

Type TYTR Series

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The TYT series of moulded solid Tantalum chip capacitors is designed for high solder heat resistance and ease of automatic placement. The product is provided with both excellent frequency and impedance characteristics.

The four different product types cover the majority of requirements for this product series.

TYTS series is the standard type used in many industries and TYTM series extends this product range by applying advanced manufacturing technology, thereby allowing reduced sizes and extended value range.

TYTP series allows even further miniaturisation offering many values in an 0805 package size.

The series is completed with the TYTR series which offers a comprehensive range of low ESR products.

Key Features

- Suitable for High Frequency Applications
- Excellent Impedance Characteristics
- P, A, B, C & D Case Sizes
- 4V to 50V Ratings
- 10% or 20% Tolerance
- RoHS Compliant

Product Specifications

Product Specifications:		Test Conditions JIS C5101-3(1998)	
Operating Temp. Range:	-55°C ~ +125°C		
Rated Voltage:	DC4 ~ 50V		85°C
Surge Voltage:	DC5 ~ 65V		85°C
Derated Voltage:	DC2.5 ~ 33V		125°C
Capacitance:	0.1 ~ 470µF		
Capacitance Tolerance:	±10% or 20%	Measuring Frequency:120Hz ±10%, Measurement Circuit: Equivalent Series Circuit: Measuring Voltage Max.: 0.5Vrms,+1.5Vdc.	
Leakage Current:	0.01 CV or less	Series Protective Resistor:1000Ω Measuring Voltage: Rated voltage Measuring Time: 5 minutes	
ESR (100kHz):	P Case 1000 ~ 6000mΩ ^{MAX} A Case 500 ~ 4000mΩ ^{MAX} B Case 500 ~ 2000mΩ ^{MAX} C Case 200 ~ 500mΩ ^{MAX} D Case 100 ~ 350mΩ ^{MAX}	Measuring Frequency: 100kHz	
Maximum Permitted Ripple Current (100kHz, 20°C):	P Case 120 ~ 300mA _{rms} ^{MAX} A Case 150 ~ 440mA _{rms} ^{MAX} B Case 220 ~ 400mA _{rms} ^{MAX} C Case 400 ~ 700mA _{rms} ^{MAX} D Case 500 ~ 1000mA _{rms} ^{MAX}	100kHz, 20°C	
Surge Withstanding Voltage:	C/C ±5% or less tanδ Specified initial value or less LC Specified initial value or less		
Temp. Characteristics:		Specified initial value	-55°C +85°C +125°C
	ΔC/C	—	-10~0% 0~+10% 0~+12%
	tanδ Value shown table or less	0.06	<10V 12% <10V 12% <10V 15%
		0.08	≥10V 15% ≥10V 15% ≥10V 15%
	LC	0.01CV	- 0.1CV 0.12CV
Solder Heat Resistance:	ΔC/C ±10% or less tanδ Specified initial value or less LC Specified initial value or less	Conditioning of Solder Dip: Solder Temperature: 260 ±5°C Dip Duration: 5±0.5s Depth of Immersion: Under Surface 10mm	
Moisture Resistance:	ΔC/C ±10% or less tanδ Specified initial value or less LC Specified initial value or less	40°C 90 ~ 95% RH, 56 Days	
High-Temperature Load:	ΔC/C ±10% or less tanδ Specified initial value or less LC Specified initial value or less	85°C The rated voltage is applied for 2000 hours.	
Thermal Shock:	ΔC/C ±10% or less tanδ Specified initial value or less LC Specified initial value or less	Leave at -55°C, normal temperature, 125°C, and normal temperature for 30 min., 3 min., 30 min. and 3 min.. Repeat this operation 30 mins running	
Failure Rate:	1% / 2000h	85°C The rated voltage is applied (through a protective resistor of 1Ω/V).	

