VOGT electronic

Since 1934 – we solve it

:INDUCTIVE :COMPONENTS

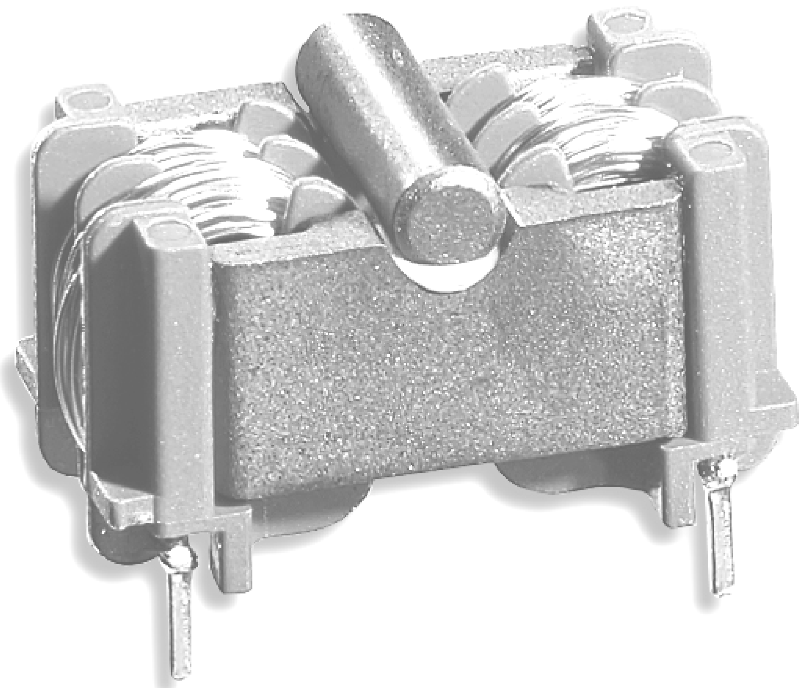
:CORES :AND KITS

:MODULES

:APPLICATIONS

A Member of Sumida Group sumida

A INDUCTIVE COMPONENTS
A1 EMC POWER LINE



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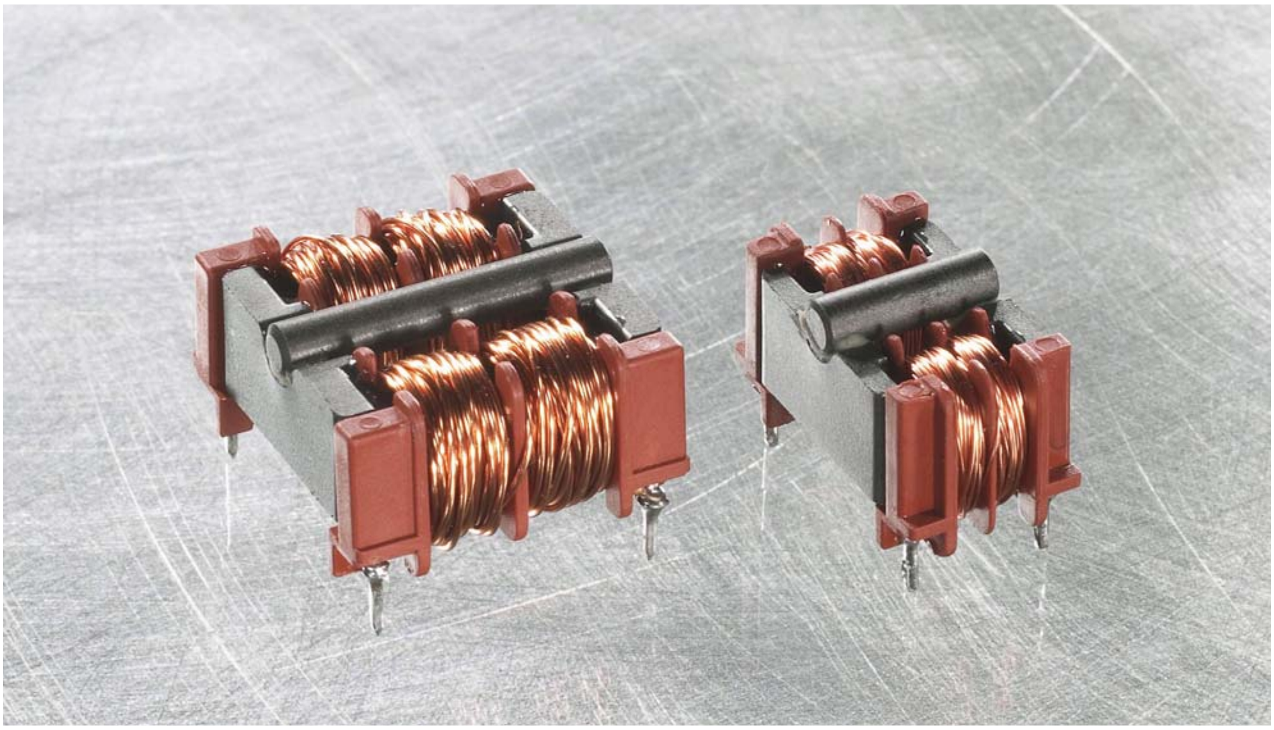
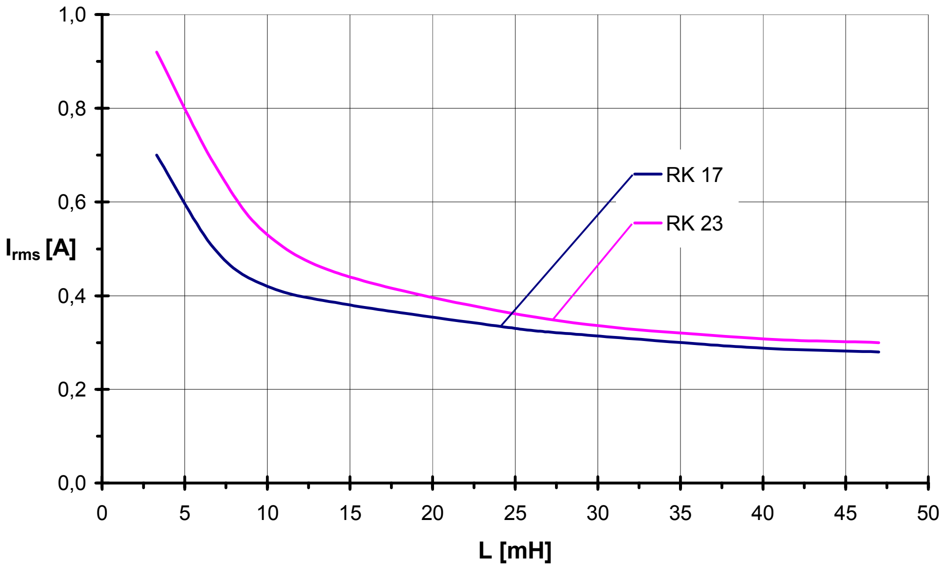
A1.1 COMMON MODE CHOKES WITH BYPASS

Common mode and differential inductance in one component



Current as a function of inductance and component size



A1.1 COMMON MODE CHOKES WITH BYPASS

Application

In devices with a protective conductor terminal, such as electronic ballasts, washing machines or electrical tools, symmetrical interference often occurs in addition to asymmetrical interference. As a rule, this requires the use of a further component for in-line inductance.

Structure

- Closed cores made of high permeability VOGT ferrites Fi340 and Fi360
- Coil-former with four chambers

Technical data

- Suitable for use in equipment to EN 50176, EN 61347, EN 61800, EN 60335, EN 60065,
- Climate category 40/125/56 in accordance with IEC 68-1
- Nominal inductance at 10 kHz, 25°C
- Testing voltage (winding – winding) 1500 V, 50 Hz, 2 sec.
- Max. permissible temperature of windings 115° C
- Inductance loss (with current compensated circuit) ≤ 15% DC preload with I_{sat} and ambient temperature T_U = 80°C

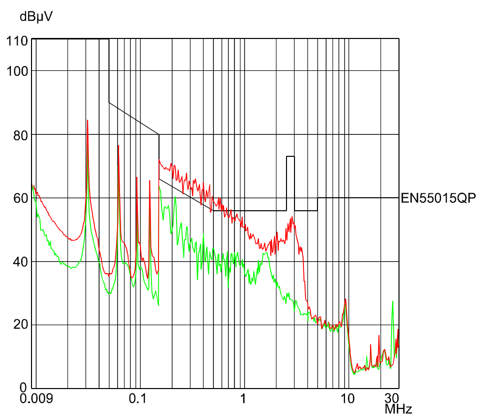
Advantages

- Very flat (e.g. for use in electronic ballasts)
- Full utilisation of material permeability due to closed core
- Low capacity winding design with four chambers
- Environmentally friendly since no adhesives or resins are used
- Low-Cos due to automated mass production

Function description

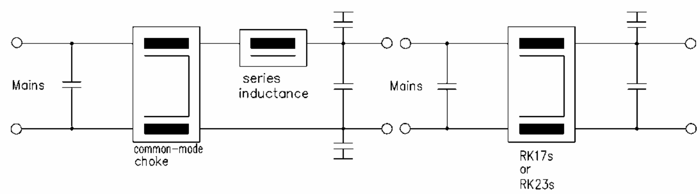
Due to their special magnetic design, the new VOGT combined noise suppression chokes enable the suppression of both the asymmetrical and symmetrical interference component in a single unit. Combining the characteristics of two separate components in one unit lowers costs considerably, as well as reduces the space requirement within the device.

EMV-measurement with and without bypass:



- RK choke without bypass
- RK choke with bypass

(measured at electronic ballast, in a typical RFI suppression circuit in accordance with EN55015)



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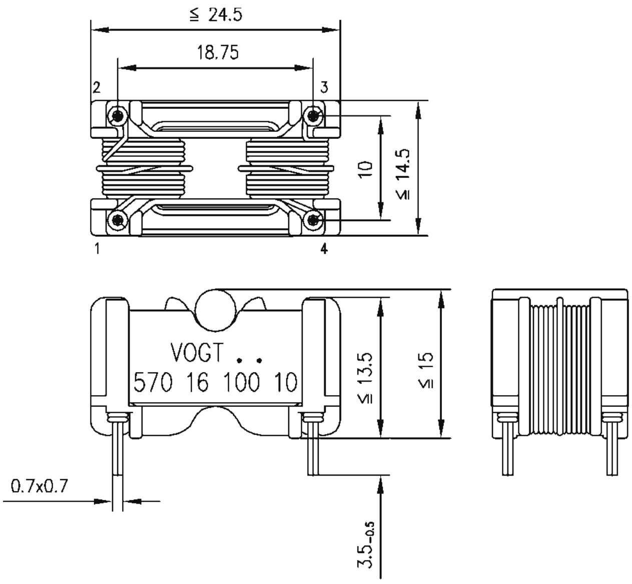
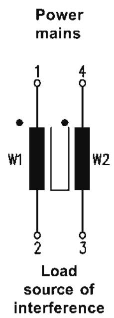
A1.1 COMMON MODE CHOKES WITH BYPASS | RK 17

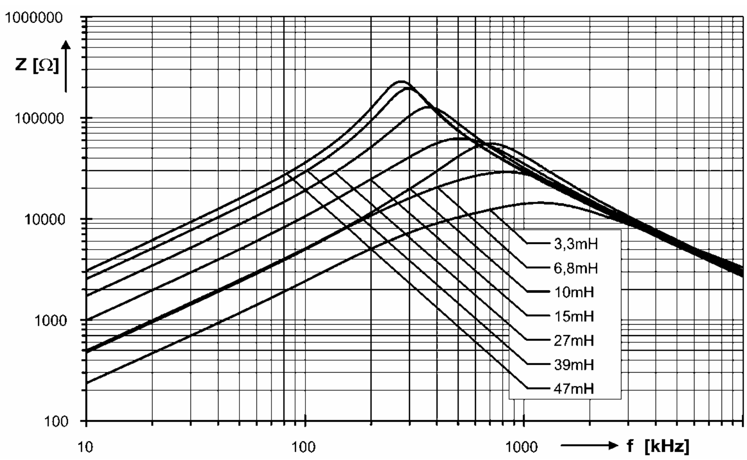




L_N[1] (mH)	R_{cu}[1] (Ω)	I_{RMS} (A)	I_{sat}[2] (A)	$L_{Leakage}$ (µH)	Part number
3.3	0.18	0.70	1.00	120	570 16 033 10
6.8	0.27	0.50	0.70	220	570 16 068 10
10	0.50	0.46	0.65	330	570 16 100 10
15	0.65	0.43	0.64	500	570 16 150 10
25	1.00	0.42	0.60	800	570 16 250 10
27	1.30	0.40	0.55	900	570 16 270 10
39	2.25	0.30	0.42	1250	570 16 390 10
47	2.50	0.28	0.40	1500	570 16 470 10

[1] per winding, [2] max. value

Impedance curves



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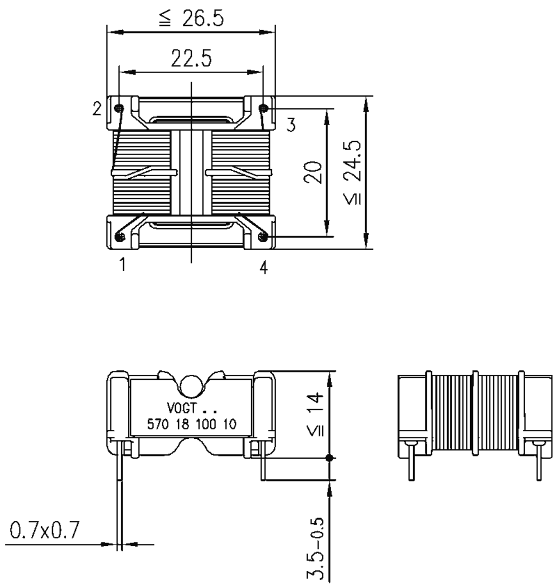
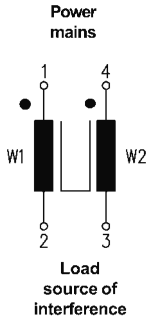
A1.1 COMMON MODE CHOKES WITH BYPASS | RK 23

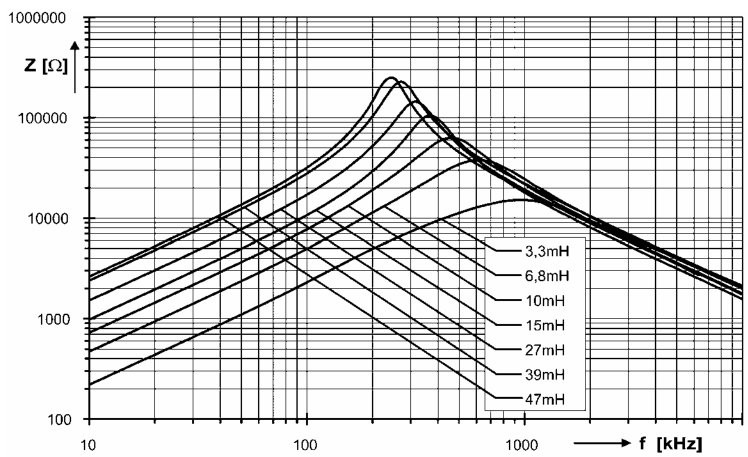




L_N [1] (mH)	R_{cu} [1] (Ω)	I_{RMS} (A)	I_{sat} [2] (A)	$L_{Leakage}$ (µH)	Part number
3.3	0.08	0.92	1.30	120	570 18 033 10
6.8	0.14	0.78	1.10	220	570 18 068 10
10	0.19	0.53	0.75	330	570 18 100 10
15	0.30	0.45	0.65	500	570 18 150 10
27	0.45	0.35	0.50	900	570 18 270 10
39	0.61	0.32	0.45	1250	570 18 390 10
47	0.75	0.30	0.42	1500	570 18 470 10

[1] per winding, [2] typical value

Impedance curves



A1.2 COMMON MODE CHOKES

Application

These chokes are preferably used in equipment that is fitted with switched mode power supplies. Together with suitable capacitors, these chokes form filters in the power supply line, which reduce the level of the noise that occurs inside the device, as well as the penetration of line noise.

Construction

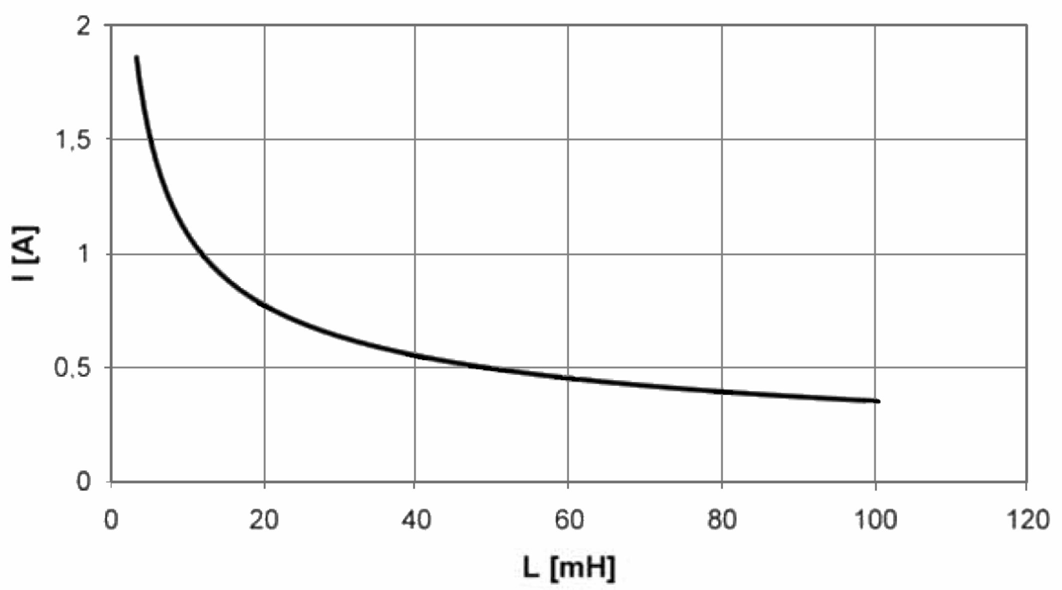
- High permeability cores from the VOGT Fi360 electronic ferrites
- Plastic cap with standard pinning (vertical and horizontal)

Technical specifications

- Climate category 40/125/56 in accordance with IEC 68-1
- Nominal inductance at 10 kHz, 25°C
- Inductance tolerance +50%/-30%
- Inductance loss (with common mode configuration) < 10% for DC initial load with IN
- Test voltage (winding-winding) 1500 V, 50 Hz, 2 sec.
- Ambient temperature 60°C
- Temperature increase of windings < 55°C
- Max. permissible temperature of windings 115°C

A1.2 COMMON MODE CHOKES | DP-F14

Current as a function of inductance and size



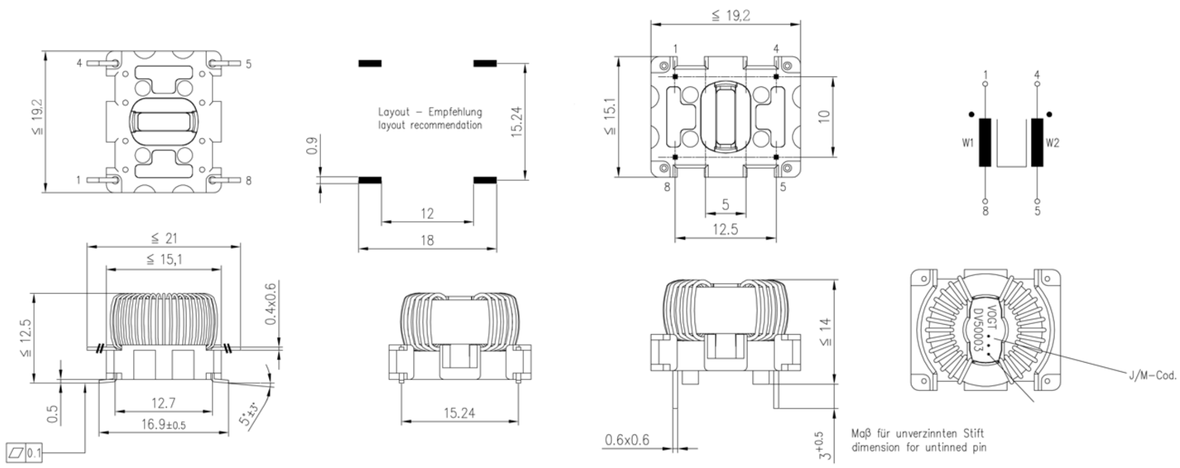
Standards

| EN 60938-2

A1.2 COMMON MODE CHOKES | DP-F14

DP-F 14

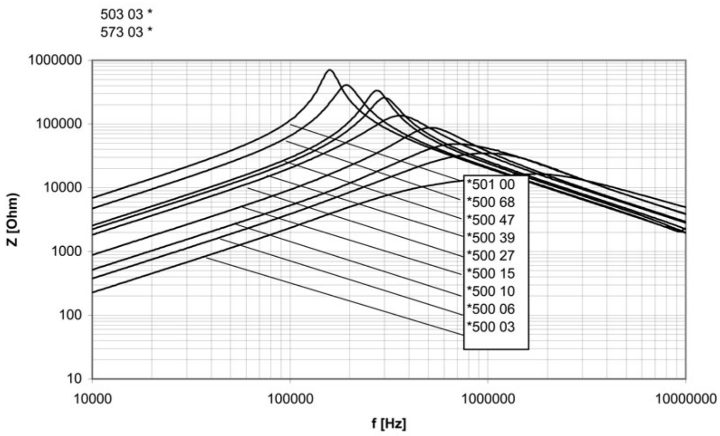
SMD **THD**



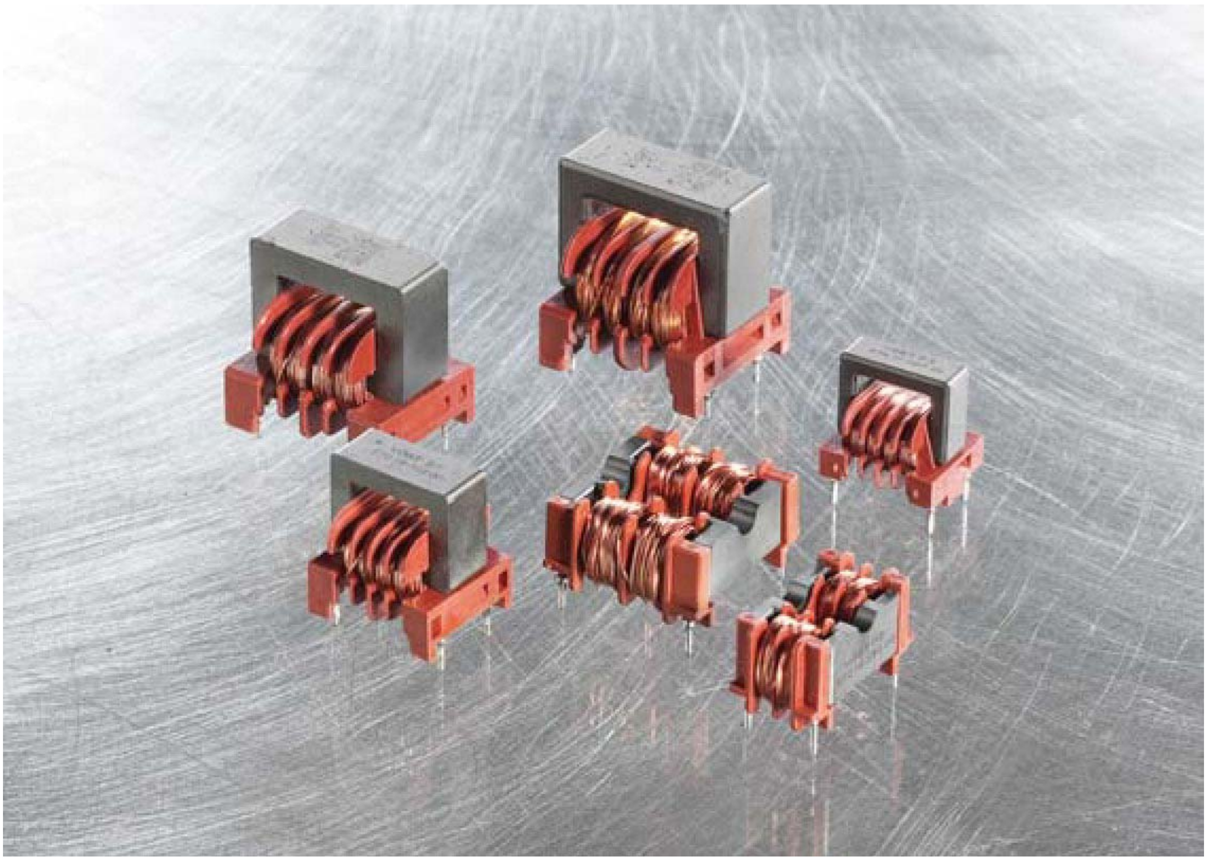
L_N [1] (mH)	I_N (A)	R_{Cu} (mΩ)	L_S (µH)	Part number SMD	Part number THD
3.3	1.8	110	32	503 03 500 03	573 03 500 03
6.8	1.3	210	70	503 03 500 06	573 03 500 06
10	1.1	350	110	503 03 500 10	573 03 500 10
15	0.9	490	170	503 03 500 15	573 03 500 15
27	0.7	810	300	503 03 500 27	573 03 500 27
39	0.6	1300	400	503 03 500 39	573 03 500 39
47	0.5	1730	510	503 03 500 47	573 03 500 47
68	0.4	2700	805	503 03 500 68	573 03 500 68
100	0.35	3700	1100	503 03 501 00	573 03 501 00

[1] per winding
Standard components, other values available on request

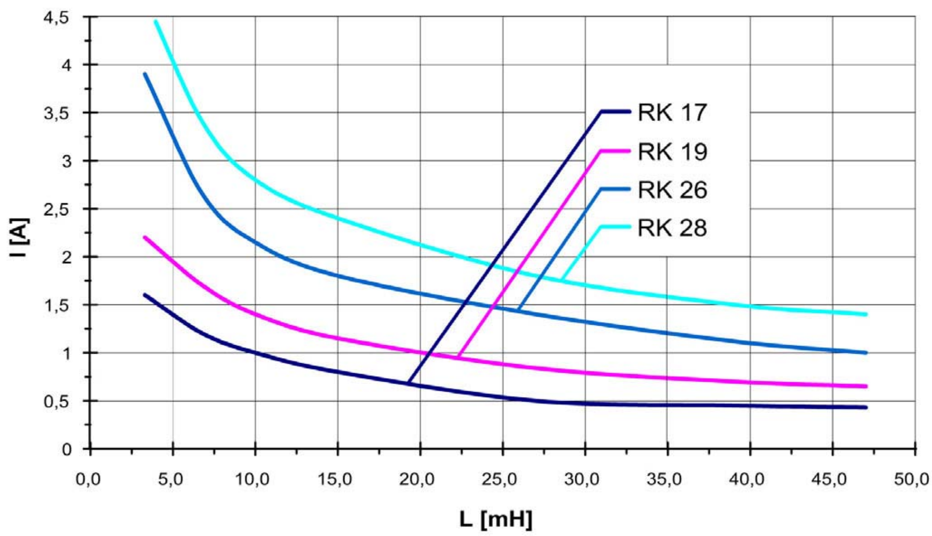
Impedance curves



A1.2 COMMON MODE CHOKES | RK



Current as a function of inductance and component size



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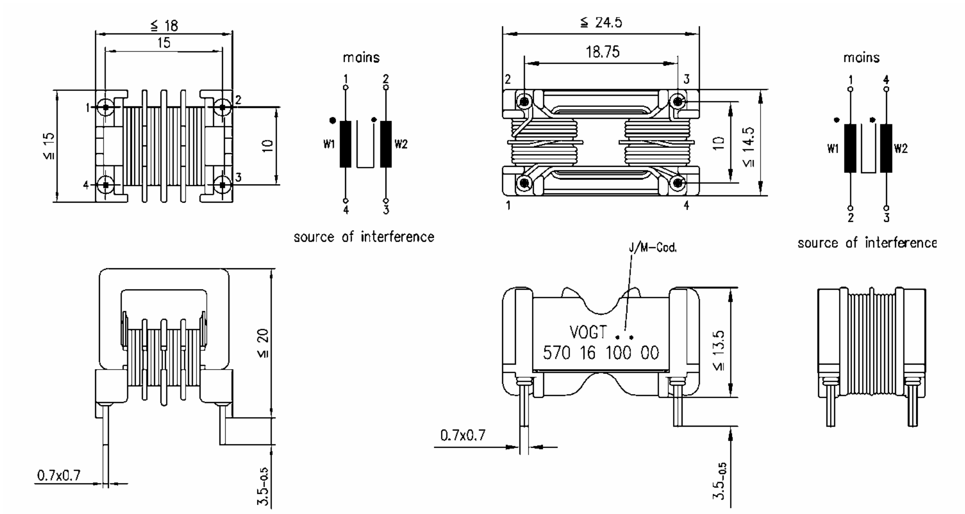
A1.2 COMMON MODE CHOKES | RK 17

vertical **horizontal**

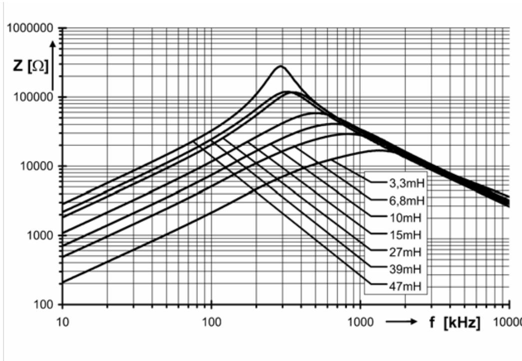


L_N[1] (mH) +50% - 30%	RK 17 vertical (Rth[2] = 70 K/W)				RK 17 horizontal (Rth[2] = 50 K/W)			
	I_N[1] (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$[2] (µH)	Part number	I_N[1] (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$[2] (µH)	Part number
3.3	1.50	0.19	25	570 17 001 00	1.50	0.20	65	570 16 033 00
6.8	1.20	0.29	50	570 17 002 00	1.20	0.30	125	570 16 068 00
10	0.90	0.51	75	570 17 003 00	0.90	0.55	190	570 16 100 00
15	0.80	0.65	110	570 17 004 00	0.80	0.70	285	570 16 150 00
27	0.50	1.30	200	570 17 005 00	0.50	1.45	510	570 16 270 00
39	0.45	2.40	300	570 17 006 00	0.45	2.55	740	570 16 390 00
47	0.40	2.70	350	570 17 007 00	0.40	2.90	880	570 16 470 00

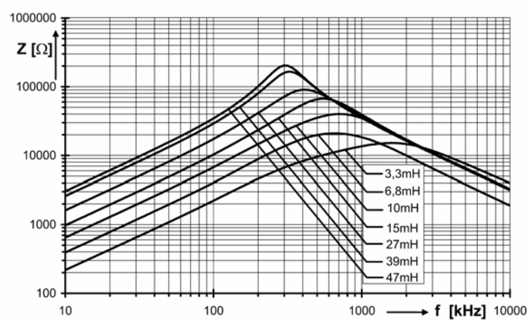
[1] per winding, [2] max. value

Impedance curves

vertical

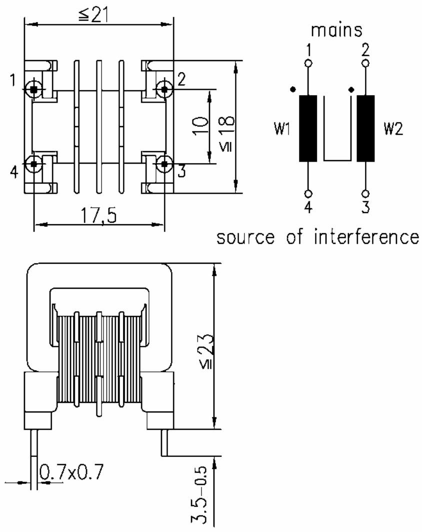


horizontal

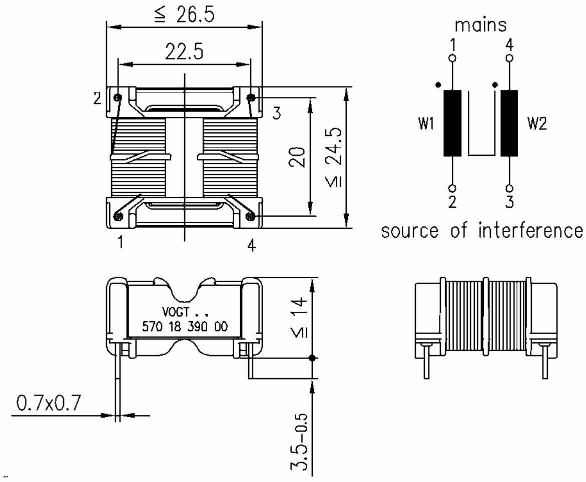


A1.2 COMMON MODE CHOKES | RK 19 + RK 23

RK 19 vertical



RK 23 horizontal

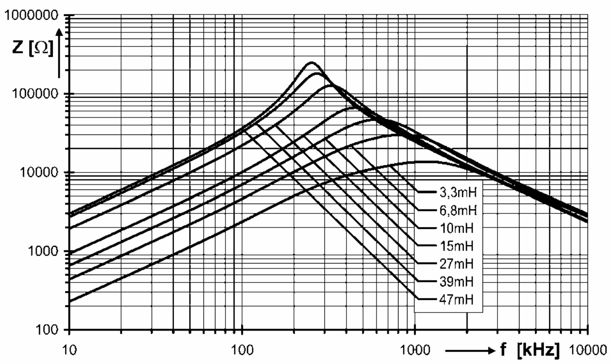


L_N [1)] (mH) +50% - 30%	RK 19 vertical (R_{th} [2)] = 52 K/W)				RK 23 horizontal (R_{th} [2)] = 33 K/W)			
	I_N [1)] (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$ [2)] (µH)	Part number	I_N [1)] (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$ [2)] (µH)	Part number
3.3	2.1	0.12	25	570 19 001 00	2.25	0.09	65	570 18 033 00
6.8	1.6	0.20	50	570 19 002 00	1.75	0.16	140	570 18 068 00
10	1.4	0.27	70	570 19 003 00	1.55	0.22	210	570 18 100 00
15	1.1	0.45	110	570 19 004 00	1.25	0.33	330	570 18 150 00
27	0.8	0.75	180	570 19 005 00	1.10	0.53	590	570 18 270 00
39	0.7	1.10	280	570 19 006 00	1.00	0.70	810	570 18 390 00
47	0.6	1.20	330	570 19 007 00	0.90	0.87	1000	570 18 470 00

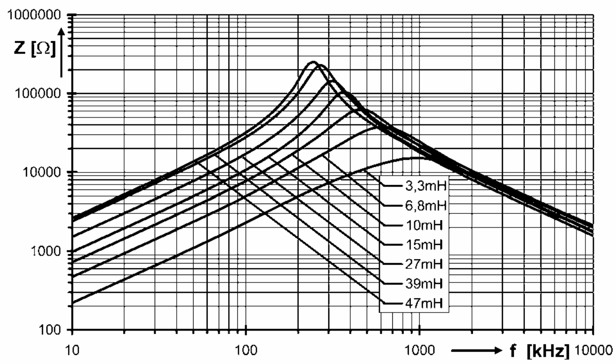
[1)] per winding, [2)] typical value

Impedance curves

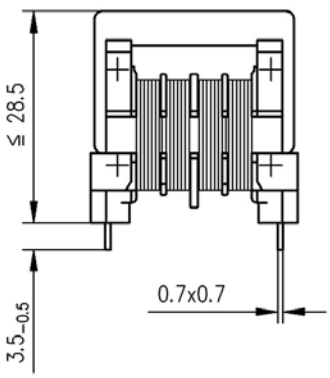
RK 19 vertical

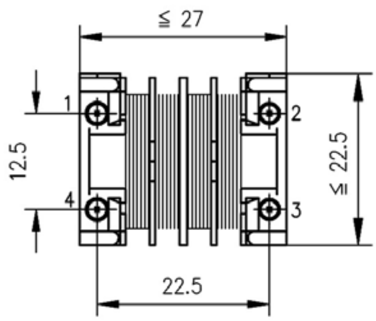


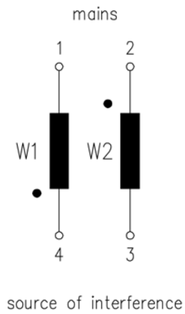
RK 23 horizontal



A1.2 COMMON MODE CHOKES | RK 26



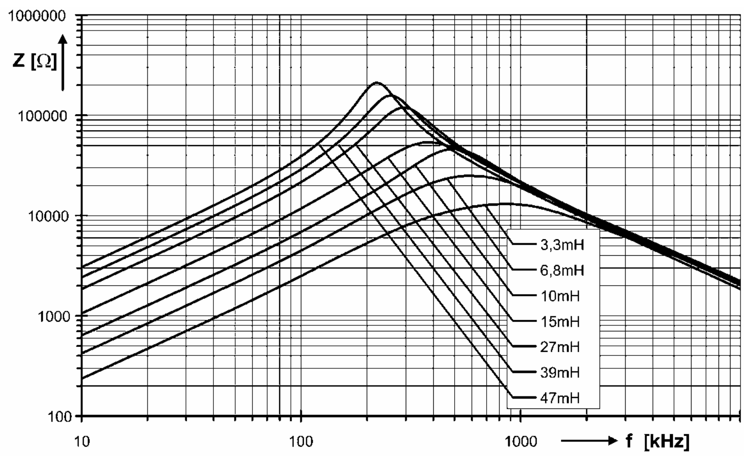




RK 26 vertical (R_{th} 2) = 35 K/W)				
L_N 1) (mH) +50%/-30%	I_N 1) (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$ 2) (µH)	Part number
3.3	3.9	0.054	25	570 26 001 00
6.8	2.4	0.14	50	570 26 002 00
10	2.2	0.17	70	570 26 003 00
15	1.7	0.29	100	570 26 004 00
27	1.4	0.45	180	570 26 005 00
39	1.1	0.75	280	570 26 006 00
47	1.0	0.82	330	570 26 007 00

1) per winding, 2) typical value

Impedance curves



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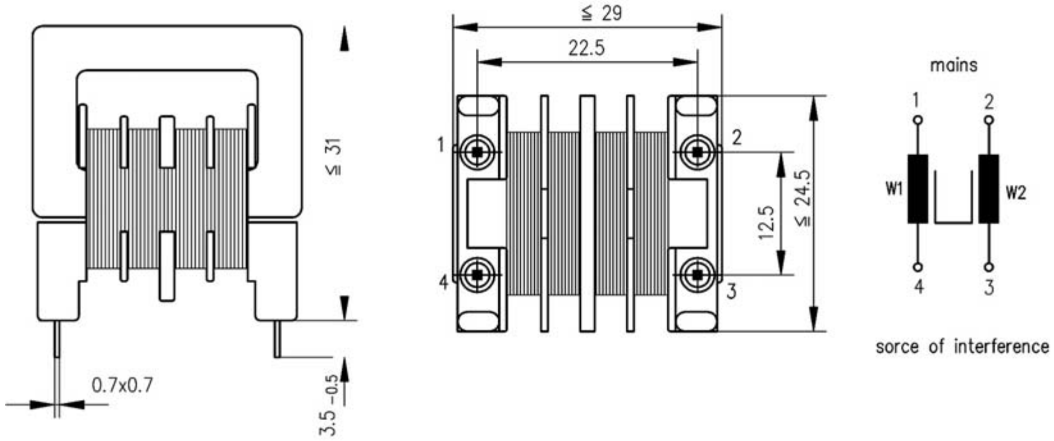
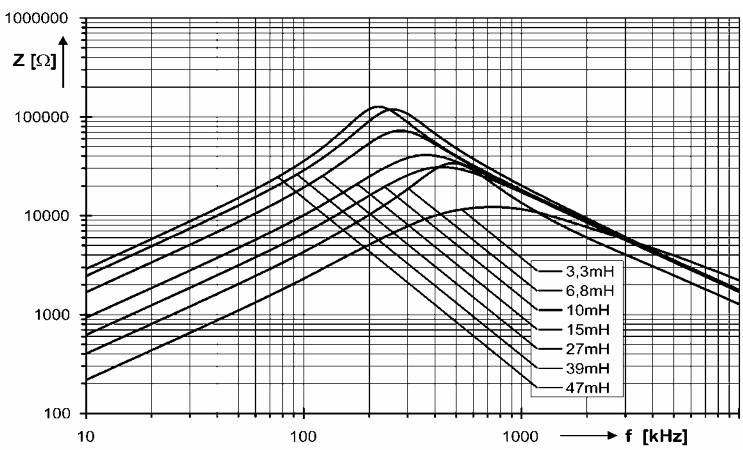
A1.2 COMMON MODE CHOKES | RK 28



RK 28 vertical (R_{th}[2]) = 30 K/W)				
L_N[1] (mH) +50%/-30%	I_N[1] (A)	R_{Cu}[1), 2)] (Ω)	$L_{Leakage}$[2)] (µH)	Part number
3.3	4.6	0.048	25	570 28 001 00
6.8	3.2	0.095	45	570 28 002 00
10	2.6	0.15	70	570 28 003 00
15	2.4	0.18	100	570 28 004 00
27	1.8	0.31	180	570 28 005 00
39	1.5	0.48	250	570 28 006 00
47	1.4	0.52	310	570 28 007 00

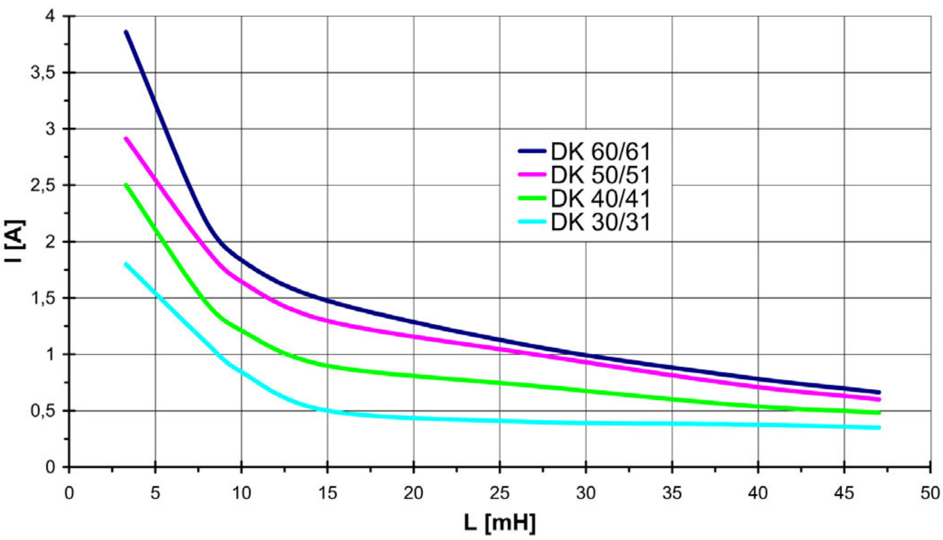
1) per winding, 2) typical value

Impedance curves



A1.2 COMMON MODE CHOKES | DK

Current as a function of inductance and size



Standards

EN 60938-2

UL 1283-FOKY2.E151145
UL 1446 Class B-OBJY2.E143220

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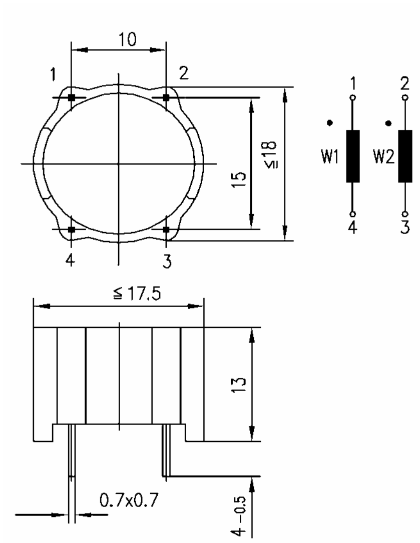
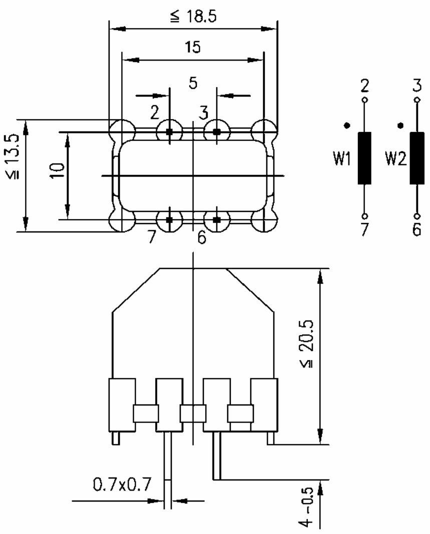
A1.2 COMMON MODE CHOKES | DK 30 + DK 31

DK 30



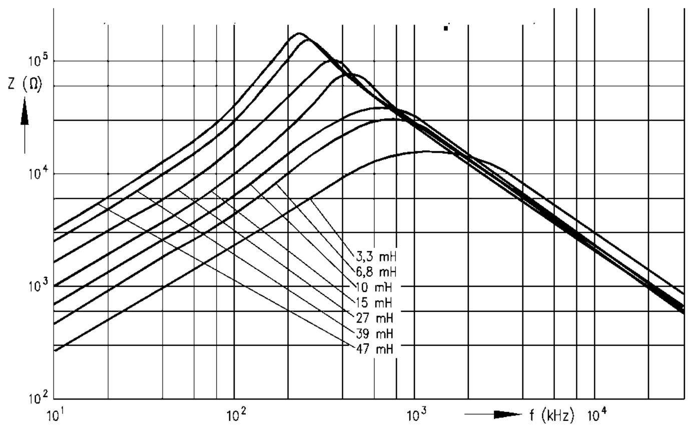
DK 31



L_N[1] (mH) +50% -30%	I_N[1] (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$[2] (µH)	DK 30 (R_{th}[2] = 65 K/W)		DK 31 (R_{th}[2] = 58 K/W)	
				Type	Part number	Type	Part number
3.3	1.5	0.17	35	K30	573 30 030 00	K31	573 31 030 00
6.8	1.2	0.28	75	K30	573 30 060 00	K31	573 31 060 00
10	0.7	0.55	105	K30	573 30 100 00	K31	573 31 100 00
15	0.5	0.83	160	K30	573 30 150 00	K31	573 31 150 00
27	0.4	1.7	300	K30	573 30 270 00	K31	573 31 270 00
39	0.4	2	450	K30	573 30 390 00	K31	573 31 390 00
47	0.3	2.5	540	K30	573 30 470 00	K31	573 31 470 00

[1] per winding, [2] typical value

Impedance curves



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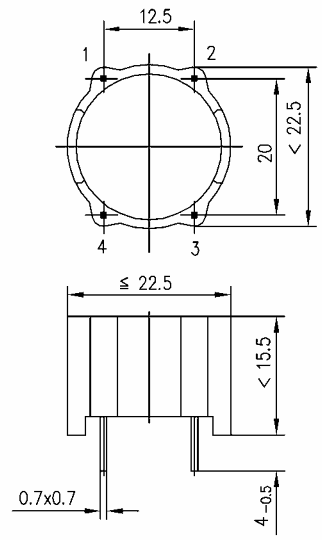
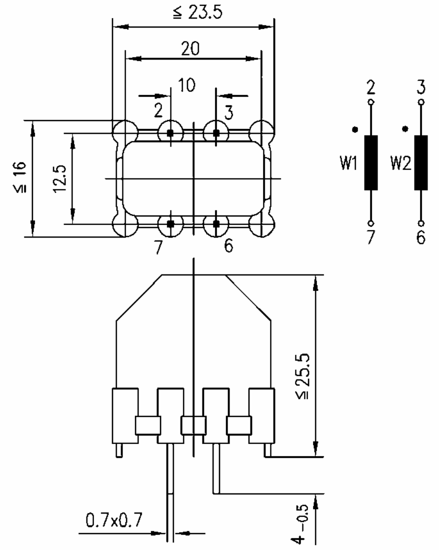
A1.2 COMMON MODE CHOKES | DK 40 + DK 41

DK 40



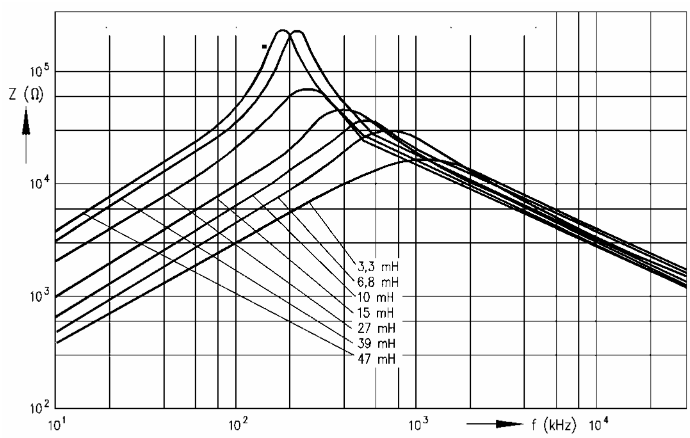
DK 41



L_N 1) (mH) +50% -30%	I_N 1) (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$ 2) (µH)	DK 40 ($Rth^{2)}$ = 50 K/W)		DK 41 ($Rth^{2)}$ = 45 K/W)	
				Type	Part number	Type	Part number
3.3	2.5	0.07	0	K40	573 40 030 00	K41	573 41 030 00
6.8	1.5	0.20	60	K40	573 40 060 00	K41	573 41 060 00
10	1.2	0.29	90	K40	573 40 100 00	K41	573 41 100 00
15	0.8	0.44	130	K40	573 40 150 00	K41	573 41 150 00
27	0.8	0.60	240	K40	573 40 270 00	K41	573 41 270 00
39	0.5	1.12	350	K40	573 40 390 00	K41	573 41 390 00
47	0.5	1.30	425	K40	573 40 470 00	K41	573 41 470 00

1) per winding, 2) typical value

Impedance curves



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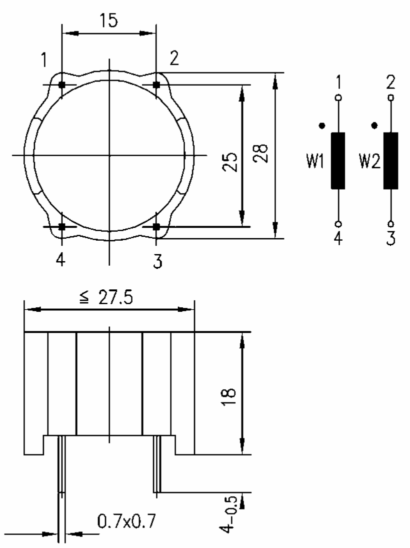
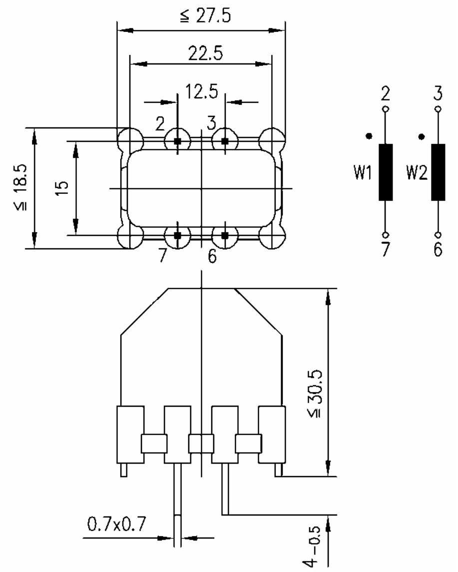
A1.2 COMMON MODE CHOKES | DK 50 + DK 51

DK 50



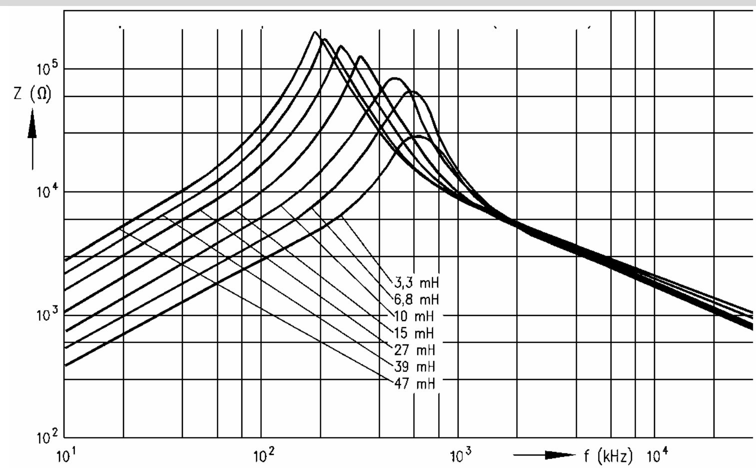
DK 51



L_N 1) (mH) +50% -30%	I_N 1) (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$ 2) (µH)	DK 50 (Rth 2) = 37 K/W)		DK 51 (Rth 2) = 34 K/W)	
				Type	Part number	Type	Part number
3.3	2.8	0.06	40	K50	573 50 030 00	K51	573 51 030 00
6.8	2.0	0.15	80	K50	573 50 060 00	K51	573 51 060 00
10	1.6	0.21	120	K50	573 50 100 00	K51	573 51 100 00
15	1.2	0.30	180	K50	573 50 150 00	K51	573 51 150 00
27	1.0	0.64	330	K50	573 50 270 00	K51	573 51 270 00
39	0.7	1.00	500	K50	573 50 390 00	K51	573 51 390 00
47	0.6	1.10	600	K50	573 50 470 00	K51	573 51 470 00

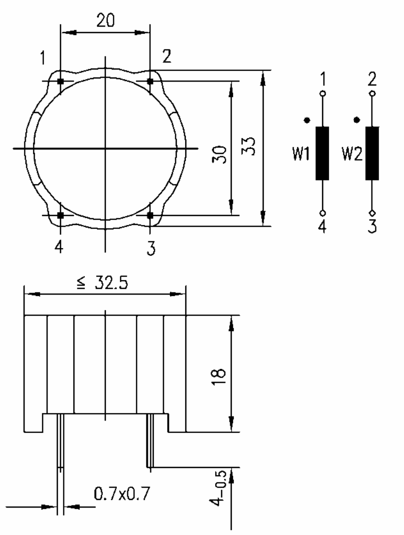
1) per winding, 2) typical value

Impedance curves

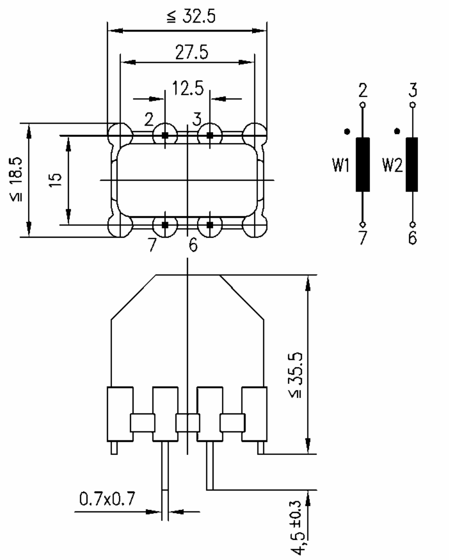


A1.2 COMMON MODE CHOKES | DK 60 + DK 61

DK 60



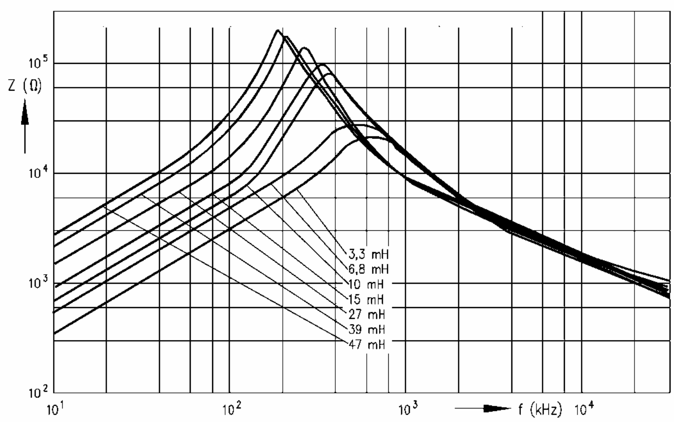
DK 61



L_N[1) (mH) +50% - 30%	I_N[1) (A)	R_{Cu} 1), 2) (Ω)	$L_{Leakage}$[2) (µH)	DK 60 (Rth[2) = 30 K/W)		DK 61 (Rth[2) = 24 K/W)	
				Type	Part number	Type	Part number
3.3	4.0	0.06	35	K60	573 60 030 00	K61	573 61 030 00
6.8	2.2	0.18	85	K60	573 60 060 00	K61	573 61 060 00
10	1.8	0.22	130	K60	573 60 100 00	K61	573 61 100 00
15	1.4	0.36	200	K60	573 60 150 00	K61	573 61 150 00
27	1.0	0.70	350	K60	573 60 270 00	K61	573 61 270 00
39	0.8	1.04	520	K60	573 60 390 00	K61	573 61 390 00
47	0.6	1.13	630	K60	573 60 470 00	K61	573 61 470 00

1) per winding, 2) typical value

Impedance curves



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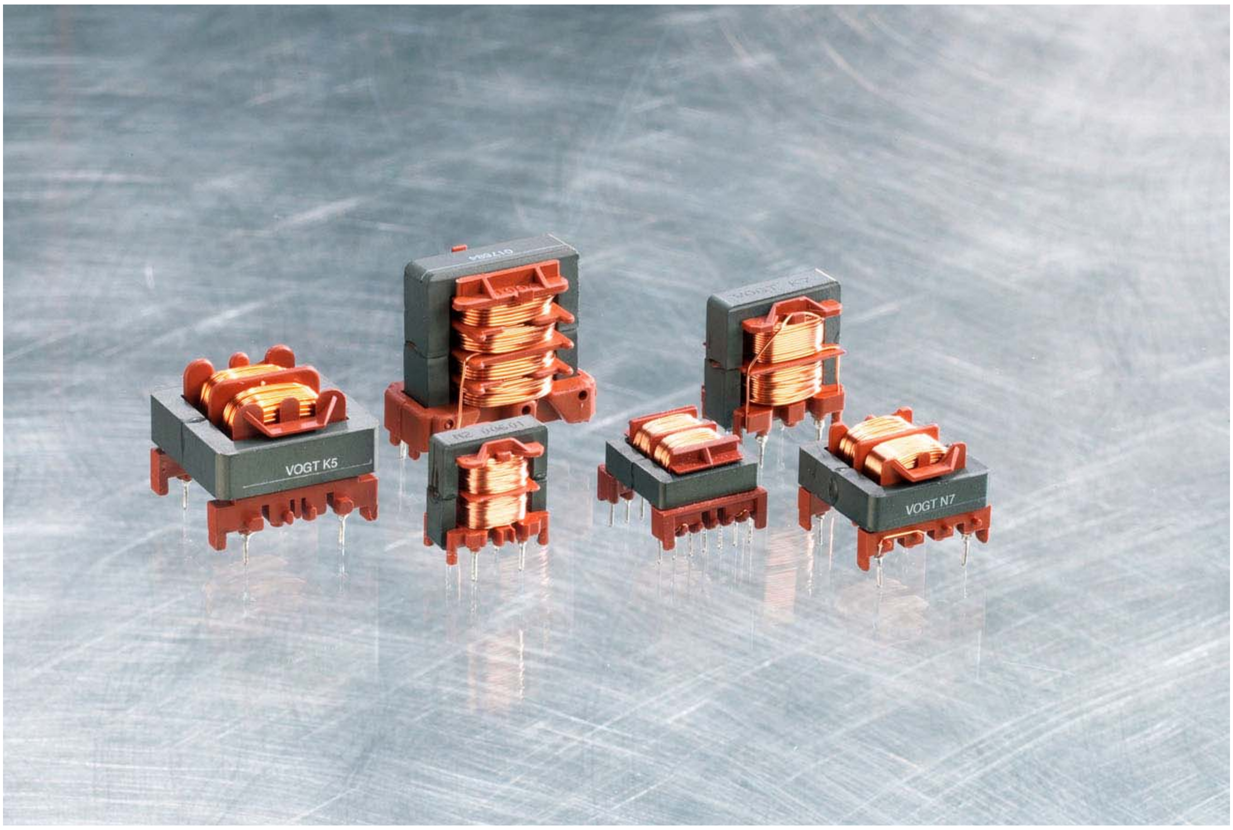
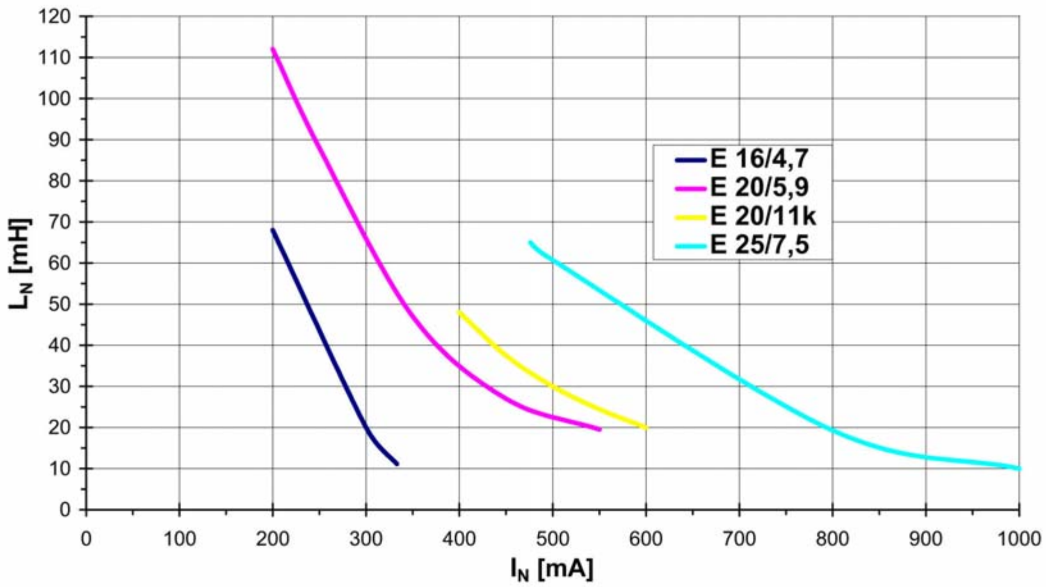
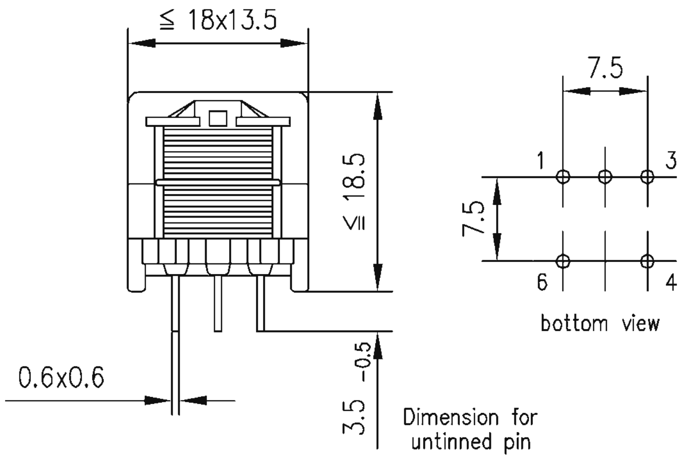
A1.2 COMMON MODE CHOKES | E-CORE

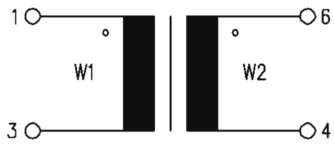


Current as a function of inductance and component size



A1.2 COMMON MODE CHOKES | E 16/4.7

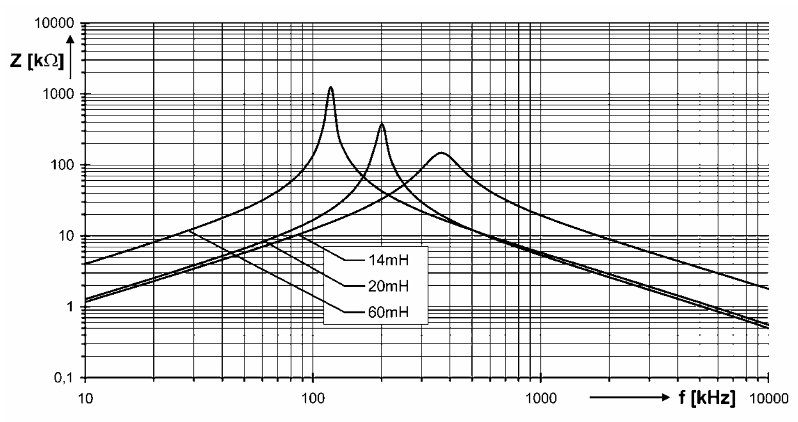




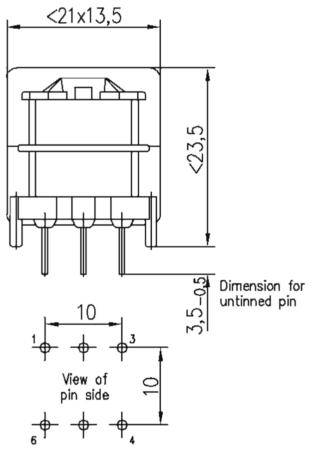
E 16/4.7 (R_{th}[2] = 76 K/W)				
L_N[1] (mH) +50%/-30%	I_N[1] (mA)	R_{Cu}[1] (Ω)	$L_{Leakage}$[2] (µH)	Part number
14	320	≤ 1.8	270	575 09 058 00
20	300	≤ 1.8	400	575 09 054 00
60	200	≤ 4.1	1220	575 09 028 00

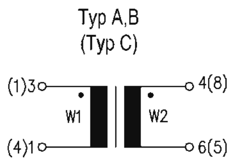
[1] per winding, [2] typical value

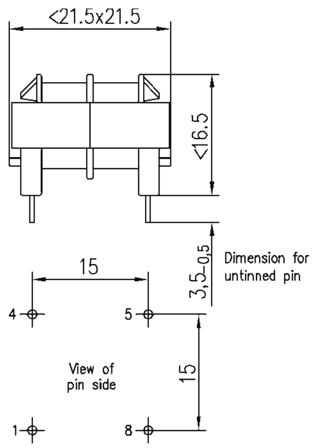
Impedance curves



A1.2 COMMON MODE CHOKES | E 20/5.9



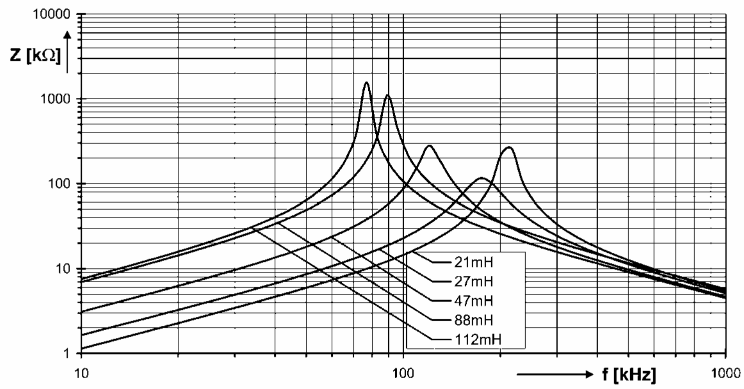




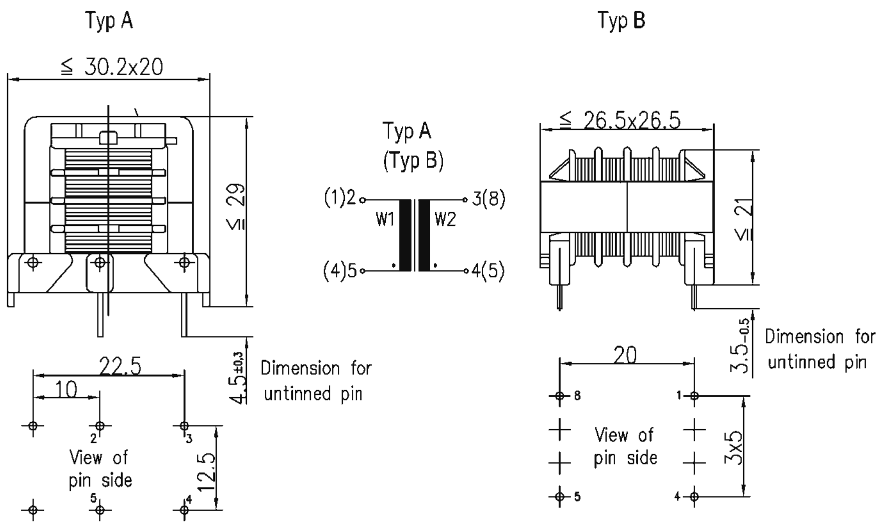
E 25/7.5 (R_{th}[2] $_{Type:\ A/B/C}$ = 57/56/55 K/W)					
L_N[1] (mH) +50%/-30%	I_N[1] (mA)	R_{Cu}[1] (Ω)	$L_{Leakage}$[2] (mH)	Type	Part number
21	550	≤ 0.78	0.35	B	575 04 158 00
27	450	≤ 1.1	0.45	B B	575 04 156 00 575 04 152 00
47	350	≤ 1.9	0.8	C	575 04 162 00
88	250	≤ 3.8	1.4	A	575 04 053 00
112	200	≤ 5.2	1.8	A	575 04 128 00

[1] per winding, [2] typical value

Impedance curves



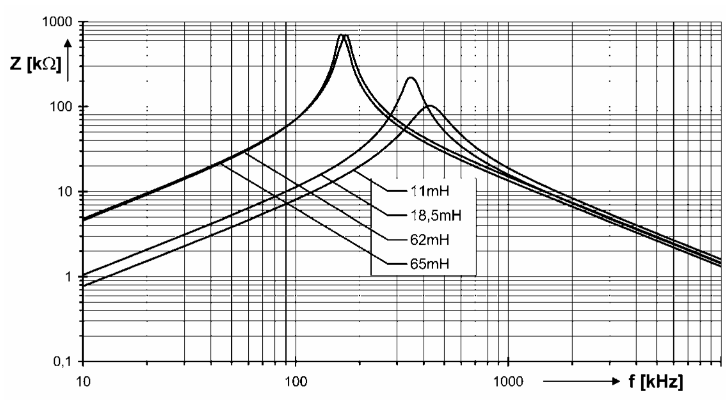
A1.2 COMMON MODE CHOKES | E 25/7.5



E 25/7.5 (R_{th}[2)] Type: A/B = 39/38 K/W)					
L_N[1)] (mH) +50%/-30%	I_N[1)] (mA)	R_{Cu}[1)] (Ω)	$L_{Leakage}$[2)] (mH)	Type	Part number
11.0	1000	≤ 0.3	0.35	B	575 03 197 00
18.5	800	≤ 0.52	0.45	A	575 03 055 00
62.0	480	≤ 1.5	0.8	B	575 03 191 00
65.0	500	≤ 1.4	1.4	B	575 03 204 00

[1)] per winding, [2)] typical value

Impedance curves



A1.3 COMMON MODE CHOKES AMORPH

Application

These chokes are mostly used in power electronics devices. In conjunction with suitable capacitors, these chokes, form filters which reduce the effects of line interference as well as propagation of interference caused by the device. The filters are one-phase or three-phase.

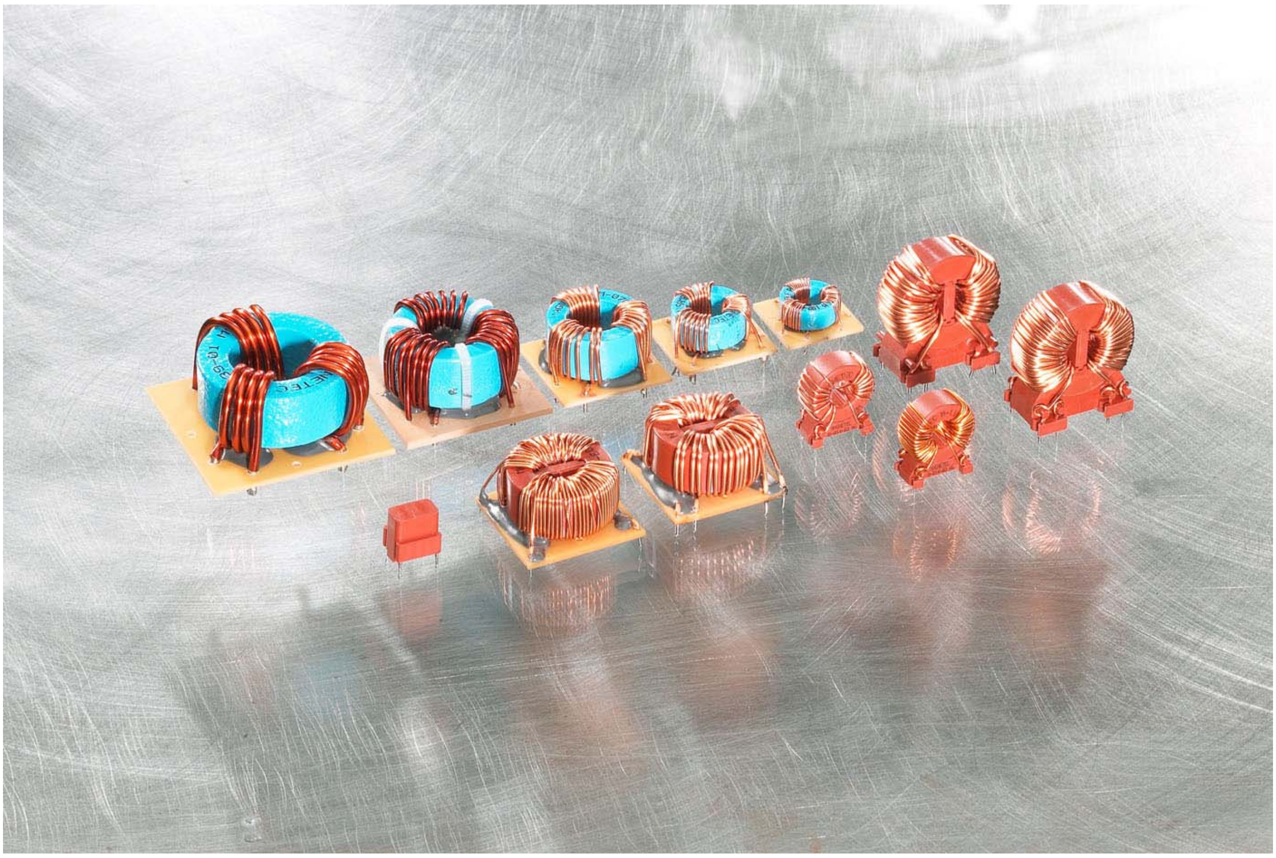
Construction

The series DP-A and DK-A chokes feature amorphous toroidal cores. This results in the following advantages, compared with chokes with ferrite cores:
Considerably greater impedance values for the same component size, or much smaller component size for the same electrical values.

Technical specifications

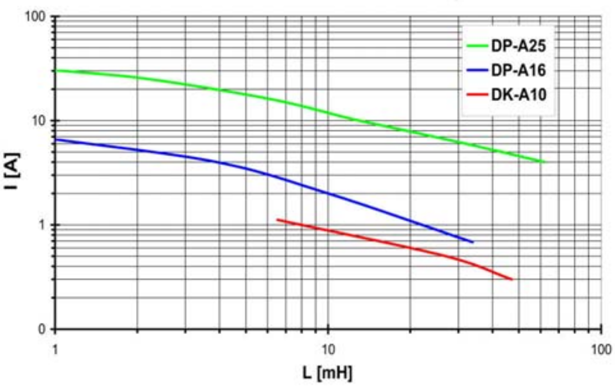
- Comply with the requirements of EN 60950, EN 60065, 60335, 61800 or EN 50178
- Climate category 40/125/56 in accordance with IEC 68-1
- Nominal inductance at 10 kHz, 25°C
- Inductance reduction (in common mode circuit) < 10% assuming DC bias with I_N and ambient temperature T_U = 25°C
- Test voltage (winding – winding) 1500 V, 50 Hz, 2 sec.
- Ambient temperature 60°C
- Temperature rise of windings < 55°C
- Maximum permissible temperature of windings 115° C

A1.3 COMMON MODE CHOKES AMORPH

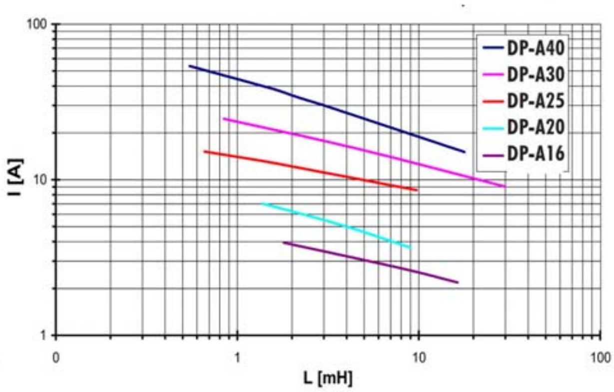


Inductance as a function of current and component size

Common mode 2-phase choke



Common mode 3-phase choke



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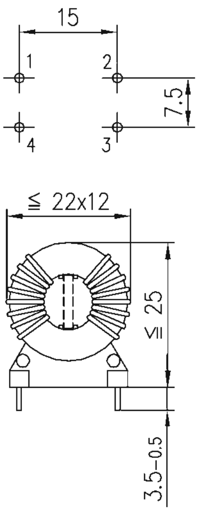
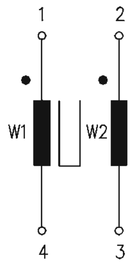
A1.3 COMMON MODE CHOKES AMORPH | DP-A16

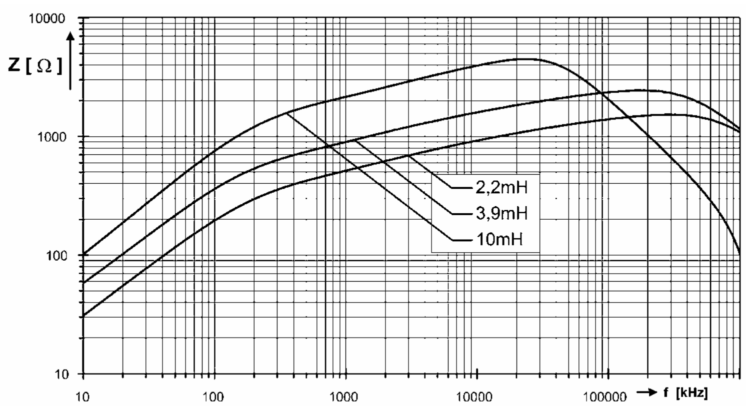




DP-A16 (R_{th}[2] = 63 K/W)				
L_N[1] (mH) +50%/-30%	I_N[1] (A)	R_{Cu}[1] (mΩ)	$L_{Leakage}$[2] (µH)	Part number
2.2	6	≤ 28	2.1	573 03 500 00
3.9	4	≤ 40	2.3	573 03 502 00
10	2	≤ 71	8.2	573 03 503 00

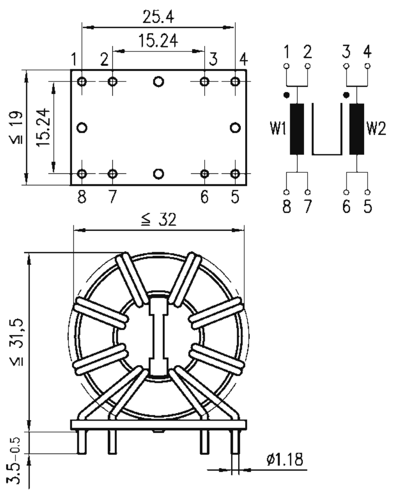
[1] per winding, [2] typical value

Impedance curves

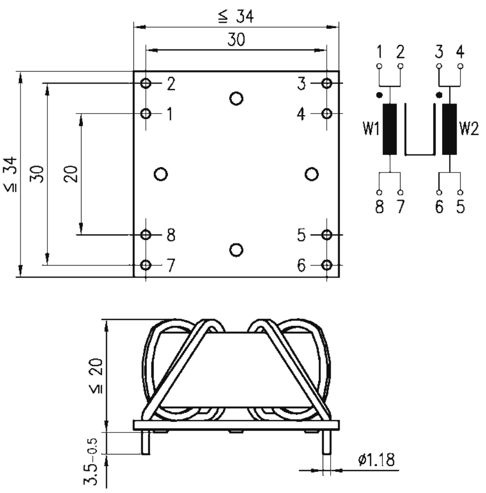


A1.3 COMMON MODE CHOKES AMORPH | DP-A25

vertical



horizontal

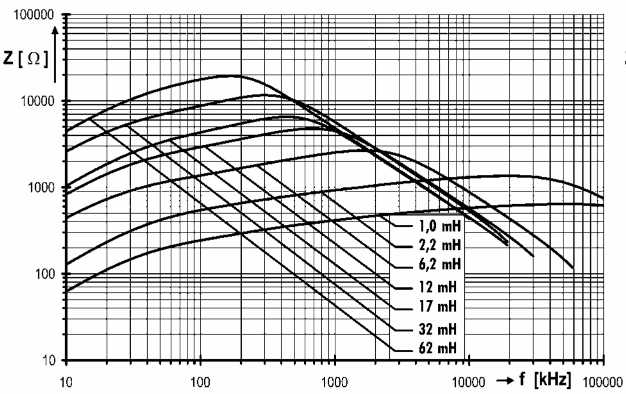


L_N[1] (mH) +50%/-30%	I_N[1] (A)	R_{Cu}[1] (mΩ)	$L_{Leakage}$[2] (µH)	DP-A25/1 (2)[3] Rth[2] = 22 K/W Part number	DP-A25/L1 (2)[3] Rth[2] = 21 K/W Part number
1.0	25	≤ 4.5	0.8	573 05 511 00[3]	573 05 551 00[3]
2.2	25	≤ 6.2	1.75	573 05 512 00[3]	573 05 552 00[3]
6.8	16	≤ 10.5	4.7	573 05 513 00[3]	573 05 553 00[3]
12	10	≤ 27	10	573 05 514 00[3]	573 05 554 00[3]
18	8	≤ 32	14	573 05 515 00[3]	573 05 555 00[3]
33	6	≤ 70	27	573 05 516 00	573 05 556 00
68	4	≤ 120	50	573 05 517 00	573 05 557 00

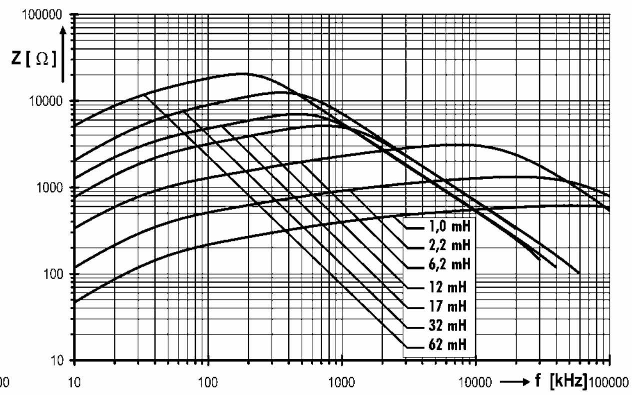
[1] per winding, [2] typical value, [3] winding with 2 wires

Impedance curves

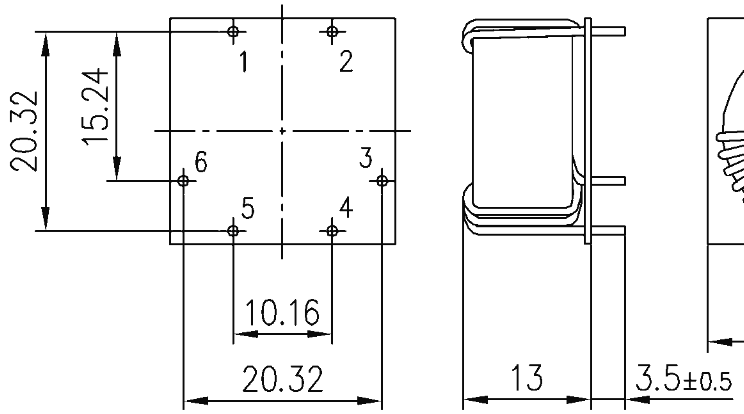
vertical

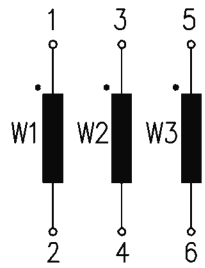


horizontal



A1.3 COMMON MODE CHOKES AMORPH | DP-A16

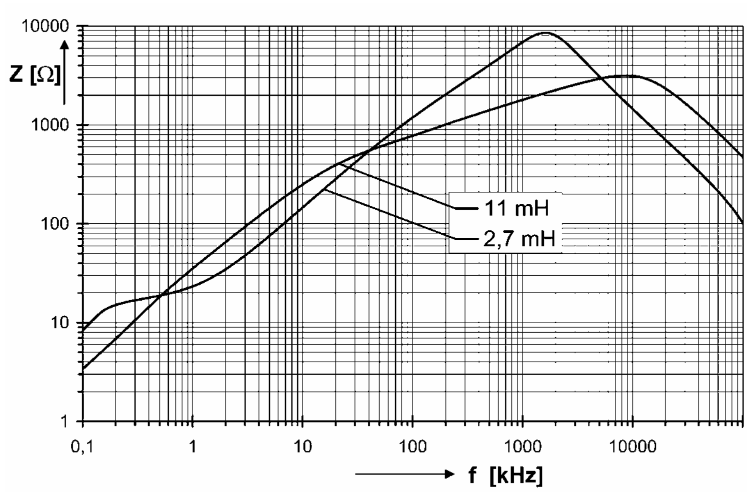




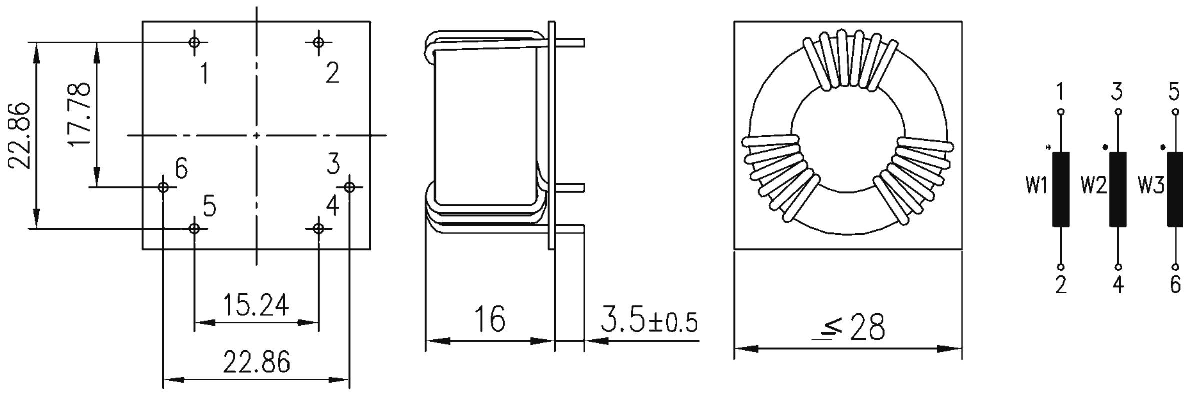
L_N[1] (mH) +50%/-30%	I_N[1] (A)	R_{Cu}[1] (mΩ)	$L_{Leakage}$[2] (µH)	Part number
2.7	3.0	≤ 21.5	2.8	573 03 601 00
11	2.5	≤ 55.0	10.0	573 03 602 00

[1] per winding, [2] typical value

Impedance curves



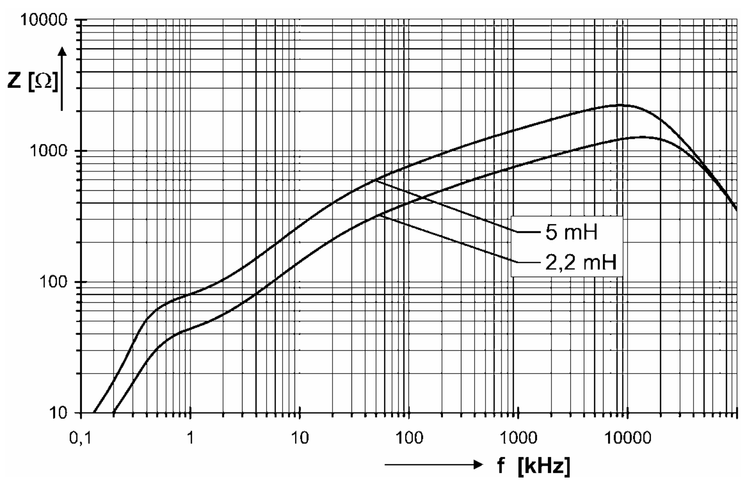
A1.3 COMMON MODE CHOKES AMORPH | DP-A20



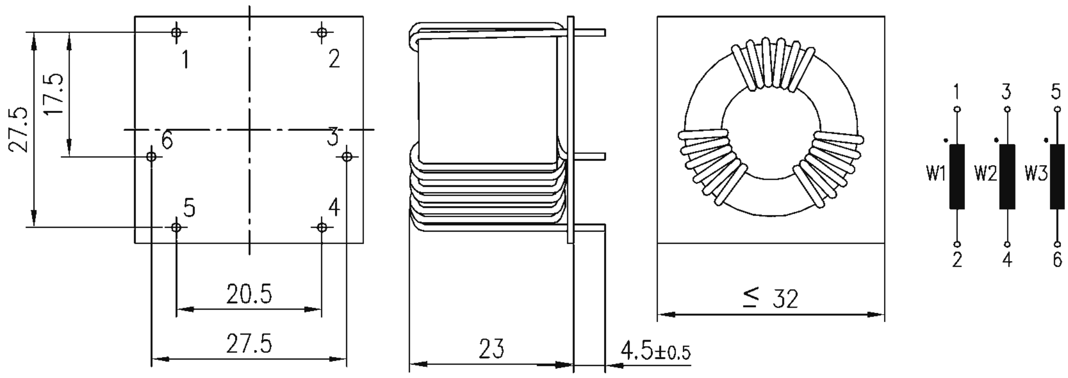
L_N 1) (mH) +50%/-30%	I_N 1) (A)	R_{Cu} 1) (mΩ)	$L_{Leakage}$ 2) (µH)	Part number
2.2	6	≤ 8.0	2.25	573 04 601 00
5.0	4	≤ 21.5	4.30	573 04 602 00

1) per winding, 2) typical value

Impedance curves



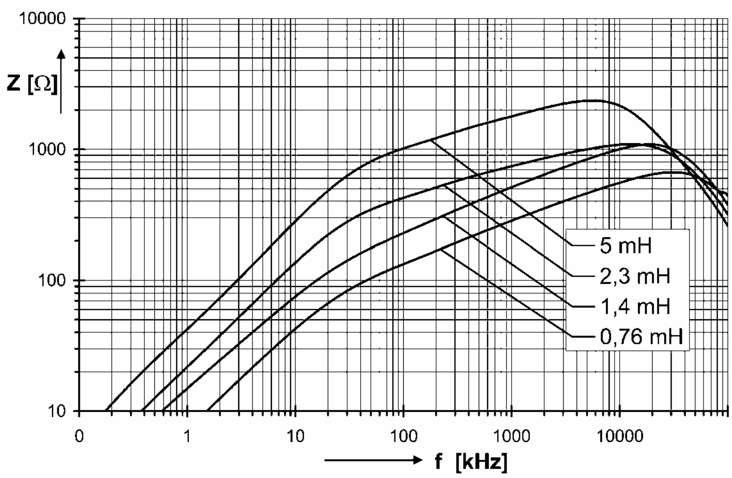
A1.3 COMMON MODE CHOKES AMORPH | DP-A25



L_N 1) (mH) +50%/-30%	I_N 1) (A)	R_{Cu} 1) (mΩ)	$L_{Leakage}$ 2) (µH)	Part number
0.76	13	≤ 2.7	0.8	573 05 601 00
1.40	13	≤ 3.5	1.3	573 05 602 00
2.30	10	≤ 4.6	1.7	573 05 603 00
5.00	10	≤ 7.2	4.4	573 05 604 00

1) per winding, 2) typical value

Impedance curves



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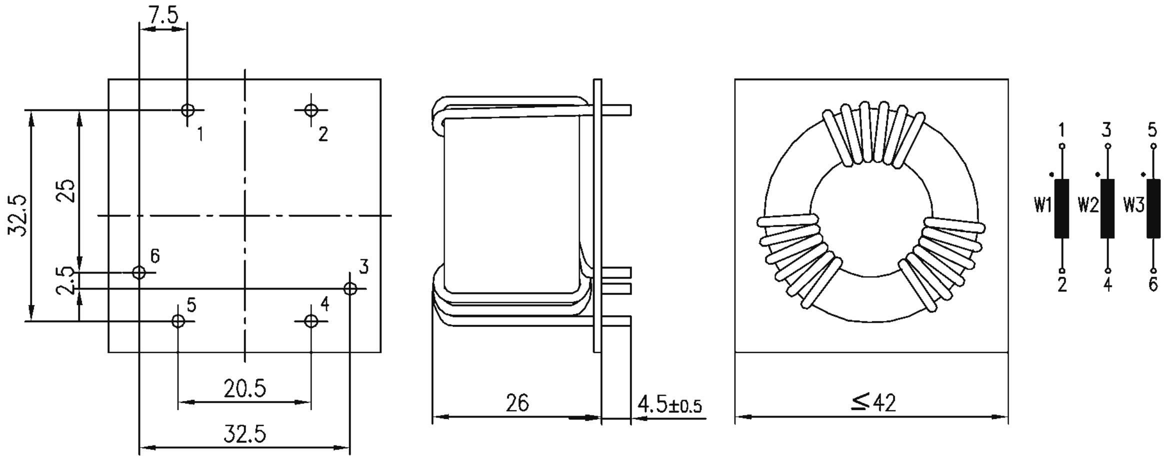
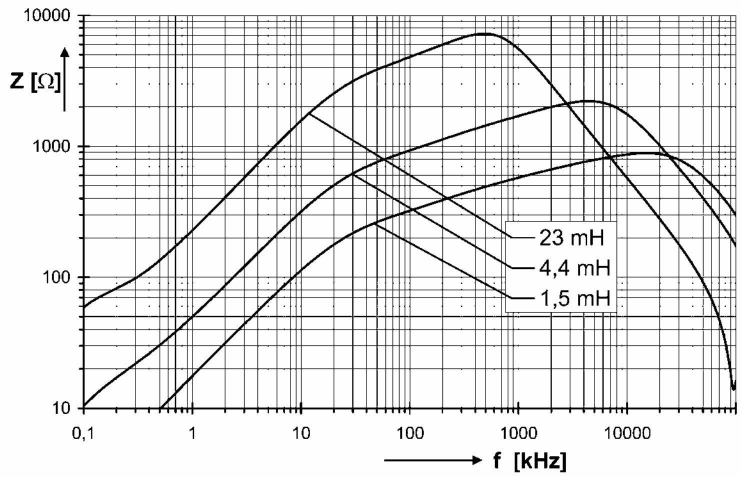
A1.3 COMMON MODE CHOKES AMORPH | DP-A30



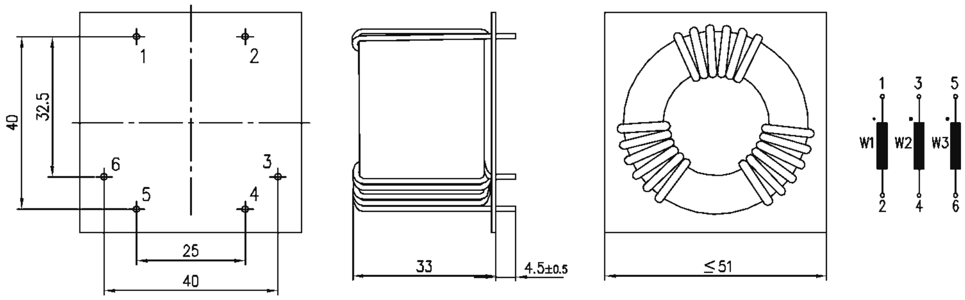
L_N [1] (mH) +50%/-30%	I_N [1] (A)	R_{Cu} [1] (mΩ)	$L_{Leakage}$ [2] (µH)	Part number
1.50	16	≤ 2.3	1.40	573 06 601 00
4.40	16	≤ 4.0	3.30	573 06 602 00
23.00	8	≤ 21.7	16.40	573 06 603 00

[1] per winding, [2] typical value

Impedance curves



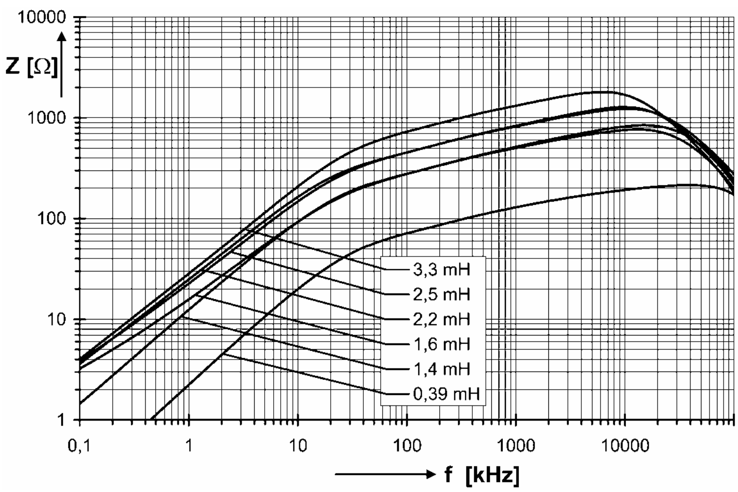
A1.3 COMMON MODE CHOKES AMORPH | DP-A40



L_N[1] (mH) +50%/-30%	I_N[1] (A)	R_{Cu}[1] (mΩ)	$L_{Leakage}$[2] (µH)	Part number
0.39	40	≤ 0.66	0.55	573 08 601 00
1.40	40	≤ 1.1	1.40	573 08 602 00
2.20	30	≤ 2.1	2.20	573 08 603 00
1.60	25	≤ 2.0	1.60	573 08 604 00
3.30	25	≤ 2.9	3.10	573 08 605 00
2.50	12	≤ 3.0	2.30	573 08 606 00

[1] per winding, [2] typical value

Impedance curves



A1.4 THYRISTOR SUPPRESSION CHOKES

Explanatory notes to the table on the previous page

These chokes are preferably used in equipment that is fitted with switched mode power supplies. Together with suitable capacitors, these chokes form filters in the power supply line, which reduce the level of noise that occurs inside the device, as well as the penetration of line noise.

Maximum current capacity

This is the maximum permissible magnetisation current with negligibly small interference signals. In the case of large current ripple, the peak current value is the maximum value.

Power range

The figures give limiting values for the loads to be connected (lamps). Within these values, stable operation, i. e. without flicker, should be possible when using the stated noise-suppression capacitor. The stable power range can be extended to smaller values by adding an RC element in parallel with the noise-suppression capacitor. With some chokes, this type of use is indicated with a footnote.

Temperature rise

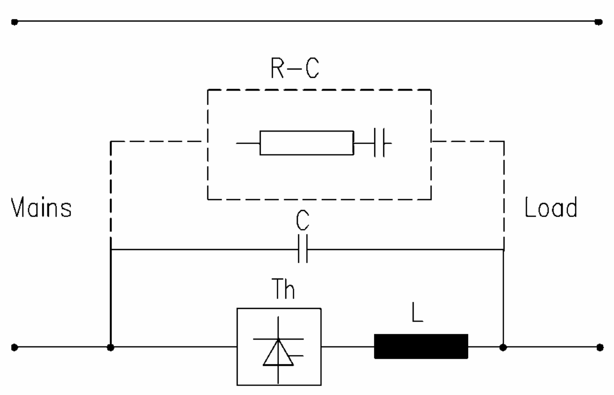
This term should be understood in accordance with EN. The values given in the table are measured values obtained after installing the choke in a standard dimmer under operating conditions. This value includes the additional heating that occurs due to the semi-conductor switch and the other circuit components.

A1.4 THYRISTOR SUPPRESSION CHOKES

Application

Noise suppression of small phase-angle controlled semi-conductor (thyristor) switches for domestic applications, such as dimmer switches for lights or for controlling small domestic appliances, such as kitchen fans.

Circuit diagram



Th = Thyristor
L = Noise suppression choke
C = Noise suppression capacitor
(R-C = Additional RC element)

Description

The choke cores are made of special FERROCARIT (ferrous powder) materials, which have high permeabilities and saturation magnetisations.

The special structure of our FERROCARIT materials prevents the occurrence of acoustic noises, for example, with chokes using laminated metal cores as a result of magnetorestriction effects.

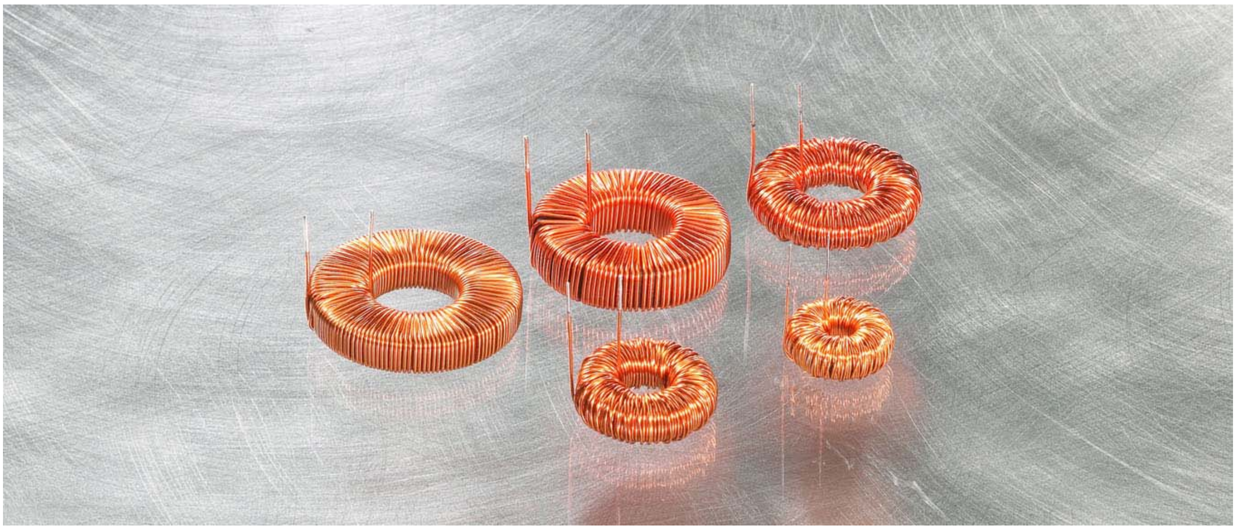
There is an insulation layer between winding and core; this is heat-resistant at standard working temperatures. The winding consists of enamelled copper wire, the connecting ends are tin-plated.

The dimensions are such that the chokes can be housed together with the noise-suppression capacitor and the switch in a standardised flush-type box.

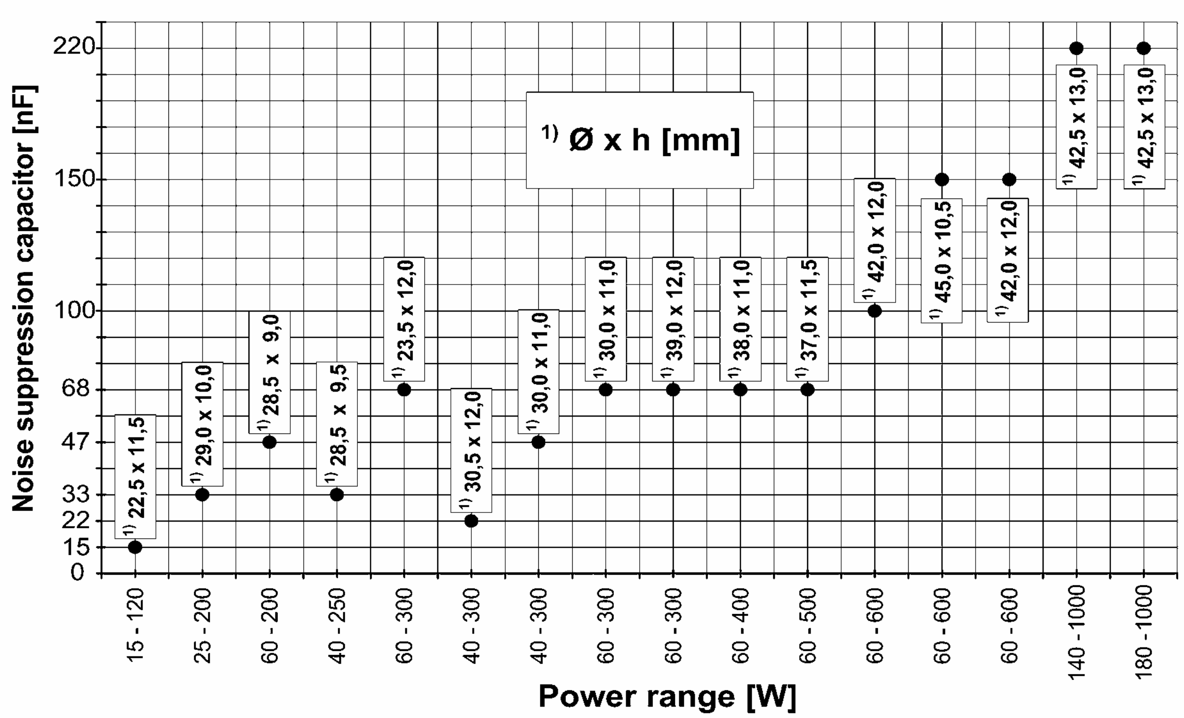
If the chokes are used together with the capacitors suggested in the table overleaf, noise suppression to interference level N as per VDE 0875 or the relevant CISPR specification is attained.

The overtemperature that occurs during operation remains below the permissible values for temperature class K.

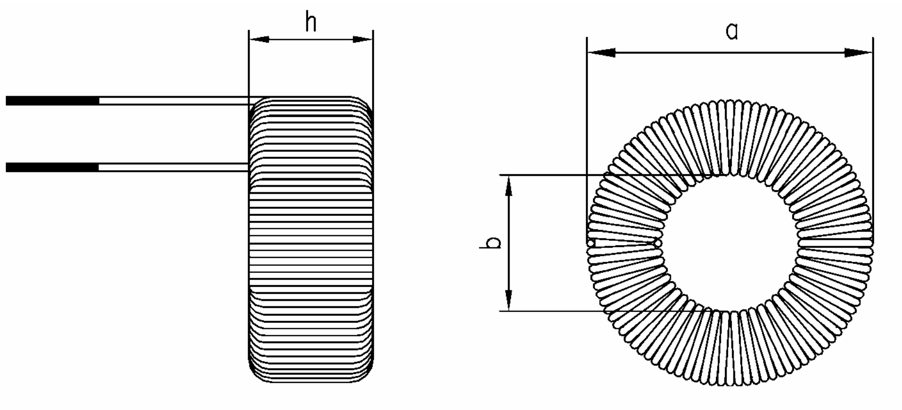
A1.4 THYRISTOR SUPPRESSION CHOKES



Component size as a function of power



A1.4 THYRISTOR SUPPRESSION CHOKES

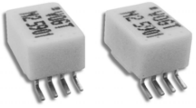


Power range (W)	Dimensions			Noise-suppression capacitor (nF)	Temperature rise (°C)	DC resistance (Ω)	Part number
	a max	b min	h max				
15 - 120	22.5	5.50	11.5	15	52	3.0	573 04 002 00
25 - 200	29.0	10.0	10.0	33	66	1.6	573 05 032 00
60 - 200	28.5	11.0	9.0	47	45	0.77	573 05 033 00
40 - 250	28.5	11.0	9.5	33	56	0.95	573 05 034 00
60 - 300	23.5	5.0	12.0	68	65	0.54	573 04 011 00
40 - 300	30.5	6.0	12.0	22	68	0.64	573 05 035 00
40 - 300	30.0	9.0	11.0	47	69	0.55	573 05 037 00
60 - 300	30.0	9.5	11.0	68	65	0.51	573 05 036 00
60 - 300	39.0	13.0	12.0	68	39	0.36	573 07 068 00
60 - 400	38.0	14.0	11.0	68	75	0.48	573 07 023 00 [1)]
60 - 500	37.0	14.5	11.5	68	65	0.31	573 07 058 00 [2)]
60 - 600	42.0	16.0	12.0	100	69	0.23	573 08 057 00
60 - 600	42.0	16.0	12.0	150	67	0.23	573 08 013 00 [2)]
140 - 1000	42.5	15.5	13.0	220	79	0.13	573 08 067 00 [3)]
180 - 1000	42.5	15.5	13.0	220	76	0.13	573 08 043 00

[1)] With additional RC element 680 Ω/68 nF, can be used for lamp load from 25 W
[2)] With additional RC element 680 Ω/100 nF, can be used for lamp load from 25 W and with 680 Ω /68 nF, for lamp load from 40 W
[3)] With additional RC element 330 Ω/0.15 nF, can be used for lamp load from 60 W

A INDUCTIVE COMPONENTS

A1 EMC POWER LINE



A INDUCTIVE COMPONENTS
A2 EMC DATA LINE

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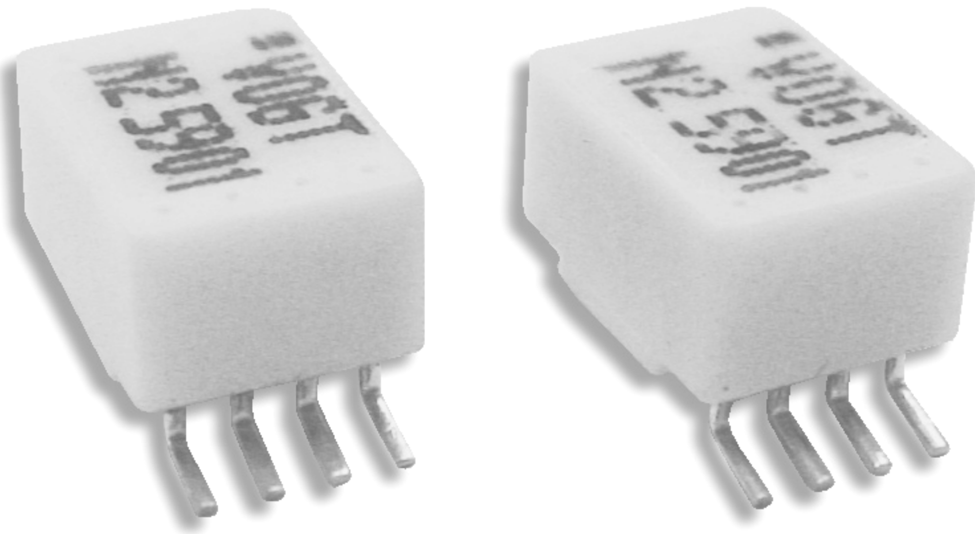
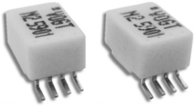
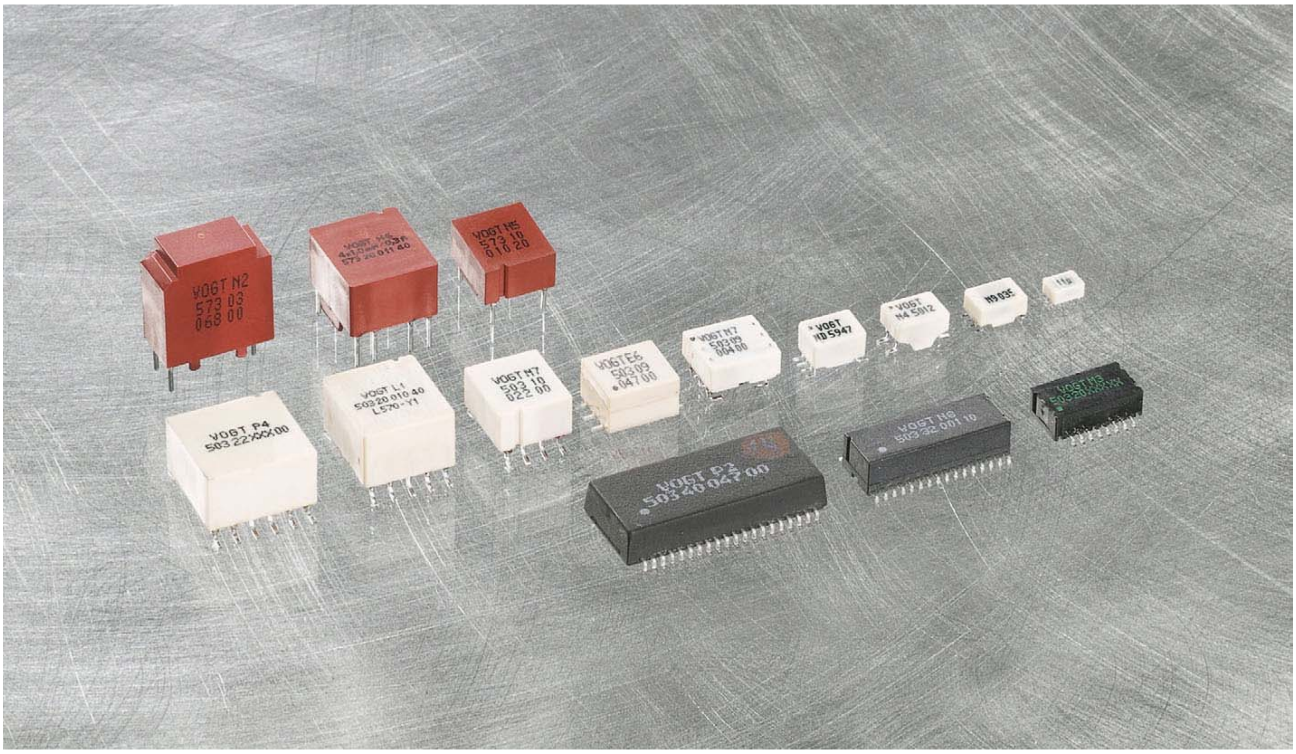




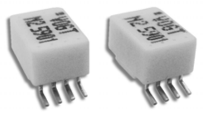
A2.1 CAN-BUS (TOROIDAL CORE)



Our common mode chokes and common mode RFI suppression chokes are designed specifically for suppressing broadband interference in digital telecommunication systems. We offer a wide range of multiple chokes and choke modules in various shapes and sizes for use in signal and data lines.

