



## Film Capacitors

### EMI Suppression Capacitors (MKP)

**Series/Type:** B32921 ... B32926  
**Date:** May 2005

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Please read "Important notes" on page 9.

**Typical applications**

- X2 class for interference suppression
- "Across the line" applications

**Climatic**

- Max. operating temperature: 125 °C
- Climatic category (IEC 60068-1): 40/105/56

**Construction**

- Dielectric: polypropylene (MKP)
- Plastic case (UL 94 V-0)
- Epoxy resin sealing (UL 94 V-0)

**Features**

- Very small dimensions
- Self-healing properties

**Terminals**

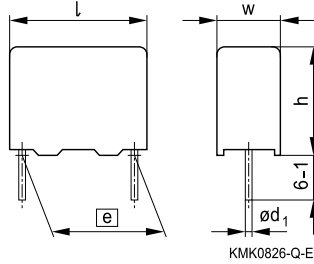
- Parallel wire leads, lead-free tinned
- Standard lead lengths: 6 – 1 mm
- Special lead lengths available on request

**Marking**

Manufacturer's logo, lot number, date code, rated capacitance (coded), cap. tolerance (code letter), rated AC voltage, series number, sub-class (X2), dielectric code (MKP), climatic category, passive flammability category, approvals.

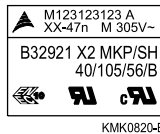
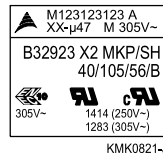
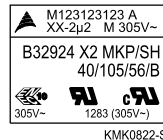
**Delivery mode**





Bulk (untaped)  
 Taped (Ammo pack or reel)  
 For taping details, refer to chapter "Taping and packing".

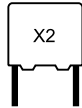
**Dimensional drawing**


Dimensions in mm

Lead spacing $e$ ±0.4	Lead diameter $d_1$	Type
10	0.6	B32921
15	0.8	B32922
22.5	0.8	B32923
27.5	0.8	B32924
37.5	1.0	B32926

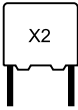
**Marking examples**
 $e = 10$  mm

 $e \geq 15$  mm/ $C_R \leq 1$   $\mu$ F

 $e = 22.5, 27.5, 37.5$  mm/ $C_R > 1$   $\mu$ F

**Approvals**

Marks of conformity	Standards	Certificate
	EN 132400, IEC 60384-14	40005536/40010694
	UL 1414 / UL 1283	E97863 / E157153
	CSA C22.2 No. 1 / No. 8	E97863 / E157153 (approved by UL)
	CQC (GB/T 14472-1998)	CQC001007-14859



**Overview of available types**

Lead spacing	10 mm	15 mm	22.5 mm	27.5 mm	37.5 mm
Type	B32921	B32922	B32923	B32924	B32926
$C_R$ ( $\mu F$ )					
0.010					
0.022					
0.033					
0.047					
0.068					
0.10					
0.15					
0.22					
0.33					
0.47					
0.56					
0.68					
0.82					
1.0					
1.5					
2.2					
3.3					
4.7					
5.6					
6.8					
8.2					
10					



B32921 ... B32926

X2 / 305 VAC

**Ordering codes and packing units**

Lead spacing mm	C <sub>R</sub> μF	Max. dimensions w × h × l mm	Ordering code (composition see below)	Ammo pack pcs./unit	Reel pcs./unit	Untaped pcs./unit
10	0.010	4.0 × 9.0 × 13.0	B32921C3103+***	1000	1700	1000
	0.022	4.0 × 9.0 × 13.0	B32921C3223+***	1000	1700	1000
	0.033	4.0 × 9.0 × 13.0	B32921C3333+***	1000	1700	1000
	0.047	5.0 × 11.0 × 13.0	B32921C3473+***	830	1300	1000
	0.047	6.0 × 12.0 × 13.0	B32921A2473+***	680	1100	1000
	0.068	6.0 × 12.0 × 13.0	B32921A2683M***	680	1100	1000
	0.068	6.0 × 12.0 × 13.0	B32921C3683+***	680	1100	1000
	0.10	6.0 × 12.0 × 13.0	B32921A2104M***	680	1100	1000
	0.10	6.0 × 12.0 × 13.0	B32921C3104M***	680	1100	1000
15	0.033	5.0 × 10.5 × 18.0	B32922C3333+***	1170	1300	1000
	0.047	5.0 × 10.5 × 18.0	B32922C3473+***	1170	1300	1000
	0.068	6.0 × 11.0 × 18.0	B32922A2683+***	960	1100	1000
	0.068	5.0 × 10.5 × 18.0	B32922C3683+***	1170	1300	1000
	0.10	6.0 × 11.0 × 18.0	B32922A2104+***	960	1100	1000
	0.10	5.0 × 10.5 × 18.0	B32922C3104+***	1170	1300	1000
	0.15	7.0 × 12.5 × 18.0	B32922A2154+***	830	900	1000
	0.15	6.0 × 12.0 × 18.0	B32922C3154+***	960	1100	1000
	0.22	8.5 × 14.5 × 18.0	B32922A2224+***	680	700	500
	0.22	8.0 × 14.0 × 18.0	B32922T2224+***	730	750	500
	0.22	7.0 × 12.5 × 18.0	B32922C3224+***	830	900	1000
	0.22	8.0 × 14.0 × 18.0	B32922T3224+***	730	750	500
	0.33	9.0 × 17.5 × 18.0	B32922A2334+***	640	700	500
	0.33	13.0 × 14.0 × 18.0	B32922T2334+***	–	500	300
	0.33	8.0 × 14.0 × 18.0	B32922C3334M***	730	750	500
	0.33	8.5 × 14.5 × 18.0	B32922D3334+***	680	700	500
	0.33	13.0 × 14.0 × 18.0	B32922T3334+***	–	500	300
	0.47	9.0 × 17.5 × 18.0	B32922C3474+***	640	700	500
0.56	11.0 × 18.5 × 18.0	B32922C3564+***	–	550	250	
0.68	11.0 × 18.5 × 18.0	B32922C3684M***	–	550	250	