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Product Availability Chart

Capacitance		Rated voltage (V.DC)							
		4.0	6.3	10	16	20	25	35	50
µF	Code								
0.1	104							A	A
0.15	154							A	A
0.22	224							A	B
0.33	334							A	B
0.47	474						A	A,B	B,C
0.68	684					A	A	A,B	B,C
1.0	105				A	A	A	A,B	C
1.5	155			A	A	A	A,B	B,C	C,D
2.2	225		A	A	A	A,B	B	B,C	C,D
3.3	335	A	A	A	A,B	A,B	B	B,C	D
4.7	475	A	A	P,A,B	A,B	A,B	B,C	C,D	D
6.8	685	A	P,A,B	A,B	A,B	B,C	C	C,D	
10	106	P,A,B	P,A,B	A,B	A,B,C	B,C	C,D	C,D	
15	156	A,B	A,B	A,B,C	B,C	C,D	C,D	D	
22	226	A,B	A,B,C	B,C	B,C,D	C,D	D	D	
33	336	B,C	B,C	B,C,D	C,D	D	D		
47	476	B,C	B,C,D	C,D	C,D	D			
68	686	B,C,D	C,D	C,D	D				
100	107	B,C,D	C,D	C,D	D				
150	157	C,D	C,D	D					
220	227	D	D	D					
330	337	D	D						
470	477	D							

Standard Product Table

Rated Voltage V.DC	Capacitance		Case Code	DC Leakage Current mA*	Dissipation Factor (%)*	ESR (Ω)*	Part Number**
	µF	Code					
4.0	3.3	335	A	0.5	6	4.0	TYTRA0G335(x)TRF
4.0	4.7	475	A	0.5	6	3.5	TYTRA0G475(x)TRF
4.0	6.8	685	A	0.5	6	3.0	TYTRA0G685(x)TRF
4.0	10	106	P	0.5	8	6.0	TYTRP0G106(x)TRF
4.0	10	106	A	0.5	6	2.0	TYTRA0G106(x)TRF
4.0	10	106	B	0.5	6	1.2	TYTRB0G106(x)TRF
4.0	15	156	A	0.6	6	1.5	TYTRA0G156(x)TRF
4.0	15	156	B	0.6	6	1.2	TYTRB0G156(x)TRF
4.0	22	226	A	0.9	6	1.5	TYTRA0G226(x)TRF
4.0	22	226	B	0.9	6	0.6	TYTRB0G226(x)TRF
4.0	33	336	B	1.3	6	0.5	TYTRB0G336(x)TRF
4.0	33	336	C	1.3	6	0.5	TYTRC0G336(x)TRF
4.0	47	476	B	1.9	6	0.5	TYTRB0G476(x)TRF
4.0	47	476	C	1.9	6	0.5	TYTRC0G476(x)TRF
4.0	68	686	B	2.7	6	2.0	TYTRB0G686(x)TRF
4.0	68	686	C	2.7	6	0.25	TYTRC0G686(x)TRF
4.0	68	686	D	2.7	6	0.2	TYTRD0G686(x)TRF
4.0	100	107	B	4.0	10	0.6	TYTRB0G107(x)TRF
4.0	100	107	C	4.0	8	0.2	TYTRC0G107(x)TRF
4.0	100	107	D	4.0	8	0.2	TYTRD0G107(x)TRF
4.0	150	157	C	6.0	8	0.3	TYTRC0G157(x)TRF
4.0	150	157	D	6.0	8	0.15	TYTRD0G157(x)TRF
4.0	220	227	D	8.8	8	0.15	TYTRD0G227(x)TRF
4.0	330	337	D	13.2	8	0.15	TYTRD0G337(x)TRF
4.0	470	477	D	18.8	8	0.15	TYTRD0G477(x)TRF

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Standard Product Table (continued)