Most of these are built on the basis of ferrite toroidal cores and feature exceptional electrical properties.

- **Inductance values up to 68 mH**
- **Usable for frequencies up to 500 MHz (CAN bus chokes)**
- **High insertion loss**



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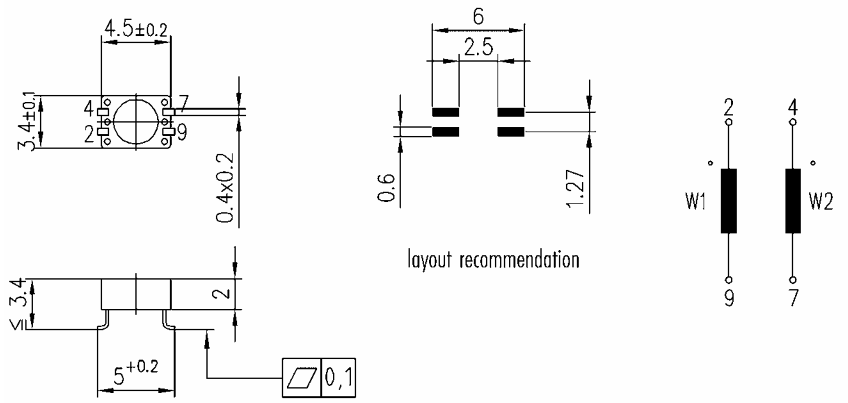
A2.1 CAN-BUS (TOROIDAL CORE)| MINIATURE TYPE K2 SMD

Frequency range 1 MHz - 500 MHz
Application e.g. as CAN bus choke

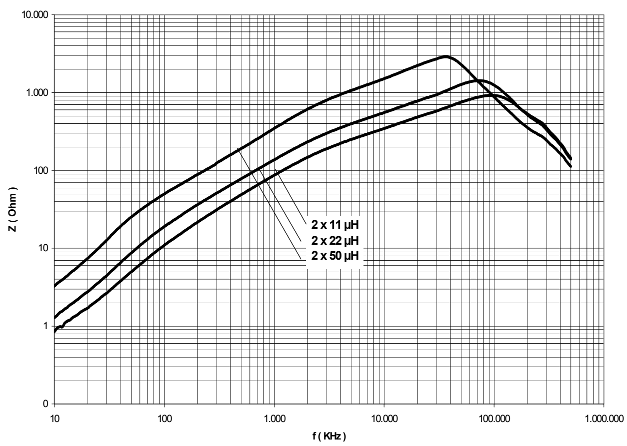
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (approximate value)
Test voltage:	500 V, 50 Hz
Thermal properties:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

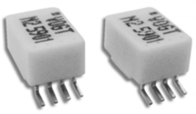
Part number	L_N (µH)	I_N (mA)	R_{Cu} (mΩ)
503 02 011 00	2x11	100	160
503 02 022 00	2x22	100	195
503 02 033 00	2x33	100	260
503 02 050 00	2x50	100	390

Mechanical dimensions and circuit diagram



Impedance curves





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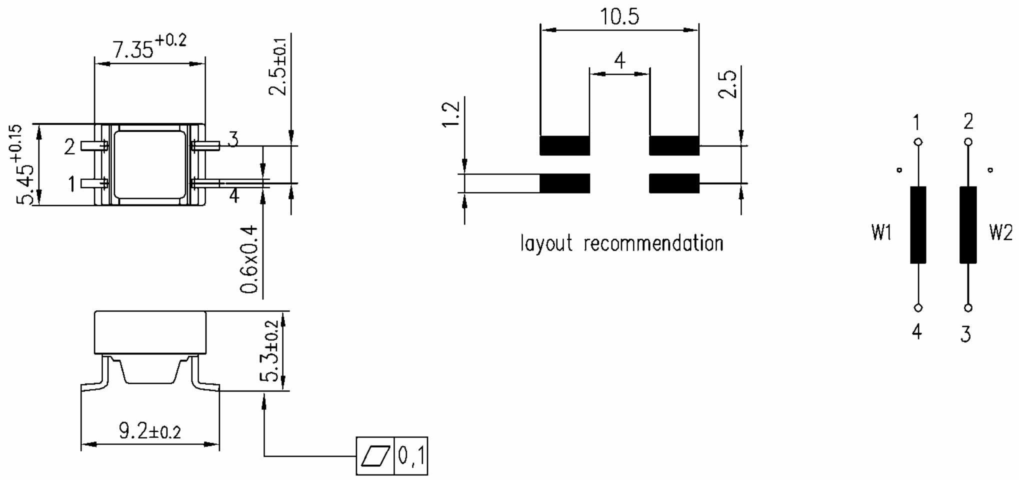
A2.1 CAN-BUS (TOROIDAL CORE)| MINIATURE TYPE K5 SMD

Frequency range 1 MHz - 500 MHz
Application e.g. as CAN bus chokes

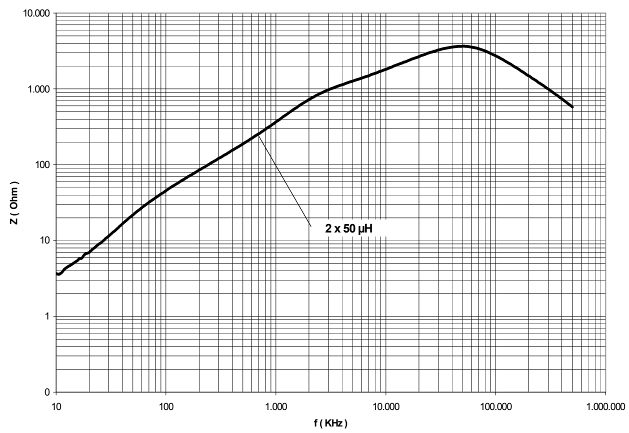
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

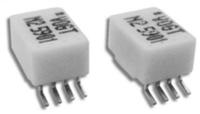
Part number	L_N (µH)	I_N (mA)	R_{Cu} (mΩ)
503 05 501 20	2x50	500	250

Mechanical dimensions and circuit diagram



Impedance curves





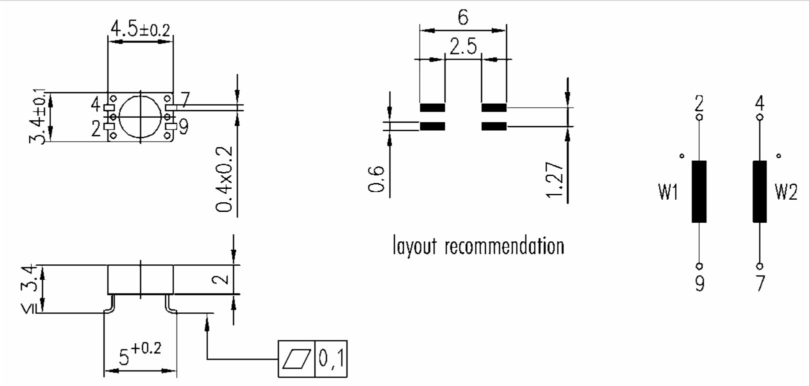
A2.2 TOROIDAL CORE | MINIATURE TYPE K2 SMD

Frequency range 10 kHz - 30 MHz

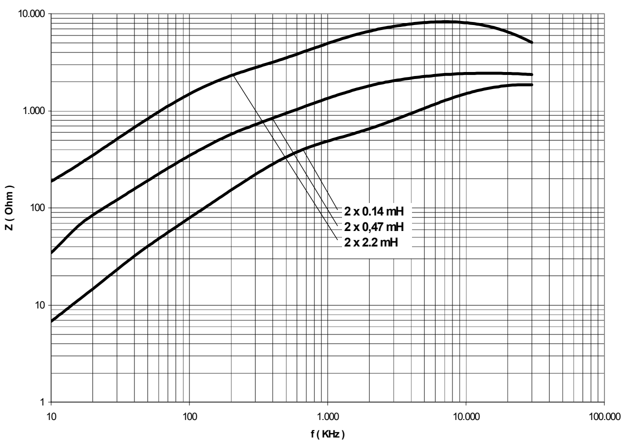
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

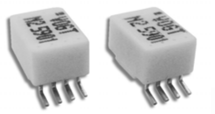
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 02 140 00	2x0.14	100	215
503 02 470 00	2x0.47	100	380
503 02 910 00	2x1.0	100	660
503 02 922 00	2x2.2	100	840
503 02 933 00	2x3.3	100	1500
503 02 947 00	2x4.7	100	1800

Mechanical dimensions and circuit diagram



Impedance curves





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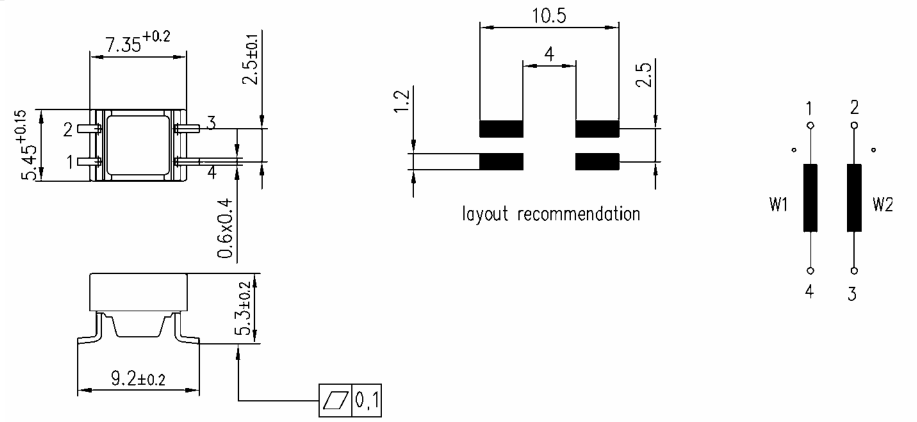
A2.2 TOROIDAL CORE | MINIATURE TYPE K5 SMD

Frequency range 10 kHz - 30 MHz

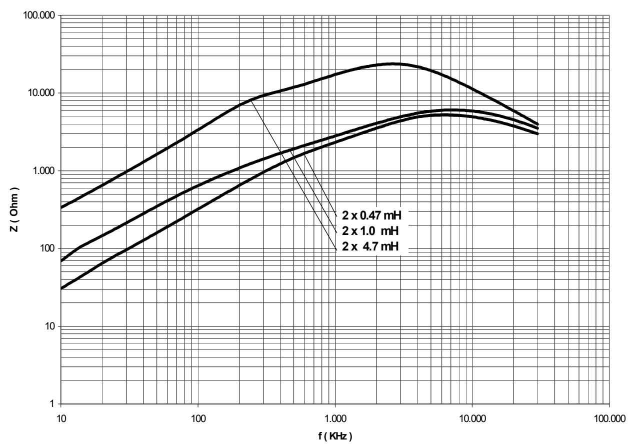
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

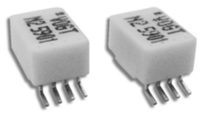
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 05 505 20	2x0.47	250	200
503 05 510 20	2x1.0	150	340
503 05 522 20	2x2.2	150	620
503 05 547 20	2x4.7	150	900
503 05 647 20	2x47	100	3850

Mechanical dimensions and circuit diagram



Impedance curves





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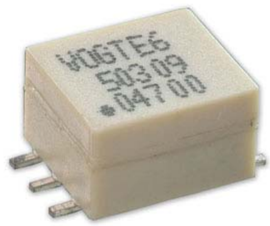
A2.2 TOROIDAL CORE | TYPE K9 SMD

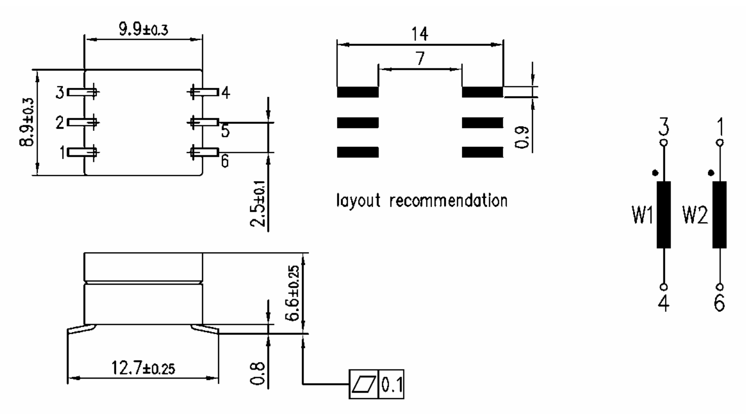


Frequency range 10 kHz - 30 MHz

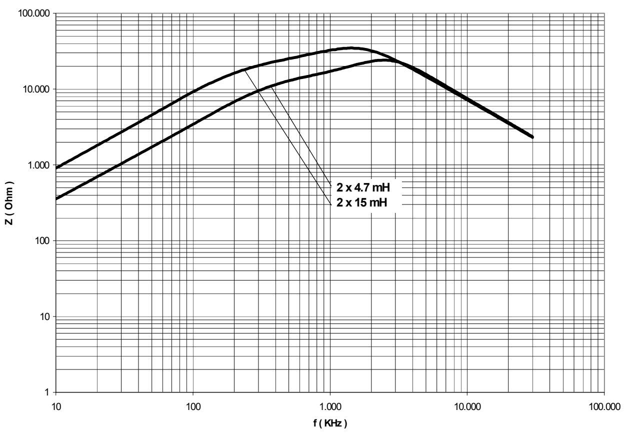
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

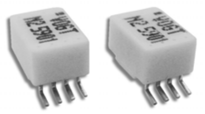
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 09 001 20	2x0.47	250	200
503 09 010 20	2x1.0	150	340
503 09 022 20	2x2.2	150	640
503 09 047 20	2x4.7	150	1400
503 09 150 20	2x15	200	1500

Mechanical dimensions and circuit diagram

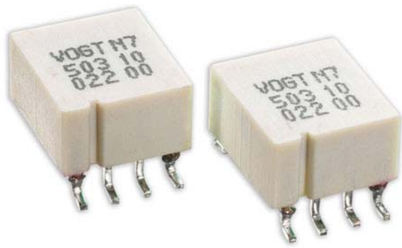


Impedance curves





A2.2 TOROIDAL CORE | TYPE K10 SMD

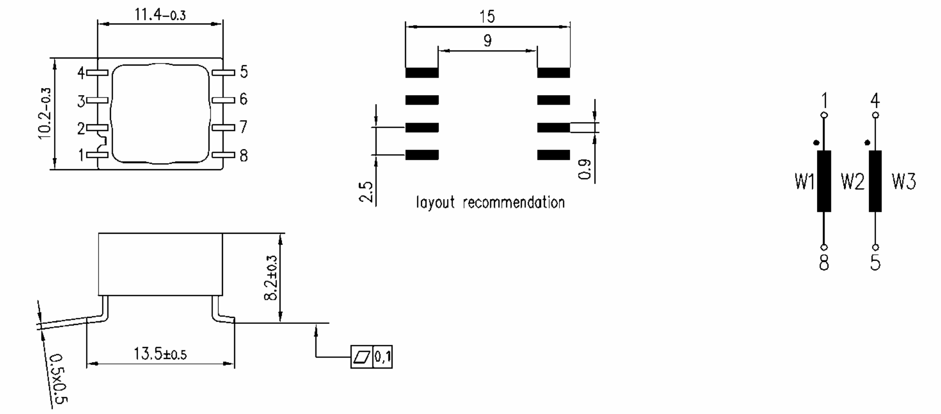


Frequency range 10 kHz - 30 MHz

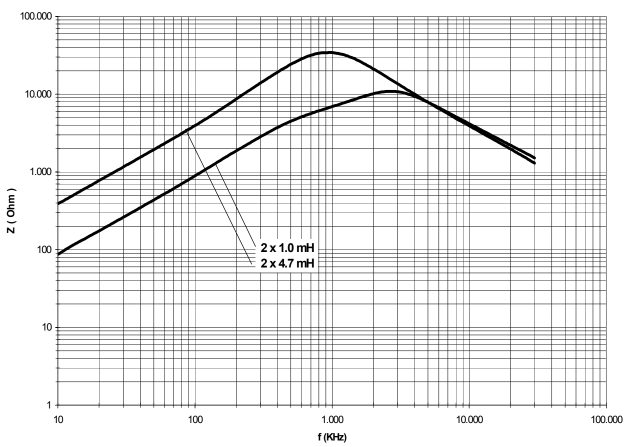
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 10 010 20	2x1.0	200	340
503 10 015 20	2x1.5	200	520
503 10 022 20	2x2.2	200	640
503 10 033 20	2x3.3	200	1200
503 10 047 20	2x4.7	200	1400
503 10 068 20	2x6.8	200	1700

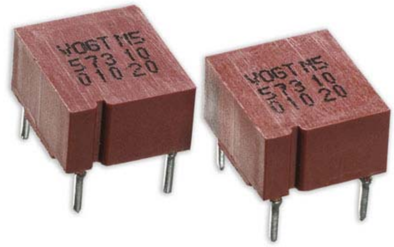
Mechanical dimensions and circuit diagram



Impedance curves



A2.2 TOROIDAL CORE | TYPE K10 SMD

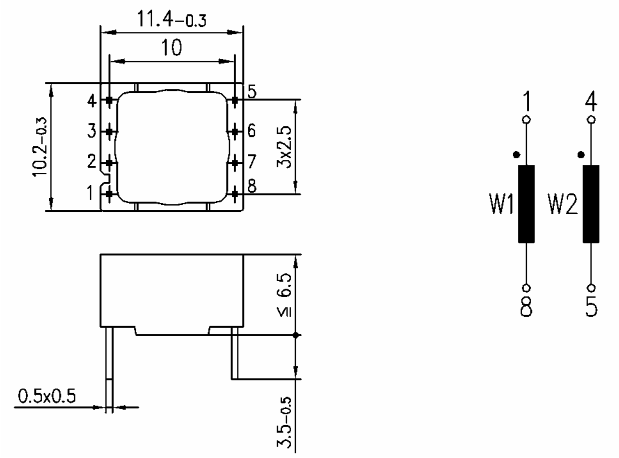


Frequency range 10 kHz - 30 MHz

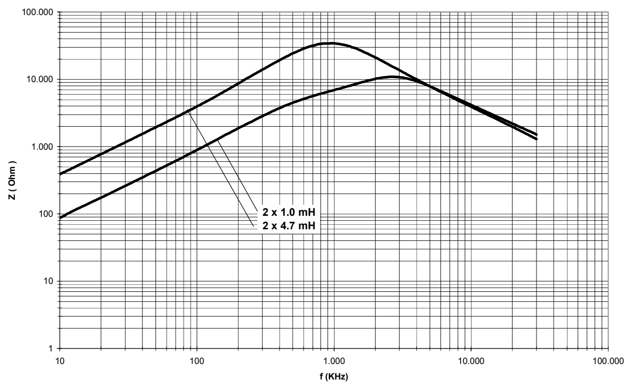
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

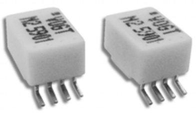
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
573 10 010 20	2x1.0	200	340
573 10 015 20	2x1.5	200	520
573 10 022 20	2x2.2	200	640
573 10 033 20	2x3.3	200	1200
573 10 047 20	2x4.7	200	1400
573 10 068 20	2x6.8	200	1700

Mechanical dimensions and circuit diagram



Impedance curves





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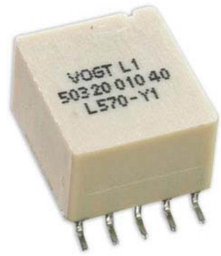
A2.2 TOROIDAL CORE | TYPE K20 SMD

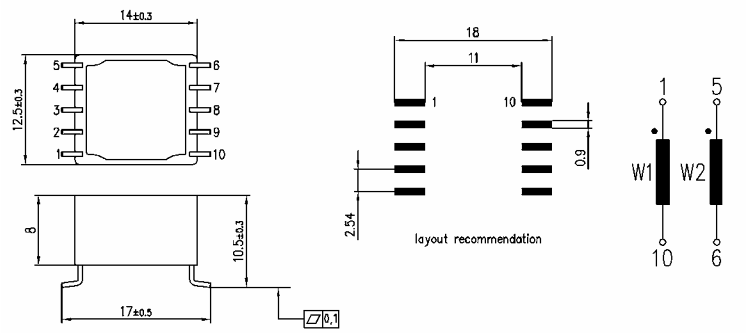


Frequency range 10 kHz - 30 MHz

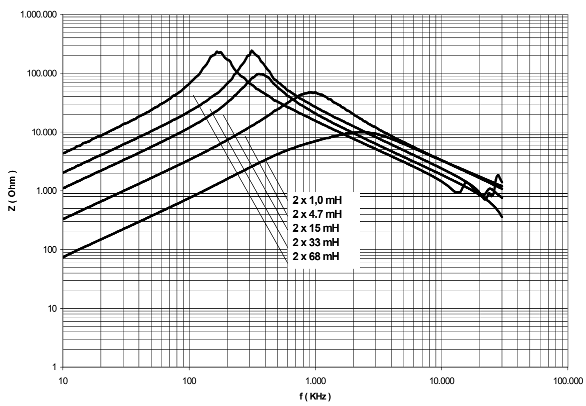
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

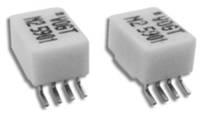
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 20 011 20	2x1.0	300	180
503 20 015 20	2x1.5	300	210
503 20 022 20	2x2.2	300	500
503 20 033 20	2x3.3	300	570
503 20 047 20	2x4.7	300	700
503 20 068 20	2x6.8	300	1200
503 20 100 20	2x10	300	1500
503 20 150 20	2x15	300	2400
503 20 220 20	2x22	300	2900
503 20 330 20	2x33	300	3600
503 20 470 20	2x47	300	4000
503 20 680 20	2x68	300	3600

Mechanical dimensions and circuit diagram



Impedance curves





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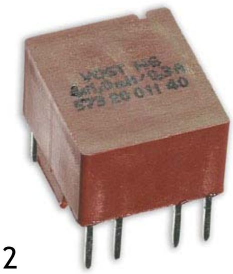
A2.2 TOROIDAL CORE | TYPE K20 THD

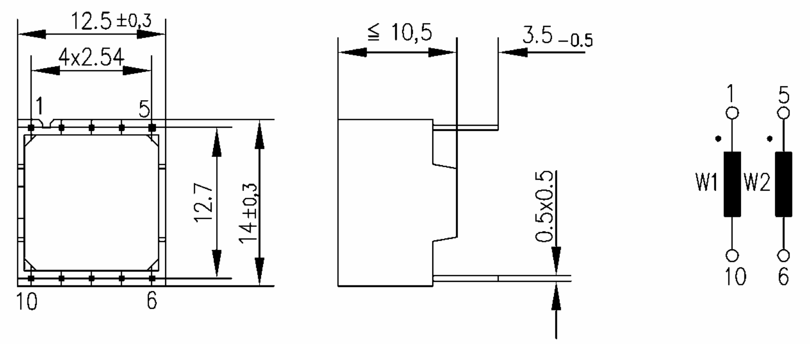


Frequency range 10 kHz - 30 MHz

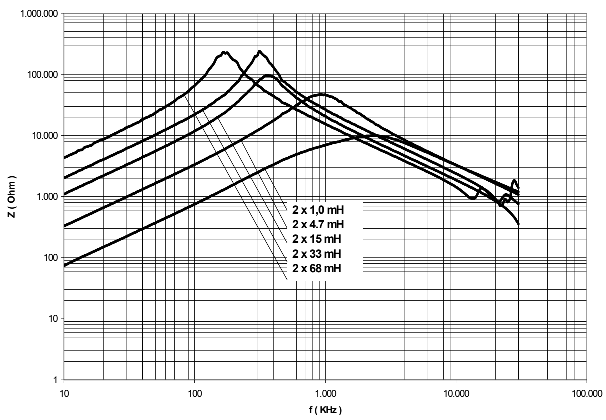
Nominal current: per winding
Nominal voltage: 80 V -/42 V ~
Inductance tolerance: +50%/-30%
DC resistance: per winding (nominal winding)
Testing voltage: 500 V, 50 Hz
Thermal characteristics: heating measurement according to VDE 0565-2
Climate category: according to IEC 68-1 25/85/56

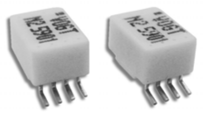
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
573 20 011 20	2x1.0	300	180
573 20 015 20	2x1.5	300	210
573 20 022 20	2x2.2	300	500
573 20 033 20	2x3.3	300	570
573 20 047 20	2x4.7	300	700
573 20 068 20	2x6.8	300	1200
573 20 100 20	2x10	300	1500
573 20 150 20	2x15	300	2400
573 20 220 20	2x22	300	2900
573 20 330 20	2x33	300	3600
573 20 470 20	2x47	300	4000
573 20 680 20	2x68	300	3600

Mechanical dimensions and circuit diagram



Impedance curves





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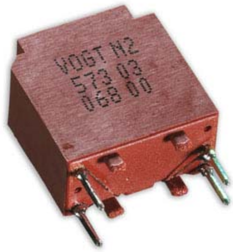
A2.2 TOROIDAL CORE | TYPE K48 THD

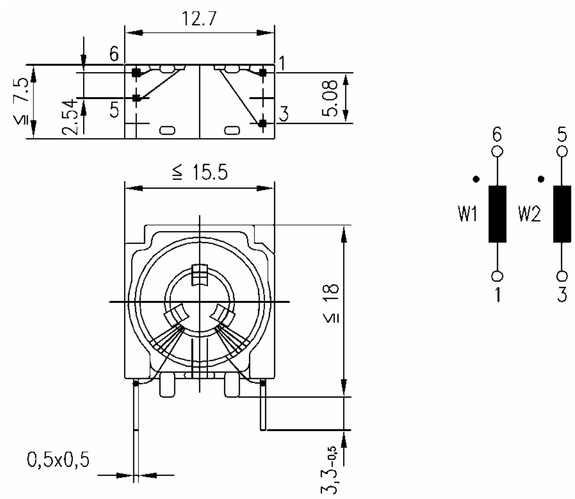


Frequency range 10 kHz - 30 MHz

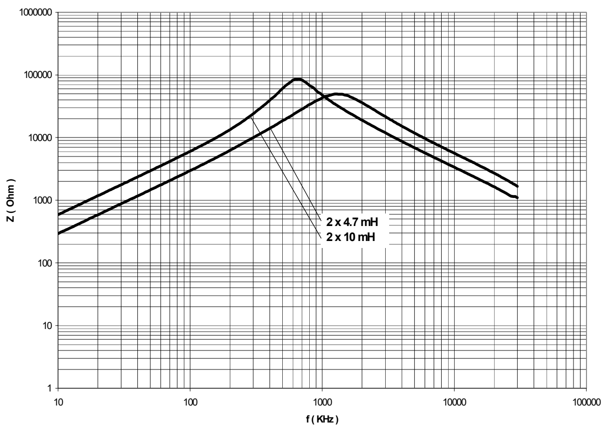
Nominal current:	per winding
Nominal voltage:	80 V - / 42 V ~
Inductance tolerance:	+50% / -30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

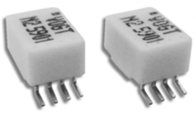
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
573 03 095 00	2x4.7	100	1000
573 03 103 00	2x10	100	1150
573 03 076 00	2x16	100	1700

Mechanical dimensions and circuit diagram

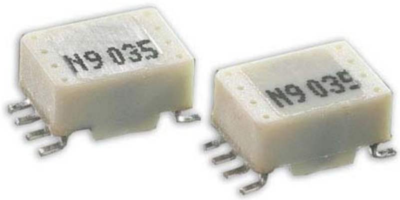


Impedance curves





A2.2 TOROIDAL CORE | MINIATURE TYPE K3 SMD

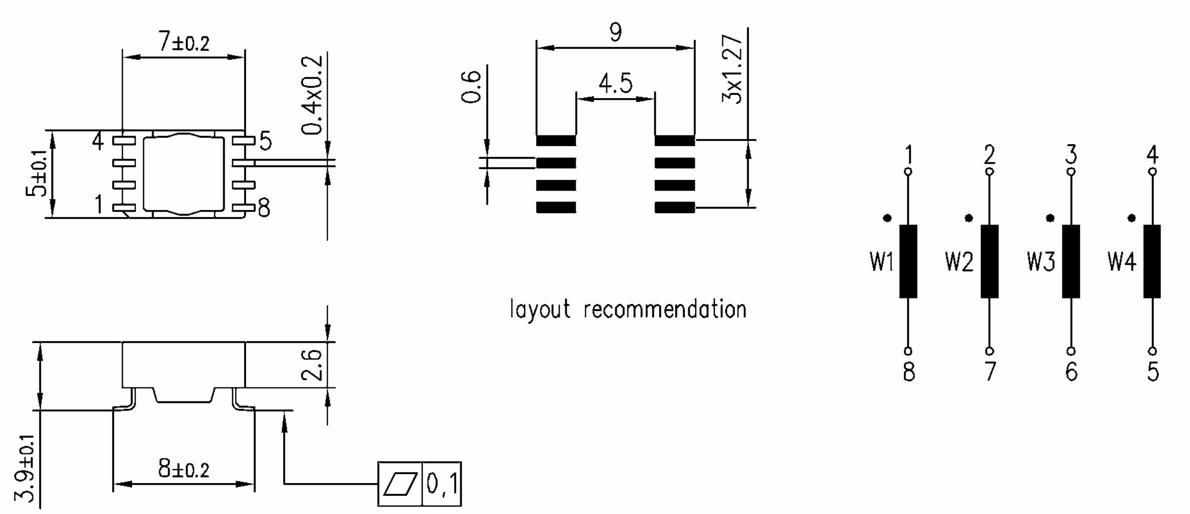


Frequency range 1 MHz - 500 MHz
Application e.g. as CAN bus chokes

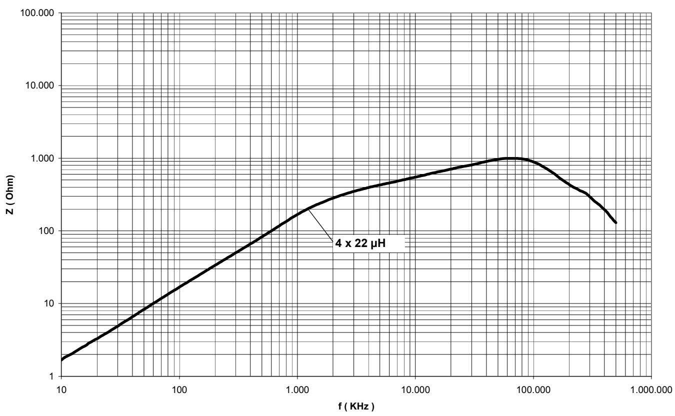
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

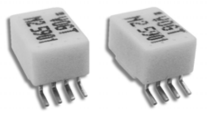
Part number	L_N (µH)	I_N (mA)	R_{Cu} (mΩ)
503 03 022 40	4x22	100	125

Mechanical dimensions and circuit diagram



Impedance curve





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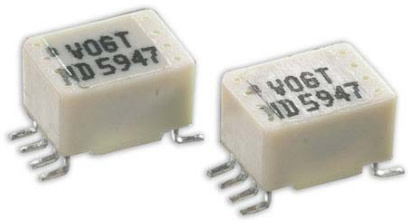
A2.2 TOROIDAL CORE | MINIATURE TYPE K5 SMD

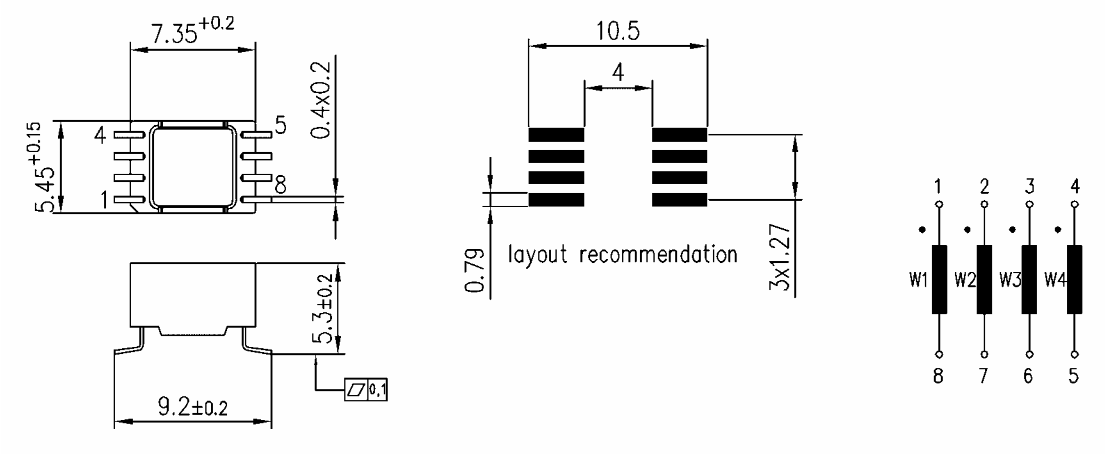


Frequency range 1 MHz - 500 MHz
Application e.g. as CAN bus chokes

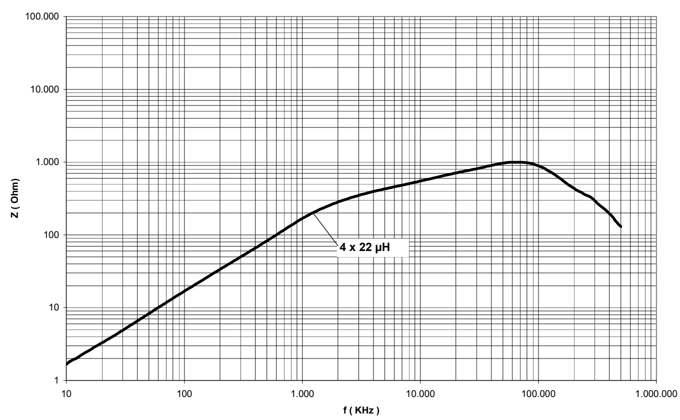
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

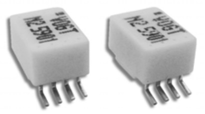
Part number	L_N (µH)	I_N (mA)	R_{Cu} (mΩ)
503 05 902 40	4x22	100	125

Mechanical dimensions and circuit diagram

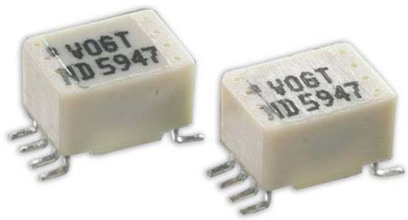


Impedance curve





A2.2 TOROIDAL CORE | MINIATURE TYPE K5 SMD

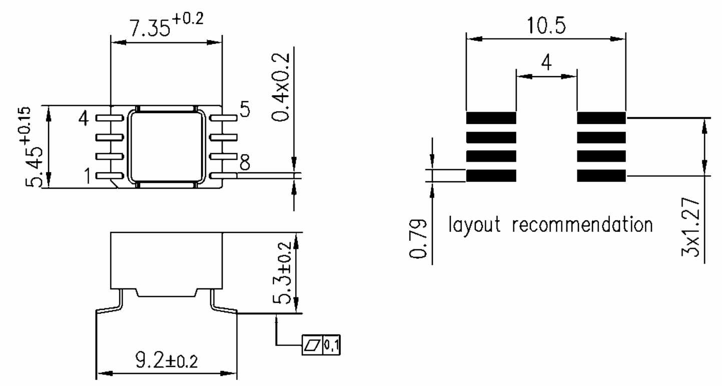


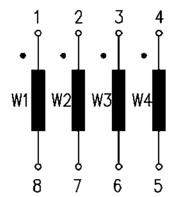
Frequency range 10 kHz - 30 MHz

Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

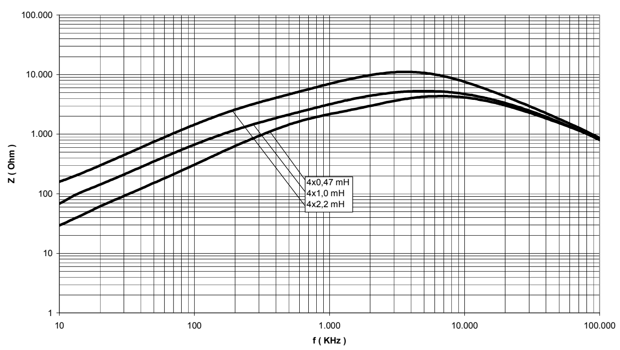
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 05 904 40	4x0.47	150	420
503 05 910 40	4x1.0	150	530
503 05 922 40	4x2.2	150	790
503 05 947 40	4x4.7	150	1200
503 05 952 40	4x12	130	2000

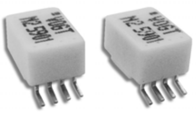
Mechanical dimensions and circuit diagram





Impedance curves





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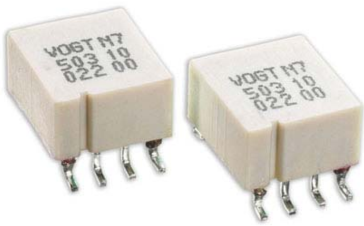
A2.2 TOROIDAL CORE | TYPE K10 SMD

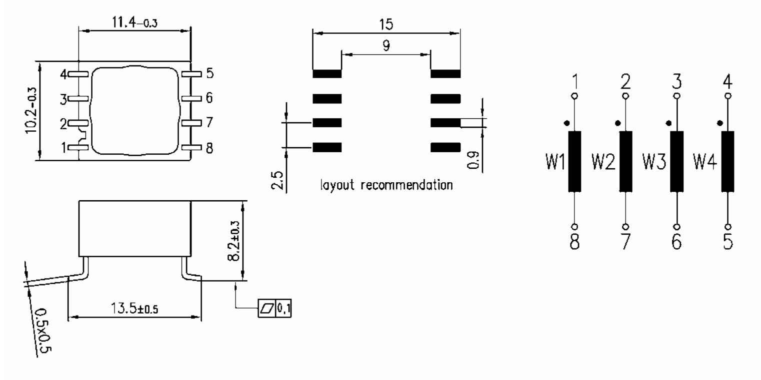


Frequency range 10 kHz - 30 MHz

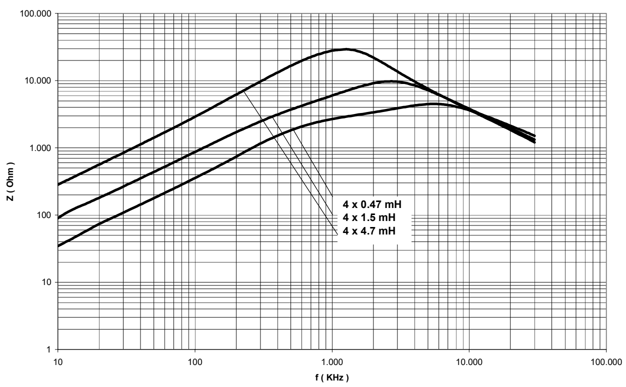
Nominal current:	per winding
Nominal voltage:	80 V - /42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

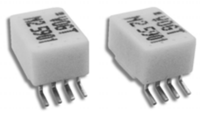
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 10 001 40	4x0.1	200	190
503 10 004 40	4x0.47	200	270
503 10 006 40	4x0.68	200	330
503 10 010 40	4x1.0	200	680
503 10 015 40	4x1.5	200	820
503 10 022 40	4x2.2	200	1000
503 10 047 40	4x4.7	200	1200

Mechanical dimensions and circuit diagram



Impedance curves





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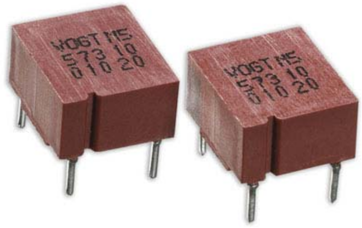
A2.2 TOROIDAL CORE | TYPE K10 THD

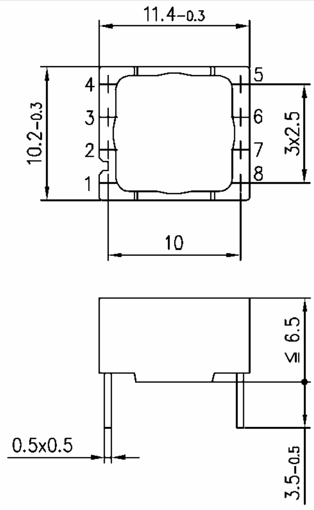


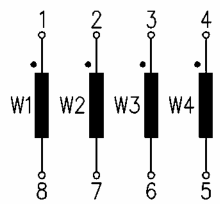
Frequency range 10 kHz - 30 MHz

Nominal current: per winding
Nominal voltage: 80 V -/42 V ~
Inductance tolerance: +50%/-30%
DC resistance: per winding (nominal winding)
Testing voltage: 500 V, 50 Hz
Thermal characteristics: heating measurement according to VDE 0565-2
Climate category: according to IEC 68-1 25/85/56

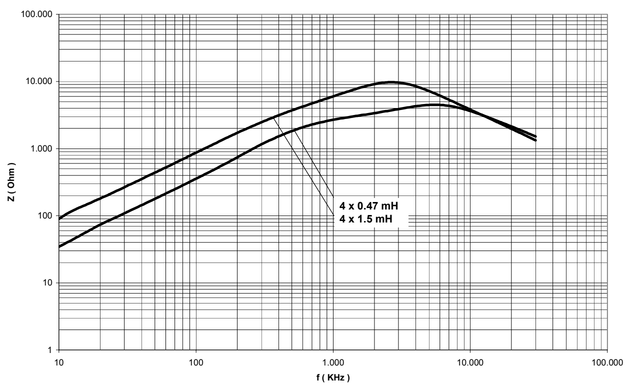
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
573 10 004 40	4x0.47	200	270
573 10 006 40	4x0.68	200	330
573 10 010 40	4x1.0	200	680
573 10 015 40	4x1.5	200	820
573 10 022 40	4x2.2	200	1000

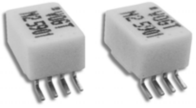
Mechanical dimensions and circuit diagram





Impedance curves:





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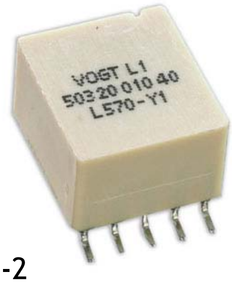
A2.2 TOROIDAL CORE | TYPE K20 SMD

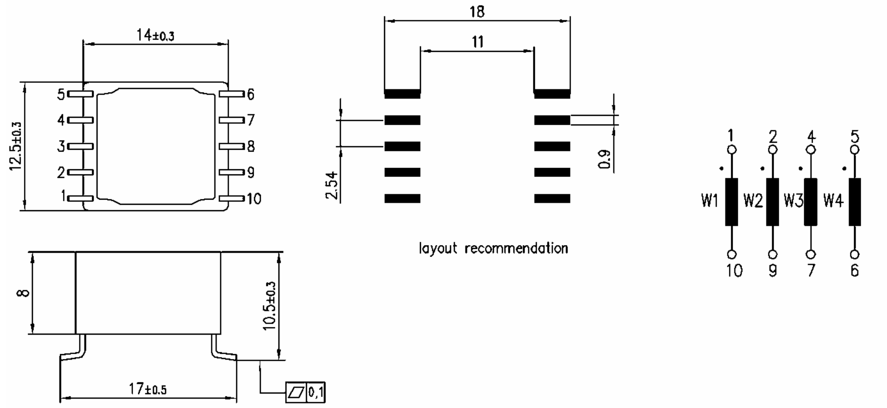


Frequency range 10 kHz - 30 MHz

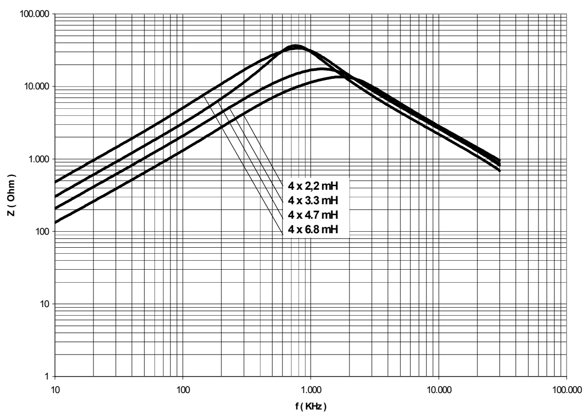
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

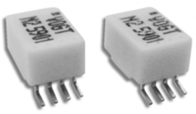
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 20 011 40	4x1.0	300	340
503 20 015 40	4x1.5	300	600
503 20 022 40	4x2.2	300	730
503 20 033 40	4x3.3	300	880
503 20 047 40	4x4.7	300	1400
503 20 068 40	4x6.8	300	1600
503 20 100 40	4x10	300	1100

Mechanical dimensions and circuit diagram

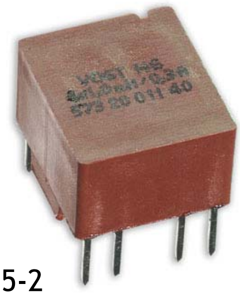


Impedance curves





A2.2 TOROIDAL CORE | TYPE K20 THD

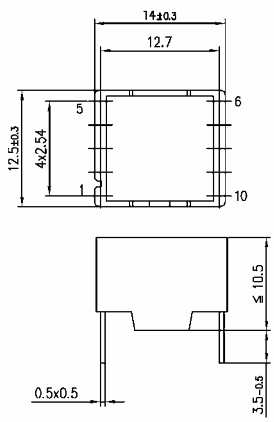


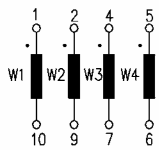
Frequency range 10 kHz - 30 MHz

Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

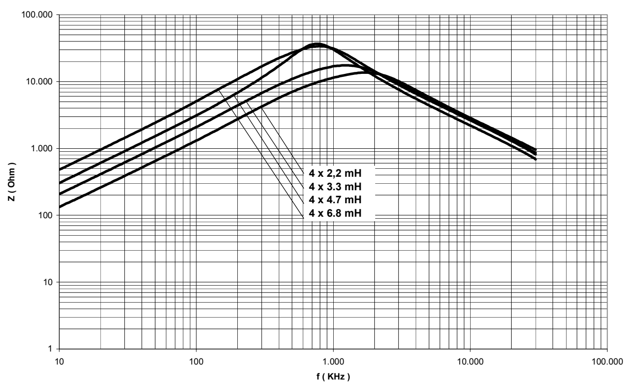
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
573 20 011 40	4x1.0	300	340
573 20 015 40	4x1.5	300	600
573 20 022 40	4x2.2	300	730
573 20 033 40	4x3.3	300	880
573 20 047 40	4x4.7	300	1400
573 20 068 40	4x6.8	300	1600
573 20 100 40	4x10	300	1100

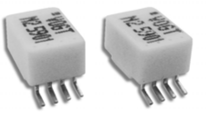
Mechanical dimensions and circuit diagram





Impedance curves





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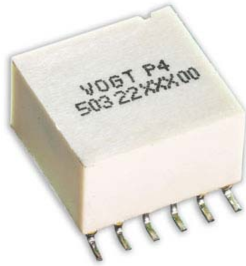
A2.2 TOROIDAL CORE | TYPE K22 SMD

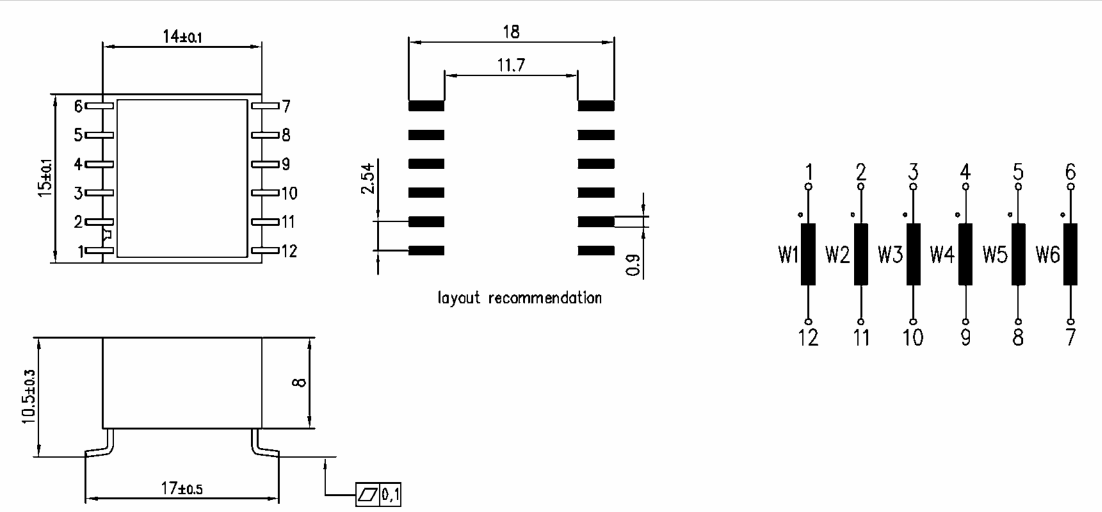


Frequency range 10 kHz - 30 MHz

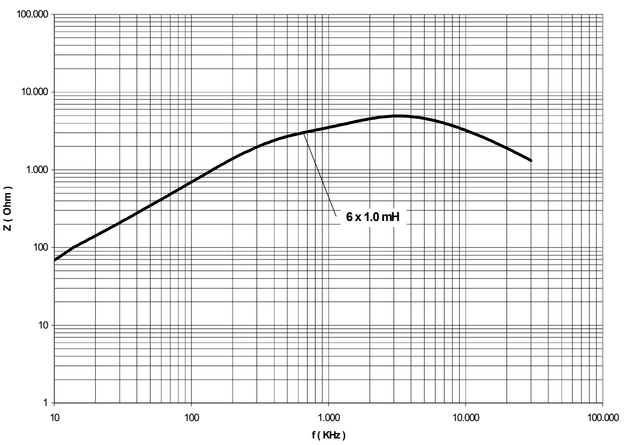
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

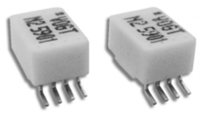
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
503 22 004 60	6x0.47	200	260
503 22 010 60	6x1.0	200	470

Mechanical dimensions and circuit diagram

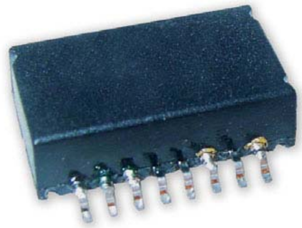


Impedance curve





A2.2 TOROIDAL CORE | TYPE S0 20 SMD

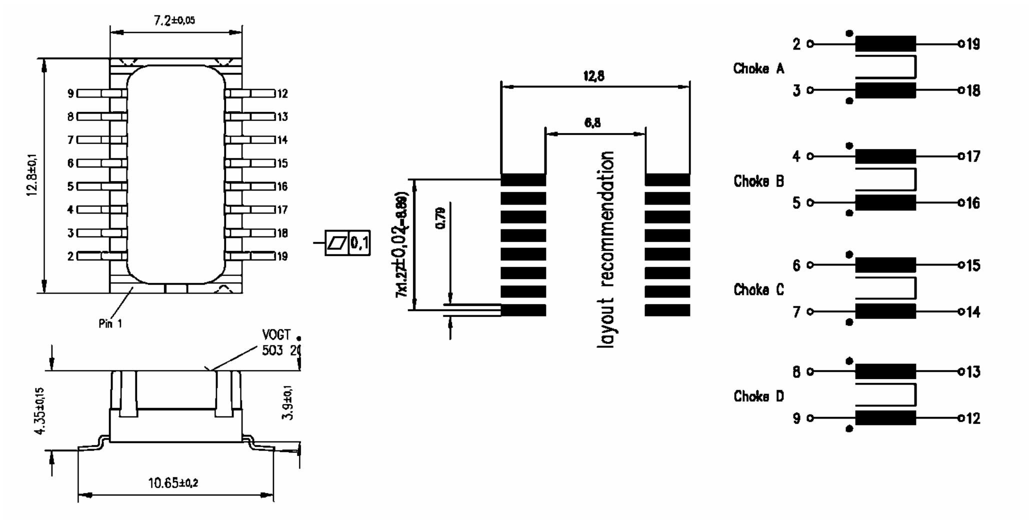


Choke module

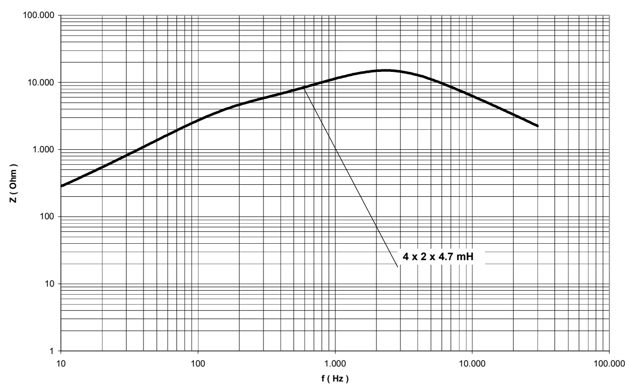
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

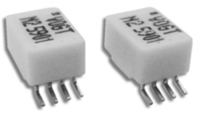
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
513 20 980 00	4x2x4.7	150	1300

Mechanical dimensions and circuit diagram



Impedance curve





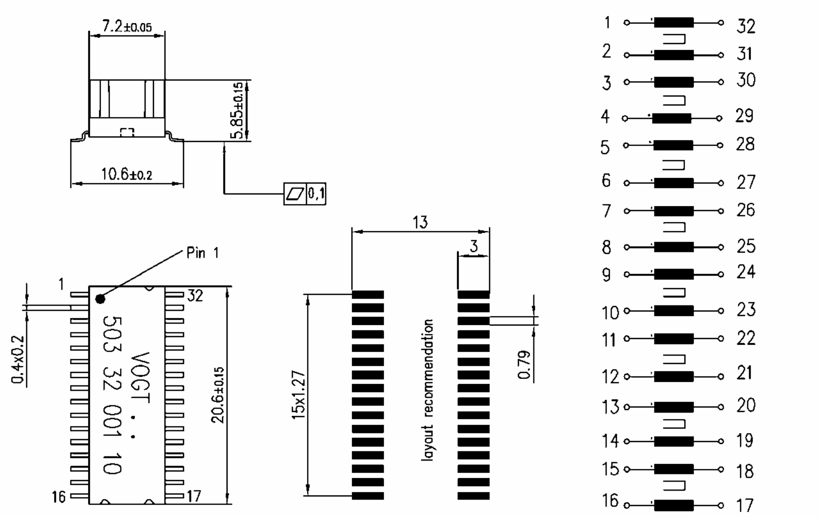
A2.2 TOROIDAL CORE | TYPE SO 32 SMD

Choke module

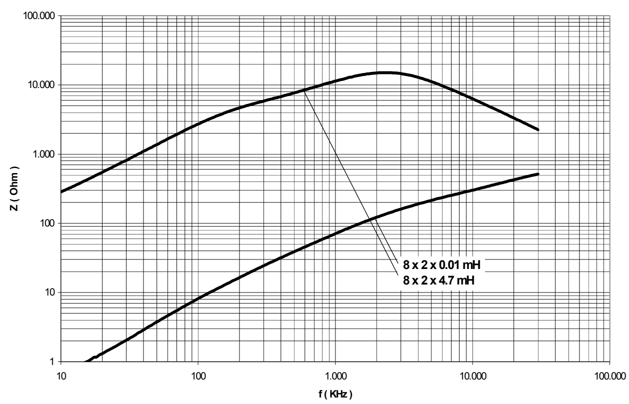
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

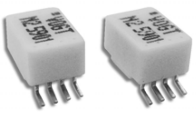
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
513 32 001 10	8x2x0.01	150	180
513 32 014 10	8x2x1.4	150	700
513 32 047 10	8x2x4.7	150	1700

Mechanical dimensions and circuit diagram



Impedance curves





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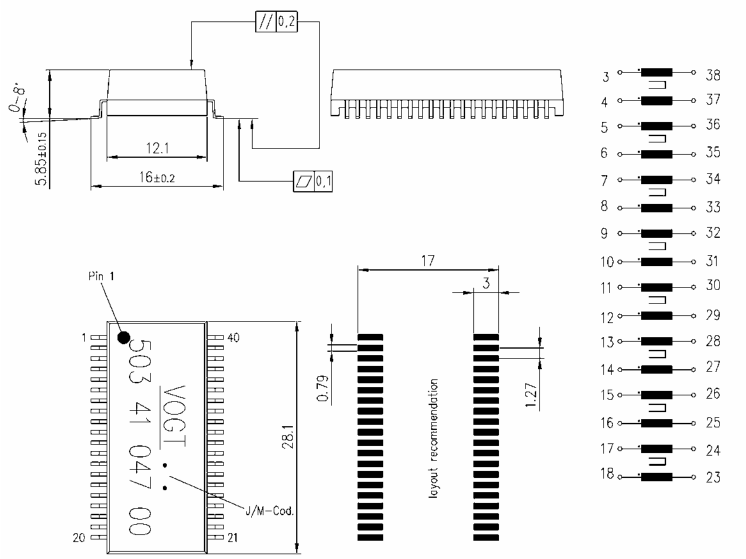
A2.2 TOROIDAL CORE | TYPE S0 41 SMD

Choke module

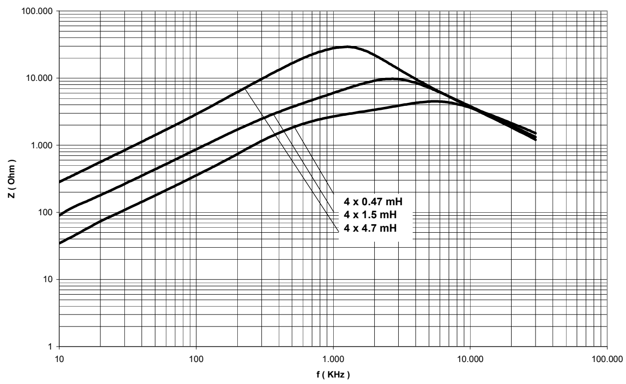
Nominal current:	per winding
Nominal voltage:	80 V -/42 V ~
Inductance tolerance:	+50%/-30%
DC resistance:	per winding (nominal winding)
Testing voltage:	500 V, 50 Hz
Thermal characteristics:	heating measurement according to VDE 0565-2
Climate category:	according to IEC 68-1 25/85/56

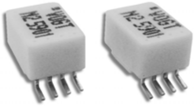
Part number	L_N (mH)	I_N (mA)	R_{Cu} (mΩ)
513 41 047 00	8x2x4.7	200	800

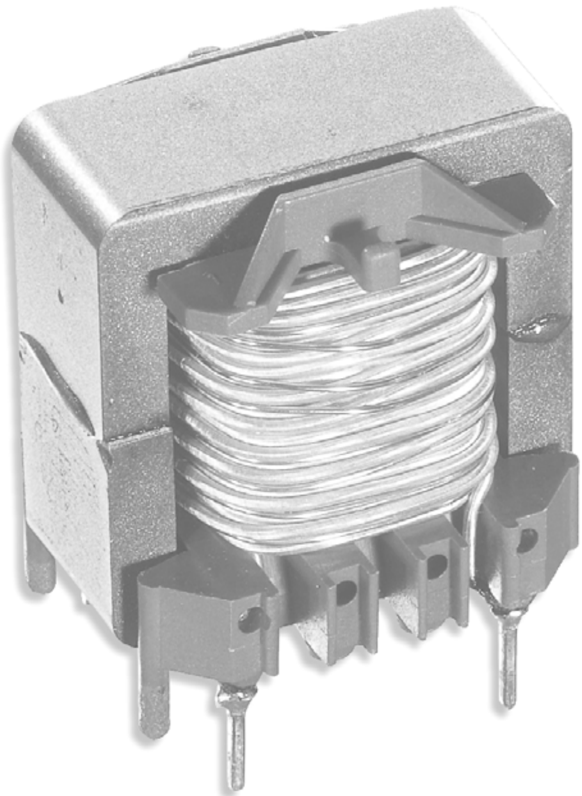
Mechanical dimensions and circuit diagram



Impedance curves

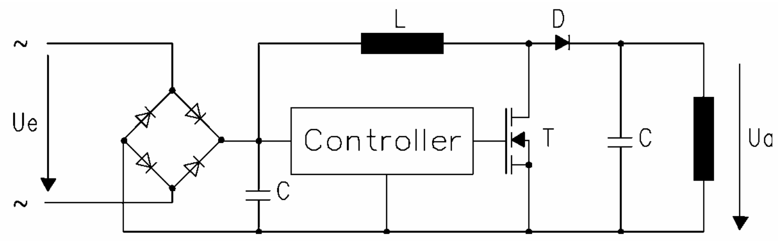




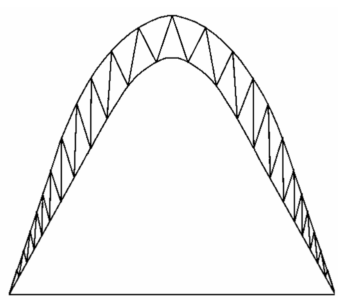


There are various types of circuits that involve controlling not only the output voltage but also the input current.

Circuit diagram

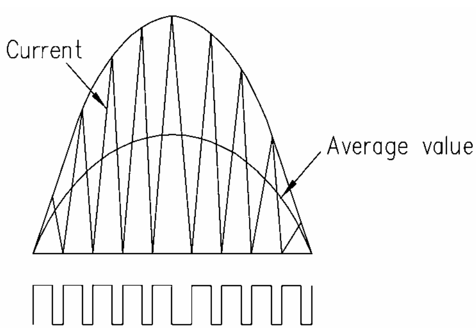


Continuous mode

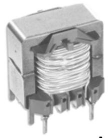


Suitable for high power

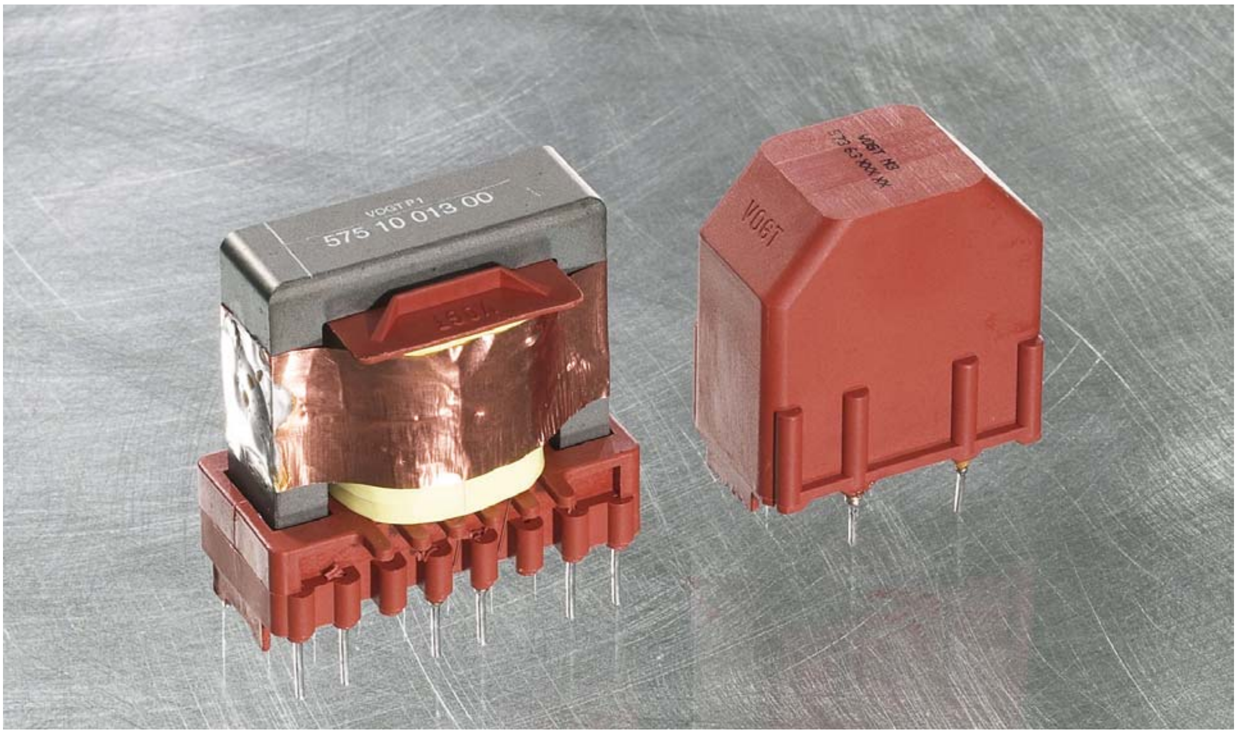
Discontinuous mode



Suitable for low power

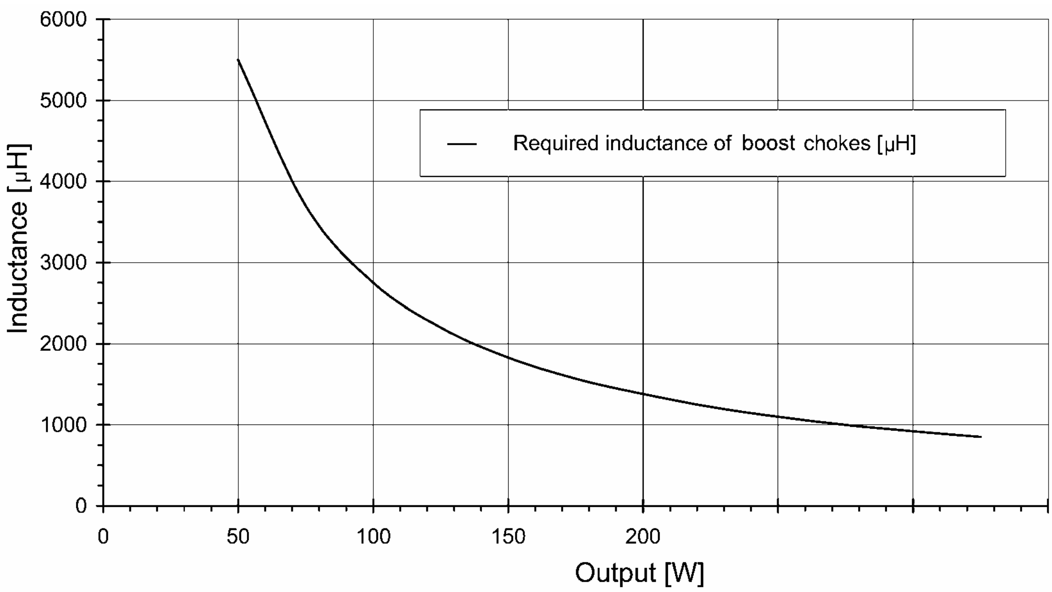


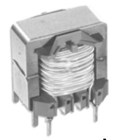
A3.1 CONTINUOUS MODE



Continuous mode boost choke

Input voltage: 90-265 VAC; output voltage: 400 VDC
Switching frequency 100 kHz; ripple of the choke current = 20%





A3.1 CONTINUOUS MODE

Application

PFC chokes for continuous mode.
With this application, the existing switched mode power supply has to be signed for PFC.

Design DK 63

- Core: R 27 – high flux
- Case: DK 63
- Primary coil and secondary coil for IC voltage supply

Design E 36/11

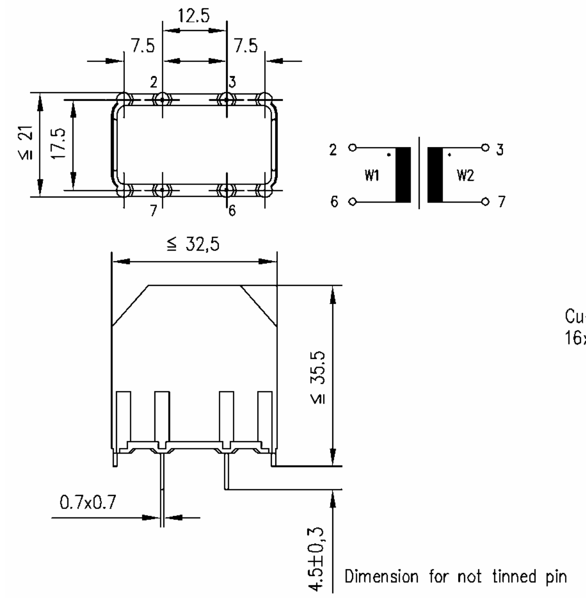
- Core: E 36/11
- Coil former: E 36/11 vertical

Technical data

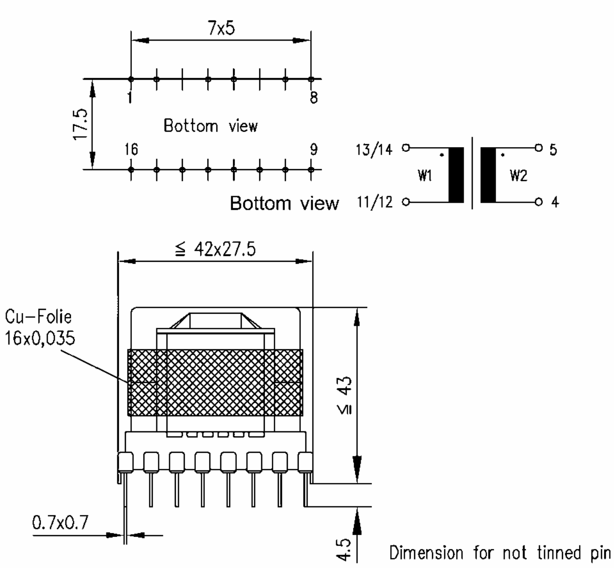
- Climate category 40/125/56 according to IEC 68-1
- Nominal inductance at 10 kHz, 25°C
- DC resistance per winding (reference values measured according to VDE 0565-2)
- Ambient temperature: 60°C
- Temperature rise of windings < 55°C
- Max. permissible temperature of windings 115°C
- Input voltage 90 – 265 V
- Typical switching frequency 100 kHz

A3.1 CONTINUOUS MODE | DK 63 + E 36/11

DK 63



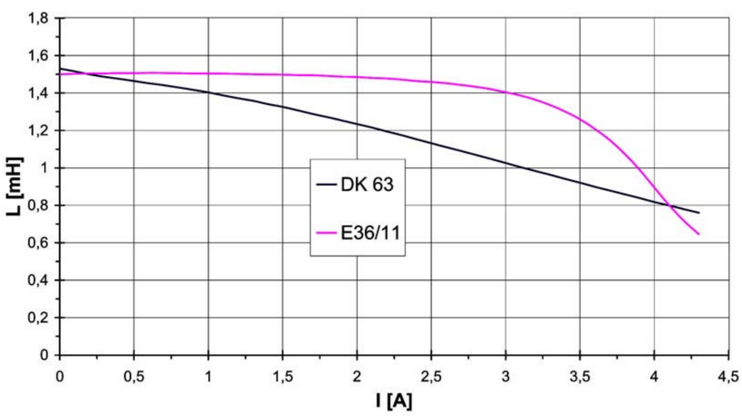
E 36/11

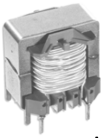


Output power (W)	I_{peak} (A)	DK 63 (R_{th} [1)] = 19 K/W)			E 36/11 vertical (R_{th} [1)] = 23 K/W)		
		L (mH) ± 15%	R_{Cu} [1)] (Ω)	Part number	L (mH) ± 10%	R_{Cu} [1)] (Ω)	Part number
150	3	1.5	≤ 0.26	573 06 029 00	1.5	≤ 0.42	575 10 013 00

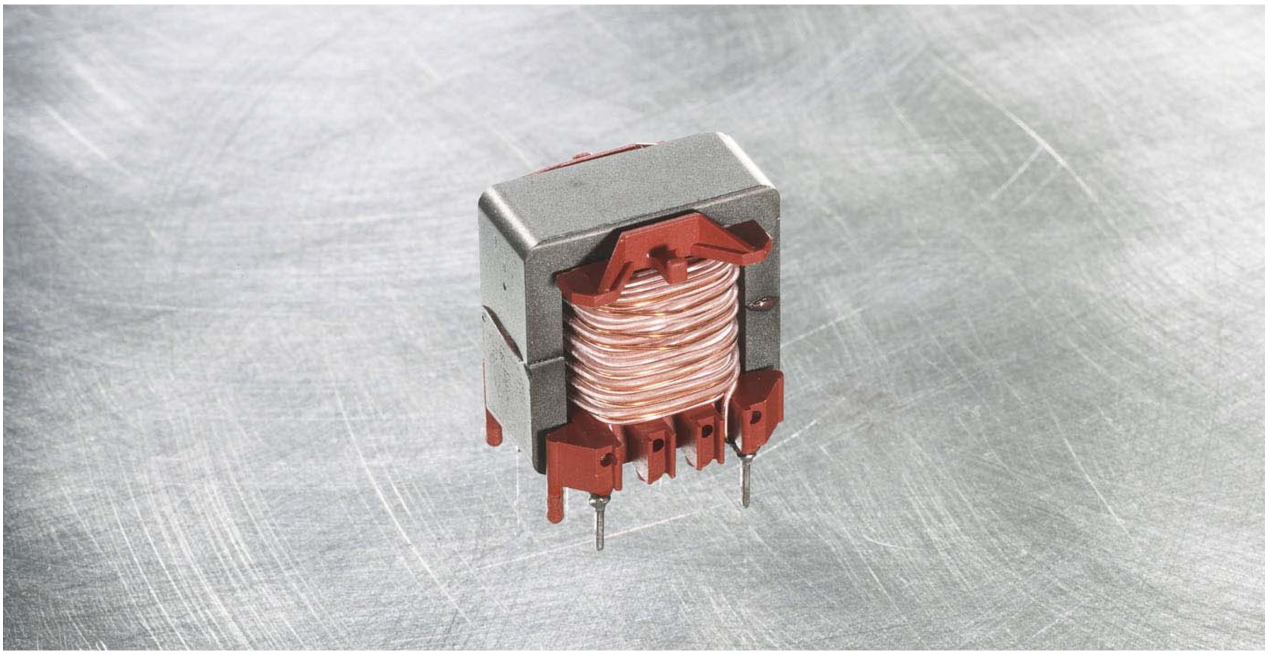
[1)] Reference value

Saturation curve



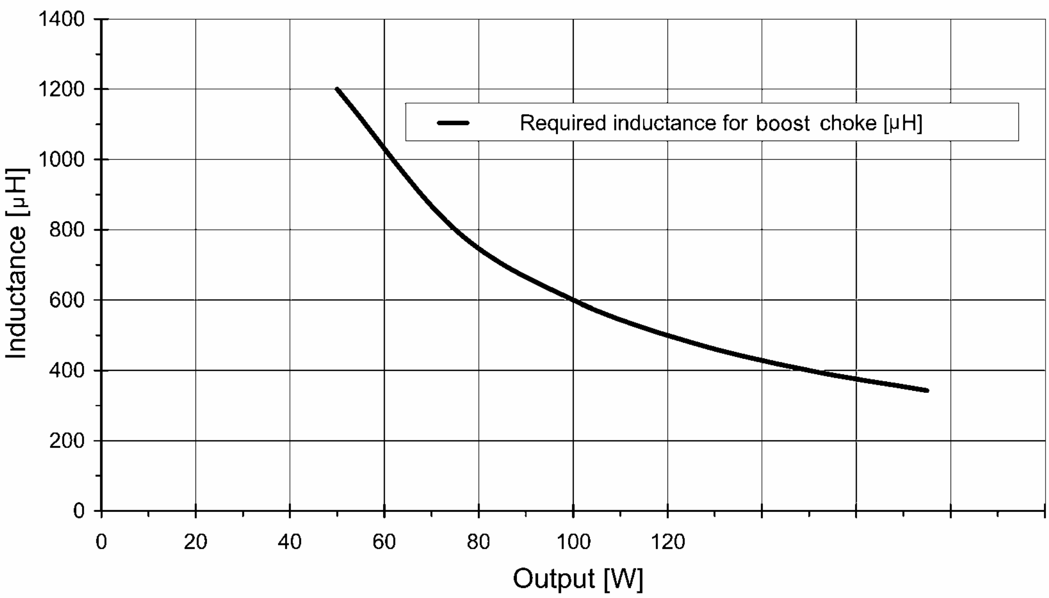


A3.2 DISCONTINUOUS MODE



Discontinuous mode boost choke

Input voltage: 90-265 VAC; output voltage: 410 VDC
Switching frequency 40 kHz



A3.2 DISCONTINUOUS MODE

Application

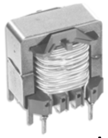
PFC choke for discontinuous mode.
With this application, the existing switched mode power supply has to be designed for PFC.

Construction

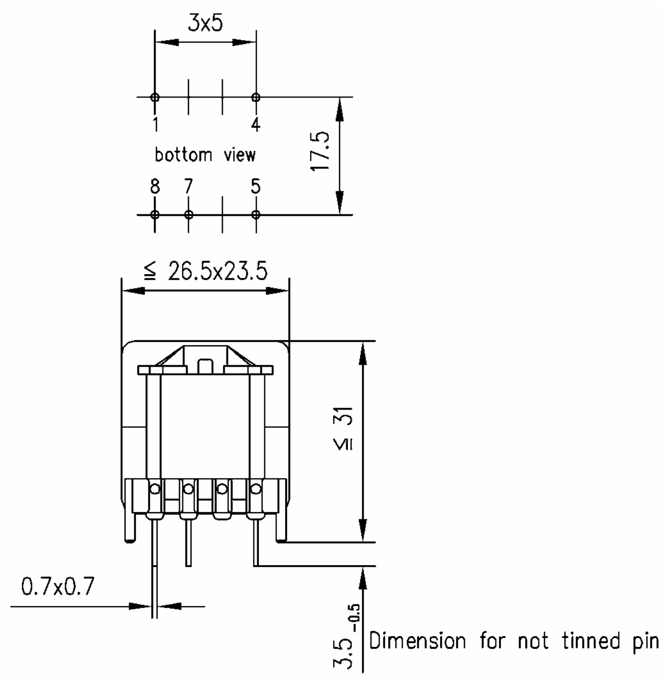
- Core: EF 25/11
- Coilformer: EF 25/11 vertical

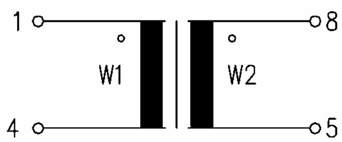
Technical data

- Climate category 40/125/56 according to IEC 68-1
- Nominal inductance at 10 kHz, 25°C
- Inductance tolerance ± 10%
- DC resistance per winding (reference values measured according to VDE 0565-2)
- Ambient temperature 60°C
- Temperature rise of windings < 55°C
- Max. permissible temperature of windings 115°C
- Input voltage 90 – 265 V
- Typical switching frequency 40 kHz



A3.2 DISCONTINUOUS MODE |EF 25/11

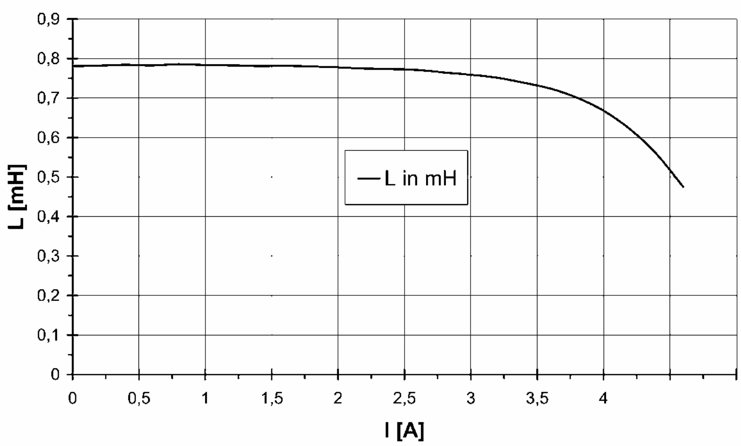




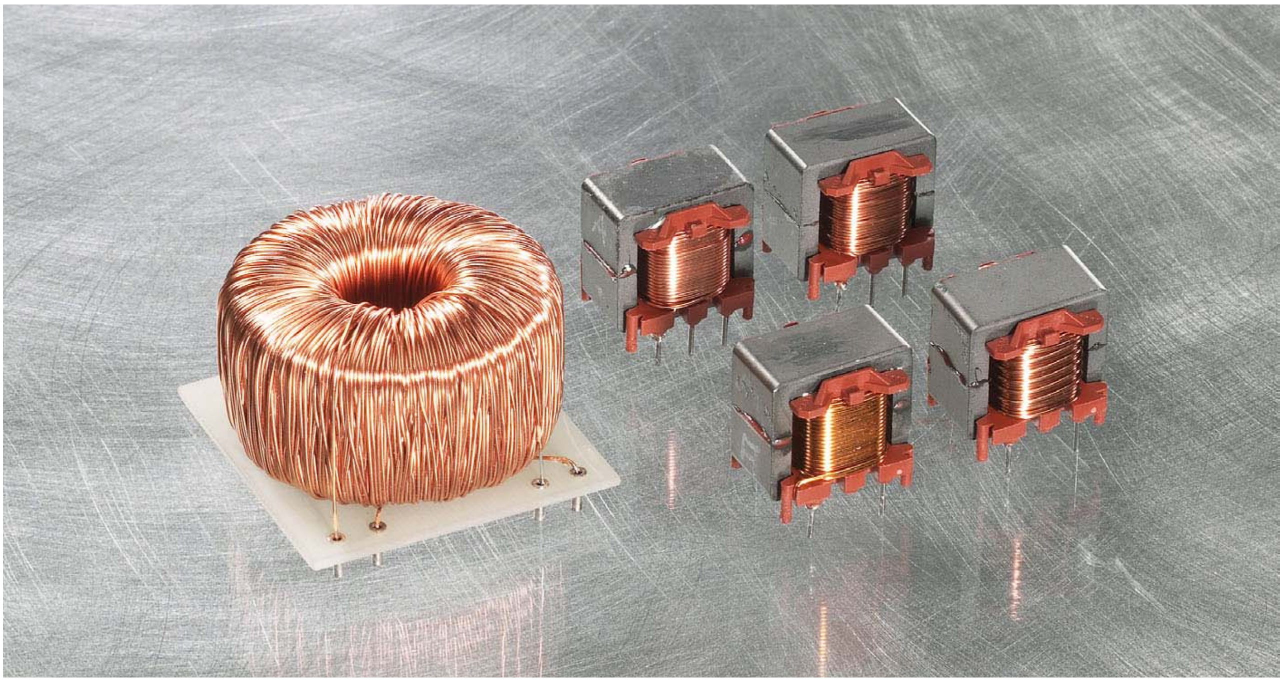
EF 25/11 vertical (R_{th}[1] = 32 K/W)				
Output power (W)	I_{peak} (A)	L (µH) ± 15%	R_{Cu} [1] (Ω)	Part number
75	2.8	800	≤ 0.56	575 06 045 00

[1] Reference value

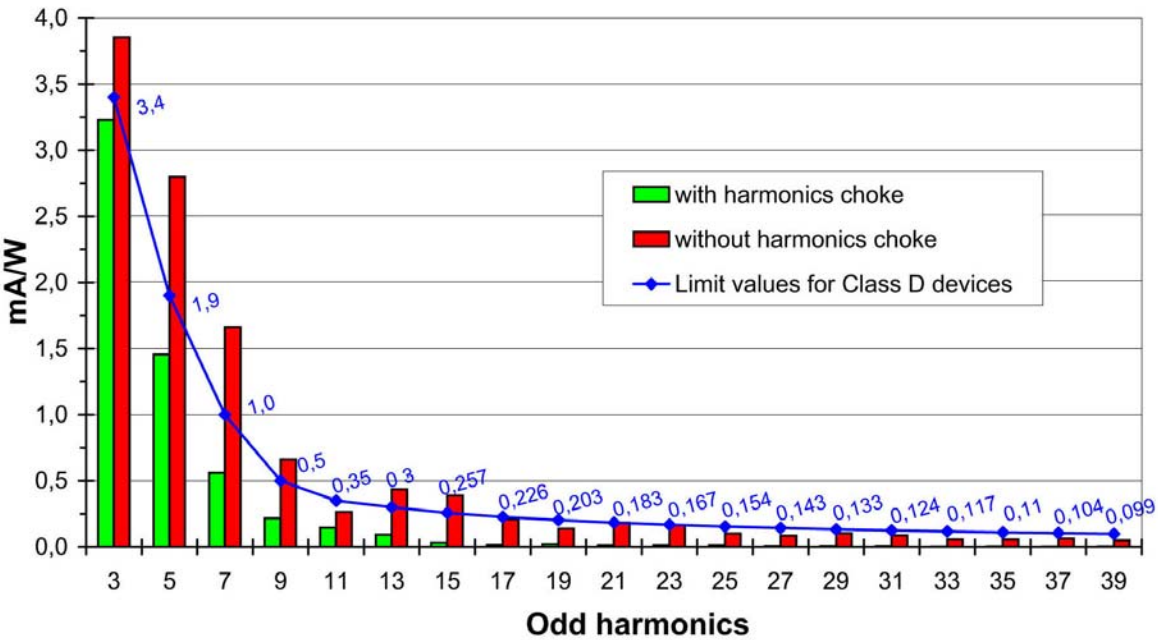
Saturation curve



A3.3 PASSIVE SOLUTIONS



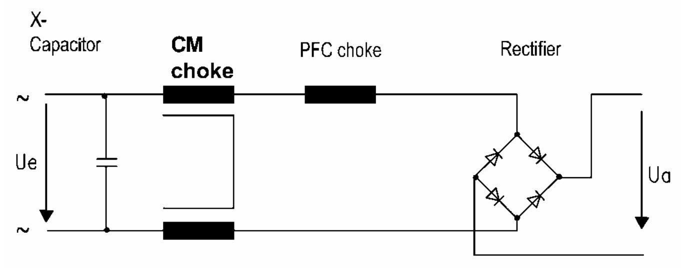
Harmonics for Class D devices (at approx. 75 W)



A3.3 PASSIVE SOLUTIONS

To A 3.3 Harmonics chokes

For existing power supplies, harmonic chokes, can be switched in front of the switched mode power supply.

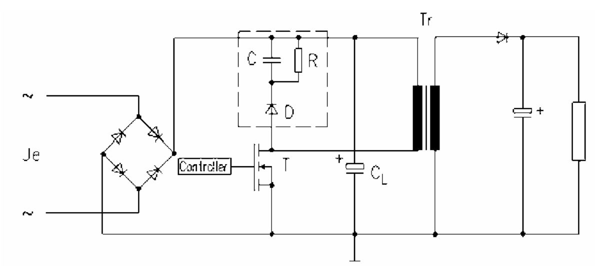


The **X-capacitor** has to be switched between the voltage supply and CM choke, otherwise resonance fluctuations can occur between the **PF choke** and X-capacitor.

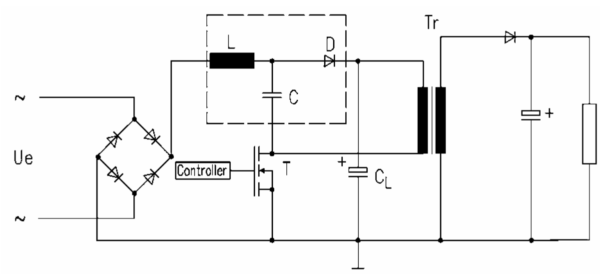
To A 3.3 Sinusoidal chokes for pump circuit

In this example with a standard switched mode power supply, a pump circuit is integrated instead of the cut-off circuit.

With the standard cut-off circuit:



Circuit diagram of the new pump circuit:



A3.3 PASSIVE SOLUTIONS | HARMONICS CHOKES

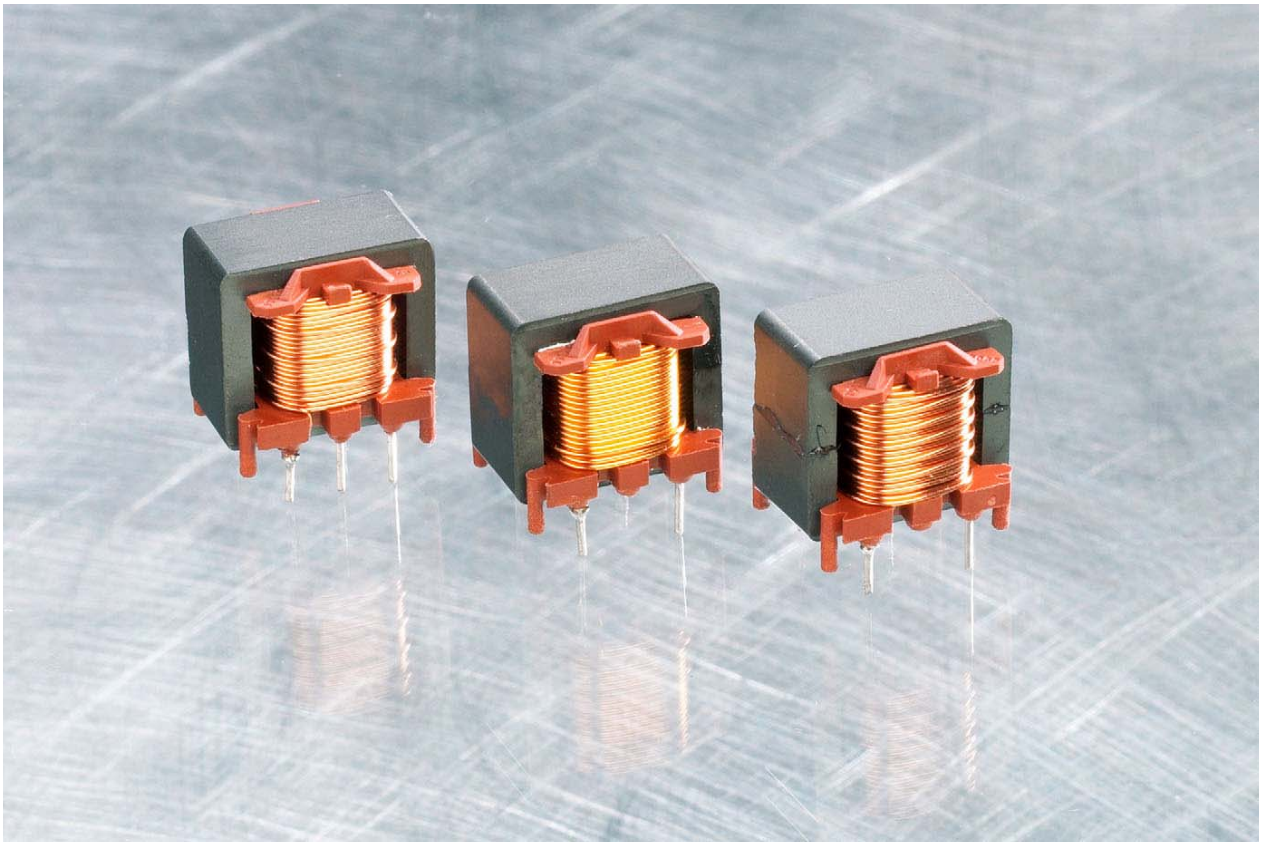
The use of a harmonics choke is the simplest and cheapest solution for maintaining standard EN 61000-3-2 requirements for harmonics since it is not necessary to redesign an existing power supply. Harmonic chokes are most frequently designed with ferrous powder cores or with laminated cores.

Advantages

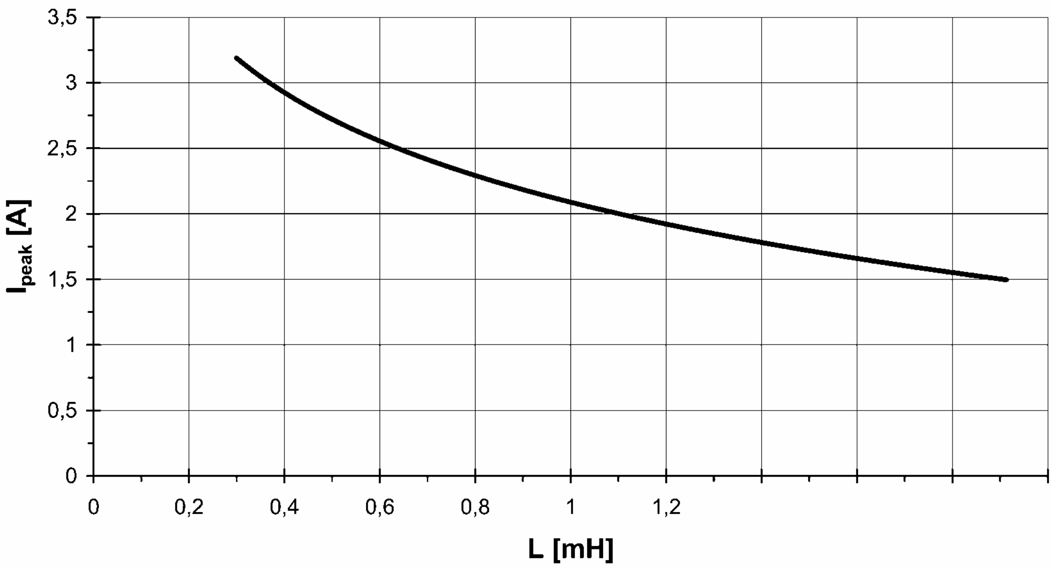
- Cheapest possibility for maintaining harmonics limits
- No redesign of existing power supplies
- Reduction of the reactive power component
- Increase in power factor

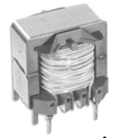
A standard VOGT series is currently under development.
Customer-specific types available on request.

A3.3 PASSIVE SOLUTIONS | SINUSOIDAL CHOKE



I_{peak} as a function of inductance





A3.3 PASSIVE SOLUTIONS | SINUSOIDAL CHOKE

Application

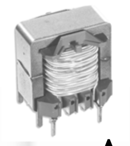
These chokes are used in switched mode power supplies, typically for PCs, monitors for PCs, televisions, etc. Together with the so-called pump circuit, switched mode power supplies can now be modified so that they observe the permitted limit values for class-D equipment.

Structure

- E 20/11 k vertical design
- Installation height = 21 mm

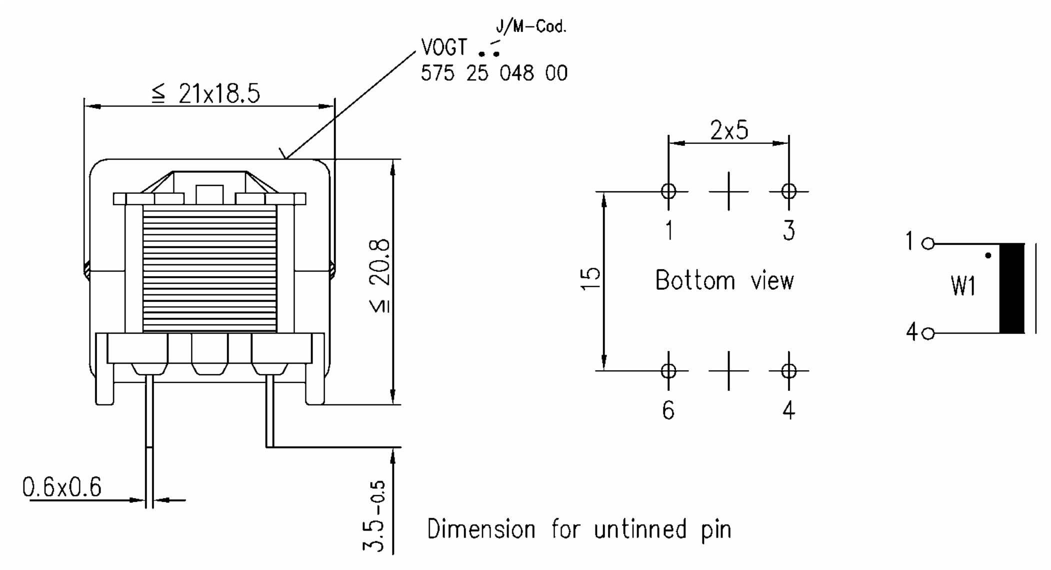
Technical data

- Climate category 40/125/56 according to IEC 68-1
- Nominal inductance at 10 kHz, 25°C
- Inductance tolerance ± 10%
- DC resistance per winding (reference values measured according to VDE 0565-2)
- Ambient temperature 60°C
- Temperature rise of windings < 55°C
- Max. permissible temperature of windings 115°C



VOGT electronic
Since 1934 – we solve it

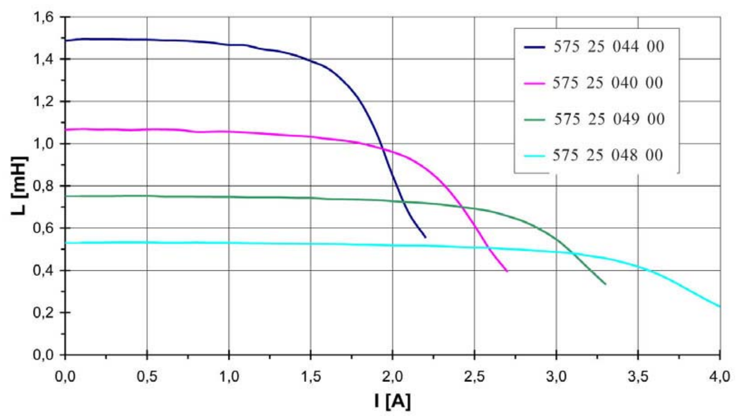
A3.3 PASSIVE SOLUTIONS | SINUSOIDAL CHOKE | EF 20/11 K

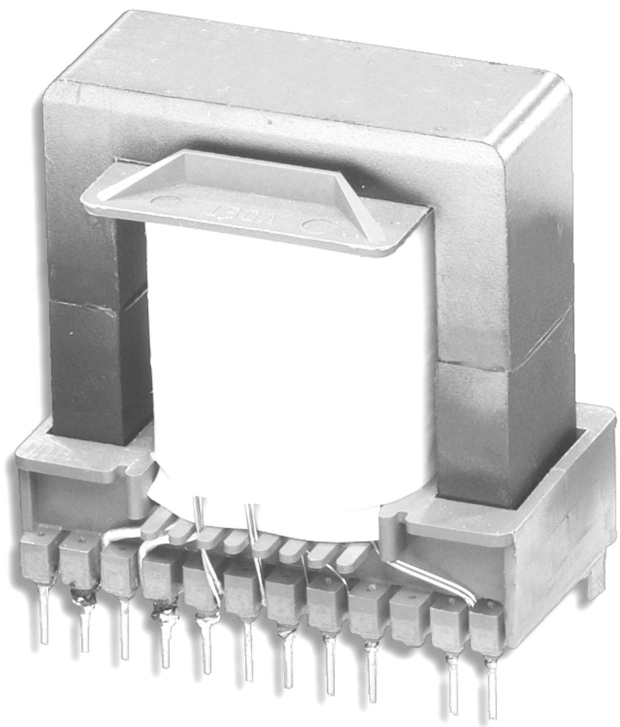


EF 20/11 k for pump circuit			
I_{peak} [1) (A)	L_N [1) (mH) ± 10%	R_{Cu} [1) (mΩ)	Part number
≤ 2.7	0.53	≤ 290	575 25 048 00
≤ 2.4	0.75	≤ 417	575 25 049 00
≤ 2.0	1.00	≤ 480	575 25 040 00
≤ 1.7	1.50	≤ 690	575 25 044 00

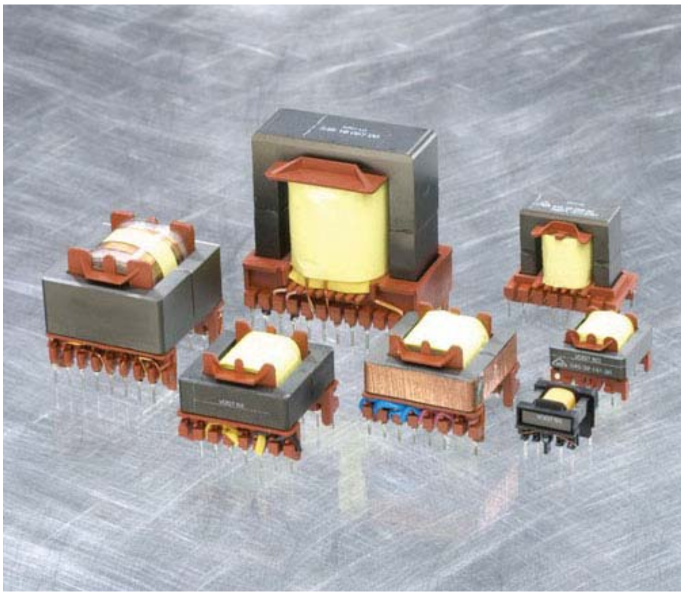
[1) Reference value

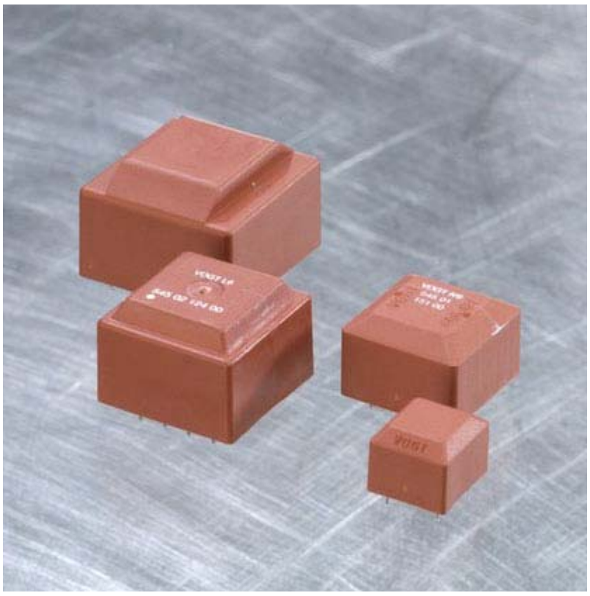
Saturation curves





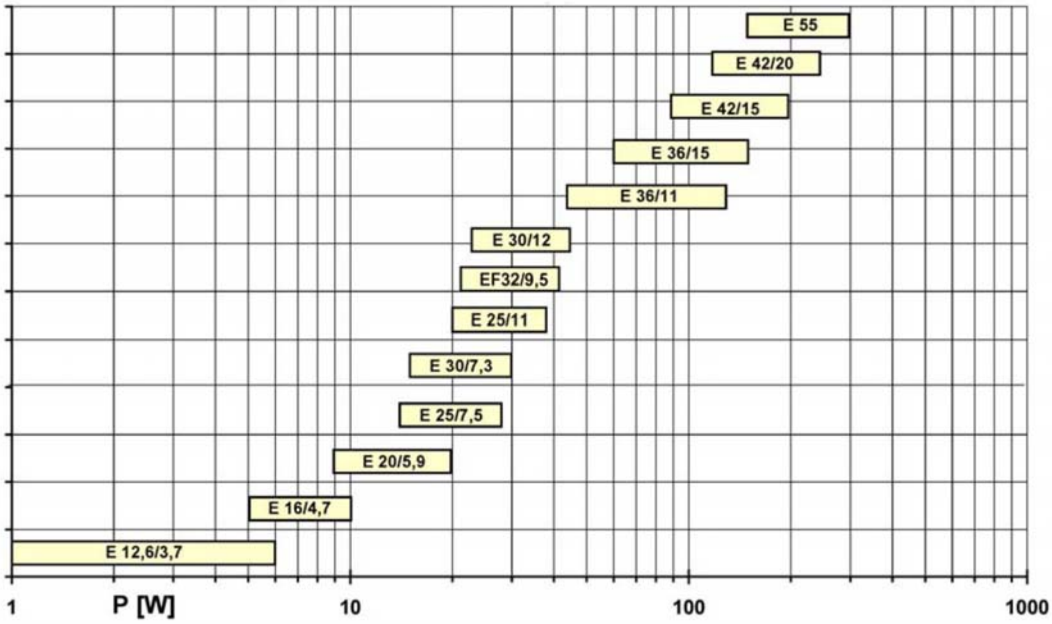
A4.1 FLYBACK/FORWARD CONVERTER E-CORE

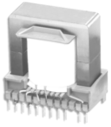




Power comparison of various E kits

Flyback converter mode at 100 kHz
Secondary power P





A4.1 FLYBACK/FORWARD CONVERTER E-CORE

Application

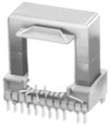
- Standby transformers
- Video recorders
- SAT systems
- TV sets
- Low-cost applications, etc.