**Composition of ordering code**

+ = Capacitance tolerance code:

M = ±20%

K = ±10%

\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)

(Closer tolerances on request)

Preferred types

**Ordering codes and packing units**

Lead spacing	C <sub>R</sub>	Max. dimensions w × h × l	Ordering code (composition see below)	Ammo pack	Reel	Untaped
mm	μF	mm		pcs./unit	pcs./unit	pcs./unit
22.5	0.33	8.5 × 16.5 × 26.5	B32923A2334+***	480	500	510
	0.33	6.0 × 15.0 × 26.5	B32923C3334M***	680	700	720
	0.33	7.0 × 16.0 × 26.5	B32923D3334+***	580	600	630
	0.33	7.5 × 14.0 × 26.5	B32923T3334+***	550	500	570
	0.47	8.5 × 16.5 × 26.5	B32923A2474M***	480	500	510
	0.47	10.5 × 16.5 × 26.5	B32923B2474+***	390	400	540
	0.47	8.5 × 16.5 × 26.5	B32923C3474+***	480	500	510
	0.56	8.5 × 16.5 × 26.5	B32923C3564M***	480	500	510
	0.68	10.5 × 18.5 × 26.5	B32923A2684M***	390	400	540
	0.68	10.5 × 20.5 × 26.5	B32923B2684+***	390	400	540
	0.68	10.5 × 16.5 × 26.5	B32923C3684+***	390	400	540
	0.82	10.5 × 18.5 × 26.5	B32923C3824M***	390	400	540
	1.0	12.0 × 22.0 × 26.5	B32923A2105M***	–	–	450
	1.0	11.0 × 20.5 × 26.5	B32923C3105+***	370	350	510
	1.5	12.0 × 22.0 × 26.5	B32923C3155M***	–	–	450
	1.5	14.5 × 29.5 × 26.5	B32923D3155+***	–	–	260
	2.2	14.5 × 29.5 × 26.5	B32923C3225+***	–	–	260

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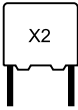
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(Closer tolerances on request)

**Preferred types**



B32921 ... B32926

X2 / 305 VAC

**Ordering codes and packing units**

Lead spacing mm	C <sub>R</sub> µF	Max. dimensions w × h × l mm	Ordering code (composition see below)	Ammo pack pcs./unit	Reel pcs./unit	Untaped pcs./unit
27.5	0.68	11.0 × 19.0 × 31.5	B32924C3684+***	–	350	320
	0.82	11.0 × 19.0 × 31.5	B32924C3824+***	–	350	320
	1.0	11.0 × 21.0 × 31.5	B32924A2105+***	–	350	320
	1.0	11.0 × 19.0 × 31.5	B32924C3105+***	–	350	320
	1.5	13.5 × 23.0 × 31.5	B32924A2155M***	–	250	260
	1.5	14.0 × 24.5 × 31.5	B32924B2155+***	–	–	260
	1.5	12.5 × 21.5 × 31.5	B32924C3155+***	–	300	280
	2.2	18.0 × 27.5 × 31.5	B32924A2225+***	–	–	200
	2.2	14.0 × 24.5 × 31.5	B32924C3225+***	–	–	260
	3.3	21.0 × 31.0 × 31.5	B32924A2335M***	–	–	180
	3.3	18.0 × 27.5 × 31.5	B32924C3335M***	–	–	200
	3.3	16.0 × 32.0 × 31.5	B32924D3335+***	–	–	220
	4.7	22.0 × 36.5 × 31.5	B32924A2475M***	–	–	160
	4.7	18.0 × 33.0 × 31.5	B32924C3475M***	–	–	200
	4.7	21.0 × 31.0 × 31.5	B32924D3475M***	–	–	180
5.6	22.0 × 36.5 × 31.5	B32924C3565+***	–	–	160	
37.5	2.2	14.0 × 25.0 × 41.5	B32926C3225+***	–	–	115
	3.3	18.0 × 32.5 × 41.5	B32926A2335+***	–	–	90
	3.3	16.0 × 28.5 × 41.5	B32926C3335+***	–	–	100
	4.7	20.0 × 39.5 × 41.5	B32926A2475M***	–	–	75
	4.7	18.0 × 32.5 × 41.5	B32926C3475+***	–	–	90
	5.6	20.0 × 39.5 × 41.5	B32926A2565M***	–	–	75
	5.6	18.0 × 32.5 × 41.5	B32926C3565+***	–	–	90
	6.8	28.0 × 42.5 × 41.5	B32926A2685M***	–	–	55
	6.8	20.0 × 39.5 × 41.5	B32926C3685+***	–	–	75
	8.2	28.0 × 42.5 × 41.5	B32926A2825M***	–	–	55
	8.2	20.0 × 39.5 × 41.5	B32926C3825+***	–	–	55
	10.0	28.0 × 42.5 × 41.5	B32926C3106+***	–	–	55