Rated Voltage V.DC	Capacitance		Case Code	DC Leakage Current mA*	Dissipation Factor (%)*	ESR (Ω)*	Part Number**
	μF	Code					
6.3	2.2	225	A	0.5	6	6.0	TYTRA0J225(x)TRF
6.3	3.3	335	A	0.5	6	6.0	TYTRA0J335(x)TRF
6.3	4.7	475	A	0.5	6	3.5	TYTRA0J475(x)TRF
6.3	6.8	685	P	0.5	6	8.0	TYTRP0J685(x)TRF
6.3	6.8	685	A	0.5	6	2.0	TYTRA0J685(x)TRF
6.3	6.8	685	B	0.5	6	1.2	TYTRB0J685(x)TRF
6.3	10	106	P	0.6	8	6.0	TYTRP0J106(x)TRF
6.3	10	106	A	0.6	6	2.0	TYTRA0J106(x)TRF
6.3	10	106	B	0.6	6	1.0	TYTRB0J106(x)TRF
6.3	15	156	A	0.9	6	2.0	TYTRA0J156(x)TRF
6.3	15	156	B	0.9	6	0.7	TYTRB0J156(x)TRF
6.3	22	226	A	1.4	6	3.0	TYTRA0J226(x)TRF
6.3	22	226	B	1.4	6	0.6	TYTRB0J226(x)TRF
6.3	22	226	C	1.4	6	0.5	TYTRC0J226(x)TRF
6.3	33	336	B	2.0	6	0.6	TYTRB0J336(x)TRF
6.3	33	336	C	2.0	6	0.3	TYTRC0J336(x)TRF
6.3	47	476	B	2.9	6	2.0	TYTRB0J476(x)TRF
6.3	47	476	C	2.9	6	0.25	TYTRC0J476(x)TRF
6.3	47	476	D	2.9	6	0.22	TYTRD0J476(x)TRF
6.3	68	686	C	4.1	6	0.2	TYTRC0J686(x)TRF
6.3	68	686	D	4.1	6	0.2	TYTRD0J686(x)TRF
6.3	100	107	C	6.0	8	0.3	TYTRC0J107(x)TRF
6.3	100	107	D	6.0	8	0.15	TYTRD0J107(x)TRF
6.3	150	157	C	9.0	8	0.3	TYTRC0J157(x)TRF
6.3	150	157	D	9.0	8	0.15	TYTRD0J157(x)TRF
6.3	220	227	D	13.2	8	0.15	TYTRD0J227(x)TRF
6.3	330	337	D	19.8	8	0.15	TYTRD0J337(x)TRF
10	1.5	155	A	0.5	6	6.0	TYTRA1A155(x)TRF
10	2.2	225	A	0.5	6	6.0	TYTRA1A225(x)TRF
10	3.3	335	A	0.5	6	4.0	TYTRA1A335(x)TRF
10	4.7	475	P	0.5	8	8.0	TYTRP1A475(x)TRF
10	4.7	475	A	0.5	6	3.0	TYTRA1A475(x)TRF
10	4.7	475	B	0.5	6	1.5	TYTRB1A475(x)TRF
10	6.8	685	A	0.7	6	3.0	TYTRA1A685(x)TRF
10	6.8	685	B	0.7	6	1.2	TYTRB1A685(x)TRF
10	10	106	A	1.0	6	2.0	TYTRA1A106(x)TRF
10	10	106	B	1.0	6	0.8	TYTRB1A106(x)TRF
10	15	156	A	1.5	8	4.0	TYTRA1A156(x)TRF
10	15	156	B	1.5	6	0.7	TYTRB1A156(x)TRF
10	15	156	C	1.5	6	0.5	TYTRC1A156(x)TRF
10	22	226	B	2.2	6	0.7	TYTRB1A226(x)TRF
10	22	226	C	2.2	6	0.4	TYTRC1A226(x)TRF
10	33	336	B	3.3	6	2.0	TYTRB1A336(x)TRF
10	33	336	C	3.3	6	0.3	TYTRC1A336(x)TRF
10	33	336	D	3.3	6	0.25	TYTRD1A336(x)TRF
10	47	476	C	4.7	6	0.3	TYTRC1A476(x)TRF
10	47	476	D	4.7	6	0.22	TYTRD1A476(x)TRF
10	68	686	C	6.8	6	0.3	TYTRC1A686(x)TRF
10	68	686	D	6.8	6	0.2	TYTRD1A686(x)TRF
10	100	107	C	10	8	0.3	TYTRC1A107(x)TRF
10	100	107	D	10	8	0.15	TYTRD1A107(x)TRF
10	150	157	D	15	8	0.15	TYTRD1A157(x)TRF
10	220	227	D	22	8	0.15	TYTRD1A227(x)TRF