Construction

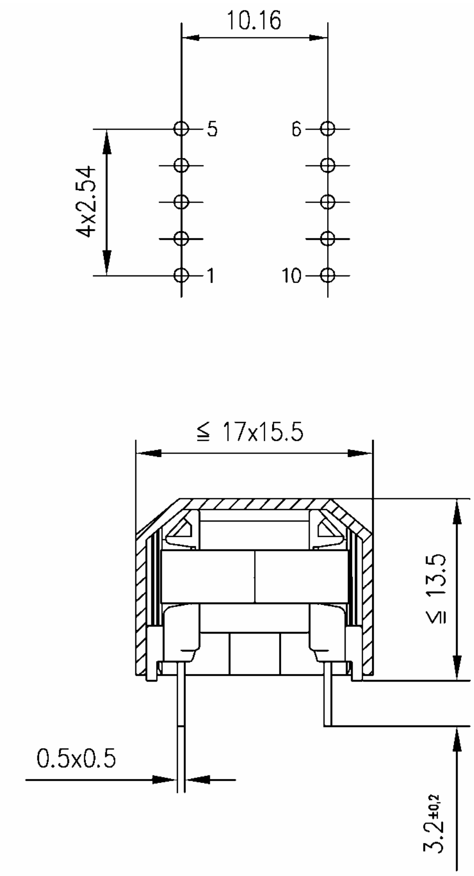
- E 12,6 – E 55 kits
- Upright and flat versions
- Open or molded structures
- E 16/4,7 kit with open structure

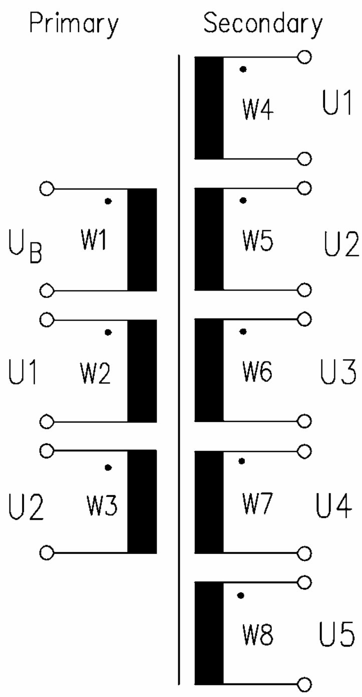
Technical data

- Climate category 40/125/56 in accordance with IEC 68-1
- Maximum permissible temperature of windings 115°C
- Additional technical data and standards: see the following data sheets



A4.2 FLYBACK/FORWARD CONVERTER 1-10 WATT |E 12.6/3.7

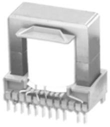




Working Frequency (kHz)	Primary				Standard	Structure	U_P [1] Prim. - Sec. (kV)	Secondary					Part no.
	U_B (V_{DC})		U1 (V)	U2 (V)				U1 (I_{max})	U2 (I_{max})	U3 (I_{ma})	U4 (I_{max})	U5 (I_{max})	
	min	max											
44	85	265			EN 61558	molded	4.0	5 V (40mA)					545 19 150 00

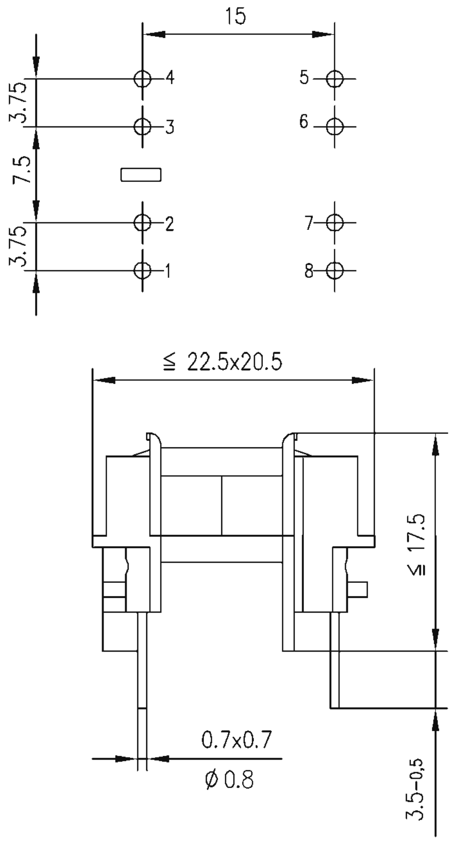
[1] Test voltage U_P (f = 50 Hz; t = 1 sec)

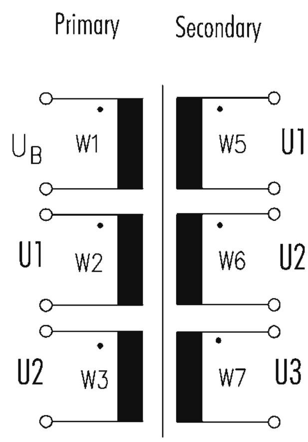
Standard types (additional types in preparation)
Customer-specific types on request



A4.2 FLYBACK/FORWARD CONVERTER 1-10 WATT | E 16/4.7

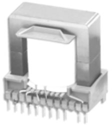
Open E core structures



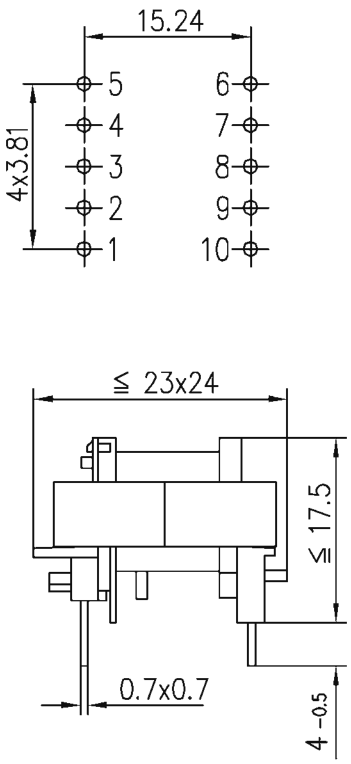


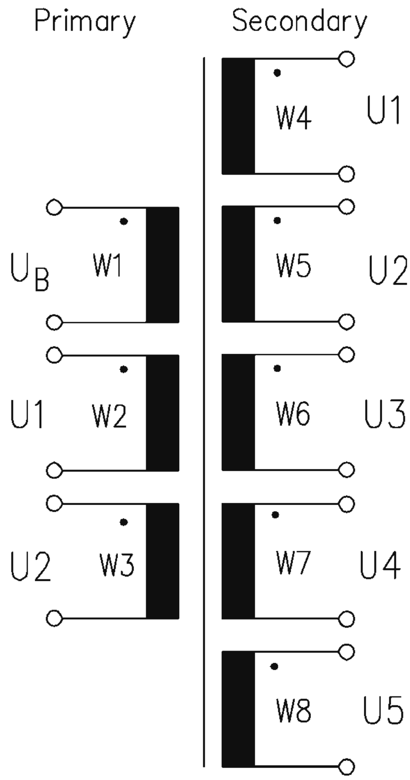
Working frequency (kHz)	Primary				U_P [1] Prim. -Sec. (kV)	Secondary			Part no. [2]
	U_B (V_{DC})		U1 (V)	U2 (V)		U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	
	min	max							
60…100…130	130	375			4.2	12V (0.4A)	5V (1.0A)		545 23 315 00
115…140	120	400	15		4.2	24V (0.25A)			545 23 211 00
124…140	240	375			4.2	28V (0.28A)			545 23 224 00
100	100	450	15		4.2	15V (0.15A)			545 23 281 00
60…100…130	130	375			4.2	12V (0.4A)	12V (0.4A)		545 23 314 00

[1] Test voltage U_P (f = 50 Hz; t = 1 sec)
[2] Group Approval EN 60065/EN 60950/EN 61558-2-17



A4.2 FLYBACK/FORWARD CONVERTER 1-10 WATT | E 20/5.9 S





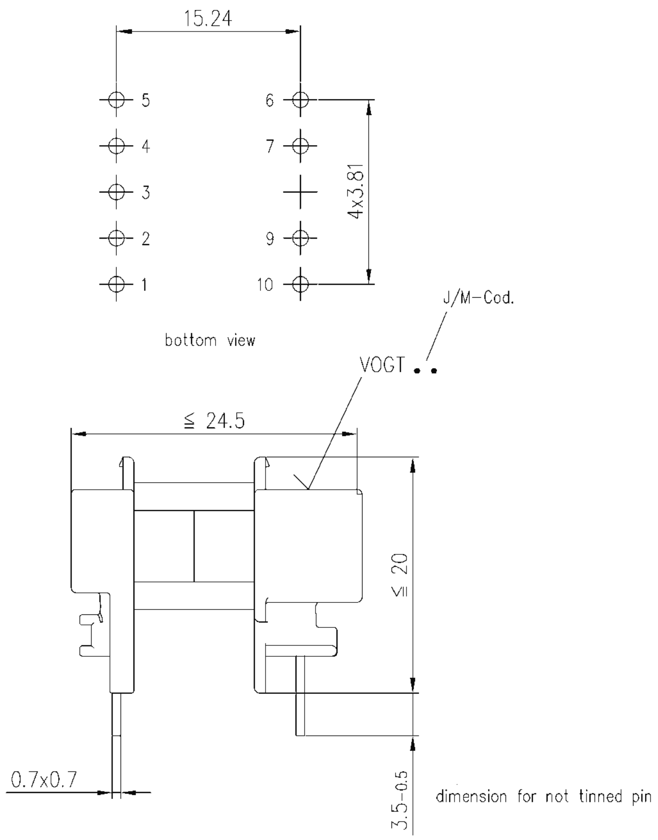
Working frequency (kHz)	Primary				Stand-ard	U_P[1)] Prim.-Sec. (kV)	Secondary					Part no.
	U_B (V_{DC}) min	U_B (V_{DC}) max	U1 (V)	U2 (V)			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
130	120	375			VDE 0860	3.0	12V (0.42A)					545 09 010 00
60	125	374	13		VDE 0860	4.2	5V (0.4A)					545 09 012 00

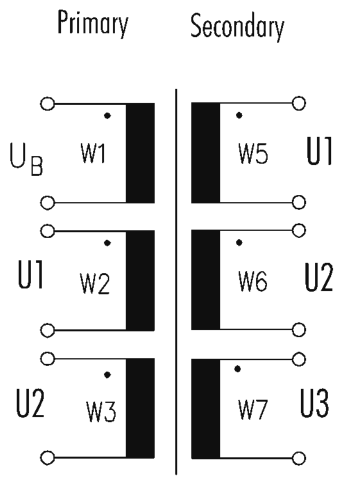
[1)] Test voltage U_P (f = 50 Hz; t = 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request

A4.3 FLYBACK/FORWARD CONVERTER 10-30 WATT |E 20/5.9

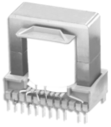
Open E-core structures





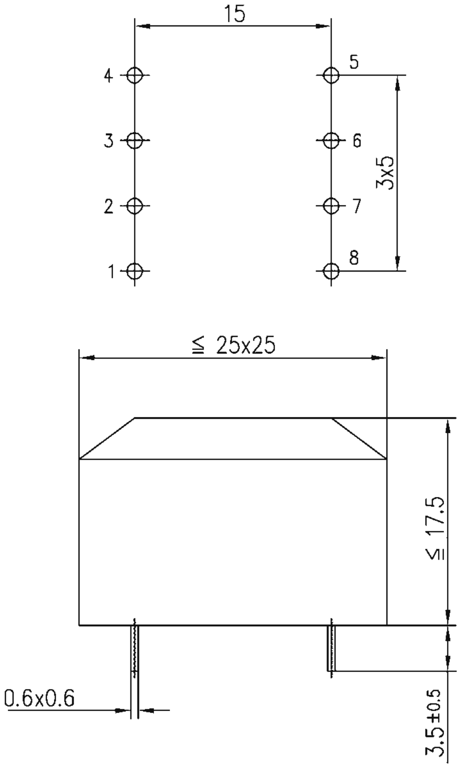
Working frequency (kHz)	Primary				U_P 1) Prim.-Sec. (kV)	Secondary			Part number 2)
	U_B (V_{DC}) min	U_B (V_{DC}) max	U1 (V)	U2 (V)		U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	
60	120	355	12		4.5	5V (6A)			545 01 225 00
100	282	360	12		4.5	13.5V (1.1A)			545 01 228 00
60...100...130	130	375			4.5	12V (0.65A)	5V (1.5A)		545 01 273 00
100	290	358			4.5	3.3V (1.2A)	5V (1A)	12V (0.5A)	545 01 246 00
60...100...130	130	375			4.5	12V (0.65A)	12V (0.65A)		545 01 274 00

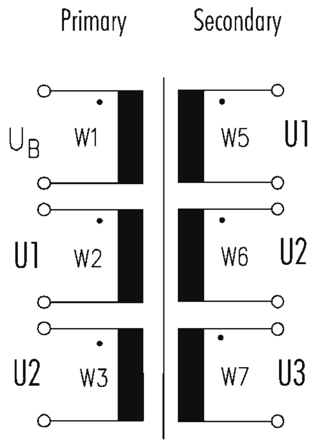
1) Test voltage U_p (f = 50 Hz; t = 1 sec)
2) Group Approval EN 60065/EN 60950/EN 61558-2-17



A4.3 FLYBACK/FORWARD CONVERTER 10-30 WATT |E 20/5.9

Molded E core structures

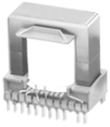




Working Fre-quency	Primary				Stand-ard	Struc-ture	U_P[1]	Secondary					Part number
	U_B (V_{DC})		U1	U2			Prim. -Sec.	U1	U2	U3	U4	U5	
(kHz)	min	max	(V)	(V)			(kV)	(I_{max})	(I_{max})	(I_{max})	(I_{max})	(I_{max})	
100	255	358	24		VDE 0805 EN 60950	molded	3.0	24V (0.8A)					545 01 151 00

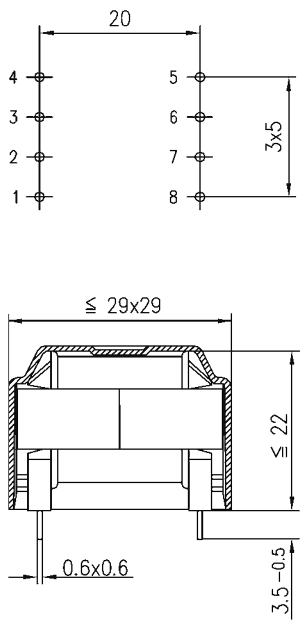
[1] Test voltage U_P (f = 50 Hz; t= 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request

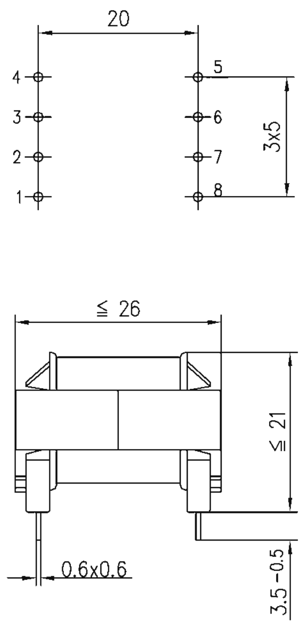


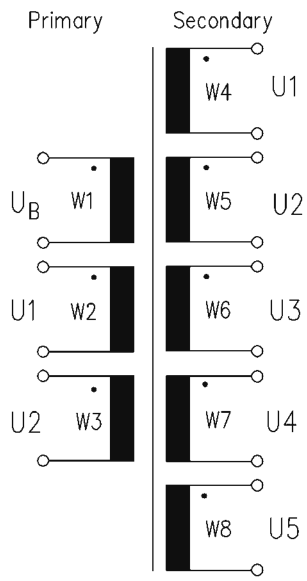
A4.3 FLYBACK/FORWARD CONVERTER 10-30 WATT | E 25/7.5

Type A



Type B

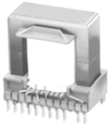




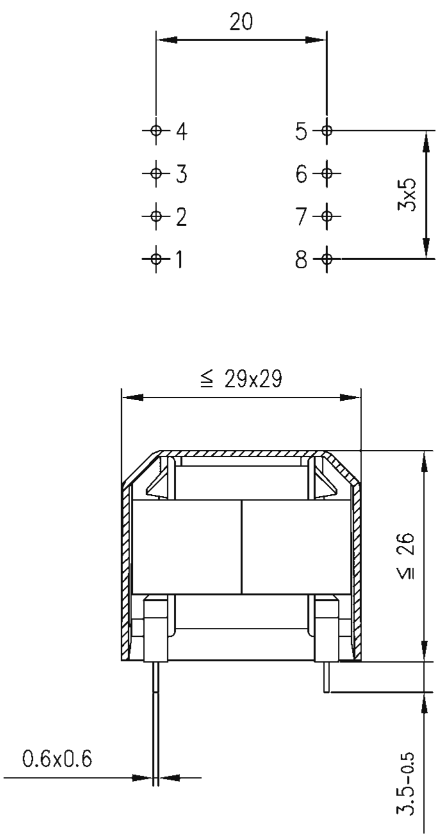
Working frequency (kHz)	Primary				Stand-ard	Struc-ture	U_P [1] Prim.-Sec. (kV)	Secondary					Part no.
	U_B (V_{DC})		U1 (V)	U2 (V)				U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
	min	max											
100	127	360	12		EN 60950	Type A molded	3.5	5V (1.2A)	5V (1.2A)				545 02 124 00
100	195	265	12		VDE 0860	Type B	3.0	8V (0.8A)	12V (0.8A)				545 02 141 00

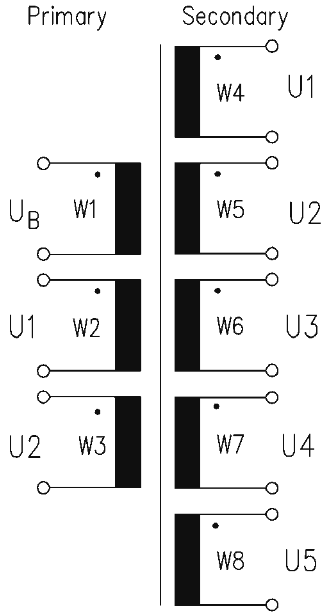
1) Test voltage U_P (f = 50 Hz; t= 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request



A4.3 FLYBACK/FORWARD CONVERTER 10-30 WATT |E 25/11

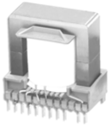




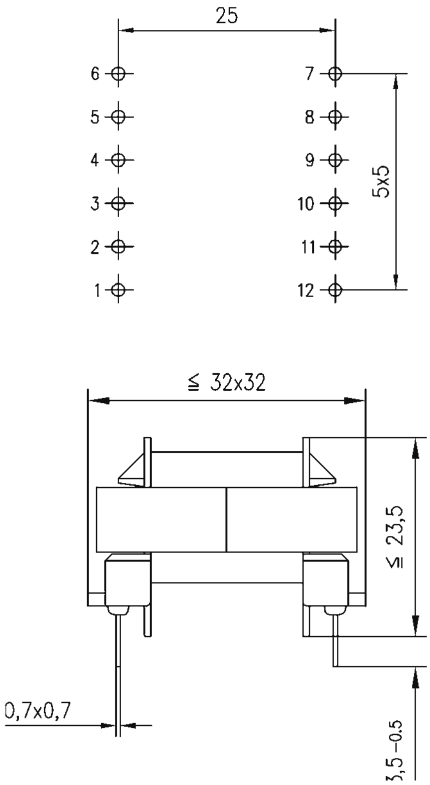
Working frequency (kHz)	Primary				Stand-ard	Struc-ture	U_P [1)] Prim.-Sec. (kV)	Secondary					Part no.
	U_B (V_{DC})		U1 (V)	U2 (V)				U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
	min	max											
100	270	360	12		VDE 0805	molded	3.5	18V (1.3A)					545 27 017 00
100	290	360	12		VDE 0805	molded	3.5	5V (2.3A)					545 27 021 00

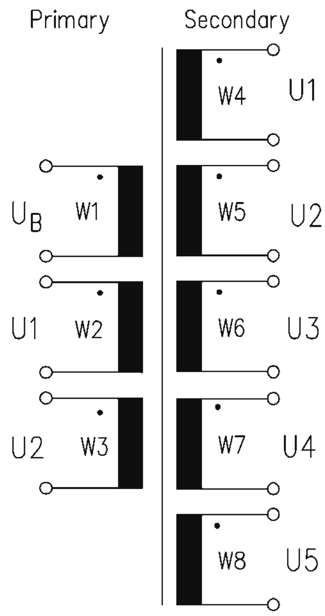
1) Test voltage U_P (f = 50 Hz; t= 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request



A4.3 FLYBACK/FORWARD CONVERTER 10-30 WATT |E 30/7.3



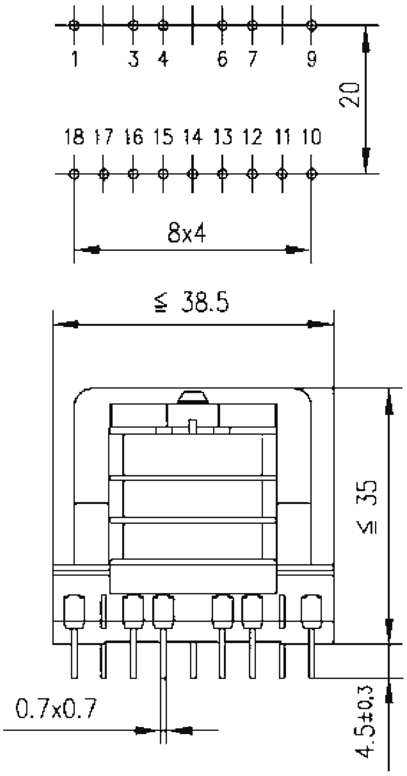


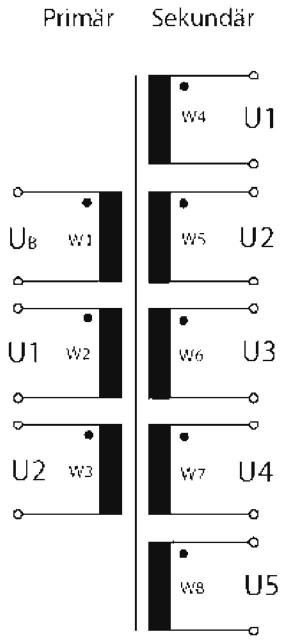
Working frequency (kHz)	Primary				Standard	U_P [1] Prim.-Sec. (kV)	Secondary					Part number
	U_B (V_{DC})		U1 (V)	U2 (V)			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
	min	max										
100	120	380	12		VDE 712 (Part 24 A1) EN 60928	4.0	24V (1A)					545 03 064 00

[1] Test voltage U_P (f = 50 Hz; t= 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request

A4.3 FLYBACK/FORWARD CONVERTER 10-30 WATT |E 32/11 S

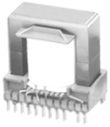




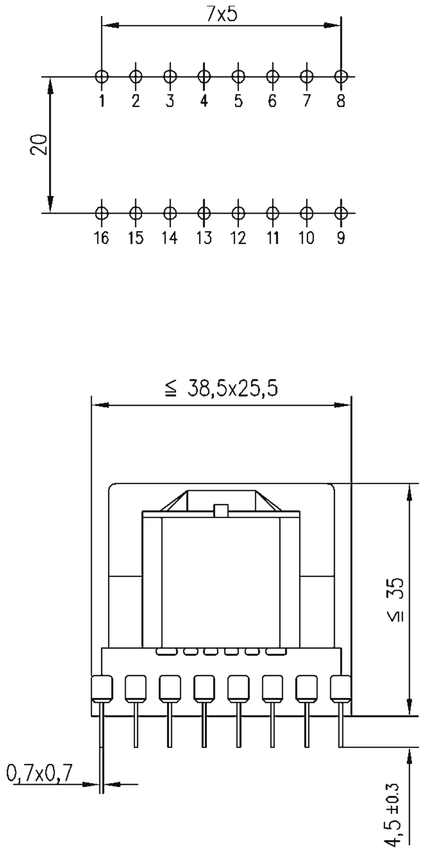
Working frequency (kHz)	Primary				Standard	U_P [1] Prim. - Sec. (kV)	Secondary					Part number
	U_B (V_{DC})		U1 (V)	U2 (V)			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
	min	max										
100	250	355	12		VDE 0860	3.0	18V (1.66A)					545 42 032 00
50	250	360	12		EN 60065	3.0	5V (2.67A)	14V (1.9A)	19.8V (0.25A)	27V (24mA)		545 42 047 00
67	255	360	18		VDE 0860 EN 60065 IEC 65	3.75	24V (0.3A)	12V (0.5A)	5V (2A)	3.3V (1.5A)		545 24 051 00
100	120	360	12		EN 60065	3.0	30V (10mA)	24V (0.6A)	12V (0.1A)	7.5V (1.5A)	3.3V (1.2A)	545 42 060 00

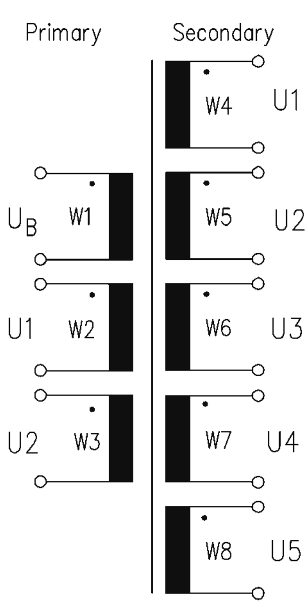
[1] Test voltage U_P (f = 50 Hz; t = 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request



A4.4 FLYBACK/FORWARD CONVERTER 30-60 WATT |E 30/12

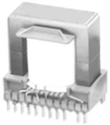




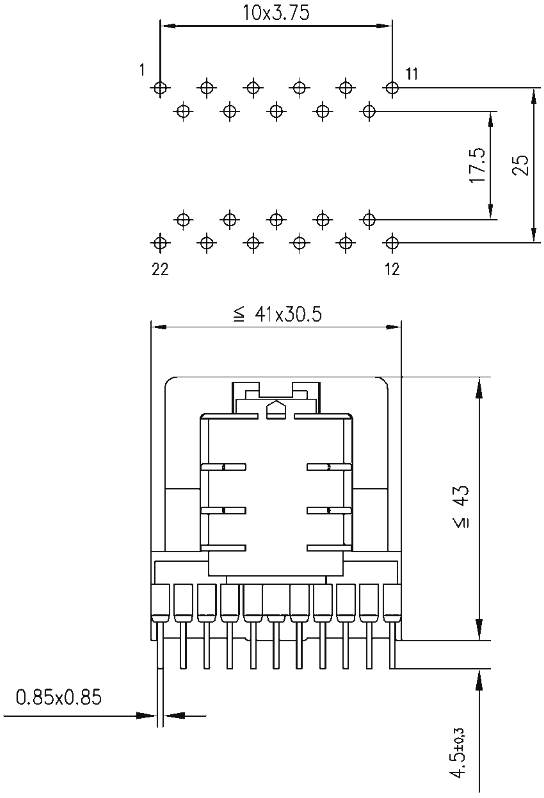
Working frequency (kHz)	Primary				Stand-ard	U_P[1] Prim.-Sec. (kV)	Secondary					Part number
	U_B (V_{DC})		U1 (V)	U2 (V)			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
	min	max										
130	180	270	12		VDE 0860 EN 60065	3.0	25V (0.3A)	5V (1.5A)	3.3V (3A)			545 08 059 00
130	275	360	12		VDE 0860	3.0	12V (1.4A)	5V (2.75A)				545 08 060 00

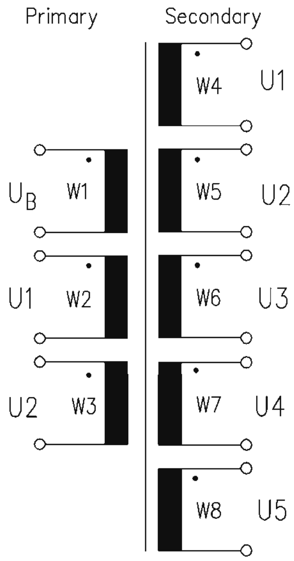
[1] Test voltage U_P (f = 50 Hz; t= 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request



A4.4 FLYBACK/FORWARD CONVERTER 30-60 WATT |E 36/11 S

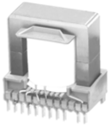




Working frequency (kHz)	Primary				Stand-ard	U_P[1] Prim.-Sec. (kV)	Secondary						Part number
	U_B (V)		U1 (V)	U2 (V)			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	U6 (I_{max})	
	min	max											
80	290	375	12		EN 60950	3.0	150V (0.35A)	8V (0.8A)	15V (0.8A)	24V (0.3A)	21V (0.8A)	28V (0.15A)	545 48 006 00
60	205	380			VDE 0860 EN 60065	3.0	105V (0.6A)	60V (10mA)	16V (1A)	8V (1A)	8V (1A)		545 48 017 00
80	180	265	12		EN 60950	3.0	145V (0.66A)	24V (1.8A)	7.5V (0.8A)				545 48 029 00

[1] Test voltage U_P (f = 50 Hz; t = 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request



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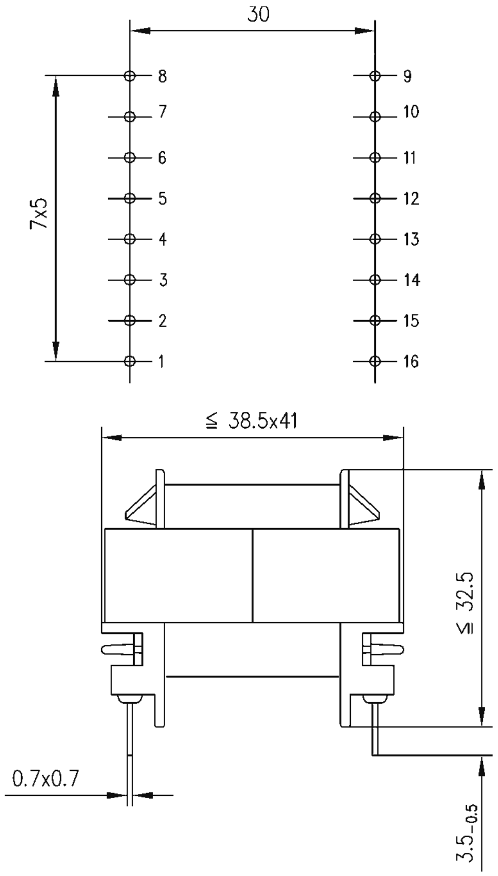
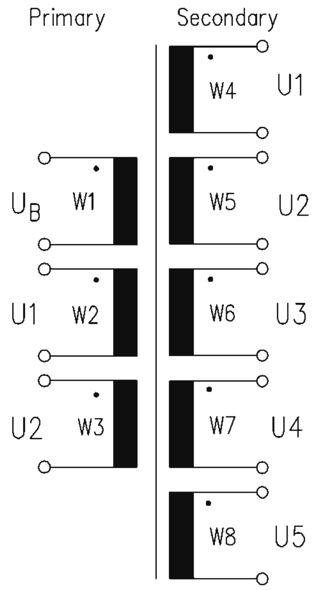
A4.5 FLYBACK/FORWARD CONVERTER 60-100 WATT |E 36/11

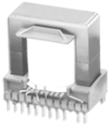




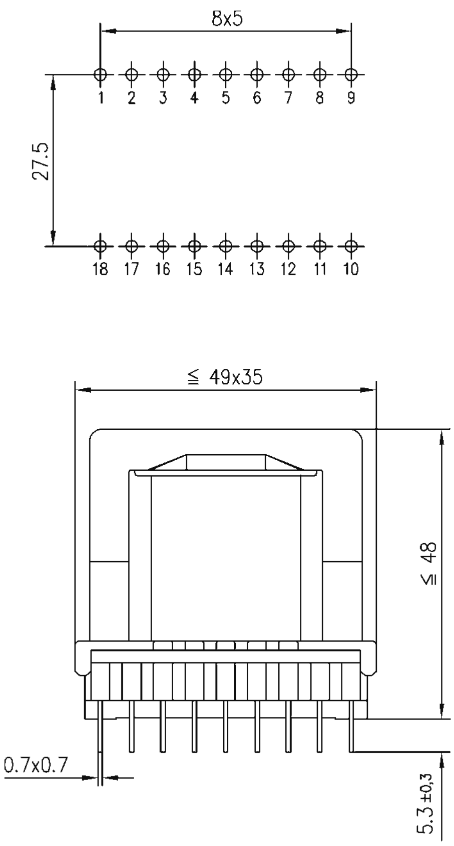
Working frequency (kHz)	Primary U_B (V) min	Primary U_B (V) max	Primary U1 (V)	Primary U2 (V)	Standard	U_P[1] Prim.-Sec. (kV)	Secondary U1 (I_{max})	Secondary U2 (I_{max})	Secondary U3 (I_{max})	Secondary U4 (I_{max})	Secondary U5 (I_{max})	Part no.
100	250	370	15		EN 60950	3.0	14.5V (6A)					545 11 093 00
60	100	375	15		EN 60950 UL 60950	3.0	19V (50mA)	12V (2.9A)	5V (2.25A)			545 11 100 00

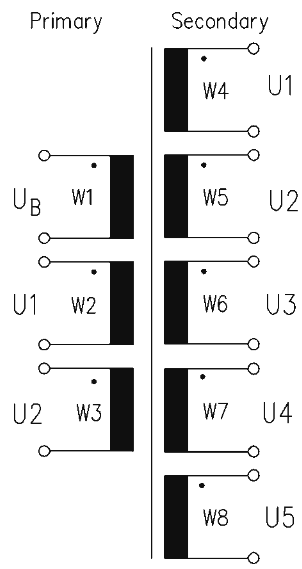
[1] Test voltage U_P (f = 50 Hz; t= 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request



A4.6 FLYBACK/FORWARD CONVERTER > 100 WATT |E 42/15



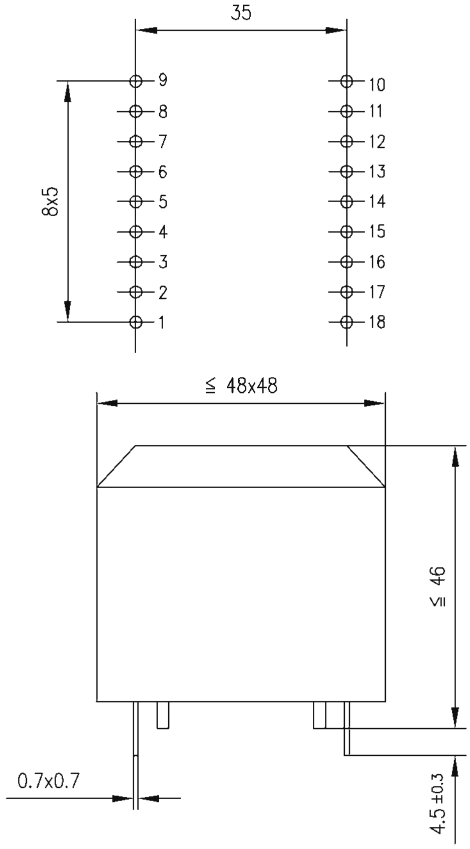


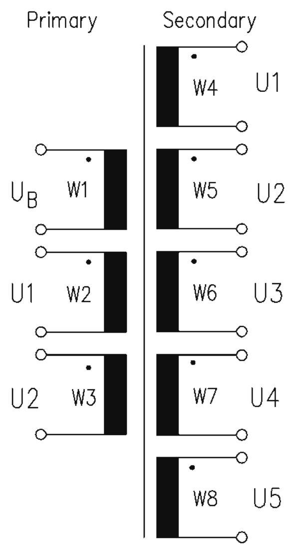
Working frequency (kHz)	Primary				Standard	U_P [1)] Prim.-Sec. (kV)	Secondary					Part number
	U_B (V)		U1 (V)	U2 (V)			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
	min	max										
40	180	270	12		VDE 0860 EN 60065 IEC 60065	3.0	5V (7A)	12V (1.6A)	25V (1.3A)	40V (50mA)		545 13 129 00

[1)] Test voltage U_P (f = 50 Hz; t= 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request

A4.6 FLYBACK/FORWARD CONVERTER > 100 WATT |E 42/20

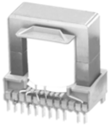




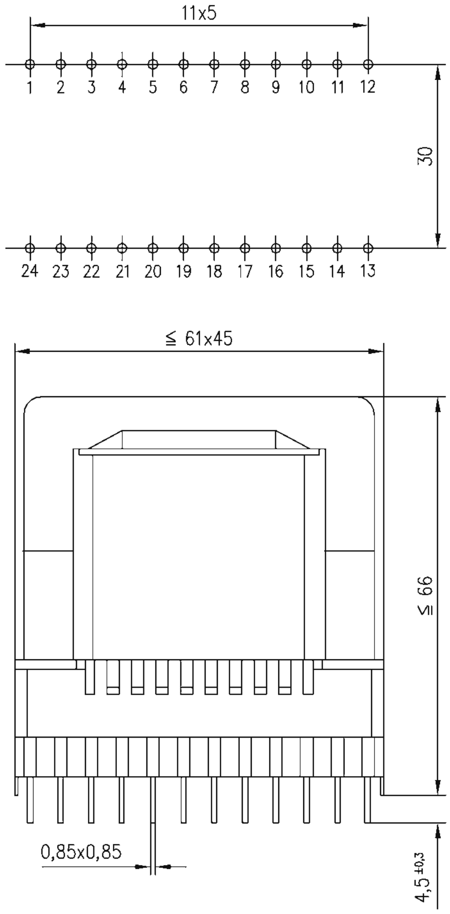
Working frequency (kHz)	Primary				Stand-ard	Struc-ture	U_P[1] Prim.-Sec. (kV)	Secondary					Part no.
	U_B (V)		U1 (V)	U2 (V)				U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
	min	max											
50	220	420	12	15V 1A	VDE 805	molded	3.75	31V (6A)	15V (1A)				545 17 104 00

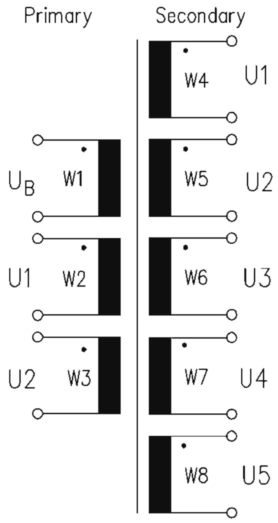
[1] Test voltage U_P (f = 50 Hz; t = 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request



A4.6 FLYBACK/FORWARD CONVERTER > 100 WATT | E 55

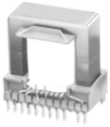




Working frequency (kHz)	Primary				Standard	U_P [1] Prim.-Sec. (kV)	Secondary					Part number
	U_B (V) min	U_B (V) max	U1 (V)	U2 (V)			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	
100	238	370	15		VDE 0805	3.0	100V (4A)	15V (0.2A)	15V (0.2A)			545 16 056 00
40	260	420	12		VDE 0551	3.75	5V (0.6A)					545 16 057 00

[1] Test voltage U_P (f = 50 Hz; t = 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request



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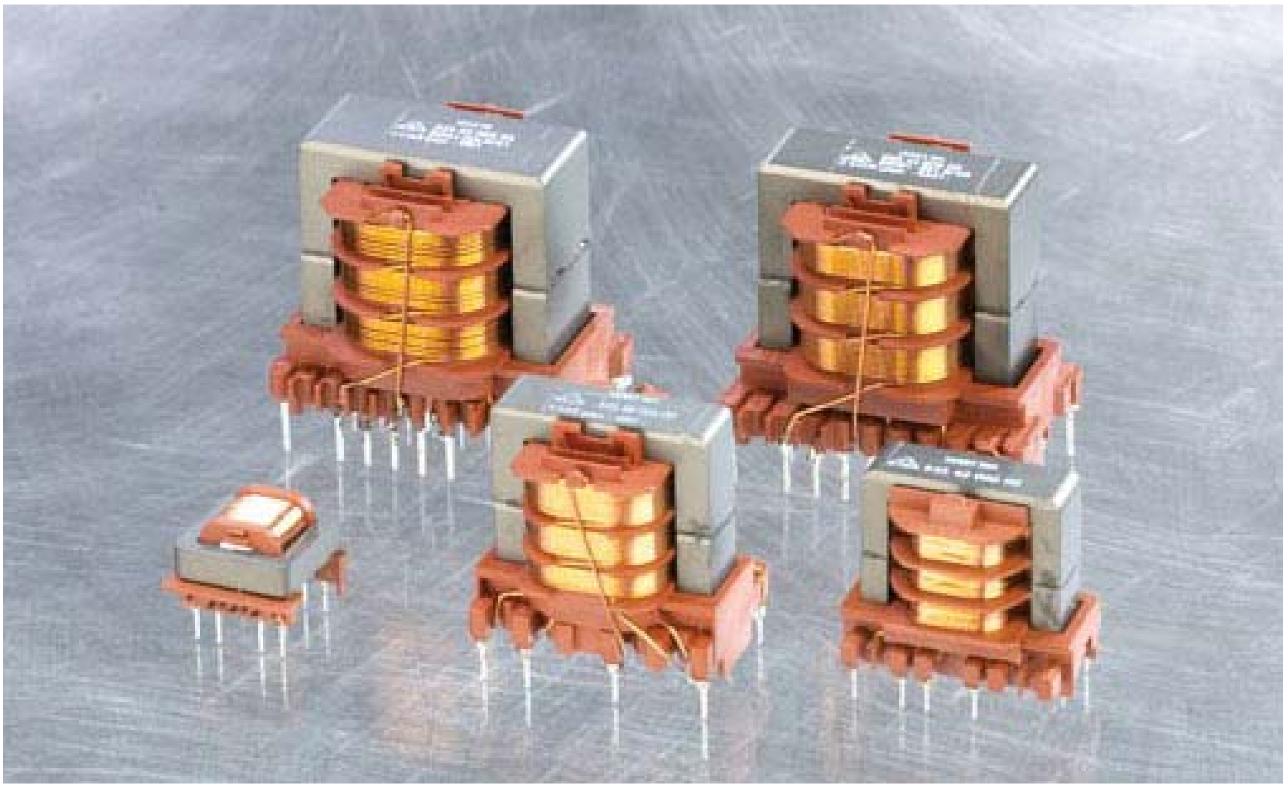
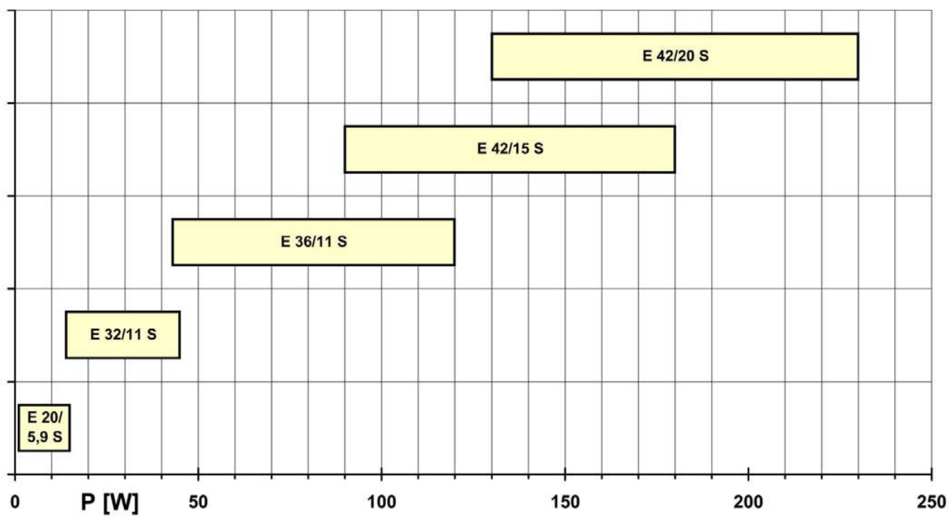
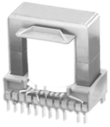
A4.6 FLYBACK/FORWARD CONVERTER > 100 WATT

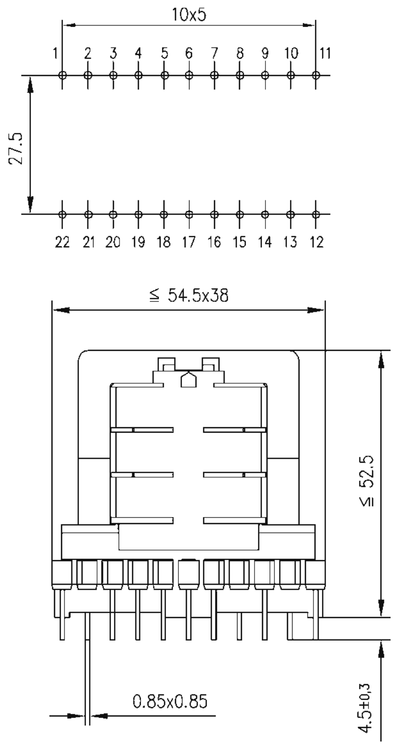


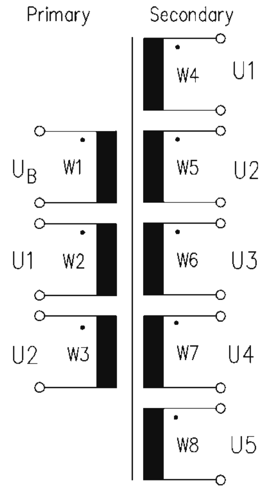
Power comparison of various plug chamber kits
Flyback-converter mode at 100 kHz
Secondary power P





A4.6 FLYBACK/FORWARD CONVERTER > 100 WATT | E 42/15 S



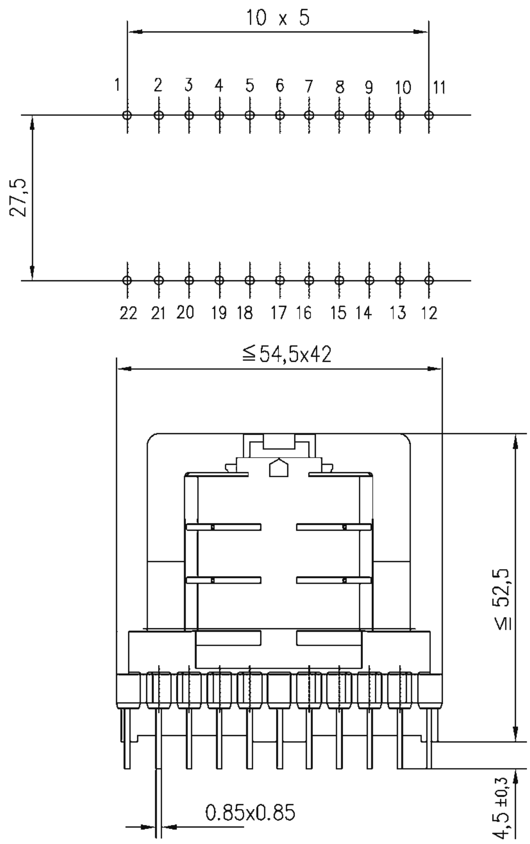


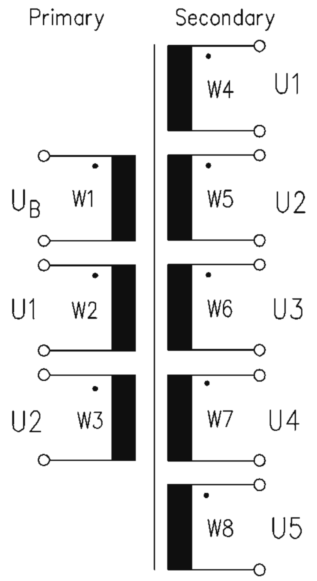
Working Frequency (kHz)	Primary				Standard	U_P [1] Prim.-Sec. (kV)	Secondary						Part no.
	U_B (V) min	U_B (V) max	U1 (V)	U2 (V)			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	U6 (I_{max})	
45	180	270	12		VDE 0860 EN 60065 IEC 60065	3.0	200V (25mA)	144V (0.6A)	16.5V (2A)	14V (0.5A)	14V (0.5A)	16.5V (4A)	545 44 032 00
66	180	270	12		VDE 0860 EN 60065 IEC 60066	3.0	200V (25mA)	138V (0.6A)	16.5V (2A)	16V (0.5A)	16V (0.5A)	16.5V (4A)	545 44 033 00

[1] Test voltage U_P (f = 50 Hz; t = 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request

A4.6 FLYBACK/FORWARD CONVERTER > 100 WATT | E 42/20 S



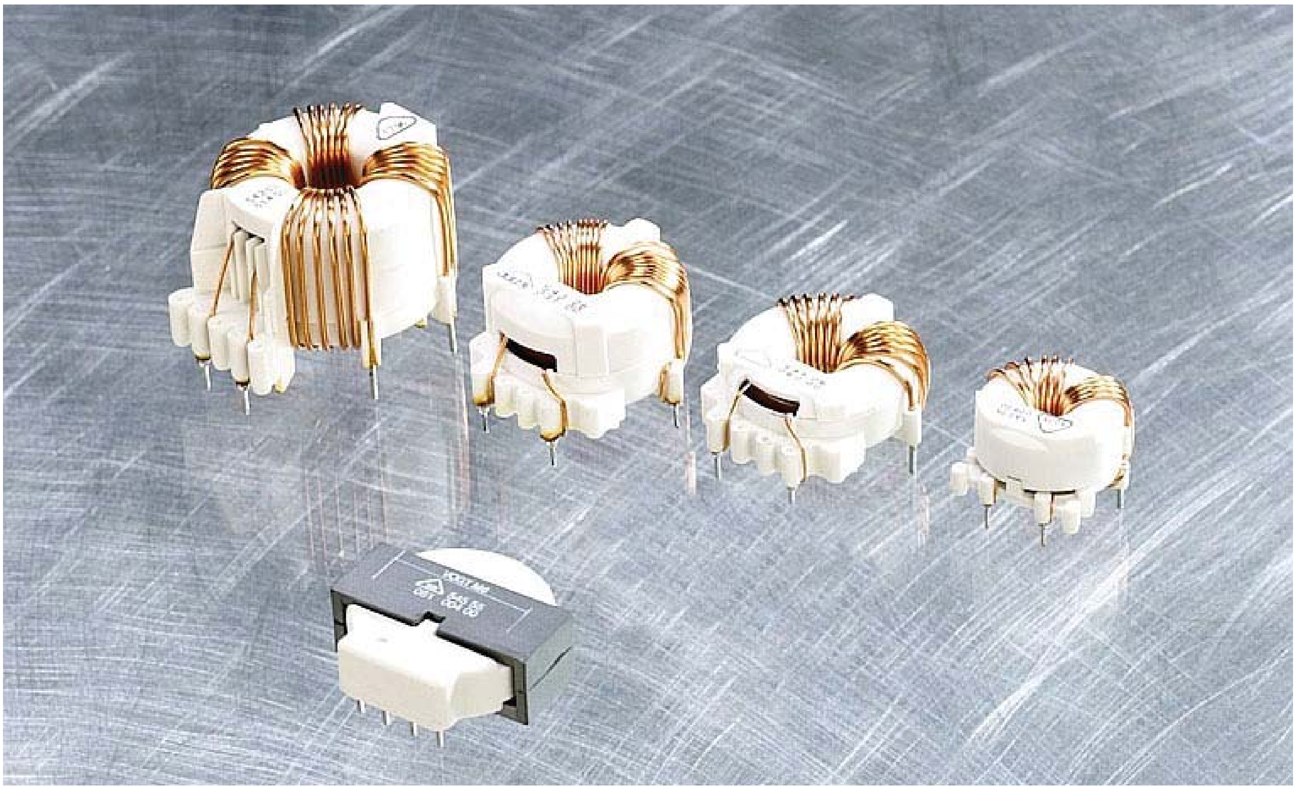


Working Frequency (kHz)	Primary U_B (V) min	Primary U_B (V) max	U1 (V)	U2 (V)	Standard	U_P[1] Prim.-Sec. (kV)	Secondary U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	U5 (I_{max})	U6 (I_{max})	Part No.
65	180	270	12		VDE 0860 EN 60065 IEC 60065	3.0	207V (25mA)	123V (0.7A)	17V (3A)	17V (0.4A)	17V (0.4A)	28V (3.5A)	545 45 079 00
65	180	270	12		VDE 0860 EN 60065 IEC 60066	3.0	207V (25mA)	123V (0.7A)	17V (2A)	17V (0.4A)	17V (0.4A)	17V (4A)	545 45 080 00

[1] Test voltage U_P (f = 50 Hz; t = 1 sec)

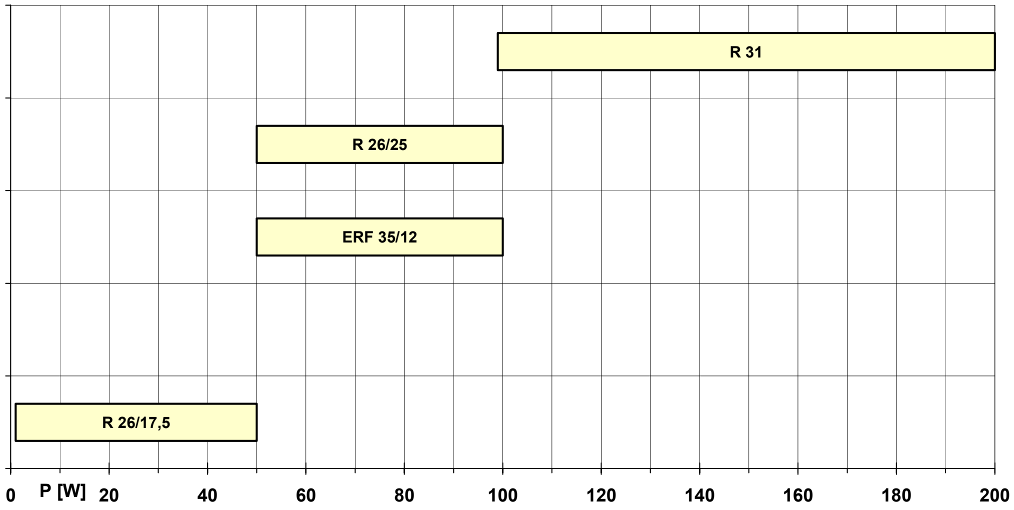
Standard types (additional types in preparation)
Customer-specific types on request

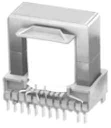
A4.7 HALF-BRIDGE/PUSH-PULL CONVERTER (TOROIDAL CORE)



Power comparison of various kits

Half bridge-converter mode at 40 kHz
Secondary power





A4.7 HALF-BRIDGE/PUSH-PULL CONVERTER (TOROIDAL CORE)

Advantages

- Primarily light technology
- Low-cost applications, etc.

Construction

- Very safe, due to spacings, built into the design

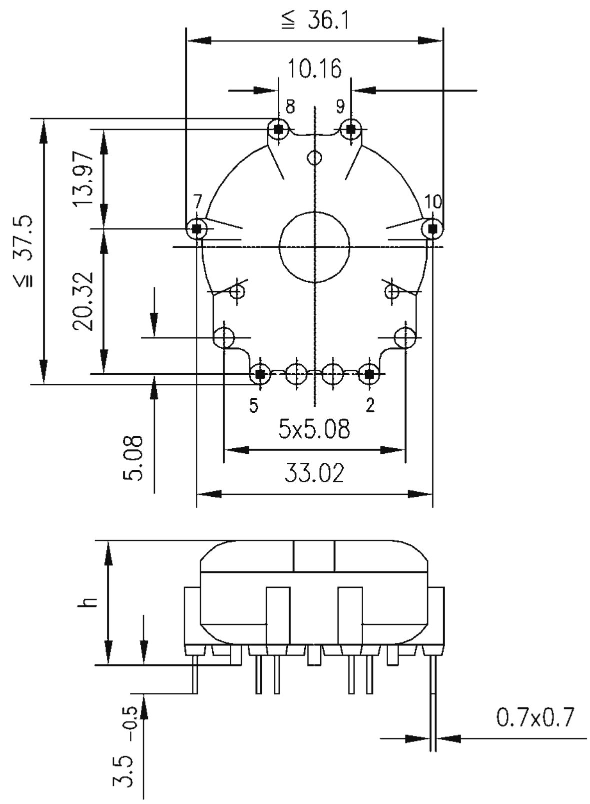
Flat transformers:
- Flat transformers with ERF cores
- Flat version
- Molded or open structure
- Very short

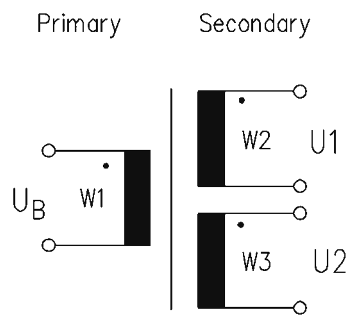
Toroidal core transformers:
- Toroidal cores with housing
- Flat version
- Compact

Technical data

- Climate category: 40/125/56 in accordance with IEC 68-1
- Maximum permissible temperature of windings 115 °C
- Test voltage (primary – secondary) flat transformer = 4 kV; toroidal core transformer = 3.75 kV
- Additional technical data and standards: see the following data sheets

A4.8 HALF-BRIDGE/PUSH-PULL CONVERTER < 100 W |R 26



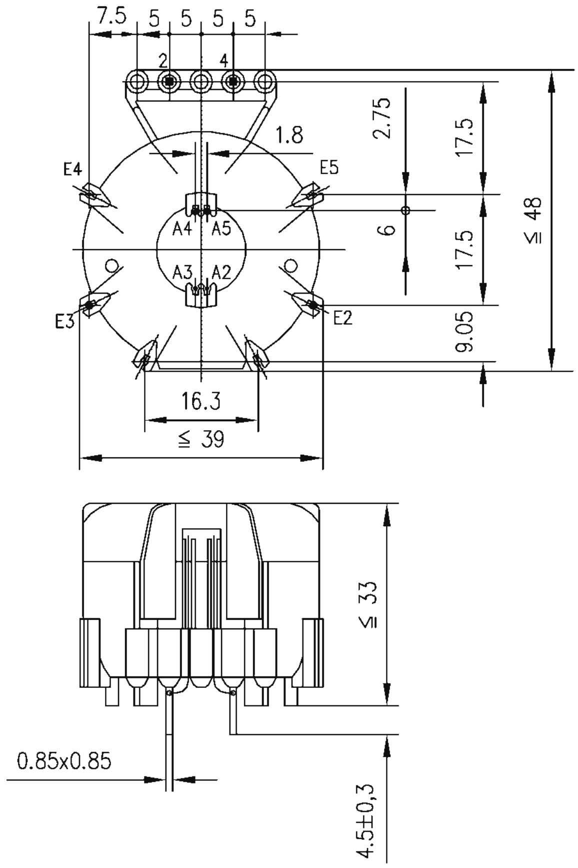


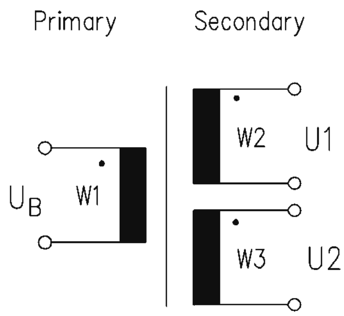
Working frequency (kHz)	Primary U_B (V)		Standard	U_P[1)] Prim. - Sec. (kV)	Secondary		h (mm)	Part number
	min	max			U1 (I_{max})	U2 (I_{max})		
40	292	358	VDE 0860 VDE 0712 (Part 24 A1)	3.75	12V (4.15A)		≤ 17.5	543 06 057 00
40	292	358	VDE 0860 VDE 0712 (Part 24 A1)	3.75	12V (6.65A)		≤ 25	543 06 058 00
40	292	358	VDE 0860 VDE 0712 (Part 24 A1)	3.75	12V (8.3A)		≤ 25	543 06 059 00

1) Test voltage U_P (f = 50 Hz; t = 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request

A4.9 HALF-BRIDGE/PUSH-PULL CONVERTER > 100 W |R 31



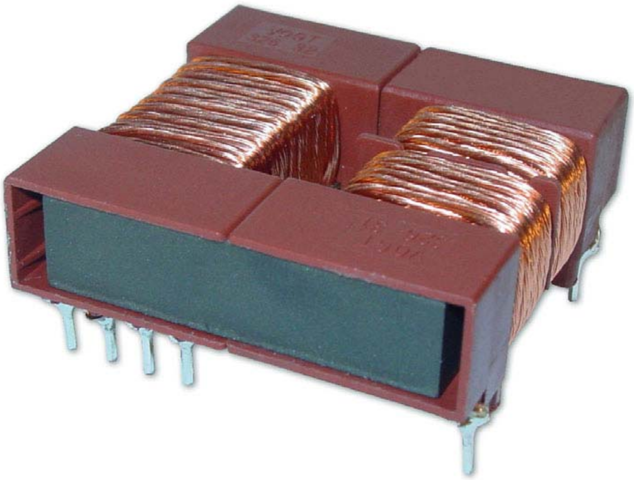


Working frequency (kHz)	Primary		Standard	U_P[1] Prim. - Sec. (kV)	Secondary		Part number
	U_B (V)				U1 (I_{max})	U2 (I_{max})	
	min	max					
40	292	358	VDE 0860 VDE 0712 (Part 24 A1)	3.75	12V (12.5A)		543 07 013 00
40	292	358	VDE 0860 VDE 0712 (Part 24 A1)	3.75	12V (16.6A)		543 07 014 00

[1] Test voltage U_P (f = 50 Hz; t = 1 sec)

Standard types (additional types in preparation)
Customer-specific types on request

A4.10 RESONANT CONVERTER (U-CORE)



Application

- Half bridge resonant mode converter
- Flat switch mode power supplies

Construction

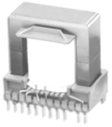
- U core
- 2,3 or 4 chambers possible
- defined high leakage inductance

Technical data

- Group approval EN 60065/EN 60950/EN 61558-2-17
- Creepage and clearance distance 8 mm
- Climate category 40/125/56 in accordance with IEC 68-1
- Insulation class B according to IEC 60085
- UL 94 V-0

Advantages

- Non-potted – environmentally friendly since no adhesives or resins are used
- Compact size, total height ≤ 20 mm
- High efficiency



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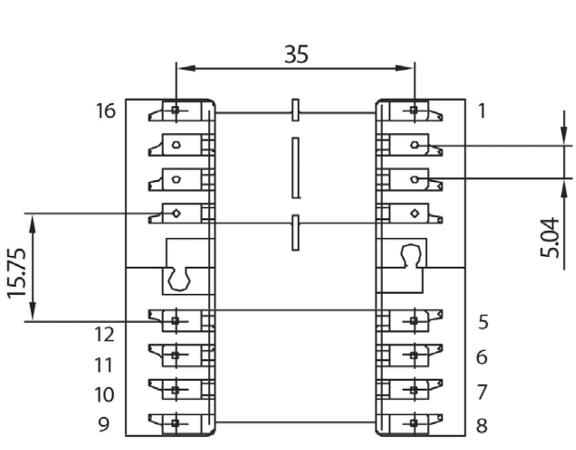
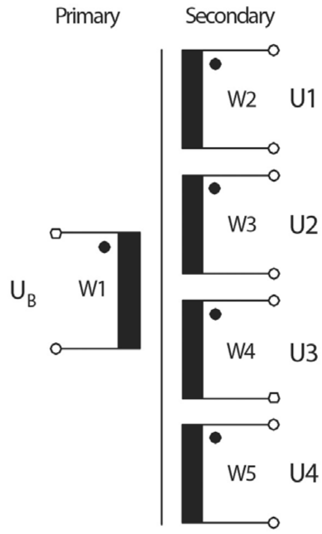
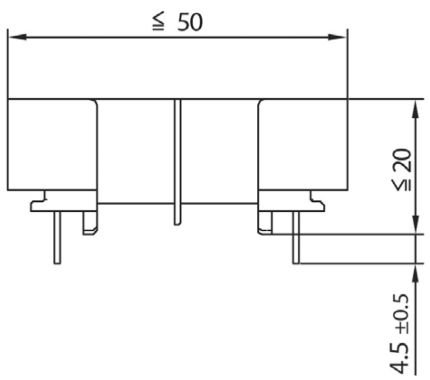
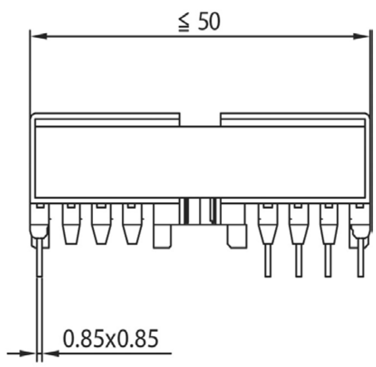
A4.10 RESONANT CONVERTER (U-CORE)| U 43





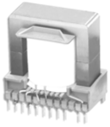


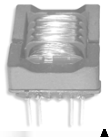


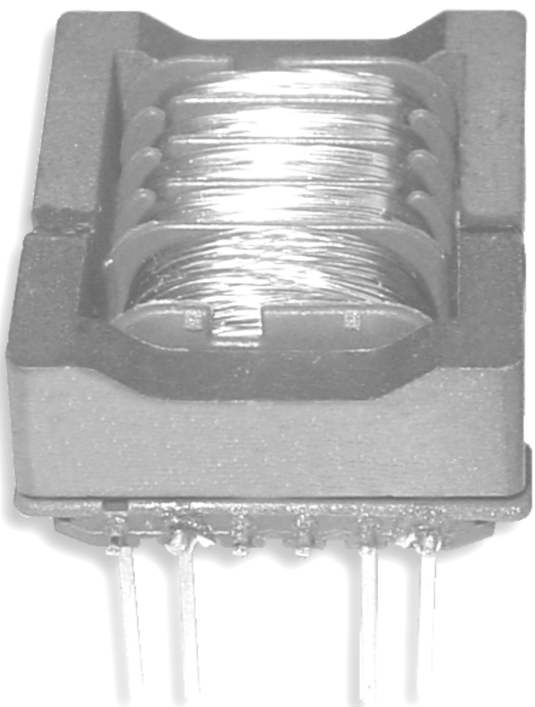
Working frequency (kHz)	Primary U_B (V_{DC})		Standard	U_P 1) Prim. - Sec. (kV)	Secondary				Part number
	min	max			U1 (I_{max})	U2 (I_{max})	U3 (I_{max})	U4 (I_{max})	
100 - 400	380	410	EN 60065 EN 60950	4.5	24 V (2.6 A)	24 V (2.6 A)	24 V (2.6 A)	24 V (2.6 A)	546 13 002 00

1) Test voltage U_P (f = 50 Hz; t = 2 sec)

Standard types (additional types in preparation)
Customer-specific types on request

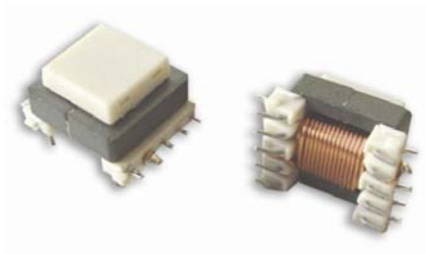






A5.1 CHOKES (E-CORE) | EF 12.6/3.7 SERIES THD/SMD

- Storage choke
- Filtering inductance
- Compact, standard packages
- SMD or THD
- High voltage strength 500V (typical) across windings

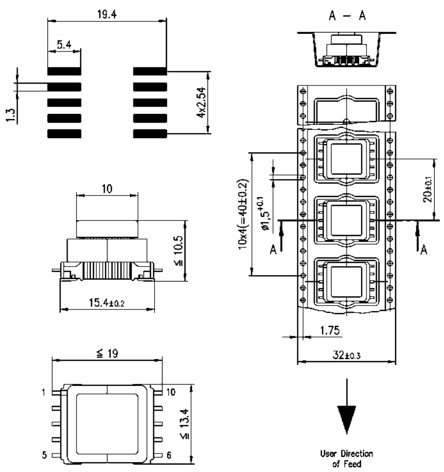


Electrical specifications @ 25°C - Operating temperature -40°C to +125°C							
L_0 (µH)	Tolerance ± 10%	I_{rms}* (mA)	I_{sat}** (mA)	R_{DC} (mΩ ± 20%)	Schematic	Part number SMD	Part number THD
27		3000	3000	44	2	505 03 500 27	575 08 500 27
33		3000	2400	44	2	505 03 500 33	575 08 500 33
39		3000	2000	44	2	505 03 500 39	575 08 500 39
47		3000	1700	44	2	505 03 500 47	575 08 500 47
56		1700	3000	125	1	505 03 500 56	575 08 500 56
68		1700	2000	125	1	505 03 500 68	575 08 500 68
82		1700	1800	125	1	505 03 500 82	575 08 500 82
100		1700	1500	125	1	505 03 501 00	575 08 501 00
120		1200	1500	235	1	505 03 501 20	575 08 501 20
150		1200	1300	235	1	505 03 501 50	575 08 501 50
180		1200	1000	235	1	505 03 501 80	575 08 501 80
220		1200	800	235	1	505 03 502 20	575 08 502 20
270		620	1300	875	1	505 03 502 70	575 08 502 70
330		620	1100	875	1	505 03 503 30	575 08 503 30
390		620	900	875	1	505 03 503 90	575 08 503 90
470		620	750	875	1	505 03 504 70	575 08 504 70
560		570	800	985	1	505 03 505 60	575 08 505 60
680		570	700	985	1	505 03 506 80	575 08 506 80
820		570	500	985	1	505 03 508 20	575 08 508 20
1000		570	400	985	1	505 03 510 00	575 08 510 00

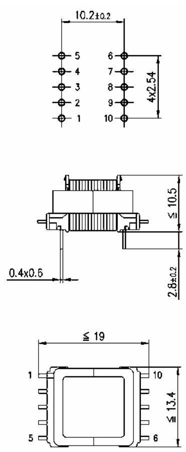
*I_{DC} rated for 40°C temperature rise;

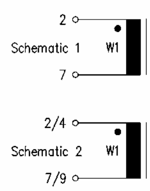
**I_{sat} is the current, at which the component inductance drops by 10% (typical) @ 25°C

Mechanical SMD



Schematic THD





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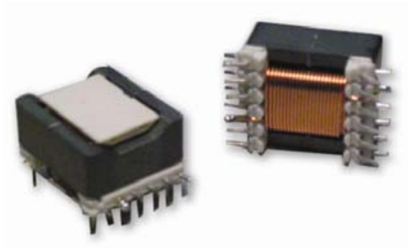
A5.1 CHOKES (E-CORE) | EVD 15 SERIES THD/SMD

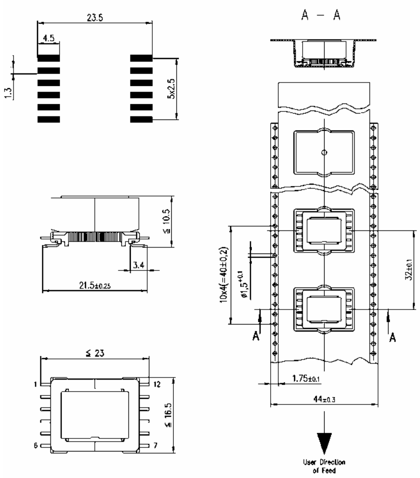


- Storage choke
- Filtering inductance
- Compact, standard packages
- SMD or THD
- High voltage strength 500V (typical) across windings

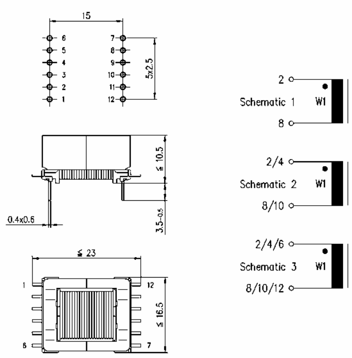
Electrical specifications @ 25°C - Operating temperature -40°C to +125°C							
L_0 (µH)	Tolerance ± 10%	I_{rms}* (mA)	I_{sat}** (mA)	R_{DC} (mΩ ± 20%)	Schematic	Part number	
						SMD	THD
33		4800	5000	25	3	505 04 500 33	575 26 500 33
39		4800	4000	25	3	505 04 500 39	575 26 500 39
47		4800	3300	25	3	505 04 500 47	575 26 500 47
56		4800	2700	25	3	505 04 500 56	575 26 500 56
68		3300	4000	56	2	505 04 500 68	575 26 500 68
82		3300	3200	56	2	505 04 500 82	575 26 500 82
100		3300	2500	56	2	505 04 501 00	575 26 501 00
120		3300	2100	56	2	505 04 501 20	575 26 501 20
150		2000	2700	140	1	505 04 501 50	575 26 501 50
180		2000	2300	140	1	505 04 501 80	575 26 501 80
220		2000	1900	140	1	505 04 502 20	575 26 502 20
270		2000	1500	140	1	505 04 502 70	575 26 502 70
330		1400	1700	280	1	505 04 503 30	575 26 503 30
390		1400	1400	280	1	505 04 503 90	575 26 503 90
470		1400	1200	280	1	505 04 504 70	575 26 504 70
560		1400	1000	280	1	505 04 505 60	575 26 505 60
680		1000	1300	520	2	505 04 506 80	575 26 506 80
820		1000	1000	520	2	505 04 508 20	575 26 508 20
1000		1000	800	520	2	505 04 510 00	575 26 510 00
1200		1000	650	520	2	505 04 512 00	575 26 512 00

*I_{DC} rated for 40°C temperature rise;
**I_{sat} is the current, at which the component inductance drops by 10% (typical) @ 25°C

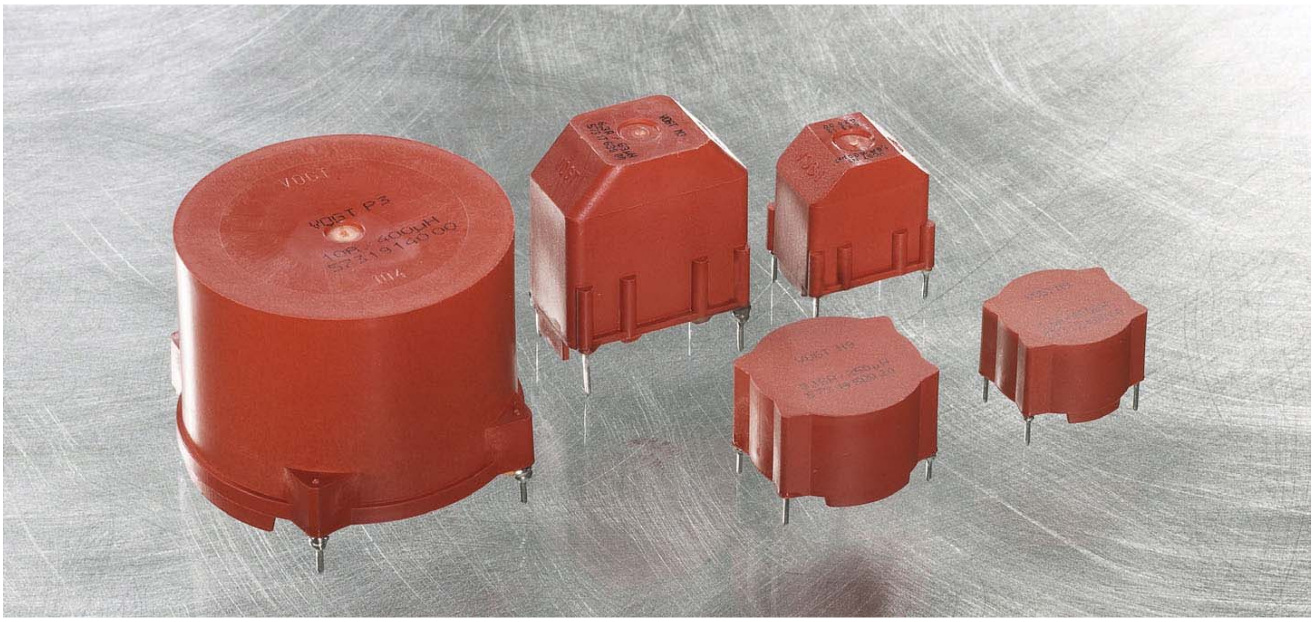
Mechanical SMD



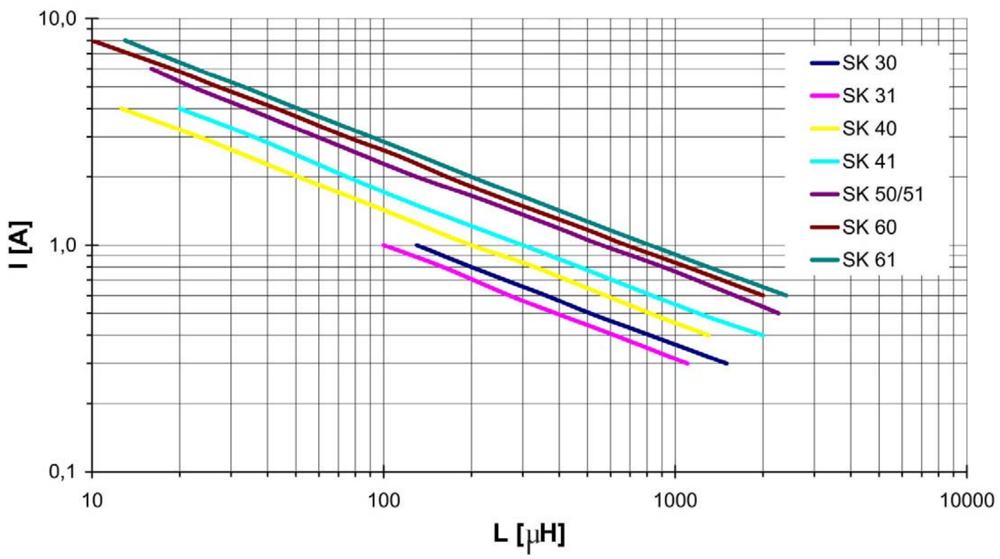
Schematic THD

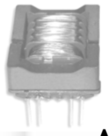


A5.2 CHOKES (TOROIDAL CORE)



Current as a function of inductance and component size





A5.2 CHOKES (TOROIDAL CORE)

Application

SK toroidal core chokes are appropriate for all applications requiring a great degree of independence of the inductance with current, such as for filter chokes in switching power supplies or for RFI suppression chokes in DC and AC circuits.

Construction

These chokes are made of a core material with $\mu_0 = 75$.
The special advantage of these choke coils is their compact, encapsulated structure. They can be mounted on the PCB without special mounting tools.
There are both flat and upright versions, so the best choke for the available installation space can be chosen. There are two windings per choke, producing two different inductances and two different nominal currents.

For the standard series, inductance values of 10 µH to 2.4 mH are used at current values of 8 through 0.4 A. Versions with several windings are also available.

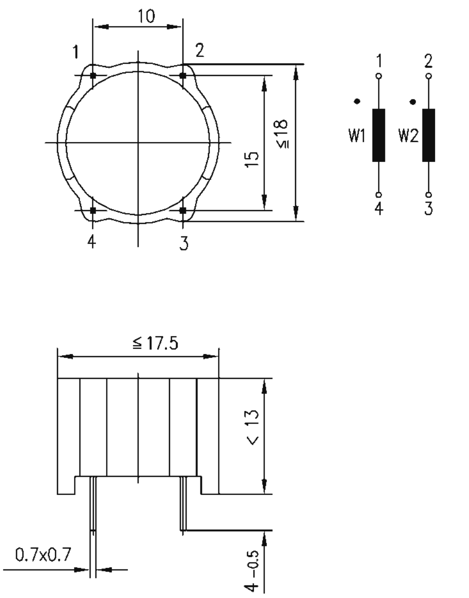
Technical data

DVE 0565/2

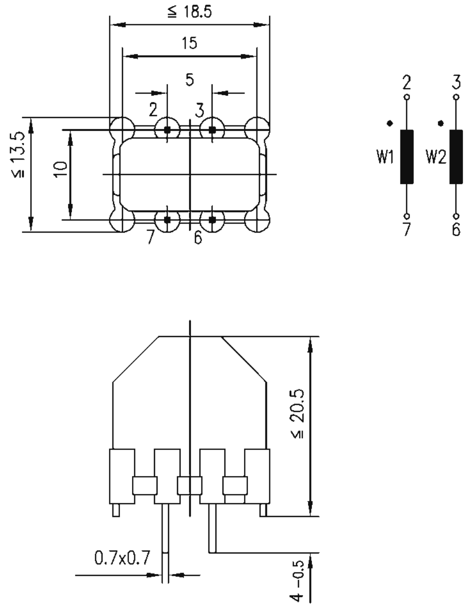
- Family release in accordance with UL 1283
- Climate category: 40/125/56 in accordance with IEC 68-1
- Nominal inductance measured at 10 kHz, 25°C
- Inductance tolerance + 25%, -15%
- Inductance drop at 1.5 times nominal current: approx. 80% of nominal inductance
- DC resistance per winding (approximate values, measured in accordance with VDE 0565-2)
- Ambient temperature: 60°C
- Temperature rise of the windings < 55°C
- Maximum permissible temperature of windings 115°C

A5.2 CHOKES (TOROIDAL CORE)| SK 30 + SK 32

SK 30



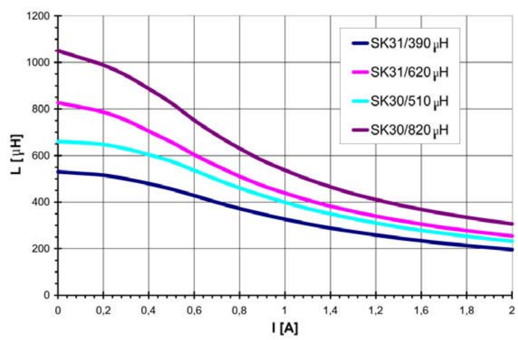
SK 31

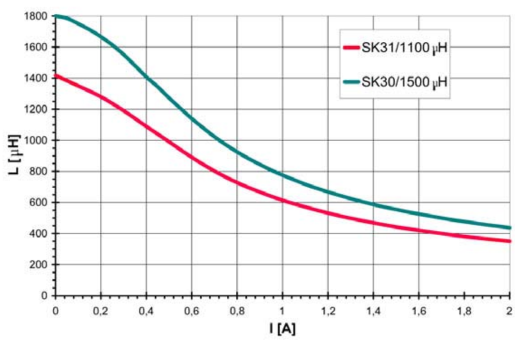


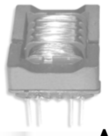
I_N (A)	Placement	SK 30 (R_{th}[2)] = 65 K/W)			SK 31 (R_{th}[2)] = 58 K/W)		
		L_N (µH) +25% -15%	R_{Cu}[1), 2)] (mΩ)	Part number	L_N (µH) +25% -15%	R_{Cu}[1), 2)] (mΩ)	Part number
1.0	parallel	130	260	573 11 300 10	100	210	573 11 310 30
0.8	parallel	200	300	573 11 300 20	160	330	573 11 310 40
0.6	parallel	360	800	573 11 300 30	270	710	573 11 310 50
0.5	series	510	260	573 11 300 10	390	210	573 11 310 30
0.4	series	820	300	573 11 300 20	620	330	573 11 310 40
0.3	series	1500	800	573 11 300 30	1100	710	573 11 310 50

[1)] per winding, [2)] typical value Windings can be placed in series or parallel

Typical values, intermediate values on request

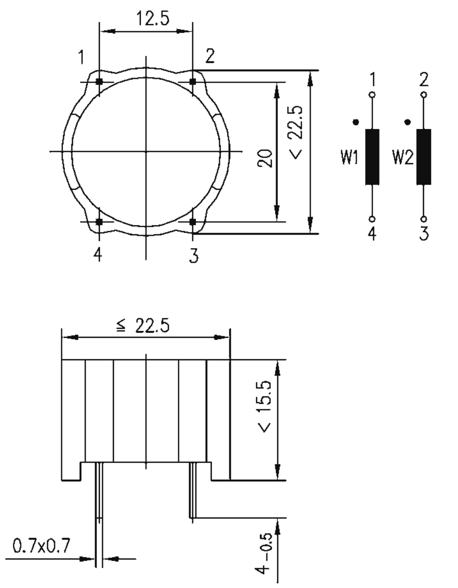




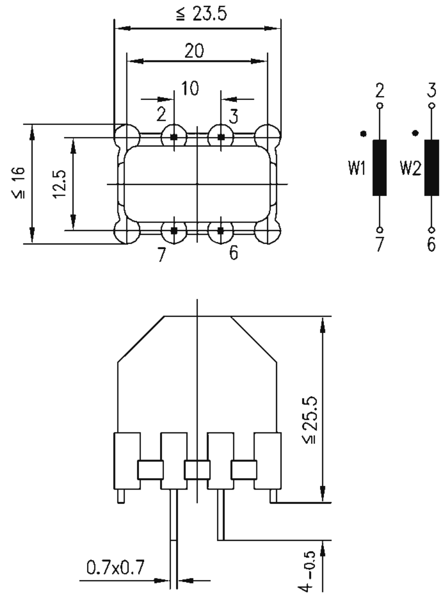


A5.2 CHOKES (TOROIDAL CORE)| SK 40 + SK 41

SK 40

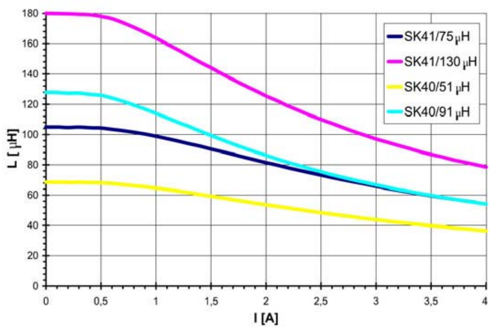


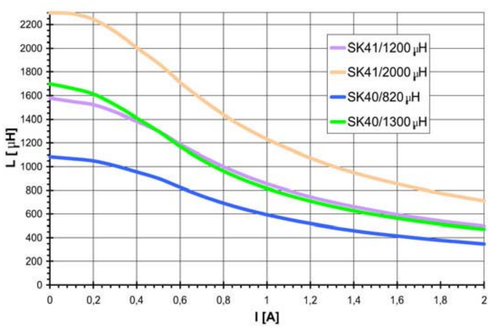
SK 41

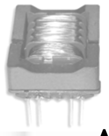


I_N (A)	Placement	SK 40 (R_{th} [2)] = 50 K/W)			SK 41 (R_{th} [2)] = 45 K/W)		
		L_N (µH) +25% -15%	R_{Cu} [1), 2)] (mΩ)	Part number	L_N (µH) +25% -15%	R_{Cu} [1), 2)] (mΩ)	Part number
4.0	parallel	12	20	573 14 400 00	20	20	573 14 410 00
3.0	parallel	24	48	573 13 400 10	36	48	573 13 410 10
2.0	series	51	20	573 14 400 00	75	20	573 14 410 00
1.5	series	91	48	573 13 400 10	130	48	573 13 410 10
1.0	parallel	200	450	573 11 400 20	300	460	573 11 410 20
0.8	parallel	330	740	573 11 400 30	470	740	573 11 410 30
0.5	series	820	450	573 11 400 20	1200	460	573 11 410 20
0.4	series	1300	740	573 11 400 30	2000	740	573 11 410 30

[1)] per winding , [2)] typical value Windings can be placed in series or parallel
Typical values, intermediate values on request

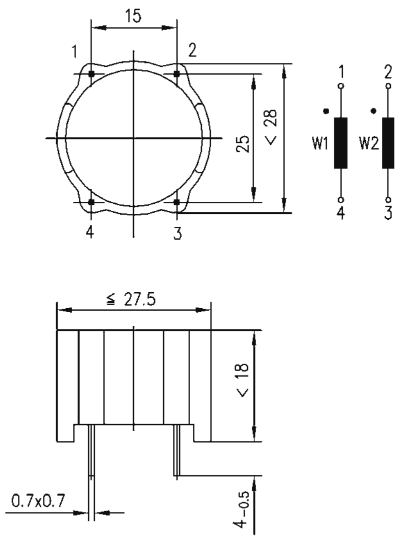




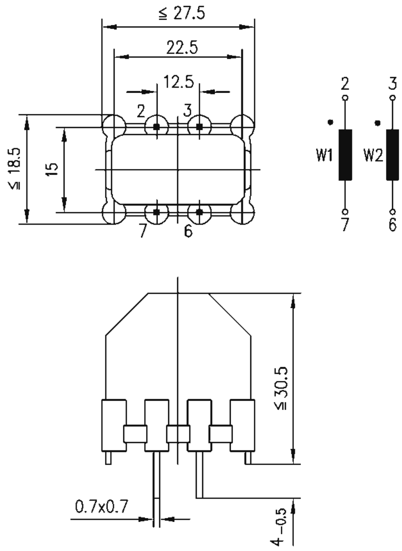


A5.2 CHOKES (TOROIDAL CORE) | SK 50 + SK 51

SK 50

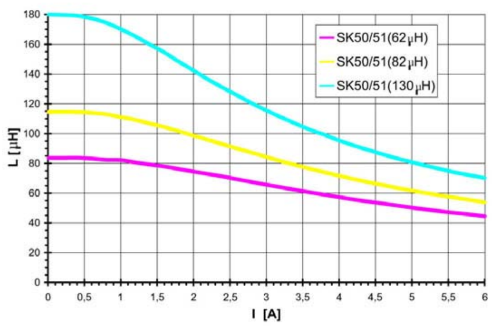


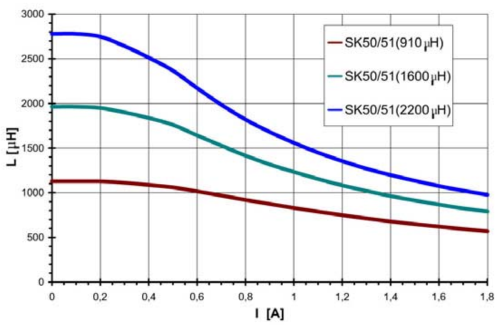
SK 51

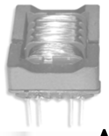


I_N (A)	Placement	SK 50 (R_{th} 2) = 37 K/W)			SK 51 (R_{th} 2) = 34 K/W)		
		L_N (µH) +25% -15%	R_{Cu} 1), 2) (mΩ)	Part number	L_N (µH) +25% -15%	R_{Cu} 1), 2) (mΩ)	Part number
6.0	parallel	16	24	573 16 500 00	16	24	573 16 510 00
5.0	parallel	22	27	573 15 500 00	22	27	573 15 510 00
4.0	parallel	33	44	573 14 500 30	33	44	573 14 510 10
3.0	series	62	24	573 16 500 00	62	24	573 16 510 00
2.5	series	82	27	573 15 500 00	82	27	573 15 510 00
2.0	series	130	44	573 14 500 30	130	44	573 14 510 10
1.6	parallel	220	270	573 12 500 00	220	270	573 12 510 00
1.2	parallel	390	440	573 12 500 10	390	440	573 12 510 10
1.0	parallel	560	670	573 11 500 00	560	670	573 11 510 20
0.8	series	910	270	573 12 500 00	910	270	573 12 510 00
0.6	series	1600	440	573 12 500 10	1600	440	573 12 510 10
0.5	series	2200	670	573 11 500 00	2200	670	573 11 510 20

1) per winding , 2) typical value Windings can be placed in series or parallel
Typical values, intermediate values on request







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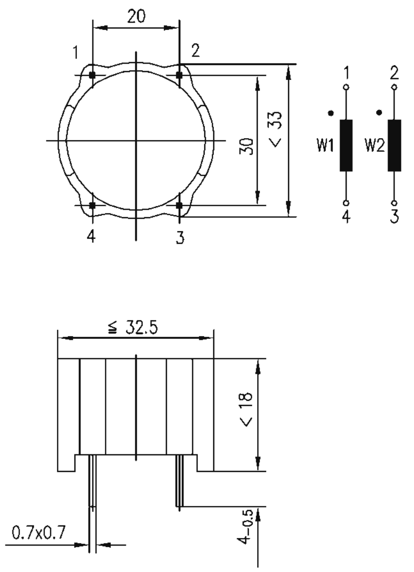
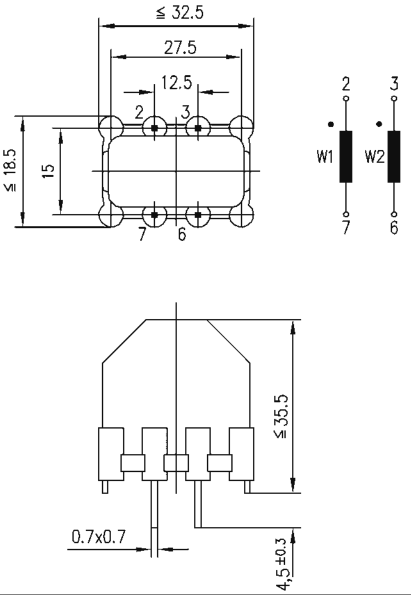
A5.2 CHOKES (TOROIDAL CORE)| SK 60 + SK 61

SK 60

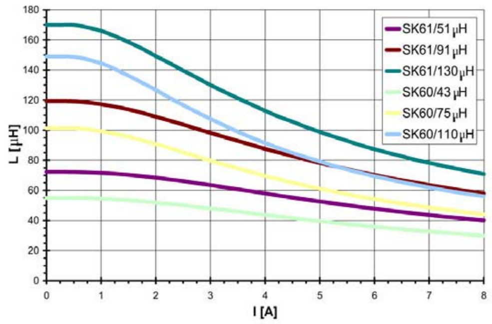


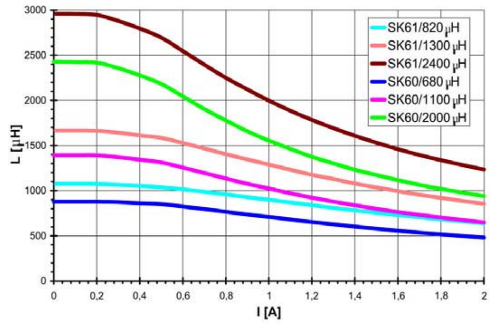
SK 61



I_N (A)	Placement	SK 60 (R_{th} [2] = 30 K/W)			SK 61 (R_{th} [2] = 27 K/W)		
		L_N (µH) +25% -15%	R_{Cu} [1), 2)] (mΩ)	Part number	L_N (µH) +25% -15%	R_{Cu} [1), 2)] mΩ	Part number
8.0	parallel	10	20	573 18 600 00	13	16	573 18 610 00
6.0	parallel	20	27	573 16 600 00	22	20	573 16 610 00
5.0	parallel	27	42	573 15 600 00	33	40	573 15 610 20
4.0	series	43	20	573 18 600 00	51	16	573 18 610 00
3.0	series	75	27	573 16 600 00	91	20	573 16 610 00
2.5	series	110	42	573 15 600 00	130	40	573 15 610 20
2.0	parallel	180	250	573 12 600 00	200	250	573 12 610 00
1.6	parallel	270	390	573 12 600 10	330	400	573 12 610 10
1.2	parallel	510	650	573 12 600 20	560	650	573 12 610 20
1.0	series	680	250	573 12 600 00	820	250	573 12 610 00
0.8	series	1100	390	573 12 600 10	1300	400	573 12 610 10
0.6	series	2000	650	573 12 600 20	2400	650	573 12 610 20

[1] per winding , [2] typical value   Windings can be placed in series or parallel
Typical values, intermediate values on request

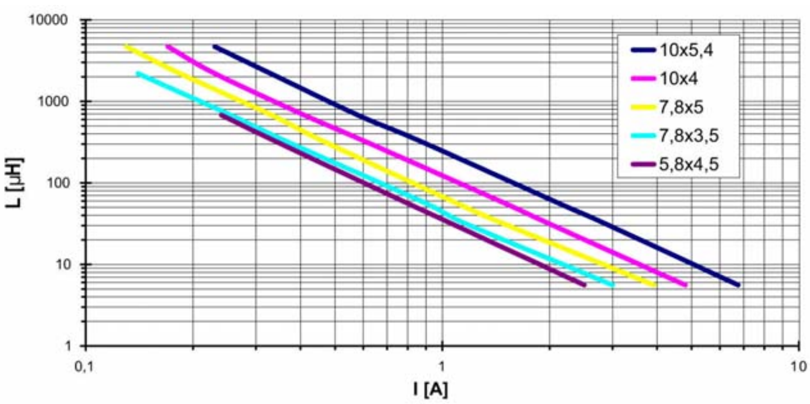




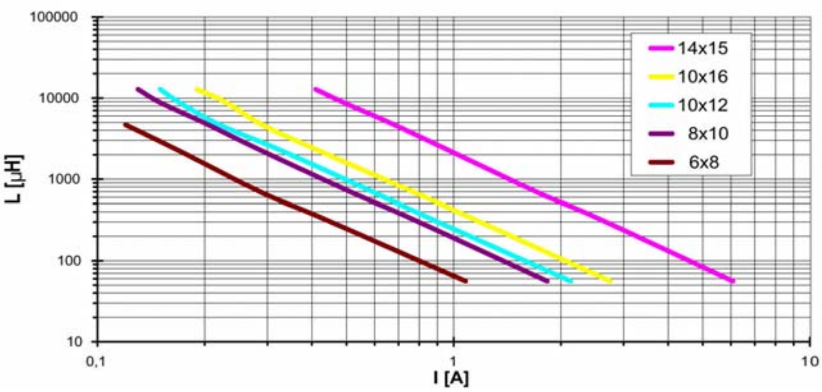
A5.3 CHOKES (DRUM CORE)

L and I as a function of component size

SMD-series



THD-series



A5.3 CHOKES (DRUM CORE)

Application

RFI suppression chokes, energy storage chokes, filter chokes, etc.

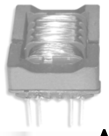
Construction

These choke coils consist of a drum core with the material H7S in various axial sizes, wound with several layers of enamel copper wire. The ends of the windings are soldered to the connection pins or SMD soldering surfaces of the yarnreel.
They are economical due to their simple design and cost-optimized manufacture.

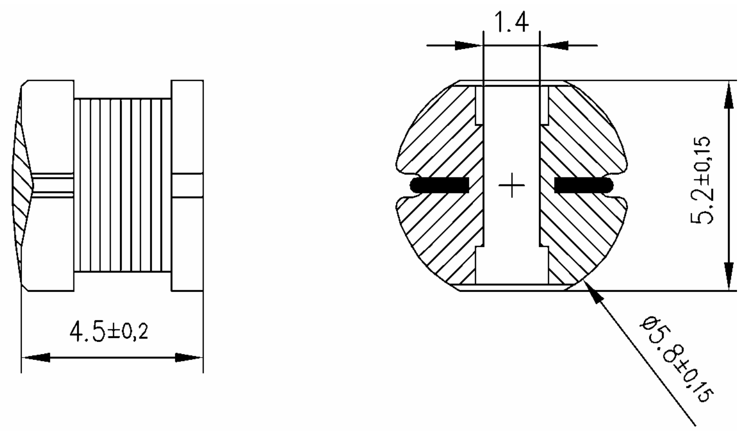
They are shipped in tapes or bunches.

Specifications

-
- Climate category: 40/125/56 in accordance with IEC 68-1
- Nominal inductance measured at 10 kHz, 25 °C
- Inductance tolerance ±10%
- DC resistance per winding (approximate values, measured in accordance with VDE 0565-2)
- Ambient temperature: 60°C
- Temperature rise of the windings < 55 °C
- Maximum permissible temperature of windings 115 °C



A5.3 CHOKES (DRUM CORE) | SMD DRUM CORE 5.8 X 4.5

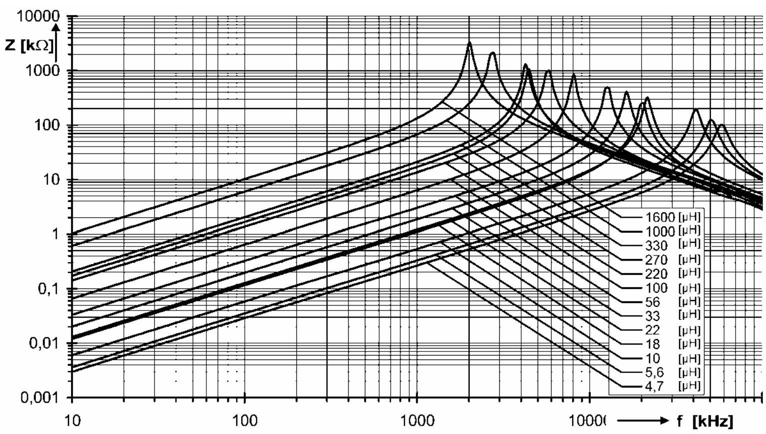


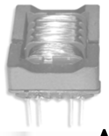
L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (mΩ)	Part number
4.7	1.5	≤ 30	507 12 000 47
5.6	2.4	≤ 36	507 12 000 56
10	1.5	≤ 48	507 12 001 00
18	0.8	≤ 76	507 12 001 80
22	0.8	≤ 105	507 12 002 20
33	1.1	≤ 165	507 12 003 30
56	0.92	≤ 250	507 12 005 60
100	0.5	≤ 650	507 12 010 00
220	0.45	≤ 970	507 12 022 00
270	0.3	≤ 1300	507 12 027 00
330	0.3	≤ 1700	507 12 033 00
1000	0.15	≤ 4400	507 12 100 00
1600	0.15	≤ 7800	507 12 160 00

[1] approximate value

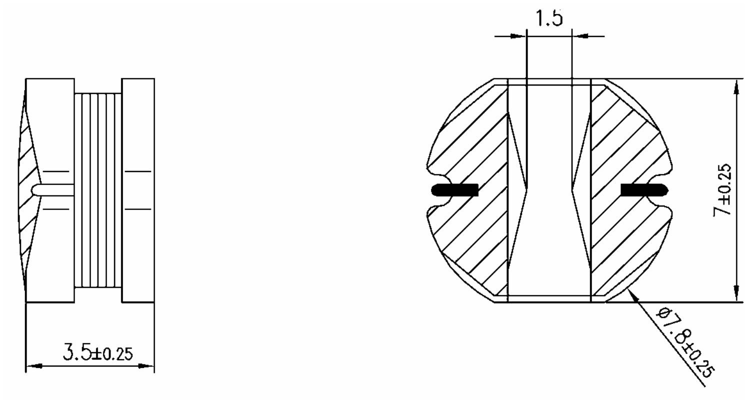
Typical values, special types on request

Impedance curves





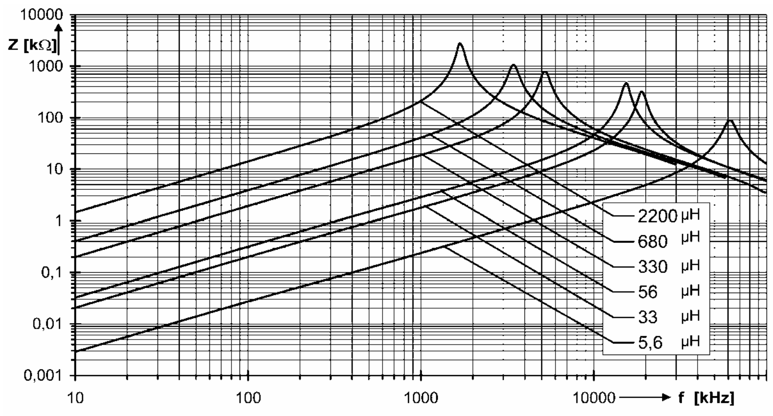
A5.3 CHOKES (DRUM CORE) | SMD DRUM CORE 7.8 X 3.5

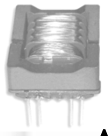


L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (mΩ)	Part number
5.6	3.0	≤ 25	507 13 000 56
33	1.15	≤ 135	507 13 003 30
56	0.9	≤ 220	507 13 005 60
330	0.35	≤ 1200	507 13 033 00
680	0.25	≤ 2400	507 13 068 00
2200	0.14	≤ 8800	507 13 220 00

[1] approximate value

Impedance curves





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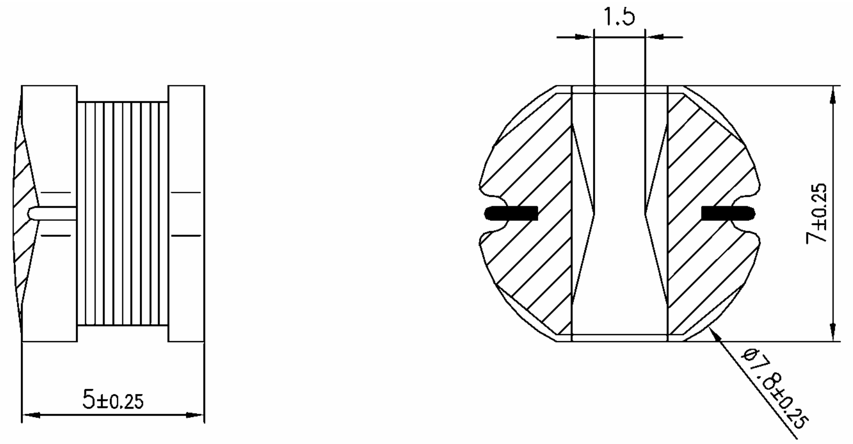
A5.3 CHOKES (DRUM CORE) | SMD DRUM CORE 7.8 X 5

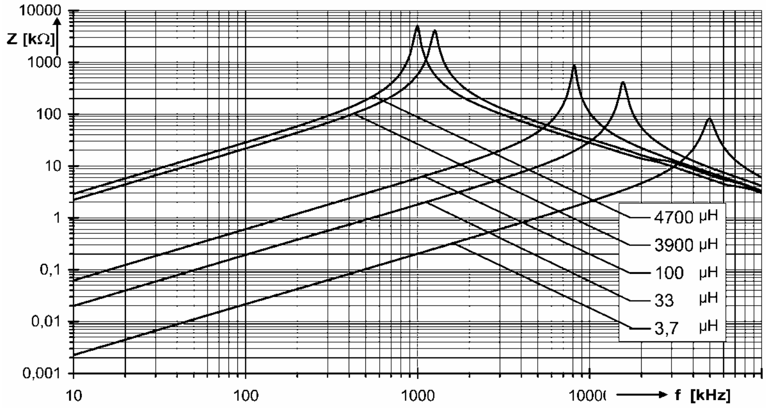


[1] approximate value

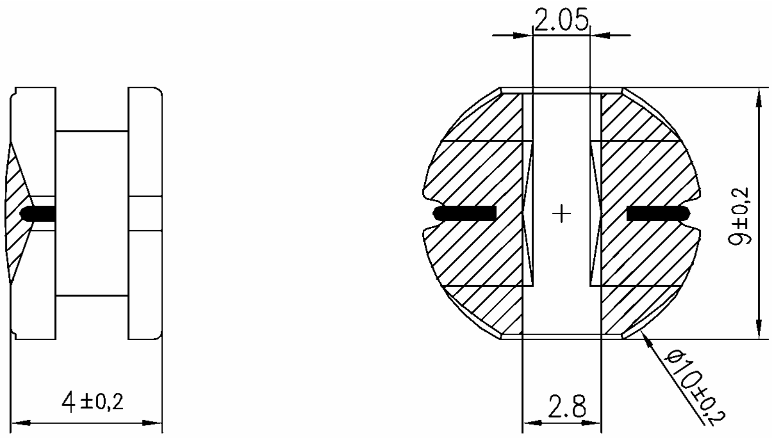
L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (mΩ)	Part number
3.7	4.5	≤ 17	507 14 000 37
33	1.8	≤ 120	507 14 003 30
100	1.0	≤ 340	507 14 010 00
3900	0.14	≤ 11000	507 14 390 00
4700	0.13	≤ 15000	507 14 470 00

Typical values, special types on request

Impedance curves



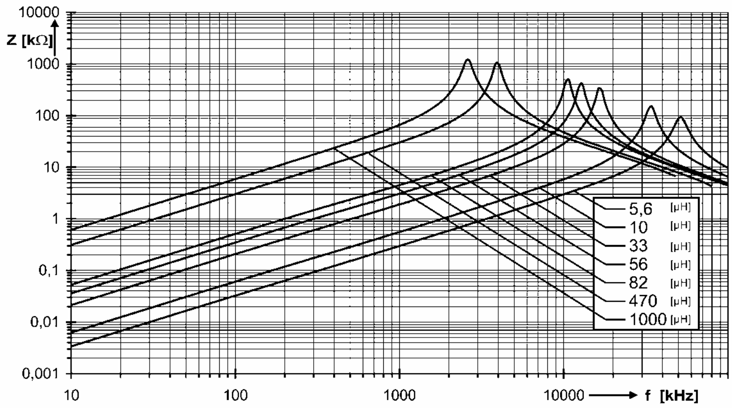
A5.3 CHOKES (DRUM CORE) | SMD DRUM CORE 10 X 4



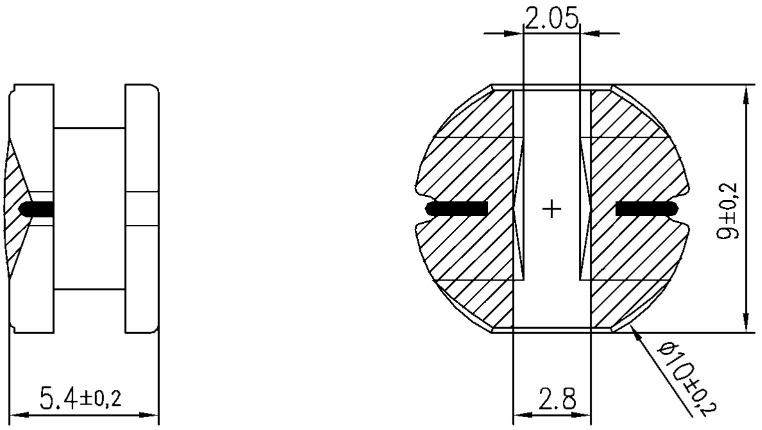
L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (mΩ)	Part number
5.6	4.6	≤ 24	507 15 000 56
10	2.8	≤ 32	507 15 001 00
33	1.8	≤ 126	507 15 003 30
56	1.5	≤ 180	507 15 005 60
82	1.2	≤ 250	507 15 008 20
470	0.45	≤ 1.3	507 15 047 00
1000	0.30	≤ 2.9	507 15 100 00

[1] approximate value

Impedance curves



A5.3 CHOKES (DRUM CORE) | SMD DRUM CORE 10 X 5.4

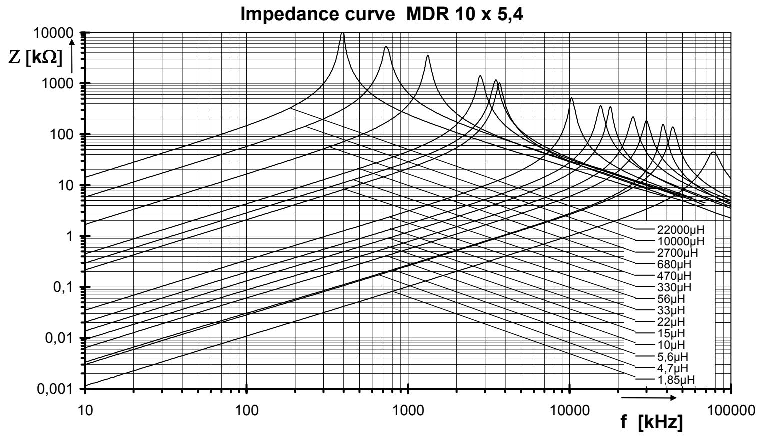


L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (mΩ)	Part number
1.85	8.0	≤ 7.20	507 16 000 18
4.7	7.5	≤ 17.0	507 16 000 47
5.6	6.0	≤ 16.8	507 16 000 56
10	4.4	≤ 31.2	507 16 001 00
15	3.7	≤ 37.2	507 16 001 50
22	3.0	≤ 860.0	507 16 002 20
33	2.7	≤ 75.0	507 16 003 30
56	1.9	≤ 127	507 16 005 60
330	0.86	≤ 770	507 16 033 00
470	0.71	≤ 1100	507 16 047 00
680	0.60	≤ 1500	507 16 068 00
2700	0.10	≤ 10000	507 16 270 00
10000	0.15	≤ 21000	507 16 910 00
22000	0.04	≤ 50000	507 16 922 00

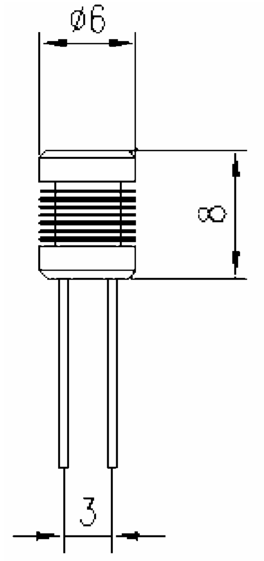
[1] approximate value

Typical values, special types on request

Impedance curves



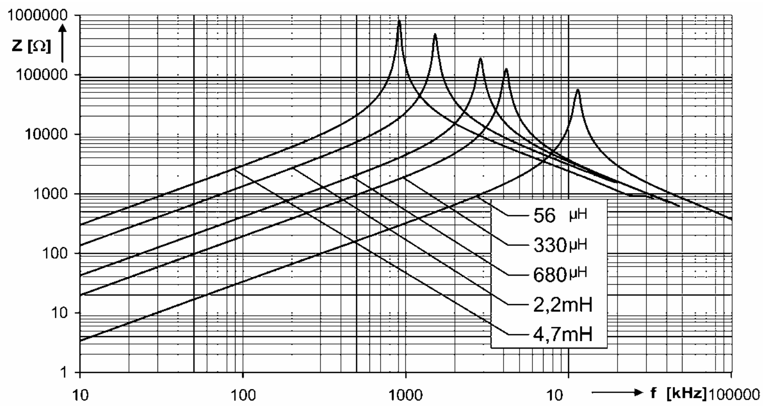
A5.3 CHOKES (DRUM CORE) | THD DRUM CORE 6 X 8



L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (Ω)	Part number
56	1.08	0.125	577 11 000 56
330	0.43	0.655	577 11 003 30
680	0.29	1.35	577 11 006 80
2200	0.17	5.34	577 11 022 00
4700	0.12	11.7	577 11 047 00

[1] approximate value

Impedance curves



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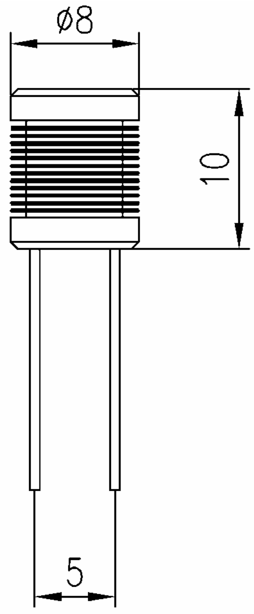
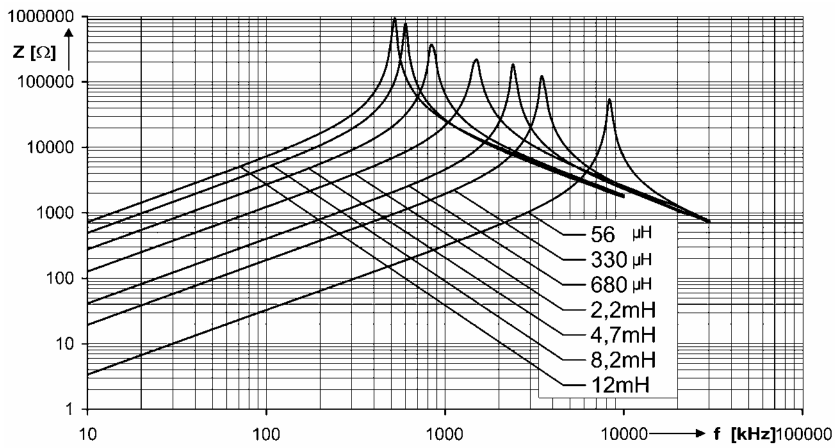
A5.3 CHOKES (DRUM CORE) | THD DRUM CORE 8 X 10



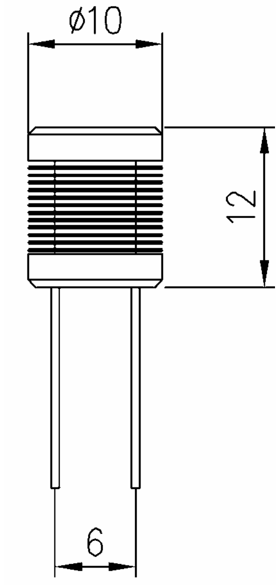
L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (Ω)	Part number
56	1.83	0.075	577 12 000 56
330	0.76	0.415	577 12 003 30
680	0.52	0.85	577 12 006 80
2200	0.29	2.65	577 12 022 00
4700	0.21	6.06	577 12 047 00
8200	0.15	11.7	577 12 082 00
12000	0.13	16.7	577 12 120 00

[1] approximate value

Impedance curves



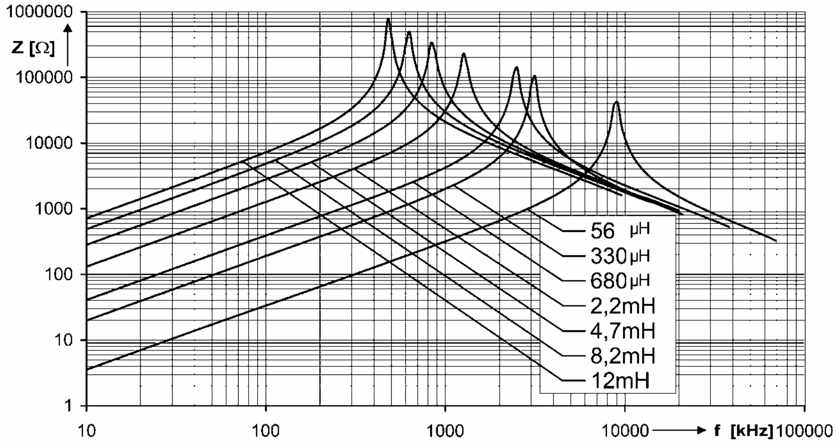
A5.3 CHOKES (DRUM CORE) | THD DRUM CORE 10 X 12



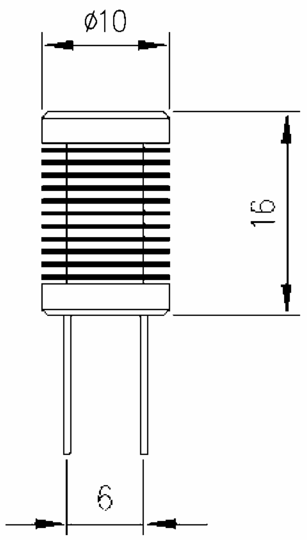
L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (mΩ)	Part number
56	2.13	0.045	577 13 000 56
330	0.86	0.266	577 13 003 30
680	0.60	0.785	577 13 006 80
2200	0.33	1.66	577 13 022 00
4700	0.22	3.6	577 13 047 00
8200	0.17	6.1	577 13 082 00
12000	0.15	9.9	577 13 120 00

[1] approximate value

Impedance curves



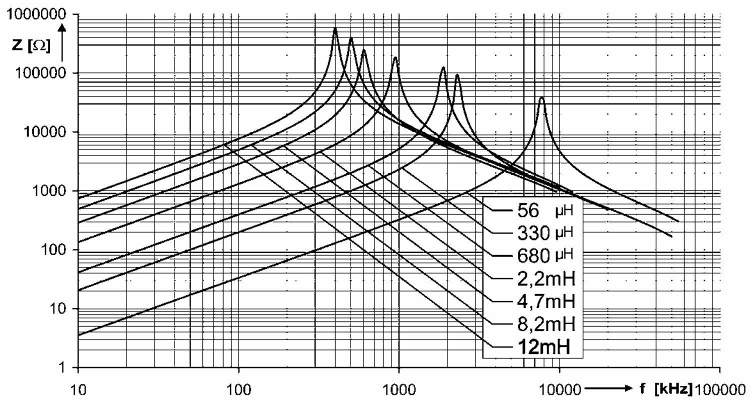
A5.3 CHOKES (DRUM CORE) | THD DRUM CORE 10 X 16



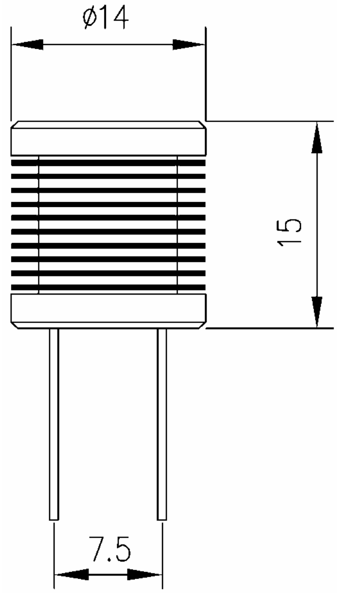
L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (mΩ)	Part number
56	2.75	37	577 14 000 56
330	1.13	215	577 14 003 30
680	0.78	405	577 14 006 80
2200	0.42	1280	577 14 022 00
4700	0.29	2760	577 14 047 00
8200	0.23	4500	577 14 082 00
12000	0.19	7280	577 14 120 00

[1] approximate value

Impedance curves



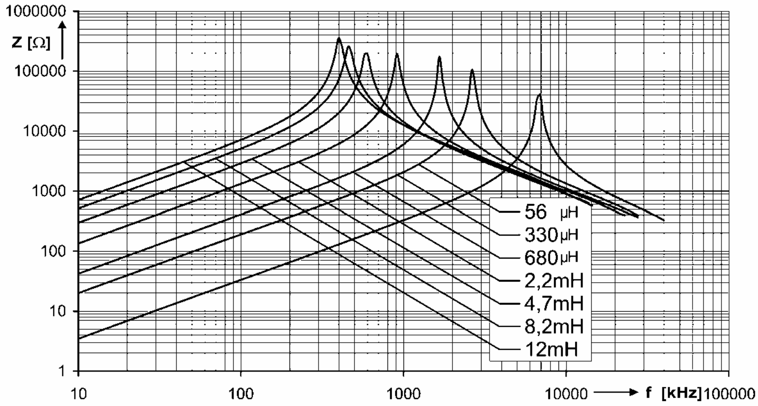
A5.3 CHOKES (DRUM CORE) | THD DRUM CORE 14 X 15

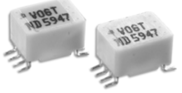


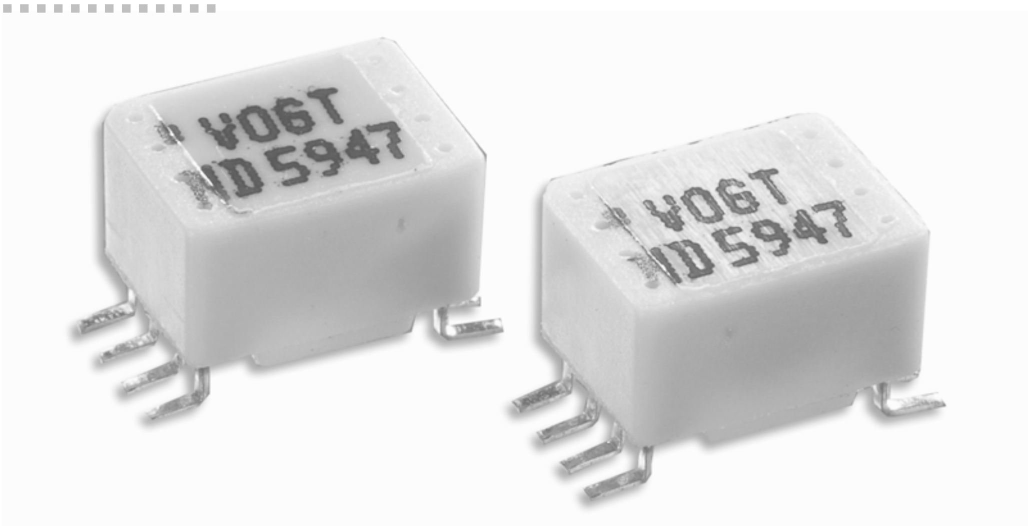
L_N (µH) ±10%	I_N (A)	R_{Cu} [1] (mΩ)	Part number
56	6.08	40	577 15 000 56
330	2.55	170	577 15 003 30
680	1.73	376	577 15 006 80
2200	1.0	1100	577 15 022 00
4700	0.65	2530	577 15 047 00
8200	0.5	4440	577 15 082 00
12000	0.41	6140	577 15 120 00

[1] approximate value

Impedance curves







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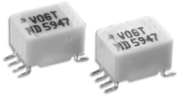
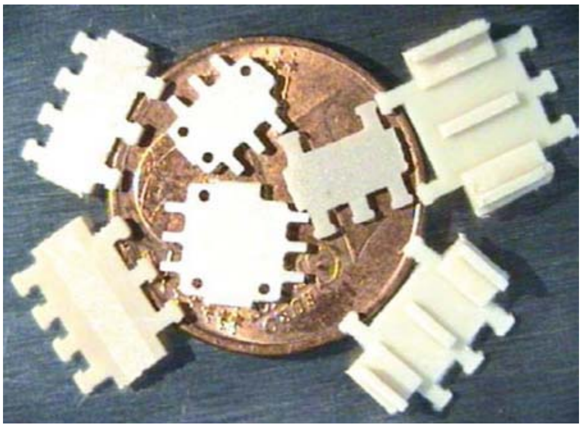
ND 5947



A6.1 RF-TRANSFORMER



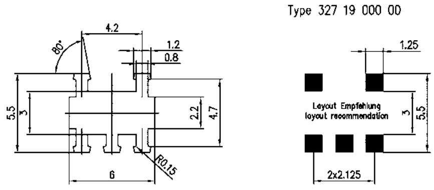
Individual design

We manufacture many customer-specific radio-frequency transformers, and therefore request that you send us your requirements.