**Composition of ordering code**

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(Closer tolerances on request)

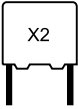
Preferred types

**Technical data**

Standard version (A/B/T): B3292\*A... / B3292\*B... / B3292\*T...

Miniaturized version (C/D): B3292\*C... / B3292\*D... (preferred types)

Max. operating temperature $T_{op,max}$	+125 °C (for $C_R \leq 1 \mu F$ with A/B/T version) +110 °C (for $C_R > 1 \mu F$ or C/D version)			
Dissipation factor $\tan \delta$ (in $10^{-3}$ ) at 20 °C (upper limit values)		$C_R \leq 0.1 \mu F$	$0.1 \mu F < C_R \leq 2.2 \mu F$	$C_R > 2.2 \mu F$
	at 1 kHz	1.0	1.0	2.0
	at 100 kHz	5.0	—	—
Insulation resistance $R_{ins}$ or time constant $\tau = C_R \cdot R_{ins}$ at 20 °C, rel. humidity $\leq 65\%$ (minimum as-delivered values)	$C_R \leq 0.33 \mu F$	$C_R > 0.33 \mu F$		
	100 000 M $\Omega$	30 000 s		
DC test voltage	2121 V, 2 s			
Passive flammability category to IEC 40 (CO) 752	B			
Maximum continuous AC voltage $V_{AC}$	310 V (50/60 Hz)			
Rated AC voltage (IEC 60384-14)	305 V (50/60 Hz)			
Maximum continuous DC voltage $V_{DC}$	760 V (630 V for C/D version)			
Operating AC voltage $V_{op}$ at high temperature	$T_A \leq 110 \text{ }^\circ\text{C}$	$V_{op} = V_{AC}$ (continuously)		
	$T_A \leq 110 \text{ }^\circ\text{C}$	$V_{op} = 1.25 \cdot V_{AC}$ (1000 h)		
	$110 \text{ }^\circ\text{C} < T_A \leq 125 \text{ }^\circ\text{C}$	$V_{op} = V_{AC}$ (1000 h) (only for A/B/T version)		
Damp heat test	56 days / 40 °C / 93% relative humidity			
Limit values after damp heat test	Capacitance change $ \Delta C/C  \leq 5\%$ Dissipation factor change $\Delta \tan \delta \leq 0.5 \cdot 10^{-3}$ (at 1 kHz) Insulation resistance $R_{ins} \leq 1.0 \cdot 10^{-3}$ (at 10 kHz) or time constant $\tau = C_R \cdot R_{ins} \geq 50\%$ of minimum as-delivered values			



B32921 ... B32926

X2 / 305 VAC

### Pulse handling capability

"dV/dt" represents the maximum permissible voltage change per unit of time for non-sinusoidal voltages, expressed in V/ $\mu$ s.

"k<sub>0</sub>" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V<sup>2</sup>/ $\mu$ s.

Note:

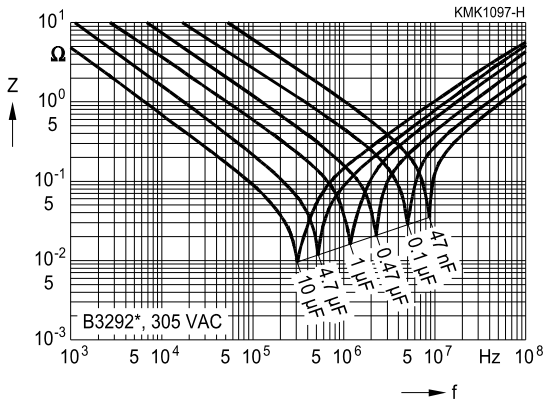
The values of dV/dt and k<sub>0</sub> provided below must not be exceeded in order to avoid damaging the capacitor.

### dV/dt and k<sub>0</sub> values

Lead spacing	10 mm		15 mm		22.5 mm		27.5 mm		37.5 mm	
	A/B/T	C/D	A/B/T	C/D	A/B/T	C/D	A/B/T	C/D	A/B/T	C/D
dV/dt in V/ $\mu$ s	550	475	400	340	200	170	150	120	100	80
k <sub>0</sub> in V <sup>2</sup> / $\mu$ s	473000	408500	344000	292400	172000	146200	129000	103200	86000	68800

### Impedance Z versus frequency f

(typical values)





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