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Standard Product Table (continued)

Rated Voltage V.DC	Capacitance		Case Code	DC Leakage Current mA*	Dissipation Factor (%)*	ESR (Ω)*	Part Number**
	μF	Code					
16	1.0	105	A	0.5	4	6.0	TYTRA1C105(x)TRF
16	1.5	155	A	0.5	6	6.0	TYTRA1C155(x)TRF
16	2.2	225	A	0.5	6	4.0	TYTRA1C225(x)TRF
16	3.3	335	A	0.5	6	4.0	TYTRA1C335(x)TRF
16	3.3	335	B	0.5	6	2.0	TYTRB1C335(x)TRF
16	4.7	475	A	0.8	6	3.0	TYTRA1C475(x)TRF
16	4.7	475	B	0.8	6	1.5	TYTRB1C475(x)TRF
16	6.8	685	A	1.1	6	3.0	TYTRA1C685(x)TRF
16	6.8	685	B	1.1	6	1.2	TYTRB1C685(x)TRF
16	10	106	A	1.6	8	3.0	TYTRA1C106(x)TRF
16	10	106	B	1.6	6	0.8	TYTRB1C106(x)TRF
16	10	106	C	1.6	6	0.6	TYTRC1C106(x)TRF
16	15	156	B	2.4	6	0.8	TYTRB1C156(x)TRF
16	15	156	C	2.4	6	0.4	TYTRC1C156(x)TRF
16	22	226	B	3.6	6	1.0	TYTRB1C226(x)TRF
16	22	226	C	3.6	6	0.35	TYTRC1C226(x)TRF
16	22	226	D	3.6	6	0.25	TYTRD1C226(x)TRF
16	33	336	C	5.3	6	0.3	TYTRC1C336(x)TRF
16	33	336	D	5.3	6	0.25	TYTRD1C336(x)TRF
16	47	476	C	7.5	6	0.55	TYTRC1C476(x)TRF
16	47	476	D	7.5	6	0.2	TYTRD1C476(x)TRF
16	68	686	D	10.9	6	0.15	TYTRD1C686(x)TRF
16	100	107	D	16	8	0.15	TYTRD1C107(x)TRF
20	0.68	684	A	0.5	4	8.0	TYTRA1D684(x)TRF
20	1.0	105	A	0.5	4	5.5	TYTRA1D105(x)TRF
20	1.5	155	A	0.5	6	4.5	TYTRA1D155(x)TRF
20	2.2	225	A	0.5	6	4.0	TYTRA1D225(x)TRF
20	2.2	225	B	0.5	6	1.5	TYTRB1D225(x)TRF
20	3.3	335	A	0.7	6	4.0	TYTRA1D335(x)TRF
20	3.3	335	B	0.7	6	1.3	TYTRB1D335(x)TRF
20	4.7	475	A	1.0	6	3.5	TYTRA1D475(x)TRF
20	4.7	475	B	1.0	6	1.0	TYTRB1D475(x)TRF
20	6.8	685	B	1.4	6	1.0	TYTRB1D685(x)TRF
20	6.8	685	C	1.4	6	0.6	TYTRC1D685(x)TRF
20	10	106	B	2.0	6	1.0	TYTRB1D106(x)TRF
20	10	106	C	2.0	6	0.5	TYTRC1D106(x)TRF
20	15	156	C	3.0	6	0.4	TYTRC1D156(x)TRF
20	15	156	D	3.0	6	0.35	TYTRD1D156(x)TRF
20	22	226	C	4.4	6	0.4	TYTRC1D226(x)TRF
20	22	226	D	4.4	6	0.3	TYTRD1D226(x)TRF
20	33	336	D	6.6	6	0.25	TYTRD1D336(x)TRF
20	47	476	D	9.4	6	0.2	TYTRD1D476(x)TRF
25	0.47	474	A	0.5	4	9.0	TYTRA1E474(x)TRF
25	0.68	684	A	0.5	4	6.0	TYTRA1E684(x)TRF
25	1.0	105	A	0.5	4	4.0	TYTRA1E105(x)TRF
25	1.5	155	A	0.5	6	5.0	TYTRA1E155(x)TRF
25	1.5	155	B	0.5	6	1.5	TYTRB1E155(x)TRF
25	2.2	225	B	0.6	6	2.2	TYTRB1E225(x)TRF
25	3.3	335	B	0.9	6	2.0	TYTRB1E335(x)TRF
25	4.7	475	B	1.2	6	1.0	TYTRB1E475(x)TRF
25	4.7	475	C	1.2	6	0.6	TYTRC1E475(x)TRF
25	6.8	685	C	1.7	6	0.6	TYTRC1E685(x)TRF
25	10	106	C	2.5	6	0.6	TYTRC1E106(x)TRF