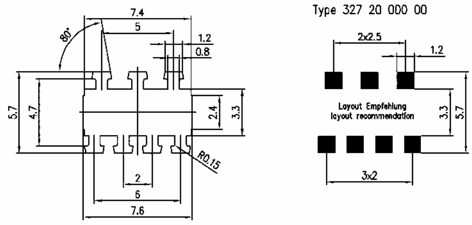
The following base plates are available along with complete RF-transformers.

The shape and dimensions of the double-aperture cores are described in chapter **"B CORES AND KITS"**.

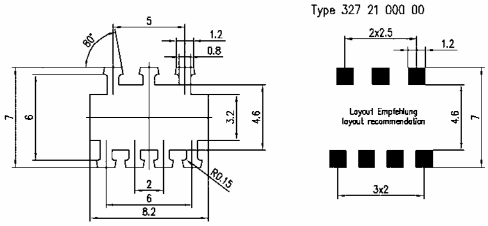
Type 327 19 000 00



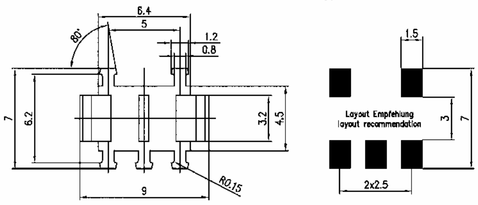
Type 327 20 000 00



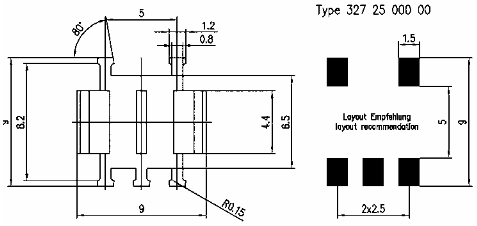
Type 327 21 000 00



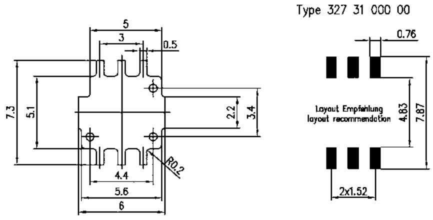
Type 327 24 000 00



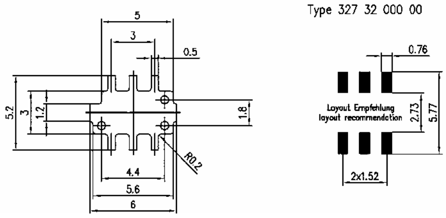
Type 327 25 000 00

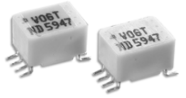


Type 327 31 000 00



Type 327 32 000 00

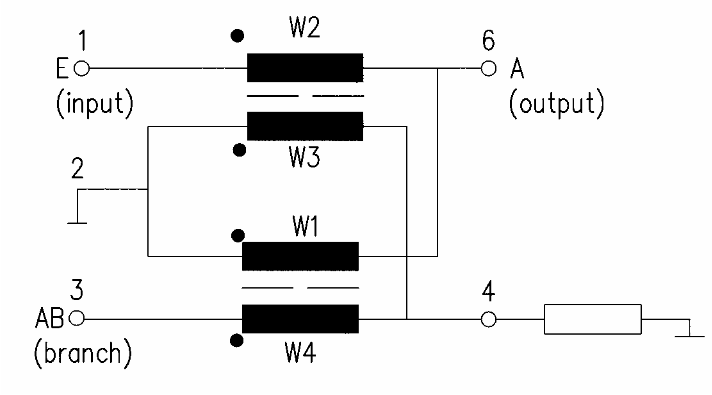




A6.1 RF-TRANSFORMER

Example for test circuit for directional couplers

Circuit / measurement arrangement



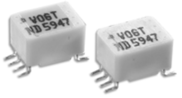
E-A	Insertion attenuation	**S 21**
E-AB	Coupling attenuation	**S 21**
A-AB	Isolation	**S 21**

The function of directional couplers is to decouple a portion of the RF energy at defined levels **(see table)** at the branch.

A linear characteristic curve at the nominal coupling value, a high degree of directionality and low transmission attenuation allow use of directional couplers in many communications applications

The directional couplers must allow bi-directional transmissions (e.g. interactive and multimedia applications), in order to handle future requirements.

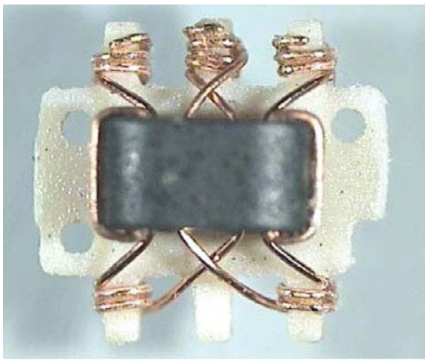
	7 dB	**10 dB**	**13 dB**	**15 dB**	**17 dB**
Broadband cable frequencies (4-862 MHz)	503 00 012 00	503 00 013 00	503 00 014 00	503 00 015 00	503 00 016 00
Satellite frequencies (47-2500 MHz)					
Expanded cable frequencies (4-2500 MHz)					

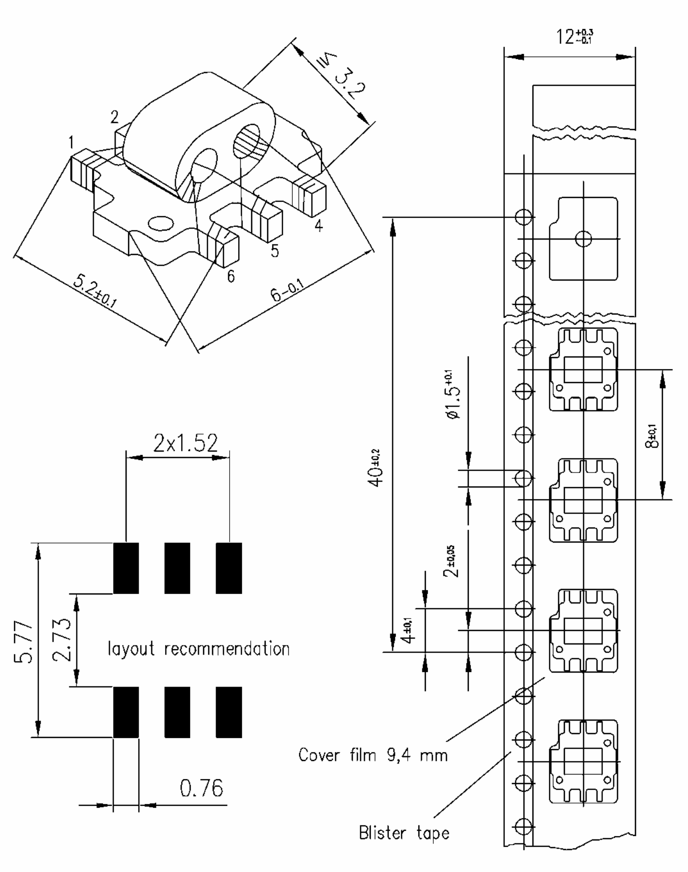


A6.1 RF-TRANSFORMER

New standard

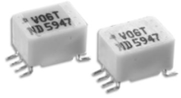
Component and tape dimensions as well as layout recommendation





Technical specifications

- Compact shape
- Requires little space
- Bonded with reflow soldering
- Automatic insertion possible
- Blister pack



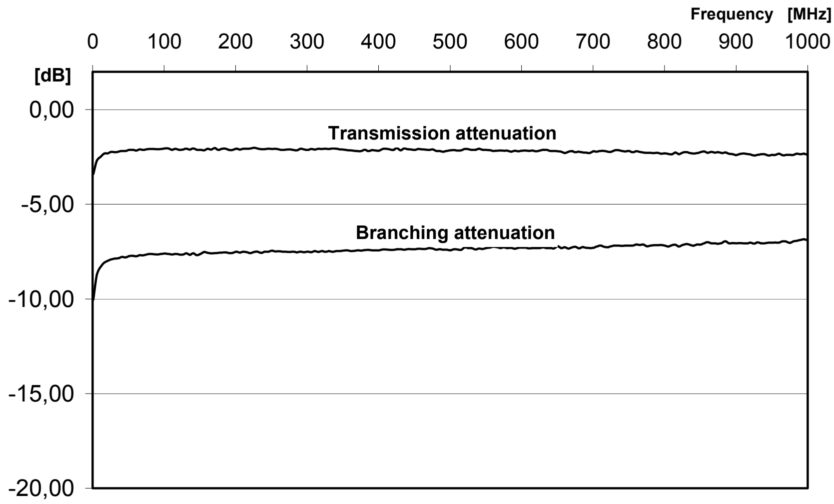
A6.1 RF-TRANSFORMER

New standard

7 dB Directional coupler

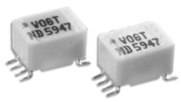
Part number: 503 00 012 00 **Ratio:** 2 : 4 : 4 : 2

Typical values



Frequency [MHz]	Transmission attenuation [dB]	Branching attenuation [dB]
5.00	-2.84	-8.84
47.00	-2.16	-7.63
606.00	-2.22	-7.33
862.00	-2.27	-7.07

Measured with Vogt test adapter



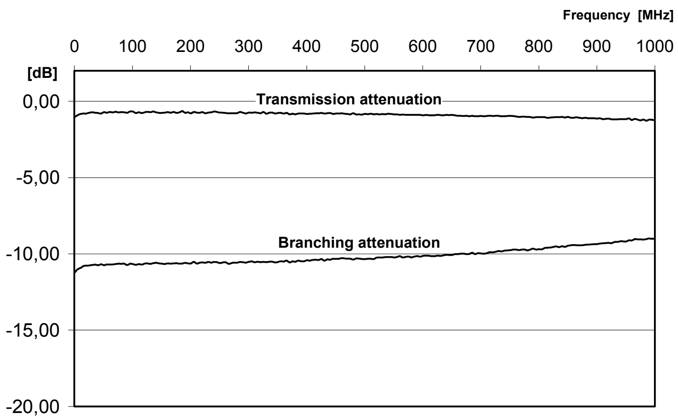
A6.1 RF-TRANSFORMER

New standard

10 dB Directional coupler

Part number: 503 00 013 00 **Ratio:** 2 : 6 : 7 : 2

Typical values



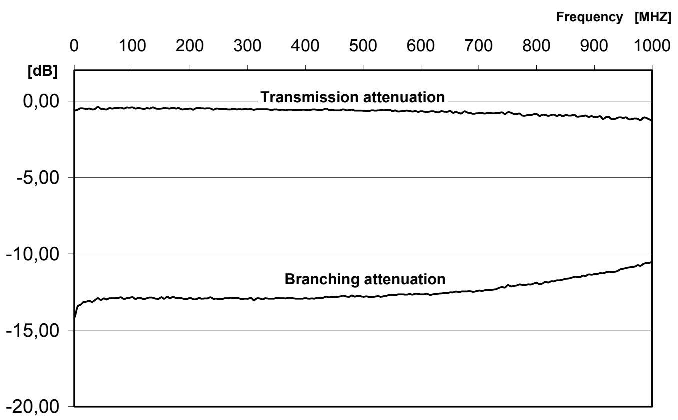
Frequency [MHz]	Transmission attenuation [dB]	Branching attenuation [dB]
5.00	-0.94	-11.03
47.00	-0.75	-10.73
606.00	-0.89	-10.20
862.00	-1.05	-9.49

Measured with Vogt test adapter

13 dB Directional coupler

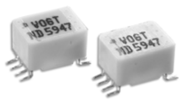
Part number: 503 00 014 00 **Ratio:** 1 : 4 : 8 : 2

Typical values



Frequency [MHz]	Transmission attenuation [dB]	Branching attenuation [dB]
5.00	-0.59	-13.65
47.00	-0.50	-13.00
606.00	-0.68	-12.71
862.00	-0.96	-11.60

Measured with Vogt test adapter



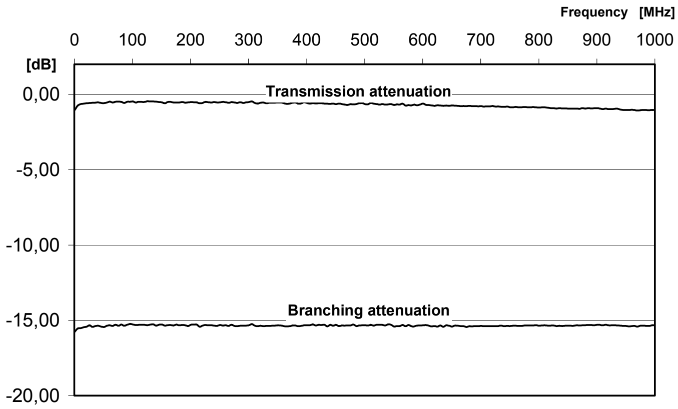
A6.1 RF-TRANSFORMER

New standard

15 dB Directional coupler

Part number: 503 00 015 00 **Ratio:** 1 : 5 : 6 : 1

Typical values



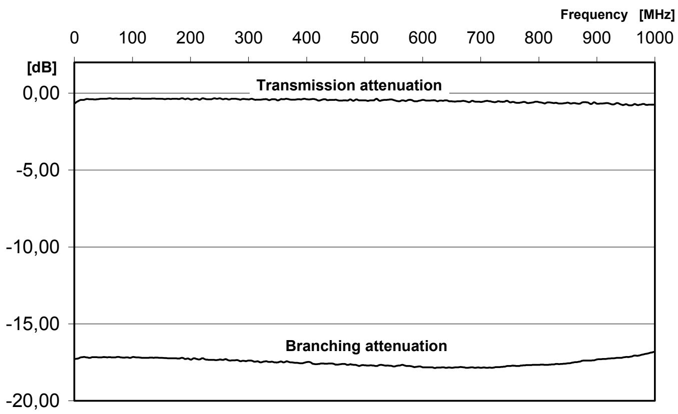
Frequency [MHz]	Transmission attenuation [dB]	Branching attenuation [dB]
5.00	-0.80	-18.59
47.00	-0.58	-15.40
606.00	-0.73	-15.35
862.00	-0.96	-15.32

Measured with Vogt test adapter

17 dB Directional coupler

Part number: 503 00 016 00 **Ratio:** 1 : 7 : 7 : 1

Typical values



Frequency [MHz]	Transmission attenuation [dB]	Branching attenuation [dB]
5.00	-0.54	-17.23
47.00	-0.38	-17.14
606.00	-0.50	-17.83
862.00	-0.65	-17.51

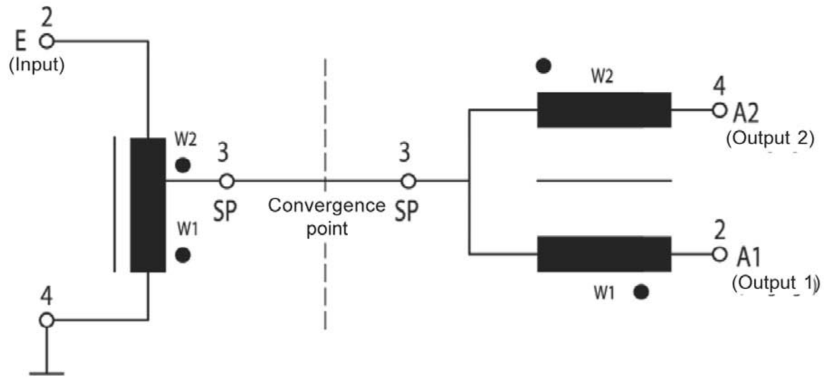
Measured with Vogt test adapter

A6.1 RF-TRANSFORMER

Test circuit for power splitting with impedance matching

Test circuit

Impedance matching splitter



E-A1	Insertion attenuation	**S 21**
E-A2	Insertion attenuation	**S 21**
A1-A2	Isolation	**S 21**

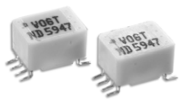
A circuit variation combining an impedance transformer with splitter is a standard circuit in communication technology for splitting radio-frequency energy.

Splitting the power at the splitter input causes a mismatch. A corresponding impedance transformer must be placed before the splitter.

The goal is a linearized attenuation curve and good decoupling of the outputs.

New products are in design.

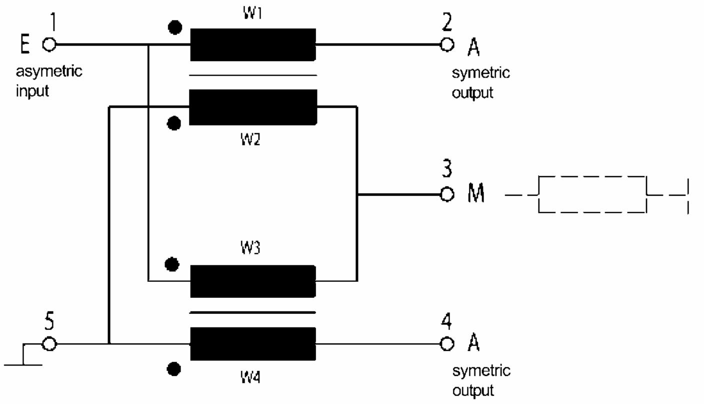
Customer-specific types on request



A6.1 RF-TRANSFORMER

Test arrangement for baluns

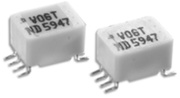
Test circuit



Baluns convert an ungrounded symmetrical signal **(RF twin lead)** to a ground-referenced unsymmetrical signal **(coax cable).**

New products are in design.

Customer-specific types on request



A6.2 INTERFACE TRANSFORMER

Inductive components for ISDN applications

For terminals
(Telephones, fax machines, PC cards, PCMCIA cards, video telephones)

- S_0 interface transformers
- S_0 interface modules
- U_{P0} interface transformers
- U_{PN} interface transformers
- Interface transformers in general

For public branch exchanges

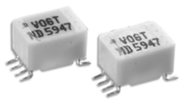
- Interface transformers in general
- S_{2M} interface transformers
- U_{K0} interface modules

For the NTBA
(Network Termination Basic Access)

- S_0 interface transformers
- S_0 interface modules
- U_{K0} interface modules
- Transformers for DC/DC converters

For private branch exchanges (PABX)

- S_0 interface transformers
- S_0 interface modules
- U_{P0} interface transformers
- U_{PN} interface transformers
- U_{K0} interface transformers
- Interface transformers in general
- Transformers for DC/DC converters

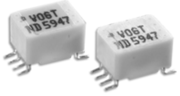


A6.2 INTERFACE TRANSFORMER

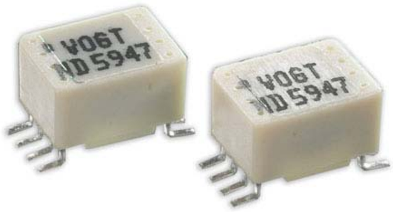
VOGT electronic offers a wide range of transformers and modules for the four-wire ISDN interface according to ITU-I.430 or FTZ1TR230 in ferrite technology.
The main differentiating features are the turns ratio for adapting the transformer to the various ISDN ICs and the permissible DC current asymmetry, depending on the respective area of use, such as participant terminal with/without own power supply or network terminator (NTBA).
The transformers and modules are also available with reinforced insulation as per IEC 950, EN 60 950, BS 6301.

Crossreference

Part number	Alcatel Micro-electronics	Lucent Techno-logies	Cologne Chip	Infineon	Infineon	Infineon	Zarlink Semicon-ductor	Motorola	National Semicon-ductor
	MTC20276	T7234	HFC-S+	PSB/PSF 21150	PEB/PEF 3081	PEB 80900	MT 8930	MC 145574	TP3420
	MTC20277	T7250	HFC-S mini	PSB21381	PEB/PEF 3086	PEF 80912/913	MT 8931		TP3421
	MTC2028	T7252	HFC-SP	PSB21382	PSB/PSF 3186	PEF 81912/913			
	MTC20279	T7256	HFC-S PCI A	PSB21383		PEF 82912/913			
		T7259	HFC-S USB	PSB21384		PEF 81902			
		T9000	HFC-S active			PEF 82902			
503 05 901 00	x		x			x	x		x
503 05 903 00				x	x				
503 10 008 00	x					x	x		x
503 10 009 00	x		x			x	x		x
503 10 016 00				x	x				
503 12 001 00	x		x			x	x		x
503 12 002 00	x					x	x		x
503 20 010 00	x		x			x	x		x
503 20 019 00	x		x			x	x		x
503 20 902 00		x						x	
503 20 906 00		x						x	
503 20 911 00				x	x				
503 20 935 00				x	x				
543 80 002 00	x					x	x		x
543 80 004 00		x						x	
543 80 006 00				x	x				
543 80 008 00	x					x	x		x



A6.2 INTERFACE TRANSFORMER



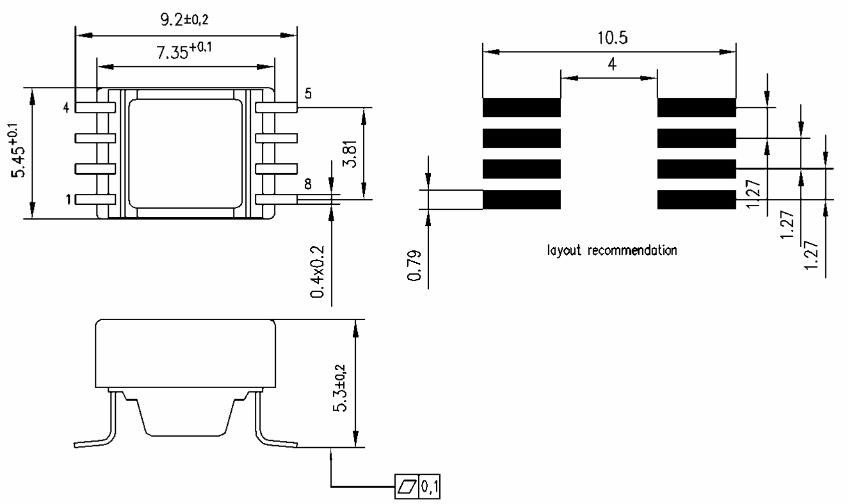
Type K5 503 05 9.. ...

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

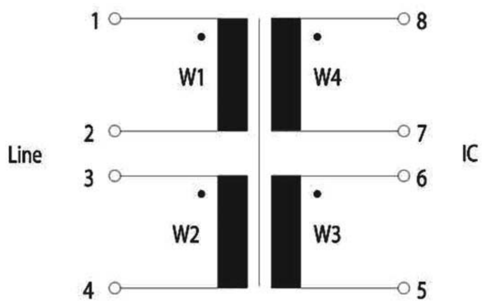
Part number	L_N (mH)	L_S (µH)	Δ I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)
503 05 901 00	≥ 22	≤ 2	-	50	2.6	6	1CS : 2CS	1.5
503 05 903 00	≥ 25	≤ 2	-	90	3.2	3.2	1CS : 1CS	1.5

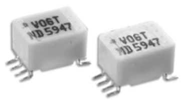
Technical data at T_U=25°C + 1°C

Mechanical dimensions

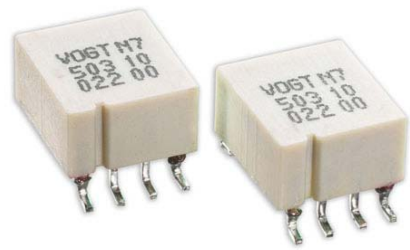


Circuit diagram





A6.2 INTERFACE TRANSFORMER



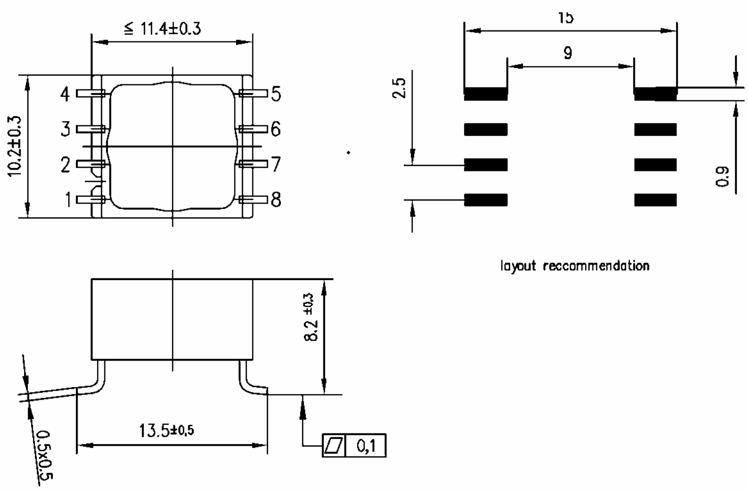
Type K10 503 10 … ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

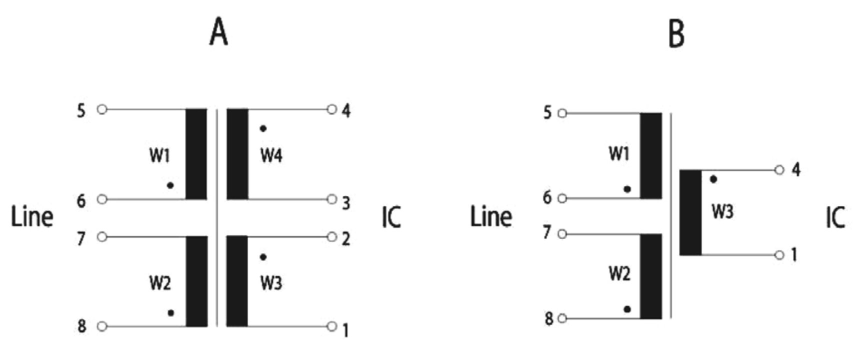
Part number	L_N (mH)	L_S (µH)	ΔI_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	Circuit diagram
503 10 008 00	≥ 30	≤ 6	4	90	2.2	5.2	1CS : 2	1.5	B
503 10 009 00	≥ 30	≤ 6	4	90	2.2	5.2	1CS : 2CS	1.5	A
530 10 016 00	≥ 30	≤ 5	4	65	1.6	1.6	1CS : 1CS	1.5	A

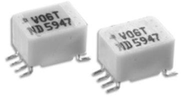
Technical data at T_U = 25°C ± 1°C

Mechanical dimensions

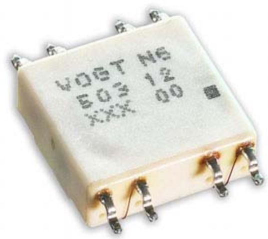


Circuit diagrams





A6.2 INTERFACE TRANSFORMER



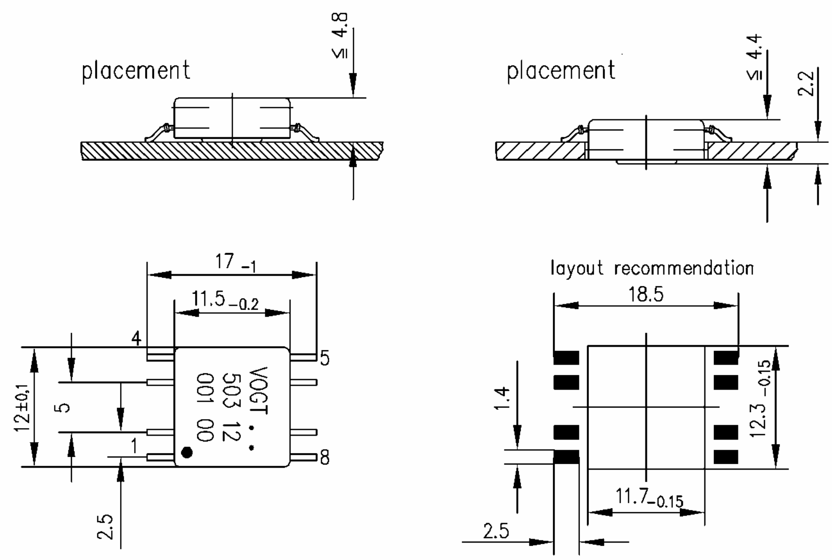
Tpye K12 503 12 … ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

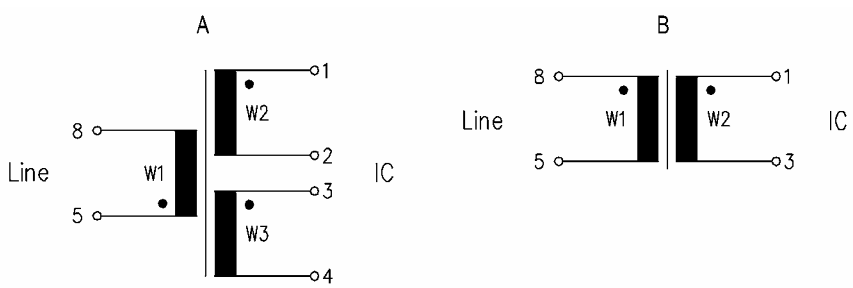
Part number	L_N (mH)	L_S (µH)	ΔI_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	Circuit diagram
503 12 001 00	≥ 25	≤ 2	-	≤ 200	2.5	4.7	1 : 2CS	1.5	A
503 12 002 00	≥ 25	≤ 2.5	-	≤ 140	2.4	4.4	1 : 2	1.5	B

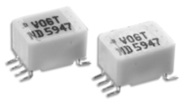
Technical data at T_U = 25°C ± 1°C

Mechanical dimensions

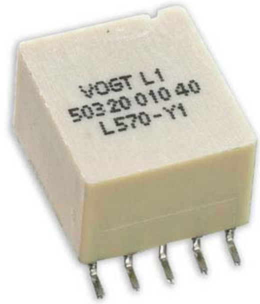


Circuit diagrams





A6.2 INTERFACE TRANSFORMER



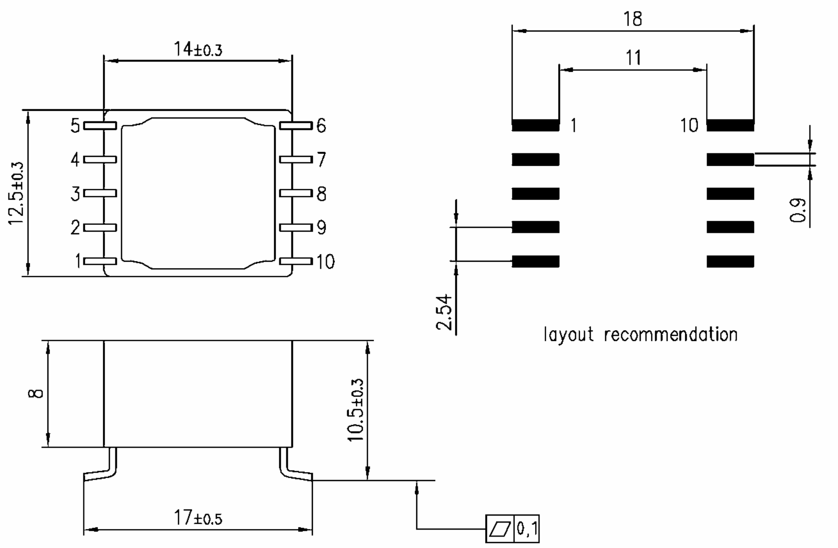
Type K20 503 20 … ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950
-

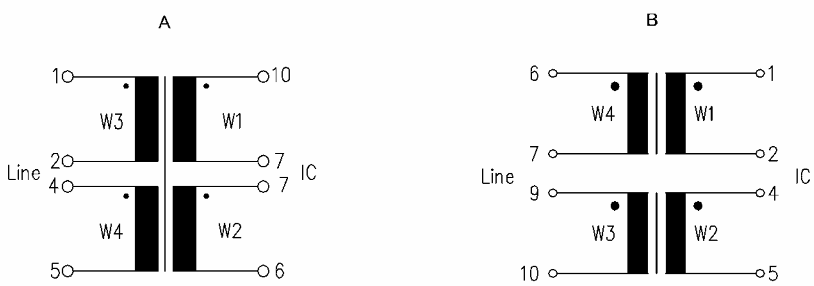
Part number	L_N (mH)	L_S (µH)	Δ I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	reinforced insolation	Circuit diagram
503 20 010 00	≥ 30	≤ 6	2.5	80	2.5	5	1CS : 2CT	1.5		A
503 20 019 00	≥ 30	≤ 6	5	40	0.45	2	1CS : 2CT	4	x	A
503 20 902 00	≥ 30	≤ 2	5	40	0.5	2.5	1CS : 2.5CT	4	x	A
503 20 906 00	≥ 30	≤ 6	5	80	2.5		1CS : 2.5CS	1.5		B
503 20 911 00	≥ 25	≤ 6	2.5	80	4	4	1CS : 1CT	0.5		A
503 20 935 00	≥ 22	≤ 6	2.5	60	0.57	1.25	1CS : 1CT	4	x	A

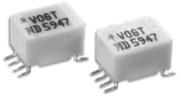
Technical data at $T_U = 25^\circ C \pm 1^\circ C$

Mechanical dimensions



Circuit diagrams





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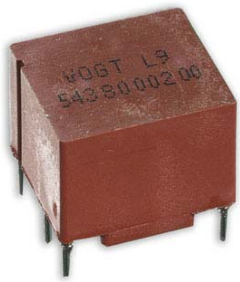
A6.2 INTERFACE TRANSFORMER



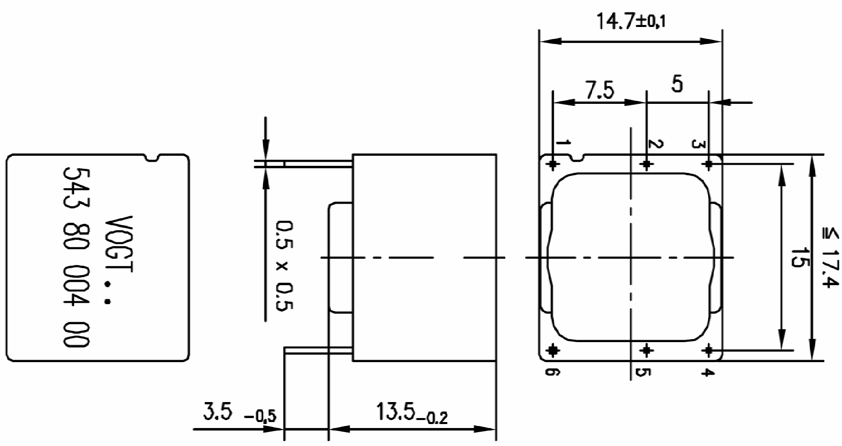
Type K80 543 80... ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

Part number	L_N (mH)	L_S (µH)	ΔI_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	reinforced insolation	Circuit diagram
543 80 002 00	≥ 30	≤ 10	5	65	0.8	4	1CS : 2	4	x	A
543 80 004 00	≥ 30	≤ 8	5	50	1	4.5	1CT : 2.5CT	4	x	B
543 80 006 00	≥ 30	≤ 10	5	65	0.8	2	1CT : 1CT	4	x	B
543 80 008 00	≥ 30	≤ 15	5	15	2	4	1CT : 2CT	4	x	B

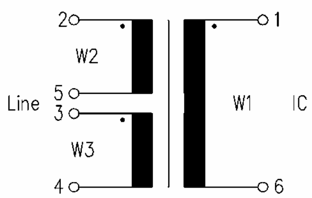
Technical data at $T_U = 25°C \pm 1°C$

Mechanical dimensions

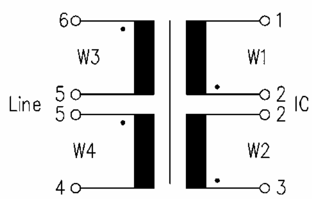


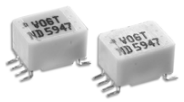
Circuit diagrams

A



B



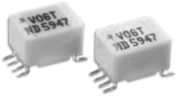


A6.2 INTERFACE TRANSFORMER

The individual components, S_0 transformers and data line chokes, are also available as modules in order to meet higher requirements for compactness and handling. Each module is available with and without data line choke.

Crossreference

Part number	Alcatel Microelectronics	Lucent Technologies	Cologne Chip	Infineon	Infineon
	MTC20276	T7234	HFC-S+	PSB/PSF 21150	PEB/PEF 3081
	MTC20277	T7250	HFC-S mini	PSB21381	PEB/PEF 3086
	MTC2028	T7252	HFC-SP	PSB21382	PSB/PSF 3186
	MTC20279	T7256	HFC-S PCI A	PSB21383	
		T7259	HFC-S USB	PSB21384	
		T9000	HFC-S active		
503 10 023 00				x	x
503 12 003 00				x	x
503 16 001 00				x	x
503 16 005 00				x	x
503 16 501 00	x		x		
503 16 502 00	x		x		
503 16 503 00				x	x
503 16 504 00	x		x		
503 16 505 00	x		x		
503 16 506 00	x		x		
503 16 508 00				x	x
503 16 509 00				x	x
503 16 510 00				x	x
503 16 511 00				x	x
503 16 512 00		x			
503 16 513 00	x				
503 20 981 00	x		x		
503 20 983 00				x	x
503 20 985 00	x		x		
503 74 001 10	x				
503 74 003 00	x		x		
503 74 006 00	x		x		
503 74 007 00				x	x
543 76 006 00	x				
543 76 007 00	x				
543 76 011 00		x			
543 76 013 00	x		x		



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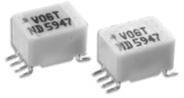
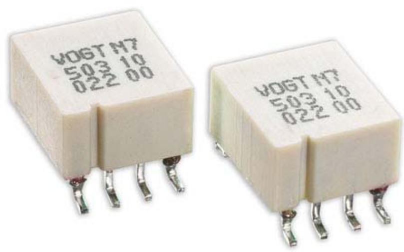
A6.2 INTERFACE TRANSFORMER

Crossreference

Part number	Infineon	Zarlink Semiconductor	Motorola	National Semi-conductor
	PEB 80900	MT8930	MC145574	TP3420
	PEF 80912/913	MT8931		TP3421
	PEF 81912/913			
	PEF 82912/913			
	PEF 81902			
	PEF 82902			
503 10 023 00				
503 12 003 00				
503 16 001 00				
503 16 005 00				
503 16 501 00	x	x		x
503 16 502 00	x	x		x
503 16 503 00				
503 16 504 00	x	x		x
503 16 505 00	x	x		x
503 16 506 00	x	x		x
503 16 508 00				
503 16 509 00				
503 16 510 00				
503 16 511 00				
503 16 512 00			x	
503 16 513 00	x	x		x
503 20 981 00	x	x		x
503 20 983 00				
503 20 985 00	x	x		x
503 74 001 10	x	x		x
503 74 003 00	x	x		x
503 74 006 00	x	x		x
503 74 007 00				
543 76 006 00	x	x		x
543 76 007 00	x	x		x
543 76 011 00			x	
543 76 013 00	x	x		x



A6.2 INTERFACE TRANSFORMER



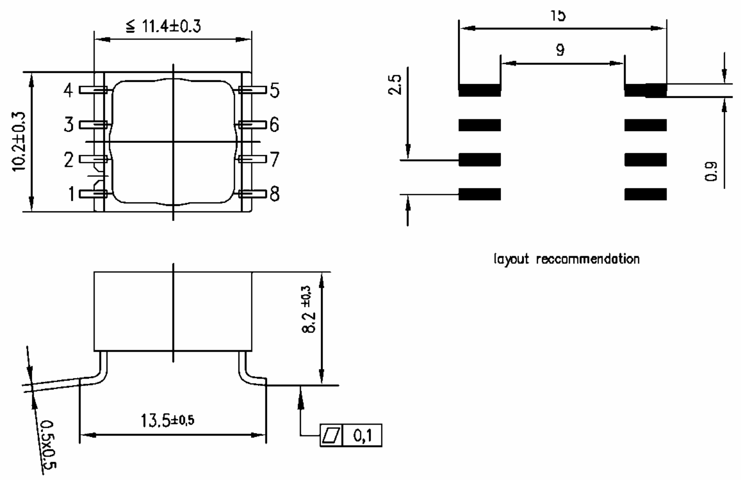
Type K10 503 10 … ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

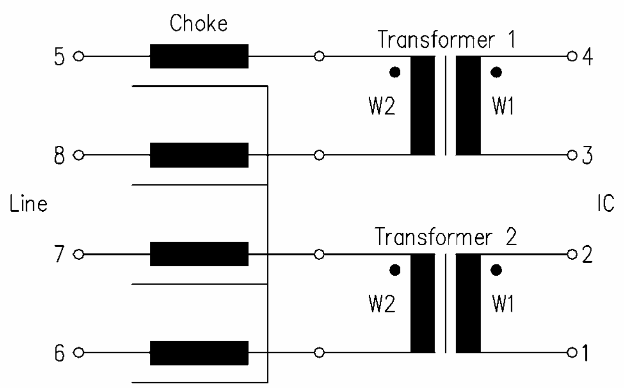
Part number	Transformers								Choke
	L_N (mH)	L_S (µH)	Δ I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	L_N (mH)
503 10 023 00	≥ 25	≤ 1	-	≤ 50	1.6	1.6	1:1	1.5	4x0.5

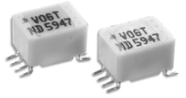
Technical data at T_U = 25°C ± 1°C

Mechanical dimensions



Circuit diagram





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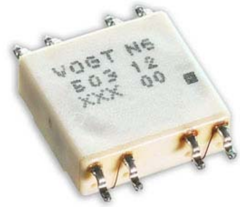
A6.2 INTERFACE TRANSFORMER



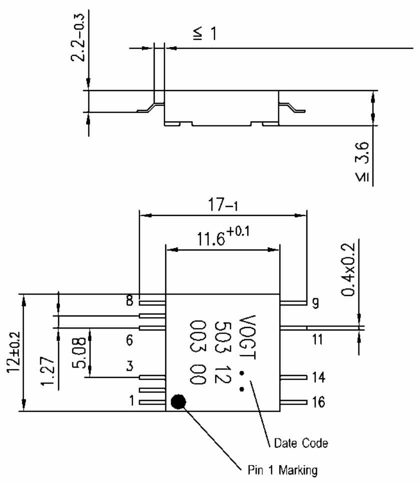
Type K12 503 12 … ..

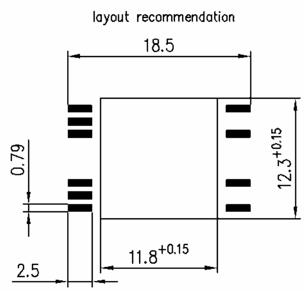
- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

	Part number	Transformers								Choke	Circuit diagram
		L_N (mH)	L_S (µH)	Δ I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	L_N (mH)	
	503 12 003 00	≥ 25	≤ 1	-	-	3.2	3.0	1 : 1CT	0.5	4 x 0.5	A
amorph	503 12 005 00	≥ 25	≤ 1	-	-	1.55	2.1	1 : 2CT	0.5	4 x 0.5	A
amorph	503 12 006 00	≥ 25	≤ 3	-	-	3.2	6.0	1 : 2CT	0.5	4 x 3.6	A
amorph	503 12 008 00	≥ 25	≤ 3	-	-	3.3	2.7	1 : 1	0.5	4 x 0.5	B

Technical data at $T_U = 25°C \pm 1°C$

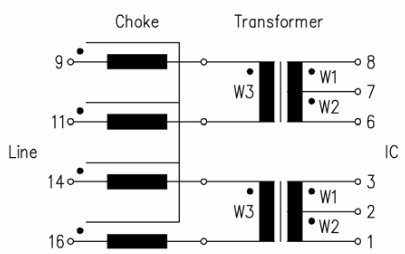
Mechanical dimensions



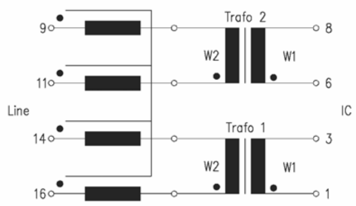


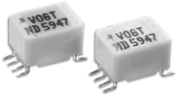
Circuit diagrams

A

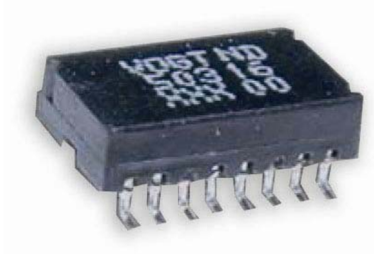


B





A6.2 INTERFACE TRANSFORMER



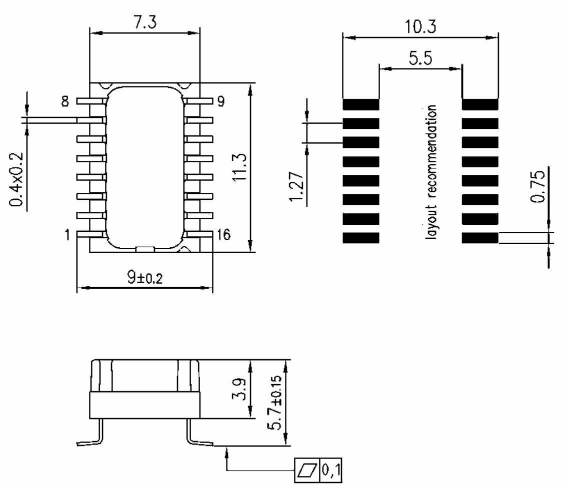
Type S016 (RM 1.27 mm) 503 16 0.. ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

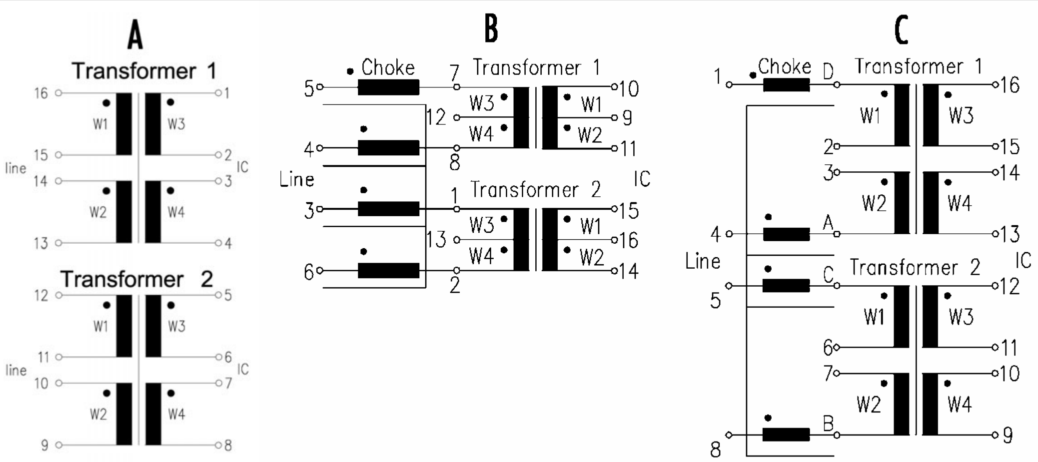
Part number	Transformer								Choke	Circuit diagram
	L_N (mH)	L_S (µH)	Δ I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	L_N (mH)	
503 16 009 00	≥ 25	≤ 5	1	≤ 100	1.5	1.5	1CS : 1CS	0.5	-	A
503 16 012 00	≥ 25	≤ 3	1	≤ 100	2.6	2.6	1CT : 1CT	0.5	4x0.5	B
503 16 017 00	≥ 25	≤ 12	1	≤ 80	3.5	6.0	1CS : 2CS	1.5	4x0.05	C

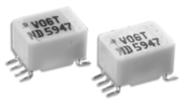
Technical data at $T_U = 25^\circ C \pm 1^\circ C$

Mechanical dimensions



Circuit diagrams





A6.2 INTERFACE TRANSFORMER

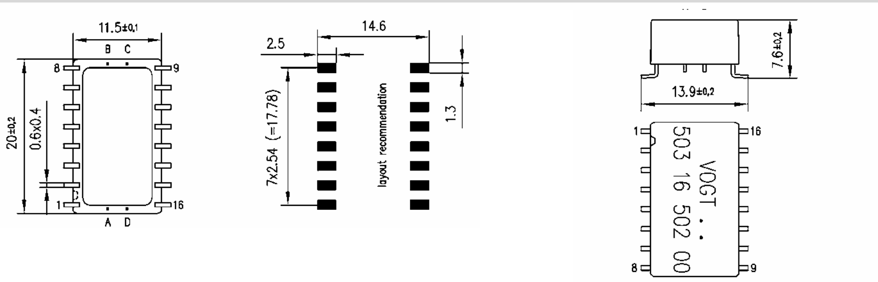
Type S016 (RM 2.54 mm) 503 16 5.. ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

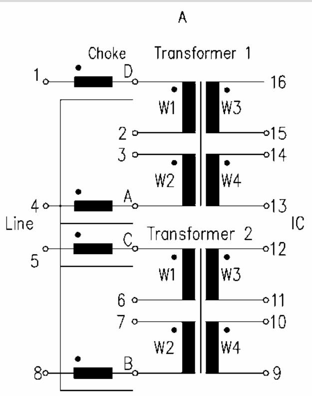
Part number	Transformer									Choke	Circuit diagram
	L_N (mH)	L_S (µH)	Δ I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	reinforced insolation	L_N (mH)	
503 16 501 00	≥ 30	≤ 5	4	110	2.4	4.8	1CS : 2CS	0.5		0.5	A
503 16 502 00	≥ 30	≤ 5	4	140	2.4	5	1CS : 2CS	0.5		4 x 5	A
503 16 503 00	≥ 30	≤ 5	4	70	1.6	1.6	1CS : 2CS	0.5		-	B
503 16 504 00	≥ 30	≤ 5	4	130	2.4	4.8	1CS : 2CS	0.5		-	B
503 16 505 00	≥ 30	≤ 5	4	110	2.4	4.8	1CS : 2CS	0.5		4 x 0.05	A
503 16 506 00	≥ 30	≤ 5	4	110	3	4.8	1CS : 2CS	2		4 x 0.1	A
503 16 508 00	≥ 30	≤ 5	4	100	2.6	2.6	1CS : 2CS	1.5		4 x 0.05	A
503 16 509 00	≥ 30	≤ 5	4	100	2.4	2.4	1CS : 2CS	2		4 x 0.1	A
503 16 510 00	≥ 30	≤ 5	4	100	2.4	2.4	1CS : 2CS	1.5		4 x 5	A
503 16 511 00	≥ 30	≤ 5	4	100	3	2.4	1CS : 2CS	1.5		4 x 0.5	A
503 16 512 00	≥ 30	≤ 5	4	140	5	6	1CS : 2CS	1.5		4 x 5	A
503 16 513 00	≥ 23	≤ 2	2	30	0.24	2.2	1CS : 2CS	4	x	-	B

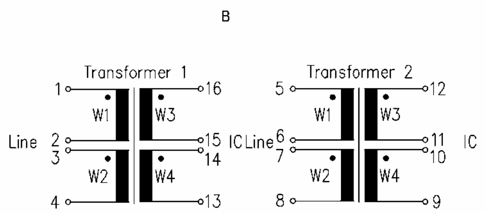
Technical data at T_U = 25 °C ± 1°C

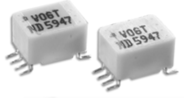
Mechanical dimensions



Circuit diagrams







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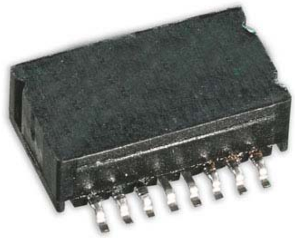
A6.2 INTERFACE TRANSFORMER



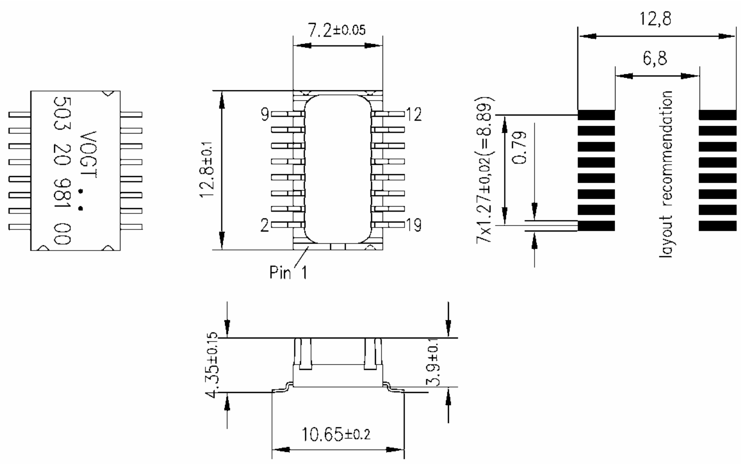
Type S020 503 20 … ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

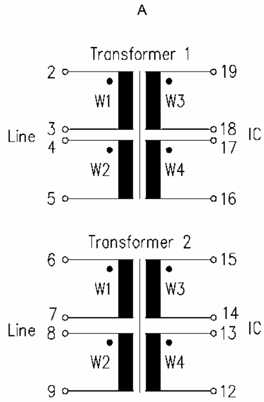
Part number	Transformer								Choke	Circuit diagram
	L_N (mH)	L_S (µH)	ΔI_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	L_N (mH)	
503 20 981 00	≥ 22	≤ 6	1	70	2.5	6.7	1CS : 2CS	1.5	-	A
503 20 983 00	≥ 25	-	1	-	4.3	3.2	1CT : 1CT	1.5	4x1	B
503 20 985 00	≥ 22	≤ 6	1	70	2.6	6	1CT : 2CT	1.5	4x0.47	B

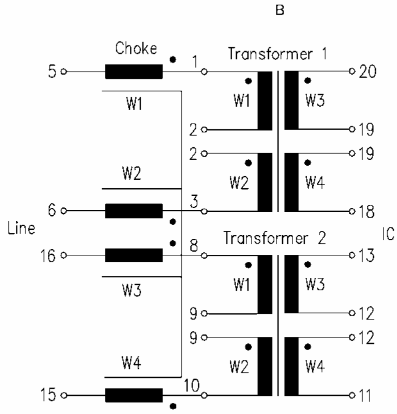
Technical data at $T_U = 25°C \pm 1°C$

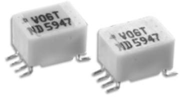
Mechanical dimensions



Circuit diagrams







A6.2 INTERFACE TRANSFORMER

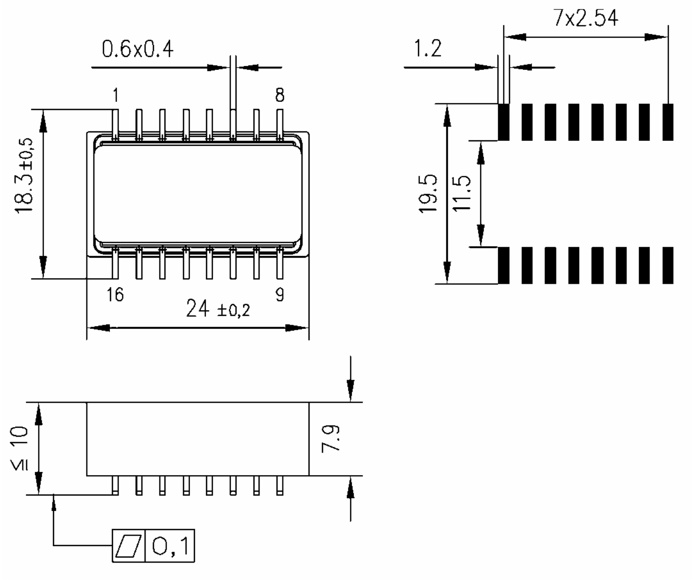
Type K74 503 74 … ..

- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

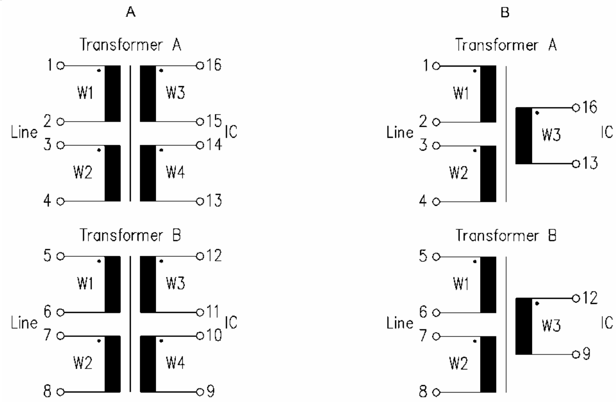
Part number	Transformer									Circuit diagram
	L_N (mH)	L_S (µH)	Δ I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	reinforced insolation	
503 74 001 10	≥ 30	≤ 6	5	180	2.2	4.3	1CT : 2	2		B
503 74 003 00	≥ 30	≤ 6	5	60	0.5	2.1	1CT : 2CT	4	x	A
503 74 006 00	≥ 22	≤ 6	5	180	1.2	2.5	1CS : 2CS	2		A
503 74 007 00	≥ 30	≤ 6	5	40	0.45	1	1CS : 1CS	4	x	A

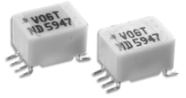
Technical data at $T_U = 25°C \pm 1°C$

Mechanical dimensions



Circuit diagrams





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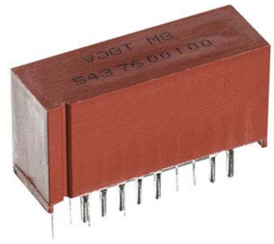
A6.2 INTERFACE TRANSFORMER



Type K76 543 76 … ..

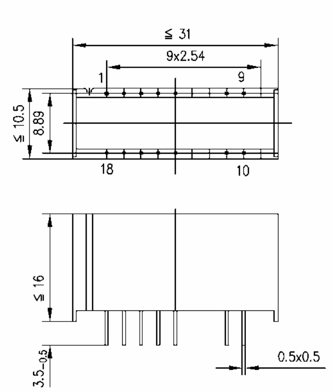
- Design: according to ITU-I.430
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

Part number	Transformer									Choke	Circuit diagram
	L_N (mH)	L_S (µH)	ΔI_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	reinforced insolation	L_N (mH)	
543 76 006 00	≥ 30	≤ 6	3	180	5.7	5	1CT : 2CT	1.5		4 x 2.5	B
543 76 007 00	≥ 30	≤ 6	3	150	6.3	5	1CT : 2	1.5		4 x 5	A
543 76 011 00	≥ 30	≤ 5	5	150	3.7	4.3	1CT : 2.5CT	1.5		4 x 2.5	B
543 76 013 00	≥ 30	≤ 5	5	60	0.55	2	1CS : 2	3	x	4 x 5	C

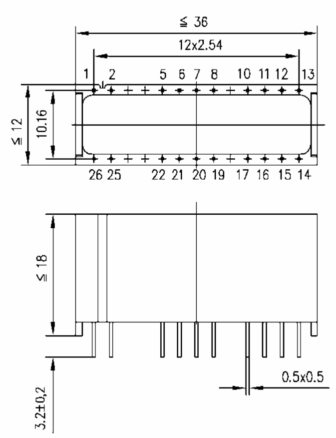
Technical data at $T_U = 25°C \pm 1°C$

Mechanical dimensions

K76-1

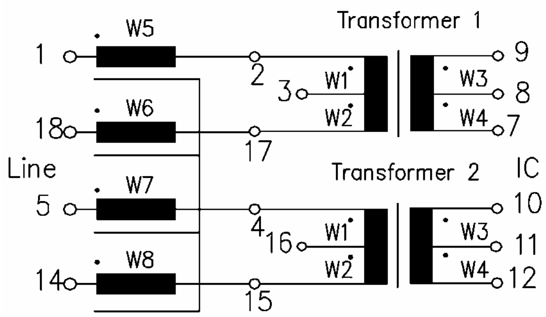


K76-2

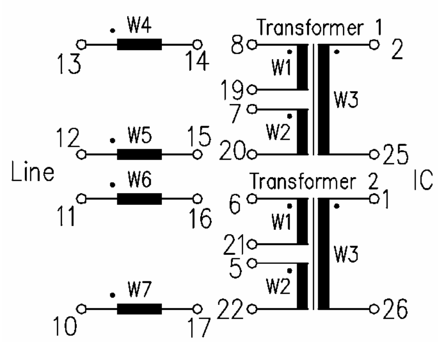


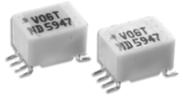
Circuit diagrams

B



C



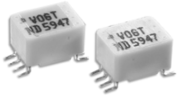


A6.2 INTERFACE TRANSFORMER

Due to the high transmission speed (2Mbit/s) in particular, the S_{2M} interface, defined as the primary multiplex connection between network terminator NT and private branch exchange PABX, makes high demands of these signal transformers with a low active return loss.

Crossreference

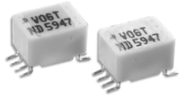
Part number	Cologne Chip	Conexant			Cirrus Logic			Dallas Semiconductor		
	HFC-E1	BT8069B	BT8370	BT8510	CS61577	CS61881	CS61535A	DS21552	DS21352	DS2148
		BT8069	BT8375		CS61584		CS61575	Q552	DS21354	Q48
		BT8071	BT8376		CS61584A		CS61574A	DS21554	Q352	
		UGA510-1					CS6158A	Q554	Q354	
							CS61304A	DS2151		
							CS61305A	DS2152		
								DS2153		
								DS2154		
503 16 004 00				x			x			
503 16 007 00	x									
503 16 008 00										
503 40 907 00			x			x	x	x		
503 40 908 00										
543 21 008 00										
503 40 911 00										
503 22 502 00				x						
503 22 503 00			x					x		x
503 22 504 00						x	x	x		
503 22 505 00										
503 40 912 00										
503 22 506 00					x					
503 32 903 00										
503 16 010 00			x			x	x	x		
503 16 011 00		x							x	x
503 74 008 00										
503 22 507 00									x	
503 32 902 00										
503 40 909 00			x					x		x
503 32 904 00										
503 40 910 00										



A6.2 INTERFACE TRANSFORMER

Crossreference

Part number	Infineon		Level One				
	PEB2254	PEB/PSB22554	LXT350	LXT380	LXT304A	LXT350	LXT331
	PEB2255	PEB/PSB2256	LXT351	LXT381	LXT305A	LXT351	LXT332
			LXT359	LXT384	LXT 307	LXT360	
			LXT360	LXT386		LXT361	
			LXT361	LXT388		LXT370	
			LXT362			LXT310	
			LXT363			LXT319	
						LXT317	
						LXT318	
503 16 004 00					x		
503 16 007 00							
503 16 008 00	x						
503 40 907 00			x				x
503 40 908 00				x			
543 21 008 00		x					
503 40 911 00		x					
503 22 502 00					x		
503 22 503 00							
503 22 504 00			x		x		x
503 22 505 00							
503 40 912 00							
503 22 506 00				x	x		x
503 32 903 00							
503 16 010 00			x		x		x
503 16 011 00			x	x		x	x
503 74 008 00	x						
503 22 507 00						x	
503 32 902 00							
503 40 909 00							
503 32 904 00							x
503 40 910 00							



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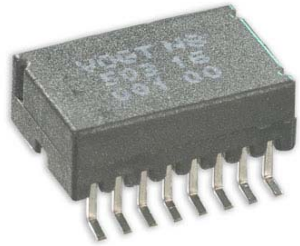
A6.2 INTERFACE TRANSFORMER



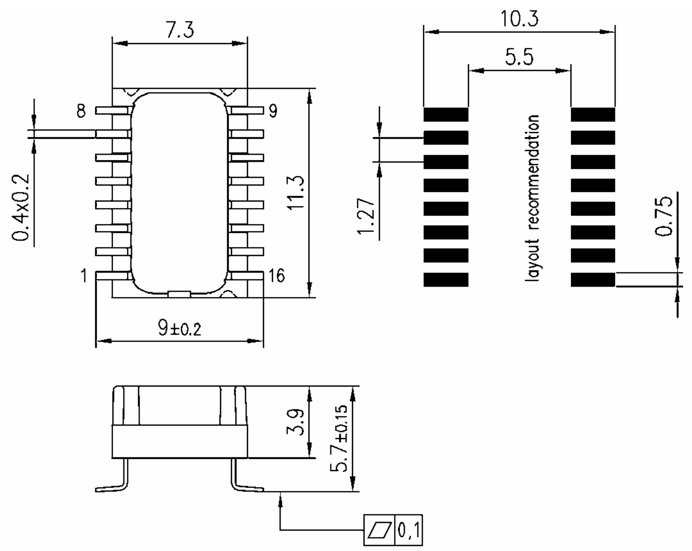
Type S016 (RM 1.27 mm) 503 16 0.. ..

- Design: according to ITU-T G.703
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

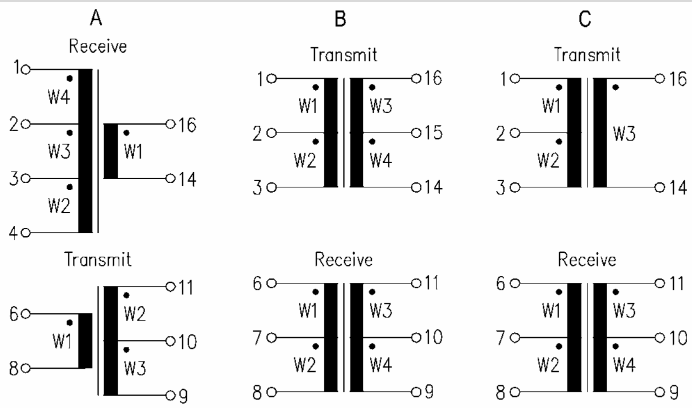
Part number	L_N (mH)	L_S (µH)	C_K (pF)	ü (pri. - sec.) Transmit	ü (pri. - sec.) Receive	U_P (kV)	Circuit diagram
503 16 004 00	≥ 1.5	≤ 0.5	35	1 : 2CT	1 : 1.15/1 : 1	1.5	A
503 16 007 00	1	0.8	50	1CT : 2.4CT	1CT : 1CT	1.5	B
503 16 008 00	1.2	≤ 0.6	≤ 30	1CT : 1.41CT	1CT : 1.41CT	1.5	B
503 16 010 00	≥ 1.2	≤ 0.6	-	1 : 1.15CT	1CT : 2CT	1.5	C
503 16 011 00	≥ 1.2	≤ 0.6	≤ 30	1CT : 1CT	1CT : 2CT	1.5	B

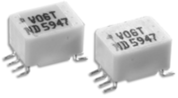
Technical data at $T_U = 25°C \pm 1°C$

Mechanical dimensions



Circuit diagrams





A6.2 INTERFACE TRANSFORMER

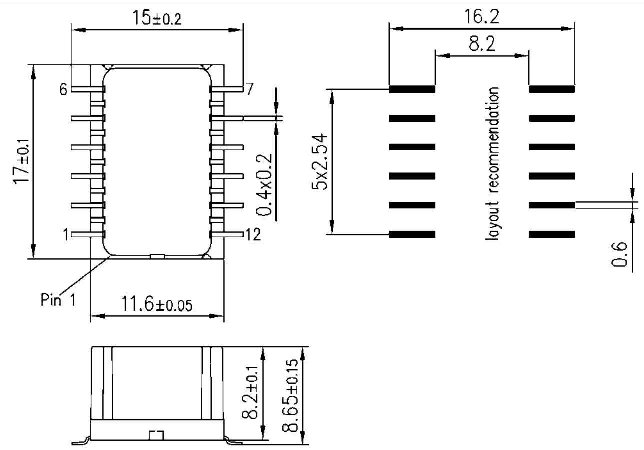
Type S022 (RM 2.54 mm) 503 22 5.. ..

- Design: according to ITU-T G.703
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

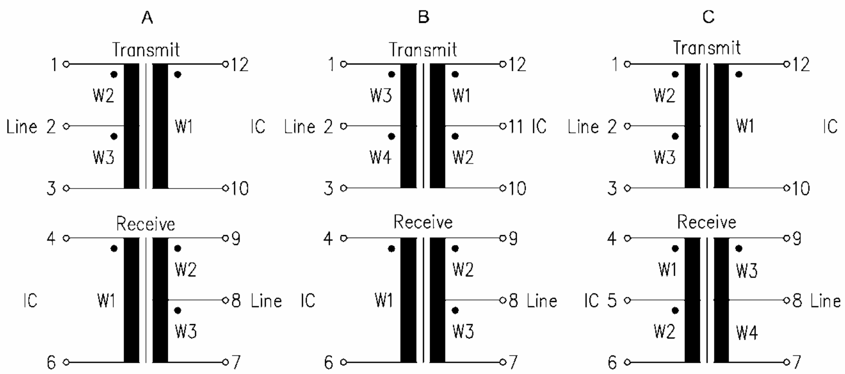
Part number	L_N (mH)	L_S (µH)	C_K (pF)	ü (IC - Line)		U_P (kV)	Circuit diagram
				Transmit	Receive		
503 22 502 00	≥ 1.5	≤ 1	≤ 30	1 : 1/1.26	1 : 2 CT	1.5	A
503 22 503 00	≥ 1.5	≤ 1	≤ 30	1CT : 2CT	1 : 1.36CT	1.5	B
503 22 504 00	≥ 1.5	≤ 1	≤ 30	1 : 1.15CT	1CT : 2CT	1.5	C
503 22 505 00	≥ 1.5	≤ 1	≤ 30	1CT : 2CT	1 : 1	1.5	D
503 22 506 00	≥ 1.5	≤ 1	≤ 30	1CT : 2CT	1CT : 2CT	1.5	E
503 22 507 00	≥ 1.2	≤ 0.6	≤ 30	1CT : 1CT	1CT : 1CT	1.5	E

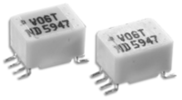
Technical data at $T_U = 25°C \pm 1°C$

Mechanical dimensions



Circuit diagrams





A6.2 INTERFACE TRANSFORMER

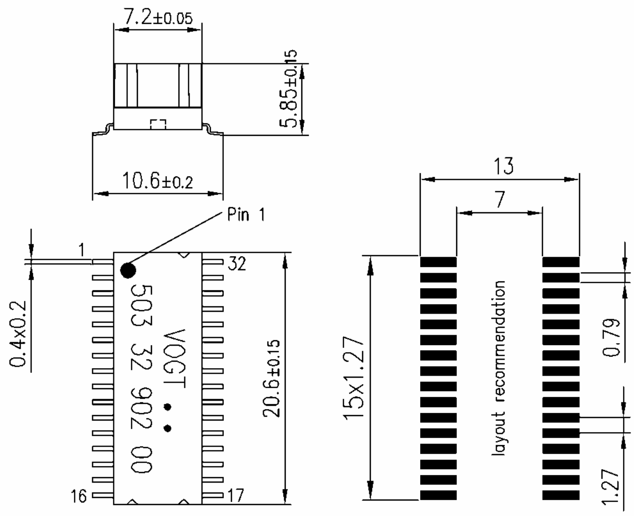
Type S032 503 32 … ..

- Design: according to ITU-T G.703
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

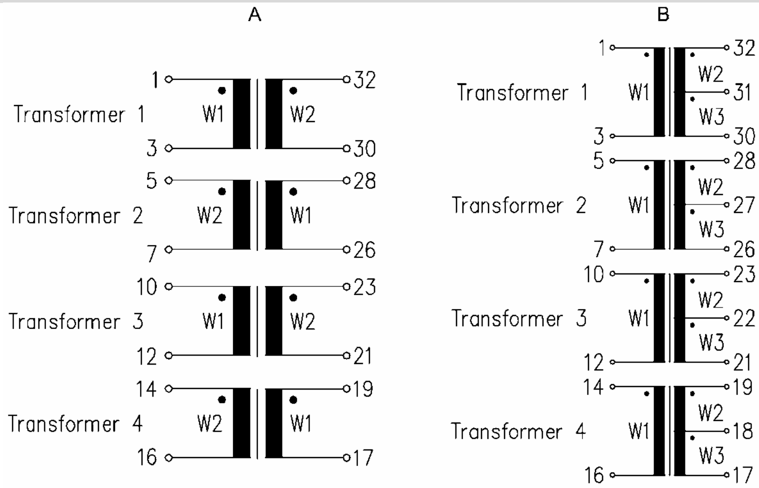
Part number	L_N (mH)	L_S (µH)	C_K (pF)	ü (IC - Line)		U_P (kV)	Circuit diagram
				Transmit	Receive		
503 32 902 00	≥ 1.2	≤ 0.5	≤ 35	1 : 1.36	1 : 2	1.5	A
503 32 903 00	≥ 1.2	≤ 0.5	≤ 30	1 : 1.36CT	-	1.5	B
503 32 904 00	≥ 1.2	≤ 0.5	≤ 30	1 : 2T	1 : 2CT	1.5	B

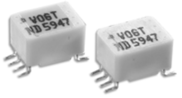
Technical data at T_U = 25°C ± 1°C

Mechanical dimensions



Circuit diagrams





A6.2 INTERFACE TRANSFORMER

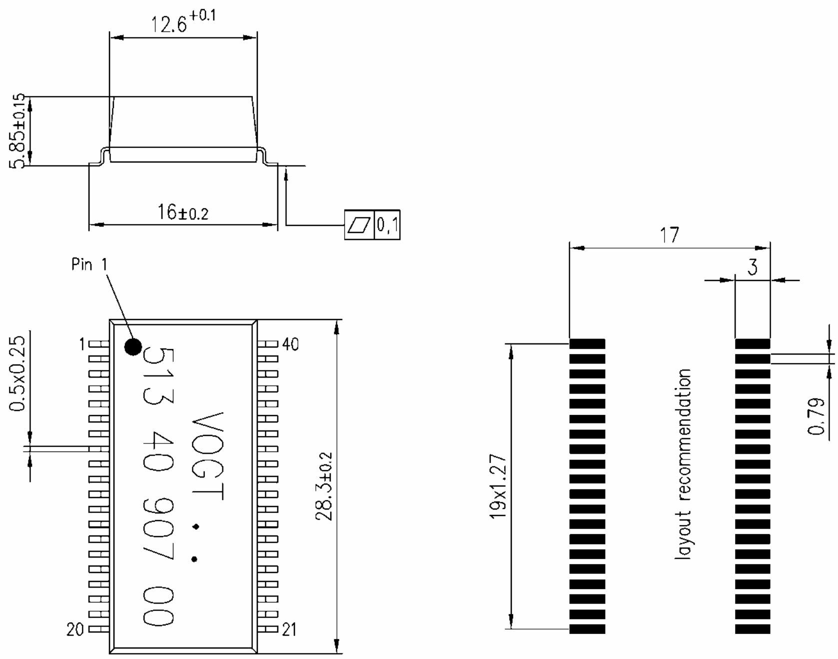
Type S040 513 40 … ..

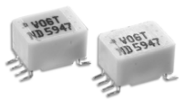
- Design: according to ITU-T G.703
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

Part number	L_N (mH)	L_S (µH)	C_K (pF)	ü (IC - Line)		U_P (kV)	Circuit diagram
				Transmit	Receive		
513 40 907 00	1.2	0.6	-	1 : 1.15	1 : 2CT	1.5	A
513 40 908 00	≥ 1.2	≤ 0.6	35	1 : 2CT	1CT : 2	1.5	B
513 40 909 00	≥ 1.2	≤ 0.6	35	1 : 1.36CT	1 : 2CT	1.5	C
513 40 910 00	≥ 1.2	-	-	1 : 2.42	1 : 2.42	1.5	D
513 40 911 00	≥ 1	-	-	1 : 2.4	1 : 1	1.5	E

Technical data at T_U = 25°C ± 1°C

Mechanical dimensions

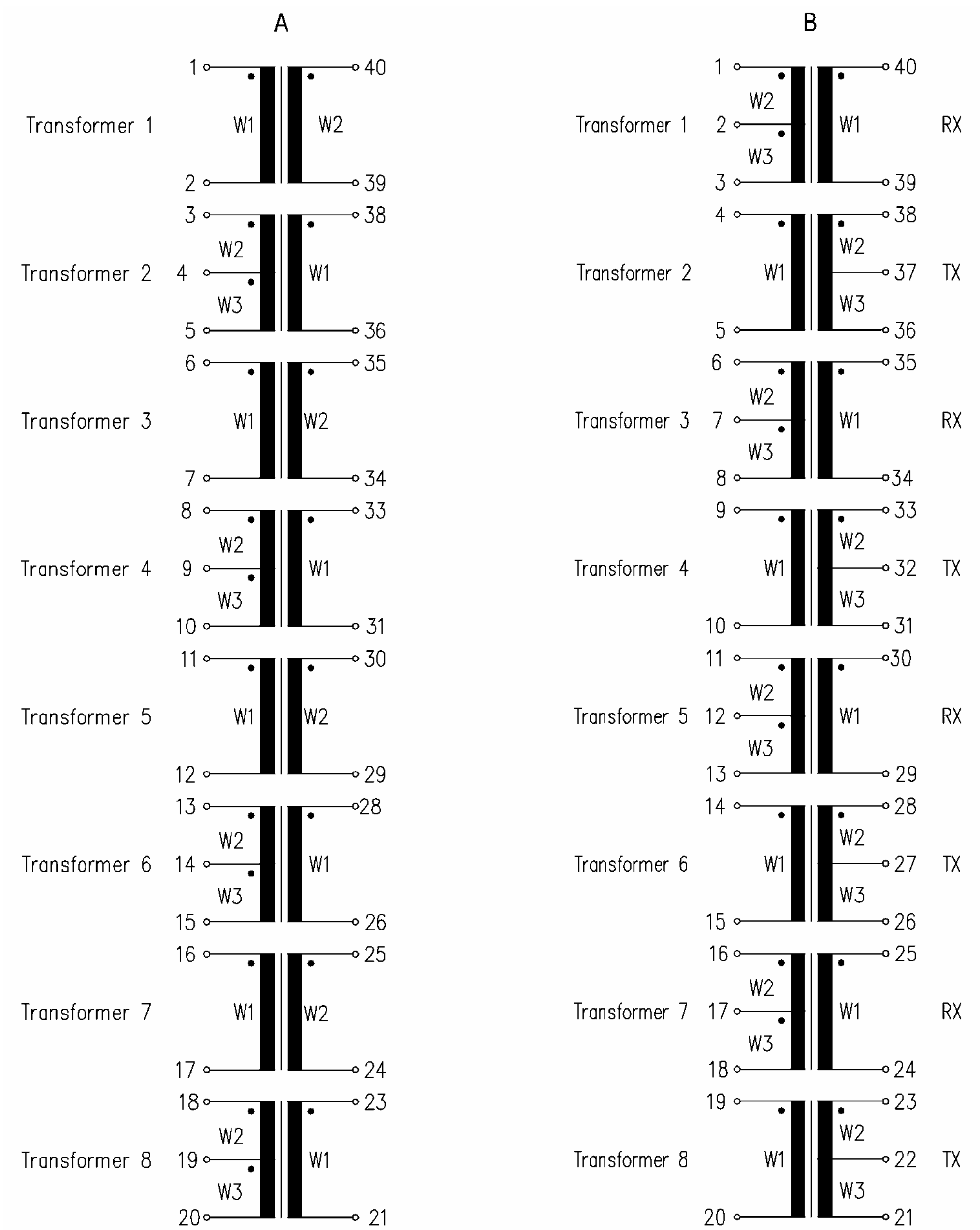


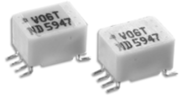


A6.2 INTERFACE TRANSFORMER

Circuit diagrams

Type S040 513 40 … ..





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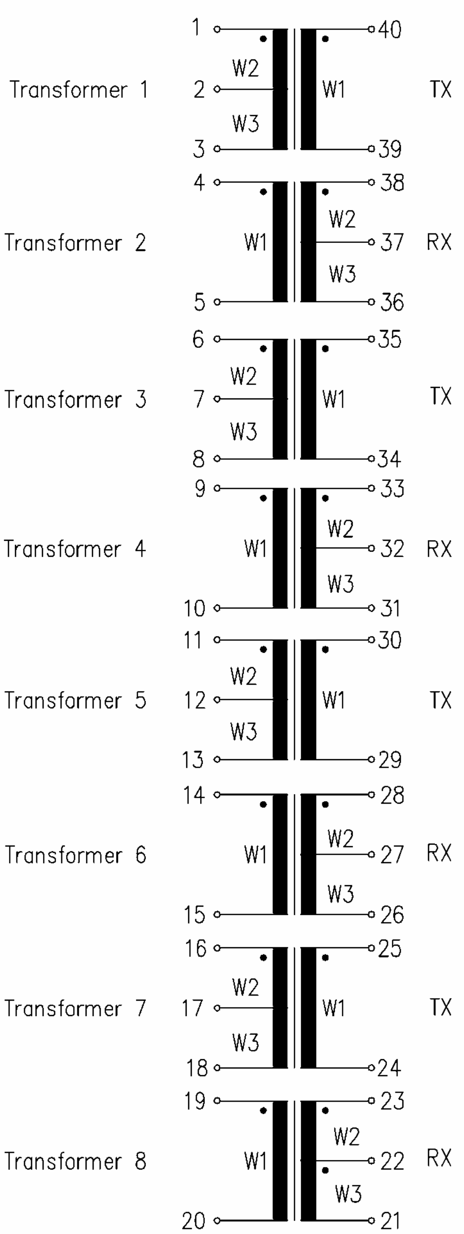
A6.2 INTERFACE TRANSFORMER

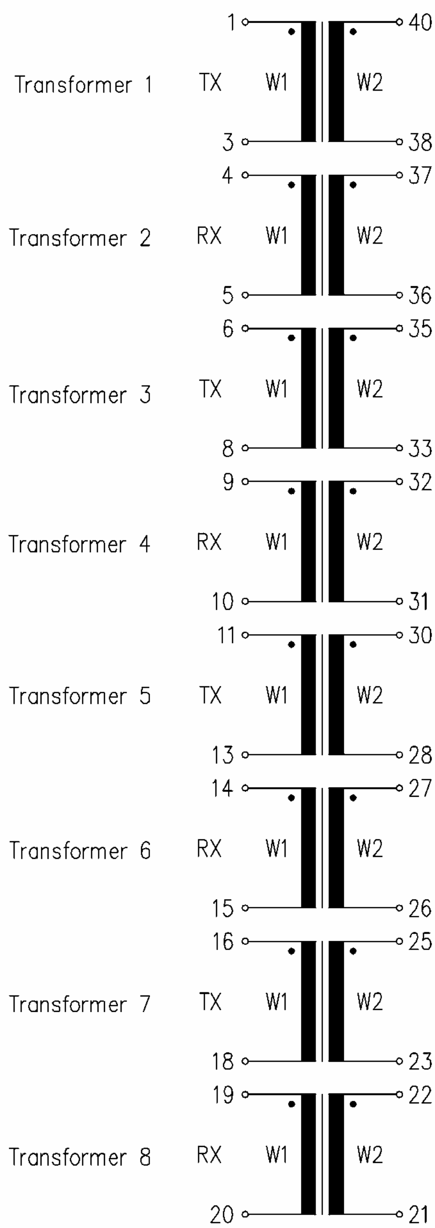
Circuit diagrams

Type S040 513 40 … ..

C



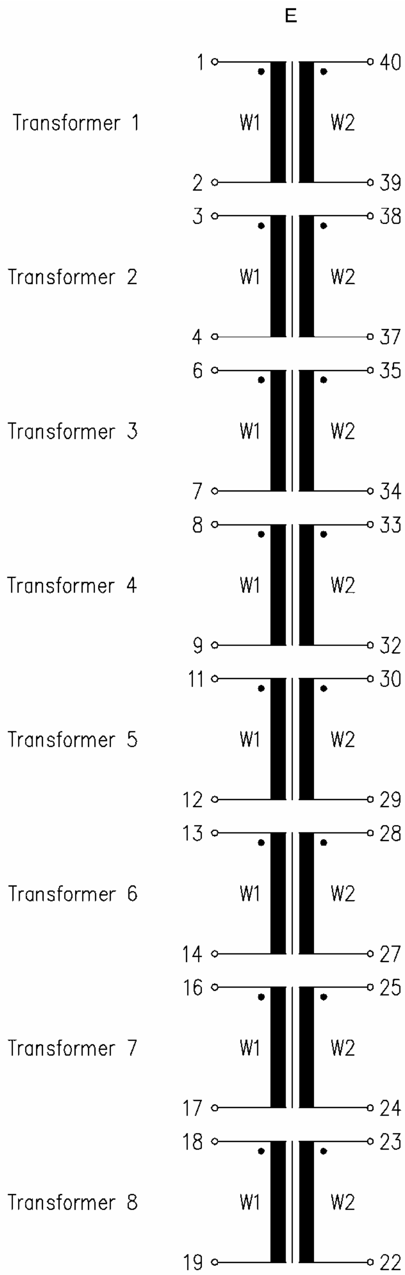
D

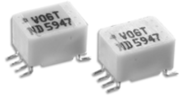


A6.2 INTERFACE TRANSFORMER

Circuit diagrams

Type S040 513 40 … ..





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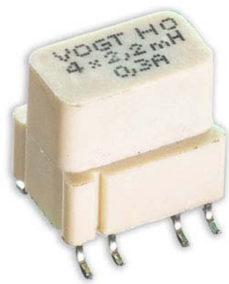
A6.2 INTERFACE TRANSFORMER



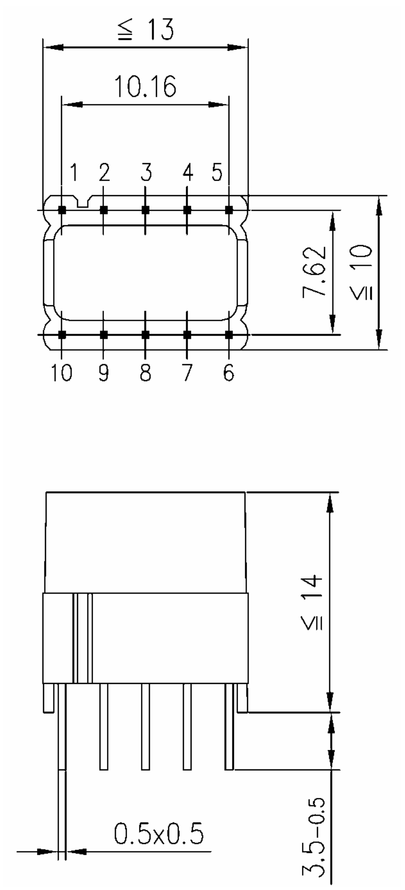
Type K21 543 21 … ...

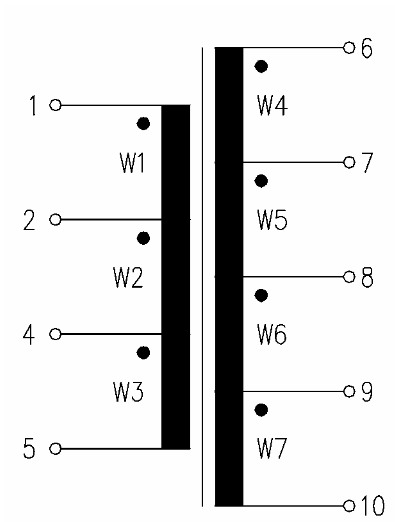
- Design: according to ITU-T G.703
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

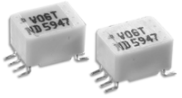
Part number	L_N (mH)	L_S (µH)	C_K (pF)	ü (IC - Line)		U_P (kV)
				Transmit	Receive	
543 21 008 00	≥ 2	1		5/4/1 : 2/8/8/2		0.5

Technical data at T_U = 25°C ± 1°C

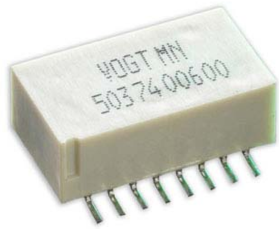
Mechanical dimensions **Circuit diagram**







A6.2 INTERFACE TRANSFORMER



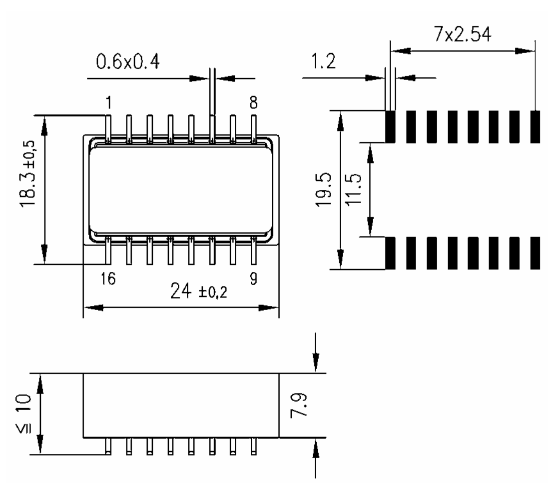
Type K74 503 74 … ..

- Design: according to ITU-T G.703
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

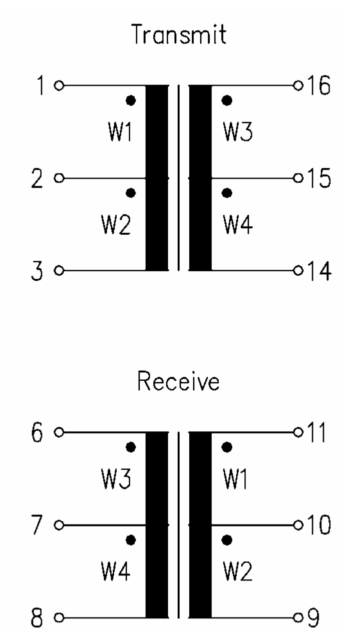
Part number	L_N (mH)	L_S (µH)	C_K (pF)	ü (IC - Line)		U_P (kV)
				Transmit	Receive	
503 74 008 00	≥ 1.2	≤ 1	20	1CT : 1.41CT	1CT : 1.41CT	3

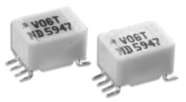
Technical data at $T_U = 25°C \pm 1°C$

Mechanical dimensions



Circuit diagram





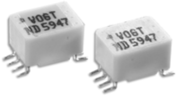
A6.2 INTERFACE TRANSFORMER

The U_{K0} interface, designed as two-wire interface, represents the link between the digital local node (DIVO) and the network terminator (NTBA).

The main requirements of the respective transformers which, depending on the application, are operated with the national transmission code 4B3T or with the ANSI standard 2B1Q, are a large transmission range with minimum bit error rate and high linearity of inductance with DC bias.

Crossreference

Part number	Alcatel Microelectronics		Infineon			Zarlink Semi-conductor	Motorola
	MTC 20277	MTC 20276	PEF 80912/913	PEB/PEF 2091	PEB 80900	MT9171/72	MC145572
		MTC 20278	PEF 81912/913	4B3T		MT9173/74	
			PEF 82912/913	PEB/PEF 24902			
			PEF 80912/913	PSB/PSF 21911			
2B1Q							
504 13 008 00		x	x			x	
504 06 006 00		x	x			x	
504 06 007 00	x			x			
544 02 011 00	x			x			
544 02 012 00							x
544 02 013 00	x			x			
544 02 019 00		x	x			x	
544 02 020 00	x			x			
544 03 009 00	x			x			
544 03 027 00		x	x			x	
544 03 036 00	x			x			
544 03 037 00		x	x			x	
540 13 017 00							x
4B3T							
503 20 917 00					x		
504 13 007 00					x		
544 02 009 00					x		
544 03 005 00					x		
544 03 008 00					x		
544 03 019 00					x		



A6.2 INTERFACE TRANSFORMER

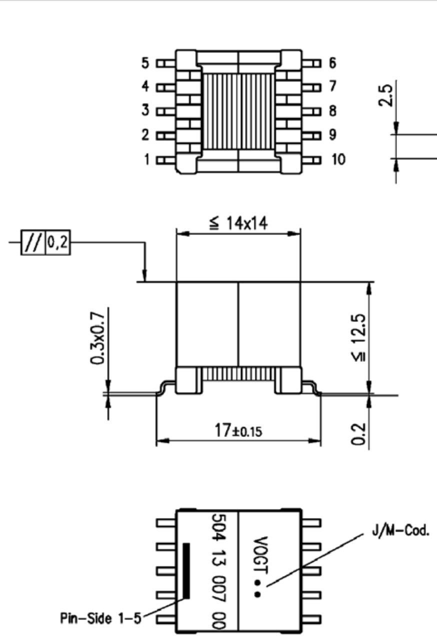
Type EP13 SMD 504 13 … ..

- Design: according to ITU-T G.691
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

Part number	Line code	L_N (mH)	L_S (µH)	I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line : IC)	U_P (kV)	Circuit diagram
504 13 007 00	4B3T	7.9	≤ 50	60	50	2.8	3.7	1.32CS : 1CS	2	A
504 13 008 00	2B1Q	14.4	≤ 60	60	-	8	1.9	2CS : 1	0.5	B

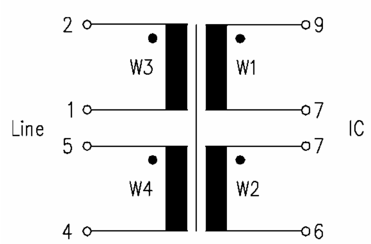
Technical data at T_U = 25°C ± 1C

Mechanical dimensions

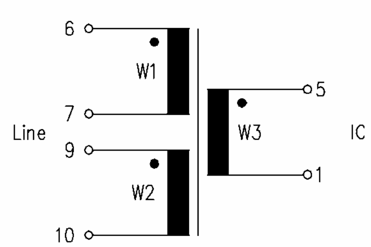


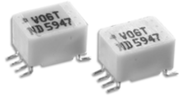
Circuit diagrams

A



B





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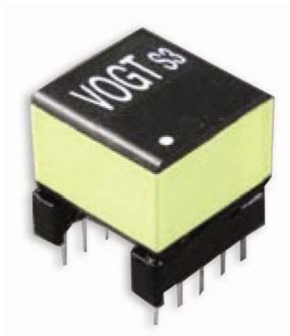
A6.2 INTERFACE TRANSFORMER



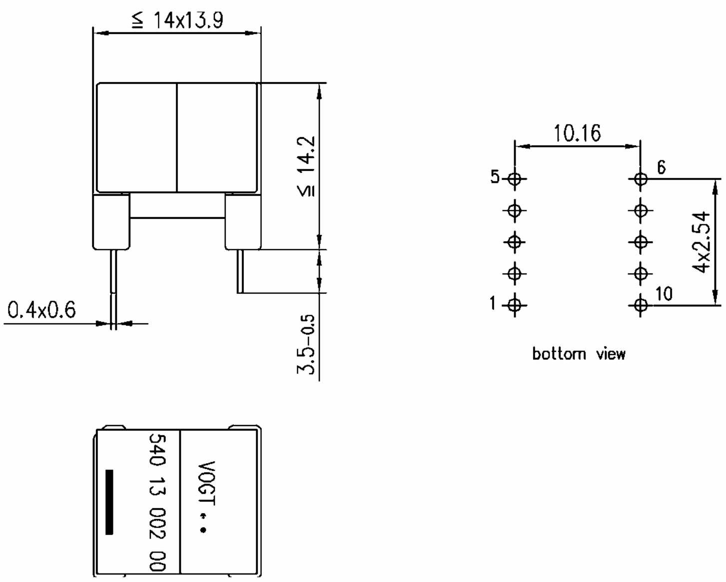
Type EP13 THD 540 13 … ..

- Design: according to ITU-T G.691
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

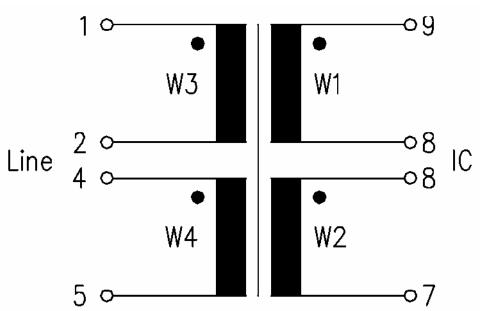
Part number	Line code	L_N (mH)	L_S (µH)	I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line : IC)	U_P (kV)
540 13 017 00	2B1Q	28	90	40	-	8.8	4.5	1.25CT : 1CT	1.5

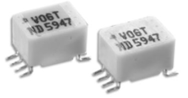
Technical data at T_U = 25 °C ± 1°C

Mechanical dimensions

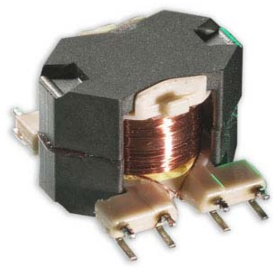


Circuit diagram





A6.2 INTERFACE TRANSFORMER



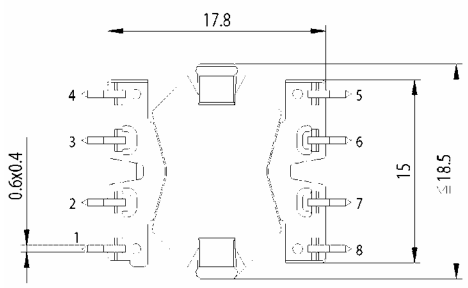
Type RM6 SMD 504 06 … ..

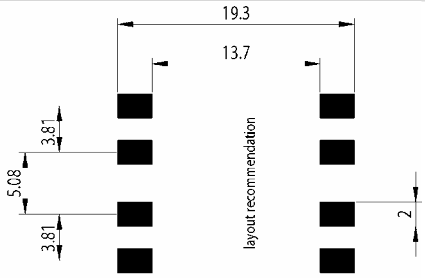
- Design: according to ITU-T G.691
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

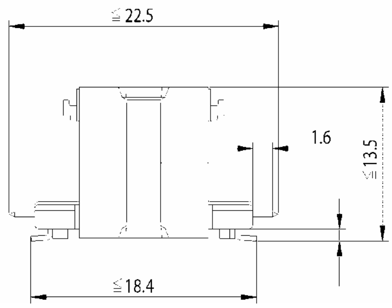
Part number	Line code	L_N (mH)	L_S (µH)	I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line : IC)	U_P (kV)	Circuit diagram
504 06 006 00	2B1Q	14.5	60	60	-	8.8	2.5	2CS : 1	0.5	A
504 06 007 00	2B1Q	13.3	50	60	50	4.7	4.7	1.6CS : 1CS	2	B

Technical data at T_U = 25 °C ± 1°C

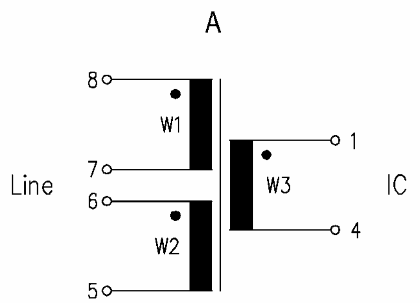
Mechanical dimensions

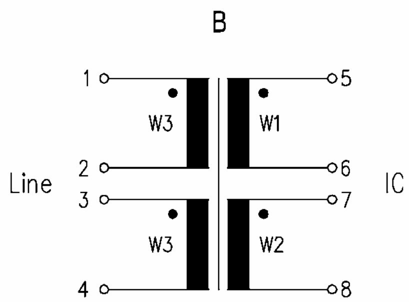


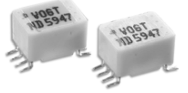




Circuit diagram







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A6.2 INTERFACE TRANSFORMER

Type RM6 THD 544 03 … ..

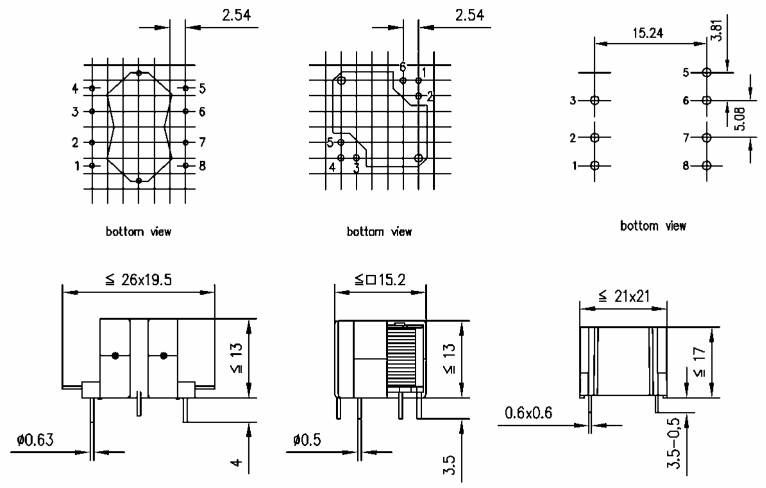
- Design: according to ITU-T G.691
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

Part number	Line code	L_N (mH)	L_S (µH)	I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line : IC)	U_P (kV)	Insolation	Circuit diagram
544 03 005 00	4B3T	6.9	50	60	60	3.4	3	1.32CT : 1CT	2		RM6-1 A
544 03 008 00	4B3T	5.5	22	60	125	3.3	2.85	1.32CT : 1	-		RM6-2 B
544 03 009 00	2B1Q	14.5	70	50	150	5.6	4.1	1.6CT : 1	-		RM6-2 B
544 03 019 00	4B3T	7.5		60	85	4	2.1	1.32CT : 1	0.5		RM6-2 B
544 03 027 00	2B1Q	14.5	100	50	70	13.6	6.8	2CT : 1CT	3	reinforced	RM6-3 D
544 03 036 00	2B1Q	13.3	75	60	70	9.7	3.7	1.6CT : 1CT	2		RM6-1 C
544 03 037 00	2B1Q	14.5	60	60	-	8.8	2.5	2CT : 1	0.5		RM6-1 E

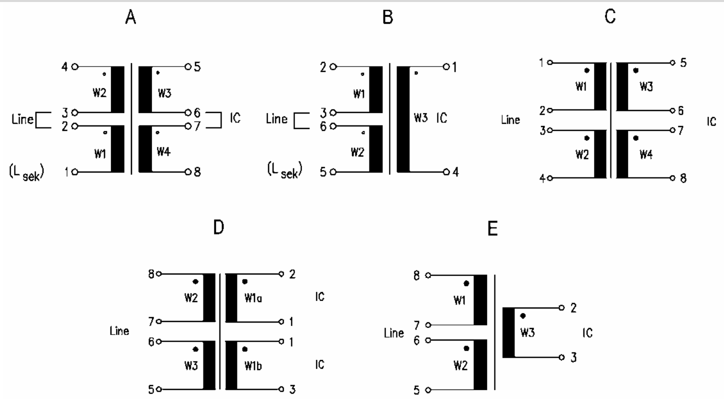
Technical data at T_U = 25 °C ± 1°C

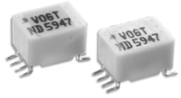
Mechanical dimensions

RM6-1 RM6-2 RM6-3



Circuit diagrams





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A6.2 INTERFACE TRANSFORMER

Type RM8 SMD 544 02 … ..

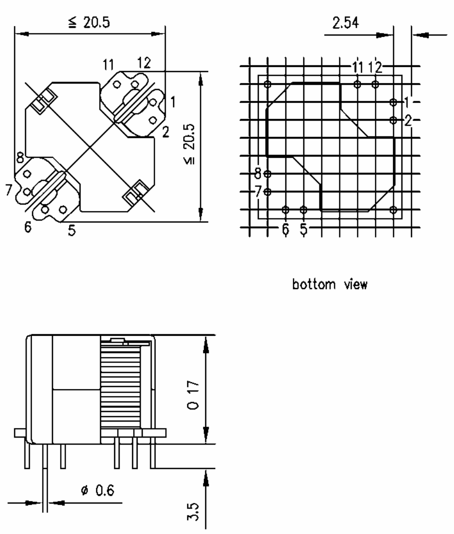
- Design: according to ITU-T G.691
- Climate category: according to IEC 68-1 25/85/56
- Dielectric strength: according to EN-60950

Part number	Line code	L_N (mH)	L_S (µH)	I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line : IC)	U_P (kV)	Insolation	Circuit diagram
544 02 009 00	4B3T	7.9	30	60	50	1.3	0.96	1.32CT : 1	2		RM8-1 A
544 02 011 00	2B1Q	14.5	90	60	90	2.2	1.3	1.6CT : 1	0.5		RM8-1 A
544 02 012 00	2B1Q	28	60	60	60	9	7.2	1.25CT : 1CT	1.5		RM8-2 B
544 02 013 00	2B1Q	14.5	50	100	90	2.7	2.7	1.6CT : 1CT	2		RM8-1 A
544 02 019 00	2B1Q	14.5	45	60	-	4.1	2.5	2CT : 1	3	reinforced	RM8-2 C
544 02 020 00	2B1Q	14.5	50	60	-	5	2.5	2CT : 1	0.5		RM8-1 A

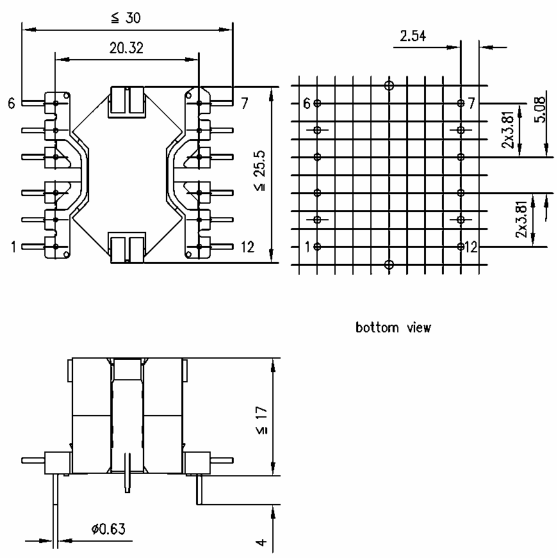
Technical data at T_U = 25 °C $\pm$ 1°C

Mechanical dimensions

RM8-1

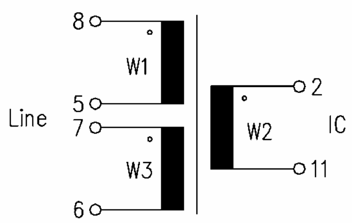


RM8-2



Circuit diagrams

A



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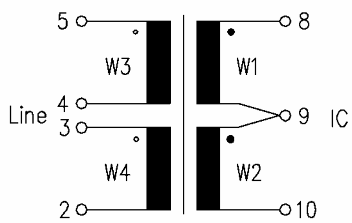

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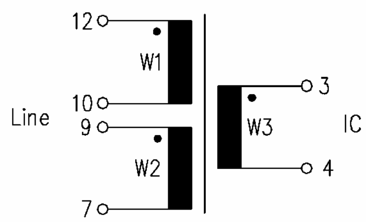
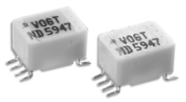




A6.2 INTERFACE TRANSFORMER

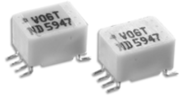
The U_{P0} interface (defined as a 2-wire interface) is an alternative to the S_0 interface for connecting terminal equipment to telecommunications systems and private branch exchanges (PABX).

The quantities secondary inductance, turns ratio and DC magnetic biasing can be tailored to the specific needs of the customer.

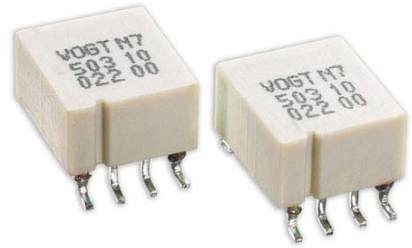
Crossreference

U_{PN} / U_{P0}

Part number	AMD	Infineon			National semi.
	AM 2095/20950	PEB20590 PEB20591 PSB21391 (3,3V) PSB21391 (3,3V)	PEB2095	PSB2196 PSB2197 PSB21391 (5V) PSB21391 (5V) PEB2196	TP3406 TP3401/04
503 10 902 00	x		x		
503 10 901 00				x	
503 10 903 00		x			x
505 03 012 00		x			x
505 03 014 00	x		x		
505 03 074 00				x	
505 03 124 00				x	
504 07 003 00	x		x		
NC 040 507 21-01		x			x
Module					
503 16 517 00		x			x
503 16 515 00				x	
503 16 507 00	x		x		



A6.2 INTERFACE TRANSFORMER



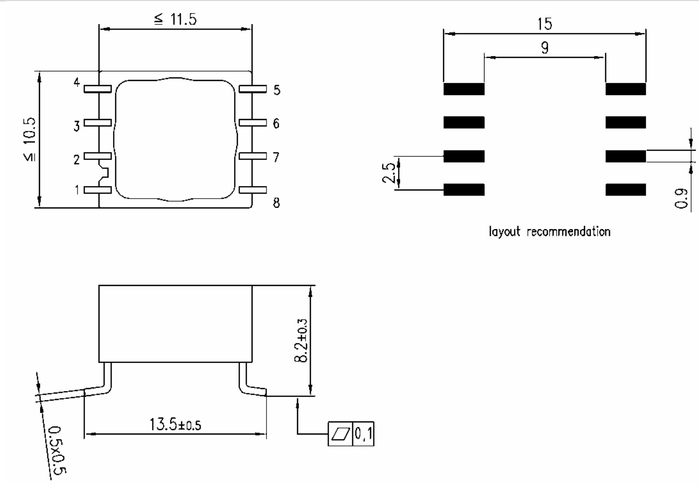
Design K10 503 10 … ..

- Climate category: in accordance with IEC 68-1 25/85/56
- Dielectric strength: in accordance with EN-60950

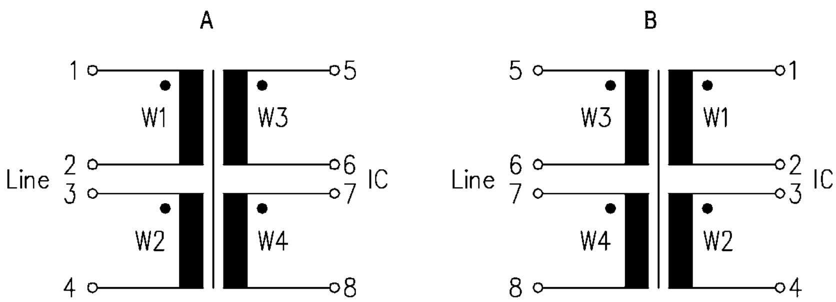
Part number	L_N (mH)	L_S (µH)	I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (turns ratio)	U_P (kV)	Circuit diagram
503 10 901 00	≥ 1.7	≤ 5	75	130	1.7	3.4	1CS : 2CS	1.5	A
503 10 902 00	≥ 1.7	≤ 5	75	110	1.7	2	1CS : 1.25ST	1.5	B
503 10 903 00	≥ 1.7	≤ 5	75	110	1.7	1.7	1CS : 1ST	1.5	A

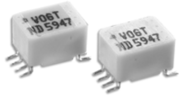
Technical data at T_U = 25°C ± 1°C

Mechanical dimensions



Circuit diagrams





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A6.2 INTERFACE TRANSFORMER

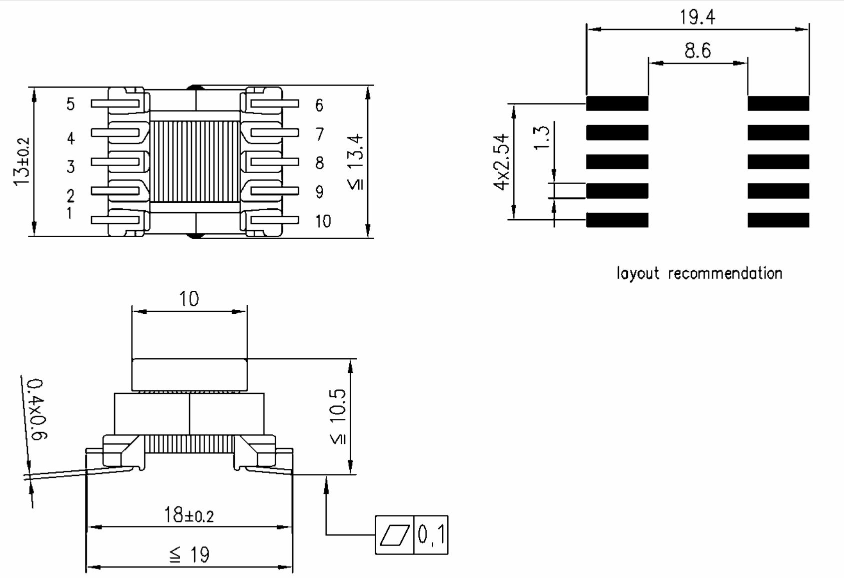
Design EF12/6 505 03 … ..

- Climate category: in accordance with IEC 68-1 25/85/56
- Dielectric strength: in accordance with EN-60950

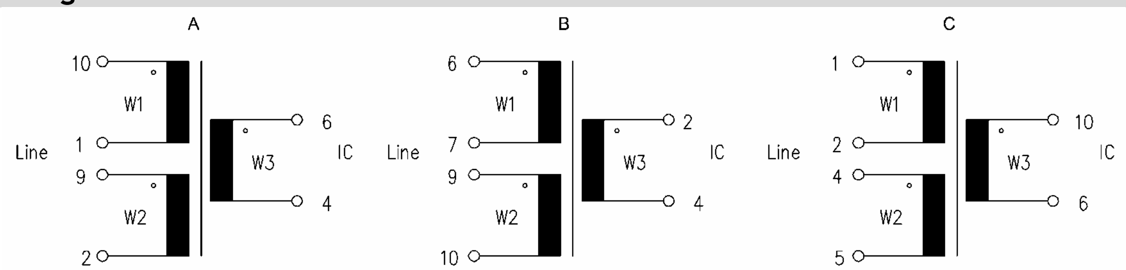
Part number	L_N (mH)	L_S (µH)	I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	ü (Line - IC)	U_P (kV)	Circuit diagram
505 03 012 00	≥ 1.7	-	70	-	1.8	1.5	1CT : 1	0.3	A
505 03 014 00	≥ 1.7	≤ 15	75	100	1.65	1.5	1CT : 1.25	0.5	B
505 03 074 00	2.1	≤ 30	140	10	-	-	1CT : 1	0.3	C
505 03 124 00	2.1	≤ 22	140	10	-	-	1CS : 2	0.3	C

Technical data at $T_U = 25°C \pm 1°C$

Mechanical dimensions



Circuit diagrams



A6.2 INTERFACE TRANSFORMER

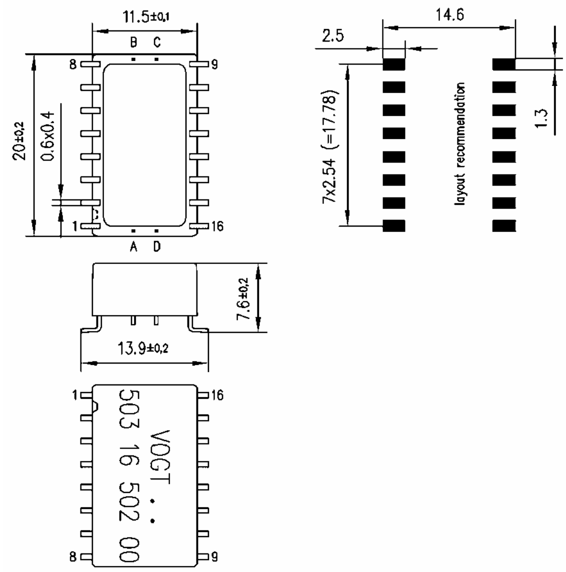
Design S016 (RM 2,54 mm) 503 16 5.. ..

- Climate category: in accordance with IEC 68-1 25/85/56
- Dielectric strength: in accordance with EN-60950

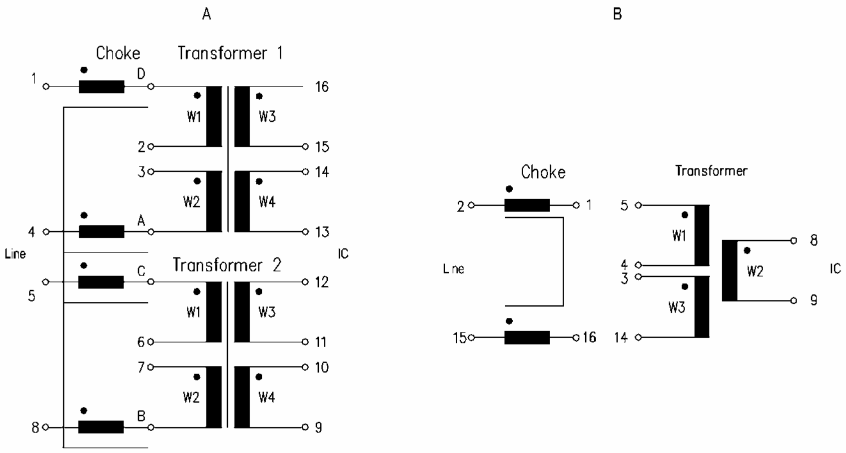
Part number	L_N (mH)	L_S (µH)	I_{DC} (mA)	C_K (pF)	R_{Line} (Ω)	R_{IC} (Ω)	Ü (Line - IC)	U_P (kV)	Choke L_N (mH)	Circuit diagram
503 16 507 00	≥ 1.7	-	75	-	2.2/1.16	2.65	1CT : 1.25	1.5	5	B
503 16 515 00	≥ 1.7	≤ 5	75	-	2.2	4.1	1CT : 2CT	1.5	5	A
503 16 517 00	≥ 1.7	≤ 5	75	-	2.2	2.2	1CS : 1	1.5	5	B

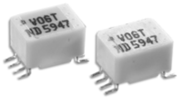
Technical data at $T_U = 25°C \pm 1°C$

Mechanical dimensions

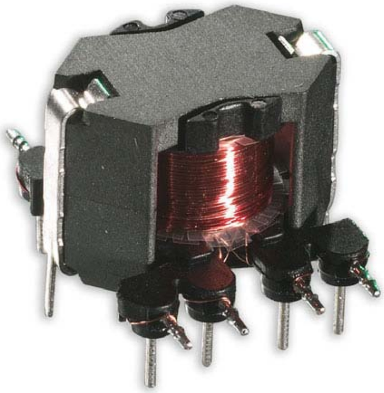


Circuit diagrams





A6.2 INTERFACE TRANSFORMER

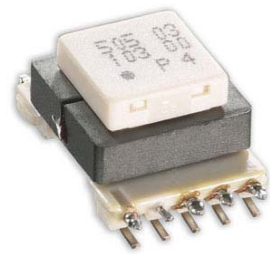


DC/DC converters are used in network terminating units (NTBA) and in terminal devices. These converters convert the remote supply voltage from the local exchange, to provide electrical power for the devices.

The required reverse converters must be very efficient and have very stabile secondary voltages. For this, the magnetic coupling of the windings must be optimal.

The types described below show how this problem is fundamentally solved. The various application circuits are very multifaceted regarding turns ratio, connections, power, etc.

A6.2 INTERFACE TRANSFORMER



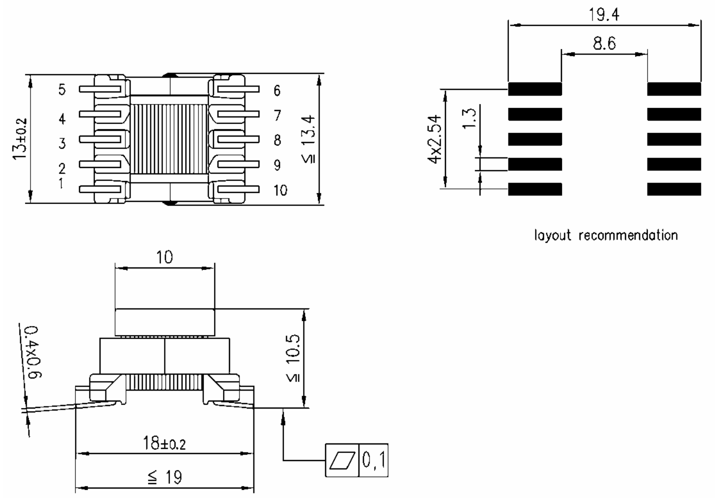
Design EF12/6 505 03 … ..

- Climate category: in accordance with IEC 68-1 25/85/56
- Dielectric strength: in accordance with EN-60950

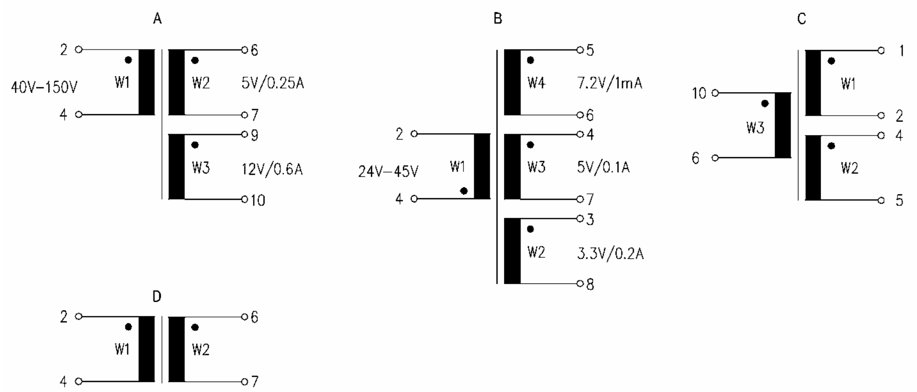
Part number	L_N (mH)	U_{in} (V)	U_{out} (V)	f (kHz)	P (W)	U_P (kV_{eff})	Circuit diagram
505 03 016 00	0.74	40 - 150	5/12	100	2	1.5	A
505 03 070 00	0.65	24 - 45	7.2/5/3.3	80	1	1.5	B
505 03 120 00	2.1	-	-	-	-	2.4	C
505 03 121 00	0.26	-	-	-	-	2.4	D

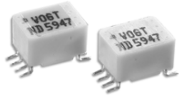
Technical data at $T_U = 25^\circ C \pm 1^\circ C$

Mechanical dimensions



Circuit diagrams





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A6.2 INTERFACE TRANSFORMER

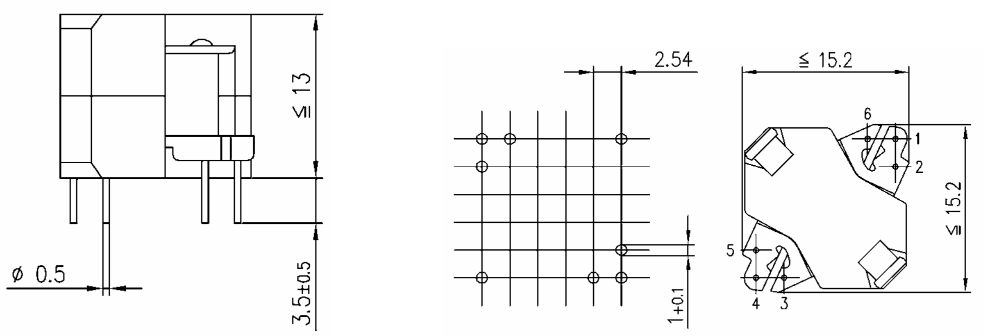
Design RM6 544 03 … ..

- Climate category: in accordance with IEC 68-1 25/85/56
- Dielectric strength: in accordance with EN-60950

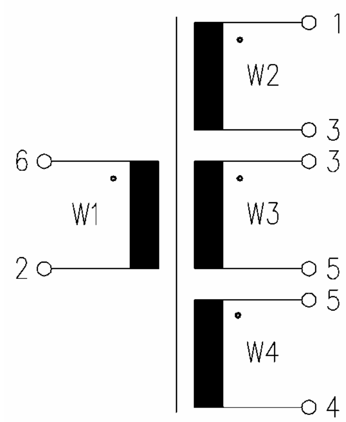
Part number	L_N (mH)	U_{in} (V)	U_{out} (V)	f (kHz)	P (W)	U_P (kV_{eff})
544 03 024 00	2.89	-	5/10/15	-	-	-

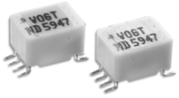
Technical data at T_U = 25°C ± 1°C

Mechanical dimensions



Circuit diagram




VOGT
HD 5947
VOGT
HD 5947

A7.1 TRANSFORMERS

Surname	
First name	
Department	
Company	
Street	
Zip/City	
Country	
Phone	
Fax	
E-Mail	
Series start	
Quantity per year	
Target price	
Deadline for samples	
Application	

Technical Data:

Mode:

- ☐ Flyback converter
- ☐ Forward converter
- ☐ Others
- ☐ Push-pull converter
- ☐ Half-bridge converter

Test voltage/nec. Standards

Standards to be applied (e. g. VDE0805, EN60950)		
Type of isolation (e. g. functional, basic, reinforced isolation)		
Rated voltage of the supply circuit		Veff
Working or rated isolation voltage primary to secondary		Veff
Input power	max.	VA
Rated switching frequency	max.	kHz
Peak voltage (with overshoots)	max.	V_S

Pollution degrees in the instrument	☐ = no contact ☐ = middle ☐ = heavy pollution
Overvoltage category	☐ I ☐ II ☐ III
Flammability class from used materials according to UL 94	☐ V0 ☐ V1 ☐ V2 ☐ HB ☐ no
System of insulating materials UL 1446 (specify temperature class)	

Driver			
Frequency	Fixed/min.	max.	kHz
Duty cycle	min.	max.	%
Input voltage	min.	max.	V
Ambient temperature on the transformer			°C
Maximal dimensions	l x	w x	h mm
Prefered Kit			

Circuit diagram

Primary:			Secondary:		
W1:	U:	I:	W1:	U:	I:
W2:	U:	I:	W2:	U:	I:
W3:	U:	I:	W3:	U:	I:
W4:	U:	I:	W4:	U:	I:
W5:	U:	I:	W5:	U:	I:
W6:	U:	I:	W6:	U:	I:
W7:	U:	I:	W7:	U:	I:
W8:	U:	I:	W8:	U:	I:
W9:	U:	I:	W9:	U:	I:

Comment:

On request, the checklist is also available as pdf-file or on our homepage: www.vogt-electronic.com

A7.2 CHOKES

Surname	
First name	
Department	
Company	
Street	
Zip/City	
Country	
Phone	
Fax	
E-Mail	
Series start	
Quantity per year	
Target price	
Deadline for samples	
Application	

Technical Data:

☐ Output choke ☐ Noise suppression choke ☐ Common mode choke
☐ PFC-choke: Input voltage in V: min. /max. , Output DC power in VA:

Inductance (no-load/load)	☐ µH, ☐ mH, ☐ H
Switching frequency	kHz
Peak current	A
Effective current	A
Current ripple	%
DC resistance	Ohm
Ambient temperature oh the choke	max. °C
Maximal dimensions	l x w x h mm

Circuit diagram

Primary:	Secondary
W1: U: I:	W1: U: I:
W2: U: I:	W2: U: I:
W3: U: I:	W3: U: I:
W4: U: I:	W4: U: I:
W5: U: I:	W5: U: I:
W6: U: I:	W6: U: I:
W7: U: I:	W7: U: I:
W8: U: I:	W8: U: I:
W9: U: I:	W9: U: I:
W10 U: I:	W10 U: I:
W11 U: I:	W11 U: I:
W12 U: I:	W12 U: I:

Comment:

On request, the checklist is also available as pdf-file or on our homepage: www.vogt-electronic.com

OVERVIEW

- MnZn ferrite
- NiZn ferrite
- Plastoferrite
- Injection molding ferrite
- Metal powder cores

ADVANTAGES

- Many different material grades and core-shapes are available
- Flexibility due to small volume production and own R&D department
- Fast supply of samples
- Individual solutions (special core shapes, ferrite applications)
- Own development and research in the field of magnetic materials
- Small quantities are available due to flexible powder production
- Direct sale of cores
- Large cores
- Secure supply chain in the case of a shortfall of magnetic cores on the market
- R&D-package of inductive components and material

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B1.1 FERROCARIT | OVERVIEW

List of used Symbols, designations and units:

Symbol	Designation	Unit
A	Cross-sectional area of magnetic path in general	mm^2
A_e	Effective cross-sectional area	mm^2
A_L	Inductance factor	nH
A_W	Cross-sectional area of winding space	mm^2
a_F	Relative temperature factor of permeability	$10^{-6} \cdot K^{-1}$
B	Magnetic induction, flux density	T
$\hat{B}$	Peak value of induction	T
D_F	Relative disaccomodation factor	10^{-6}
η_B	Hysteresis material constant	$10^{-6} \cdot mT^{-1}$
f	Frequency in general	Hz
f_{in}	Input frequency	Hz
H	Magnetic field strength	A/m
$\hat{H}$	Peak value of magnetic field strength	A/m
H_c	Coercivity	A/m
H_e	Effective magnetic field strength in the core	A/m
I	Current intensity	A
K	Coupling factor	1
L	Inductance in general	H
L_0	Inductance of a coil without core	H
L_k	Inductance of a coil with core	H
l	Magnetic path length	mm
l_e	Effective magnetic path length	mm
l_W	Mean winding length	mm
$\sum \frac{l}{A} = C_1$	Magnetic core constant	mm^{-1}
$\Lambda_o = c$	Permeance factor	nH
μ	Permeability in general	1

Symbol	Designation	Unit
μ_a	Amplitude permeability	1
$\mu_w = \mu_{app}$	Apparent permeability	1
μ_e	Effective permeability	1
μ_i	Initial permeability	1
μ_o	Absolute permeability of vacuum = $4 \cdot \pi \cdot 10^{-7}$	T · m/A
$\underline{\mu}$	Complex permeability	1
μ_Δ	Incremental permeability	1
n	Number of winding turns	1
P_v	Relative core dissipation power	mW/cm^3
Q	Coil quality factor	1
Q_o	Zero-load quality factor	1
R_v	Loss resistance	Ω
$R_=$	DC-resistance	Ω
ρ	DC-resistivity	$\Omega \cdot m$
s	air gap	mm
t	time	s
$\tan\delta$	loss factor in general	1
$\tan\delta_h$	Hysteresis loss factor	1
$\tan\delta_l$	Coil loss factor	1
$\tan\delta_n$	Loss factor due to residual losses	1
$\tan\delta_w$	Loss factor due to eddy current	1
$\tan\delta wi$	Loss factor due to winding loss	1
$\tan\delta / \mu_i$	Relative loss factor	10^{-6}
ϑ / T	Temperature in general	°C
ϑ_c	Curie temperature	°C
V_e	Effective magnetic volume	mm^3
$\lvert\dot{z}\rvert$	Specific impedance	Ω/cm

Terms and Definitions

A list of the symbols and units used in this catalogue is given above.

Most of the equations used in the following passages are equations of quantities. Where other kinds of equations are given please use the units listed next to them.

1 Permeability

1.1 Magnetic field constant μ_0

$$\mu_0 = 1{,}257 \cdot 10^{-6} \qquad T \cdot m \cdot A^{-1}$$

The quantity μ_0 is also called the Absolute permeability of vacuum.

In contrast to μ_0 the permeabilities defined below are relative quantities. They are related to μ_0 and represent plain numerical values without dimensional units.

1.2 Initial permeability μ_i

μ_i is the permeability of a magnetic material at an infinitely small amplitude of the magnetizing field, measured without pre magnetization and without exterior shearing influence:

$$\mu_i = \frac{1}{\mu_0} \cdot \frac{\Delta B}{\Delta H} \qquad (H = 0;\ \Delta H \rightarrow 0)$$

In practice μ_i is derived from the inductance of a toroidal core coil:

$$\mu_i = \frac{1}{\mu_0} \cdot \frac{L}{n^2} \cdot \frac{l}{A}$$

L in µH

l in mm

A in mm^2

With cores of closed magnetic circuit having changing cross-sectional areas along the magnetic path length, the expression l/A has to be replaced by Σ l/A (core constant C_1).

$$\mu_i = \frac{1}{\mu_0} \cdot \frac{L}{n^2} \cdot \sum \frac{l}{A}$$

This equation is valid only for cores without any magnetic shearing. It should be recognized, however, that composite cores (e.g. pot or E-cores) must be considered as slightly sheared, even if they are declared as non-gapped.

The initial permeability is also called toroidal or material permeability. Over a wide range μ_i is independent on frequency. On our material data tables $f_{0,8}$ marks that frequency at which μ_i decreases to 80% of the tabulated value.

1.3 Effective permeability μ_e

If in a closed magnetic circuit an air gap exists (shearing) the initial permeability is reduced to a smaller value called effective permeability μ_e.

The effective permeability μ_e equals the initial permeability μ_i of a core material which unsheared with the same shape of core, the same course of magnetic flux, and under equal measuring conditions would give the same electrical performance. Because of the presupposition of the same course of the magnetic flux μ_e is applicable only to cores with relatively high permeability, which are but slightly sheared so that the magnetic stray field remains negligible. This presupposition is fulfilled e.g. with pot or E-cores having customary air gap.

The quotient μ_e/μ_i is called the shearing ratio.

With the aid of μ_e and of the material characteristics shown on the material data tables all important properties of a coil (e.g. losses, thermal performance, temporal instability - see sections 4, 6, and 7) are easily calculable.

If the effective permeability μ_e of a core is unknown, it can be found out by an inductance measurement and by making use of the reduced magnetic conductivity Λ_o, also called permeance factor c (see section 3).

$$\mu_e = \frac{10^6 \cdot L}{n^2 \cdot \Lambda_0}$$

L in mH
Λ_0 in nH

The numerical values of c are contained in the data sheets of the appropriate core types.

A merely mathematical way of ascertaining μ_e may be used, if the initial permeability μ_i of the core material, the core constant $C_1 = \Sigma\ l/A$, the air gap length s, and the magnetic cross-sectional area A_s in the gap are known:

$$\mu_e = \frac{\mu_i}{1 + \dfrac{s}{A_s \quad \Sigma \frac{l}{A}}(\mu_i - 1)} = \frac{\mu_i}{1 + \dfrac{s \cdot \Lambda_O}{A_s \cdot \mu_O}(\mu_i - 1)}$$

s in mm
As in mm²
$\Sigma \frac{l}{A}$ in mm^{-1}

1.4 Apparent permeability μ_{app}

The ratio of the inductance L_k of a cored coil and the inductance L_O of the same coil without core is called apparent permeability μ_{app}.

$$\mu_{app} = \mu_w = \frac{L_k}{L_O}$$

μ_{app} is used with coils having magnetically open cores (strong shearing) with large stray fields, as e.g. rod, tube, or screw cores. The numerical values of μ_{app} depend not only on core material and core shape, but also on the kind of winding and its position relatively to the core. μ_{app}-values are comparable only if evaluated under equal measuring conditions.

1.5 Amplitude permeability μ_a

The amplitude permeability is defined by the equation

$$\mu_a = \frac{1}{\mu_O} \cdot \frac{\hat{B}}{\hat{H}}$$

where sinusoidal induction being assumed.
The numerical values of μ_a as well the measuring conditions under which they were evaluated are contained in the respective data sheets of the appropriate cores, as e.g. E- or U-cores.

1.6 Incremental permeability μ_Δ

It corresponds to the amplitude permeability μ_a with pre-magnetization and is defined by the equation

$$\mu_\Delta = \frac{1}{\mu_O} \cdot \frac{\Delta B}{\Delta H}$$

The incremental permeability is usually understood to be a function of a DC. pre-magnetization by a fieldstrengh H_-. In order to evaluate μ_Δ the alternating field ΔH is rated in such a way that the alternating induction ΔB for any value of the pre-magnetizing field H_- remains constant, e.g. 10 mT.

1.7 Complex permeability $\underline{\mu}$

In alternating-current engineering complex values are used for describing the phase position. A perfectly lossless coil with a core of permeability μ causes a phase shift of 90° between voltage U and current I. In complex writing this is described as follows (concerning the introduction of Λ_O for describing the core geometry of any core shape see paragraph 3.2):

$$\frac{\underline{U}}{\underline{I}} = \underline{Z} = j\omega L = j\omega\Lambda_O n^2 \mu$$

If in the core material losses are occurring, an active resistance R is added to the reactance jωL, which causes a diminution of the phase angle 90° by the angle δ, usually described by:

$$\tan\delta = \frac{R}{\omega L}.$$

In this case the complex writing is as follows:

$$\frac{\underline{U}}{\underline{I}} = \underline{Z} = R + j\omega L = j\omega L \;(1 - j\tan\delta) = j\,\omega\Lambda_O n^2 \underline{\mu} \qquad (2)$$

$$\textit{with} \quad \underline{\mu} = \mu(1 - j\tan\delta) = \mu'_s - j\mu''_s$$

The phase shift is described by a complex permeability. Its real and imaginary parts are usually described by μ'_s and μ''_s (the index s shall indicate that active resistance and reactance are connected in series).
Hence follows:

$$\mu'_s = \frac{L}{\Lambda_O n^2} \qquad (3)$$

$$\mu''_s = \mu'_s \tan\delta = \frac{R}{\omega\Lambda_O n^2}$$

For toroids is valid:

$$L = n^2 \Lambda_O \mu_i$$

Hence follows:

$$\mu'_s = \mu_i$$

and

$$\mu''_s = \frac{R}{\omega L} \cdot \mu_i = \tan\delta \cdot \mu_i$$

The diagrams for **FERROCARIT**-materials in this catalogue are presenting the complex permeability in series connection, measured on toroids.

The real component μ'_s of those diagrams corresponds to the initial permeability μ_i of the material. The dependence of the initial permeability from the frequency is directly obvious. It has to be noted that from a certain frequency the initial permeability gradually decreases.

μ''_s is particularly of interest for wide-band applications (transformers, attenuation chokes): at each frequency you can read from the relation μ''_s / μ'_s the share of the losses and of the pure inductance in relation to the total impedance or attenuation.

At that frequency, where the curves μ'_s and μ''_s are intersecting, both contributions are equal. In the frequency range below, the inductance contribution is determining. Above, the inductive effect is decreasing and the attenuating effect is increasing by energy absorption. As by decreasing μ'_s the magnetization processes are disappearing, the losses caused by that are also disappearing.
For the circuit design it is often useful to consider the admittance instead of the impedance and to describe it as parallel connection of a resistance Rp and an inductance Lp. From (2) follows:

$$\underline{Y} = \frac{1}{\underline{Z}} = \frac{1}{R_p} + \frac{1}{j\omega L_p} = \frac{1}{j\omega\Lambda_O n^2 \underline{\mu}} \qquad (4)$$

$$or \qquad \frac{1}{\underline{\mu}} = \frac{n^2\Lambda_O}{L_p} + j\frac{\omega n^2\Lambda_O}{R_p} = \frac{1}{\mu'_p} + j\frac{1}{\mu''_p}$$

From this results analogues to (3) simple relations for the values μ'_p and μ''_p follow:

$$\mu'_p = \frac{L_p}{n^2\Lambda_O} \qquad (5)$$

$$\mu''_p = \frac{R_p}{\omega n^2\Lambda_O}$$

From (3) and (5) follows:

$$\mu'_p = \mu'_s \ (1 + \tan^2\delta)$$

$$\mu''_p = \mu''_s \ (1 + \frac{1}{\tan^2\delta})$$

In the diagrams for **FERROCARIT**-materials in this catalogue curves of the complex permeability for parallel connection are shown, sometimes they are described as products $\omega\mu'_p$ and $\omega\mu''_p$, for easier calculating transformers.

Also in this case the influence of the inductance is equal to the influence of the losses by the intersection of both curves for the admittance value of the transformer.

1.8 Specific impedance $|\dot{z}|$

The suppression quality of a component is essentially specified by its impedance:

$$Z = j\omega L + R$$

The amount of impedance includes a material specific component $|\dot{z}|$:

$$|Z| = \frac{A_e}{l_e} \cdot N^2 \cdot |\dot{z}|$$

This material specific impedance can be formulated as follows:

$$|\dot{z}| = \mu_0 \omega \sqrt{\mu'^2 + \mu''^2}$$

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2. Effective magnetic parameters

They are applicable only to cores of a closed magnetic circuit (e.g. pot, E-, and U-cores), having changing cross-sectional areas along the magnetic path length. They are also applicable to sheared cores having negligible magnetic stray fields.

The effective parameters permit a simple way of calculating the magnetic properties of closed cores of arbitrary geometry. For this method of calculation, the core is substituted by an ideal toroid giving the same magnetic performance as the original core. (IEC publication 205)

2.1 Core constant C_1

C_1 results from the summation of the quotients of the partial magnetic path lengths l and the corresponding cross-sectional areas A of a core of closed magnetic circuit subdivided into uniform sections:

$$C_1 = \Sigma \frac{l}{A}$$

2.2 Effective magnetic path length l_e

l_e is defined by the equation:

$$l_e = \frac{\left(\Sigma \frac{l}{A}\right)^2}{\Sigma \frac{l}{A^2}}$$

2.3 Effective cross-sectional area A_e

A_e is defined by the equation:

$$A_e = \frac{\Sigma \frac{l}{A}}{\Sigma \frac{l}{A^2}}$$

2.4 Effective magnetic volume V_e

From $l_e \cdot A_e$ results:

$$V_e = \frac{\left(\Sigma \frac{l}{A}\right)^3}{\left(\Sigma \frac{l}{A^2}\right)^2}$$

The numerical values of the effective parameters are given on the data sheets of cores of closed magnetic circuit.

3. Inductance factor and Permeance factor

3.1. Inductance factor A_L

A_L is used to calculate the number of winding turns of a coil in order to achieve a given inductance L with cores of closed magnetic circuit with cores of closed magnetic circuit with or without air gap.

$$A_L = \frac{L}{n^2} = \mu_e \frac{\mu_O}{\Sigma \frac{l}{A}}$$

Thus A_L is the inductance L related to one winding turn (w=1). It is usually given in nH. To strongly sheared core shapes A_L is only applicable, if the kind of winding and the position of the winding relatively to the core are exactly defined. As this holds true for our coil kits, A_L-values are given on the appropriate data sheets. They are approximate values supposing the coil formers to be nearly fully wound.

The inductance factor A_L is not applicable to magnetic circuits with large stray fields, e.g. rod or screw cored coils.

3.2 Permeance factor c

If the expression

$$A_L = \mu_e \frac{\mu_O}{\Sigma \frac{l}{A}}$$

is reduced to $\mu_e = 1$, the portion conditioned by the core material is eliminated. The rest conditioned only by the core configuration represents the Permeance factor c which may be derived also from the magnetic field constant and the core constant C_1.

$$c = \Lambda_O = \frac{A_L}{\mu_e} = \frac{\mu_O}{\Sigma \frac{l}{A}}$$

$$\textit{From } A_L = \frac{L}{n^2} \textit{ and } c = \frac{A_L}{\mu_e} \textit{ results:}$$

$$L = n^2 \cdot \mu_e \cdot c$$

Thus the inductance L of a closed magnetic circuit depends on three factors, one being conditioned by the winding (n^2), another one by the core material (μ_e, which takes into account an eventual air gap), and a third one by the core configuration Λ_O.

This fundamental relation holds true for any calculation concerning the selection of core shape, core material, and winding of magnetic circuits.

4. Loss at small magnetizing force

4.1 Loss angle $\tan\delta_L$ and Quality factor Q:

When small magnetizing forces predominate in electronics (small signal applications), the total loss of a coil can be expressed by the loss angle

$$\tan\delta_L = \frac{R_V}{2\pi \cdot f \cdot L}$$

The loss resistance R_V is supposed to be in series to the no-loss inductance L. From R_V and the effective coil current I the dissipation power $R_V \cdot I^2$ may be easily calculated.

The reciprocal value of the loss angle is called Quality factor Q:

$$Q = \frac{1}{\tan\delta_L} = \frac{2\pi \cdot f \cdot L}{R_V}$$

The loss resistance R_V is supposed to be in series to the no-loss inductance L. From R_V and the effective coil current I the dissipation power $R_V \cdot I^2$ may be easily calculated.

The reciprocal value of the loss angle is called Quality factor Q:

$$Q = \frac{1}{\tan\delta_L} = \frac{2\pi \cdot f \cdot L}{R_V}$$

The total loss angle of a coil is composed of different loss portions originating from the core, the winding, and possibly from a screening:

$\tan\delta_L = \tan\delta_h + \tan\delta_w + \tan\delta_n + \tan\delta_{wi}$

Hysteresis loss	$\tan\delta_h$	Residual loss	$\tan\delta_n$
Eddy current loss	$\tan\delta_w$	Winding loss	$\tan\delta_{wi}$

4.2 Hysteresis loss

4.2.1 Hysteresis coefficient

At small magnetizing forces, where the Rayleigh relations are valid, there is a practically linear increase of hysteresis loss as a function of field strength or flux density respectively.

$$\tan\delta_h = \eta_B \cdot \hat{B} \cdot \mu_i$$

According to the IEC publication 401 the linearity constant η_B is called hysterersis material constant.

4.2.2 Hysteresis material constant

For determining the hysteresis material constant two measurement points at low induction $\hat{B}_1$ and $\hat{B}_2$ are relevant

$\tan\delta\,(\hat{B}_1)$; $\hat{B}_1 = 1,5$ mT
$\tan\delta\,(\hat{B}_2)$; $\hat{B}_2 = 3,0$ mT

The measurement of the loss angle $\tan\delta$ is performed at a frequency f=10 kHz for $\mu_i \leq 500$ and f=100 kHz for $\mu_i > 500$.

η_B now can be calculated by

4.3. Eddy current, Residual loss and Relative loss factor $\tan\delta/\mu_i$

The loss factor related to $\mu_i = 1$ is ascertained by loss angle measurements at two magnetizing forces and by extrapolation to H = 0. Magnetizing forces for the tabulated values of our material data sheets are 0,1 and 0,5 Am^{-1}.

By extrapolation of the magnetizing force to zero, loss caused by this force (hysteresis) becomes zero too. Thus the relative loss factor $\tan\delta/\mu_i$ is a characteristic for the remaining eddy current and residual losses.
If gapped cores with negligible stray field are used, the loss factor becomes effective with the shearing ratio μ_e/μ_i.

Therefore the tabulated $\tan\delta/\mu_i$ values are to be multplied with μ_e.

4.4 Winding loss $\tan\delta_{wi}$

Winding loss is composed of copper loss, eddy current loss in the conductor material, and dielectric loss due to the intrinsic capacity of the winding.

Copper loss results from the ohmic resistance of the conductor material and the resistance increase due to skin effect. The ohmic resistance can be deduced from the nominal conductor diameter D, the mean length of winding turn l_w, the number of turns n, and the resistivity of the conductor material. The increase of resistance due for skin effect is involved by the dimensionless value ß which is the relation of the effective cross section caused by skin effect to the physical one of the wire. For low frequency ß is equal to 1. The total copper loss can be calculated by the aid of the following equation:

$$\tan\delta_{wi} = 3{,}5 \cdot 10^{-6} \frac{l_w \cdot n \cdot \beta}{D^2 \cdot f \cdot L}$$

l_w in mm
D in mm
f in Hz
L in H

This formula may be used, if dielectric loss is negligibly small. This is true of cores of closed magnetic circuit like pot or E-cores, made out of high-permeability materials and used at frequencies up to 100 kHz.

There exists no practicable formula for calculating dielectric loss conditioned by the intrinsic capacity of the winding at higher frequencies.

4.5 Screening loss

If coils are screened, eddy current loss within the screening material must not be neglected. It depends on the extent of the stray field, the distance between coil and screening can, the screening material and the operating frequency. As there exists no practicable formula for calculation of screening loss, empirical ascertainment or advanced computer simulation such as FEM is recommended.

If high permeability cores of closed magnetic circuit are used screening may often be dispensed with.

5 Power loss at high magnetizing force

Inductors and transformers for power application use to take strong current loads. Magnetizing force and flux density then are beyond the Rayleigh range with its simple linear relations between these two quantities.

5.1 Bipolar losses at high magnetizing force

In our data sheets of cores designed for power application the total power loss in W as well as the specific power loss in $mW \cdot cm^{-3}$ is given for defined values of frequency, flux density, and temperature.

The dependence of power loss on frequency f and peak flux density within the ranges of frequency and current used in electronic power applications, is expressed by an empirical formula (Steinmetz relation). P_V being the specific power loss, i.e. the power loss related to the unit of volume, this formula reads:

$$P_V = K \cdot f^a \cdot B^b$$

$K =$ const
$a \approx 1 \dots 2$
$b \approx 2 \dots 3$

P_V is given in $mW \cdot cm^{-3}$. K is a constant, a and b are constant powers to f and B. The quantities K, a and b ascertained by loss measurements at different frequencies and flux densities. Where in our core data sheets the dependence of loss on frequency and flux density is specified, the graphs are in accordance with the formula given above.

5.2 Unipolar losses at high magnetizing force

If an inductive component is forced by a DC - magnetization with an additional AC - component so called unipolar losses are induced in the core material. These losses depend on the amplitude of DC - magnetization, which defines the working point on the magnetization curve of the core material, and the frequency and amplitude of the alternating field component.

This application is typical for output chokes. Therefore in our data sheets for the preferred **FERROCART** materials for output chokes unipolar power loss values are given for different frequencies and ripple percentages. Ripple is defined as ratio of peak-to-peak value of the AC- to amplitude of the DC - component.

6. Temperature-dependence of Inductance, Temperature Factor of Permeability α_F

The temperature-dependent alternations of initial permeability are described by the relative temperature factor, i.e. the alternation per Kelvin. In accordance with IEC-publication 401 for this quantity the symbol α_F is used, the signification of which is identical with the former expression α_μ/μ_i

α_F is ascertained from measurements of the initial permeabilities μ_{i1} and μ_{i2} at the temperatures ϑ_1 and ϑ_2

The values indicated in our material table were achieved by measurements at 20°C and 70°C

$$\alpha_F = \frac{\mu_{i_2} - \mu_{i_1}}{\mu_{i_1} \cdot \mu_{i_2} \left(\vartheta_2 - \vartheta_1\right)}$$

If coils with gapped cores and negligible stray field are used, the tabulated α_F -values must be multiplied by μ_e. The alteration of inductance of such a coil caused by changes of temperature may be calculated by aid of the formula:

$$\frac{\Delta L}{L} = \alpha_F \cdot \mu_e \cdot \Delta\vartheta$$

This equation is not applicable to coils with large stray fields as e.g. rod or screw cored coils. The temperature performance of such a coil depends not only on the temperature factor of the core but also, in a proportion not be neglected, on the temperature performance of the winding and of the whole assembly.

In cases of this kind α_F cannot be more than an aid to comparison of different core materials.

7. Temporal Alternation of Inductance, Disaccommodation Factor D_F

A change of the magnetic state of a core by magnetic or thermic demagnetization causing a sudden increase of permeability, is followed even under constant environmental conditions by a limited permeability decrease taking a logarithmic course.

This temporal instability is called disaccommodation. It is described by the disaccommodation factor D_F relating to an initial permeability $\mu_i = 1$. According to an IEC recommendation D_F replaces the physically identical expression d/μ_i. D_F is ascertained by measuring the initial permeabilities μ_{i1} and μ_{i2} at the timings t_1 and t_2 after demagnetization. The tabulated D_F-values of our materials were calculated from measurements at the timings 5 and 30 minutes.

$$D_F = \frac{1}{\mu_i} \cdot \frac{\mu_{i1} - \mu_{i2}}{\mu_{i1} \cdot lg \frac{t_2}{t_1}}$$

If coils with gapped cores and a negligible stray field are used, the tabulated values must be multiplied with μ_e. The alternation of inductance of such a coil between the timings t_1 and t_2 after demagnetization may be calculated by the aid of the formula:

$$\frac{\Delta L}{L} = -D_F \cdot \mu_e \cdot lg \frac{t_2}{t_1}$$

Changes of the magnetic state by DC pre-magnetization will as a rule cause smaller alterations of inductance than a calculation by the aid of the disaccommodation factor D_F will show.

8. Curie point

We define Curie point as that temperature, at which the initial permeability has decreased to 10% of the tabulated value.

B1.1 FERROCARIT

Production and composition of ferrites

Ferrites are compounds of the iron oxide Fe_2O_3 and one or more oxides of bivalent metal. The most frequently used oxides are those of nickel, manganese, magnesium and zinc. The oxide powder is prepared in various processing steps before being pressed to a core of the desired shape. After that the core is sintered at temperatures between 1150 and 1400°C depending on the type of ferrite. The resulting material is hard and brittle like porcelain ("black ceramics") and can only be machined by grinding. The shrinkage of the cores during the sintering process results in tolerances of the non-machined dimensions similar to those of other ceramics (± 2 to ± 3%).

An important characteristic of **FERROCARIT** materials is their high electric resistivity, covering according to grade a range from 1 up to 10^7 Ωm, as opposed to approx. 10^{-5} Ωm with metals. Consequently eddy current loss is relatively low and may be neglected over a wide frequency range.

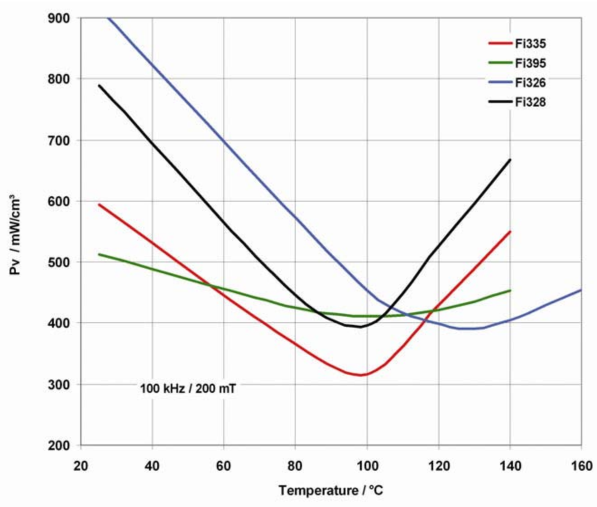
General technical characteristics

Density	≈	4,5 . . . 5,1	$g\ cm^{-3}$
Tensile strength	≈	20 . . . 60	$N\ mm^{-2}$
Compressive strength	≈	100 . . . 800	$N\ mm^{-2}$
Modulus of elasticity	≈	150	$kN\ mm^{-2}$
Thermal conductivity	≈	$5 \cdot 10^{-3}$	$J \cdot mm^{-1} \cdot s^{-1} \cdot K^{-1}$
Specific heat	≈	1000	$J \cdot kg^{-1} \cdot K^{-1}$
Coefficient of linear expansion	≈	$7 \cdot 10^{-6}$ . . . $12 \cdot 10^{-6}$	K^{-1}
Vickers hardness	≈	500	$N\ mm^{-2}$

PSPICE –parameters for FERROCARIT materials are available on your inquiry.

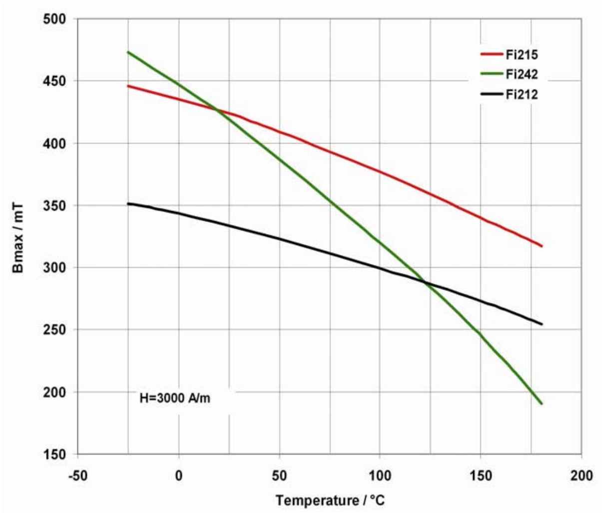
B1.1 FERROCARIT NEW MATERIALS

Fi 335, Fi 395, Fi 326: MnZn ferrite for power application:



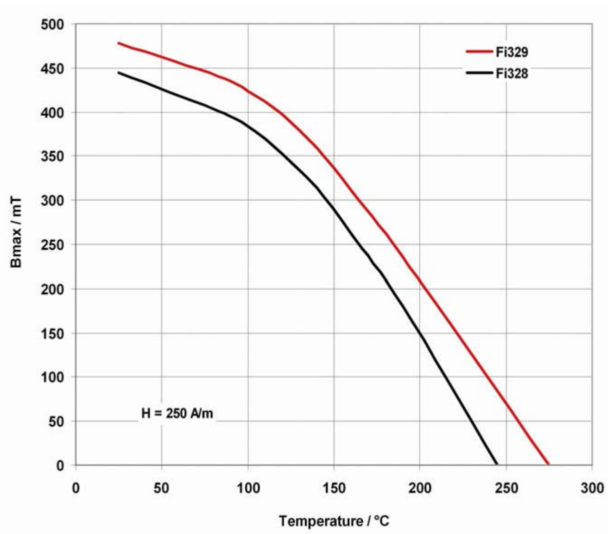
TASK: Development of customer adjusted MnZn ferrites with low losses and high saturation induction
RESULT: In comparison with the currently used materials (e.g. Fi 328): Fi 335 provides 25% lower losses, Fi 395 provides a flat Pv-line, Fi 326 is optimized for high temperature

Fi 215: NiZn ferrite with high induction



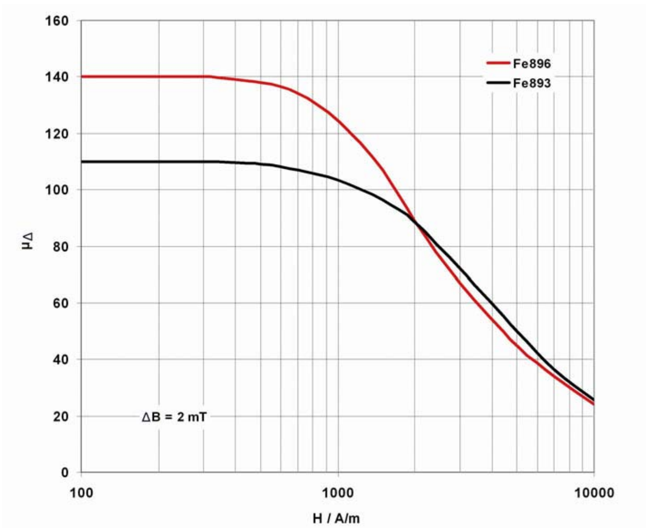
TASK: Development of a high ohmic NiZn ferrite with optimized saturation induction
RESULT: In comparison with the currently used ferrite Fi 212, Xenit Fi 215 provides a 25% higher saturation induction at high ambient temperatures

Fi 329: MnZn ferrite with higher induction as standard material



TASK: Development of a Bmax optimized ferrite
RESULT: In comparison with the currently used materials, Fi 329 provides 10% higher Bmax as standard

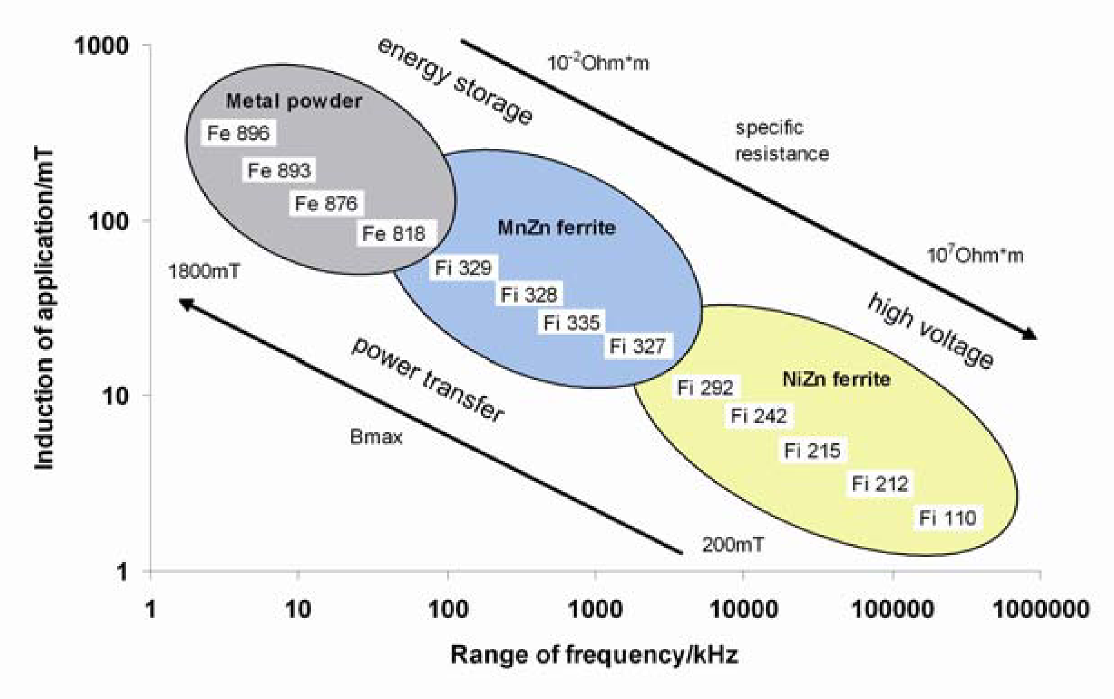
Fe 896: Iron powder with high permeability for high premagnetization



TASK: Improvement of our unique Fe 893 for higher permeability
RESULT: Fe 896 with a permeability of 140 and comparable broadband characteristics

Ferrite materials		f - MHz	µi (25°C)	Tc	DC-resist. Ωm	Bmax - mT	Pv - mW/cm^3	
Fi 415	Highest permeability MnZn ferrite	≤ 0,2	15000	130	≥ 0,05			
Fi 412	High permeability MnZn ferrite	≤ 0,2	12000	125	≥ 0,05			
Fi 410	High permeability MnZn ferrite	≤ 0,2	10000	135	≥ 0,05			
Fi 360	High permeability MnZn ferrite	≤ 0,4	6000	150	≥ 0,05			
Fi 340	Medium permeability MnZn ferrite	≤ 0,4	4300	130	≥ 0,5			
Fi 395	Power MnZn ferrite with const. low losses up to 120°C.	≤ 0,4	2700	220		> 330 250A/m/100°C	520 100kHz/200mT/25°C	450 100kHz/200mT/100°C
Fi 335	Power MnZn ferrite with low losses and high saturation flux density	≤ 1	2000	230		> 350 250A/m/100°C	140 200kHz/100mT/100°C	310 100kHz/200mT/100°C
Fi 329	Power MnZn ferrite with highest saturation flux density	≤ 0,5	1500	275	≥ 1,5	> 400 250A/m/100°C	1000 100kHz/200mT/25°C	500 100kHz/200mT/100°C
Fi 328	Power MnZn ferrite with high saturation flux density	≤ 0,5	1800	260	≥ 2	> 370 250A/m/100°C	670 100kHz/200mT/25°C	450 100kHz/200mT/100°C
Fi 327	High frequency power MnZn ferrite	≤ 3	1200	240	≥ 30	> 300 250A/m/100°C	560 1000kHz/50mT/25°C	540 1000kHz/50mT/100°C
Fi 326	Power MnZn ferrite with lowest power losses around 140°C.	≤ 0,4	1500	250		> 310 250A/m/140°C	900 100kHz/200mT/25°C	400 100kHz/200mT/140°C
Fi 325	Medium frequency power MnZn ferrite	≤ 1	1800	230	≥ 6	> 340 250A/m/100°C	320 200kHz/100mT/25°C	170 200kHz/100mT/100°C
Fi 324	Standard power MnZn ferrite	≤ 0,3	2300	230	≥ 3	> 340 250A/m/100°C	685 100kHz/200mT/25°C	560 100kHz/200mT/100°C
Fi 301	High permeability ferrite with broad frequency range	≤ 100	3000	140		380 3000A/m/25°C		
Fi 292	High permeability NiZn ferrite	≤ 100	900	140	≥ 10^7			
Fi 262	Medium permeability MnZn ferrite	≤ 5	650	290	≥ 1			
Fi 242	Low power loss NiZn ferrite with high specific resistance	≤ 400	400	230	≥ 10^7	> 300 3000A/m/100°C	700 100kHz/100mT/25°C	550 100kHz/100mT/100°C
Fi 221	Medium permeability NiZn ferrite	≤ 400	250	330	≥ 10^4			
Fi 215	Low permeability NiZn ferrite for high ignition applications	≤ 400	150	385	≥ 10^7	> 310 3000A/m/170°C		
Fi 212	Low permeability NiZn ferrite	≤ 400	100	420	≥ 10^4			
Fi 150	Low permeability NiZn ferrite	≤400	50	430	≥ 10^3			
Fi 130	Low permeability NiZn ferrite	≤ 500	30	500	≥ 10^3			
Fi 110	Low permeability NiZn ferrite	≤ 1000	12	580	≥ 10^4			
Plasto ferrite materials		**f - MHz**	**µi (25°C)**	**Tc**	**DC-resist. Ωm**			
Fi 520	Wide band material with high temperature-consistency of permeability	≤ 400	20	150	> 3,0			
Fi 522	Wide band material with high temperature consistency of permeability up to 200°C.	≤ 400	19	200	> 1,0			

Ferrocart materials		f - MHz	µi (25°C)	Tmax	tand/µi * 10^{-6}		µ Δ at 5000 A/m	Pv-mW/cm^3 100kHz/40mT
Fe 896	High permeability material	≤ 0,2	140	200		1200 0,16 MHz	45	570
Fe 893	High permeability material for high premagnetization	≤ 0,2	110	200	190 0,01 MHz	1400 0,16 MHz	50	650
Fe 892	Noise suppression material	≤ 0,2	100	200	120 0,01 MHz	1600 0,16 MHz	36	650
Fe 876	Wide band material for high premagnetization with low losses	≤ 0,2	75	180		100 0,16 MHz	46	310
Fe 850	Wide band material for high premagnetization with low losses	≤ 0,3	55	180	140 0,02 MHz	800 0,3 MHz	43	440
Fe 835	Wide band material	≤ 0,5	35	150	100 0,05 MHz	180 0,5 MHz	33	390
Fe 818	Wide band material	≤ 10	18	150	110 0,05 MHz	200 0,5 MHz		
Fe 810	Wide band material	≤ 100	10	120	500 12 MHz	2000 100 MHz		



B1.1 FERROCARIT | SUMMARY

Application	Frequency range MHz	magnetic load low	magnetic load high	Ferrite materials FERROCARIT	Core shape
High Q circuits (Input and oscillator coils, variometers, IF-transformers LF-coils, MW and LW antennas etc.)	≤ 1,6	X		Fi 262	Rod, tube, screw, nipple, saddle and cup cores
	0,2 ... 5	X		Fi 221	
	0,5 … 10	X		Fi 215	
	1 ... 12	X		Fi 212	
	5 ... 40	X		Fi 150	
	10 ... 60	X		Fi 130	
	50 ... 150	X		Fi 110	
Anti-interference and damping coils	≤ 0,5	X		Fi 415	Rod, tube, drum and multi-aperture cores toroids, screening beads
		X		Fi 412	
		X		Fi 410	
		X		Fi 360	
	≤ 1	X		Fi 350	
		X		Fi 340	
	≤ 6	X		Fi 262	
	2 ... 1000	X		Fi 292	
		X		Fi 221	
		X		Fi 150	
Wide-band transformers (Antenna-transformers for TV and radio, pulse transformers, etc.)	≤ 2	X		Fi 415	Pot and E-cores, toroids, two- and multi-aperture cores
		X		Fi 412	
		X		Fi 410	
		X		Fi 360	
		X		Fi 340	
	≤ 10	X		Fi 292	Rod, tube, two- and multi-aperture cores
		X		Fi 262	
	≤ 100	X		Fi 221	
	≤ 250	X		Fi 215	
		X		Fi 212	
	≤ 400	X		Fi 242	
		X		Fi 150	
		X		Fi 130	
		X		Fi 110	
Power applications (Fly-back transformers, DC converters, audio frequency chokes, TV correcting coils, audio frequency filters)	≤ 0,3		X	Fi 395	E-, U-, E+I-, screw, rod, tube, nipple and drum cores
			X	Fi 328	
			X	Fi 326	
			X	Fi 324	
	≤ 1		X	Fi 335	
			X	Fi 325	
	≤ 3		X	Fi 327	
	≤ 0,5		X	Fi 329	

B1.1 FERROCARIT | SUMMARY

FERROCARIT			Fi 415		Fi 412		Fi 410		Fi 360		Fi 340	
Initial permeability	μ_i	1	15000 ± 30%		12000 ± 30%		10000 ± 30%		6000 ± 30%		4300 ± 20%	
Relative loss factor	$\frac{\tan\delta}{\mu_i}$	10^{-6}	< 6	< 70	< 6	< 50	< 6	< 70	< 4	< 20	< 4	< 20
frequency	f	MHz	0,01	0,1	0,01	0,1	0,01	0,1	0,01	0,1	0,01	0,1
Hysteresis material constant	η_B	$\frac{10^{-6}}{mT}$	< 0,6		< 1,2		< 0,6		< 0,8		< 0,6	
Induction H = 1200 A/m	B	mT	430		430		420		440		390	
Coercivity	H_C	A/m	9		8		8		9		10	
Curie temperature	T_C	°C	130		125		135		150		130	
Rel. temperature factor +23...+70°C	α_F	$\frac{10^{-6}}{K}$	≤ 1,5		≤ 1,5		≤ 1,5		≤ 1,5		≤ 1,5	
Rel. disaccommodation factor T = 40°C	D_F	10^{-6}	< 3		< 3		< 3		< 3		< 6	
DC - Resistivity	ρ	Ωm	≥ 0,05		≥ 0,05		≥ 0,05		≥ 0,05		> 0,5	

B1.1 FERROCARIT | SUMMARY

FERROCARIT			Fi 395 [1)]	Fi 335 [1)]	Fi 329	Fi 328	Fi 327
Initial permeability	μ_i	1	2700 ± 25%	2200 ± 25%	1500 ± 25%	1800 ± 25%	1200 ± 25%
Relative loss factor	$\frac{\tan\delta}{\mu_i}$	10^{-6}	< 3,5	2,6	< 8	< 3,5	< 2,5
frequency	f	MHz	0,1	0,1	0,1	0,1	0,1
Hysteresis material constant	η_B	$\frac{10^{-6}}{mT}$				< 1	< 0,9
Induction H = 1200 A/m	B	mT	460	500	525	480	430
Coercivity	H_C	A/m	12	15	12	15	50
Curie temperature	T_C	°C	250	230	275	260	240
Rel. temperature factor +23...+70°C	α_F	$\frac{10^{-6}}{K}$					
Rel. disaccommodation factor T = 40°C	D_F	10^{-6}					
DC - Resistivity	ρ	Ωm			> 1,5	> 2	> 30

1) new material

B1.1 FERROCARIT | SUMMARY

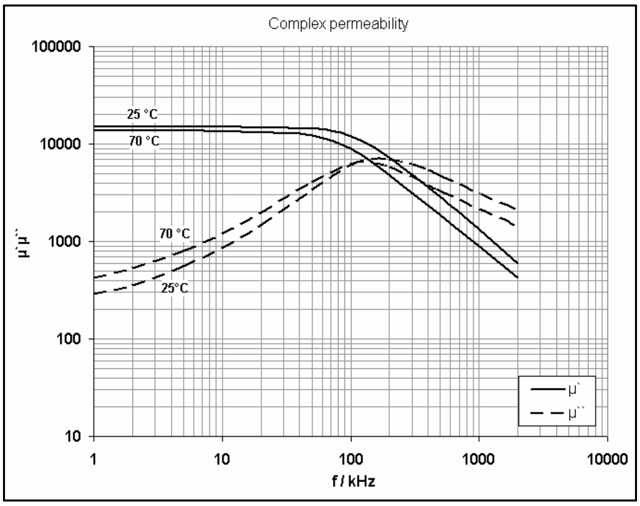
FERROCARIT			Fi 326 [1]	Fi 325	Fi 324		
Initial permeability	μ_i	1	1500 ± 25%	1800 ± 25%	2300 ± 25%		
Relative loss factor	$\frac{\tan\delta}{\mu_i}$	10^{-6}	<5	< 3,5	< 4,5		
frequency	f	MHz	0,1	0,1	0,1		
Hysteresis material constant	η_B	$\frac{10^{-6}}{mT}$		< 0,42	≤ 1		
Induction H = 1200 A/m	B	mT	500	500	490		
Coercivity	H_C	A/m	15	16	15		
Curie temperature	T_C	°C	250	230	230		
Rel. temperature factor +23...+70°C	α_F	$\frac{10^{-6}}{K}$					
Rel. disaccommodation factor T = 40°C	D_F	10^{-6}					
DC - Resistivity	ρ	Ωm		≥ 6	≥ 3		

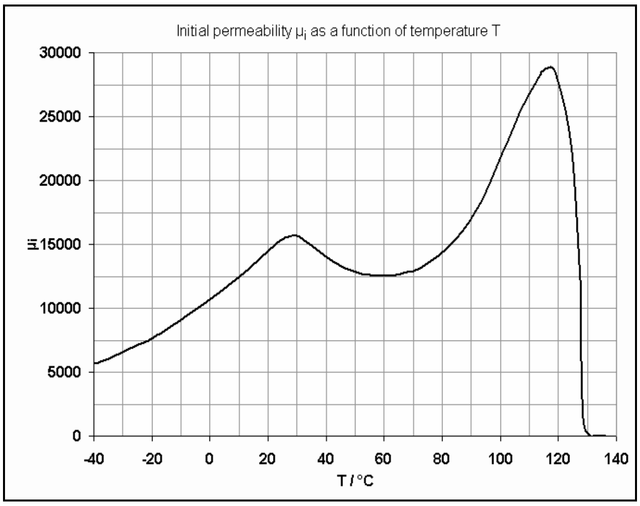
1) new material

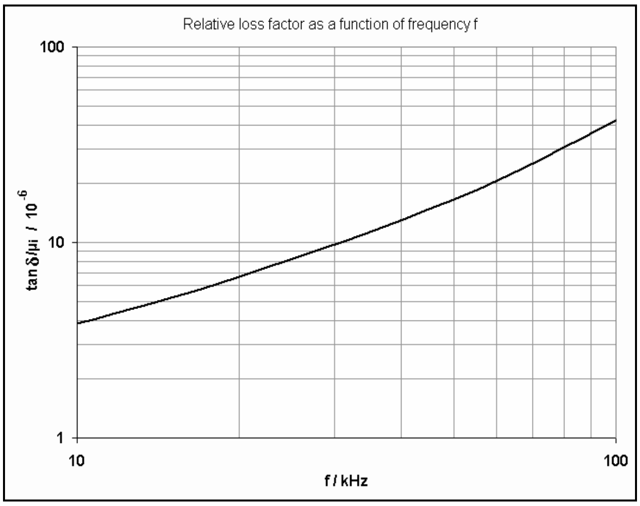
B1.1 FERROCARIT | FI 415

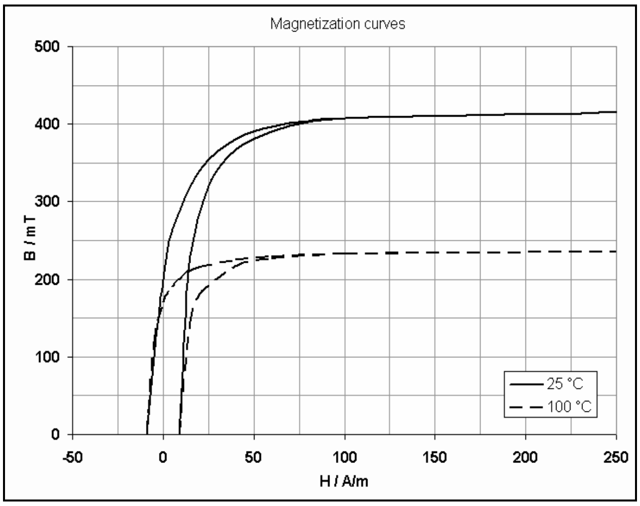
A highest permeability material optimized for broadband transmission and miniature inductors with high inductance values

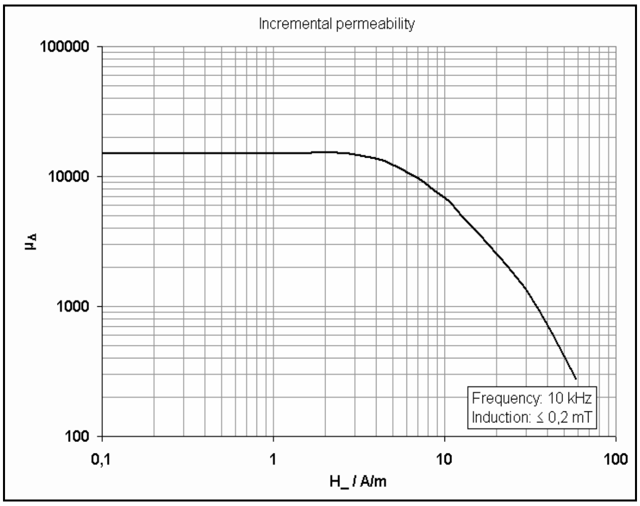
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	15000 ± 30%	1	25°C ; <= 10 kHz <= 0,25 mT
$\tan\delta / \mu_i$	< 70	10^{-6}	25°C ; 0,1 MHz <= 0,25 mT
η_B	< 0,6	10^{-6} / mT	25°C ; 10 kHz <=1,5mT to 3mT
B	415	mT	25°C ; 16 kHz 250 A/m
	235		100°C ; 16 kHz 250 A/m
P_v			
T_c	130	°C	







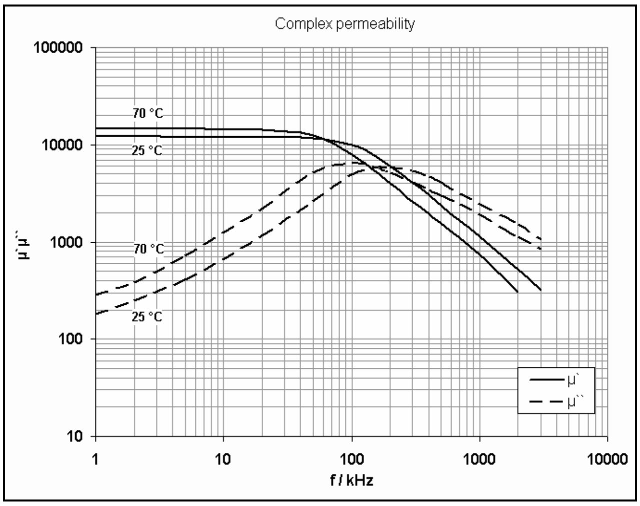


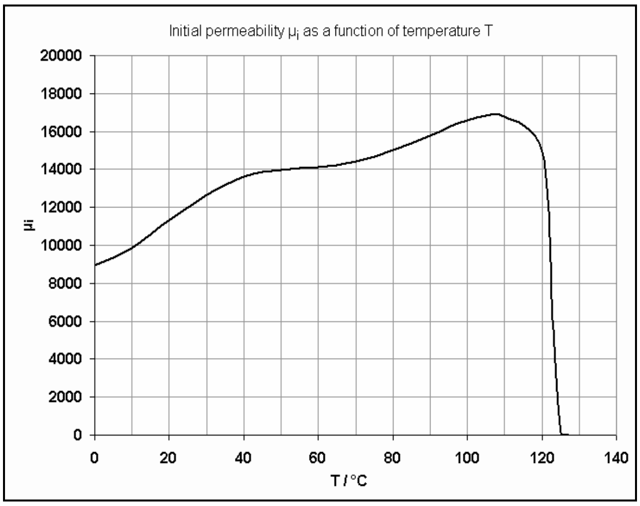


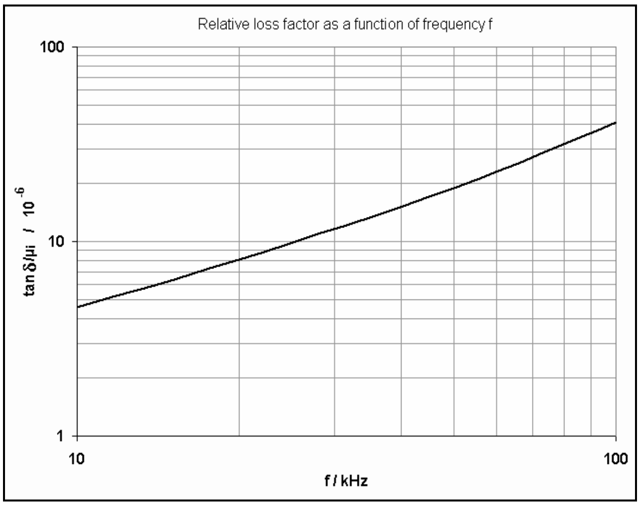
B1.1 FERROCARIT | FI 412

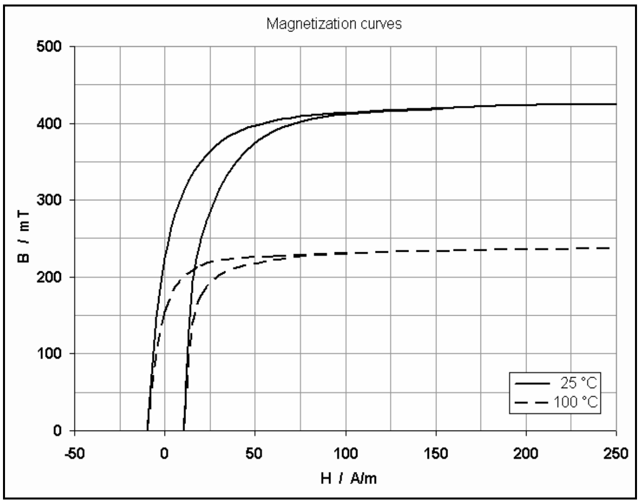
A high permeability material optimized for broadband transmission, common mode chokes as well as suppression filters

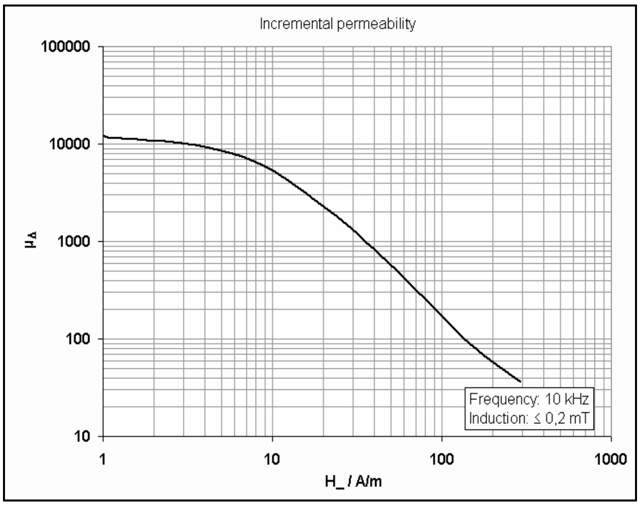
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	12000 ± 30%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 50	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	< 1,2	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	425	mT	25°C ; 16 kHz 250 A/m
	235		100°C ; 16 kHz 250 A/m
P_v		mW / cm³	25°C ; ..... kHz .... mT
			100°C ; ..... kHz .... mT
T_c	125	°C	10 kHz ≤ 0,25 mT







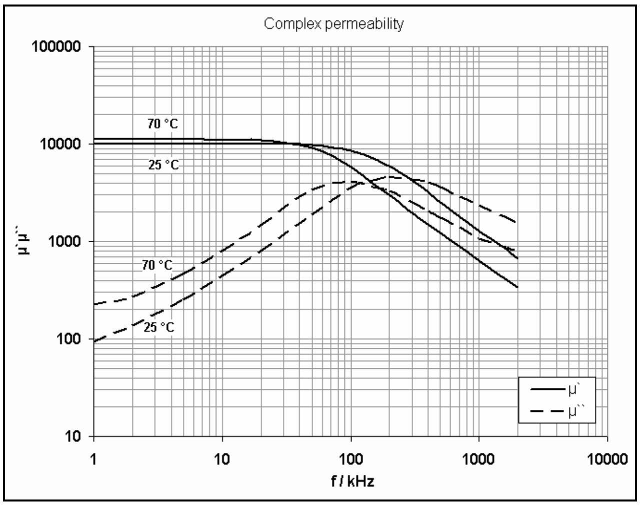


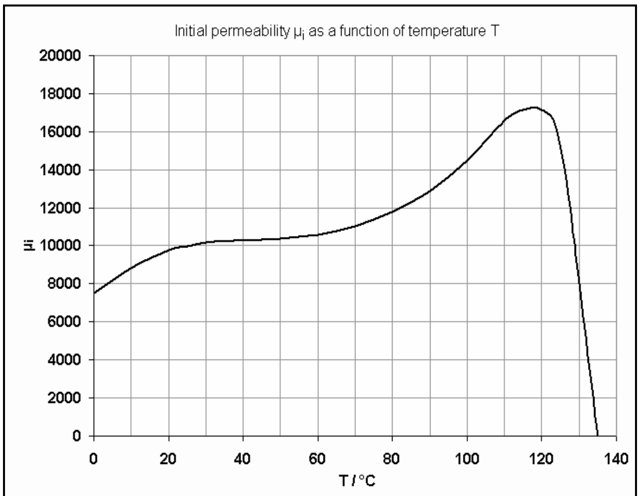


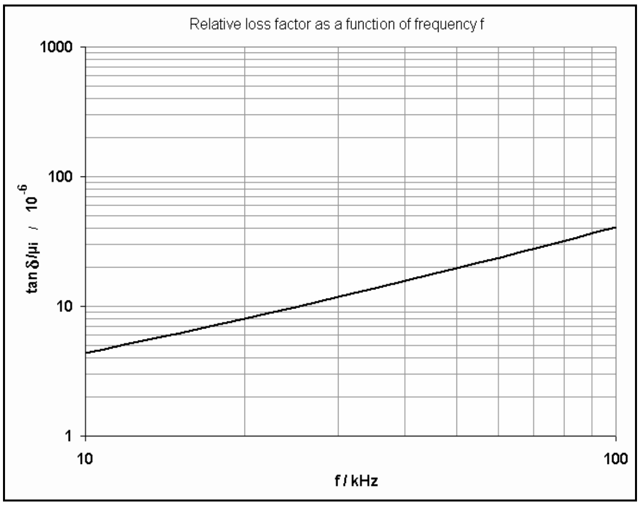
B1.1 FERROCARIT | FI 410

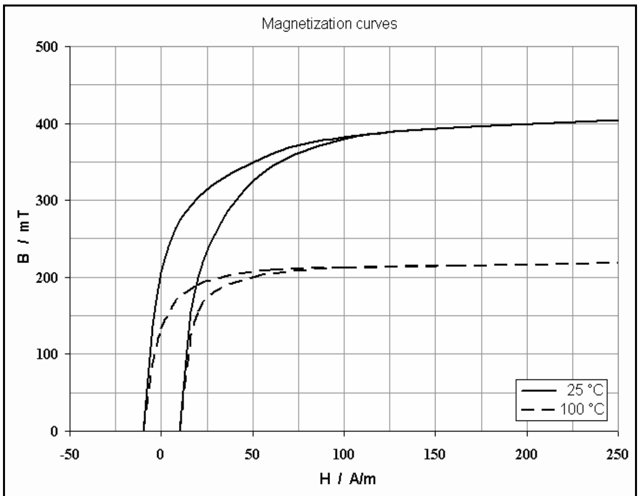
A high permeability material optimized for broadband transmission, common mode chokes as well as suppression filters

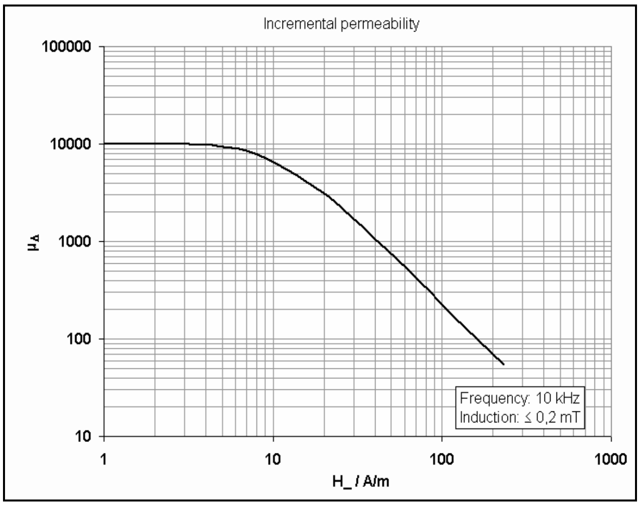
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	10000 ± 30%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 70	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	< 0,6	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	405	mT	25°C ; 16 kHz 250 A/m
	220		100°C ; 16 kHz 250 A/m
P_v		mW / cm³	25°C ; ..... kHz .... mT
			100°C ; ..... kHz .... mT
T_c	135	°C	10 kHz ≤ 0,25 mT











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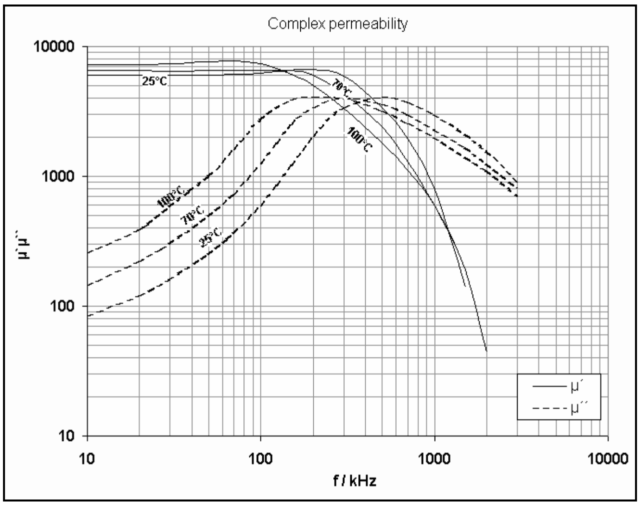
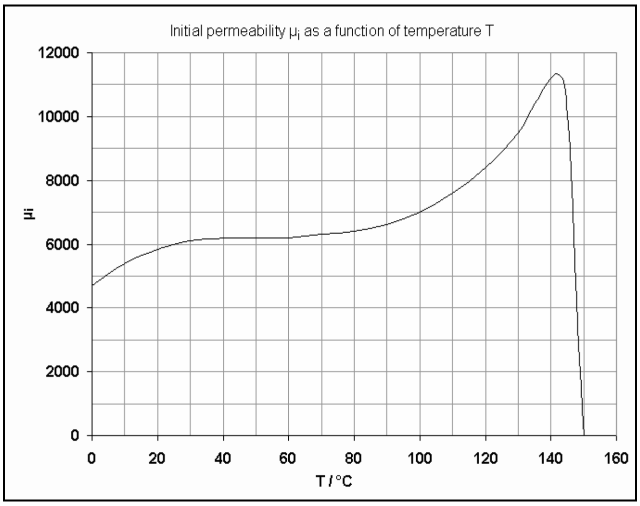
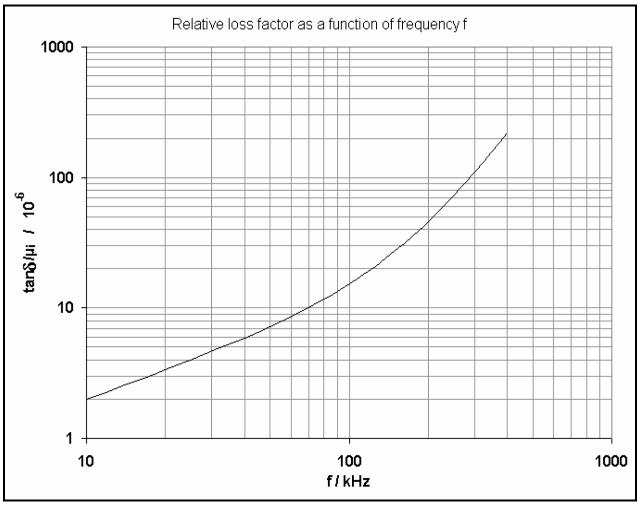
B1.1 FERROCARIT | FI 360

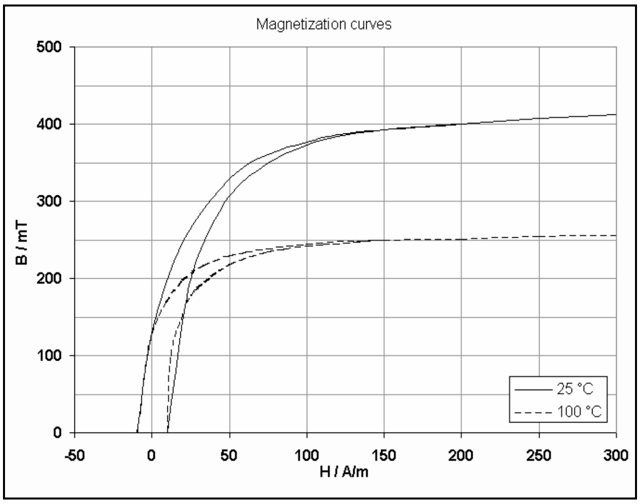
A medium permeability material with a frequency stability up to 0,2 MHz and a high Tc for broadband transmission, current transformers as well as suppression filters

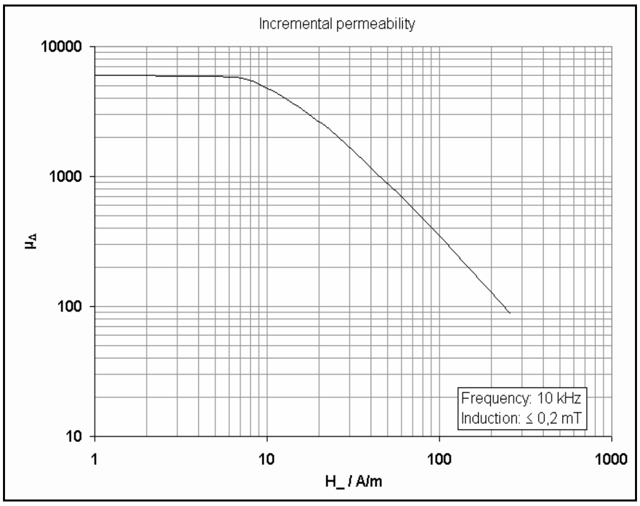
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	6000 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 20	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	< 0,8	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	410	mT	25°C ; 16 kHz 250 A/m
	255		100°C ; 16 kHz 250 A/m
P_v		mW / cm³	25°C ; ..... kHz .... mT
			100°C ; ..... kHz .... mT
T_c	150	°C	10 kHz ≤ 0,25 mT











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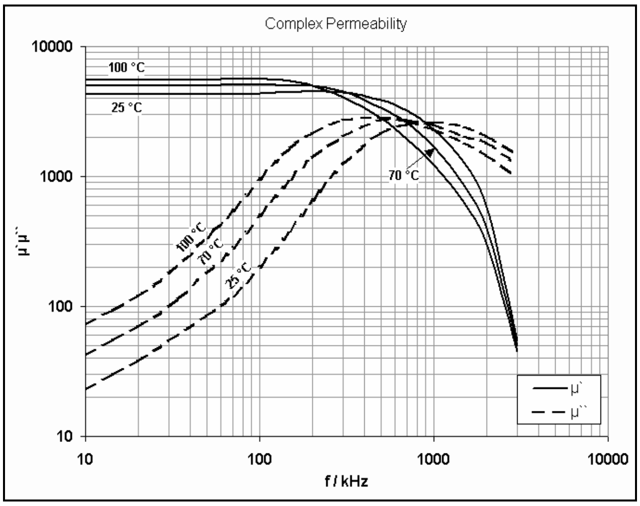
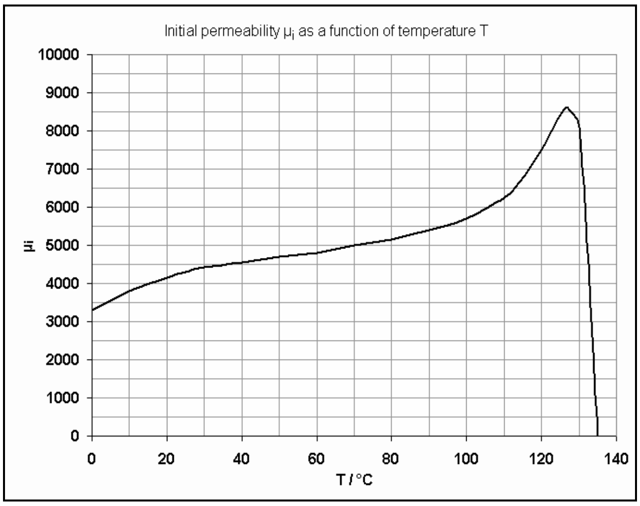
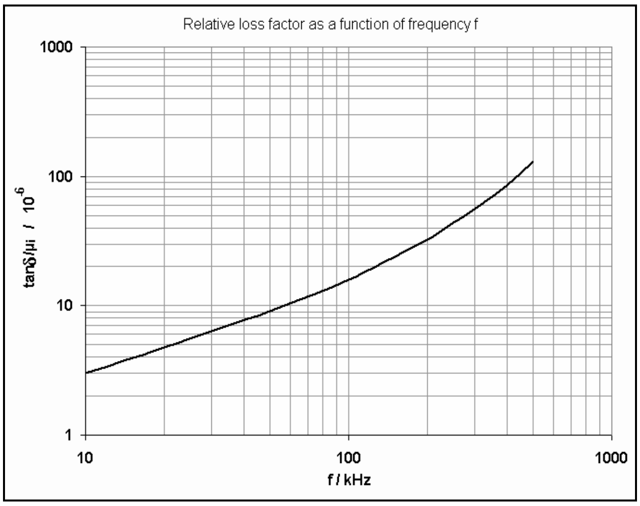
B1.1 FERROCARIT | FI 340

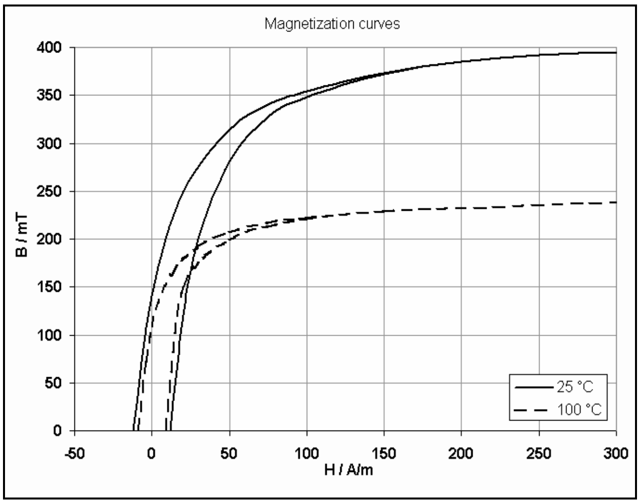
A medium permeability material with a low temperature dependence of the initial permeability and a frequency stability up to 0,4 MHz. Optimized for use in broadband transformers with high DC-bias current

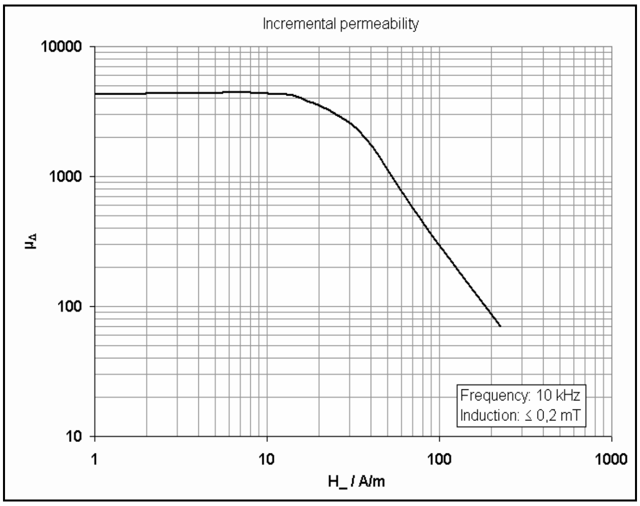
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	4300 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 20	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	< 0,6	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	390	mT	25°C ; 16 kHz 250 A/m
	235		100°C ; 16 kHz 250 A/m
P_v		mW / cm³	25°C ; ..... kHz .... mT
			100°C ; ..... kHz .... mT
T_c	130	°C	10 kHz ≤ 0,25 mT







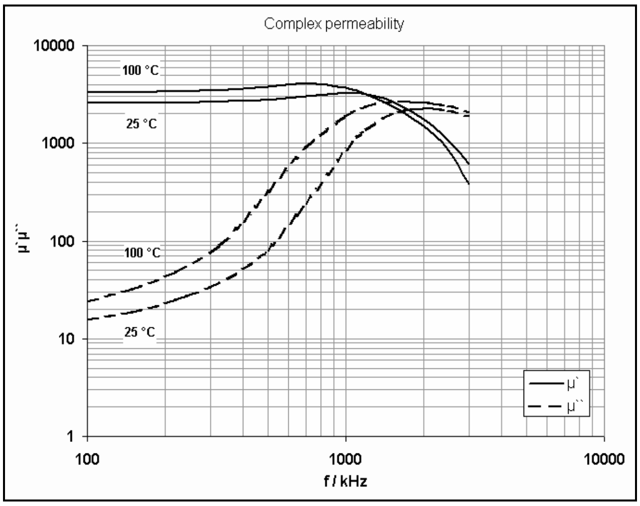


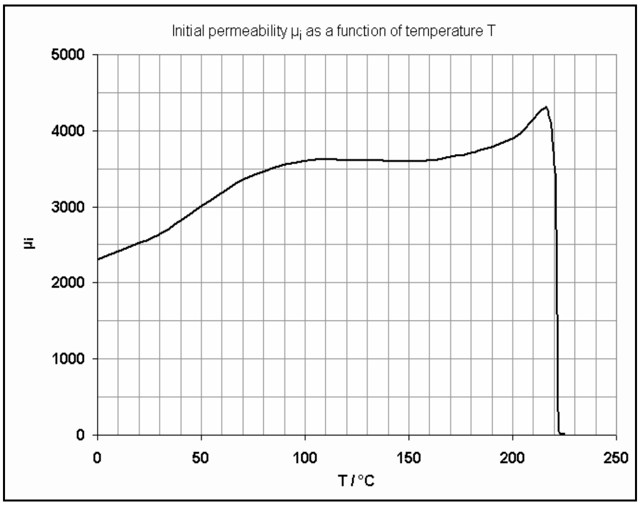


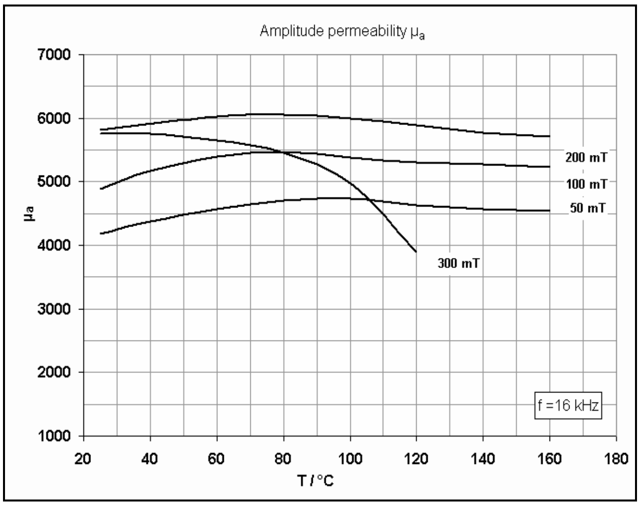
B1.1 FERROCARIT | FI 395

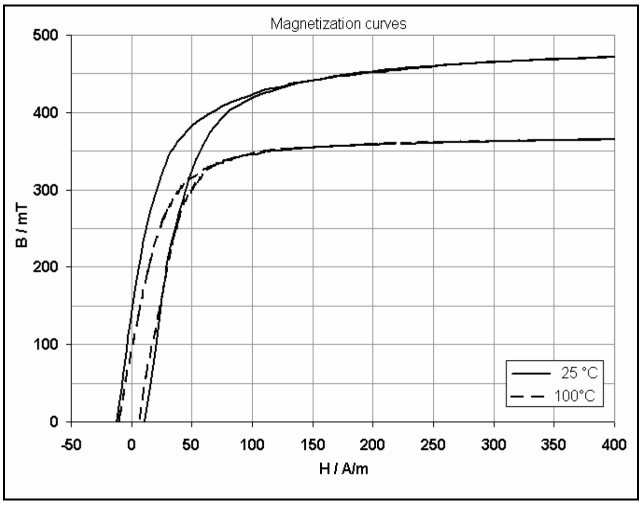
A low frequency power material with a flat power loss curve from 25°C to 120°C for use in general purpose transformers up to 0,3 MHz. Especially suited for broad temperature range applications

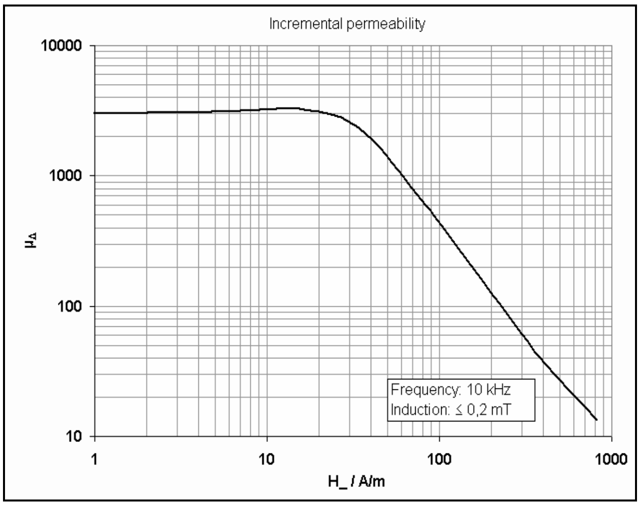
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	2700 ± 25%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 3,5	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B		10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	460	mT	25°C ; 16 kHz 250 A/m
	> 330		100°C ; 16 kHz 250 A/m
P_v	520	mW / cm³	25°C ; 100 kHz 200 mT
	450		100°C ; 100 kHz 200 mT
T_c	220	°C	10 kHz ≤ 0,25 mT

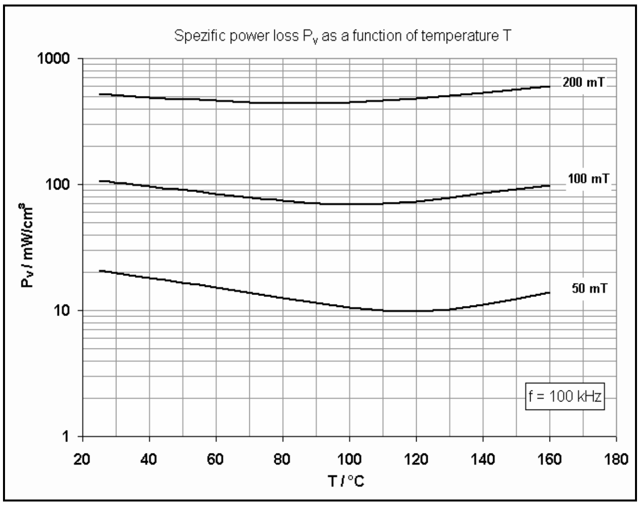


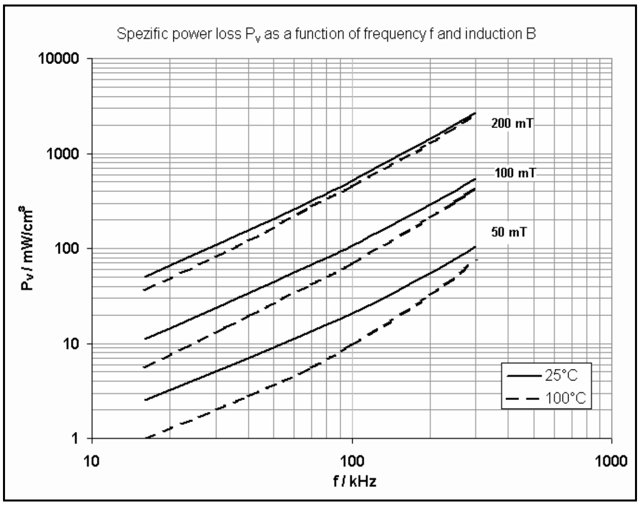


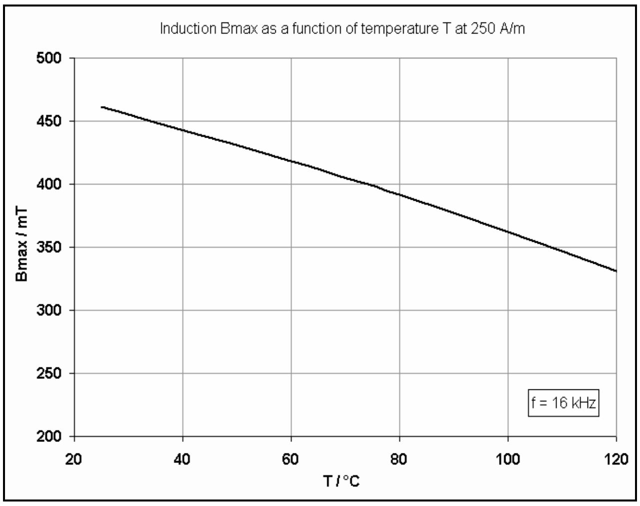







Spezific power loss Pv as a function of temperature T
1000
100
10
1
Pv / mW/cm³
200 mT
100 mT
50 mT
f = 100 kHz
20
40
60
80
100
120
140
160
180
T / °C


Spezific power loss Pv as a function of frequency f and induction B
10000
1000
100
10
1
Pv / mW/cm³
200 mT
100 mT
50 mT
25°C
100°C
10
100
1000
f / kHz


Induction Bmax as a function of temperature T at 250 A/m
500
450
400
350
300
250
200
Bmax / mT
f = 16 kHz
20
40
60
80
100
120
T / °C