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Standard Product Table (continued)

Rated Voltage V.DC	Capacitance		Case Code	DC Leakage Current mA*	Dissipation Factor (%)*	ESR (Ω)*	Part Number**
	μF	Code					
25	10	106	D	2.5	6	0.4	TYTRD1E106(x)TRF
25	15	156	C	3.8	6	0.9	TYTRC1E156(x)TRF
25	15	156	D	3.8	6	0.4	TYTRD1E156(x)TRF
25	22	226	D	5.5	6	0.4	TYTRD1E226(x)TRF
25	33	336	D	8.3	6	0.4	TYTRD1E336(x)TRF
35	0.1	104	A	0.5	4	10	TYTRA1V104(x)TRF
35	0.15	154	A	0.5	4	6.0	TYTRA1V154(x)TRF
35	0.22	224	A	0.5	4	6.0	TYTRA1V224(x)TRF
35	0.33	334	A	0.5	4	6.0	TYTRA1V334(x)TRF
35	0.47	474	A	0.5	4	4.0	TYTRA1V474(x)TRF
35	0.47	474	B	0.5	4	2.5	TYTRB1V474(x)TRF
35	0.68	684	A	0.5	4	6.0	TYTRA1V684(x)TRF
35	0.68	684	B	0.5	4	2.5	TYTRB1V684(x)TRF
35	1.0	105	A	0.5	4	6.0	TYTRA1V105(x)TRF
35	1.0	105	B	0.5	4	2.0	TYTRB1V105(x)TRF
35	1.5	155	B	0.5	6	3.0	TYTRB1V155(x)TRF
35	1.5	155	C	0.5	6	2.5	TYTRC1V155(x)TRF
35	2.2	225	B	0.8	6	2.5	TYTRB1V225(x)TRF
35	2.2	225	C	0.8	6	1.5	TYTRC1V225(x)TRF
35	3.3	335	B	1.2	6	2.0	TYTRB1V335(x)TRF
35	3.3	335	C	1.2	6	0.8	TYTRC1V335(x)TRF
35	4.7	475	C	1.7	6	0.7	TYTRC1V475(x)TRF
35	4.7	475	D	1.7	6	0.7	TYTRD1V475(x)TRF
35	6.8	685	C	2.4	6	0.9	TYTRC1V685(x)TRF
35	6.8	685	D	2.4	6	0.5	TYTRD1V685(x)TRF
35	10	106	C	3.5	6	1.2	TYTRC1V106(x)TRF
35	10	106	D	3.5	6	0.4	TYTRD1V106(x)TRF
35	15	156	D	5.3	6	0.35	TYTRD1V156(x)TRF
35	22	226	D	7.7	6	0.4	TYTRD1V226(x)TRF
50	0.1	104	A	0.5	4	10	TYTRA1H104(x)TRF
50	0.15	154	A	0.5	4	10	TYTRA1H154(x)TRF
50	0.15	154	B	0.5	4	10	TYTRB1H154(x)TRF
50	0.22	224	B	0.5	4	10	TYTRB1H224(x)TRF
50	0.33	334	B	0.5	4	2.5	TYTRB1H334(x)TRF
50	0.47	474	B	0.5	4	2.0	TYTRB1H474(x)TRF
50	0.47	474	C	0.5	4	1.8	TYTRC1H474(x)TRF
50	0.68	684	B	0.5	4	3.0	TYTRB1H684(x)TRF
50	0.68	684	C	0.5	4	1.6	TYTRC1H684(x)TRF
50	1.0	105	C	0.5	4	1.6	TYTRC1H105(x)TRF
50	1.5	155	C	0.8	6	1.5	TYTRC1H155(x)TRF
50	1.5	155	D	0.8	6	1.0	TYTRD1H155(x)TRF
50	2.2	225	C	1.1	6	1.5	TYTRC1H225(x)TRF
50	2.2	225	D	1.1	6	0.8	TYTRD1H225(x)TRF
50	3.3	335	D	1.7	6	0.8	TYTRD1H335(x)TRF
50	4.7	475	D	2.4	6	0.6	TYTRD1H475(x)TRF