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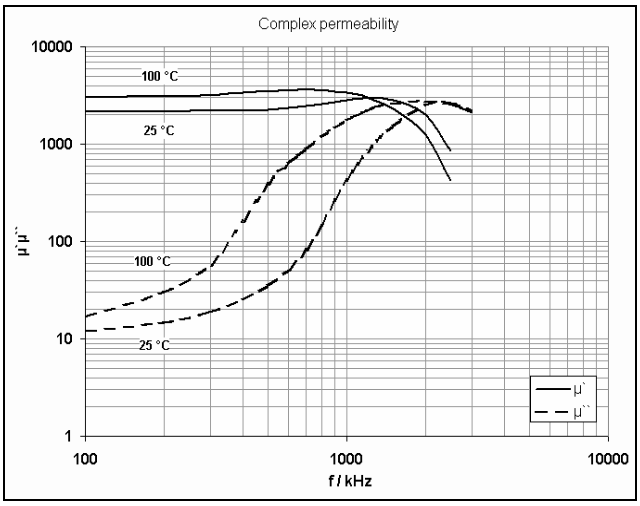
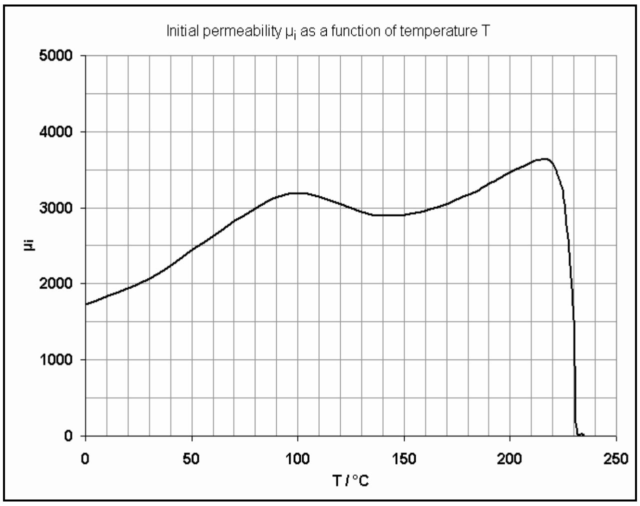
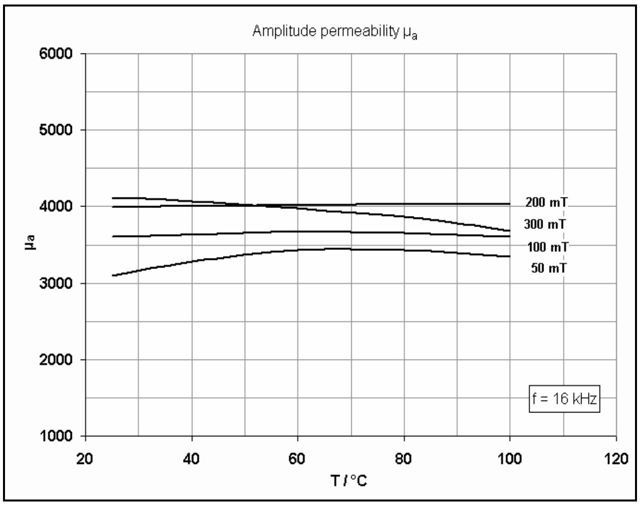
B1.1 FERROCARIT | FI 335

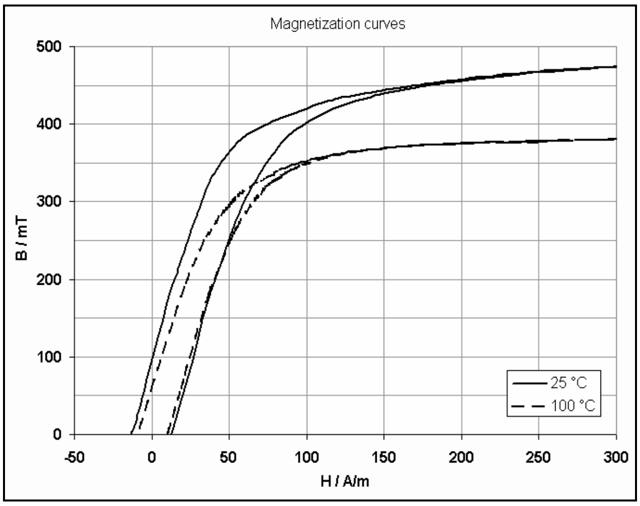
A low to medium frequency power material with low losses and high saturation flux density in a operating frequency range up to 0,4 MHz

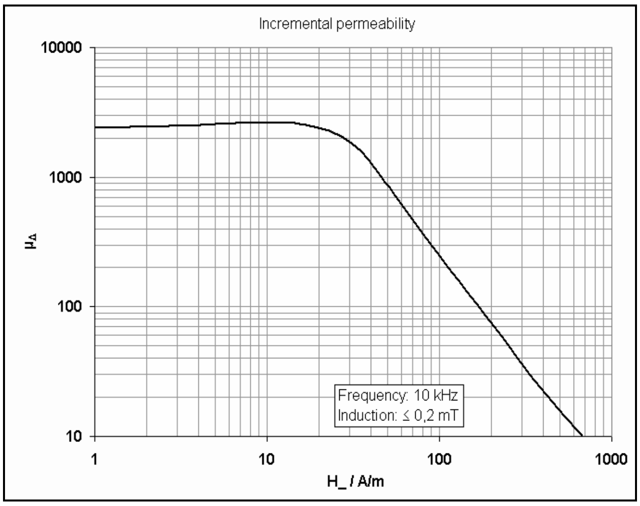
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	2000	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	2,6	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	0,35	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	470	mT	25°C ; 16 kHz 250 A/m
	> 350		100°C ; 16 kHz 250 A/m
P_v	< 450	mW / cm³	100°C ; 100 kHz 200 mT
	< 190		100°C ; 200 kHz 100 mT
T_c	230	°C	10 kHz ≤ 0,25 mT

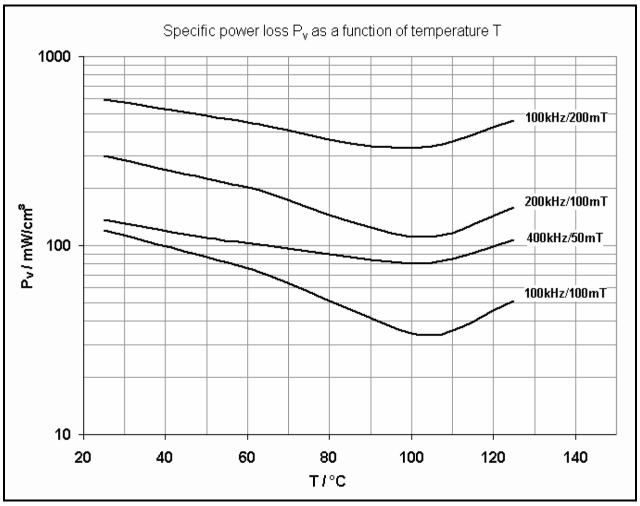


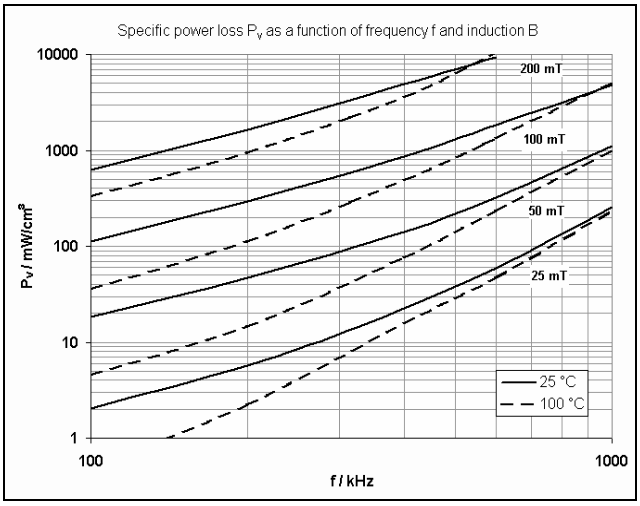


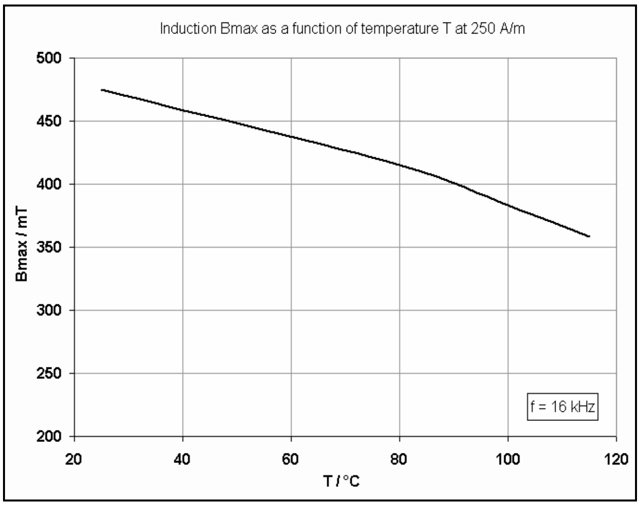







Specific power loss P_V as a function of temperature T
1000
100
10
20
40
60
80
100
120
140
P_V / mW/cm³
T / °C
100kHz/200mT
200kHz/100mT
400kHz/50mT
100kHz/100mT

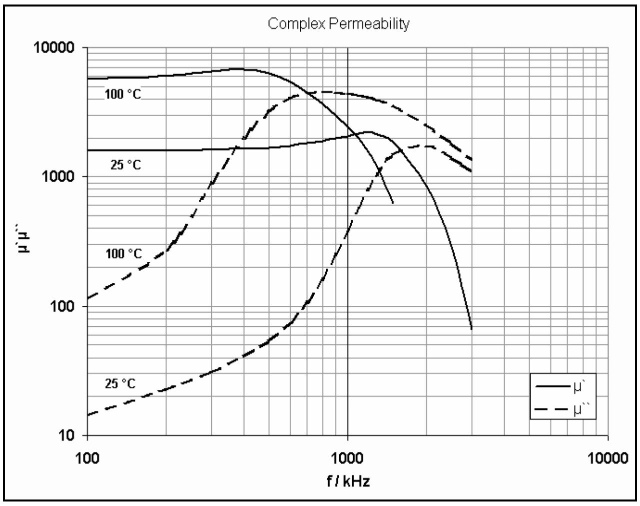

Specific power loss P_V as a function of frequency f and induction B
10000
1000
100
10
1
100
1000
P_V / mW/cm³
f / kHz
200 mT
100 mT
50 mT
25 mT
25 °C
100 °C

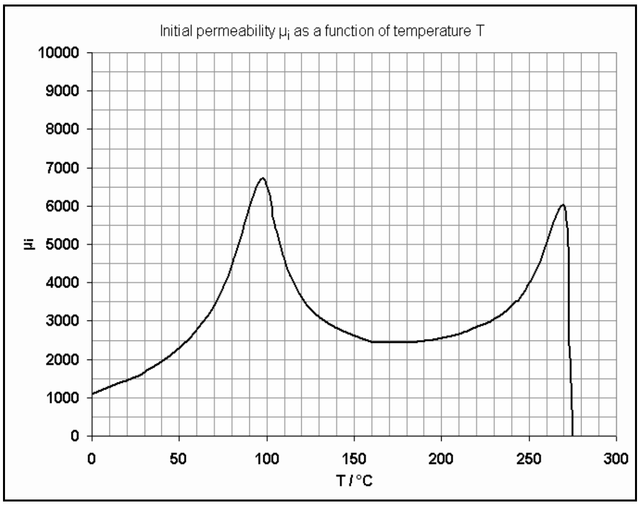

Induction Bmax as a function of temperature T at 250 A/m
500
450
400
350
300
250
200
20
40
60
80
100
120
Bmax / mT
T / °C
f = 16 kHz

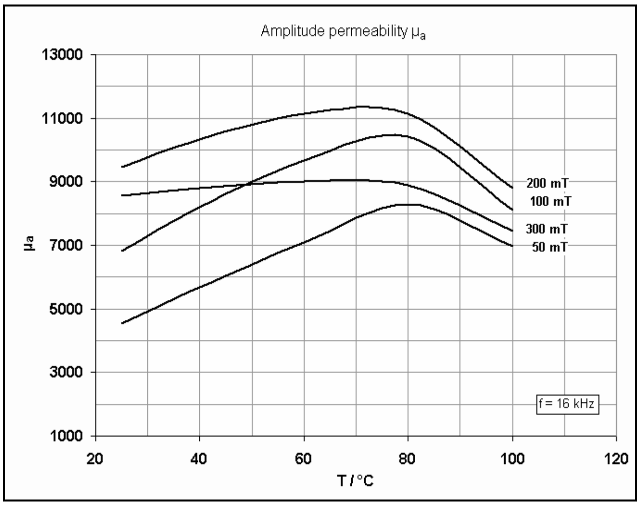
B1.1 FERROCARIT | FI 329

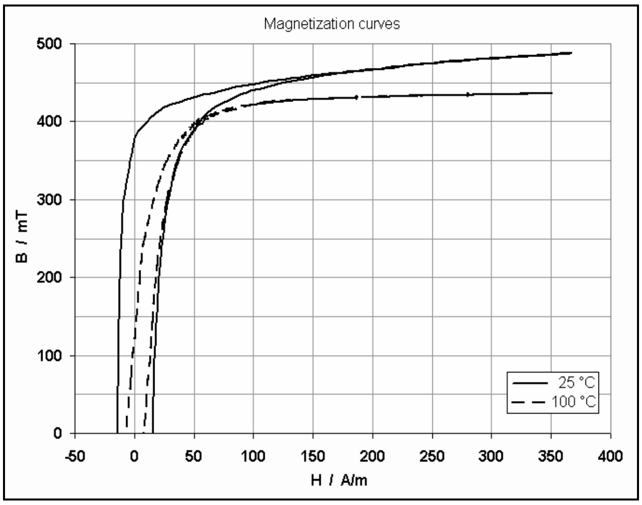
A low to medium frequency power material with high saturation flux density
for applications up to 0,2 MHz

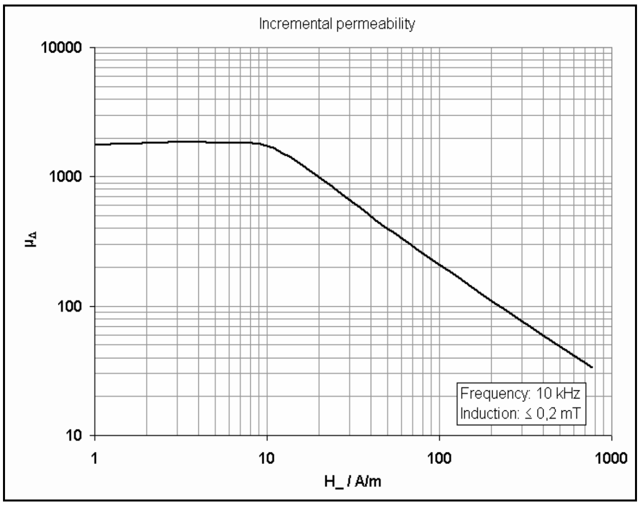
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	1500 ± 25%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 8	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B		10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	475	mT	25°C ; 16 kHz 250 A/m
	> 400		100°C ; 16 kHz 250 A/m
P_v	1000	mW / cm³	25°C ; 100 kHz 200 mT
	500		100°C ; 100 kHz 200 mT
T_c	275	°C	

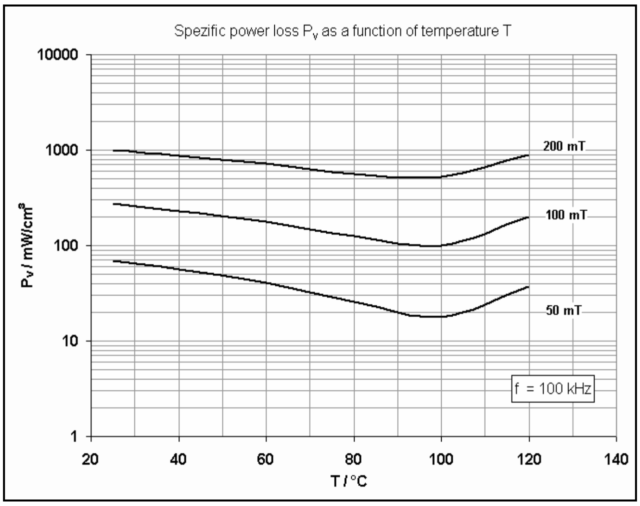


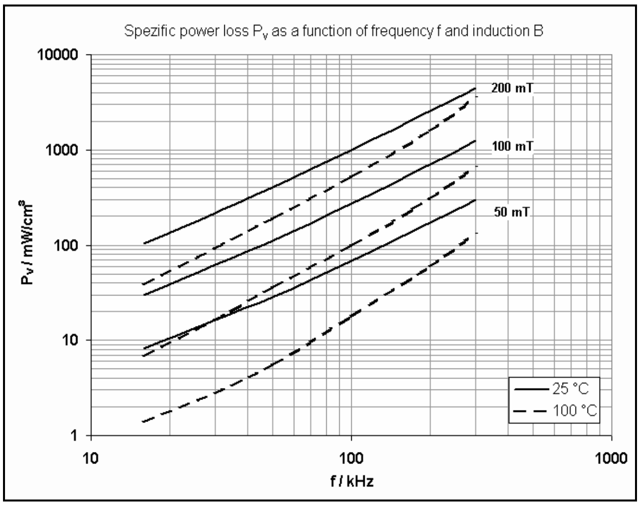


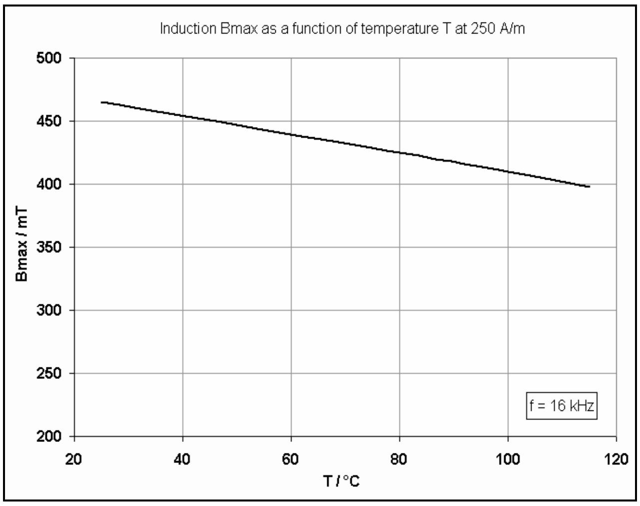







Spezific power loss P_V as a function of temperature T
10000
1000
100
10
1
P_V / mW/cm³
200 mT
100 mT
50 mT
f = 100 kHz
20
40
60
80
100
120
140
T / °C

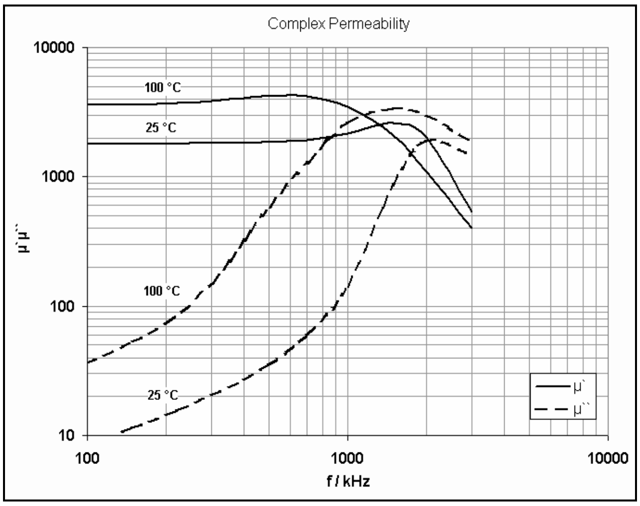

Spezific power loss P_V as a function of frequency f and induction B
10000
1000
100
10
1
P_V / mW/cm³
200 mT
100 mT
50 mT
25 °C
100 °C
10
100
1000
f / kHz

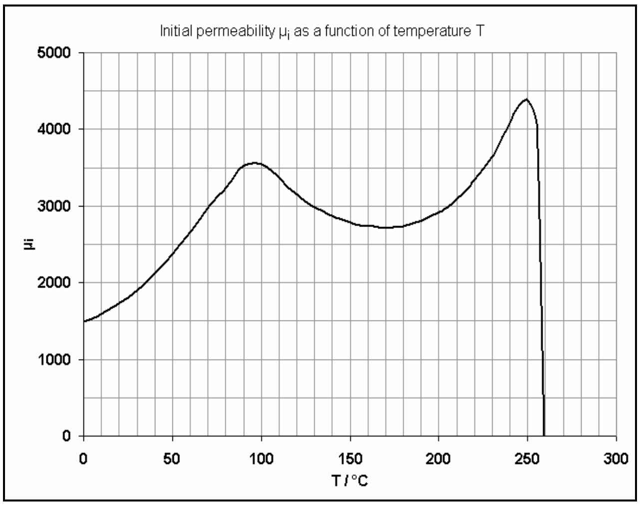

Induction Bmax as a function of temperature T at 250 A/m
500
450
400
350
300
250
200
Bmax / mT
f = 16 kHz
20
40
60
80
100
120
T / °C

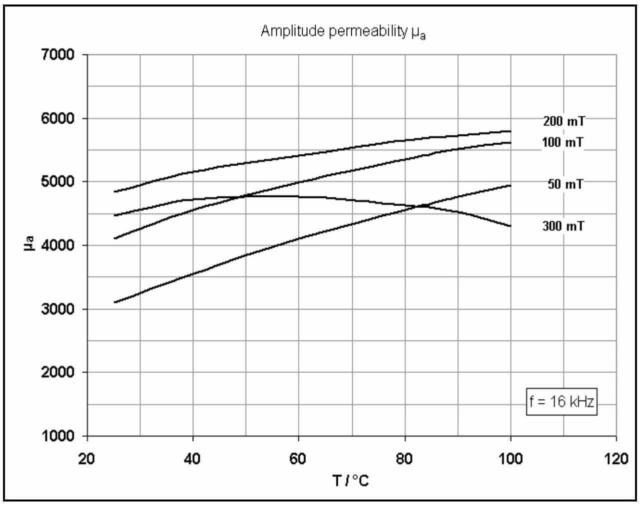
B1.1 FERROCARIT | FI 328

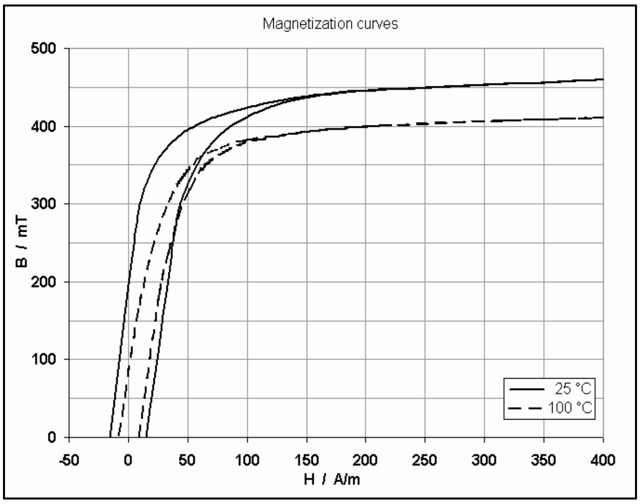
A low to medium frequency power material with high saturation flux density and low losses for applications up to 0,2 MHz

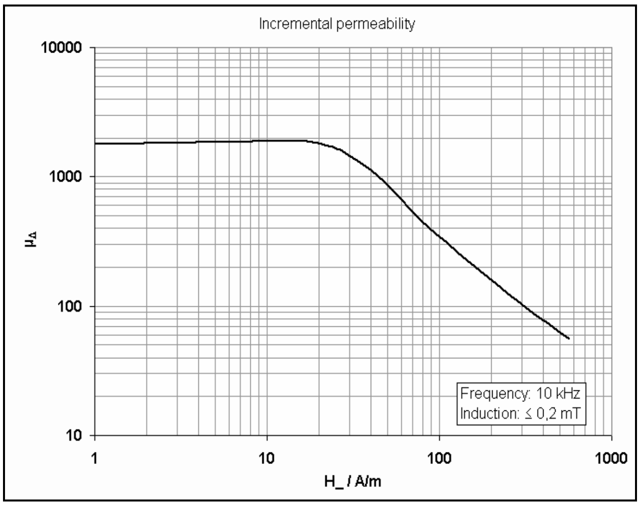
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	1800 ± 25%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 3,5	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	< 1	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	450	mT	25°C ; 16 kHz 250 A/m
	> 370		100°C ; 16 kHz 250 A/m
P_v	670	mW / cm^3	25°C ; 100 kHz 200 mT
	450		100°C ; 100 kHz 200 mT
T_c	260	°C	10 kHz ≤ 0,25 mT

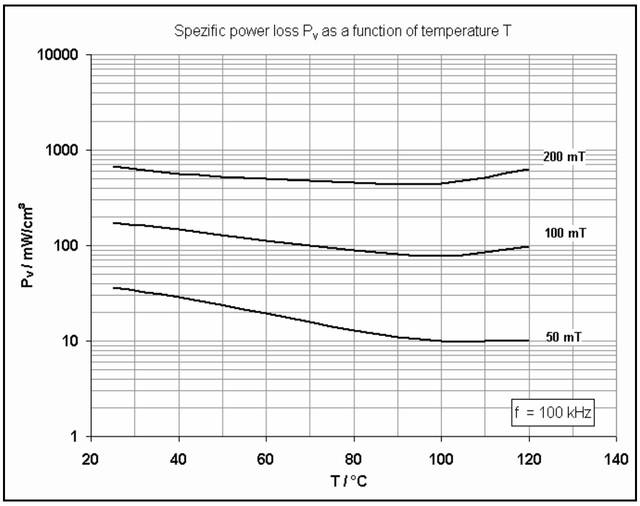


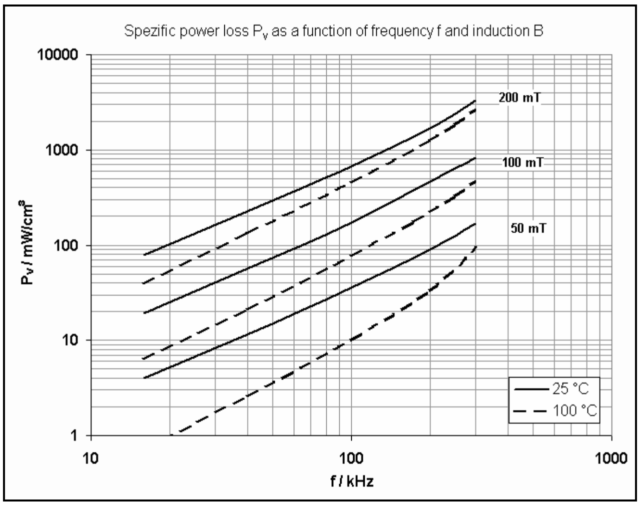


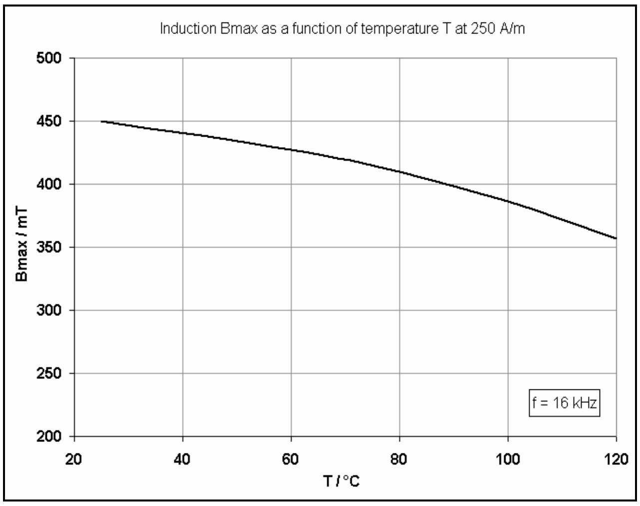


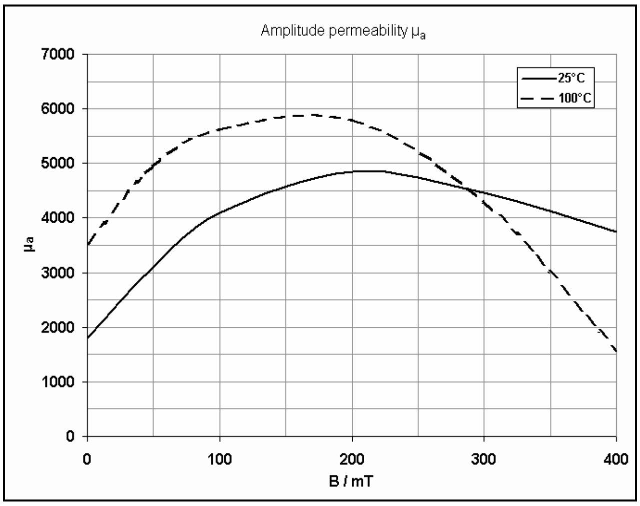





Spezific power loss Pv as a function of temperature T
Pv / mW/cm³
T / °C
200 mT
100 mT
50 mT
f = 100 kHz


Spezific power loss Pv as a function of frequency f and induction B
Pv / mW/cm³
f / kHz
200 mT
100 mT
50 mT
25 °C
100 °C

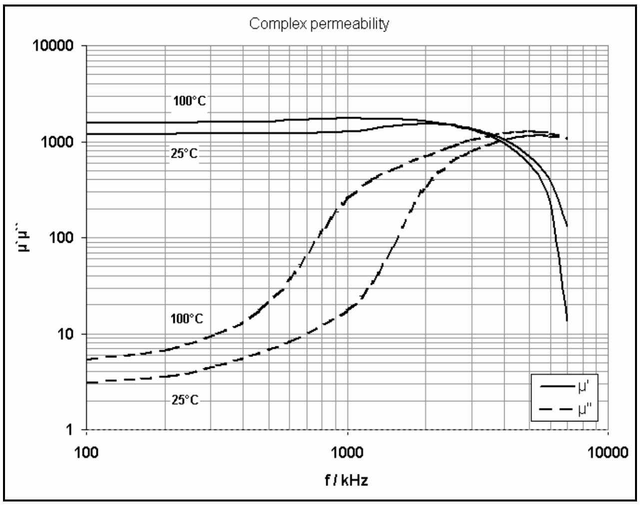

Induction Bmax as a function of temperature T at 250 A/m
Bmax / mT
T / °C
f = 16 kHz

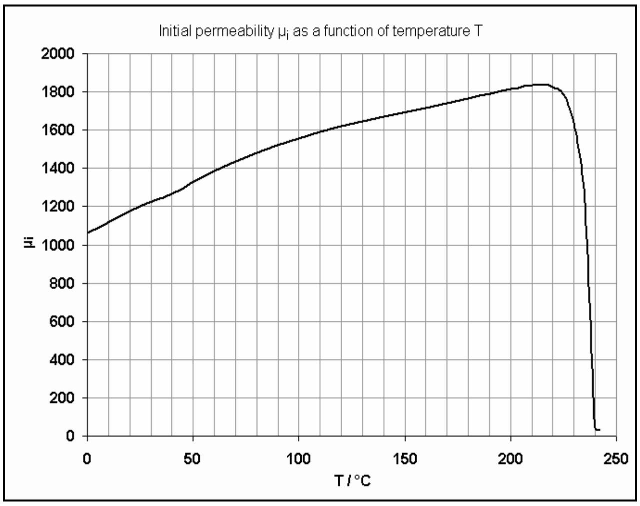

Amplitude permeability µa
µa
B / mT
25°C
100°C

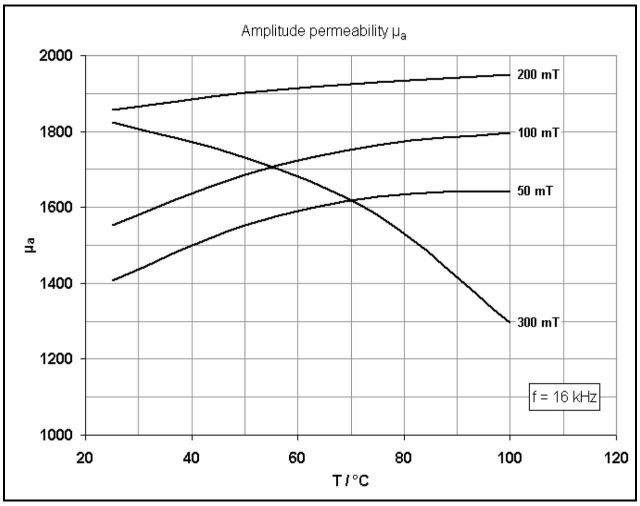
B1.1 FERROCARIT | FI 327

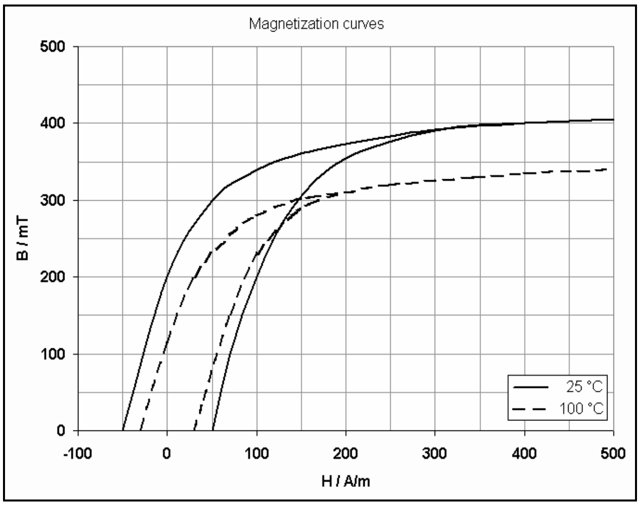
A high frequency power material suitable for power and standard transformers in a frequency range of 0,5 to 2 MHz

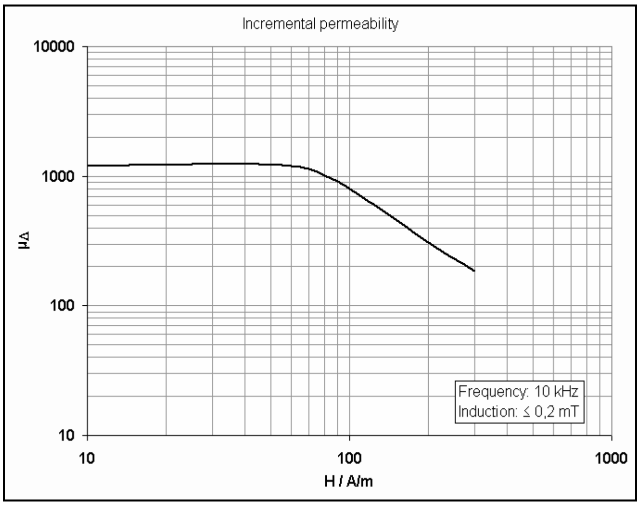
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	1200 ± 25%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 2,5	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	< 0,9	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	380	mT	25°C ; 16 kHz 250 A/m
	>300		100°C ; 16 kHz 250 A/m
P_v	560	mW / cm³	25°C ; 1000 kHz 50 mT
	540		100°C ; 1000 kHz 50 mT
T_c	240	°C	10 kHz ≤ 0,25 mT

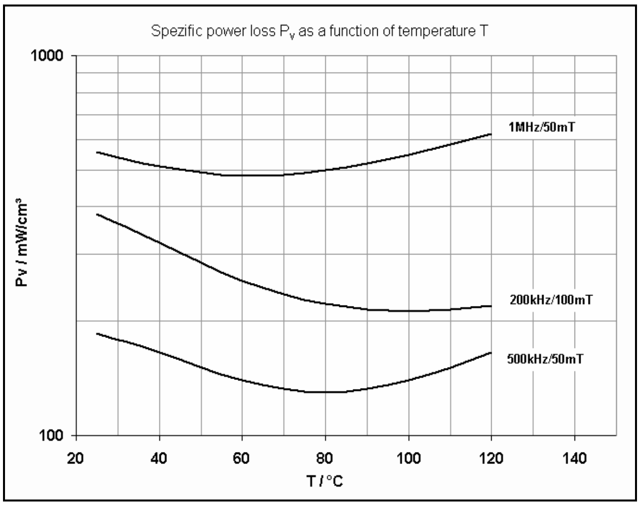


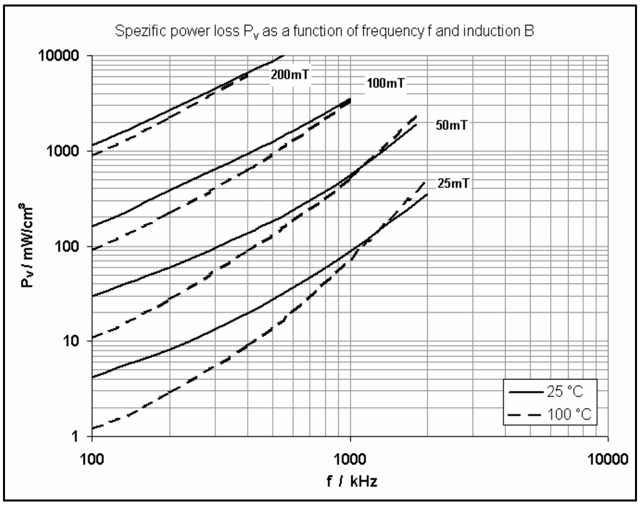


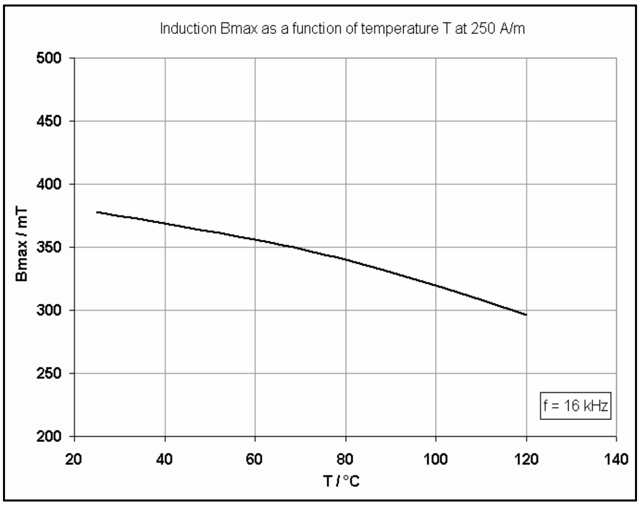







Spezific power loss Pv as a function of temperature T
1MHz/50mT
200kHz/100mT
500kHz/50mT
Pv / mW/cm³
T / °C

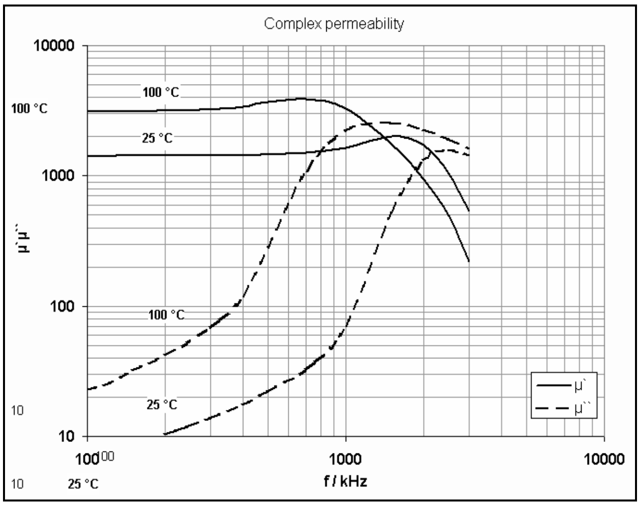

Spezific power loss Pv as a function of frequency f and induction B
200mT
100mT
50mT
25mT
25 °C
100 °C
Pv / mW/cm³
f / kHz

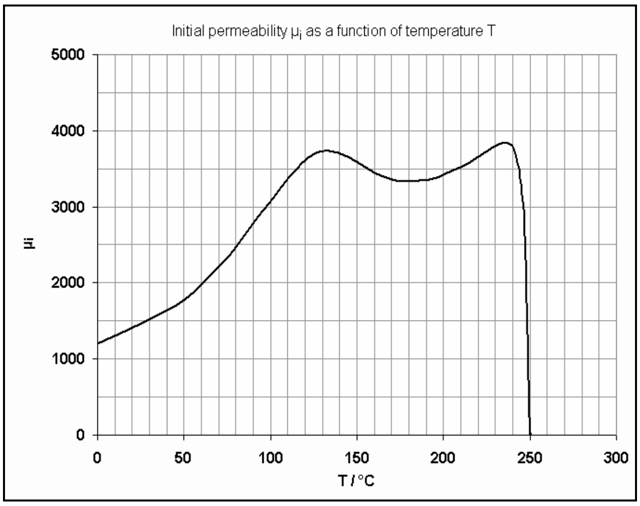

Induction Bmax as a function of temperature T at 250 A/m
f = 16 kHz
Bmax / mT
T / °C

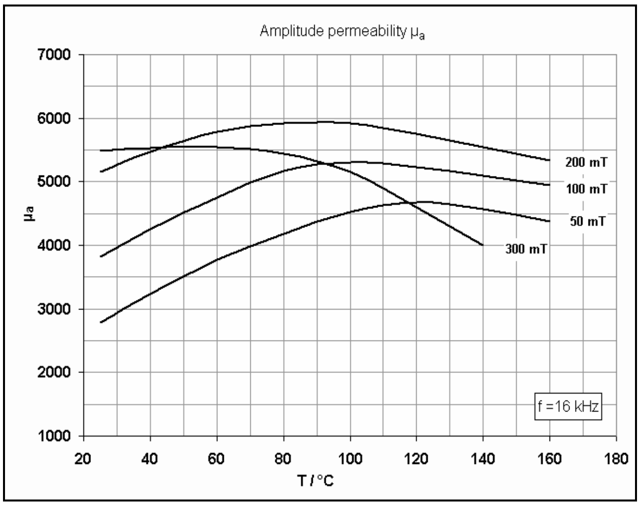
B1.1 FERROCARIT | FI 326

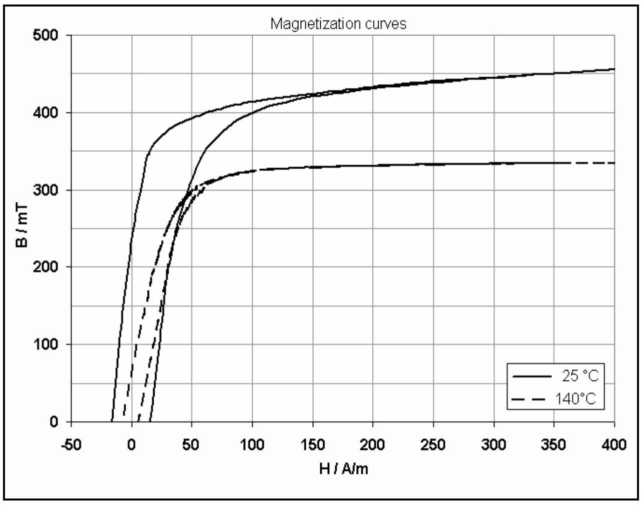
A low to medium frequency power material with lowest power losses around 140°C.
Suitable for power transformers in a frequency range up to 0,3 MHz

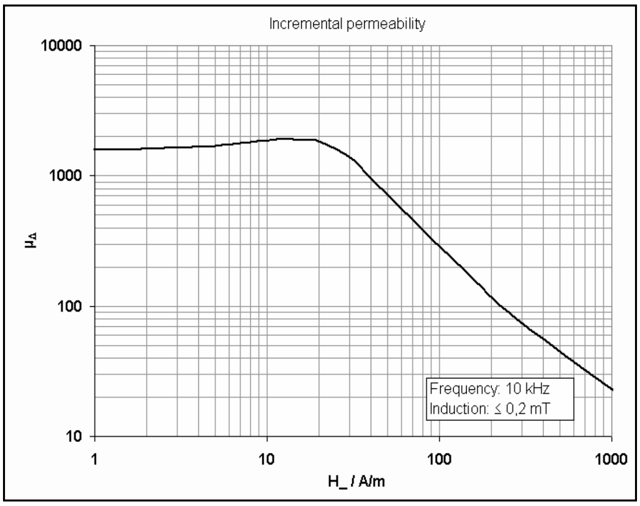
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	1500 ± 25%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 5	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B		10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	440	mT	25°C ; 16 kHz 250 A/m
	> 310		140°C ; 16 kHz 250 A/m
P_v	900	mW / cm³	25°C ; 100 kHz 200 mT
	400		140°C ; 100 kHz 200 mT
T_c	250	°C	10 kHz ≤ 0,25 mT

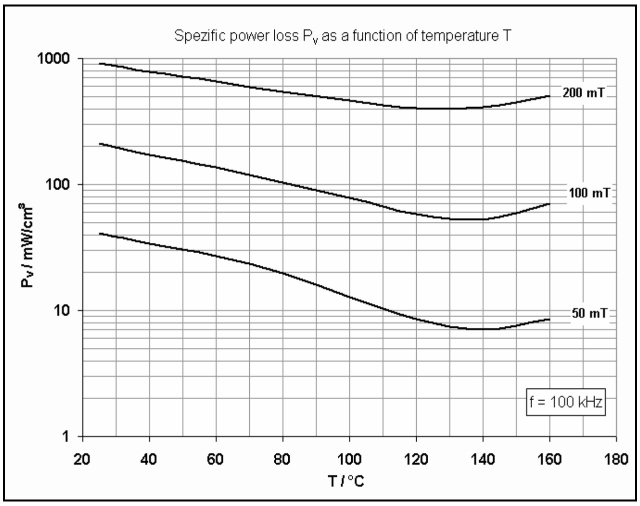


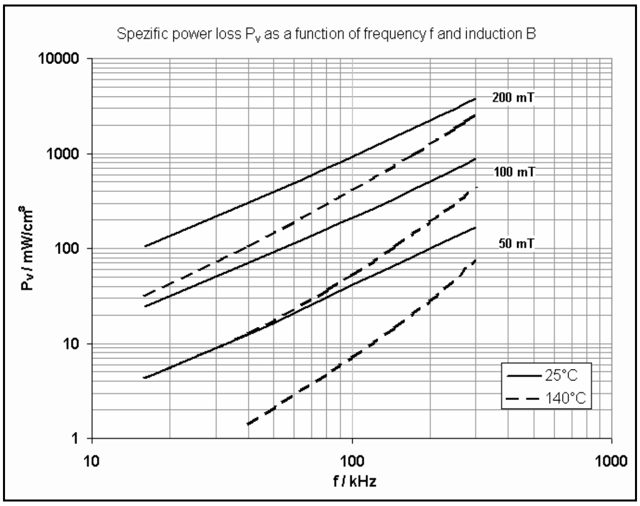


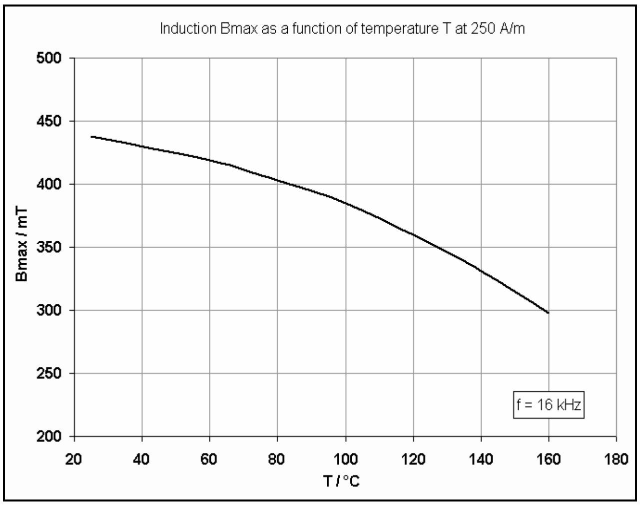







Spezific power loss P_V as a function of temperature T
1000
100
10
1
P_V / mW/cm³
20
40
60
80
100
120
140
160
180
T / °C
200 mT
100 mT
50 mT
f = 100 kHz

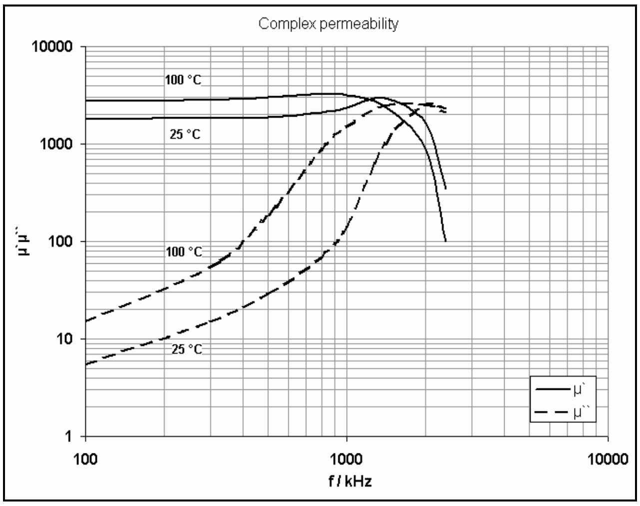

Spezific power loss P_V as a function of frequency f and induction B
10000
1000
100
10
1
P_V / mW/cm³
10
100
1000
f / kHz
200 mT
100 mT
50 mT
25°C
140°C

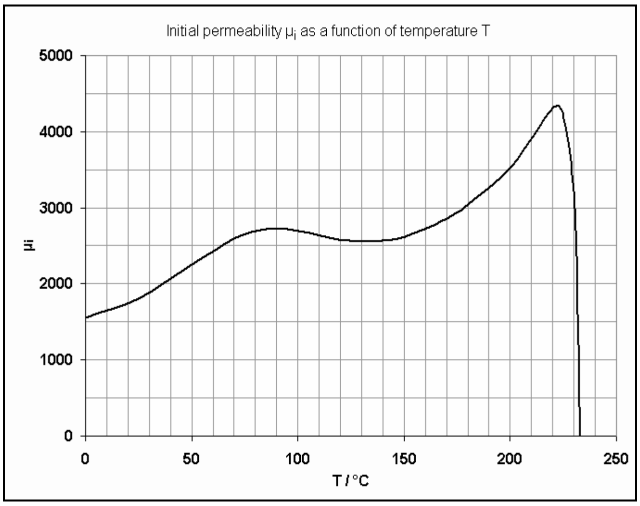

Induction Bmax as a function of temperature T at 250 A/m
500
450
400
350
300
250
200
Bmax / mT
20
40
60
80
100
120
140
160
180
T / °C
f = 16 kHz

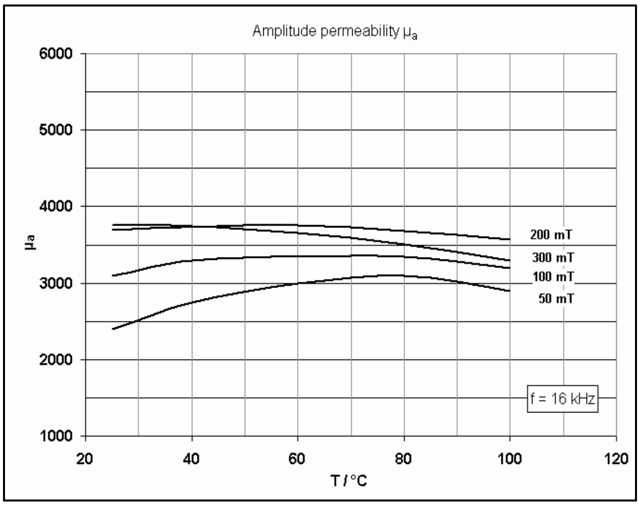
B1.1 FERROCARIT | FI 325

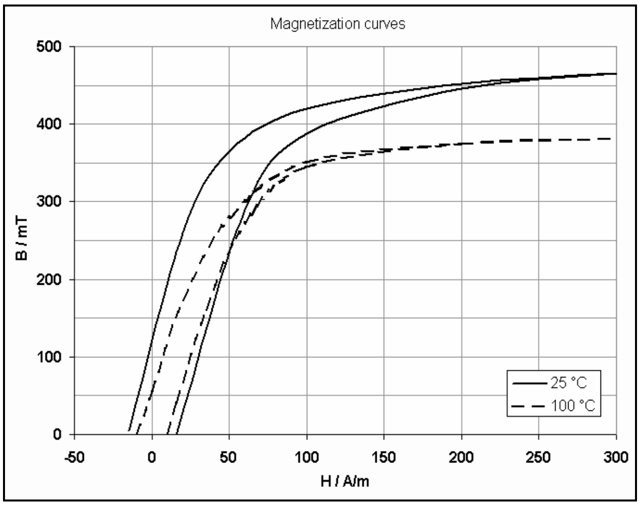
A low to medium frequency power material suitable for power and standard transformers in a frequency range up to 0,4 MHz

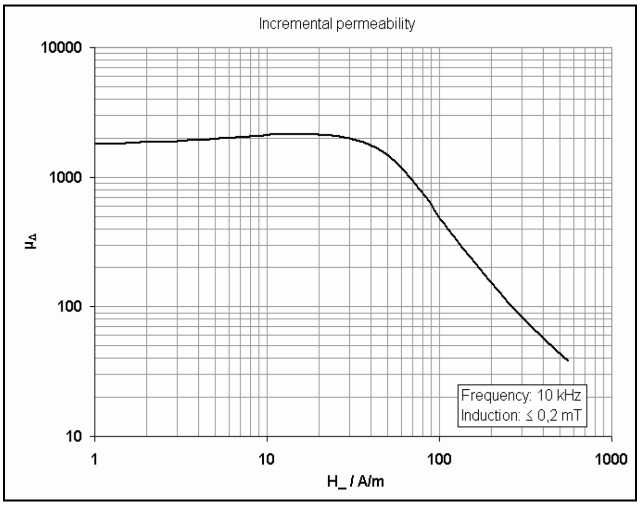
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	1800 ± 25%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 3,5	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	< 0,42	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	470	mT	25°C ; 16 kHz 250 A/m
	≥ 340		100°C ; 16 kHz 250 A/m
P_v	320	mW / cm³	25°C ; 200 kHz 100 mT
	170		100°C ; 200 kHz 100 mT
T_c	230	°C	10 kHz ≤ 0,25 mT

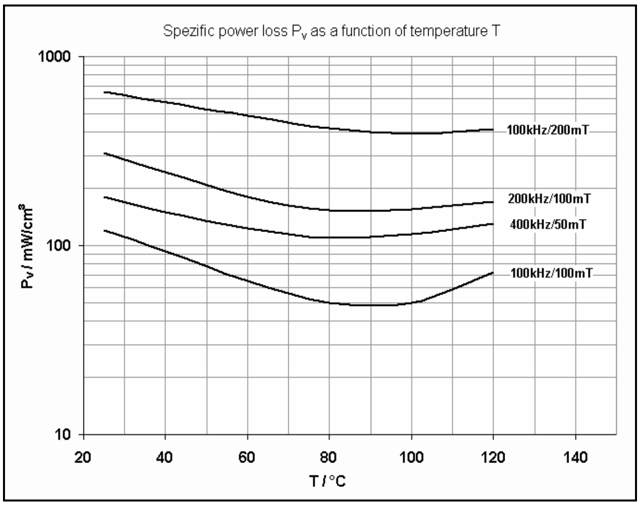


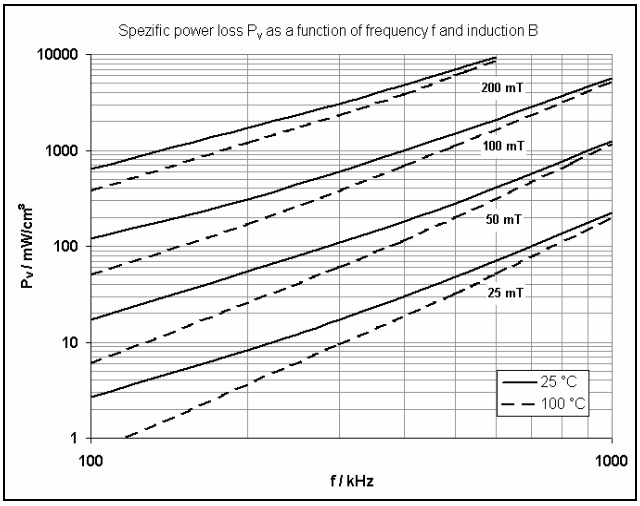


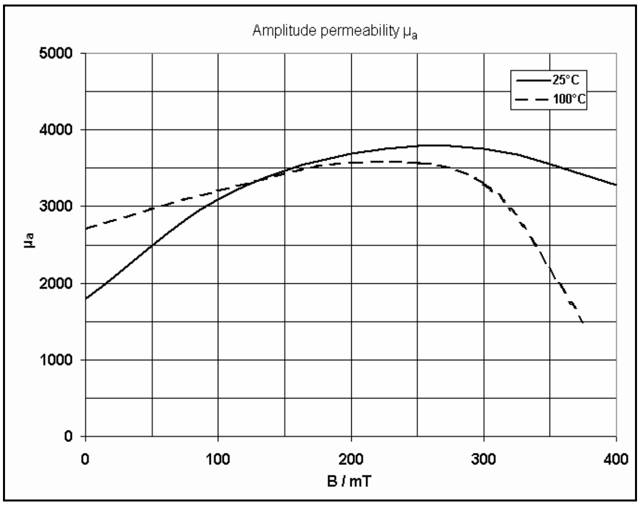







Spezific power loss P_v as a function of temperature T
1000
100
10
P_v / mW/cm³
20
40
60
80
100
120
140
T / °C
100kHz/200mT
200kHz/100mT
400kHz/50mT
100kHz/100mT

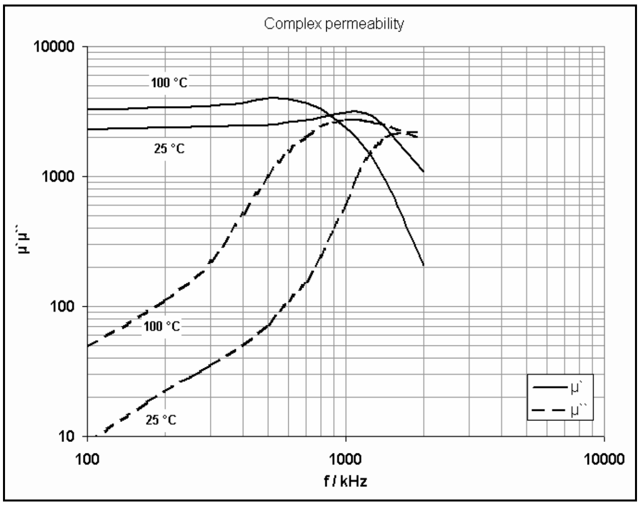

Spezific power loss P_v as a function of frequency f and induction B
10000
1000
100
10
1
P_v / mW/cm³
100
1000
f / kHz
200 mT
100 mT
50 mT
25 mT
25 °C
100 °C

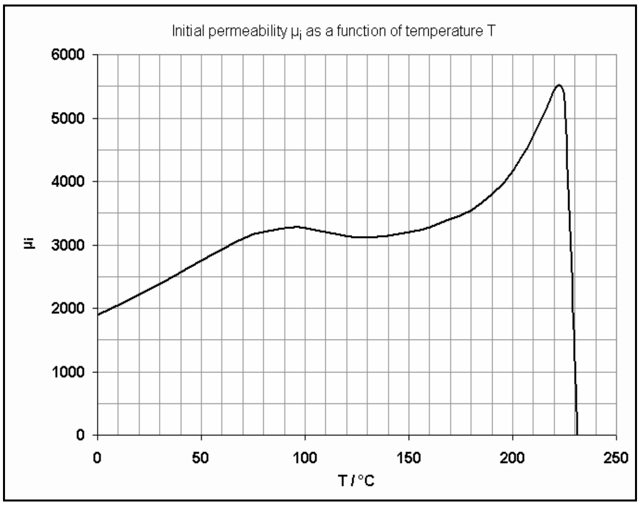

Amplitude permeability μ_a
5000
4000
3000
2000
1000
0
μ_a
0
100
200
300
400
B / mT
25°C
100°C

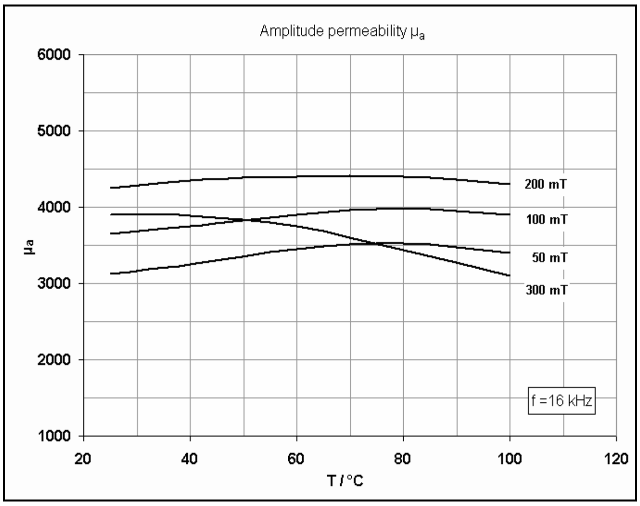
B1.1 FERROCARIT | FI 324

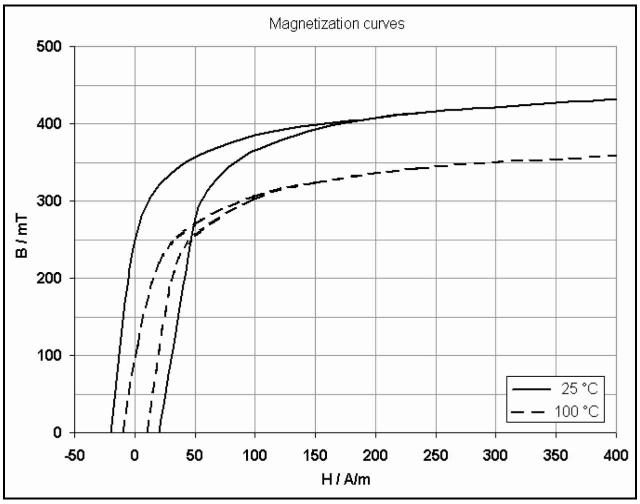
A low frequency power material for standard transformers at frequencies up to 0,2 MHz

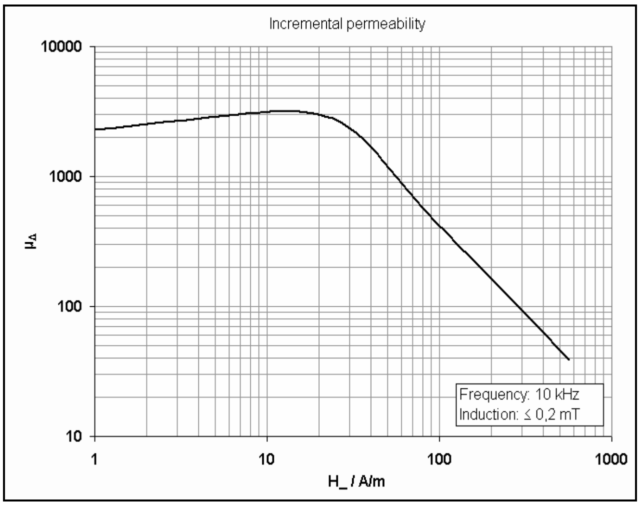
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	2300 ± 25%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 4,5	10^{-6}	25°C ; 0,1 MHz ≤ 0,25 mT
η_B	≤ 1	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	420	mT	25°C ; 16 kHz 250 A/m
	> 340		100°C ; 16 kHz 250 A/m
P_v	685	mW / cm³	25°C ; 100 kHz 200 mT
	560		100°C ; 100 kHz 200 mT
T_c	230	°C	10 kHz ≤ 0,25 mT

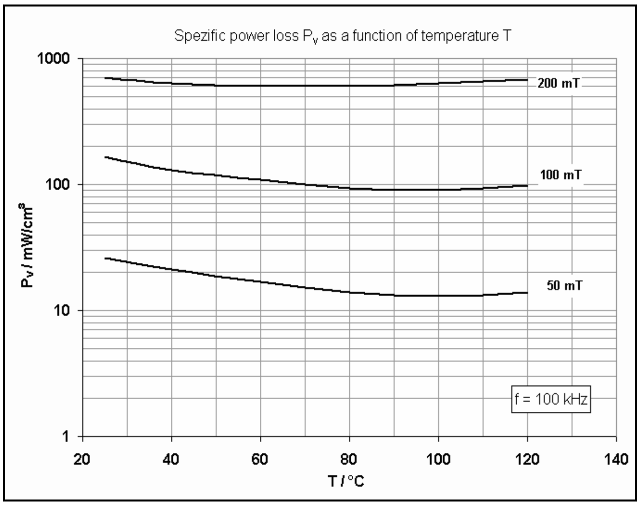


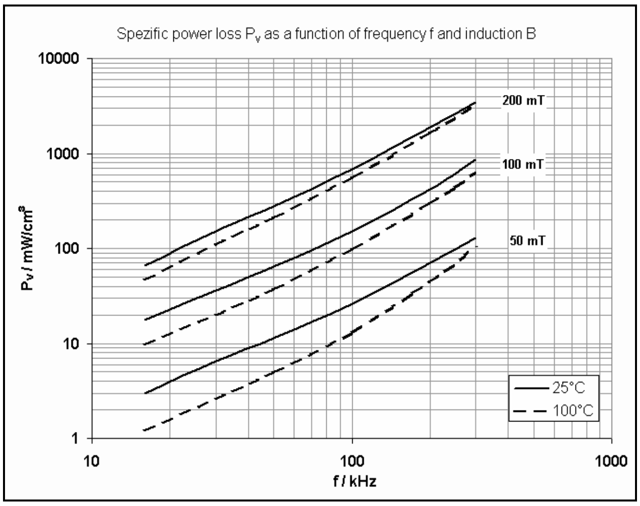


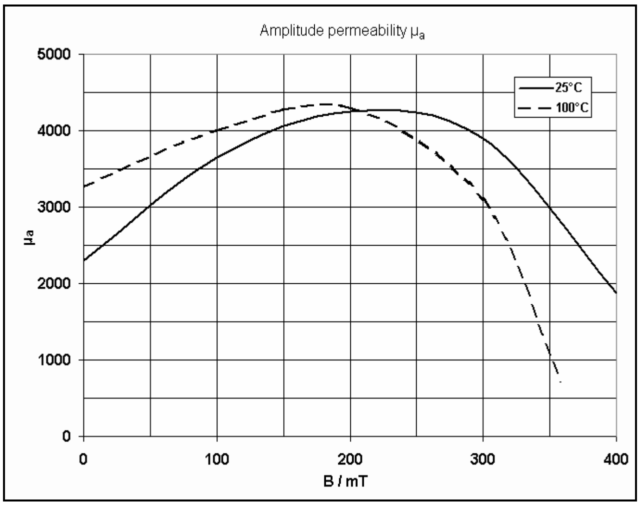







Spezific power loss P_v as a function of temperature T
1000
100
10
1
P_v / mW/cm³
200 mT
100 mT
50 mT
f = 100 kHz
20
40
60
80
100
120
140
T / °C


Spezific power loss P_v as a function of frequency f and induction B
10000
1000
100
10
1
P_v / mW/cm³
200 mT
100 mT
50 mT
25°C
100°C
10
100
1000
f / kHz


Amplitude permeability μ_a
5000
4000
3000
2000
1000
0
μ_a
25°C
100°C
0
100
200
300
400
B / mT

B1.1 FERROCARIT | SUMMARY

FERROCARIT			Fi 292		Fi 262		Fi 242		Fi 221		Fi 215[1)]	
Initial permeability	μ_i	1	900 ± 20%		650 ± 20%		400 ± 20%		250 ± 20%		150 ± 20%	
Relative loss factor	$\frac{\tan\delta}{\mu i}$	10^{-6}	< 12	< 30	< 10	< 50	< 25	< 100	< 40	< 200	< 80	< 140
frequency	f	MHz	0,01	0,2	0,05	1,6	0,2	2	0,2	5	1	5
Hysteresis material constant	η_B	$\frac{10^{-6}}{mT}$					< 11		< 10			
Induction *H* = 3000 A/m	B	mT	330		480		400		330		430	
Coercivity	H_C	A/m	20		40		45		120		100	
Curie temperature	T_C	°C	140		290		230		330		385	
Rel. temperature factor +23...+70°C	α_F	$\frac{10^{-6}}{K}$			< 2,5		< 20		< 5			
Rel. disaccommodation factor T = 40°C	D_F	10^{-6}					< 6					
DC - Resistivity	ρ	Ωm	> 10^7		> 1		> 10^7		> 10^4		> 10^7	

1) new material

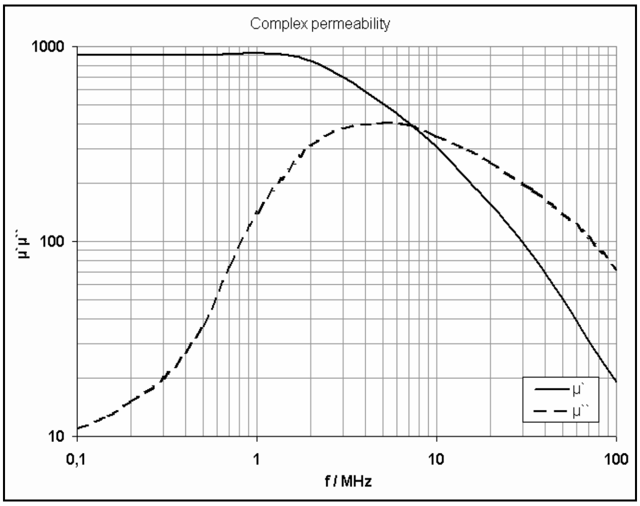
B1.1 FERROCARIT | SUMMARY

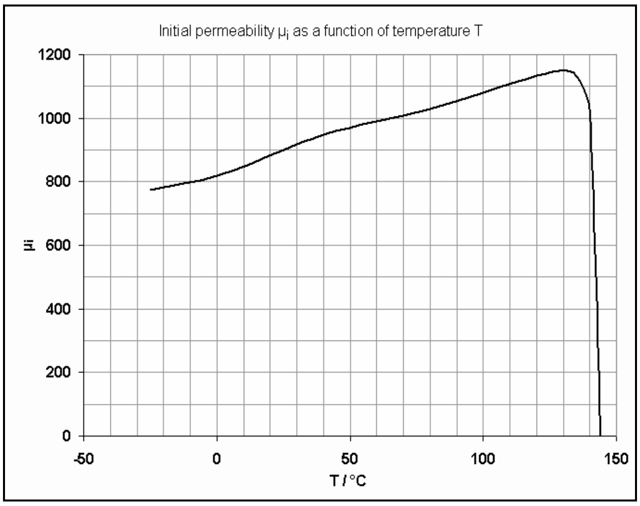
FERROCARIT			Fi 212		Fi 150		Fi 130		Fi 110			
Initial permeability	μ_i	1	100 ± 20%		50 ± 20%		30 ± 20%		12 ± 20%			
Relative loss factor	$\frac{\tan\delta}{\mu i}$	10^{-6}	< 50	< 150	< 100	< 700	< 80	< 500	< 150	< 400		
frequency	f	MHz	2	10	10	50	10	50	10	100		
Hysteresis material constant	η_B	$\frac{10^{-6}}{mT}$										
Induction *H* = 3000 A/m	B	mT	310		300		270		240			
Coercivity	H_C	A/m	600		200		700		1800			
Curie temperature	T_C	°C	420		430		500		580			
Rel. temperature factor +23...+70°C	α_F	$\frac{10^{-6}}{K}$	< 7		< 20		< 25		< 80			
Rel. disaccommodation factor T = 40°C	D_F	10^{-6}										
DC - Resistivity	ρ	Ωm	$> 10^4$		$> 10^3$		$> 10^3$		$> 10^4$			

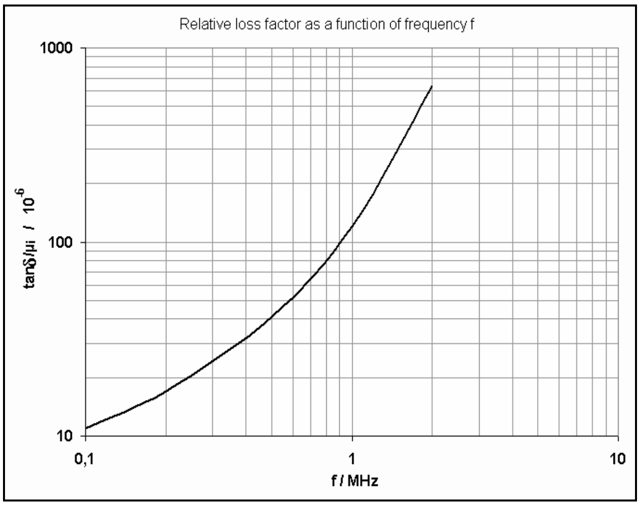
B1.1 FERROCARIT | FI 292

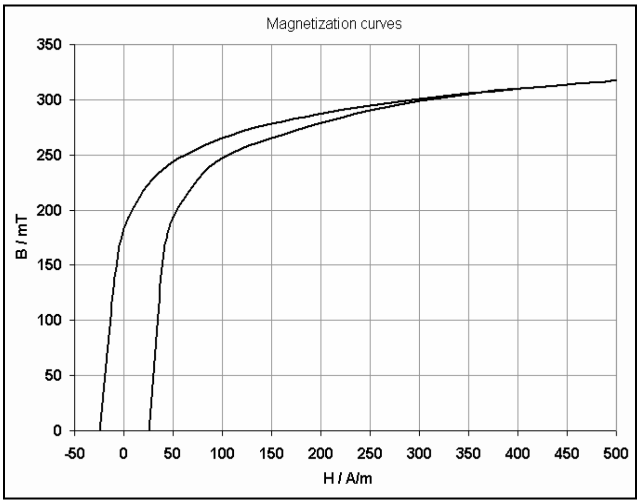
A high permeability NiZn ferrite for use in broadband EMI-suppression in a frequency range of 30 – 1000 MHz ,as well as RF broadband transformers

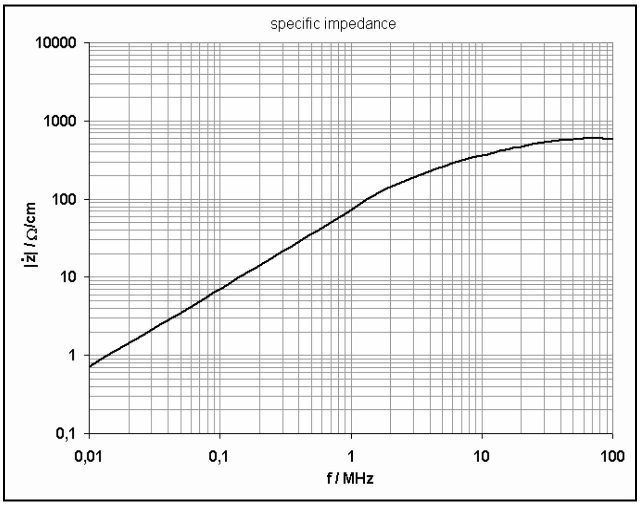
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	900 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 30	10^{-6}	25°C ; 0,2 MHz ≤ 0,25 mT
η_B			
B	340	mT	25°C ; 16 kHz 3000 A/m
P_v			
T_c	140	°C	10 kHz ≤ 0,25 mT

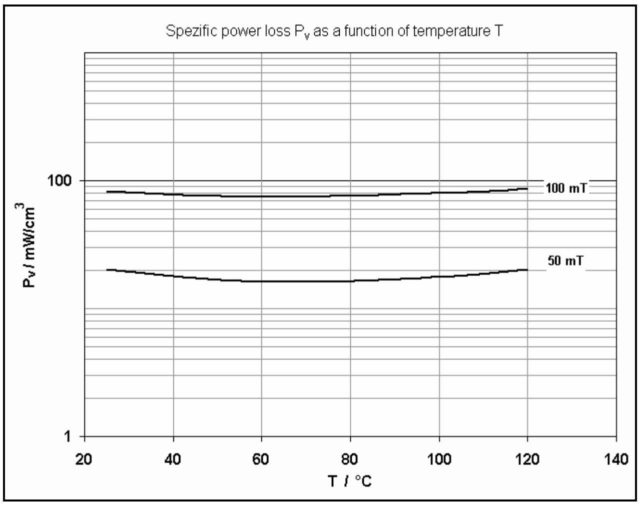


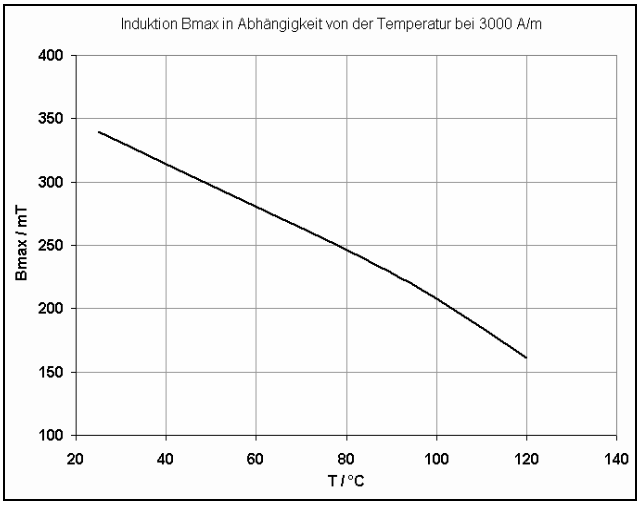


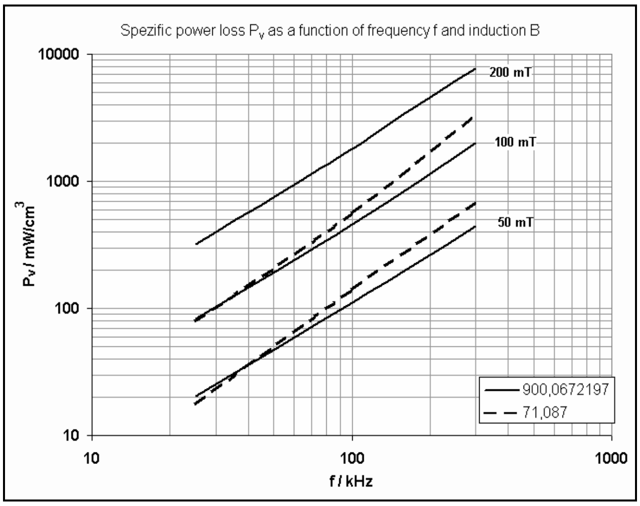







Spezific power loss Pv as a function of temperature T
Pv / mW/cm3
100
1
20
40
60
80
100
120
140
T / °C
100 mT
50 mT

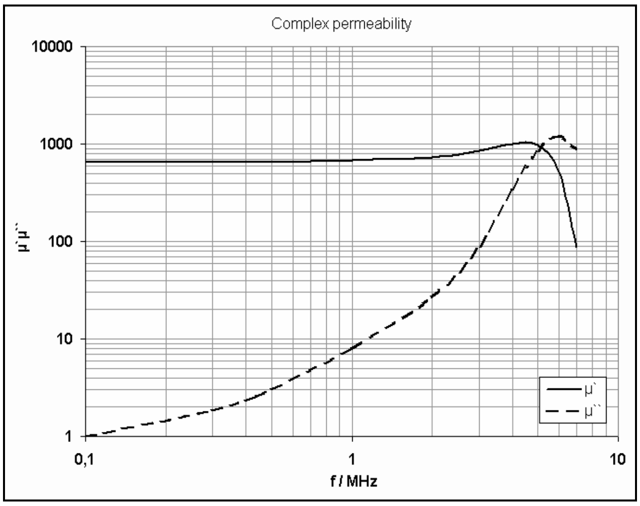

Induktion Bmax in Abhängigkeit von der Temperatur bei 3000 A/m
Bmax / mT
400
350
300
250
200
150
100
20
40
60
80
100
120
140
T / °C

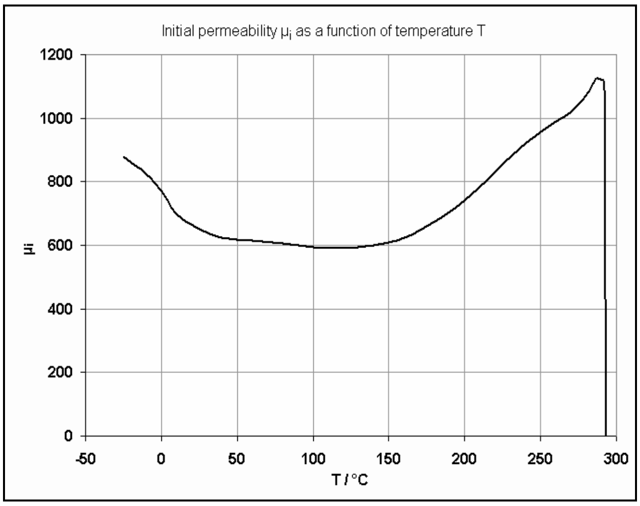

Spezific power loss Pv as a function of frequency f and induction B
Pv / mW/cm3
10000
1000
100
10
10
100
1000
f / kHz
200 mT
100 mT
50 mT
900,0672197
71,087

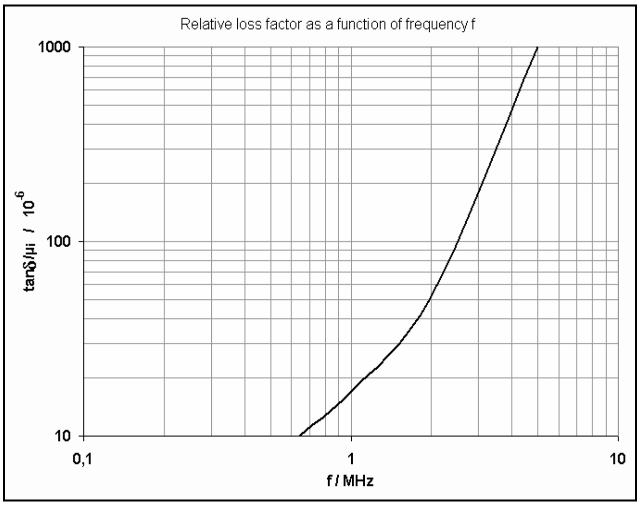
B1.1 FERROCARIT | FI 262

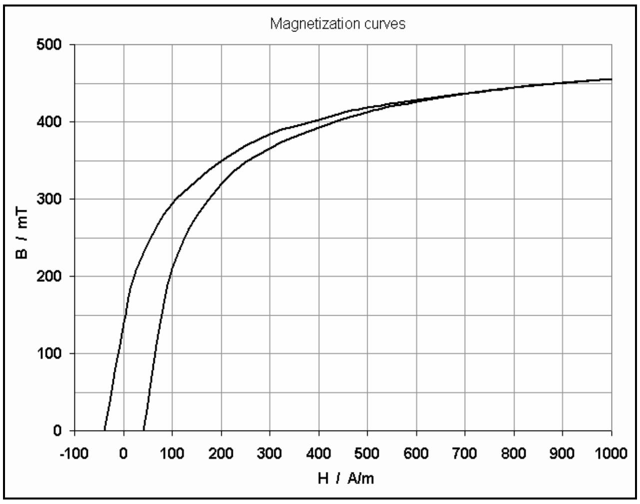
A medium permeability MnZn ferrite for broadband filters and tuning material for frequencies up to 2 MHz

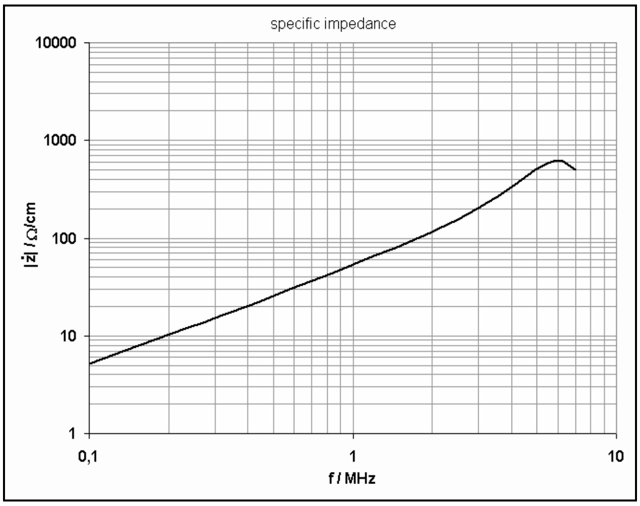
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	650 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 50	10^{-6}	25°C ; 1,6 MHz ≤ 0,25 mT
η_B			
B	480	mT	25°C ; 16 kHz 3000 A/m
P_v		mW / cm³	
T_c	290	°C	







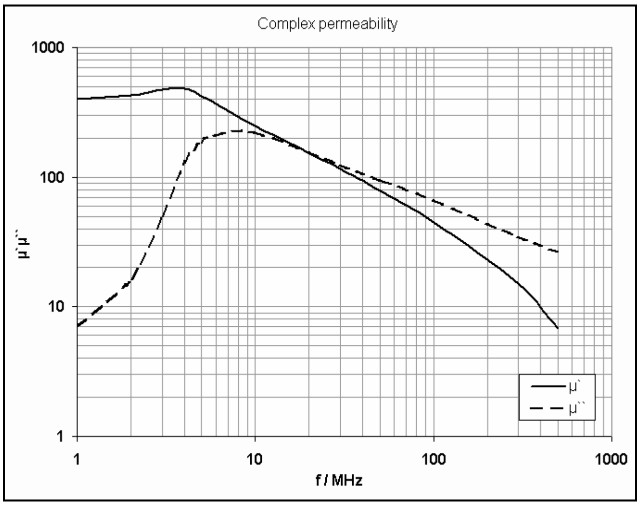


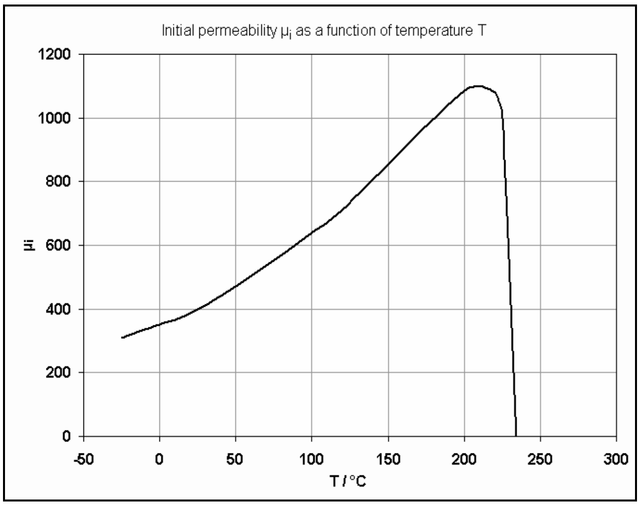


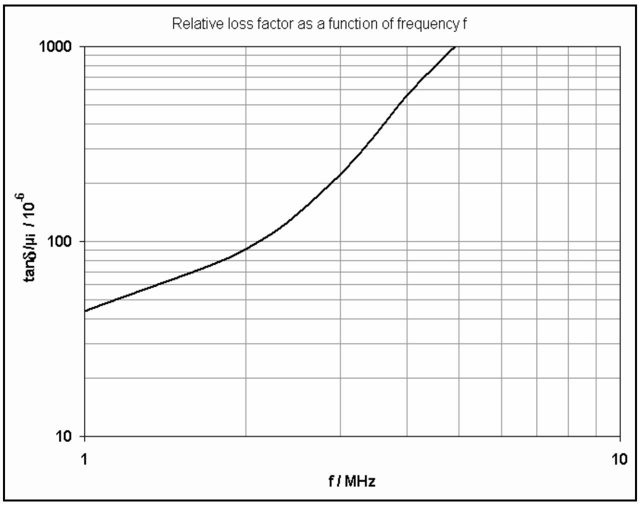
B1.1 FERROCARIT | FI 242

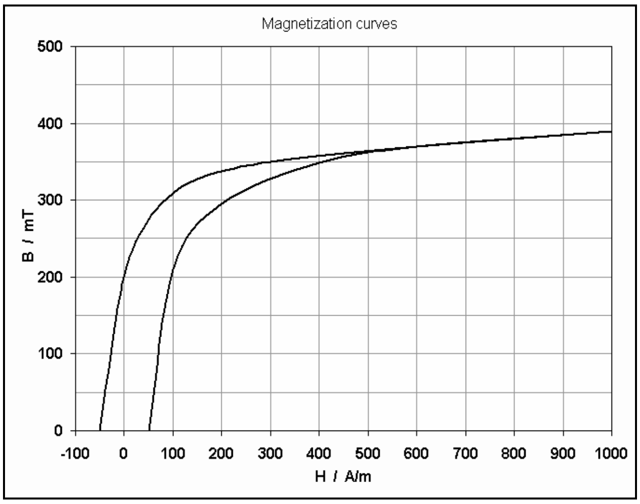
A medium permeability NiZn ferrite for applications requiring a high specific resistance by relatively low power losses

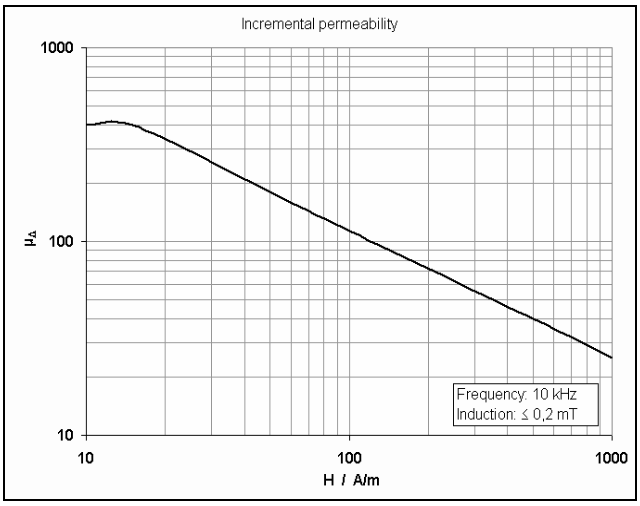
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	400 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 100	10^{-6}	25°C ; 2 MHz ≤ 0,25 mT
η_B	< 11	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	420	mT	25°C ; 16 kHz 3000 A/m
	>300		100°C ; 16 kHz 3000 A/m
P_v	700	mW / cm³	25°C ; 100 kHz 100 mT
	550		100°C ; 100 kHz 100 mT
T_c	230	°C	

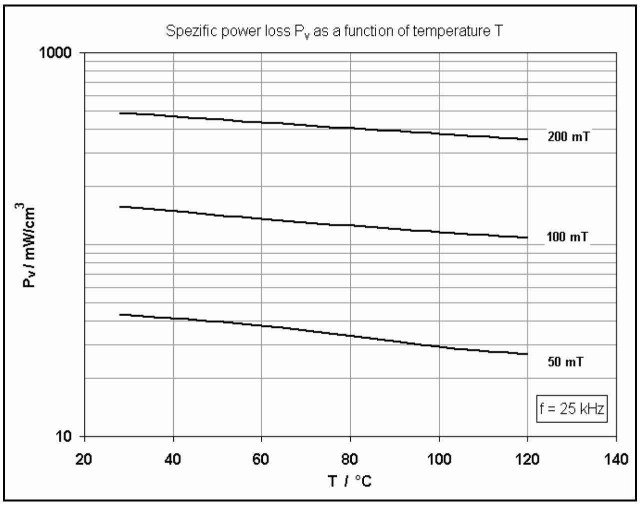


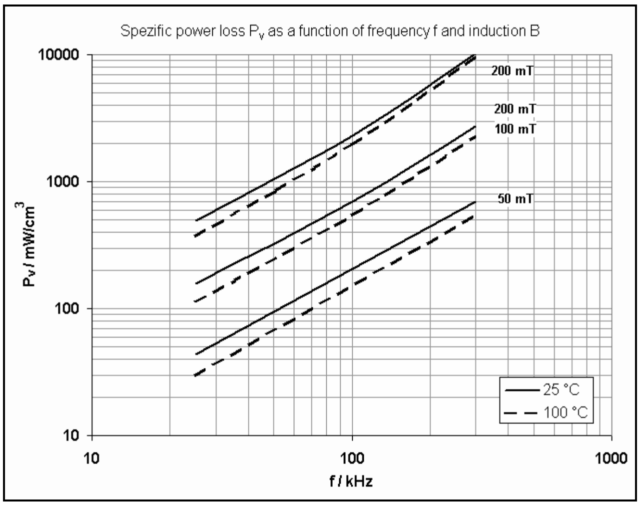


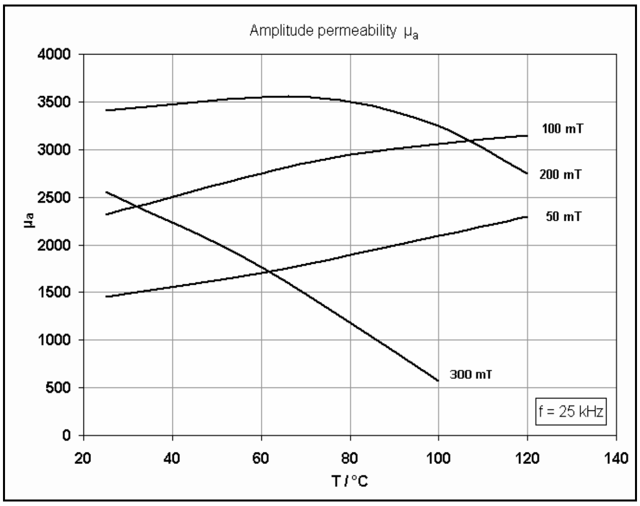




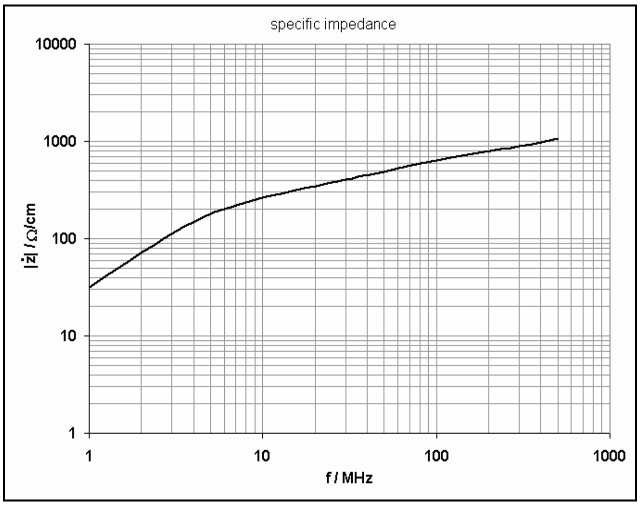



Spezific power loss P_v as a function of temperature T
1000
10
P_v / mW/cm³
200 mT
100 mT
50 mT
f = 25 kHz
20
40
60
80
100
120
140
T / °C


Spezific power loss P_v as a function of frequency f and induction B
10000
1000
100
10
P_v / mW/cm³
200 mT
200 mT
100 mT
50 mT
25 °C
100 °C
10
100
1000
f / kHz


Amplitude permeability μ_a
4000
3500
3000
2500
2000
1500
1000
500
0
μ_a
100 mT
200 mT
50 mT
300 mT
f = 25 kHz
20
40
60
80
100
120
140
T / °C

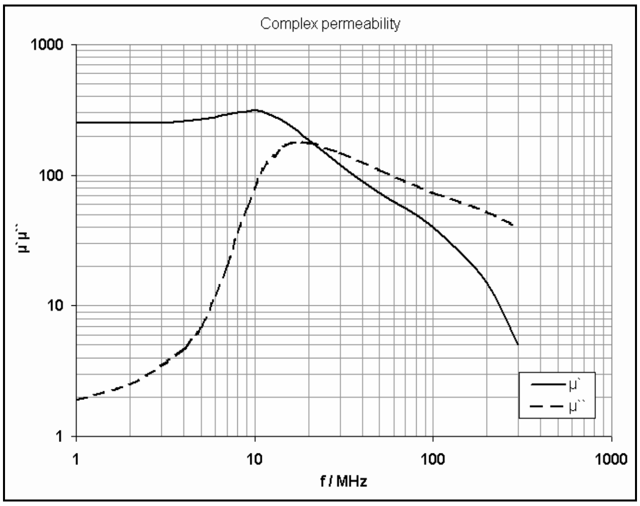

Induktion Bmax in Abhängigkeit von der Temperatur bei 3000 A/m
500
450
400
350
300
250
200
150
Bmax / mT
-50
0
50
100
150
200
T / °C

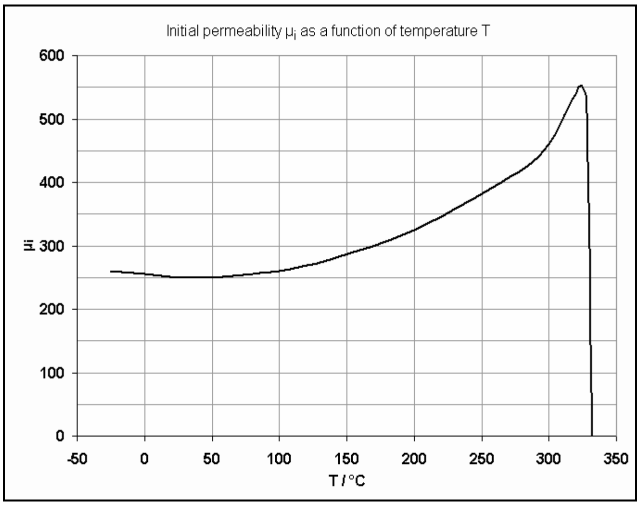

specific impedance
10000
1000
100
10
1
|z| / Ω/cm
1
10
100
1000
f / MHz

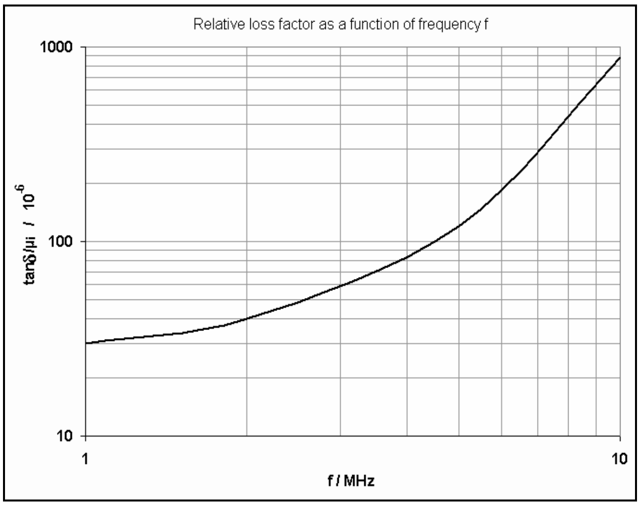
B1.1 FERROCARIT | FI 221

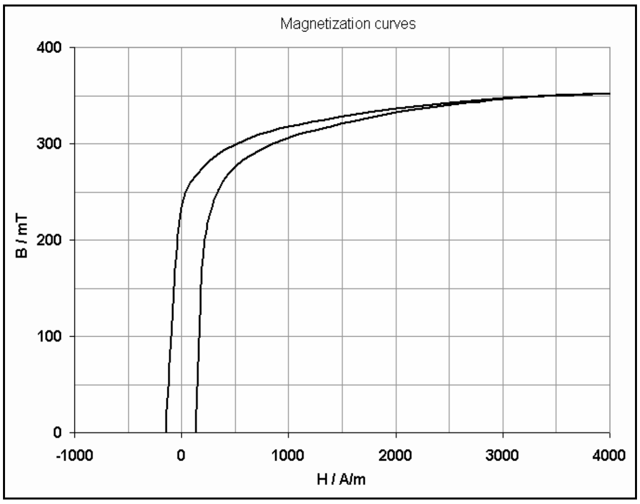
A medium permeability NiZn ferrite for use in broadband EMI-suppression in a frequency range of 30 – 1000 MHz ,as well as RF broadband transformers

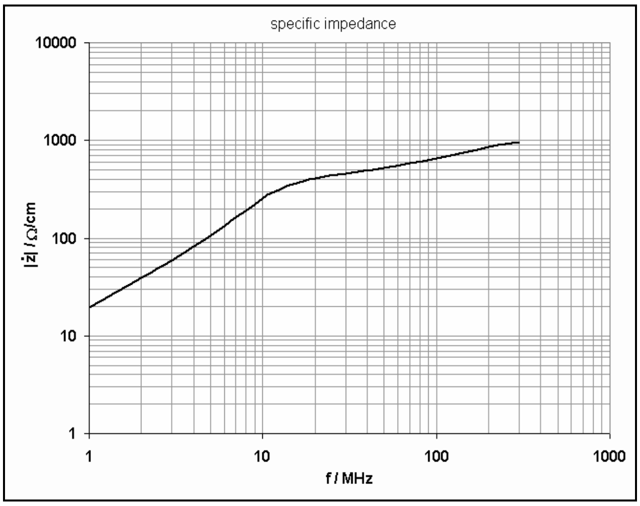
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	250 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 200	10^{-6}	25°C ; 5 MHz ≤ 0,25 mT
η_B	< 10	10^{-6} / mT	25°C ; 10 kHz ≤ 1,5mT to 3mT
B	330	mT	25°C ; 16 kHz 3000 A/m
P_v			
T_c	330	°C	







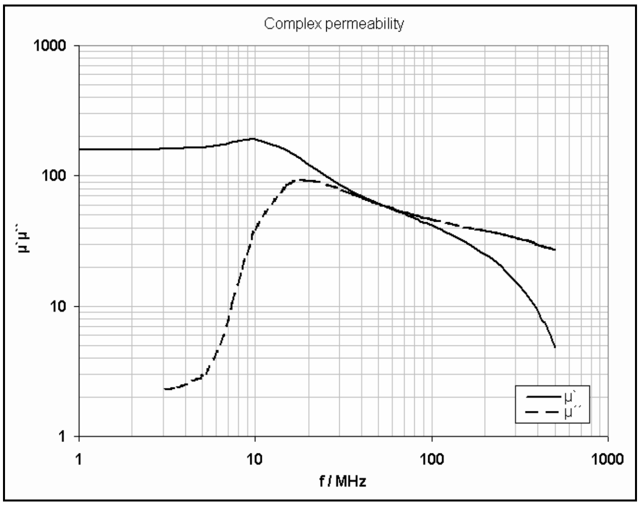


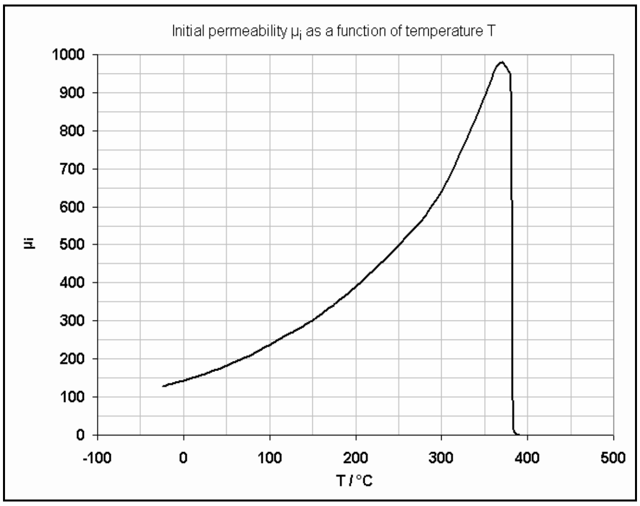


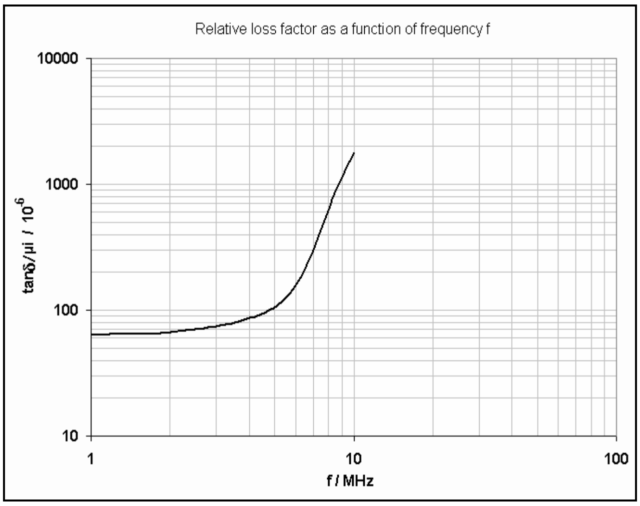
B1.1 FERROCARIT | FI 215

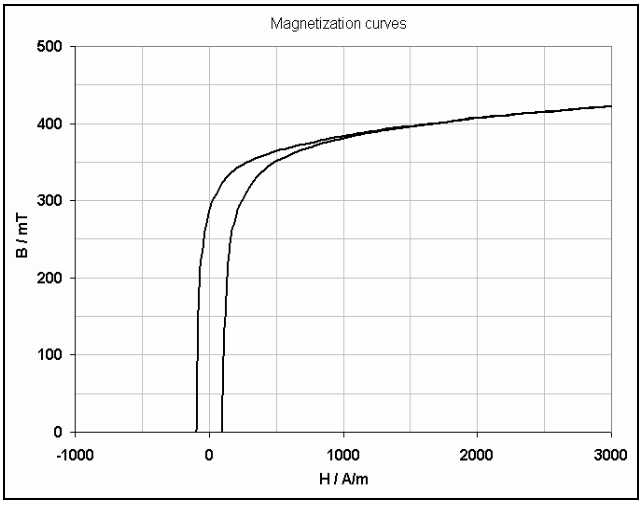
A high ohmic NiZn ferrite with optimized saturation induction at high ambient temperatures, e.g. for HID – Xenon ignition modules

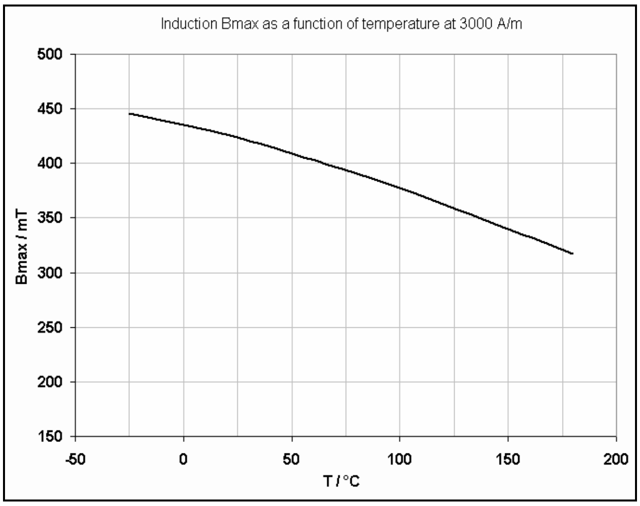
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	150 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 140	10^{-6}	25°C ; 5 MHz ≤ 0,25 mT
η_B			
B	430	mT	25°C ; 12 kHz 3000 A/m
	325		170°C ; 12 kHz 3000 A/m
P_v	1800	mW / cm³	25°C ; 100 kHz 100 mT
	1500		100°C ; 100 kHz 100 mT
T_c	390	°C	10 kHz ≤ 0,25 mT

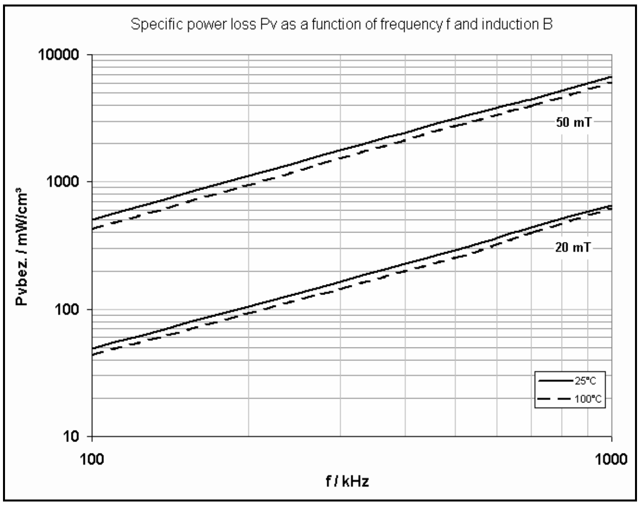


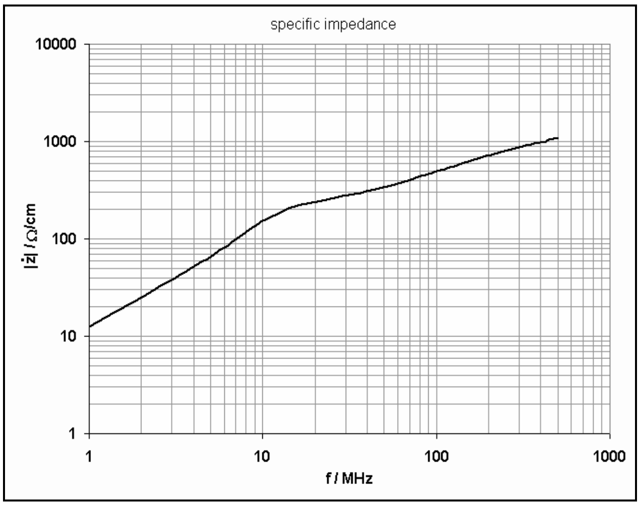








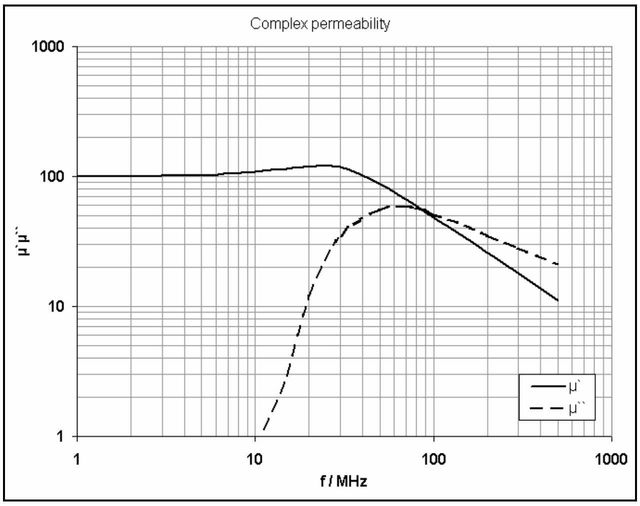

Specific power loss Pv as a function of frequency f and induction B
Pvbez. / mW/cm³
f / kHz
50 mT
20 mT
25°C
100°C
10000
1000
100
10
100
1000

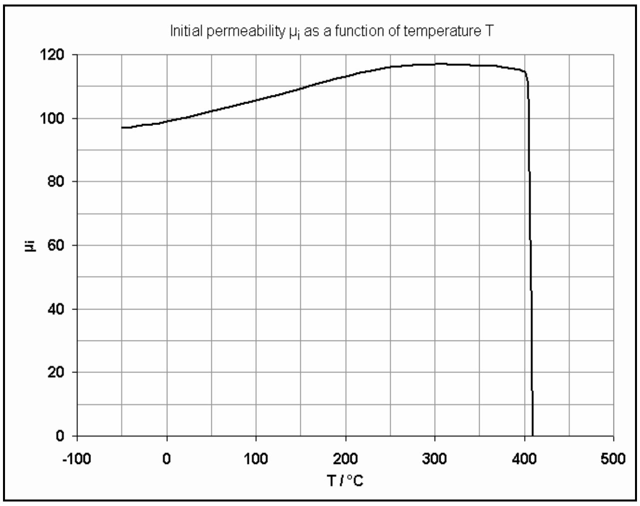

specific impedance
|z| / Ω/cm
f / MHz
10000
1000
100
10
1
1
10
100
1000

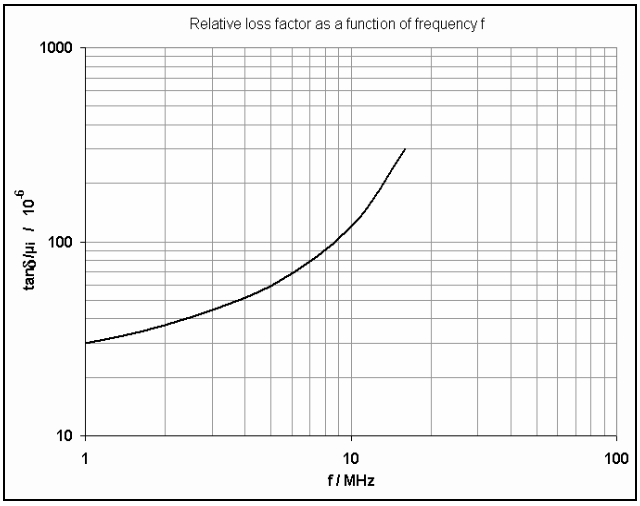
B1.1 FERROCARIT | FI 212

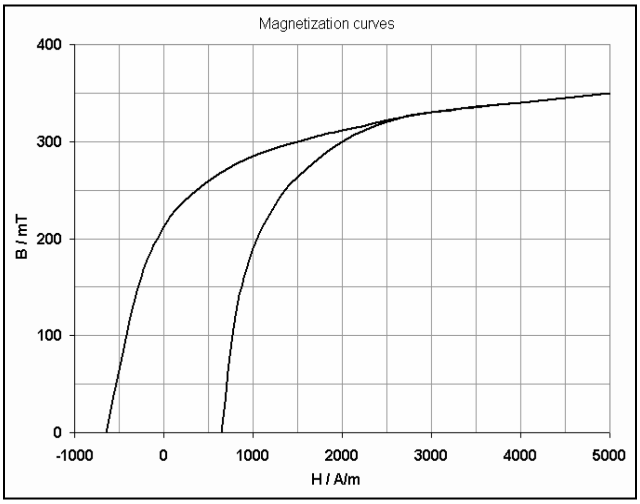
A low permeability NiZn ferrite for use in RF tuning, broadband and balance-to-unbalance transformers (baluns)

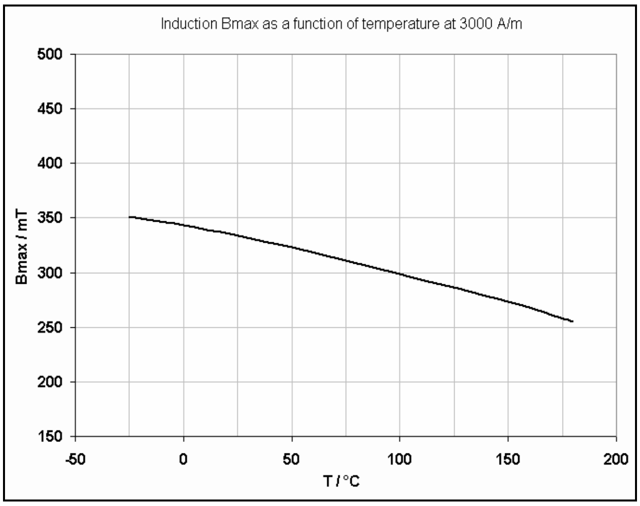
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	100 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 150	10^{-6}	25°C ; 10 MHz ≤ 0,25 mT
η_B			
B	330	mT	25°C ; 16 kHz 3000 A/m
	300		100°C ; 16 kHz 3000 A/m
P_v	580	mW / cm³	25°C ; 100 kHz 50 mT
	770		100°C ; 100 kHz 50 mT
T_c	420	°C	

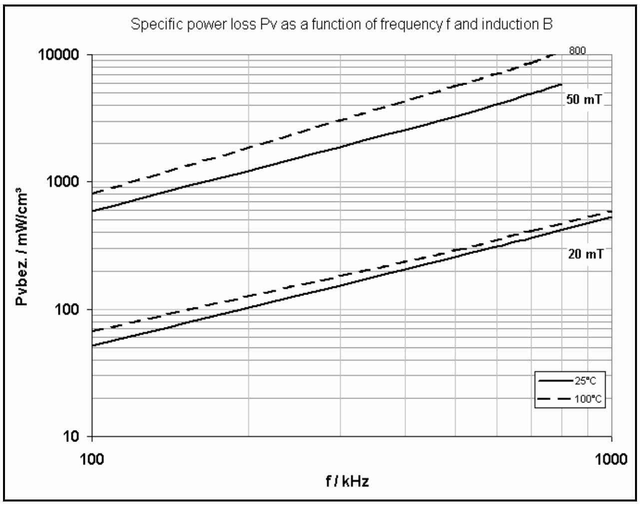


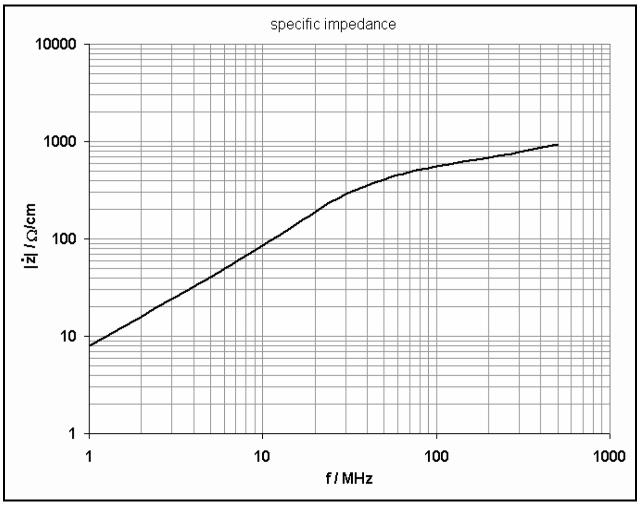








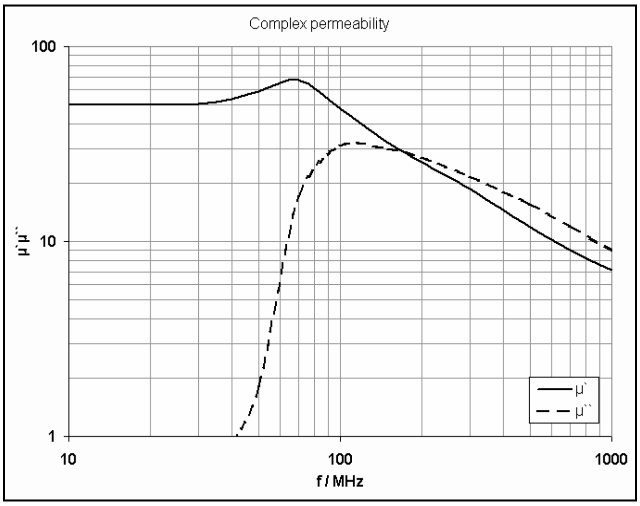

Specific power loss Pv as a function of frequency f and induction B
Pvbez. / mW/cm³
f / kHz
10000
1000
100
10
100
1000
800
50 mT
20 mT
25°C
100°C

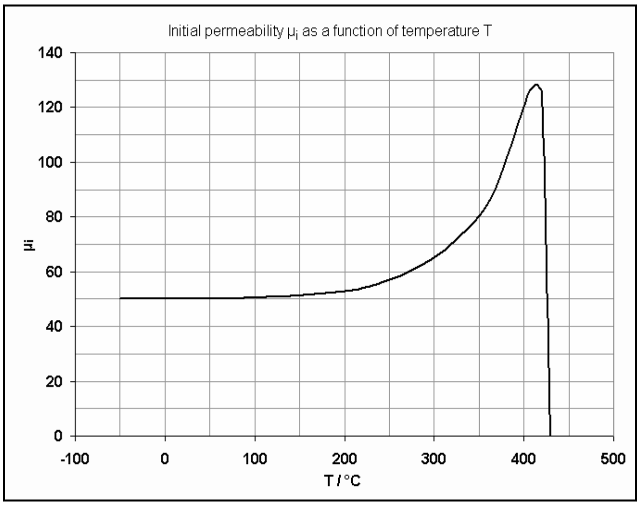

specific impedance
|z| / Ω/cm
f / MHz
10000
1000
100
10
1
1
10
100
1000

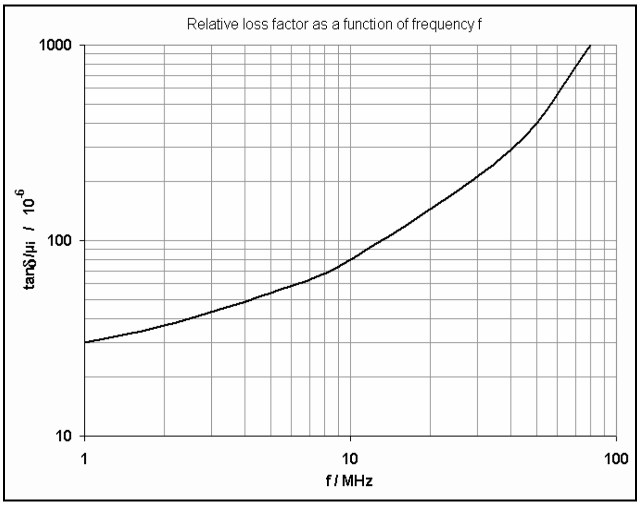
B1.1 FERROCARIT | FI 150

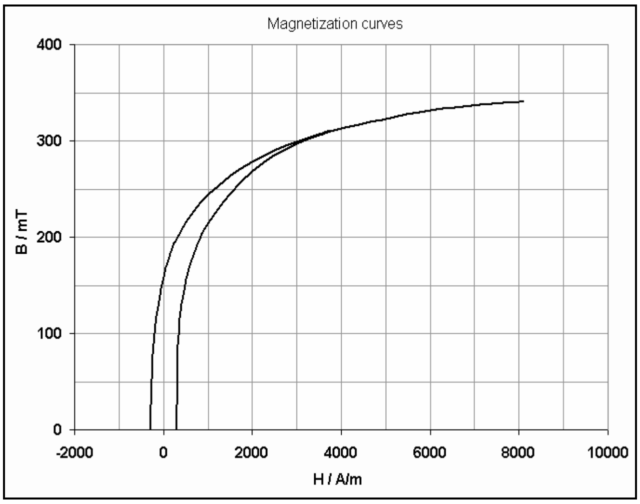
A low permeability NiZn ferrite for use in RF tuning, broadband and balance-to-unbalance transformers (baluns)

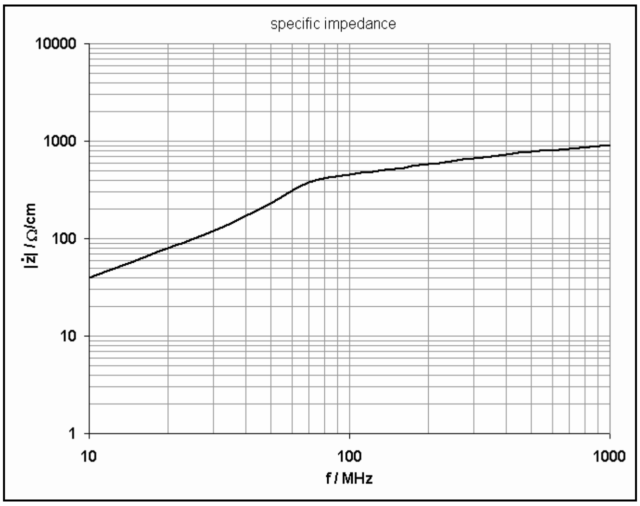
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	50 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 700	10^{-6}	25°C ; 50 MHz ≤ 0,25 mT
η_B			
B	300	mT	25°C ; 16 kHz 3000 A/m
P_v			
T_c	430	°C	







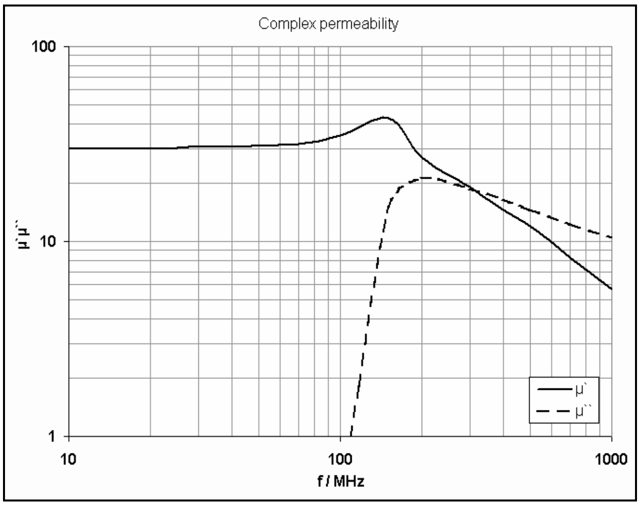


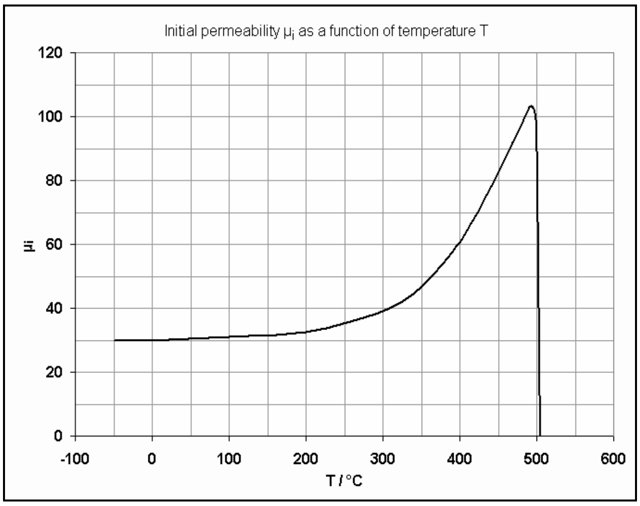


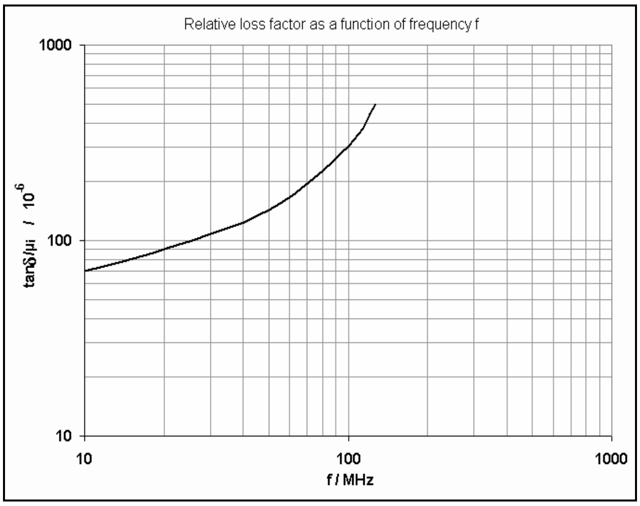
B1.1 FERROCARIT | FI 130

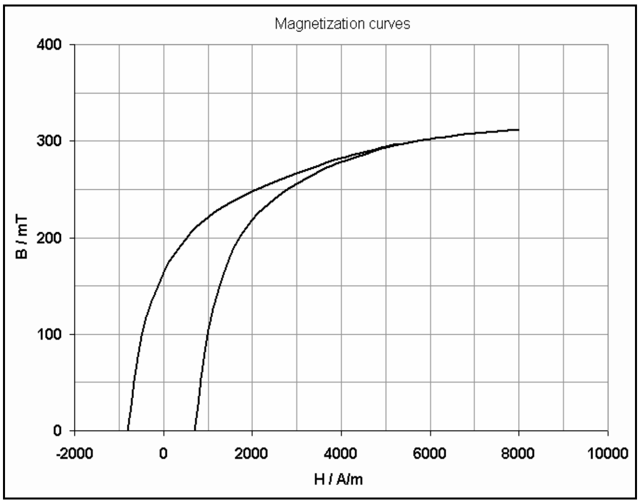
A low permeability NiZn ferrite for use in RF tuning, broadband and balance-to-unbalance transformers (baluns)

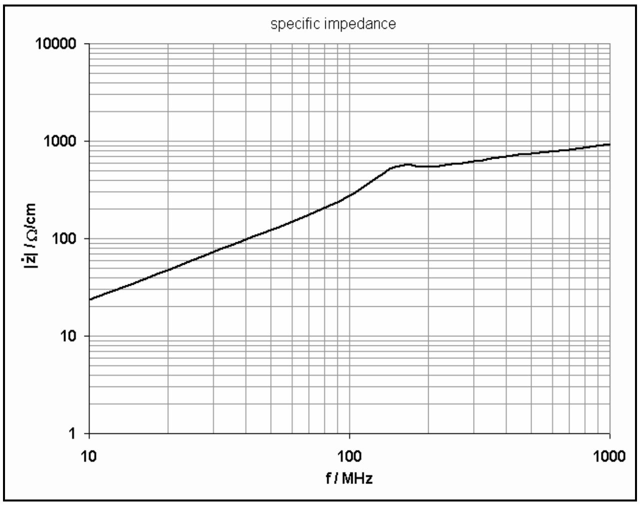
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	30 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 500	10^{-6}	25°C ; 50 MHz ≤ 0,25 mT
η_B			
B	270	mT	25°C ; 16 kHz 3000 A/m
P_v			
T_c	500	°C	







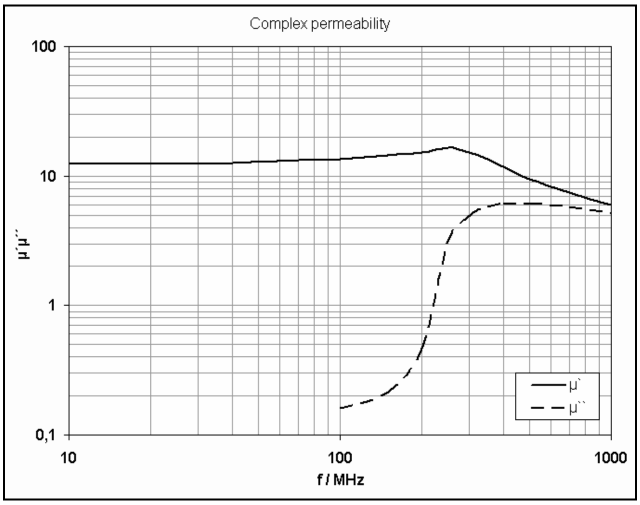


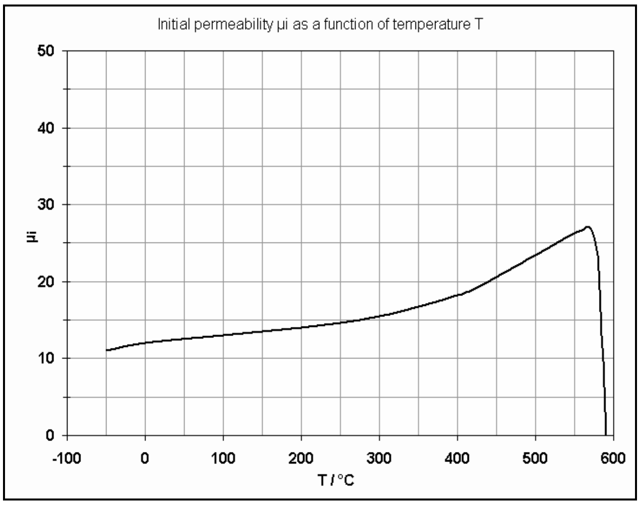


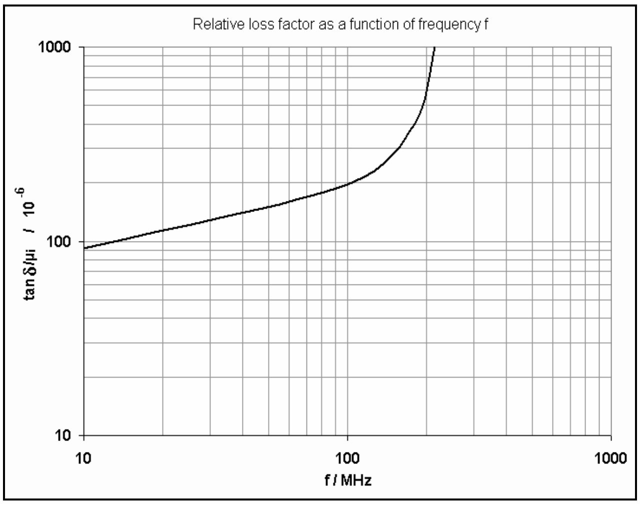
B1.1 FERROCARIT | FI 110

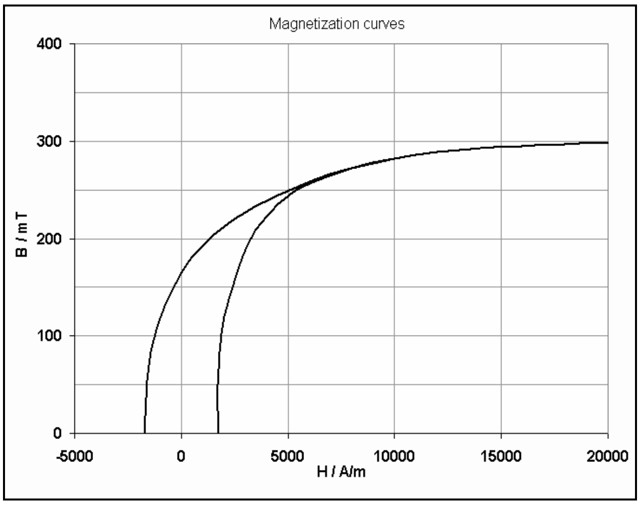
A low permeability NiZn ferrite for use in RF tuning, broadband and balance-to-unbalance transformers (baluns)

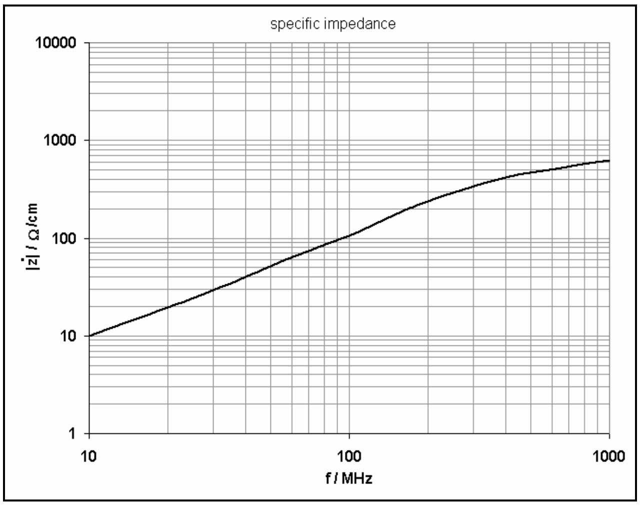
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	12 ± 20%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	< 400	10^{-6}	25°C ; 100 MHz ≤ 0,25 mT
η_B			
B	240	mT	25°C ; 16 kHz 3000 A/m
P_v			
T_c	580	°C	











B1.2 PLASTOFERRITE | GENERAL DESCRIPTION

Magnetically Soft Plastoferrite Fi520 - Fi522

Plastoferrite **Fi520 - Fi522** represent a special development in our range of soft magnetic ferrite materials.

The basis of this materials is a homogenization process which allows production of an injectable plastic compound with a high proportion of loading material from soft ferrite powder, spread evenly throughout the plastic matrix. The result is a soft magnetic material particularly suited for small signal applications but providing all the advantages of the free shaping of injection moulding, thus permitting economical production of complex core geometries with high dimensional accuracy.

Another advantage of cores made from Plastoferrite is the low brittleness of the material and consequently its insensitiveness especially to mechanical load.

The general technical data of the magnetically soft Plastoferrite is specified in the following charts. The filling ratio of this plastic compound is very high, which is indicated by the relatively high admissible magnetic load - according to the magnetization curve - and the fact that, for magnetically thinned materials meaning distributed air gaps, initial permeability is high, reaching a value of μ_i = 20.
If requested, lower values of initial permeability can be individually set up by modification of the mixing ratio ferrite powder/plastic.

The particular electrical advantages are the considerable wide-band property of the material up to MHz-range and the high temperature-consistency of permeability up to values in direct vicinity of the Curie temperature for **Fi520** and up to 200°C for **Fi522**.

Thus Plastoferrite **Fi520** and **Fi522** are interesting materials for various applications, for example in sensors or for the production of magnetically active coil formers, which demand a combination of soft magnetic qualities along with the possibilities of free shaping

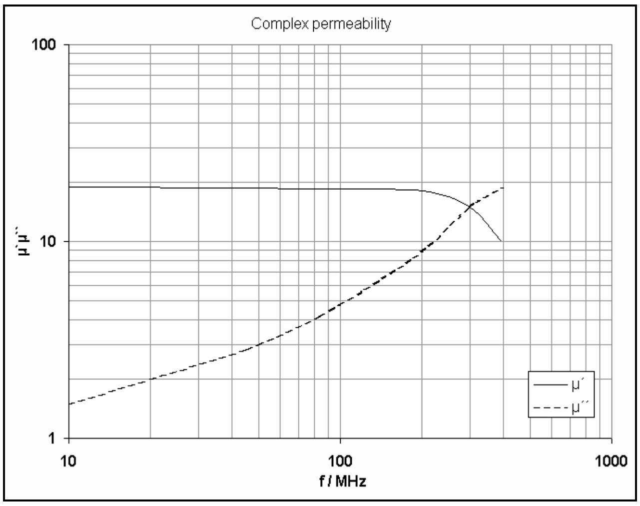
B1.2 PLASTOFERRITE | SUMMARY

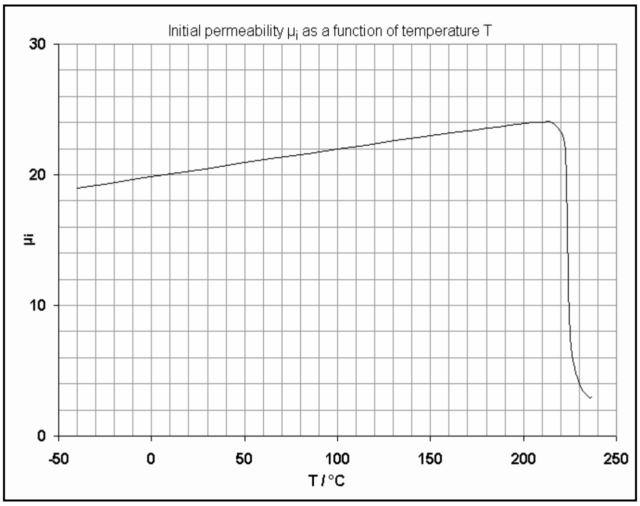
Plastoferrite			Fi 520	Fi 522
Initial permeability f = 10 kHz	μ_i	1	20 ± 10%	19 ± 10%
Relative loss factor frequency	$\frac{\tan\delta}{\mu_i}$ f	10^{-6} MHz	< 3500 10	< 5000 10
Hysteresis material constant f = 20 kHz	η_B	$\frac{10^{-6}}{mT}$	< 700	< 300
Induction H = 30000 A/m	B	mT	280	350
Coercivity	H_C	A/m	400	400
Curie temperature	T_C	°C	150	> 200
DC - Resistivity	ρ	Ωm	> 3,0	> 1,0
Rel. temperature factor 25°C - 70°C	α_F	$\frac{10^{-6}}{K}$	< 30	< 50

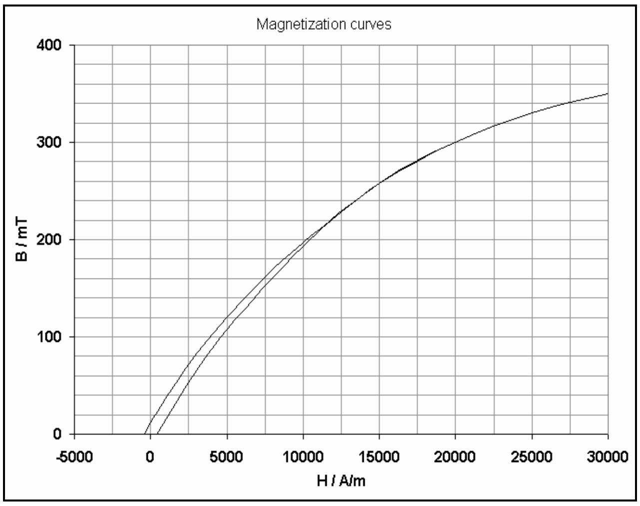
B1.2 PLASTOFERRITE | FI 522

A material with a considerable wide-band property up to MHz-range and high temperature-consistency of permeability up to 200°C. For use in sensors or magnetically active coil formers with the possibility of free shaping

Symbol	Value	Unit	Conditions
μ_i	19 ± 10%	1	25°C ; <= 10 kHz <= 0,25 mT
$\tan\delta / \mu_i$	< 5000	10^{-6}	25°C ; 10 MHz <= 0,25 mT
η_B	< 300	10^{-6} / mT	25°C ; 20 kHz <=1,5mT to 3mT
B	350	mT	25°C ; 16 kHz 30000 A/m
Rspez.	> 1,0	Ωm	
a_F	< 50	10^{-6} / k	-25° - 70°C
Tc	> 200	°C	



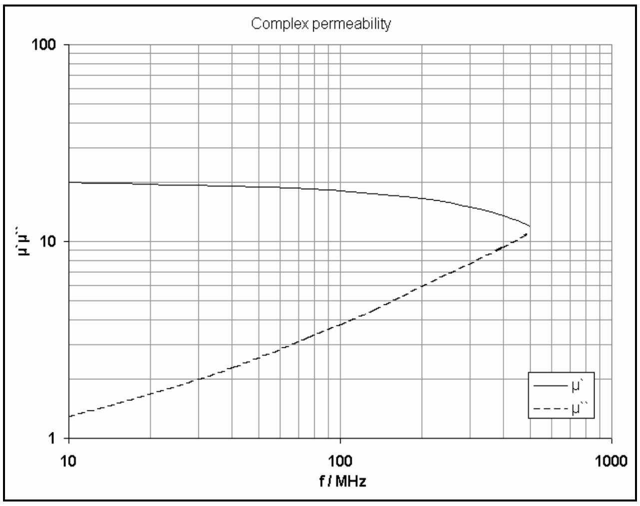


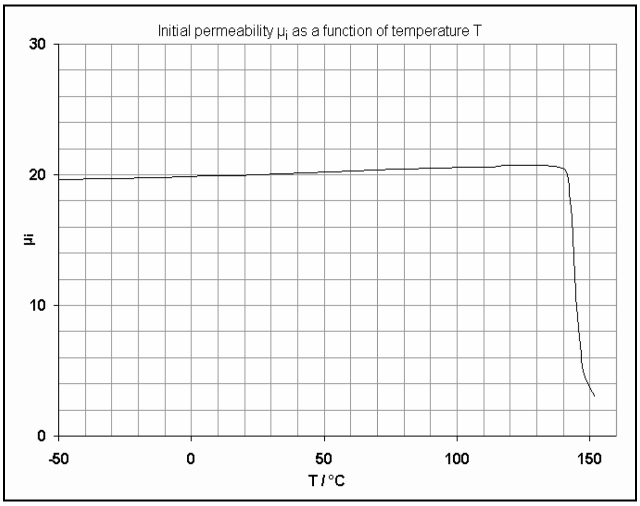


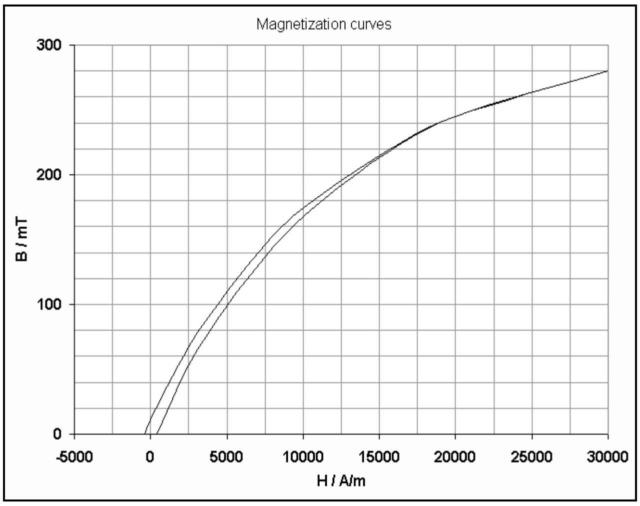
B1.2 PLASTOFERRITE | FI 520

A material with a considerable wide-band property up to MHz-range and high temperature-consistency of permeability nearly up to Curie-temperature. For use in sensors or magnetically active coil formers with the possibility of free shaping

Symbol	Value	Unit	Conditions
μ_i	20 ± 10%	1	25°C ; <= 10 kHz <= 0,25 mT
$\tan\delta / \mu_i$	< 3500	10^{-6}	25°C ; 10 MHz <= 0,25 mT
η_B	< 700	10^{-6} / mT	25°C ; 20 kHz <=1,5mT to 3mT
B	280	mT	25°C ; 16 kHz 30000 A/m
Rspez.	> 3,0	Ωm	
a_F	< 30	10^{-6} / k	-25° - 70°C
T_c	150	°C	







B1.3 FERROCART | OVERVIEW

FERROCART (IRON POWDER)

Our FERROCART material grades are manufactured by pressing; they consist of a blend of magnetically soft metal powder and isolating binder. Through fine grain dispersion, eddy currents are largely suppressed. Different FERROCART types, which are suitable for application at low frequency ranges, up to approximately 100 MHz, can be manufactured by mixture of metal powder types and isolation portions. We can fully take advantage of the metallic Magnetika, which is the high magnetization, with this material, for instance in component parts used for power electronics. Furthermore fine grain dispersion implicates internal demagnetization with the result of an extremely good stabilization. Air gaps, which have to be mostly used in strip band cores or laminated steel cores, are no more necessary. By using FERROCART material grades, it ensues in many cases, like loading coil - and noise suppression choke applications, very cheap inductive component parts.

FERROCART-cores are pressure-moulded. They can be ground or machined by means of hard metal tools. Dimension tolerances are very small. The density (in function of the material) is between 5,0 and 7,5 gcm-3. Long-term thermic resistance is up to 150°C; in special cases it can be raised by the use of special binders.

Remark

The data of our different material grades as shown on the following tables, were measured on toroidal test cores. As is well known there is no direct relation between material characteristics as measured on test pieces and the corresponding parameters of other cores, made of the same material, but different in shape and size, especially if cores are applied outside those ranges (e.g. of frequency, induction, or temperature), within which the catalogue material properties have been ascertained.

No guarantee can be given that specifications as laid down in this catalogue may not be changed before the next edition is given to press. Obligatory assurances of properties require separate agreements in writing in order to become efficacious.

For these reasons, if new components are to be designed, we ask our customers for due contact in order to agree on suitable specifications. This can be done either by fixing measuring conditions and quantities or by exchanging standard cores or components.

B1.3 FERROCART | SUMMARY

<table>
<tr><th>Application</th><th>Frequency range
MHz</th><th>Magnetic load</th><th>Powder materials
FERROCART</th><th>Core shape</th></tr>
<tr><td rowspan="2">High Q circuits
(Coils with high thermal and temporal stability insensible of external magnetic fields)</td><td>≤ 10</td><td rowspan="5">All powder materials have a high saturation magnetization and are therefore usable at extremely high magnetic load.</td><td>Fe 818</td><td rowspan="2">Rod, tube, screw, nipple and cup cores</td></tr>
<tr><td>≤ 100</td><td>Fe 810</td></tr>
<tr><td>Anti-interference and damping coils</td><td>≤ 10</td><td>Fe 876
Fe 850
Fe 818
Fe 810</td><td>Rod, tube, multi-aperture, E-, and pot cores, toroids</td></tr>
<tr><td>Power applications
(Inductors and transformers with high thermal and temporal stability, for high AC amplitudes or high premagnetization, e.g. loading coils, noise suppression coils)</td><td>≤ 0,2</td><td>Fe 896
Fe 893
Fe 892
Fe 876
Fe 875
Fe 850
Fe 835
Fe 818</td><td>Toroids</td></tr>
<tr><td>Toroids for thyristor noise suppression chokes for dimmers.</td><td></td><td>Fe 896
Fe 892</td><td>Toroids</td></tr>
</table>

B1.3 FERROCART | SUMMARY

FERROCART			Fe 896		Fe 893		Fe 892		Fe 876		Fe 875	
Initial permeability	μ_i	1	140 ± 15%		110 ± 15%		100 ± 15%		75 ± 15%		75 ± 15%	
Relative loss factor	$\frac{\tan\delta}{\mu_i}$	10^{-6}		1200	190	1400	120	1600		100	120	1300
frequency	f	MHz	0,01	0,16	0,01	0,16	0,01	0,16	0,01	0,16	0,01	0,16
Rel. temperature factor 25°C - 70°C	α_F	$\frac{10^{-6}}{K}$	< 10		< 18		< 18		< 5		< 18	
Maximum operating temperature [1]		°C	200		200		200		180		180	
preferred shapes			Toroids									

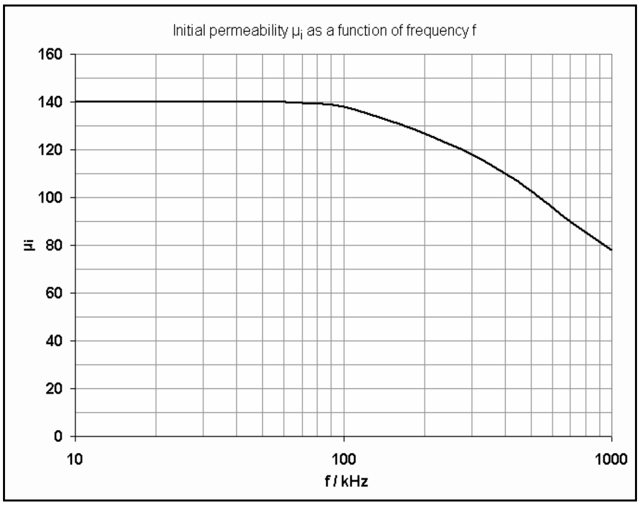
FERROCART			Fe 850		Fe 835		Fe 818		Fe 810			
Initial permeability	μ_i	1	55 ± 15%		35 ± 15%		18 ± 10%		10 ± 10%			
Relative loss factor	$\frac{\tan\delta}{\mu_i}$	10^{-6}	140	800	100	180	110	200	500	2000		
frequency	f	MHz	0,02	0,3	0,05	0,5	0,05	0,5	12	100		
Rel. temperature factor 25°C - 70°C	α_F	$\frac{10^{-6}}{K}$	< 15		< 12		< 12		< 2			
Maximum operating temperature [1)]		°C	180		150		150		120			
preferred shapes			Toroids		Toroids		Toroid, rod, tube, screw cores					

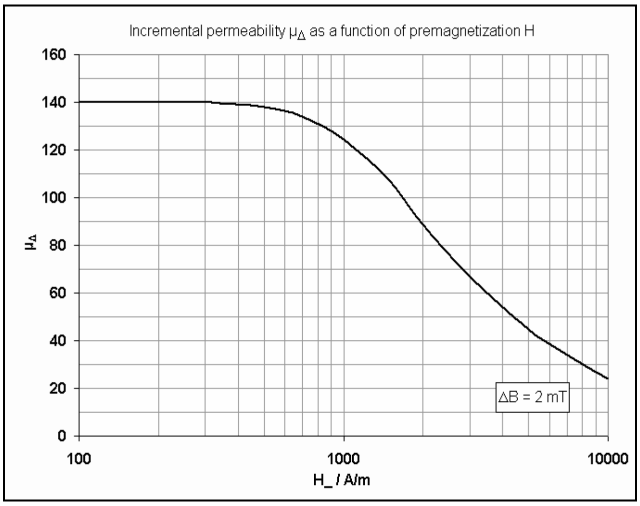
[1)] the maximum operating temperature of coated cores depends on the temperature behaviour of the coating material.

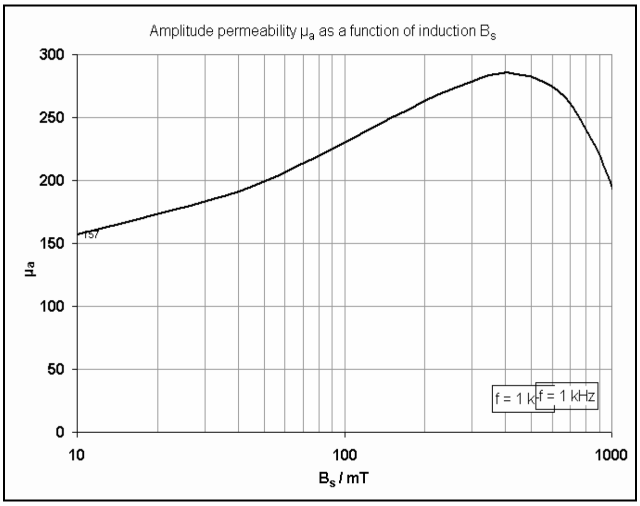
B1.3 FERROCART | FE 896

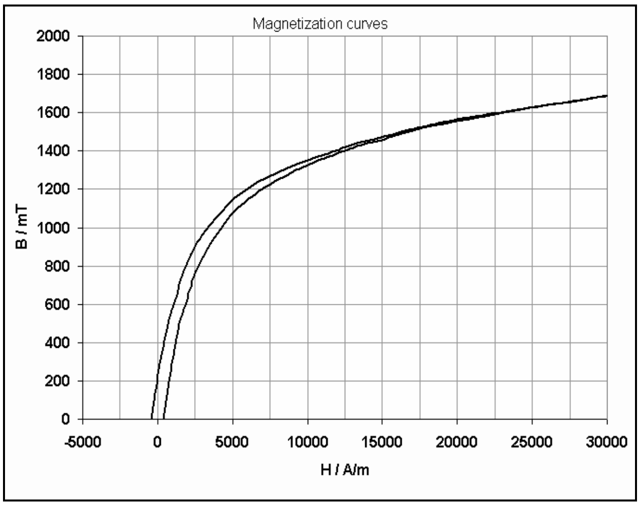
A material with high thermal and temporal stability , for high AC amplitudes or high premagnetization. For use in power applications (e.g. loading coils, noise suppression)

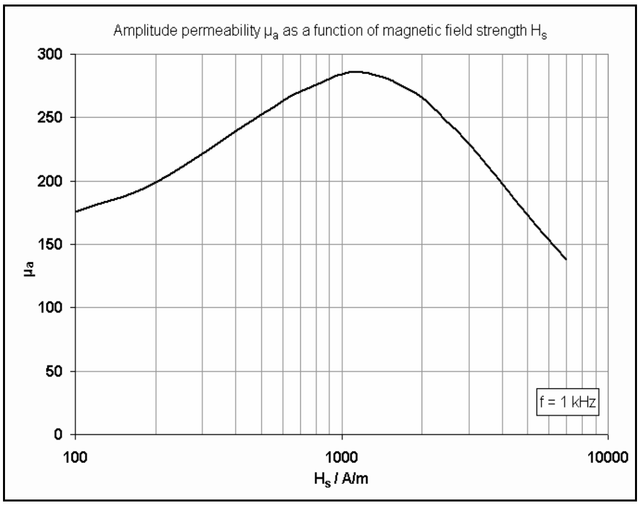
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	140 ± 15%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	1200	10^{-6}	25°C ; 0,16 MHz ≤ 0,25 mT
μ_a	270	1	1 kHz 500 mT
μ_Δ	90	1	25°C ; 10 kHz 2000 A/m
	45		25°C ; 10 kHz 5000 A/m
a_F	< 10	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	200	°C	

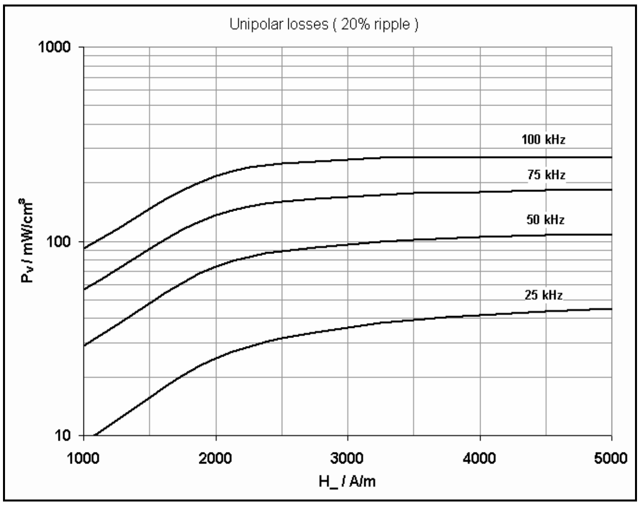


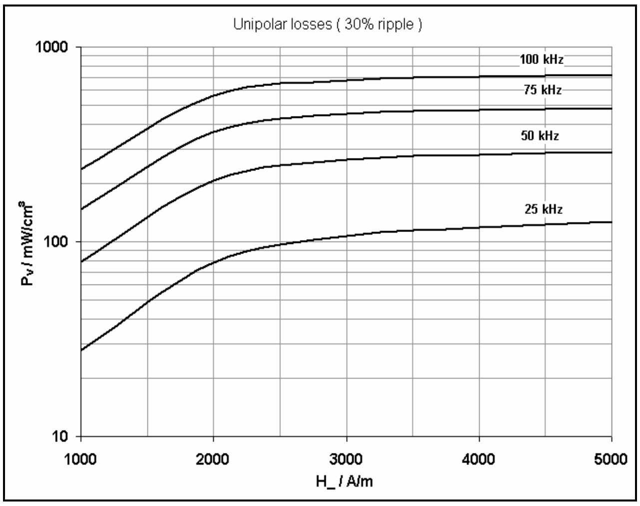


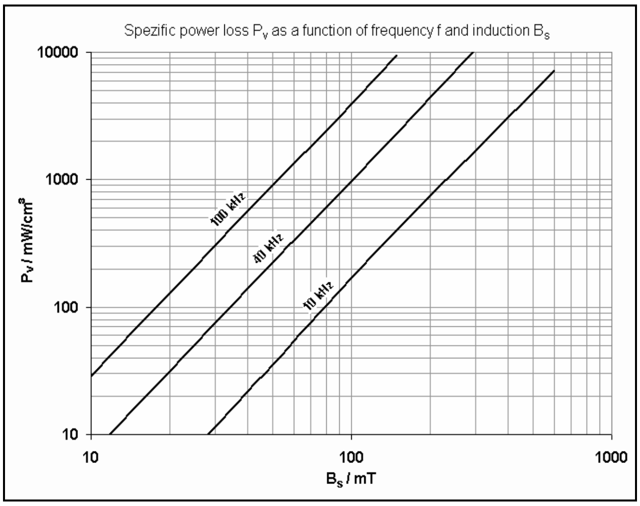







Unipolar losses (20% ripple)
1000
100
10
Pv / mW/cm³
100 kHz
75 kHz
50 kHz
25 kHz
1000
2000
3000
4000
5000
H_ / A/m

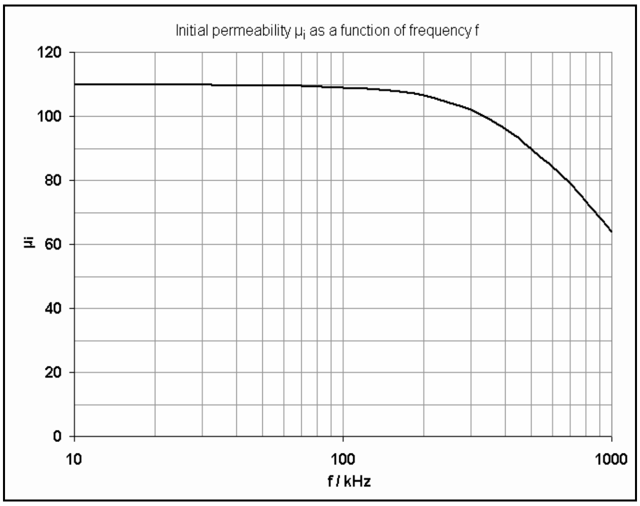

Unipolar losses (30% ripple)
1000
100
10
Pv / mW/cm³
100 kHz
75 kHz
50 kHz
25 kHz
1000
2000
3000
4000
5000
H_ / A/m

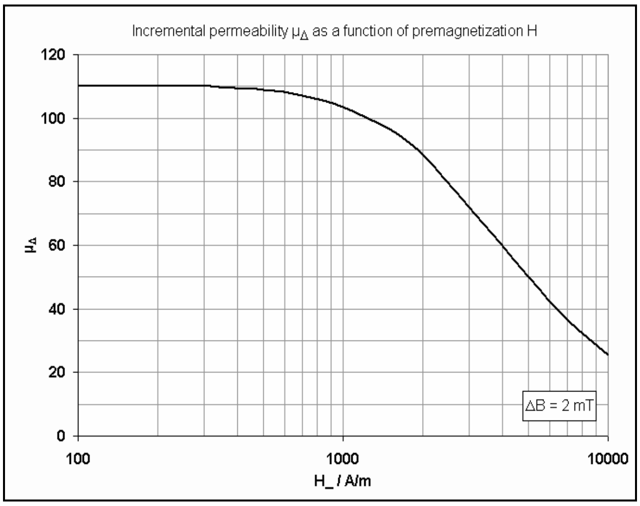

Spezific power loss Pv as a function of frequency f and induction Bs
10000
1000
100
10
Pv / mW/cm³
100 kHz
40 kHz
10 kHz
10
100
1000
Bs / mT

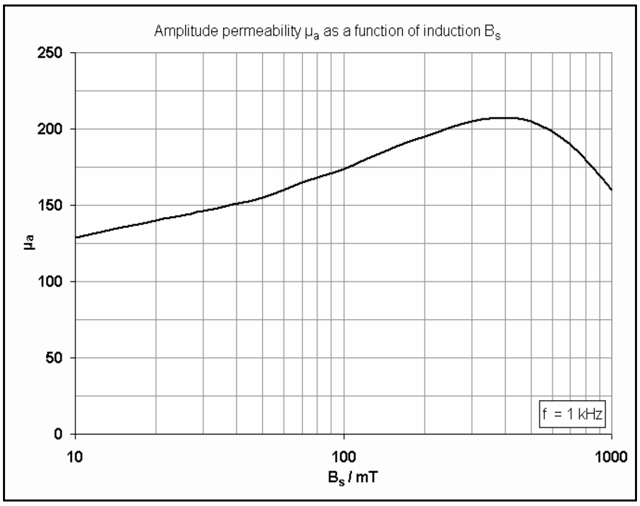
B1.3 FERROCART | FE 893

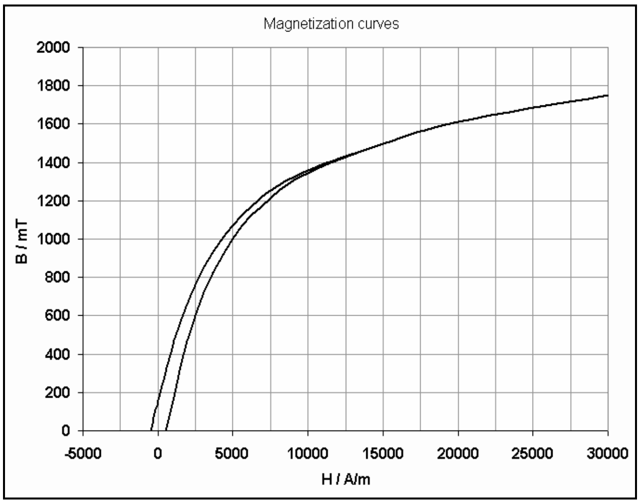
A material with high thermal and temporal stability , for high AC amplitudes or high premagnetization. For use in power applications (e.g. loading coils, noise suppression coils)

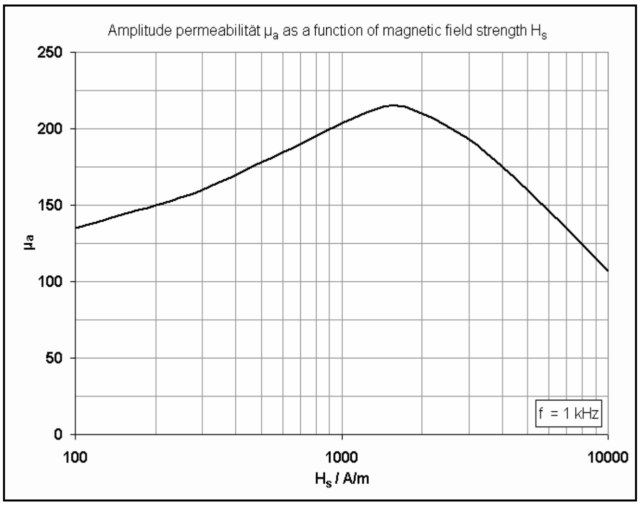
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	110 ± 15%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	1400	10^{-6}	25°C ; 0,16 MHz ≤ 0,25 mT
μ_a	210	1	1 kHz 500 mT
μ_Δ	88	1	25°C ; 10 kHz 2000 A/m
	50		25°C ; 10 kHz 5000 A/m
a_F	≤ 18	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	200	°C	











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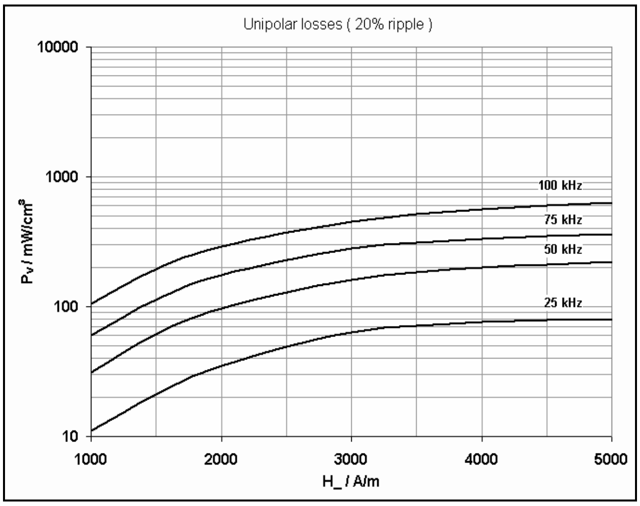
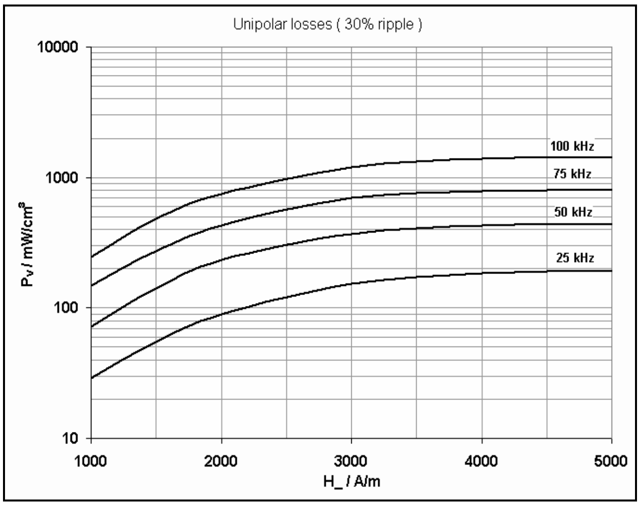
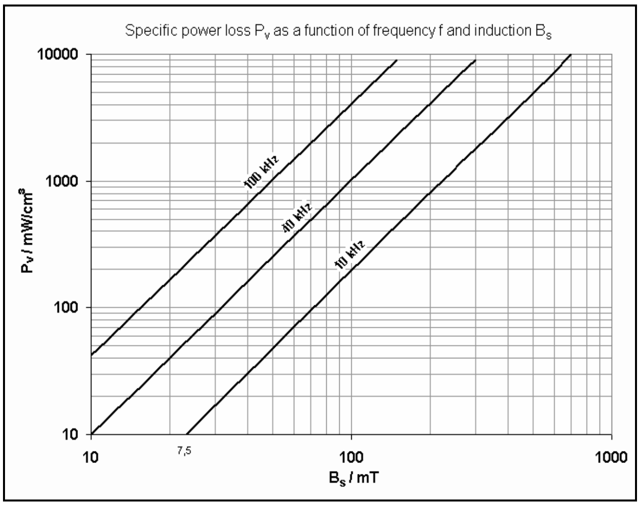


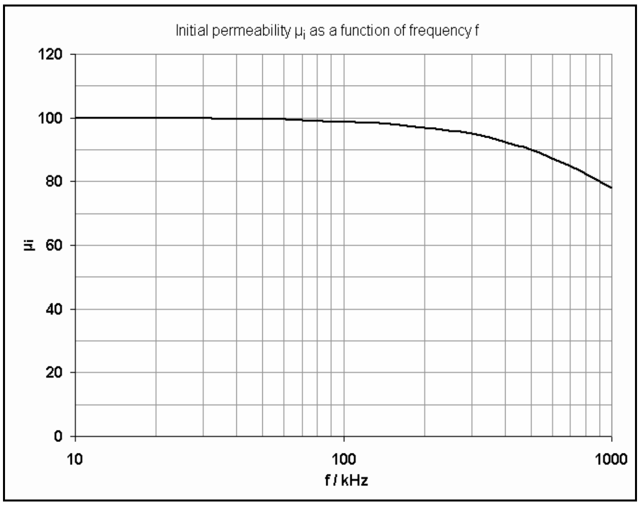


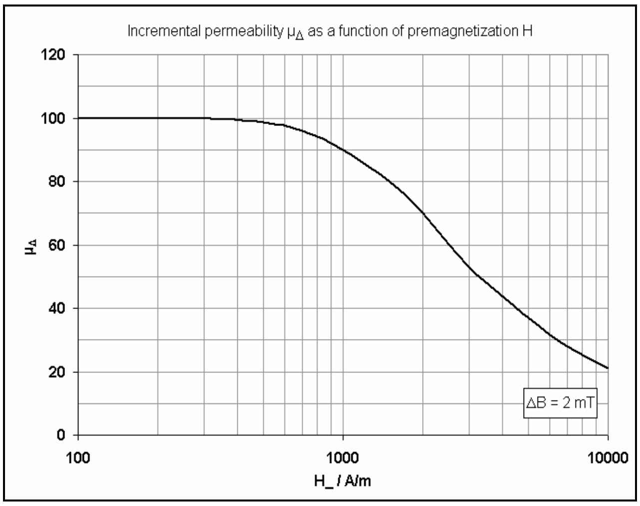


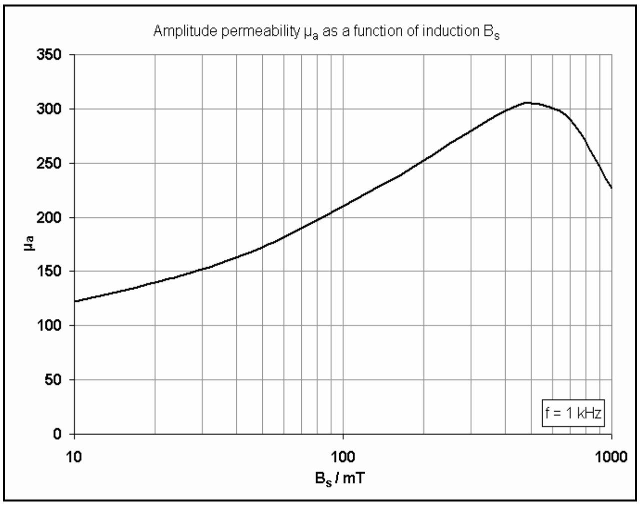
B1.3 FERROCART | FE 892

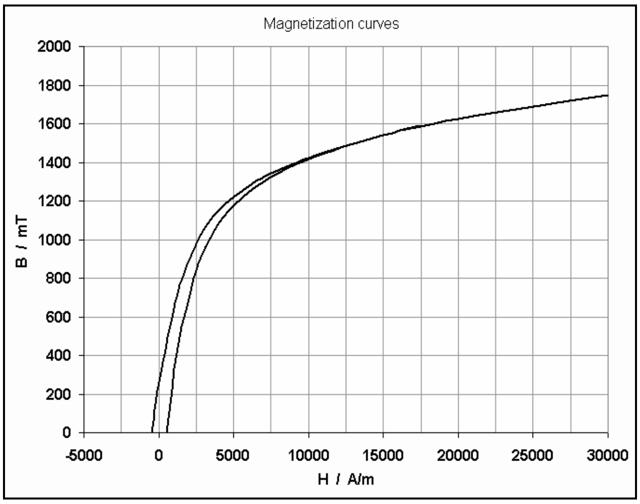
A material with high thermal and temporal stability , for high AC amplitudes or high premagnetization.
For use in noise suppression chokes for dimmers

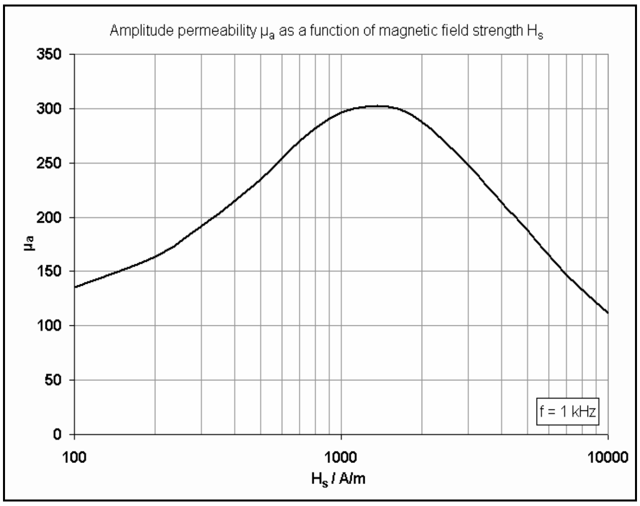
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	100 ± 15%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	1600	10^{-6}	25°C ; 0,16 MHz ≤ 0,25 mT
μ_a	310	1	25°C ; 1 kHz 500 mT
μ_Δ	70	1	25°C ; 10 kHz 2000 A/m
	36		25°C ; 10 kHz 5000 A/m
a_F	≤ 18	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	200	°C	

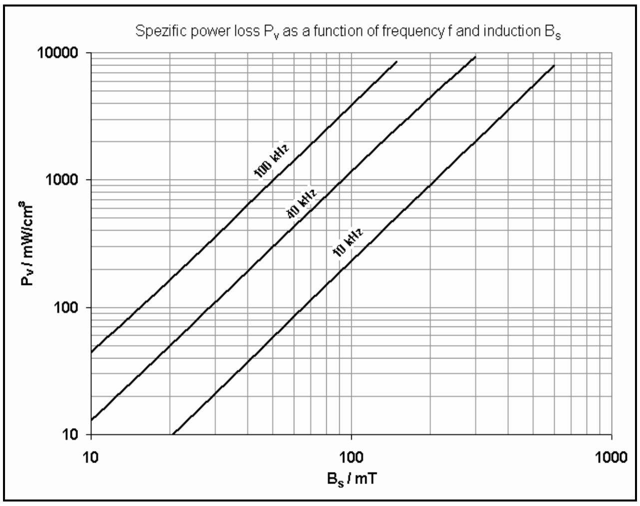








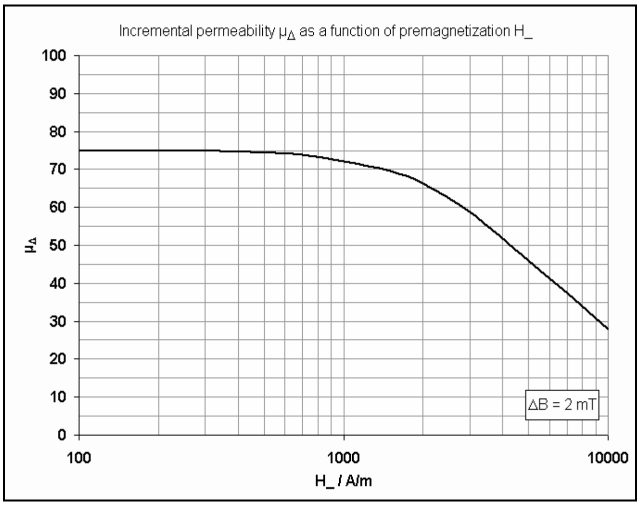


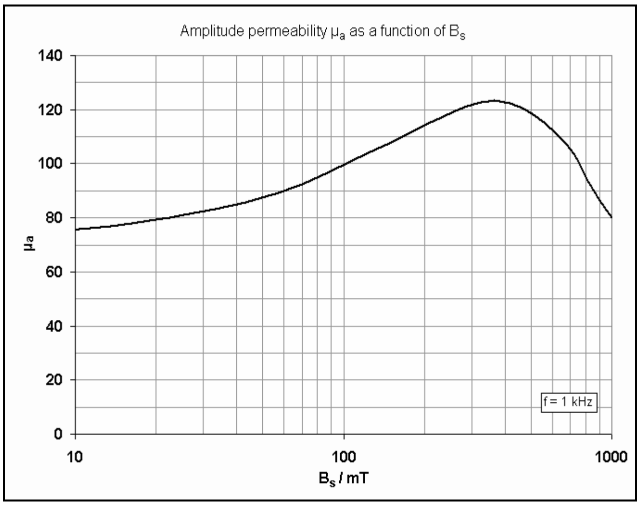

Spezific power loss P_V as a function of frequency f and induction B_S
10000
1000
100
10
P_V / mW/cm³
100 kHz
40 kHz
10 kHz
10
100
1000
B_S / mT

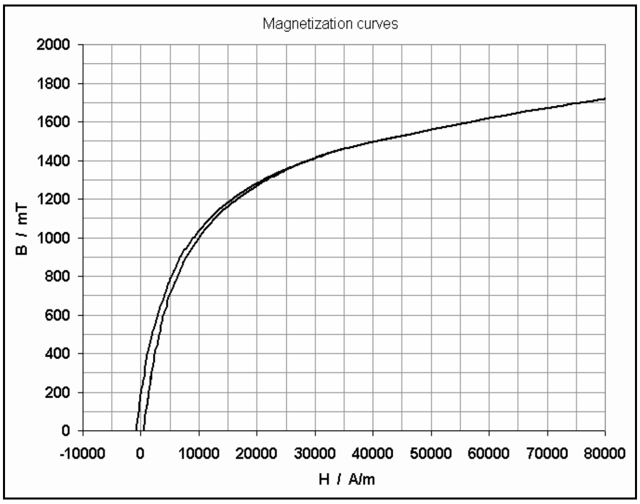
B1.3 FERROCART | FE 876

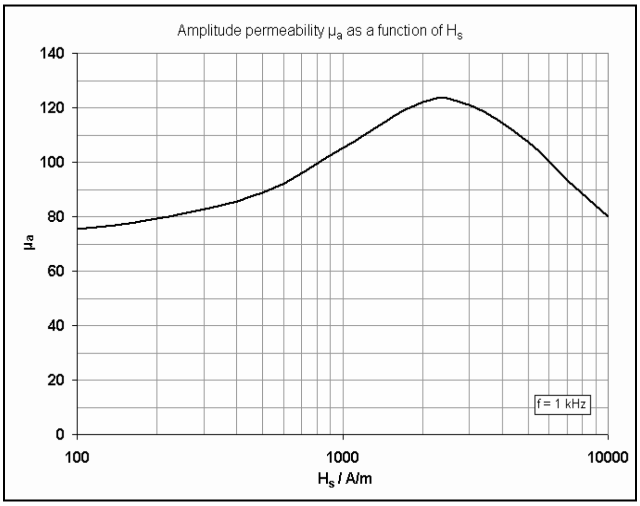
A material with high thermal and temporal stability , for high AC amplitudes or high premagnetization. For use in anti-interference and damping coils

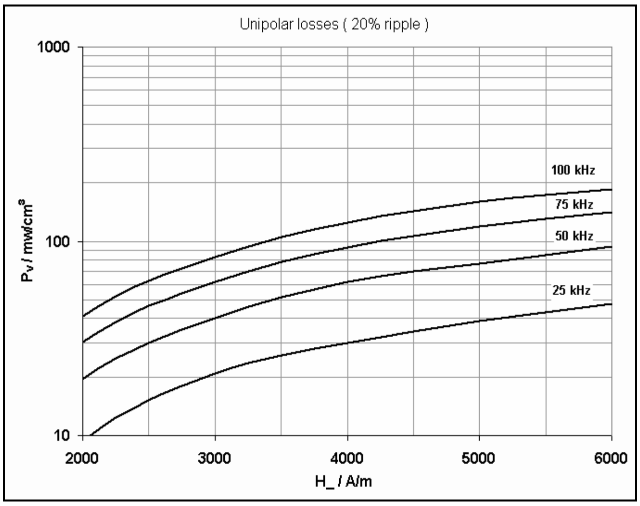
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	75 ± 15%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	100	10^{-6}	25°C ; 0,16 MHz ≤ 0,25 mT
μ_a	120	1	1 kHz 500 mT
μ_Δ	66	1	25°C ; 10 kHz 2000 A/m
	46		25°C ; 10 kHz 5000 A/m
α_F	< 5	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	180	°C	

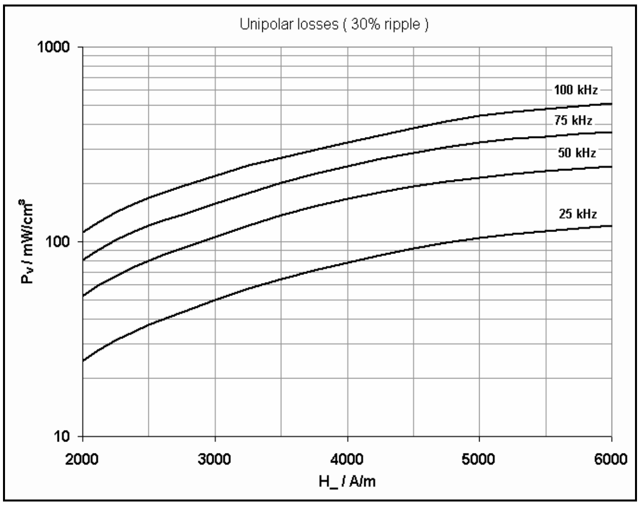


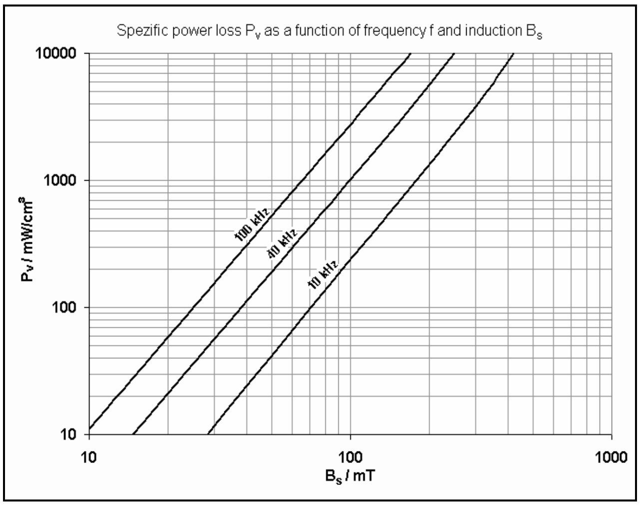







Unipolar losses (20% ripple)
1000
100
10
Pv / mw/cm³
100 kHz
75 kHz
50 kHz
25 kHz
2000
3000
4000
5000
6000
H_ / A/m

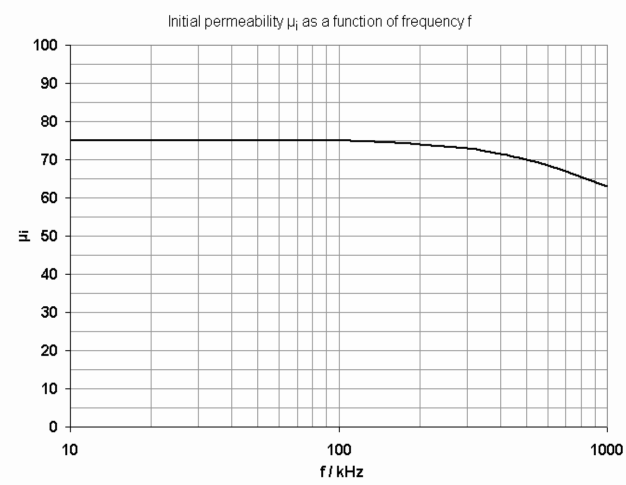

Unipolar losses (30% ripple)
1000
100
10
Pv / mW/cm³
100 kHz
75 kHz
50 kHz
25 kHz
2000
3000
4000
5000
6000
H_ / A/m

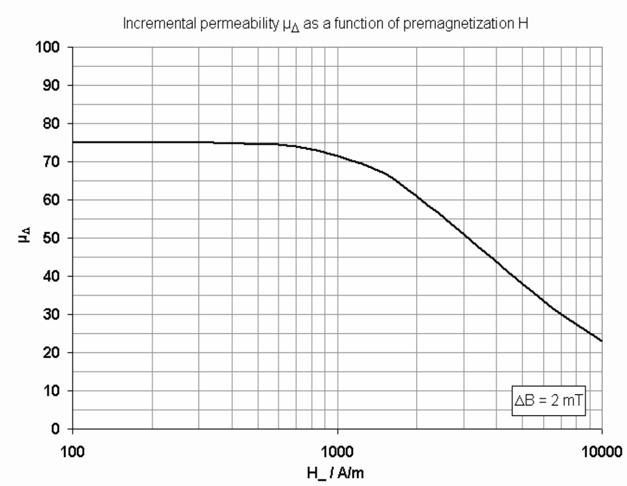

Spezific power loss Pv as a function of frequency f and induction Bs
10000
1000
100
10
Pv / mW/cm³
100 kHz
40 kHz
10 kHz
10
100
1000
Bs / mT

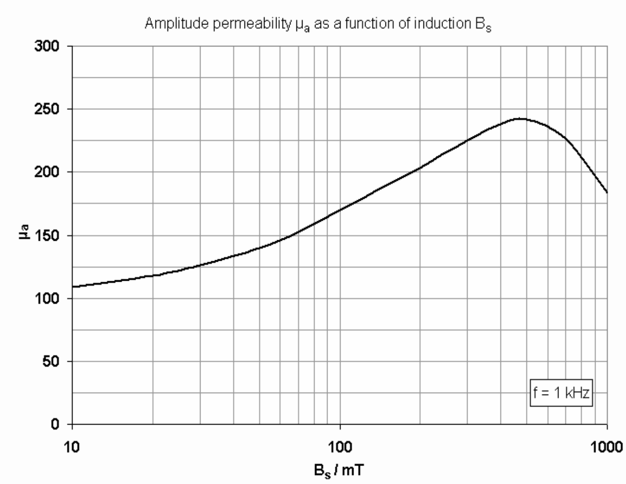
B1.3 FERROCART | FE 875

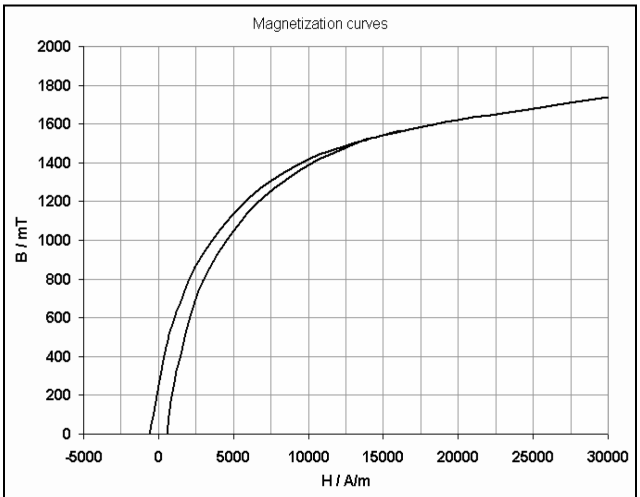
A material with high thermal and temporal stability , for high AC amplitudes or high premagnetization.
For use in power applications (e.g. loading coils, noise suppression coils)

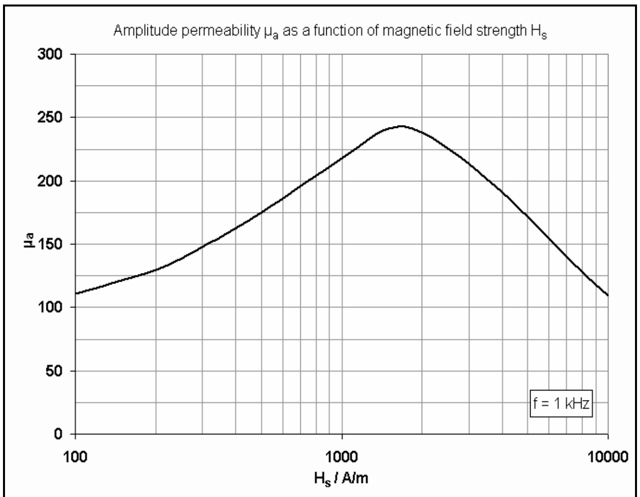
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	75 ± 15%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
tanδ / μ_i	1300	10^{-6}	25°C ; 0,16 MHz ≤ 0,25 mT
μ_a	240	1	1 kHz 500 mT
μ_Δ	61	1	25°C ; 10 kHz 2000 A/m
	38		25°C ; 10 kHz 5000 A/m
a_F	≤ 18	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	180	°C	

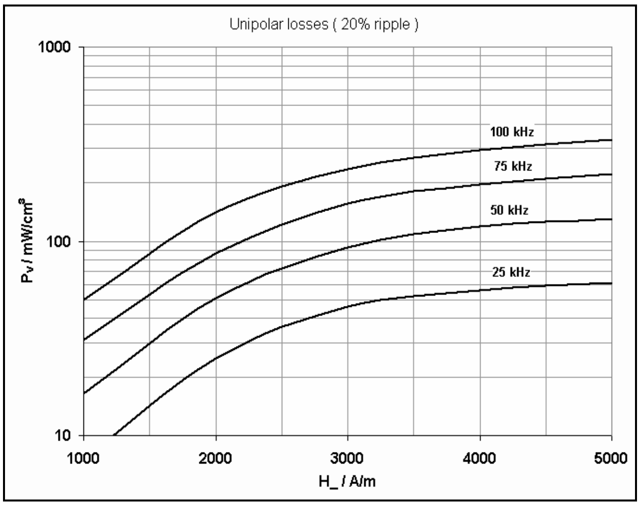


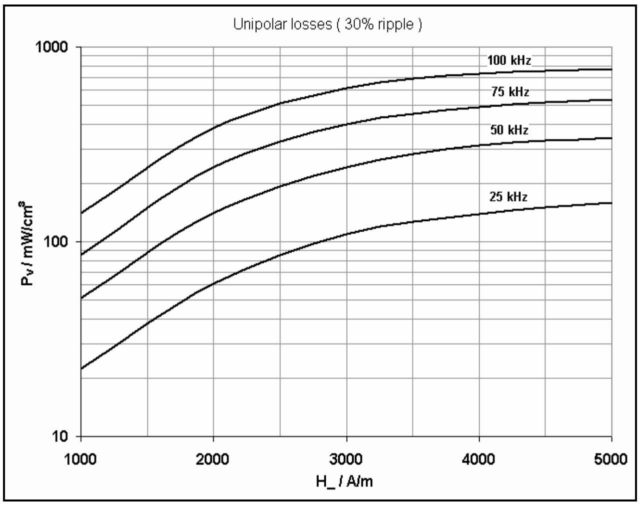


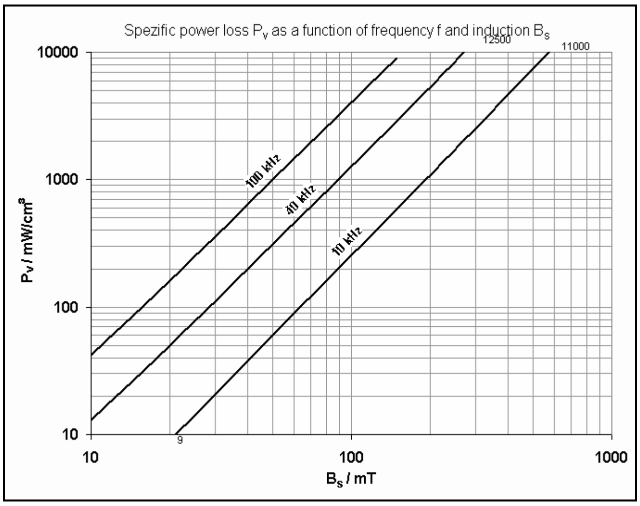







Unipolar losses (20% ripple)
1000
100
10
Pv / mW/cm³
100 kHz
75 kHz
50 kHz
25 kHz
1000
2000
3000
4000
5000
H_ / A/m

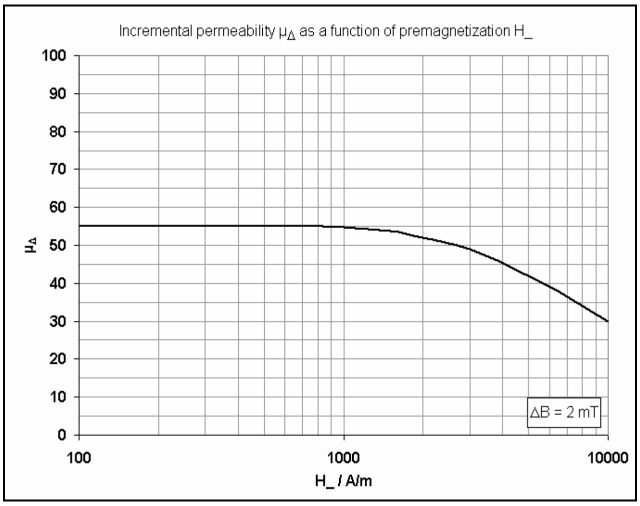

Unipolar losses (30% ripple)
1000
100
10
Pv / mW/cm³
100 kHz
75 kHz
50 kHz
25 kHz
1000
2000
3000
4000
5000
H_ / A/m

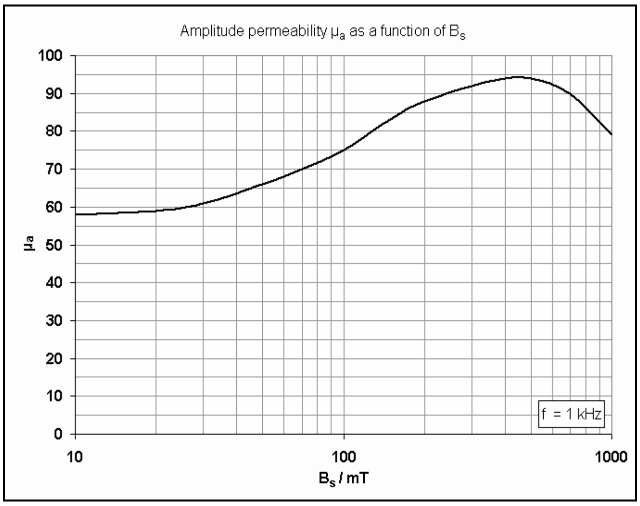

Spezific power loss Pv as a function of frequency f and induction Bs
12500
11000
10000
1000
100
10
Pv / mW/cm³
100 kHz
40 kHz
10 kHz
9
10
100
1000
Bs / mT

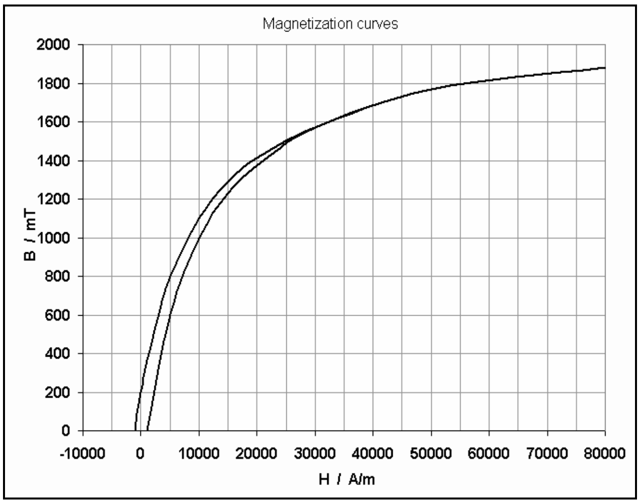
B1.3 FERROCART | FE 850

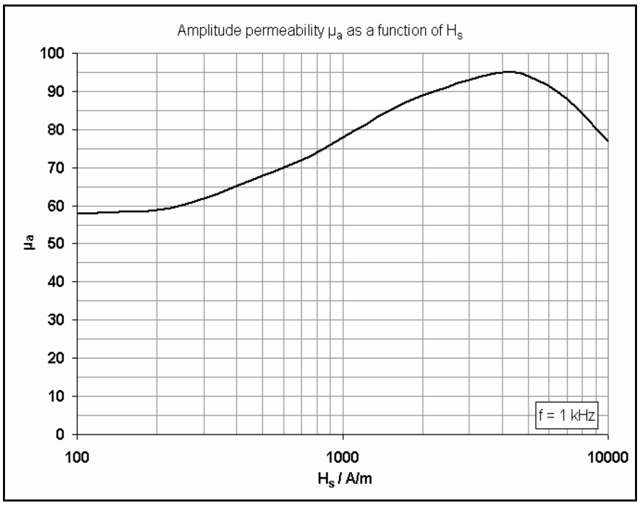
A material with high thermal and temporal stability , for high AC amplitudes or high premagnetization. For use in anti-interference and damping coils

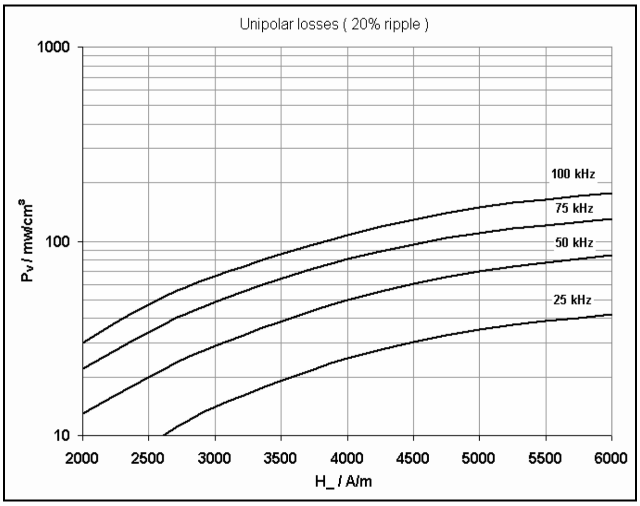
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	55 ± 15%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
tanδ / μ_i	800	10^{-6}	25°C ; 0,3 MHz ≤ 0,25 mT
μ_a	93	1	1 kHz 500 mT
μ_Δ	52	1	25°C ; 10 kHz 2000 A/m
	43		25°C ; 10 kHz 5000 A/m
α_F	≤ 15	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	180	°C	

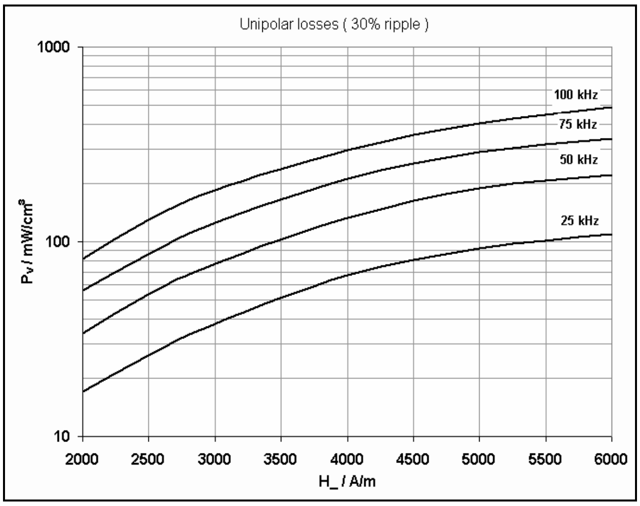


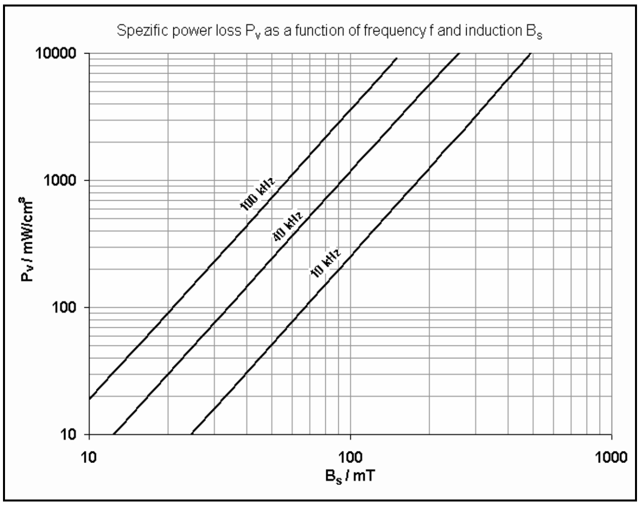







Unipolar losses (20% ripple)
1000
100
10
Pv / mw/cm³
100 kHz
75 kHz
50 kHz
25 kHz
2000
2500
3000
3500
4000
4500
5000
5500
6000
H_ / A/m

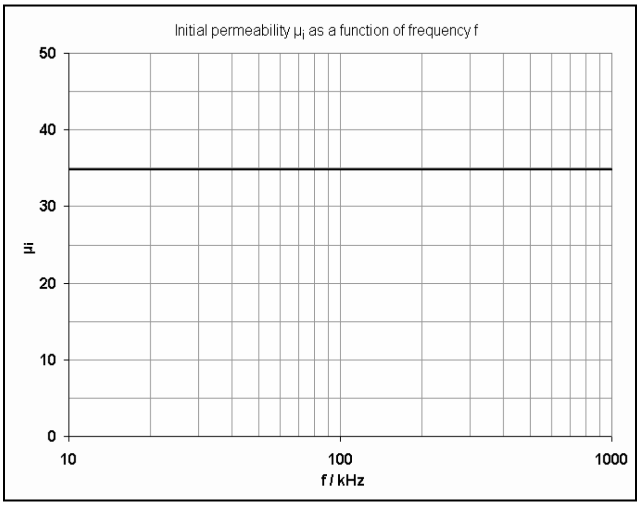

Unipolar losses (30% ripple)
1000
100
10
Pv / mW/cm³
100 kHz
75 kHz
50 kHz
25 kHz
2000
2500
3000
3500
4000
4500
5000
5500
6000
H_ / A/m

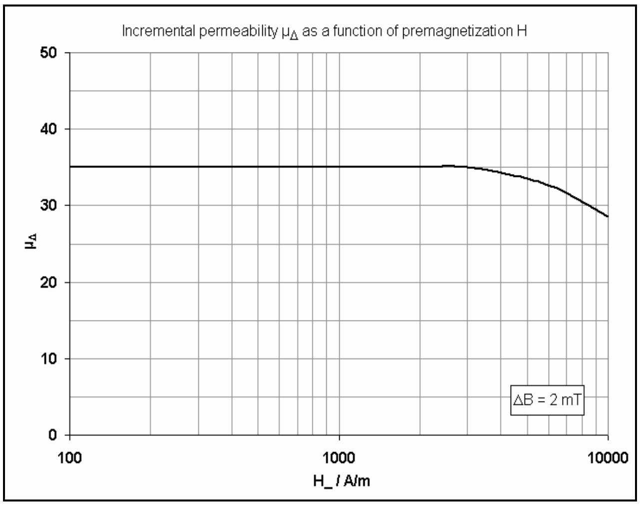

Spezific power loss Pv as a function of frequency f and induction Bs
10000
1000
100
10
Pv / mW/cm³
100 kHz
40 kHz
10 kHz
10
100
1000
Bs / mT

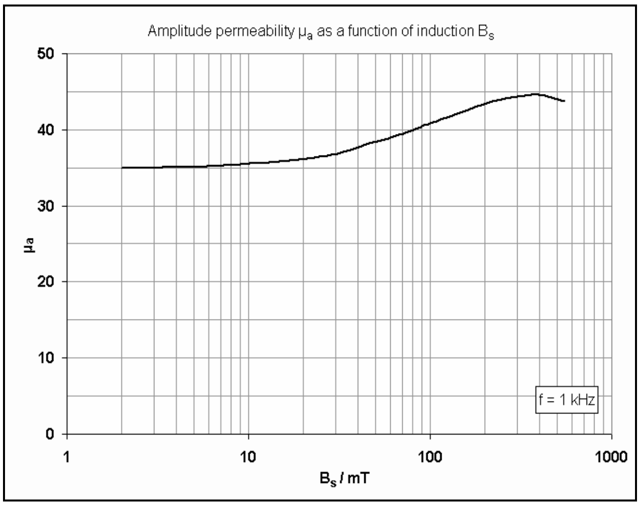
B1.3 FERROCART | FE 835

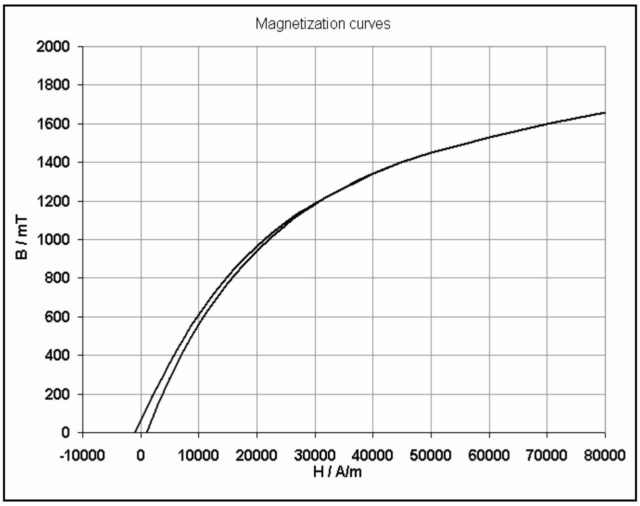
A material with high thermal and temporal stability , for high AC amplitudes or high premagnetization. For use in power applications (e.g. loading coils, noise suppression coils)

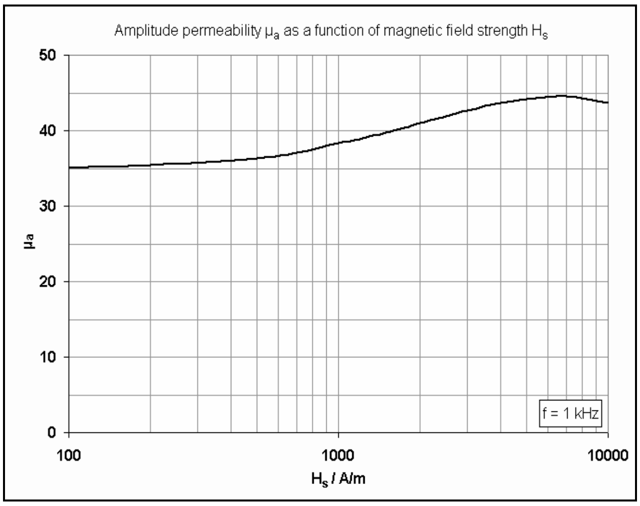
SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	35 ± 15%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	180	10^{-6}	25°C ; 0,5 MHz ≤ 0,25 mT
μ_a	44	1	1 kHz 500 mT
μ_Δ	35	1	25°C ; 10 kHz 2000 A/m
	33		25°C ; 10 kHz 5000 A/m
a_F	≤ 12	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	150	°C	

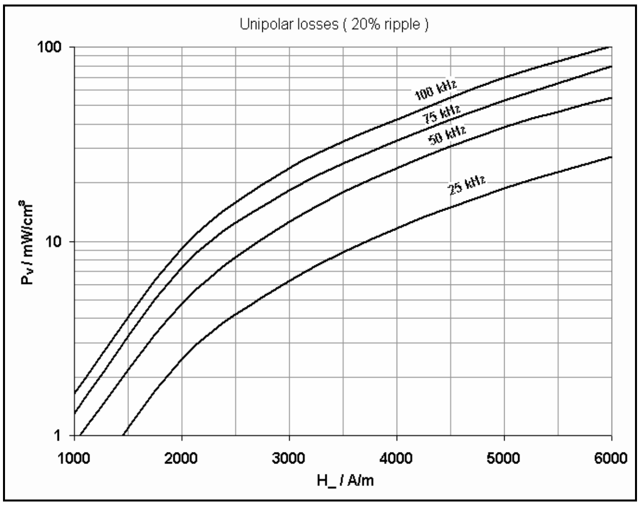


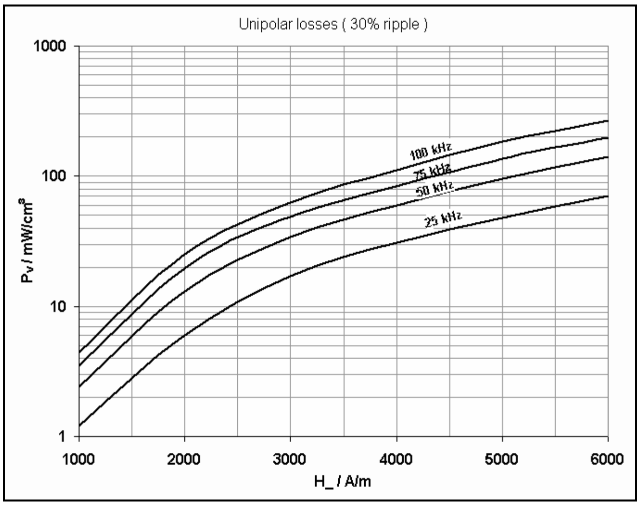


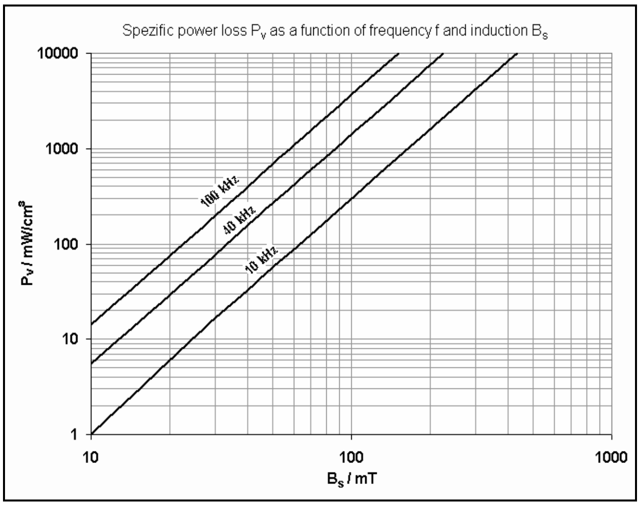







Unipolar losses (20% ripple)
100
10
1
Pv / mW/cm³
1000
2000
3000
4000
5000
6000
H_ / A/m
100 kHz
75 kHz
50 kHz
25 kHz

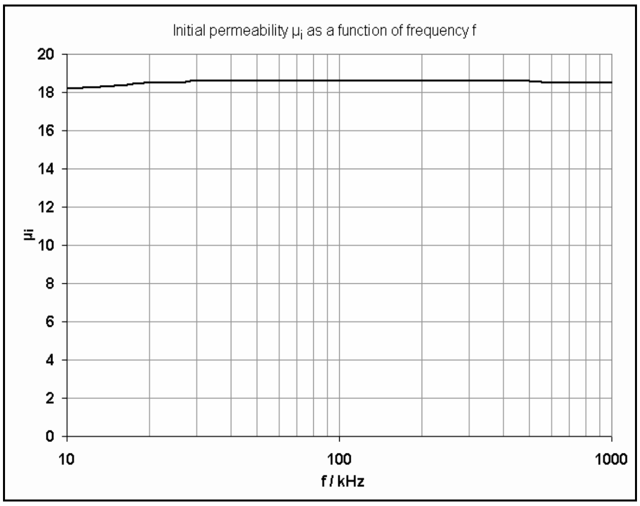

Unipolar losses (30% ripple)
1000
100
10
1
Pv / mW/cm³
1000
2000
3000
4000
5000
6000
H_ / A/m
100 kHz
75 kHz
50 kHz
25 kHz

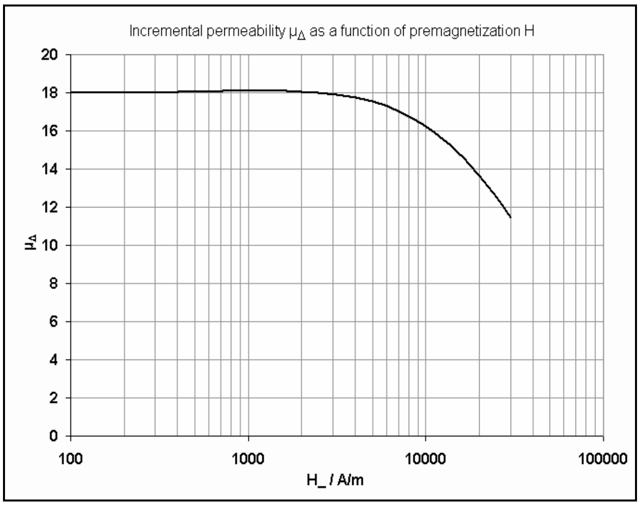

Spezific power loss Pv as a function of frequency f and induction Bs
10000
1000
100
10
1
Pv / mW/cm³
10
100
1000
Bs / mT
100 kHz
40 kHz
10 kHz

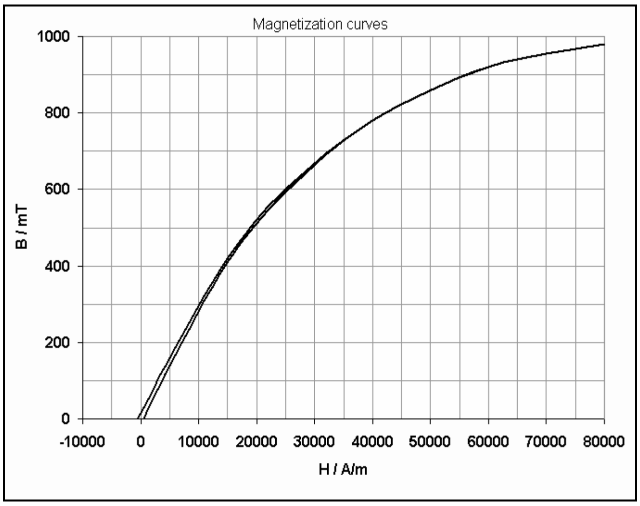
B1.3 FERROCART | FE 818

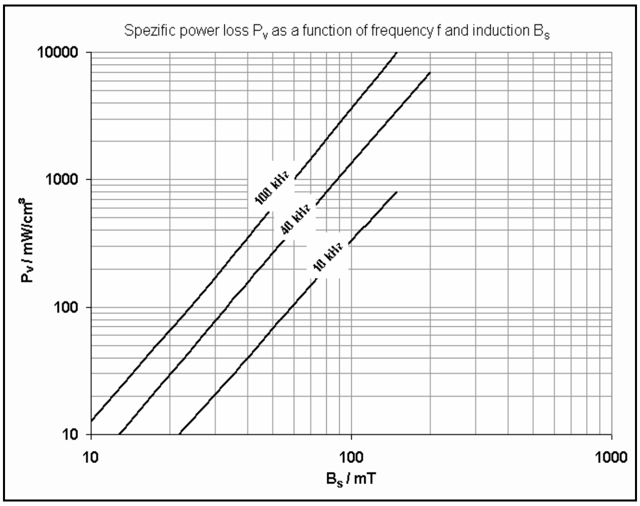
A material with high thermal and temporal stability, insensible of external magnetic fields

SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	18 ± 10%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	200	10^{-6}	25°C ; 0,16 MHz ≤ 0,25 mT
μ_a	21	1	1 kHz 500 mT
μ_Δ	16	1	25°C ; 10 kHz 10000 A/m
	11		25°C ; 10 kHz 30000 A/m
a_F	< 12	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	150	°C	





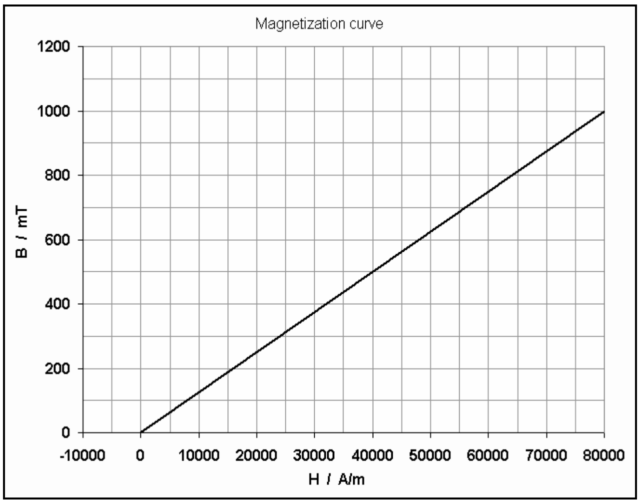


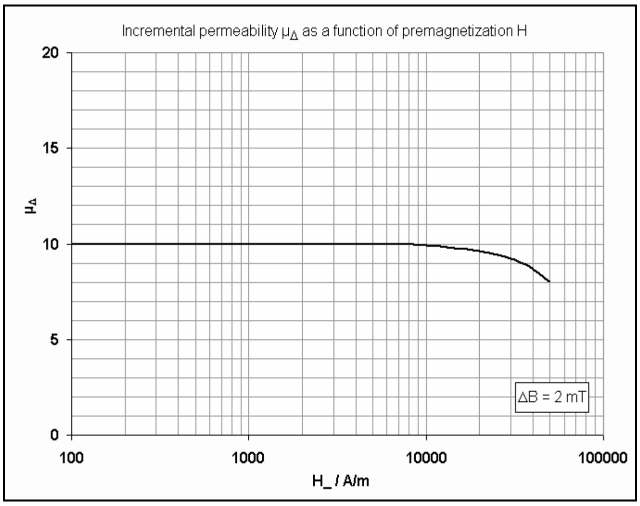


B1.3 FERROCART | FE 810

A material with high thermal and temporal stability , insensible of external magnetic fields

SYMBOL	VALUE	UNIT	CONDITIONS
μ_i	10 ± 10%	1	25°C ; ≤ 10 kHz ≤ 0,25 mT
$\tan\delta / \mu_i$	500	10^{-6}	25°C ; 12 MHz ≤ 0,25 mT
μ_a		1	25°C; 1 kHz 500 mT
μ_Δ	10	1	25°C ; 10 kHz 10000 A/m
	8		25°C ; 10 kHz 50000 A/m
a_F	≤ 2	10^{-6} / K	25°C - 70°C ≤ 10 kHz; ≤ 0,25 mT
T_{max}	120	°C	





Standard A_L-values for E and U cores

Core materials

For high-switching frequencies to 300 kHz, we recommend our Ferrite Fi 325 or Fi 328. This way, core losses can be minimized even at high frequencies.

Core air gaps

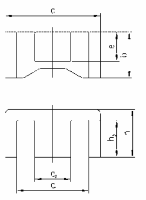
Please refer to the below table for the standard A_L values for E cores with an air gap.

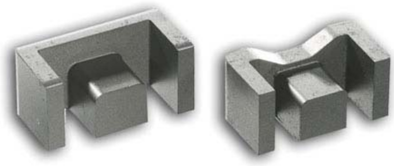
Standard A_L-values nH	Final numbers of the part number
22	 70
27	 71
33	 72
39	 73
47	 74
56	 75
68	 76
82	 77
100	 78
120	 79
150	 81
180	 82
220	 83
270	 84
330	 85
390	 86
470	 87
560	 88
680	 89
820	 90
1000	 91
1200	 92
1500	 93
1800	 94
2200	 95
2700	 96
3300	 97
3900	 98

A_L-values apply to a core pair. The order number is for a single core.