*DCL measured at 25°C

*DF measured at 25°C, 125Hz max

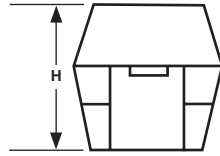
*ESR measured at 25°C, 120kHz max

** (x) = tolerance where K = 10%, M = 20%

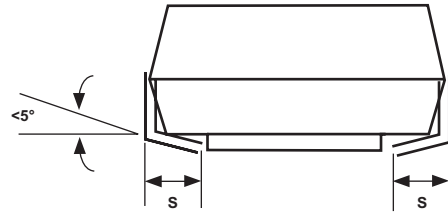
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Dimensions

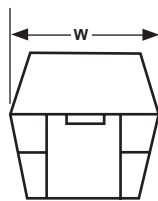
Anode (+) End View



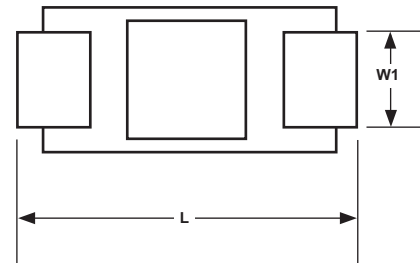
Side View



Cathode (-) End View



Bottom View



Case Code	Dimensions (mm)				
	L	W	H	S	W1
P	2.0±0.2	1.3±0.2	1.2±0.2	0.5±0.3	1.2±0.1
A	3.2±0.2	1.6±0.2	1.6±0.2	0.8±0.3	1.2±0.1
B	3.5±0.2	2.8±0.2	1.9±0.2	0.8±0.3	2.2±0.1
C	6.0±0.3	3.2±0.3	2.5±0.3	1.3±0.3	2.2±0.1
D	7.3±0.3	4.3±0.3	2.8±0.3	1.3±0.3	2.4±0.1

How to Order

TYTR	A	0G	106	K	TRF
Series	Case Code	Voltage Code	Capacitance	Tolerance	Packaging
TYTR	P, A, B, C or D	0G (4.0V) 0J (6.3V) 1A (10V) 1C (16V) 1D (20V) 1E (25V) 1V (35V) 1H (50V)	eg. 106	K (10%) M (20%)	TRF = 7" Reels (P Case 3000) (A, B Case 2000) (C, D Case 500)