Sample order: for an E core EVD 25/12.8/12.7 material **Fi 328**,
A_L = 100 nH
Part number: **255 13 328 78**

B2.1 EVD CORES AND KITS





Core shape	Effective area of magnetic path A_e (mm²)	Effective magnetic path length l_e (mm)	Core constant $\Sigma\ l/A$ (mm⁻¹)	Effective magnetic volume V_e (mm³)	a (mm)	b (mm)	d1 (mm)	d2 (mm)	h1 (mm)	h2 (mm)	e (mm)
EVD 10/5/6	11.7	25.4	2.18	270	10.7 ±0.4	5.8 -0.4	8.4 +0.5	3.6 -0.3	5.4 -0.2	3.9 +0.3	3.6 -0.3
EVD 15/9/7	26.1	37.9	1.45	990	14.8 +0.7/-0.5	7.0 -0.4	10.8 +0.6	5.8 -0.4	9.0 -0.3	6.0 +0.4	4.8 -0.4
EVD 20/10/8.5	40.1	46.6	1.17	1870	20.3 ±0.7	8.6 ±0.25	15.7 ±0.4	8.0 ±0.3	10.4 ±0.25	7.4 ±0.25	4.9 ±0.2
EVD 23/12/11	63.9	55.1	0.865	3500	22.7 ±0.7	11.2 ±0.3	17.1 ±0.4	8.1 ±0.3	12.3 ±0.3	8.9 ±0.3	7.7 ±0.25
EVD 25/12.8/ 12.7	73.1	58.9	0.807	4300	25.0 +0.8/-0.7	12.7 -0.5	18.8 +0.8	8.8 ±0.25	12.8 -0.4	9.3 +0.5	8.3 ±0.3
EVD 30/16/ 12.5	96.6	72.6	0.755	7000	29.7 ±0.8	12.5 ±0.4	22.1 ±0.5	11.6 ±0.3	16.4 ±0.3	11.9 ±0.3	8.2 ±0.3
EVD 36/19/16	150	87.4	0.582	13100	36.3 ±0.7	16.2 ±0.4	27.1 ±0.55	14.5 ±0.35	19.5 ±0.2	14.4 ±0.3	10.5 ±0.3
EVD 42/21/20	196	97.6	0.499	19100	41.5 ±0.8	20.1 ±0.5	31.5 ±0.6	15.7 ±0.4	21.0 ±0.2	16.0 ±0.3	12.7 ±0.35

Core shape	Material	Losses (W) (≤) Fi 328 f = 100 kHz / Bs = 200 mT		A_L value (nH)	μ_e	B_{max} (mT) f = 25 kHz Hs = 250 A/m 100°C	Part number
		25°C	100°C	10 kHz 50 mV Tol. = ± 25%			
EVD 10/5/6	Fi 325	≤ 0.13[1)]	≤ 0.07[1)]	680	1180	≥ 290	252 05 325 10
	Fi 328	≤ 0.26	≤ 0.18	680	1180	≥ 350	252 05 328 10
EVD 15/9/7	Fi 325	≤ 0.42[1)]	≤ 0.24[1)]	1170	1350	≥ 315	254 13 325 10
	Fi 328	≤ 0.89	≤ 0.59	1170	1350	≥ 350	254 13 328 10
EVD 20/10/8.5	Fi 325	≤ 0.79[1)]	≤ 0.45[1)]	1510	1400	≥ 330	254 20 325 10
	Fi 328	≤ 1.68	≤ 1.12	1510	1400	≥ 350	254 20 328 10
EVD 23/12/11	Fi 325	≤ 1.50[1)]	≤ 0.84[1)]	2110	1450	≥ 330	255 15 325 10
	Fi 328	≤ 3.17	≤ 2.11	2110	1450	≥ 350	255 15 328 10
EVD 25/12.8/12.7	Fi 325	≤1.83[1)]	≤ 1.02[1)]	2300	1480	≥ 330	255 13 325 10
	Fi 328	≤ 3.87	≤ 2.58	2300	1480	≥ 350	255 13 328 10
EVD 30/16/12.5	Fi 325	≤ 2.98[1)]	≤ 1.67[1)]	2540	1520	≥ 330	256 14 325 10
	Fi 328	≤ 6.31	≤ 4.20	2540	1520	≥ 350	256 14 328 10
EVD 36/19/16	Fi 325	≤ 5.58[1)]	≤ 3.13[1)]	3380	1560	≥ 330	258 07 325 10
	Fi 328	≤ 11.8	≤ 7.88	3380	1560	≥ 350	258 07 328 10
EVD 42/21/20	Fi 325	≤ 8.11[1)]	≤ 4.54[1)]	4010	1590	≥ 330	259 37 325 10
	Fi 328	≤ 17.2	≤ 11.4	4010	1590	≥ 350	259 37 328 10

[1)] at Fi 325 f = 200 kHz/Bs = 100 mT

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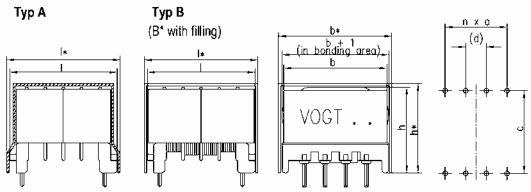
Since 1934 – we solve it

B2.1 EVD CORES AND KITS



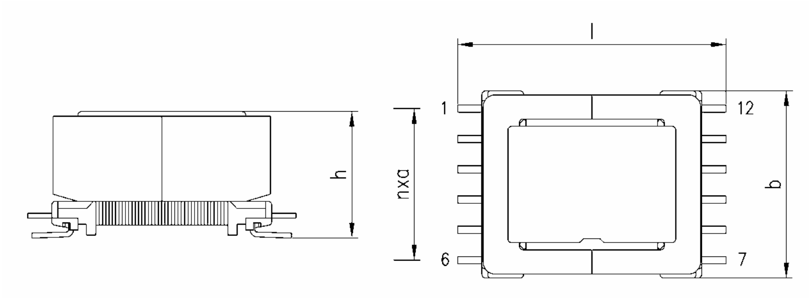
EVD kit	Crosssectional area **A** (mm²)	Average length of winding turn l_e (mm)	Type	Number of Chambers	Dimensions			Pins			Part number of coil former (casing)
					l (l*) (mm)	b (b*) (mm)	h (h*) (mm)	Number of pins	c (mm)	n x a (d) (mm)	
10/5/6	12	26	A	4	≤ 11.5 (≤13.5*)	≤ 11 (≤ 13*)	≤ 9.5 (≤ 10.5*)	8	7.62	3 x 2.54	325 25 092 10 (406 06 023 00)
15/9/7	20	30	B	1	≤ 19	≤ 16.5	≤ 10.5	8	15	3 x 3.75	325 25 051 10
			A	1	≤ 23 (≤ 25*)	≤ 16 (≤ 18*)	≤ 10.5 (≤ 12*)	12	15	5 x 2.5	325 25 100 00 (406 06 025 00)
				4	≤ 23 (≤ 25*)	≤ 16 (≤ 18*)	≤ 10.5 (≤ 11.3*)	12	15	5 x 2.5	325 25 101 00 (406 06 025 00)
20/10/ 8.5	32	42	A	1	≤ 27.5 (≤ 34.5*)	≤ 22 (≤ 23*)	≤ 13.5 (≤ 12.3*)	12	15.24	5 x 3.81	325 25 085 00 (406 06 038 00)
23/12/ 11	62	48	A	1	≤ 30 (≤ 32.5*)	≤ 24 (≤ 26.5*)	≤ 17.5 (≤ 20*)	12	20.32	4 x 3.81 (1 x 5.08)	325 25 074 10 (406 06 012 00)
25/12. 8/ 12.7	42	50/58	B*	4	≤ 26.5 (≤ 29*)	≤ 26.5 (≤ 29*)	≤ 21 (≤ 25*)	8	20	3 x 5	325 25 040 10 (406 06 024 00)
	62	50	B	1	≤ 26.5 (≤ 29*)	≤ 26.5 (≤ 29*)	≤ 21 (≤ 25*)	8	20	3 x 5	325 25 110 10 (406 06 024 00)
	56	50		4	≤ 26.5 (≤ 29*)	≤ 26.5 (≤ 29*)	≤ 21 (≤ 25*)	8	20	3 x 5	325 25 111 10 (406 06 024 00)
30/16/ 12.5	94	58	A	1	≤ 40 (≤ 44*)	≤ 31 (≤ 35*)	≤ 20 (≤ 23.7*)	12	27.94	4 x 3.81 (1 x 5.08)	325 25 075 10 (406 06 013 00)
36/19/ 16	149	73	A	1	≤ 46 (≤ 49*)	≤ 37 (≤ 41*)	≤ 24.5 (≤ 28*)	12	33.02	5 x 5.08	325 25 072 10 (406 06 010 00)
42/21/ 20	194	85	A	1	≤ 50 (≤ 55*)	≤ 43 (≤ 47*)	≤ 30.5 (≤ 34*)	16	35.56	6 x 5.08 (1 x 7.62)	325 25 073 10 (406 06 014 00)

Kit	Coil former	Casing	Core
EVD 10/5/6	325 25 092 10	406 06 023 00	252 05 XXX XX
EVD 15/9/7	325 25 051 10		254 13 XXX XX
	325 25 100 00	406 06 025 00	
	325 25 101 00	406 06 025 00	
EVD 20/10/8.5	325 25 085 00	406 06 038 00	254 20 XXX XX
EVD 23/12/11	325 25 074 10	406 06 012 00	255 15 XXX XX
EVD 25/12.8/12.7	325 25 040 10	406 06 024 00	255 13 XXX XX
	325 25 110 10	406 06 024 00	
	325 25 111 10	406 06 024 00	
EVD 30/16/12.5	325 25 075 10	406 06 013 00	256 14 XXX XX
EVD 36/19/16	325 25 072 10	406 06 010 00	258 07 XXX XX
EVD 42/21/20	325 25 073 10	406 06 014 00	259 37 XXX XX

Core no. description

XXX XX — Competent shape/size
XXX — Core material
XX — A_L - Code

B2.1 EVD CORES AND KITS



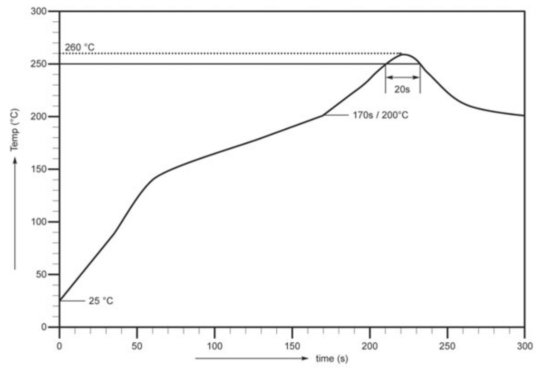
E-Core	Cross-sectional area A (mm²)	Average length of winding turn l_e (mm)	Number of chambers	Dimensions			Pins		Part number of coil former
				l (l*) (mm)	b (b*) (mm)	h (h*) (mm)	Number of Pins	n x a (d) (mm)	
EF 12.6	12	26	1 (4)	19	13.5	10.5	10	4 x 2.54	325 25 087 00
			1	22	13.5	10.5	10	4 x 2.54	325 00 073 10
EVD 10/5/6	12	26	4	≤ 13.5	≤ 13	≤ 10.8	8	3 x 2.54	325 25 092 10
EVD 15/9/7	20	30	1	≤ 23	≤ 16	≤ 10.5	12	5 x 2.5	325 25 100 00
			1 (4)	≤ 23	≤ 16	≤ 10.5	12	5 x 2.5	325 25 101 00
EVD 20	40	42	1	27.7	22	14.5	12	5 x 3.81	325 25 085 00

Kit	Coil former	Casing	Core
EF 12.6	325 25 087 00		365 03 XXX XX
	325 00 073 10		
EVD 10/5/6	325 25 092 10	406 06 023 00	252 05 XXX XX
EVD 15/9/7	325 25 100 00		254 13 XXX XX
	325 25 101 00		
EVD 20	325 25 085 00		254 20 XXX XX

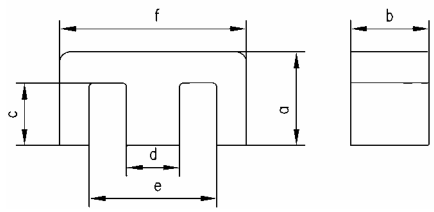
Core no. description

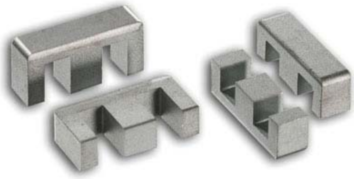
XXX XX – **Competent shape/size**
XXX – **Core material**
XX – **A_L - Code**

Solder-profiles according to JEDEG J-STD 020C



B2.2 E CORES AND KITS | CORES E10 - E19



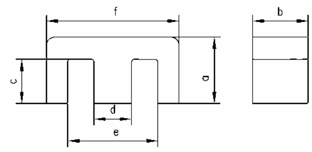


Core shape	Magnetically effective cross-section A_e (mm^2)	Magnetically effective path length l_e (mm)	Form factor $\Sigma\, l/A$ (mm^{-1})	Magnetically effective volume V_e (mm^3)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
E 10/3	7.96	23.2	2.92	185	5.1 -0.2	3.0 -0.3	3.5 +0.25	3.0 -0.25	7.0 +0.5	10.0 ±0.3
E 12.6/3.7	12.4	29.7	2.4	370	6.5 -0.2	3.7 -0.3	4.5 +0.3	3.7 -0.3	8.9 +0.6	12.6 +0.5/-0.4
E 16/4.7k	20	28.5	1.43	570	5.95 -0.3	4.7 -0.4	3.45 +0.4	4.7 -0.3	11.3 +0.6	16.0 +0.7/-0.5
E 16/4.7	20.1	37.5	1.88	750	8.2 -0.3	4.7 -0.4	5.7 +0.4	4.7 -0.3	11.3 +0.6	16.0 +0.7/-0.5
E 16/7.4	31.2	28.8	0.928	900	5.95 -0.3	7.4 -0.5	2.05 ±0.15	4.7 -0.3	11.3 +0.6	16.0 +0.7/-0.5
E 16/8.4	36.3	37.6	1.03	1365	8.2 -0.3	8.4 -0.5	5.7 +0.4	4.7 -0.3	11.3 +0.6	16.0 +0.7/-0.5
E 19/5	22.6	39.6	1.76	896	8.0 ±0.2	4.8 ±0.2	5.7 ±0.2	4.8 ±0.2	14.3 ±0.3	19.0 ±0.4

Core shape	Material	Losses (W) (≤) Fi 328 f = 100 kHz/ Bs = 200 mT		A_L - value (nH)	μ_0	B_{max} (mT)	Part number
				10 kHz/50 mV		f = 25 kHz/Hs = 250 A/m	
		25°C	100°C	Tol. = ± 25 %		100°C	
E 10/3	Fi 325	0.08 [1)]	0.04 [1)]	500	1150		252 04 325 10
E 10/3	Fi 328	0.17	0.11	500	1150	≥ 360	252 04 328 10
E 12.6/3.7	Fi 325	0.16 [1)]	0.09 [1)]	660	1260	≥ 315	254 03 325 10
E 12.6/3.7	Fi 328	0.33	0.22	660	1260	≥ 360	254 03 328 10
E 16/4.7	Fi 325	0.32 [1)]	0.18 [1)]	900	1340	≥ 315	254 05 325 10
E 16/4.7	Fi 328	0.68	0.45	900	1340	≥ 360	254 05 328 10
E 16/4.7K	Fi 325	0.24 [1)]	0.14 [1)]	1090	1240	≥ 315	254 12 325 10
E 16/4.7K	Fi 328	0.51	0.34	1090	1240	≥ 360	254 12 328 10
E 16/7.4	Fi 325	0.38 [1)]	0.21 [1)]	1700	1250	≥ 315	254 14 325 10
E 16/7.4	Fi 328	0.81	0.54	1700	1250	≥ 360	254 14 328 10
E 16/8.4	Fi 325	0.58 [1)]	0.32 [1)]	1630	1340	≥ 315	254 15 325 10
E 16/8.4	Fi 328	1.23	0.82	1630	1340	≥ 360	254 15 328 10
E 19/5	Fi 325	0.38 [1)]	0.21 [1)]	970	1360	≥ 315	254 19 325 10
E 19/5	Fi 328	0.80	0.53	970	1360	≥ 360	254 19 328 10

1) at Fi 325 f = 200kHz/Bs = 100mT

B2.2 E CORES AND KITS | CORES E20 - E30

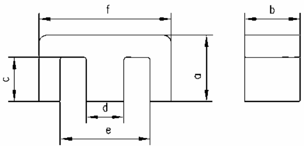


Core shape	Magnetically Effective cross-section A_e (mm^2)	Magnetically effective path length l_e (mm)	Form factor $\Sigma\, l/A$ (mm^{-1})	Magnetically effective volume V_e (mm^3)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
E 20/5.3	30.8	43.2	1.41	1330	10.2 -0.4	5.3 -0.4	6.3 +0.4	5.2 -0.4	12.8 +0.6	20.0 +0.7/-0.4
E 20/5	22.5	42.6	1.9	960	8.65 -0.4	5.0 -0.4	5.95 +0.4	5.0 -0.4	15.2 +0.6	20.0 +0.7/-0.4
E 20/5.9K	32	42.7	1.34	1370	9.3 -0.4	5.9 -0.5	6.1 +0.4	5.9 -0.4	14.1 +0.6	20.0 +0.8/-0.6
E 20/5.9	32.1	46.4	1.45	1490	10.2 -0.4	5.9 -0.5	7.0 +0.4	5.9 -0.4	14.1 +0.6	20.0 + 0.8/-0.6
E 20/11K	60.9	42.8	0.703	2610	9.3 -0.4	11.0 -0.5	6.1 +0.4	5.9 -0.4	14.1 +0.6	20.0 +0.8/-0.6
E 20/11	61	46.4	0.762	2830	10.2 -0.4	11.0 -0.5	7.0 +0.4	5.9 -0.4	14.1 +0.6	20.0 +0.8/-0.6
E 25/7.5	51.9	57.7	1.12	3000	12.8 -0.5	7.5 -0.6	8.7 +0.5	7.5 -0.5	17.5 +0.8	25.0 +0.8/-0.7
E 25/11	77.4	57.7	0.747	4480	12.8 -0.5	11.0 -0.5	8.7 +0.5	7.5 -0.5	17.5 +0.8	25.0 +0.8/-0.7
E 25/13	91.8	57.8	0.629	5302	12.8 -0.5	13.0 -0.5	8.7 +0.5	7.5 -0.5	17.5 +0.8	25.0 +0.8/-0.7
E 30/7.3	60.1	65.3	1.09	3930	15.2 -0.4	7.3 -0.5	9.7 +0.6	7.2 -0.5	19.5 +0.8	30.0 +0.8/-0.6
E 30/12	105	65.3	0.624	6860	15.2 -0.4	12.6 -0.6	9.7 +0.6	7.2 -0.5	19.5 +0.8	30.0 +0.8/-0.6

Core shape	Material	Losses (W) (≤) Fi 328 f = 100 kHz/Bs = 200 mT		A_L -value (nH)	μ_0	B_{max} (mT) f = 25 kHz, Hs = 250 A/m	Part number
		25°C	100°C	10 kHz / 50 mV Tol. = ± 25%		100°C	
E 20/5.3	Fi 325	0.45 1)	0.24 1)	1230	1380	≥ 315	254 01 325 10
	Fi 328	0.95	0.60	1230	1380	≥ 360	254 01 328 10
E 20/5	Fi 325	0.41 1)	0.23 1)	920	1390	≥ 315	254 02 325 10
	Fi 328	0.86	0.58	920	1390	≥ 360	254 02 328 10
E 20/5.9	Fi 325	0.63 1)	0.35 1)	1230	1420	≥ 315	254 06 325 10
	Fi 328	1.34	0.89	1230	1420	≥ 360	254 06 328 10
E 20/5.9K	Fi 325	0.47 1)	0.25 1)	1310	1390	≥ 315	254 10 325 10
	Fi 328	1.23	0.82	1310	1390	≥ 360	254 10 328 10
E 20/11K	Fi 325	1.11 1)	0.62 1)	2470	1380	≥ 315	254 16 325 10
	Fi 328	2.35	1.56	2470	1380	≥ 360	254 16 328 10
E 20/11	Fi 325	1.20 1)	0.67 1)	2330	1410	≥ 315	254 11 325 10
	Fi 328	2.55	1.70	2330	1410	≥ 360	254 11 328 10
E 25/7.5	Fi 325	1.27 1)	0.71 1)	1660	1470	≥ 315	255 07 325 10
	Fi 328	2.69	1.80	1660	1470	≥ 360	255 07 328 10
E 25/11	Fi 325	1.90 1)	1.06 1)	2470	1470	≥ 315	255 09 325 10
	Fi 328	4.03	2.68	2470	1470	≥ 360	255 09 328 10
E 25/13	Fi 325	2.26 1)	1.26 1)	2930	1470	≥ 315	255 16 325 10
	Fi 328	4.78	3.18	2930	1470	≥ 360	255 16 328 10
E 30/7.3	Fi 325	1.33 1)	0.71 1)	1730	1500	≥ 330	256 01 325 10
	Fi 328	2.83	1.77	1730	1500	≥ 360	256 01 328 10
E 30/12	Fi 325	2.33 1)	1.23 1)	3010	1490	≥ 330	256 05 325 10
	Fi 328	4.93	3.08	3010	1490	≥ 360	256 05 328 10

1) at Fi 325 f = 200 kHz/Bs = 100 mT

B2.2 E CORES AND KITS I CORES E32 - E65

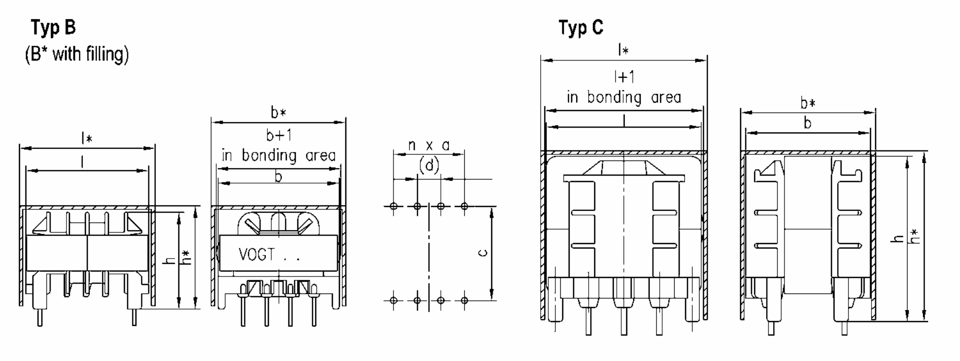


Core shape	Magnetically Effective cross-section A_e (mm^2)	Magnetically effective path length l_e (mm)	Form factor $\Sigma\ l/A$ (mm^{-1})	Magnetically effective volume V_e (mm^3)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
E 32/9.5	83.2	74.3	0.895	6190	16.4 -0.6	9.5 -0.7	11.2 +0.6	9.5 -0.6	22.7 +1.0	32.0 +0.9/-0.7
E 32/11	96.9	70.7	0.731	6860	15.5 -0.6	11.0 -0.7	10.3 +0.6	9.5 -0.6	22.7 +1.0	32.0 +0.9/-0.7
E 36/11	119	81	0.68	9670	18.0 -0.4	11.5 -0.5	12.0 +0.6	10.2 -0.5	24.5 +1.2	36.0 +1.0/-0.7
E 36/15	157	81	0.515	12800	18.0 -0.4	15.2 -0.7	12.0 +0.6	10.2 -0.5	24.5 +1.2	36.0 +1.0/-0.7
E 42/15	178	97.2	0.545	17400	21.2 -0.4	15.2 -0.5	14.8 +0.7	12.2 -0.5	29.5 +1.2	42.0 +1.0/-0.7
E 42/15A	178.5	98.6	0.553	17607	21.2 -0.4	15.2 -0.5	14.8 +0.6	12.2 -0.5	31.0 +1.2/-0.2	43.5 +1.0/-0.9
E 42/20	235	97.2	0.413	22900	21.2 -0.4	20.0 -0.8	14.8 +0.7	12.2 -0.5	29.5 +1.2	42.0 +1.0/-0.7
E 42/20A	235	98.6	0.419	23200	21.2 -0.4	20.0 -0.6	14.8 +0.6	12.2 -0.5	31.0 +1.2/-0.2	43.5 +1.0/-0.9
E 55/21	354	123	0.348	43700	27.8 -0.6	21.0 -0.6	18.5 +0.6	17.2 -0.5	37.5 +1.2	55.0 +1.2/-0.9
E 55/25	421	123	0.293	51900	27.8 -0.6	25.0 -0.8	18.5 +0.6	17.2 -0.5	37.5 +1.2	55.0 +1.2/-0.9
E 65/27.4	533	147	0.276	78300	32.8 -0.6	27.4 -1.2	22.2 +0.8	20.0 -0.7	44.2 +1.5	65.0 +1.5/-1.2

Core shape	Material	Losses (W) (≤) Fi 328 f = 100 kHz/Bs = 200 mT		A_L -value (nH)	μ_0	B_{max} (mT)	Part number
				10 kHz / 50 mV		f = 25 kHz, Hs = 250 A/m	
		25°C	100°C	Tol. = ± 25%		100°C	
E 32/9.5	Fi 325	2.63 1)	1.47 1)	2160	1530	≥ 330	257 01 325 10
	Fi 328	5.56	3.71	2160	1530	≥ 360	257 01 328 10
E 32/11	Fi 325	2.91 1)	1.63 1)	2620	1520	≥ 315	257 08 325 10
	Fi 328	6.16	4.11	2620	1520	≥ 360	257 08 328 10
E 36/11	Fi 325	4.11 1)	2.30 1)	2860	1550	≥ 315	257 05 325 10
	Fi 328	8.71	5.80	2860	1550	≥ 360	257 05 328 10
E 36/15	Fi 325	5.43 1)	3.04 1)	3770	1550	≥ 315	257 07 325 10
	Fi 328	11.49	7.66	3770	1550	≥ 360	257 07 328 10
E 42/15	Fi 325	7.37 1)	4.13 1)	3660	1590	≥ 330	259 06 325 10
	Fi 328	15.62	10.41	3660	1590	≥ 360	259 06 328 10
E 42/15A	Fi 325	7.48 1)	4.19 1)	3610	1590	≥ 315	259 35 325 10
	Fi 328	15.84	10.56	3610	1590	≥ 360	259 35 328 10
E 42/20	Fi 325	9.72 1)	5.44 1)	4820	1580	≥ 315	259 04 325 10
	Fi 328	20.58	13.72	4820	1580	≥ 360	259 04 328 10
E 42/20A	Fi 325	9.86 1)	5.52 1)	4750	1580	≥ 315	259 20 325 10
	Fi 328	20.87	13.91	4750	1580	≥ 360	259 20 328 10
E 55/21	Fi 325	18.58 1)	10.40 1)	5870	1630	≥ 315	259 01 325 10
	Fi 328			5870	1630	≥ 360	259 01 328 10
E 30/7.3	Fi 325	1.33 1)	0.71 1)	1730	1500	≥ 330	256 01 325 10
	Fi 328	2.83	1.77	1730	1500	≥ 360	256 01 328 10
E 30/12	Fi 325	2.33 1)	1.23 1)	3010	1490	≥ 330	256 05 325 10
	Fi 328	4.93	3.08	3010	1490	≥ 360	256 05 328 10

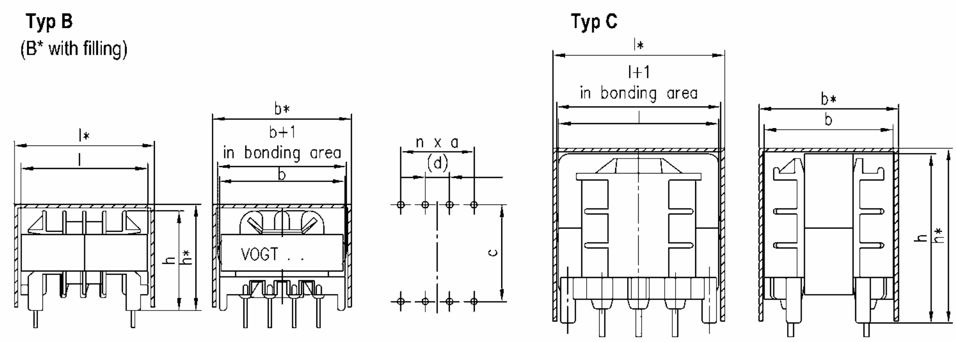
1) at Fi 325 f = 200kHz/Bs = 100mT

B2.2 E CORES AND KITS



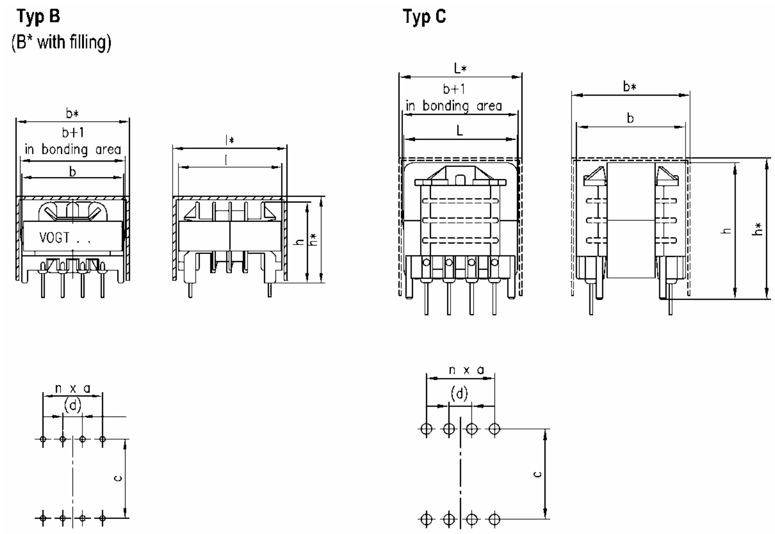
Kit	Winding cross-section A (mm^2)	Mean winding length l_e (mm)	Type	Number of Chambers	Dimensions l (l*) (mm)	b (b*) (mm)	h	Pinning Number of pins	c (mm)	n x a (d) (mm)	Part number of coil former (casing)
E 12.6/3.7	12.75	26	B	1	< 15.5 (< 16.6)	< 13.5 (< 15.1)	< 12.5 (< 12.2)	10	10.16	4 x 2.54	325 55 909 00 (406 47 000 00)
	11.73	26	B	2	< 15.5 (< 16.6)	< 13.5 (< 15.1)	< 12.5 (< 12.2)	10	10.16	4 x 2.54	325 50 909 00 (406 47 000 00)
	12.775	26	C	1	< 14.5 (< 16.6)	< 11.5 (< 15.1)	< 15.5 (< 12.2)	6	7.5	2 x 3.75	325 25 016 10 (406 47 000 00)
	11.9	26	C	2	< 14.5 (< 16.6)	< 11.5 (< 15.1)	< 15.5 (< 12.2)	6	7.5	2 x 3.75	325 25 017 10 (406 47 000 00)
E 16/4.7	24.5	32.5	B	1	< 19.5 (< 21.7)	< 17.5 (< 19.8)	< 13.5 (< 13.9)	14	12.7	6 x 2.54	325 84 914 00 (406 73 000 00)
	24.5	32.5	B	1	< 19.5 (< 21.7)	< 17.5 (< 9.8)	< 13.5 (< 13.9)	14	15.24	6 x 2.54	325 74 914 00 (406 73 000 00)
	23.75	32.5	B	2	< 19.5 (< 21.7)	< 17.5 (< 19.8)	< 13.5 (< 13.9)	14	12.7	6 x 2.54	325 85 914 00 (406 73 000 00)
	23.75	32.5	B	2	< 19.5 (< 21.7)	< 17.5 (< 19.8)	< 13.5 (< 13.9)	14	15.24	6 x 2.54	325 75 914 00 (406 73 000 00)
	22.05	32.5	B	3	< 19.5 (< 21.7)	< 17.5 (< 19.8)	< 13.5 (< 13.9)	14	15.24	6 x 2.54	325 76 990 00 (406 73 000 00)
	23.75	32.5	C	1	< 17.5	< 13.5	< 19	6	7.5	2 x 3.75	325 25 094 10
	22.56	32.5	C	2	< 17.5	< 13.5	< 19	6	7.5	2 x 3.75	325 25 095 10
	21.375	32.5	C	3	< 17.5	< 13.5	< 19	6	7.5	2 x 3.75	325 25 023 10
	13.06	32	B	1	< 17	< 13	< 12.5	6	7.5	2 x 3.75	325 25 043 10
E 16/7.4	13.34	38	C	1	< 17.5	< 14.5	< 12.5	8	10.16	2 x 3.75 (1 x 3.6)	325 25 058 10
E 16/8.4	23.75	45	C	1	< 18	< 17	< 18	6	11.25	2 x 3.75	325 25 059 10

B2.2 E CORES AND KITS



Kit	Winding cross-section A (mm²)	Mean winding length l_e (mm)	Type	Number of chambers	Dimensions: l (l*) (mm)	Dimensions: b (b*) (mm)	Dimensions: h (h*) (mm)	Pinning: Number of pins	Pinning: c (mm)	Pinning: n x a (d) (mm)	Part number of coil former (casing)
E 20/5	31.13	42	B	2	< 20.5	< 22.5	< 20	8	12.5	3 x 5	325 34 249 00
E 20/5,9	38.75	39	B	1	< 21 (< 23.7)	< 21 (< 23.7)	< 16 (< 16)	8	15	3 x 5	325 21 255 00 (406 69 000 00)
	38.75	39	B	1	< 21 (< 23.7)	< 21 (< 23.7)	< 16 (< 16)	8	15	3 x 5	325 25 106 00
	37.12	40	B	2	< 21	< 21	< 14.8	8	15	3 x 5	325 23 255 00 (406 69 000 00)
	33.17	39	C	1	< 21	< 13.5	< 21	6	10	2 x 5	325 25 003 10
	30.69	39	C	2	< 21	< 13.5	< 21	6	10	2 x 5	325 25 004 10
	38.75	39	C	1	< 21	< 13.5	< 23	6	10	2 x 5	325 25 001 10
	36.27	39	C	2	< 21	< 13.5	< 23	6	10	2 x 5	325 25 002 10
E 20/11	38.75	48	C	1	< 21	< 18.5	< 23.5	6	15	2 x 5	325 25 012 10
	33.17	48	C	1	< 21	< 18.5	< 20.8	6	15	2 x 5	325 25 065 10
	30.69	48	C	2	< 21	< 18.5	< 20.8	6	15	2 x 5	325 25 066 10
E 25/7,5	63.55	48.5	B	1	< 26 (< 28)	< 26 (< 28)	< 21 (< 20.3)	8	20	3 x 5	325 53 255 00 (406 38 000 00)
	59.04	48.5	B	2	< 26 (< 28)	< 26 (< 28)	< 21 (< 20.3)	8	20	3 x 5	325 72 255 00 (406 38 000 00)
	41.85	50/58	B*	4	< 26 (< 28)	< 26 (< 28)	< 21 (< 20.3)	8	20	3 x 5	325 25 022 20 (406 38 000 00)
	58.52	48.5	C	1	< 27	< 18	< 29.5	6	12.5	2 x 5	325 03 047 00
E 25/11	40.16	57/65	B	4	< 26 (< 28)	< 26 (< 28)	< 24.5 (< 24.5)	8	20	3 x 5	325 25 024 20 (406 58 000 00)
	72.54	58	B	1	< 26 (< 28)	< 26 (< 28)	< 24.5 (< 24.5)	8	20	3 x 5	325 95 153 00 (406 58 000 00)
	62.7	56	C	1	< 26.5	< 23.5	< 31	8	20	3 x 5	325 25 041 00
	60.84	56	C	1	< 26.5	< 23.5	< 29	8	20	3 x 5	325 25 077 20
E 30/7,3	82.65	48.5	B	1	< 32 (<33.8)	< 31 (< 33.8)	< 23.5 (< 23.2)	12	25	5 x 5	325 25 036 10 (406 84 000 00)
	78.375	48.5	B	2	< 32 (< 33.8)	< 31 (< 33.8)	< 23.5 (< 23.2)	12	25	5 x 5	325 25 037 10 (406 84 000 00)
	88.88	49	C	1	< 31.5 (< 38.3)	< 21 (< 22.4)	< 33 (< 35.4)	6	12.5	7.5	325 26 061 00 (406 06 017 00)
	84.36	49	C	3	< 31.5 (< 38.3)	< 21 (< 22.4)	< 33 (< 35.4)	6	12.5	7.5	325 07 061 00 (406 06 017 00)
E 30/12	83.9	59	C	1	< 38.5 (< 40.4)	< 25.5 (< 25.4)	< 35.8 (< 35.6)	16	20	7 x 5	325 25 010 10 (406 06 009 00)

B2.2 E CORES AND KITS



Kit	Winding cross-section A (mm²)	Mean winding length l_e (mm)	Type	Number of chambers	Dimensions			Pinning			Part number of coil former (casing)
					l (l*) (mm)	b (b*) (mm)	h (h*) (mm)	Number of pins	c (mm)	n x a (d) (mm)	
E 32/9.5	111.24	63	B	1	< 34.5	< 33.5	< 30	12	25	5 x 5	325 42 911 00
	99.36	63	B	4	< 34.5	< 33.5	< 30	12	25	5 x 5	325 25 021 20
E 36/11	110.77	70	B	1	< 38.5 (< 41.3)	< 38.5 (< 40.3)	< 33.5 (< 33.2)	12	30	5 x 5	325 46 910 00 (406 71 000 00)
	116.09	70	B	1	< 38.5 (< 41.3)	< 38.5 (< 40.3)	< 33.5 (< 33.2)	16	30	7 x 5	325 36 915 00 (406 71 000 00)
	121.02	56	C	1	< 42	< 27	< 43	16	17.5	7 x 5	325 25 070 10
E 36/15	116.085	78	B	1	< 38 (< 41.3)	< 39 (< 40.4)	< 36 (< 37)	16	30	7 x 5	325 18 915 00 (406 72 000 00)
E 42/15	189.475	93	B	1	< 43.5 (< 46.6)	< 43.5 (< 46.6)	< 39.5 (< 38.8)	18	35	8 x 5	325 89 917 00 (406 63 000 00)
	203	93	C	1	< 49 (< 51.5)	< 35 (< 37.5)	< 47 (< 49.3)	18	27.5	8 x 5	325 83 917 00 (406 50 000 00)
E 42/20	185.5	101	C	1	< 50.5	< 38.5	< 53	18	27.5	8 x 5	325 35 961 00
	189.475	101	B	1	< 44 (< 46.1)	< 44 (< 46.1)	< 44 (< 43.6)	18	35	8 x 5	325 25 011 10 (406 77 000 00)
E 55/21	283.075	120	C	1	< 61	< 45	< 66	24	30	11 x 5	325 69 923 00

B2.2 E CORES AND KITS

Comparison of coil formers and cores

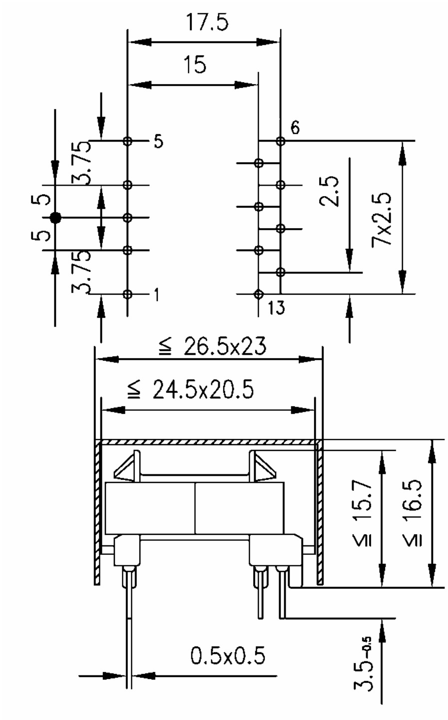
Kit	Coil number	Core
12.6/3.7	325 55 909 00	254 03 XXX XX
	325 50 909 00	
	325 25 016 10	
	325 25 017 10	
16/4.7	325 84 914 00	254 05 XXX XX
	325 74 914 00	
	325 85 914 00	
	325 75 914 00	
	325 76 990 00	
	325 25 094 10	
	325 25 095 10	
	325 25 023 10	
	325 25 043 10	
16/7.4	325 25 058 10	254 14 XXX XX
16/8.4	325 25 059 10	254 14 XXX XX
20/5	325 34 249 00	254 02 XXX XX
20/5.9	325 21 255 00	254 06 XXX XX
	325 25 106 00	
	325 23 255 00	
	325 25 003 10	
	325 25 004 10	
	325 25 001 10	
	325 25 002 10	
20/11	325 25 012 10	254 11 XXX XX
	325 25 065 10	
	325 25 066 10	
25/7.5	325 53 255 00	255 07 XXX XX
	325 72 255 00	
	325 25 022 20	
	325 03 047 00	

Kit	Coil number	Core
25/11	325 25 024 20	255 09 XXX XX
	325 95 153 00	
	325 25 041 00	
	325 25 077 20	
30/7.3	325 25 036 10	256 01 XXX XX
	325 25 037 10	
	325 26 061 00	
	325 07 061 00	
30/12	325 25 010 10	256 05 XXX XX
32/9.5	325 42 911 00	257 01 XXX XX
	325 25 021 20	
36/11	325 46 910 00	257 05 XXX XX
	325 36 915 00	
	325 25 070 10	
36/15	325 18 915 00	257 07 XXX XX
42/15	325 89 917 00	259 06 XXX XX
	328 83 917 00	
42/20	325 35 961 00	259 04 XXX XX
	325 25 011 10	
55/21	325 69 923 00	259 01 XXX XX

Core no. description

XXX XX — Competent shape/size
XXX — Core material
XX — A_L - Code

B2.2 E CORES AND KITS | E 20/5.9

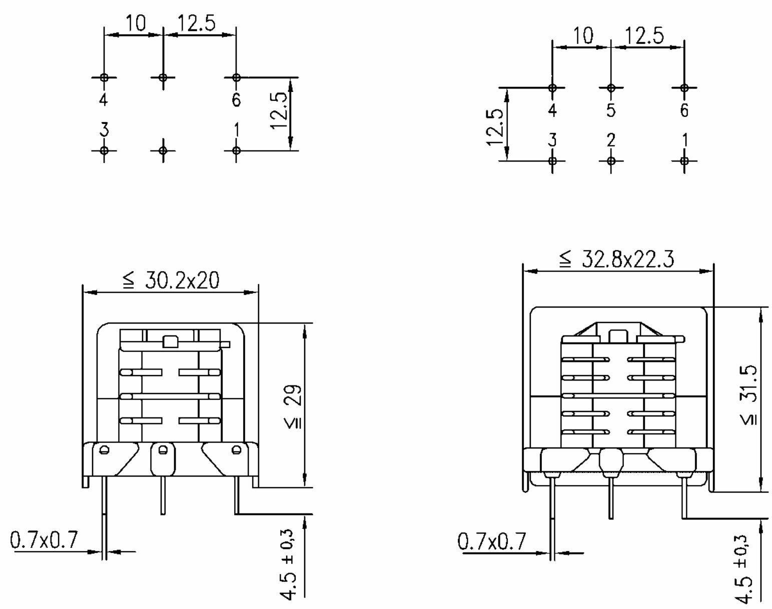


Kit	Winding cross-section A (mm²)	Mean winding length l_e (mm)	Number of chambers	Special features	Part number/ coil former	Core
E 20/5.9	39.06	39	1	Special pinning	325 17 913 00 (406 66 000 00)	254 06 XXX XX

Core no. description

XXX XX — Competent shape/size
XXX — Core material
XX — A_L - Code

B2.2 E CORES AND KITS | E 25/7.5 + E 30/7.3



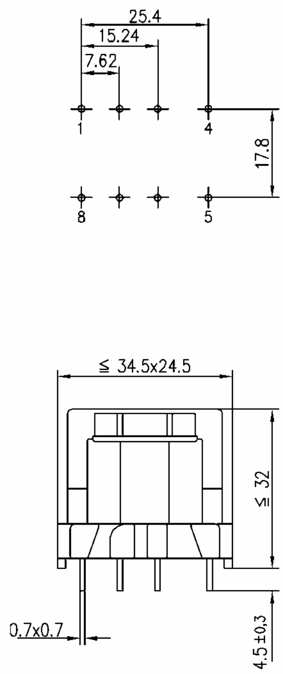
Kit	Winding cross-section A (mm^2)	Mean winding length l_e (mm)	Number of chambers	Special features	Part number/ coil former	Core
E 25/7.5	49.395	48.5	2	Special pinning	325 22 063 00	255 07 XXX XX
	51.25	48.5	4		325 87 063 00	255 07 XXX XX
E 30/7.3	76.63	51	4	Special pinning	325 25 014 10	256 01 XXX XX
	73.44	51	6		325 25 015 10	256 01 XXX XX

Core no. description

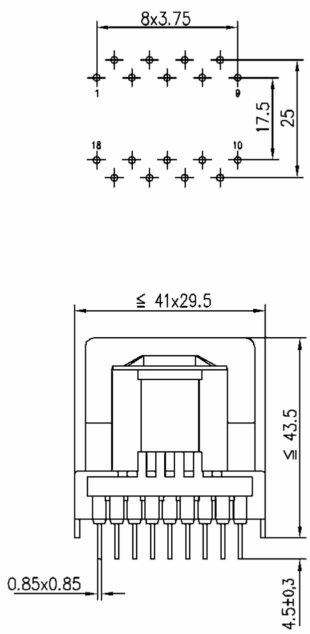
XXX XX — Competent shape/size
XXX — Core material
XX — A_L - Code

B2.2 E CORES AND KITS

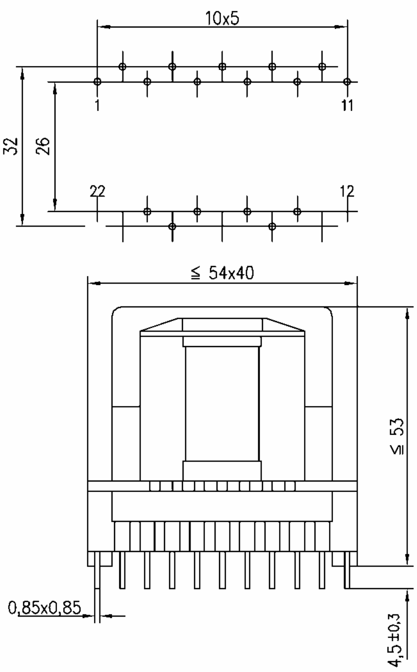
E 30/12



E 36/11



E 42/20



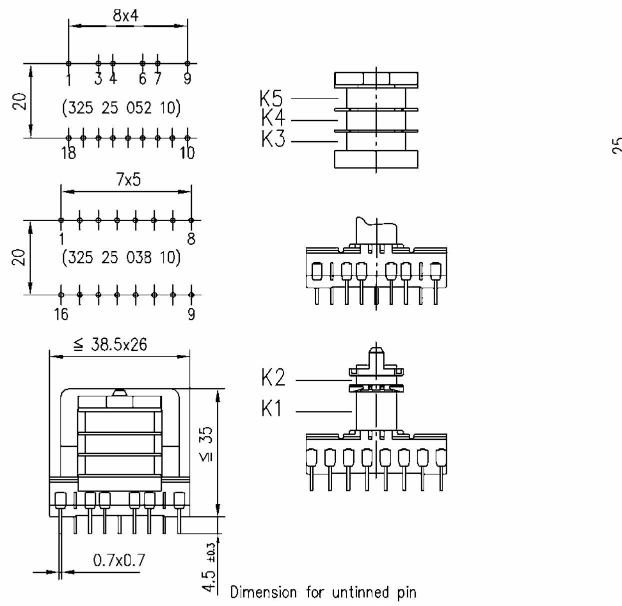
Kit	Winding cross-section A (mm^2)	Mean winding length l_e (mm)	Number of pins	Special features	Part number/ coil former	Core
E 30/12	88.5	65	1	Special pinning	325 19 255 00	256 02 XXX XX
E 36/11	136.676	76	1	Special pinning (Z-pattern)	325 97 918 00	257 05 XXX XX
E 42/20	175.39	101	1	Special pinning (Z-pattern)	325 93 917 00	259 04 XXX XX

Core no. description

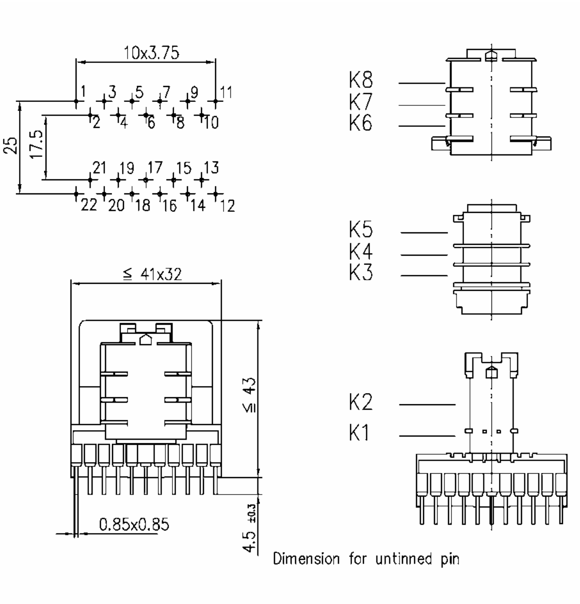
XXX XX — Competent shape/size
XXX — Core material
XX — A_L - Code

B2.2 E CORES AND KITS

E 32/11



E 36/11 S



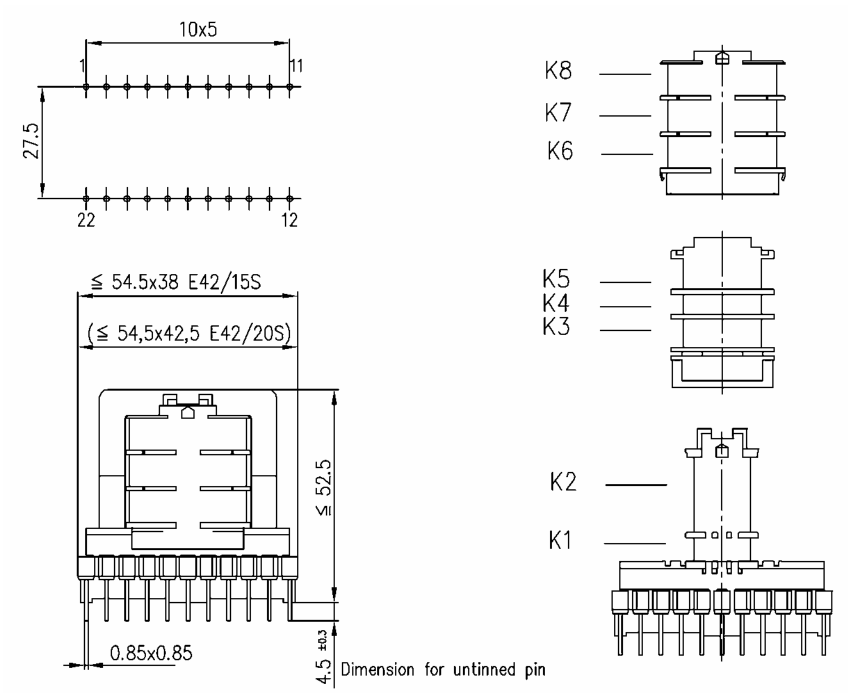
Kit	Part number/ coil former I coil former II coil former III	Core	Special features
E 32/11	325 25 038 10 325 25 039 00	257 08 XXX XX	economical structure suitable for automatic insertion machines, very safe due to design-related distances between the VDE splitting points in accordance with VDE 08 ... and VDE 08 ...(family release)
E 32/11	325 25 052 10 325 25 039 00	257 08 XXX XX	economical structure suitable for automatic insertion machines, very safe due to design-related distances between the VDE splitting points in accordance with VDE 08 ... and VDE 08 ...(family release)
E 36/11S	325 25 055 10 325 25 056 00 325 25 057 00	257 05 XXX XX	economical structure suitable for automatic insertion machines, very safe due to design-related distances between the VDE splitting points in accordance with VDE 08 ... and VDE 08 ...(family release)

Core no. description

XXX XX — Competent shape/size
XXX — Core material
XX — A_L - Code

B2.2 E CORES AND KITS

E 42/15 S and E 42/20 S



Kit	Part number/ coil former I coil former II coil former III	Core	Special features
E 42/15S	325 25 091 10	259 35 XXX XX	economical structure suitable for automatic insertion machines, very safe due to design-related distances between the VDE splitting points in accordance with VDE 0805/EN 60950/IEC 60950 and VDE 0860/EN 60065/IEC 60065 (family release)
	325 25 046 00		
	325 25 047 00		
E 42/20S	325 25 086 10	259 20 XXX XX	economical structure suitable for automatic insertion machines, very safe due to design-related distances between the VDE splitting points in accordance with VDE 0805/EN 60950/IEC 60950 and VDE 0860/EN 60065/IEC 60065 (family release)
	325 25 049 00		
	325 25 050 00		

Core no. description

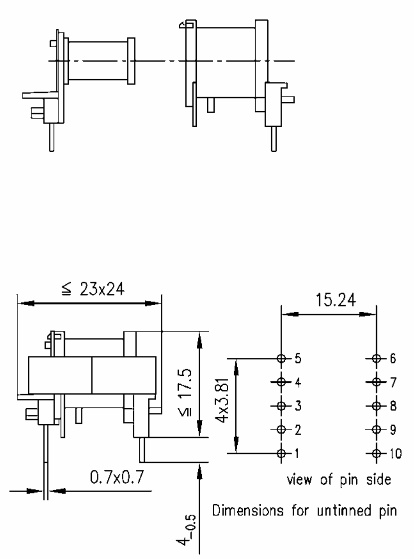
XXX XX — Competent shape/size

XXX — Core material

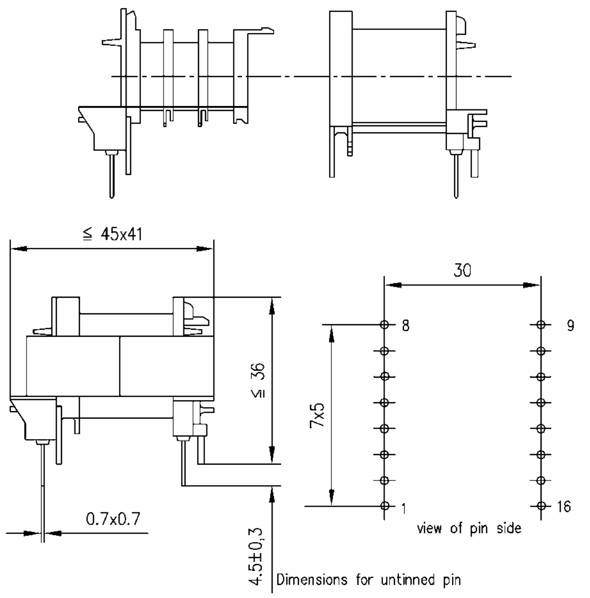
XX — A_L - Code

B2.2 E CORES AND KITS

E 20/5.9 S



E 39 R



Kit	Part number/ coil former I coil former II	Core	Special features
E 20/5.9S	325 00 076 10 325 00 077 10	254 06 XXX XX	economical structure suitable for automatic insertion machines, very safe due to design-related distances between the VDE splitting points in accordance with VDE 0805/EN 60950/IEC 60950 and VDE 0860/EN 60065/IEC 60065 (family release)
E 39 R	325 25 007 10 325 25 008 10	258 01 XXX XX	economical structure suitable for automatic insertion machines, very safe due to design-related distances between the VDE splitting points in accordance with VDE 0860/EN 60065/IEC 60065 (family release)

Core no. description

XXX XX — Competent shape/size

XXX — Core material

XX — A_L - Code

VOGT electronic
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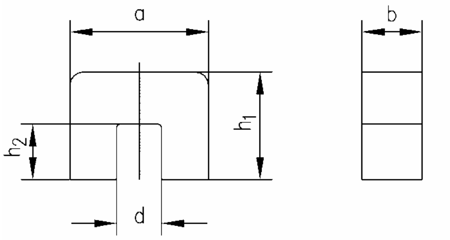
B2.3 U CORES

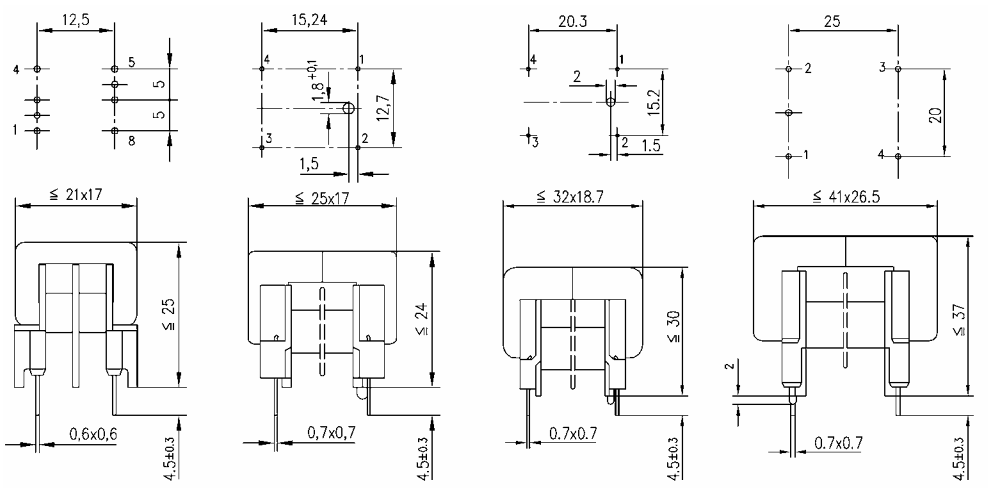


Core shape	Magnetically effective crosssection A_e (mm²)	Magnetically effective path length l_e (mm)	Form factor $\Sigma\, l/A$ (mm⁻¹)	Magnetically effective volume V_e (mm³)	a mm)	b (mm)	d mm)	h1 mm)	h2 (mm)
U 13.5/5	16	49.2	3.01	800	13.5 ±0.5	5 -0.4	6.5 +0.5	9.9 -0.4	6.2 +0.2
U 15/6.7	34.2	52.3	1.53	1790	15.4 ±0.6	6.7 -0.5	5 +0.6	12 ±0.15	6.2 ±0.15
U 20/7.7	53.8	68.7	1.28	3700	19.8 ±0.6	7.7 -0.5	5.6 +0.6	16 -0.6	8.9 +0.3
U 21/12	66.5	81.2	1.22	5390	21 ±0.6	12 -0.7	9 +0.7	17 -0.6	11 +0.4
U 25/7	53.2	87	1.64	4600	24.8 +0.3/-0.4	7.3 ±0.2	10.2 +0.3/-0.4	18.2 ±0.3	10.8 +0.3
U 25/13	105	88.2	0.84	9300	24.8 ±0.7	13 -0.7	8 +0.7	20.2 -0.7	11 +0.6
U 26/16	151	84.2	0.56	12700	25.8 ±0.7	16 -0.6	9 +0.7	22.2 -0.7	13 +0.4
U 30/26	266	118	0.43	31400	30.8 ±1.2	26.5 -0.8	10.4 ±0.4	26.4 ±0.6	16 +0.5

Core shape	Material	Losses (W) (≤) f = 200 kHz/ Bs = 100 mT		A_L -value (nH)	μ_0	B_{max} (mT) f = 25 kHz Hs = 250 A/m	Part number
		25°C	100°C	10 kHz/50 mV Tol. = ± 25%		100°C	
U 13.5/5	Fi 325	0.34	0.19	5995	1430	≥ 290	261 21 325 10
U 13.5/5	Fi 328	0.72	0.48	5995	1430	≥ 360	261 21 328 10
U 15/6.7	Fi 325	0.76	0.42	1180	1440	≥ 315	261 12 325 10
U 15/6.7	Fi 328	1.61	1.07	1180	1440	≥ 360	261 12 328 10
U 20/7.7	Fi 325	1.57	0.88	1490	1510	≥ 315	261 14 325 00
U 20/7.7	Fi 328	3.32	2.22	1490	1510	≥ 360	261 14 328 00
U 21/12	Fi 325	2.30	1.29	1600	1560	≥ 315	261 31 325 00
U 21/12	Fi 328	4.86	3.24	1600	1560	≥ 360	261 31 328 00
U 25/7	Fi 325	1.96	1.10	1200	1560	≥ 315	261 09 325 00
U 25/7	Fi 328	4.16	2.77	1200	1560	≥ 360	261 09 328 00
U 25/13	Fi 325	3.95	2.21	2350	1560	≥ 315	261 17 325 00
U 25/13	Fi 328	8.37	5.58	2350	1560	≥ 360	261 17 328 00
U 26/16	Fi 325	5.40	3.02	2670	1190	≥ 315	261 28 325 00
U 26/16	Fi 328	11.44	7.63	2670	1190	≥ 360	261 28 328 00
U 30/26	Fi 325			4600	1620		261 20 325 00
U 30/26	Fi 328			4600	1620		261 20 328 00

B2.3 U CORES

U13.5/5 **U15/6.7** **U20/7.7** **U25/13**



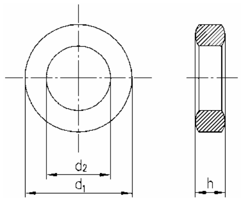
Kit	Winding cross-section A (mm²)	Mean winding length l_e (mm)	Number of chambers	Dimensions l (mm)	Dimensions w (mm)	Dimensions h (mm)	Pinning Number of pins	Part number
U 13.5/5	46	43	2	< 21	< 17	< 25	8	326 14 059 00
U 15/6.7	37	45	1	< 25	< 17	< 24	4	326 07 015 00
	35	45	2	< 25	< 17	< 24	4	326 12 015 00
U 20/7.7	70	60	1	< 32	< 18.7	< 30	4	326 05 015 00
	66	60	2	< 32	< 18.7	< 30	4	326 10 015 00
U 25/13	120	72	1	< 41	< 26.5	< 37	4	326 15 015 00
	114	72	2	< 41	< 26.5	< 37	4	326 15 011 00

Kit	Coil former	Core
U 13.5/5	326 14 059 00	261 21 XXX XX
U 15/6.7	326 07 015 00	261 12 XXX XX
	326 12 015 00	
U 20/7.7	326 05 015 00	261 14 XXX XX
	326 10 015 00	
U 25/13	326 15 015 00	261 17 XXX XX
	326 15 011 00	

Core no. description

XXX XX — Competent shape/size
XXX — Core material
XX — A_L - Code

B2.4 TOROIDAL CORES | MADE OF FERROCART POWDERS (IRON POWDERS)



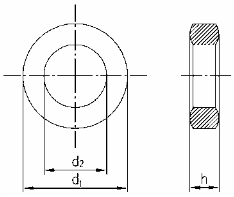
Designation	Magnetic shape parameters				Dimensions [2]			Part number [1]
	l_e (mm	A_e (mm²)	V_e (mm³)	Λ_0 = c (nH)	d_1 (mm)	d_2 (mm)	h (mm)	
R 12.5 x 8 x 7	31.9	14.8	471	0.58	12.5 ±0.2	8+ 0.2	7 +0.3	233 28 XXX 10
R 14.3 x 7.2 x 9.5	32.5	30.9	1006	1.2	14.3 -0.3	7.2 +0.2	9.5 ±0.2	233 18 XXX 10
R 17 x 9 x 9	39.4	35.6	1400	1.13	17 -0.2	9 ±0.1	9 ±0.2	234 39 XXX 10
R 19 x 10 x 6	43.9	25.1	1099	0.72	19 -0.3	10 ±0.1	6 ±0.25	234 16 XXX 10
R 19 x 10 x 9	43.9	38.3	1681	1.1	19 -0.3	10 ±0.1	9 ±0.25	234 24 XXX 10
R 21.5 x 12 x 6	51.2	27.8	1420	0.68	21.5 -0.3	12 +0.2	6 ±0.15	235 28 XXX 10
R 23 x 14.5 x 11	57.8	41.9	2418	0.91	23 -0.7	14.5 +0.4	11 -0.4	235 22 XXX 10
R 25 x 15 x 12.5	61.5	58.9	3623	1.2	25 -0.3	15 +0.2	12 ±0.3	235 13 XXX 10
R 30.5 x 14.5 x 15	67.6	111.7	7556	2.08	30.5 -0.3	14.5 +0.2	15 ±0.3	237 30 XXX 10
R 33 x 19 x 5.6	79.6	34.5	2747	0.54	33 -0.3	19 +0.2	5.6 ±0.15	237 10 XXX 10
R 33 x 19 x 9	79.6	57.7	4596	0.91	33 -0.3	19 +0.2	9 ±0.25	237 01 XXX 10
R 33 x 19 x 16	79.6	105.8	8429	1.67	33 -0.3	19 +0.2	16 ±0.3	237 33 XXX 10
R 33 x 20 x 5.6	81.5	32.5	2654	0.5	33 -0.3	20 +0.2	5.6 ±0.15	237 25 XXX 10
R 33 x 20 x 8	81.5	47.7	3888	0.73	33 -0.3	20 +0.2	8 ±0.15	237 24 XXX 10
R 36 x 19 x 14	83.8	120.4	10090	1.8	36.2 ±0.2	19 ±0.1	14 ±0.3	238 46 XXX 10
R 36 x 19 x 16	83.8	137.5	11530	2.06	36.2 ±0.2	19 ±0.1	16 ±0.3	238 45 XXX 10
R 36 x 22 x 6.7	89.3	46.7	4169	0.66	36.3 -0.3	21.8 +0.2	6.7 -0.3	238 34 XXX 10
R 38.6 x 21.2 x 4.4	91.3	37	3382	0.51	38.85 -0.3	21.1 +0.2	4.4 ±0.1	238 25 XXX 10
R 38.6 x 21.2 x 6	91.3	51	4661	0.7	38.85 -0.3	21.1 +0.2	6 ±0.15	238 30 XXX 10
R 38.6 x 21.2 x 8	91.3	67.2	6140	0.92	38.85 -0.3	21.1 +0.2	8 -0.3	238 32 XXX 10
R 38.6 x 21.2 x 18.5	91.3	160.4	14653	2.2	38.85 -0.3	21.1 +0.2	18.5 ±0.3	238 35 XXX 10
R 41.5 x 21.2 x 13.5	94.8	129.8	12300	1.72	41.5 -0.3	21.1 +0.2	13.6 -0.6	239 48 XXX 10
R 41.5 x 21.2 x 27	94.8	265.8	25200	3.52	41.5 -0.3	21.1 +0.2	26.8 ±0.6	239 49 XXX 10
R 50 x 32 x 13.5	126.7	111.6	14135	1.11	50 -0.3	32 +0.2	13.5 ±0.3	239 46 XXX 10
R 50 x 32 x 18	126.7	152	19190	1.5	50 -0.3	32 +0.2	18 ± 0.3	239 27 XXX 10
R 50 x 32 x 25	126.7	214	27100	2.12	50 -0.3	32 +0.2	25 ±0.3	239 47 XXX 10
R 50 x 32 x 30	126.7	258	32690	2.56	50 -0.3	32 +0.2	30 ±0.5	239 31 XXX 10
R 66 x 39 x 28	161.3	346	55801	2.7	66 -0.5	39 +0.4	28 ±0.6	239 52 XXX 10

[1] Please insert material number, [2] Dimensions without plastic coating

The A_L values for each version and each selected material can be easily calculated with the equation:
$A_L = \mu_i * \Lambda_0$ (nH) (Initial permeability (μ_i) of the selected material: see chapter D1.1)

The cores are shipped with chamfered edges and with plastic coating. The coating is 0.2 - 0.4 mm thick.

B2.4 TOROIDAL CORES | MADE OF FERROCARIT MATERIAL



Designation	Magnetic shape parameters				Dimensions			Weight (g)	Part number [1]
	l_e (mm)	A_e (mm²)	V_e (mm³)	$\Lambda_0 = c$ (nH)	d_1 (mm)	d_2 (mm)	h (mm)		
R 5.2 x 2.6 x 2	12	2.5	30	0.26	5.2 ±0.2	2.6 +0.2	2 ±0.2	0.13	232 17 XXX 00
R 5.5 x 2.5 x 1.5	12	2.5	30	0.25	5.5 +0.2	2.5 +0.2	1.5 +0.3	0.12	232 12 XXX 00
R 6 x 2 x 2	11	3.8	43	0.43	5.8 ±0.2	2 ±0.2	2±0.3	0.20	232 20 XXX 00
R 6 x 3 x 2	14	3	41	0.28	6 ±0.25	3 ±0.15	2 ±0.3	0.18	232 27 XXX 00
R 6 x 3 x 3	14	4.6	64	0.41	6 +0.3	3 +0.2	3 ±0.3	30.00	232 14 XXX 00
R 6 x 3 x 5.4	14	8.5	120	0.76	6 +0.5	3 +0.2	5.4 ±0.3	0.50	232 23 XXX 00
R 8 x 3.5 x 4	17	9	150	0.66	8 ±0.2	3.5 ±0.2	4 ±0.4	0.70	232 05 XXX 00
R 9.4 x 4.6 x 1.5	20	3.9	79	0.24	9.4 ±0.2	4.6 ±0.1	1.5 ±0.15	0.40	232 56 XXX 00
R 9.4 x 4.6 x 3.5	20	8.5	170	0.53	9.4 ±0.2	4.6 ±0.1	3.5 ±0.2	0.94	232 57 XXX 00
R 9.4 x 4.6 x 4.5	20	11	230	0.70	9.4 ±0.2	4.6 ±0.1	4.6 ±0.3	1.20	232 54 XXX 00
R 10 x 6 x 3	25	5.4	130	0.27	10 ±0.3	6 ±0.2	3 ± 0.3	0.63	232 32 XXX 00
R 10 x 6 x 4	24	7.1	170	0.36	10 ±0.2	6 ±0.15	4 ±0.15	0.87	232 31 XXX 00
R 10 x 6 x 8	24	15	360	0.76	9.8 ±0.3	6 ±0.2	8 ±0.3	1.81	232 29 XXX 00
R 13 x 6.1 x 4.5	29	14	410	0.60	13 +0.6	6.1 +0.3	4.5 ±0.3	2.00	233 06 XXX 00
R 13 x 7 x 3	30	7.6	230	0.31	13 ±0.35	7 ±0.2	3 ±0.2	1.20	233 11 XXX 00
R 13 x 7 x 4	30	11	320	0.44	13 ±0.35	7 ±0.2	4 ±0.3	1.50	233 31 XXX 00
R 13 x 7 x 4.5	30	12	370	0.50	13 ±0.35	7 ±0.2	4.5 ±0.3	1.80	233 24 XXX 00
R 13 x 7 x 5	30	14	410	0.56	13 ±0.35	7 ±0.2	5 ±0.3	2.00	233 20 XXX 00
R 13 x 7 x 12	30	35	1050	1.43	13 ±0.35	7 ±0.2	12 ±0.4	4.80	233 09 XXX 00
R 13.3 x 8.3 x 5	33	12	410	0.47	13.3 ±0.3	8.3 ±0.3	5.15 -0.4	1.80	233 16 XXX 00
R 13.3 x 8.3 x 5.7	33	13	440	0.50	13.3 ±0.3	8.3 ±0.3	5.7 ±0.3	2.10	233 33 XXX 00
R 13.6 x 7.3 x 6	32	17	550	0.68	13.6 ± 0.3	7.3 ±0.2	6 ±0.4	2.60	233 17 XXX 00
R 14 x 9 x 5	36	12	410	0.41	14 ±0.4	9 ±0.4	5 ±0.3	2.00	233 14 XXX 00
R 14 x 9 x 6	36	14	500	0.50	14 ±0.4	9 ±0.3	6 ±0.3	2.40	233 08 XXX 00
R 14 x 9 x 9	36	22	770	0.76	14 ±0.4	9 ±0.4	9 ±0.4	3.50	233 07 XXX 00
R 15 x 10 x 5	39	12	460	0.39	15 ±0.5	10 ±0.5	5 ±0.3	2.20	233 05 XXX 00
R 15 x 10 x 5.7	40	12	470	0.37	15 ±0.5	10.6 ±0.4	5.7 -0.4	2.20	233 23 XXX 00

[1] Please insert material number

The A_L values for each version and each selected material can be easily calculated with the equation:

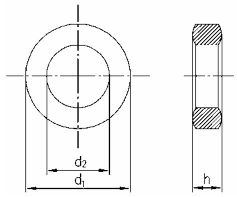
$A_L = \mu_i^* \Lambda_0$, (nH)

(Initial permeability (μ_i) of the selected material: see chapter D 1)

Calculated A_L values should be considered to be approximate values. The tolerance is ±25%.

If you need toroidal cores with other dimensions, please send us your request.

B2.4 TOROIDAL CORES | MADE OF FERROCARIT MATERIAL

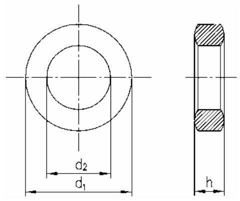


Designation	Magnetic shape parameters				Dimensions			Weight (g)	Part number [1]
	l_e (mm)	A_e (mm²)	V_e (mm³)	$\Lambda_0 = c$ (nH)	d_1 (mm)	d_2 (mm)	h (mm)		
R 16.4 x 9.3 x 6.5	39	19	750	0.61	16.4 -0.8	9.3 +0.6	6.5 -0.4	4.00	234 06 XXX 00
R 17.4 x 10.4 x 7	43	20	860	0.59	17.4 -0.8	10.4 +0.6	7 -0.4	4.60	234 22 XXX 00
R 19 x 11 x 8	47	30	1390	0.80	11.2 ±0.5	11.2 ±0.25	8 ±0.5	6.50	234 08 XXX 00
R 19 x 11 x 10	47	38	1760	1.02	19.2 ±0.5	11.2 ±0.25	10 ±0.5	8.10	234 09 XXX 00
R 19 x 11 x 15	47	58	2690	1.56	19.2 ±0.5	11.2 ±0.25	15 ±0.5	12.2	234 15 XXX 00
R 20 x 10 x 6.7	45	31	1420	0.87	20 ±0.5	10 ±0.35	6.7 ±0.4	6.80	234 32 XXX 00
R 20 x 10 x 8	45	38	1710	1.05	20 ±0.5	10 ±0.35	8 ±0.4	8.10	234 19 XXX 00
R 20 x 11 x 11	47	43	2000	1.15	19.2 ±0.5	11.2 ±0.25	11 +0.5	10.00	234 01 XXX 00
R 20 x 11 x 5	49	19	920	0.48	20.3 ±0.6	11.7 ±0.4	5 ±0.4	4.10	234 05 XXX 00
R 23 x 14.8 x 7	58	26	1520	0.56	22.8 ±0.4	14.8 ±0.3	7 ±0.25	7.30	235 21 XXX 00
R 25 x 15 x 10	62	46	2870	0.93	25 ±0.5	15 +1	10 ±0.5	14.00	235 06 XXX 00
R 26 x 14.5 x 7.5	62	39	2410	0.79	26 ±0.55	14.5 ±0.35	7.5 -0.5	11.60	236 19 XXX 00
R 26 x 14.5 x 9	62	49	3030	1.00	26 ±0.55	14.5 ±0.35	9 ±0.3	14.60	236 18 XXX 00
R 26 x 14.5 x 10	62	55	3390	1.11	26 ±0.55	14.5 ±0.35	10 ±0.3	15.80	236 05 XXX 00
R 26 x 14.5 x 15	62	84	5170	1.70	26 ±0.55	14.5 ±0.35	15 ±0.4	23.70	236 09 XXX 00
R 26 x 14.5 x 20	62	112	6950	2.28	26 ±0.55	14.5 ±0.35	20 ±0.45	31.60	236 08 XXX 00
R 27 x 14 x 9	62	52	3230	1.05	27 ±0.7	14 ±0.4	9 -0.5	16.20	236 12 XXX 00
R 27 x 14 x 30	62	190	11800	3.84	27 ±0.7	14 ±0.4	30 ±0.9	54.00	236 04 XXX 00
R 27 x 14 x 40	62	255	15860	5.15	27 ±0.7	14 ±0.4	40 ±1.2	72.00	229 39 XXX 00
R 29.5 x 19 x 9	75	45	3390	0.76	29.5 ±0.7	19 ±0.5	9 ±0.3	16.30	236 21 XXX 00
R 29.5 x 19 x 15	75	77	5750	1.29	29.5 ±0.7	19 ±0.5	15 ±0.3	27.60	237 27 XXX 00
R 36 x 23 x 15	91	94	8520	1.29	36 ±0.9	23 ±0.7	15 ±0.4	39.00	238 09 XXX 00
R 45 x 23 x 17.5	103	193	19800	2.35	45 ±1.1	23 ±0.6	17.5 ±0.5	98.00	239 60 XXX 00
R 61 x 38 x 18	153	191	29100	1.57	61 ±1.5	38 ±1.2	18 ±0.8	157.00	239 51 XXX 00
R 80 x 40 x 15	181	300	54400	2.08	80 ±2.5	40 ±1.2	15 ±0.5	261.00	239 40 XXX 00

[1] Please insert material number

The A_L values for each version and each selected material can be easily calculated with the equation:
$A_L = \mu_i * \Lambda_0$ (nH) (Initial permeability (μ_i) of the selected material: see chapter B 1)
Calculated A_L values should be considered to be approximate values. The tolerance is ±25%.
If you need toroidal cores with other dimensions, please send us your request.

B2.4 TOROIDAL CORES | WITH PLASTIC COAT



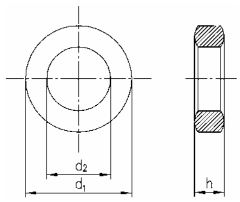
Designation	A_L (nH) for material			Dimensions			Part number [2]
	Fi 340 (±25%)	Fi 360 (± 25%)	Fi 410 (+30%) (-40%)	d_1 (mm)	d_2 (mm)	h (mm)	
R 10 x 6 x 4	1590 [1]	2200 [1]	4090	10.90	5.00	5.10	232 31 XXX 10
R 10 x 6 x 8	3380	4570	7640	10.90	5.00	9.10	232 29 XXX 10
R 13 x 7 x 12	6170 [1]	8600	14400	14.15	6.00	13.20	233 09 XXX 10
R 13.3 x 8.3 x 5	1870	2600	4400	14.40	7.20	6.05	233 21 XXX 10
R 13.3 x 8.3 x 5	2010	2800 [1]	4700	14.40	7.20	5.95	233 16 XXX 10
R 14 x 9 x 5	1760	2450	4100	15.30	7.90	6.10	233 14 XXX 10
R 14 x 9 x 6	2160	3000	5100	15.30	7.90	7.20	233 08 XXX 10
R 14 x 9 x 9	3270	4570	7600	15.30	7.90	10.20	233 07 XXX 10
R 15 x 10 x 5	1670	2330	3900	16.30	8.70	6.10	233 05 XXX 10
R 15 x 10 x 5.7	1600	2230	3700	16.30	9.40	6.50	233 23 XXX 10
R 16.4 x 9.3 x 6.5	2640	3680	6150	17.20	8.50	7.30	234 06 XXX 10
R 17.4 x 10.4 x 7	2540	3600	5900	18.20	9.60	7.80	234 22 XXX 10
R 19 x 11 x 8	3500 [1]	4900	8200	20.50	10.15	9.30	234 08 XXX 10
R 19 x 11 x 10	4430 [1]	6200	10350	20.50	10.15	11.30	234 09 XXX 10
R 19 x 11 x 13.5	6050	8440	14100	20.50	10.15	14.80	234 31 XXX 10
R 19 x 11 x 14	6310	8800	14700	20.50	10.15	15.30	234 10 XXX 10
R 19 x 11 x 15	6750	9500	15900	20.50	10.15	16.30	234 15 XXX 10

[1] ± 30%
[2] Please insert material number

Plastic coating
The coating is 0.2 -0.4 mm thick.
The breakdown (puncture) voltage for coated cores is > 1.5 kV, 50 Hz.

If you need plastic-coated toroidal cores with other dimensions, please send us your request.

B2.4 TOROIDAL CORES | WITH PLASTIC COAT



Designation	A_L (nH) for material			Dimensions			Part number [2]
	Fi 340 (±25%)	Fi 360 (± 25%)	Fi 410 (+30%) (-40%)	d_1 (mm)	d_2 (mm)	h (mm)	
R 20 x 10 x 6.7	3770	5250 [1]	8800	21.30	8.85	7.90	234 32 XXX 10
R 20 x 10 x 7	3950	5500	9200	21.30	8.85	8.20	234 20 XXX 10
R 20 x 10 x 8	4540	6300	10600	21.30	8.85	9.20	234 19 XXX 10
R 20 x 11 x 11	4990	6950	11600	20.80	10.35	12.30	234 01 XXX 10
R 20 x 11 x 16	7270	10100	17000	20.80	10.35	17.30	234 18 XXX 10
R 23 x 14.8 x 7	2440	3400	5700	24.00	13.70	8.05	235 21 XXX 10
R 25 x 15 x 10	4000	5580	9300	26.30	14.20	11.30	235 06 XXX 10
R 26 x 14.5 x 7.5	3420	4770	8000	27.35	13.35	8.30	236 19 XXX 10
R 26 x 14.5 x 9	4300	6000	10000	27.35	13.35	10.10	236 18 XXX 10
R 26 x 14.5 x 10	4810	6700	11200	27.35	13.35	11.10	236 05 XXX 10
R 26 x 14.5 x 15	7320	10200		27.35	13.35	16.20	236 09 XXX 10
R 26 x 14.5 x 20	9840	13730		27.35	13.35	21.25	236 08 XXX 10
R 27 x 14 x 30	16600 [1]			28.50	12.80	31.70	236 04 XXX 10
R 27 x 14 x 40	22280 [1]			28.50	12.80	42.00	229 39 XXX 10
R 29.5 x 19 x 9	3270	4570		31.00	17.70	10.10	236 21 XXX 10
R 29.5 x 19 x 15	5540	7700		31.00	17.70	16.60	237 27 XXX 10
R 30 x 19 x 10	3650	5100		31.00	17.70	11.10	236 15 XXX 10
R 36 x 23 x 15	5560	7750		37.70	21.50	16.20	238 09 XXX 10

[1] ± 30%
[2] Please insert material number

Plastic coating

The coating is 0.2 -0.4 mm thick.
The breakdown (puncture) voltage for coated cores is > 1.5 kV, 50 Hz.

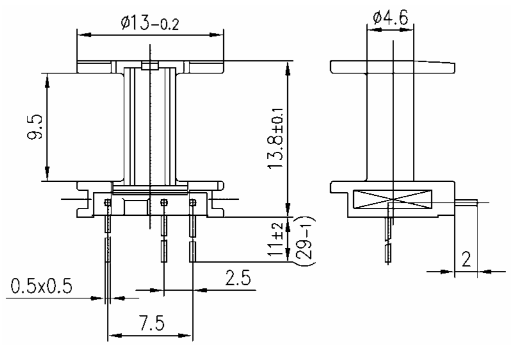
If you need plastic-coated toroidal cores with other dimensions, please send us your request.

B2.5 ROD CORES/ROD CORE KITS (I CORE) | ROD CORES

Nominal diameter d[1] (mm)	Diameter tolerances rough	Diameter tolerances fine[2]	Greatest length l (mm)	Part number [3]
2	+ 0.2	- 0.05	16	212 66 XXX XX
2.5	+ 0.25	- 0.05	20	213 55 XXX XX
3	+ 0.25	- 0.05	25	213 70 XXX XX
3.5	+ 0.25	- 0.05	25	on request
4	+ 0.3	- 0.05	30	214 52 XXX XX
5	+ 0.3	- 0.05	35	215 75 XXX XX
6	+ 0.3	- 0.1	40	216 43 XXX XX
8	+ 0.4	- 0.1	50	on request
10	+ 0.4	- 0.1	50	on request

[1] Other dimensions on request
[3] Please insert material number

B2.5 ROD CORES/ROD CORE KITS (I CORE) | ROD CORE KITS (I CORE)

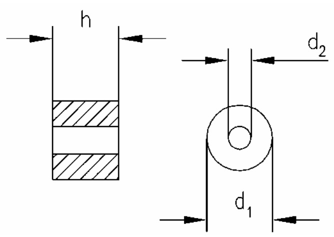


Core no. description

XXX XX — Competent shape/size
XXX — Core material
XX — A_L - Code

Kit	Winding cross-section A (mm²)	Mean winding length l_e (mm)	Part number / coil former	Part number core
I core	52	24.5	321 39 007 00	214 32 XXX XX

B2.6 ATTENUATION BEADS



Designation: attenuation beads	d_1 (mm)	d_2 (mm)	h (mm)	Part number [1]
2.5 x 1 x 1	2.5 ±0.15	1 +0.3	1 +0.2	231 29 XXX XX
2.5 x 1 x 3	2.5 ±0.15	1 +0.3	4 ±0.2	223 12 XXX XX
2.6 x 1.2 x 1.6	2.6 ±0.15	1.2 +0.2	1.65 ±0.15	231 01 XXX XX
3 x 0.9 x 6.5	3 +0.2	0.9+0.2	6.5 ±0.4	223 09 XXX XX
3 x 0.9 x 8	3 +0.2	0.9 +0.2	8 ±0.5	223 02 XXX XX
3 x 0.9 x 11	3 +0.2	0.9 +0.2	11 ±0.5	223 03 XXX XX
3 x 1.2 x 12	3 ±0.1	1.2 ±0.1	12 ±0.5	223 04 XXX XX
3.2 x 0.9 x 4.2	3.2 -0.2	0.9 +0.2	4 ±0.2	224 44 XXX XX
3.5 x 1.2 x 1	3.5 ±0.2	1.2 ±0.2	1 +0.3	231 39 XXX XX
3.5 x 1.2 x 1.5	3.5 ±0.2	1.2 ±0.2	1.5 ± 0.3	231 11 XXX XX
3.5 x 1.2 x 1.9	3.5 ±0.2	1.2 ±0.2	1.9 ±0.3	231 35 XXX XX
3.5 x 1.2 x 3	3.5 ±0.2	1.2 ± 0.2	3 ±0.3	231 16 XXX XX
3.5 x 1.2 x 3.5	3.5 ±0.2	1.2 ±0.2	3.5 ±0.3	231 12 XXX XX
3.5 x 1.2 x 5	3.5 ±0.2	1.2 ±0.2	5 ±0.3	224 49 XXX XX
3.5 x 1.2 x 8	3.5 ±0.2	1.2 ±0.2	8 ±0.4	224 42 XXX XX
3.5 x 1.2 x 9	3.5 ±0.2	1.2 ±0.2	9 ±0.4	224 17 XXX XX
3.5 x 1.3 x 3	3.5 ±0.2	1.3 ±0.2	3 ±0.3	231 28 XXX XX
3.5 x 1.5 x 5	3.5 ±0.2	1.5 ±0.2	5 ±0.4	224 29 XXX XX
4 x 1.6 x 4	4 -0.3	1.6 ±0.1	4 ±0.3	231 07 XXX XX
4 x 1.6 x 6	4 ±0.15	1.6 ±0.2	6 ±0.4	224 37 XXX XX
4 x 1.6 x 13	4 -0.1	1.6 ±0.1	13 ±0.2	224 12 XXX XX
4 x 2 x 1	4 ±0.2	2 ±0.1	1 +0.3	231 06 XXX XX
4 x 2 x 3	4 ±0.3	2 ±0.2	3 ±0.2	231 05 XXX XX
4 x 2 x 7	4 ±0.2	2 ±0.2	7 ±0.3	224 45 XXX XX

[1] Please insert material number

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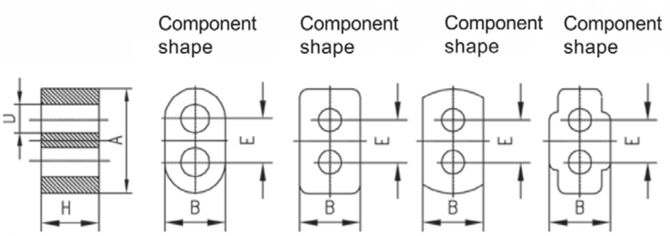
B2.7 DOUBLE APERTURE CORES



Designation: Twin-hole core	Dimensions					Material	Part number [1]
	A (mm)	B (mm)	D (mm)	E (mm)	H (mm)		
ZB 3.4 x 1.95 x 1.8	3.4 ±0.2	1.95 ±0.2	0.9 ±0.1	1.45 ±0.15	1.8 ±0.2	[4]	230 88 XXX XX
ZB 3.5 x 2.4	3.45	92.01	0.86	1.45	2.36	[6]	230 00 001 00
ZB 3.6 x 2	3.6 -0.3	2.1 -0.3	0.8 +0.15	1.45 ±0.1	2.0 -0.3	[7]	230 00 002 00
ZC 3.6 x 2.5	3.6 ±0.2	2.1 ±0.2	0.8 ±0.15	1.45 ±0.15	2.5 -0.3	[3] [4] [5]	230 81 XXX XX
ZC 5 x 2.5	5.0 ±0.3	2.5 ±0.2	1.5 ±0.1	2.5 ±0.2	2.5 -0.2	[2] [3] [4] [5]	230 60 XXX XX
ZC 7 x 2.5	6.6 ±0.3	4.1 ±0.2	2.1 ±0.1	3.3 ±0.2	2.5 ±0.3	[2] [4]	230 05 XXX XX
ZC 7 x 6	6.9 ±0.3	4.3 ±0.2	2.0 ±0.3	3.0 ±0.2	6.0 ±0.3	[2]	230 06 XXX XX
ZF 7 x 4	6.95 ±0.3	3.85 ±0.2	1.2 ±0.1	3.45 ±0.2	4.0 ±0.3	[4]	230 04 XXX XX
ZH 5 x 2.5	5.3 ±0.3	3.1 ±0.25	1.4 ±0.1	2.5 ±0.2	2.5 ±0.2	[3] [4]	230 85 XXX XX

[1] Please insert material number
[2] Fi 221 [3] Fi 242 [4] Fi 292 [5] Fi 340
[6] 12-315-g (Fa. Ferronics) [7] M13 (Fa. EPCOS)

Core no. description

XXX XX **XXX** **XX**

XXX XX – **Competent shape/size**
XXX – **Core material**
XX – **A_L - Code**

Further, the RM, ERF, ETD, EFD and EP series cores and kits are also offered.

If you require kits which are not listed here, after the profitability is reviewed, we will be happy to add any other kit to our product line.

For large quantities, special tooling can be manufactured for your customer-specific applications, with separate tools and molds.

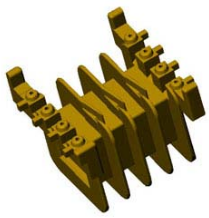
Please send us your inquiry

B3.1 OVERVIEW

Plastics

In any application Vogt is prepared for optimising each component and module with best quality grade plastic material and matching technology. For a short view over some processed materials the following listings shall inform you about principal advantages and disadvantages of these materials. In direct discussion with our suppliers and our customers we are looking each product to be best compromised between thermal, mechanical and electrical properties in combination with economical requirements.
Plastic material applied in Vogt-electronic parts complies with ROHS restriction. As one contribution to the responsibility for our environment we prevent from halogenide substances in plastics if possible. We are endeavoured to reduce material waste by consequently recycling our materials if there is no restriction by our customer and if technically possible.

Polyamide (PA6/PA66/PA 66T/PA12)



Polyamide has become a standard for electrical insulating material. Its characteristics are high mechanical strength, rigidness combined with good thermal stability. In general polyamide is fibre, ball or mineral reinforced (see GF, GB or M with content in % in the description):
P6: due to the advanced dimensional stability this material is preferably applied for casing
PA66: the properties are close to the one of PA6 but with improved temperature stability. We use the material for coil formers, antennas, immobilizer systems and others. A negative aspect is its sensitivity to moisture (moisture absorption).
We have introduced an additionally temperature stabilized version for sensors and flame resistant versions (V0 due to UL-listing) for coil formers.
PA12: here, sensitivity to moisture is lower. We use this material for various internal applications.

Polyester (PBT)

Technically grade with various mostly fibre, ball or mineral filling to improve mechanical and dimensional stability. Typically, the material is used for plug connectors and for casing where coils and coil former shall be shielded from moisture and chemical assault. (V0-classified version due to UL-listing are available).

Polycarbonate (PC)

Due to its clarity we use polycarbonate for components where good light transmission is required.

Polyoximethylene (POM)

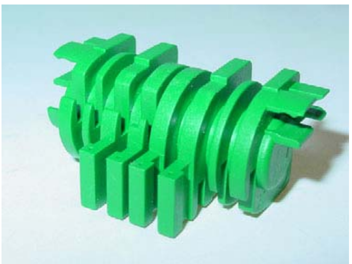
Material with good mechanical properties even when it's not reinforced, due to its excellent fatigue strength it is used for mechanically stressed parts. The application temperature is comparable to PS and therefore rather low.

Polypropylene (PP)

A standard material (commodity) with low price level and balanced range of properties. The application is very restricted due to its brittleness at lower temperature.

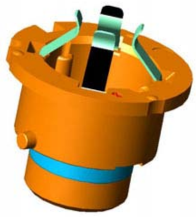
Polyphenylene oxide (PPO)

For parts with demand on dimensional stability.



Polyphenylensulfide (PPS)

Technical grade for high temperature application with reinforcement. Used for coil former with demand on high thermal resistivity, when in e.g. lead-free soldering the plastic come in touch with the hot solder (reflow soldering). Due to its excellent mechanical properties combined with best processing characteristics it is used for thin-wall casings and high temperature application. The material is listed by UL94 with V0.

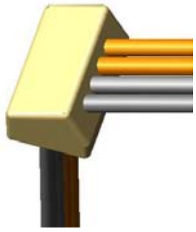


Polystyrol/Polystyrene (PS)

Optically transparent material with less mechanical strength. Used for special products where temperature application is low.

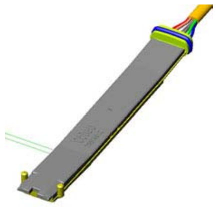
Thermoelaste (TPE)

Mechanically elastic material modified for injection moulding process. It is applied for stoppers often in combination with polyamide. Due to its mechanical damping in combination to its adhesion to other plastics it's excellent for protecting fragile parts and for cable entries.



Thermosetting plastic

Thermosetting plastic is an irreversibly curing material. Its low processing viscosity close to the curing temperature allows the construction of thin wall casing. The processing technology differs from standard thermoplastic materials. Low pressure and lower processing temperature often permit the direct overmoulding of electrical printed circuits boards.

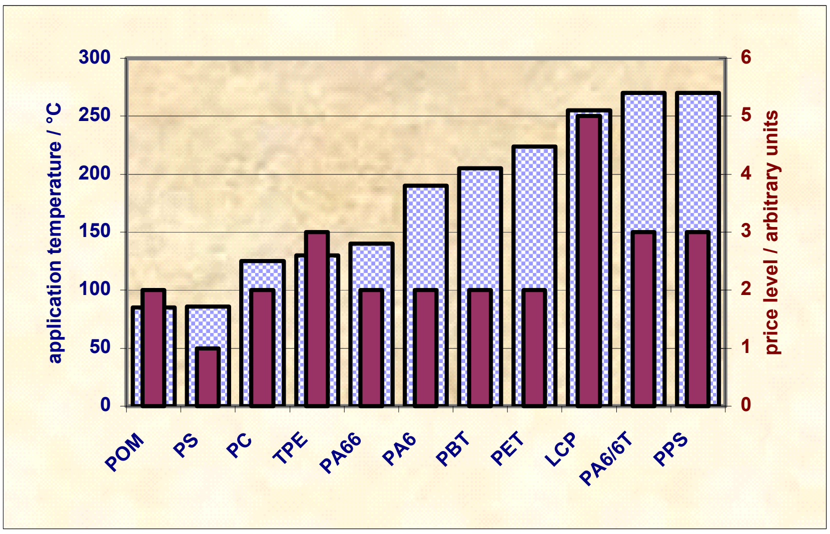


Liquid Crystalline Polymere (LCP)

High performance technical grade for thin-wall parts. LCP is classified to V0 0,75mm down to 0,38mm wall thickness by UL 94 flame testing. In combination with a reinforcement, the material has an excellent dimensional stability. Close to PPS it is designed for higher temperature stress as applied in soldering of SMT-parts.

Application temperature for plastics

For a first approximation the diagram shows the absolute max. application temperature due to laboratory testing (Heat distortion temperature HDT/A for 1,8Mpa measured according to ISO 075). Max. temperature for material under processing or permanent load can be reduced significantly. The price level is just an indication and a rough average over different grades



	Material	reinforcement	density	moisture absorbtion	Vicat-Temp.	temperatue index 500h/20000h		dissipation factor	relative permittivity	dielectric strength	flammability rating	min. thickness
	Parameter			23°C/50%r.F. (100°C/30min)	VST/ B/50	50% loss of tensil strenght after 5000h	20000h	1 MHz (100Hz)	1 MHz (100Hz)	K20/P50 1.0mm (3mm)		
	unit	%	g/cm3	%	°C	°C	°C	tand x10-4	1	kV/mm	classification	mm
	Norm / standard	ISO 3451	ISO 1183	ISO 62	ISO 306	IEC 216-1	IEC 216-1	IEC 60250	IEC 60250	IEC 60243	UL94	UL94
Poly-propylen	PP	-	0,9	0,1	80	-	-	3,5	2,3	30-40	HB	1,6
Poly-styrol	PS	-	1,05	0,05	101	-	-	0,5	2,5	135	HB	1,5
POM Polyoxymethylen/Polyacetal	POM	-	14,2	-	-	-	-	-	-	-	-	-
	POM-GF25	25	1,6	0,15	160	-	-	50	4	43	HB	1,5
	POM-GB30	30	1,6	0,12	150	-	-	300 (80)	4,5 (5)	40	HB	0,81
Poly-carbonat	PC	-	1,2	0,15	140	-	-	10	2,7	35	HB	0,7
Poly-phenylen-oxid	PPO	30	1,3	0,06	145	-	-	1	2,9	18	HB	1,5
Polyamide	PA66-(GF25)-HB	25	1,32	1,9	250	170	140	tr/lf 140/1600	tr/lf 3,5/5,5	tr/lf 90/80	HB	0,8
	PA66-GF25-V0	25	1,34	1,4	-	155	140	tr/lf 200/1000	tr/lf 3,7/5,0	tr/lf 80/65	VO	0,81
	PA66-GF30	30	1,36	1,7	250	175	145	tr/lf 140/3000	-	-	HB	0,71
	PA66-GF35	35	1,41	1,6	250	170	140	tr/lf 200/3000	tr/lf 3,5/5,7	-	HB	0,71
	PA66-GF35-V0	35	1,45	1,3	-	155	140	tr/lf 200/2000	tr/lf 3,6/5,0	tr/lf 70/40	VO	0,81
	PA66-(GF+GK)30	30	1,36	-	>200	-	-	-	-	-	-	-
	PA66-GF25 Temp.stabiliz	25	1,35	1,3	285	160	135	tr/lf 300/400	tr/lf 4,3/4,5	tr/lf 100/-	HB	0,44
	PA6-GB30	30	1,35	6,5	215	-	-	17	3,9	35	HB	1,6
	PA12	-	1,01	0,8	140	-	-	310	2,5	27	HB	0,81

data are typical values taken from manufacturers data sheets

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	Material	reinforcement	density	moisture absorbtion	Vicat-Temp.	temperatue index 500h/20000h		dissipation factor	relative permittivity	dielectric strength	flammability rating	min. thickness
	Parameter			23°C/50%r.F. (100°C/30min)	VST/ B/50	50% loss of tensil strenght after 5000h / 20000h		1 MHz (100Hz)	1 MHz (100Hz)	K20/P50 1.0mm (3mm)		
	unit	%	g/cm3	%	°C	°C	°C	tand x10-4	1	kV/mm	classification	mm
	Norm / standard	ISO 3451	ISO 1183	ISO 62	ISO 306	IEC 216-1	IEC 216-1	IEC 60250	IEC 60250	IEC 60243	UL94	UL94
Polyester	PBT-GF10	10	1,37	0,2	-	140	140	150	3,6	-		
	PBT-GF20	20	1,45	0,2	-	140	140	150 (12)	3,7 (3,7)	-		
	PBT-GF30	30	1,68	0,2	-	150	125	158	3,7	40		
	(PBT+ASA)-GF20	20	1,39	0,2	-	140	110	190 (30)	3,6 (3,7)	-	HB	
	(PBT+ASA)-GF30	30	1,47	0,2	-	140	140	180 (30)	3,7 (3,8)	-	HB	
	PET	30	1,67	0,17	218	-	-	100	4,7	33		
Polyphenylen-sulfid	PPS-(GF+M)30	30	1,56	0,02	-	-	-	-	-	-	VO	
	PPS-(GF+M)40	40	1,65	0,02	-	-	-	20	4,1	28	VO	
	PPS-(GF+M)65	65	2,03	0,02	-	-	-	20	5,3	25	VO	
Thermo-elaste	TPE	25	1,2	-	-	-	-	-	-	-		
	TPE	25	1,2	-	-	-	-	-	-	-		
LCP	LCP-GF30	30	1,6	-	195	-	-	250 (100)	3,3 (4,0)	32		
Duro - plast	Duroplaste	70	1,9	(0,80)	-	-	-	(1,0)	(5,2)	(23)		

data are typical values taken from manufacturers data sheets

	Material	RTI / ELEC	min. thickness	RTI / IMP	min. thickness	RTI / Str	min. thickness	hot wire test	heat deflection	heat deflection	heat deflection
	Parameter			mech. Stress / Impact		mech. Stress no impact			HDT/A (1,8MPA)	HDT/B (0,45MPA)	HDT/B (8,0MPA)
	unit	°C	mm	°C	mm	°C	mm	°C	°C	°C	
	Norm / standard	UL94	UL94	UL94	UL94	UL94	UL94	IEC 60695	ISO 75	ISO 75	ISO 75
Poly-propylen	PP	105	1,6	-	-	-	-	-	-	-	
Poly-styrol	PS	50	1,5	50	1,5	50	1,5	-	86	98	
POM Polyoxymethylen/Polyacetal	POM	-	-	-	-	-	-	-	95	165	
	POM-GF25	50	1,5	50	1,5	50	1,5	-	160	-	
	POM-GB30	110	1,5	90	1,5	100	1,5	-	104	-	
Poly-carbonat	PC	80	0,7	80	0,7	80	0.7	850	122	133	
Poly-phenylen-oxid	PPO	90	1,5	90	1,5	90	1,5	850	140	145	
Polyamide	PA66-(GF25)-HB	130	0,8	120	1,5	130	1,5	-	250	250	-
	PA66-GF25-V0	110	0,41	115	0,41	130	0,81	960	250	250	-
	PA66-GF30	125	0,71	115	1,5	115	1,5	-	250	250	
	PA66-GF35	120	0,71	120	1,5	115	1,5	650	250	250	
	PA66-GF35-V0	110	0,41	115	0,41	130	0,81	960	250	250	-
	PA66-(GF+GK)30	-	-	-	-	-	-	-	250	-	-
	PA66-GF25 Temp.stabiliz	140	0,75	100	0,75	120	0,75	-	270	-	-
	PA6-GB30	-	-	-	-	-	-	-	85	195	
	PA12	110	0,81	70	1,5	90	0,81	-	50	110	

data are typical values taken from manufacturers data sheets

	Material	*RTI / ELEC*	min. thickness	*RTI / IMP*	min. thickness	*RTI / Str*	min. thickness	hot wire test	heat deflection	heat deflection	heat deflection
	Parameter			mech. Stress / Impact		mech. Stress no impact			HDT/A (1,8MPA)	HDT/B (0,45MPA)	HDT/B (8,0MPA)
	unit	°C	mm	°C	mm	°C	mm	°C	°C	°C	
	Norm / standard	UL94	UL94	UL94	UL94	UL94	UL94	IEC 60695	ISO 75	ISO 75	ISO 75
Polyester	PBT-GF10	130	0,75	125	0,75	125	0,75	<750	200	220	
	PBT-GF20	-	-	-	-	-	-	-	205	220	
	PBT-GF30	140	0,75	115	0,75	130	0,75	960	195	220	
	(PBT+ASA)-GF20	-	-	-	-	-	-	-	160	205	-
	(PBT+ASA)-GF30	-	-	-	-	-	-	-	175	210	-
	PET	100	0,35	155	0,81	155	0,81	960	222	243	
Polyphenylen-sulfid	PPS-(GF+M)30	130	0,38	130	0,38	130	0,38	960	265	-	205
	PPS-(GF+M)40	130	0,38	180	0,38	200	0,38	960	270	-	215
	PPS-(GF+M)65	130	0,45	130	0,45	130	0,45	960	270	-	215
Thermo-elaste	TPE	-	-	-	-	-	-	-	-	-	
	TPE	-	-	-	-	-	-	-	-	-	
LCP	LCP-GF30	-	-	-	-	-	-	-	276	-	
		-	-	-	-	-	-	-	-	-	-
Duro - plast	Duroplaste	-	-	-	-	-	-	-	-	-	

data are typical values taken from manufacturers data sheets

IMMOBILIZER ANTENNAS

Immobilizers are the standard system to prevent car-theft. Ring type antennas are used to establish a short range communication with the transponder chip inside the ignition key.

Features

- Customised antenna modules for mounting onto keylock-housings
- Various configurations with moulded housing, connector or cable-harness
- Optional integration of RF-antenna leads and illumination plastics
- High quality visible surface according to customer specification

Technology

- Complex shapes can be realized
- Overmoulding of the antenna winding and moulding of housing and connector in one shot
- Pressfit pin interface for solderless assembly of the transceiver electronics

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PASSIVE-ENTRY ANTENNAS

Automotive passive entry and start systems require multiple antennas to clearly locate the electronic key. Low frequency technology (125kHz) allows precise control of the detection range.

Features

- Doorhandle Modules, optionally with integrated electronics and switches
- Interior Antennas, e.g. trunk mounted
- Exterior Antennas, e.g. bumper mounted
- Various configurations with cable-harness or connectors
- Optionally with integrated capacitor and resistor

Technology

- Standardized, robust design concept
- Waterproof design as an option
- Extremely low electrical tolerances and temperature co-efficient
- Highly automated mass production

LF INITIATOR FOR TIRE PRESSURE MONITORING SYSTEMS (TPMS)

The continuous monitoring of the pressure in all tires together with the indication of the current pressure in the corresponding tire requires a reliable and exact measurement technology.

Highlights

- LFIs are utilized to initiate the communication of the sensors installed in each wheel
- For premium TPMS, LFIs in each wheelhouse provide unambiguous localisation of the sensor’s signals
- Durable, cost-effective modules using proven 125 kHz technology

Technology

- Complete manufacturing solution
- PCB assembly (SMT/THT) & test
- Housing with integrated ferrite rod antenna
- Pressfit pin interface for solderless assembly of the electronics
- Plastic laser welding
- Leakage test of each unit

XENON-IGNITER

Designed for automotive applications, Xenon Igniter Modules from VOGT meet the most stringent technical and quality requirements demanded by vehicle lighting systems today.

Highlights

- D1/D3 igniter modules
- D2/D4 click on igniter modules
- D2/D4 lamp socket

Patented VOGT HID Igniter technology

- Moulding of highly reinforced PPS plastics
- High temperature electronics, using leadframe and laser welding
- Sophisticated high-voltage transformer
- Vacuum potting

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FUNCTIONAL INTEGRATED MODULES

The combination of mechanics and electronics allows the integration of several functions into one module. Such Functional Integrated Modules lead to reduced efforts for assembly and logistics at the customer.

Integrated Functions

- Carrier for power inductors and capacitors
- Interconnection between large components
- EMI-Filter
- Sensor
- Connectors
- Housing

Technology

- Plastic injection moulding
- Overmoulding of leadframe
- Various soldering and welding techniques for electrical interconnection
- Pressfit pin interface for solderless assembly

INDUCTIVE SENSORS

VOGT’s inductive sensor technology is based on the functional principle of “eddy current” losses. The distinctive feature is high immunity to magnetic interference fields, thus making them suitable for harsh environments inside electric motors and generators.

Rotor Position Sensors

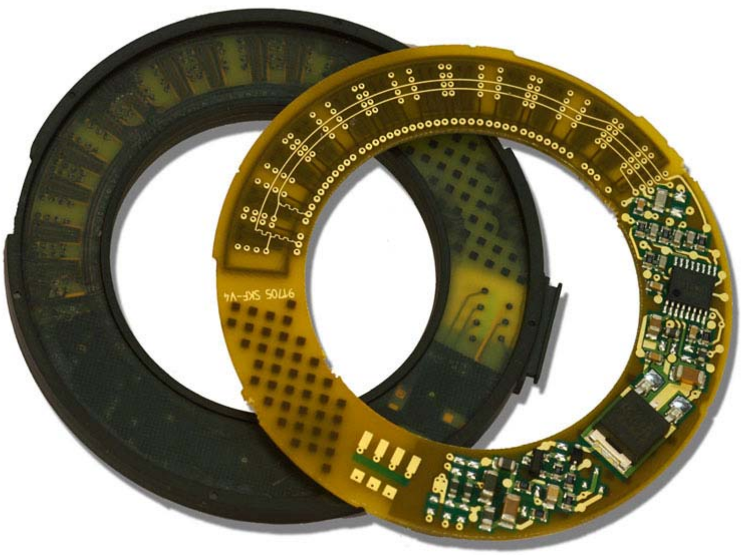
- Detection of rotor position in electric motors, e.g. in hybrid electric vehicles
- Replacement of resolvers

Speed Sensors

- Detection of speed and sense of rotation, e.g. bearing sensor
- Passive wheelspeed sensors for commercial vehicles

Patented eddy current sensor technology

- High immunity to magnetic interference fields
- Scanning of electrically conductive target material
- Automotive grade ASICs available
- No permanent magnet required
- High speed operation



AUTOMOTIVE

Due to the acquired know-how and the enthusiasm for the technology in the fields of automotive electronics and mechatronics, we are proud to provide customized solutions in the areas:

- Inductive components
- Immobilizer antennas
- Passive-entry antennas
- Inductive sensors
- LF initiators for tire pressure monitoring systems
- Component carriers with functional integration
- High voltage ignition modules for HID lamps

Market Segments: / Products:	Noise Suppression	Data Line Chokes	Power Factor Chokes	Power Transformers	Output Chokes	Signal Transformers	LF Antennas	High voltage Igniters	Module Solutions	Inductive Sensors
Body Electronics	A1	A2		A4	A5	A6	C1	C2	C3	C4
Security	A1	A2		A4	A5	A6	C1		C3	
Chassis	A1	A2					C1		C3	C4
Powertrain	A1	A2		A4	A5	A6			C3	C4
Infotainment	A1	A2		A4	A5	A6				
Electric/ Hybrid - Powertrain	A1 *)	A2	A3 *)	*)	*)	A6			C3	C4

Note *): Customized solutions for high power & high current applications are available upon request.

INDUSTRIAL

- Design-in of switching power supply transformers and output chokes for the most different applications, circuit topologies and ranges of performance
- Design-in for signal transformers, trigger transformers and noise suppression chokes
- Design conforming to standards (VDE, UL, CSA); partly available VDE construction-set family releases (e.g. EF16 TEX-E, EF20 TEX-E)
- Consideration of mechanical requirements (dimension, fixing, …)
- Optimization of power losses and thermal resistors.

Market Segments: / **Products:**	Noise Suppression Chokes	Data Line Chokes	Power Factor Chokes	Power Transformers	Output Chokes	Signal Transformers	LF-Antennas	High voltage Igniters	Module Solutions	Inductive Sensors
Industrial	A1	A2	A3	A4	A5	A6				

HOUSEHOLD/TV

End devices of the fields telecommunication, consumer electronics and technology for household appliances are subject to continuous improvement and are continuously provided with new functions.
VOGT electronic provides most different standard products and also customized components which e.g. are used in energy saving and cost effective mains supply circuits or in electronics for signal processing (data interchange, control and regulation, sensors).

COMMUNICATION

The global expansion of the internet and the continuously increasing data rates pose a big challenge for the telecommunication providers and suppliers of components.
VOGT electronic offers a broad range of signal transformers, modules and noise suppression components for applications in the latest ISDN, DSL and LAN systems.
Moreover, you also can get complete DSL splitters and splitter modules for the CO and CPE side from **VOGT electronic**.

LIGHTING

Lighting electronics is a strongly growing market segment marked by energy saving, innovation and new applications (e.g. in HID and LED applications).
Based on a longtime experience as well as global development and production activities, we are able to always offer our customers the adequate package consisting of an optimum technical solution, cost minimization and flexible logistics performance.

Market Segments: **Products:**	Noise Suppression Chokes	Data Line Chokes	Power Factor Chokes	Power Transformers	Output Chokes	Signal Transformers	LF Antennas	High voltage Igniters	Module Solutions	Inductive Sensors
Lighting Technology	A1		A3	A4	A5	A6				
Telecommunication	A1	A2		A4	A5	A6				
Household Appliances	A1		A3	A4	A5					
TV, Video, SAT	A1		A3	A4	A5					

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This handbook presents a brief summary of our production and delivery, giving technical information to design and production engineers as well as buyers.

In this sense the data specified in this catalogue exclusively serve to describe the properties of our products. They must not be understood as guarantee-values in a juridical sense. Eventual indemnity claims against us – no matter for what legal reasons – are excluded except in cases of gross negligence or intent.

Please note that – for reasons of the given space – the whole range of available components and their variants could not be included into this catalogue. If you cannot find the component you are looking for or if you need more detailed information please send us your inquiry.

Components no longer included in this handbook are generally deliverable as long as the appropriate tools are usable. Such items, however, are no longer recommended for use in new equipment designs.

You certainly will understand that we cannot guarantee that the components, applications and procedures shown and described in this handbook are always free of the rights of third parties.

We reserve the right to perform corrections and engineering changes.

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