

TPE series has low ESR and can aid in creating thinner and smaller products.
This page focuses on the smaller packages within the series.



Specifications

Items	Condition	Specifications					
Rated voltage (V)	—	2.0	2.5	4.0	6.3	8.0	10
Surge voltage (V)	—	2.3	2.9	4.6	7.2	9.2	12
Category temperature range (°C)	—	-55 to +105					
Capacitance tolerance (%)	120Hz/20°C	M: ±20					
Rated capacitance range (μF)	120Hz/20°C	47 to 470					
Dissipation Factor (DF)	120Hz/20°C	Please see the attached characteristics list					
Leakage current	Rated voltage applied, after 5 minutes	Please see the attached characteristics list					
Equivalent series resistance (ESR)	100kHz/20°C	Please see the attached characteristics list					
Characteristics of impedance ratio at high temp. and low temp.	100kHz/+20°C	-55°C	Z/Z _{20°C}	0.6 to 2.0			
		+105°C	Z/Z _{20°C}	0.6 to 2.0			
Endurance	105°C, 1,000h rated voltage applied ※Rated temp. 85°C products: 85°C, 1,000h, rated voltage applied	ΔC/C		Within±20% of the initial value			
		DF		≤ 1.5 times of the initial limit			
		LC		Within the initial limit			
Damp heat (Steady State)	60°C, 90 to 95%RH, 500h, No-applied voltage	ΔC/C		Within+50%, -20% (2R5TPE220MDGB(MAZB,MAPB,MAFB), 2R5TPE330MAZB,2TPE330MFB(MAFB,MADGB) ETPE330MA9GB,2TPE470MAJGB)			
		DF		≤ 1.5 times of the initial limit			
		LC		≤ 3 times of the initial limit			
		ΔC/C		Within+40%, -20% of the initial value (Except for the above model)			
Surge	105°C, 1,000 cycles, 1kΩ discharge resistance,surge voltage applied ※Rated temp 85°C products:85°C	ΔC/C		Within±5% of the initial value			
		DF		Within the initial limit			
		LC		≤ 3 times of the initial limit			

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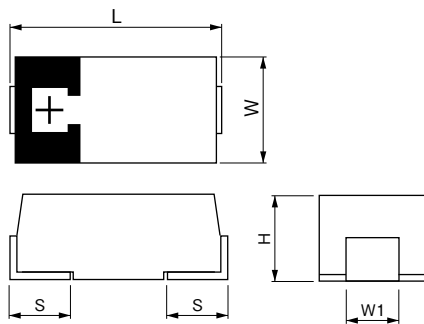
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(unit: mm)

Size code	L ±0.2	W ±0.2	H ±0.1*1	S ±0.2	W1 ±0.1
B2	3.5	2.8	1.9	0.8	2.2

*1 ±0.2:C3

Size list

RV : Rated voltage

μF \ RV	2.0	2.5	4.0	6.3	8.0	10
47						B2
100			B2	B2	B2	
120				B2		
150			B2	B2		
220		B2	B2	B2		
330	B2	B2				
470	B2					

TPE series characteristics list

Size code	Part number	Rated voltage (V)	Rated temperature (°C)	Rated capacitance (μF)	Category voltage (V)	Category temperature (°C)	DF (% max)	LC (μA) max/5min.	ESR (mΩmax) 100kHz/20°C	Maximum allowable ripple current (mA rms) 100kHz*1	MSL	
											Reflow temp. ≤ 260°C	Reflow temp. ≤ 250°C
B2	10TPE47MAZB	10	85	47	8.0	105	8.0	47.0	35	1400	3	3
	8TPE100MAZB	8.0	85	100	6.3	105	8.0	80.0	35	1400	3	3
	6TPE220MAZB	6.3	85	220	5.0	105	10.0	138.6	35	1400	3	3
	6TPE220MAPB*2	6.3	85	220	5.0	105	10.0	138.6	25	1400	3	3
	6TPE150MAZB	6.3	85	150	5.0	105	8.0	94.5	35	1400	3	3
	6TPE150MAPB	6.3	85	150	5.0	105	8.0	94.5	25	1600	3	3
	6TPE120MAZB	6.3	85	120	5.0	105	8.0	75.6	35	1400	3	3
	6TPE100MPB	6.3	105	100	6.3	105	8.0	63.0	25	1600	3	3
	6TPE100MAZB	6.3	85	100	5.0	105	8.0	63.0	35	1400	3	3
	4TPE220MAZB	4.0	85	220	3.2	105	8.0	88.0	35	1400	3	3
	4TPE150MAZB	4.0	85	150	3.2	105	8.0	60.0	35	1400	3	3
	4TPE150MAUB	4.0	85	150	3.2	105	8.0	60.0	30	1500	3	3
	4TPE100MZB	4.0	105	100	4.0	105	8.0	40.0	35	1400	3	3
	2R5TPE330MAZB	2.5	85	330	2.0	105	8.0	82.5	35	1400	3	3
	2R5TPE330MA9GB*2	2.5	85	330	2.0	105	8.0	165.0	9/300kHz	3200	3	3
	2R5TPE220MZB	2.5	105	220	2.5	105	8.0	55.0	35	1400	3	3
	2R5TPE220MLB	2.5	105	220	2.5	105	8.0	55.0	21	1700	3	3
	2R5TPE220MIB	2.5	105	220	2.5	105	8.0	110.0	18	1800	3	3
	2R5TPE220MFGB	2.5	105	220	2.5	105	8.0	110.0	15/300kHz	1800	3	3
	2R5TPE220MDGB	2.5	105	220	2.5	105	8.0	110.0	13/300kHz	2000	3	3
	2R5TPE220MAZB	2.5	85	220	2.0	105	8.0	55.0	35	1400	3	3
	2R5TPE220MAPB	2.5	85	220	2.0	105	8.0	55.0	25	1600	3	3
	2R5TPE220MAFB	2.5	85	220	2.0	105	8.0	110.0	15	2000	3	3
	2TPE470MAJGB*2	2.0	85	470	1.8	105	10.0	188.0	11/300kHz	2300	3	3
	2TPE330MFB	2.0	105	330	2.0	105	8.0	132.0	15	2000	3	3
	2TPE330MAFB	2.0	85	330	1.8	105	8.0	132.0	15	2000	3	3
	2TPE330MADGB	2.0	85	330	1.8	105	8.0	132.0	13/300kHz	2000	3	3

Please refer to page 65 for the compensation coefficient of maximum allowable ripple current. *1 100k to 500kHz,45°C *2 Under development

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- TPC
- TPE**
- TPB
- TPL-TPLF
- TPF
- TA
- TV
- TH
- TQC

* Red letters : New models * Yellow letters : Update

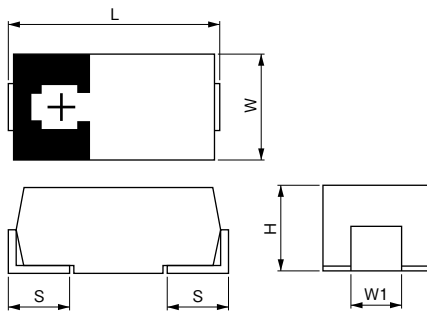
TPE series has low ESR and can aid in creating thinner and smaller products.



Specifications

Items		Condition		Specifications			
Rated voltage (V)		-		2.5	4.0	6.3	10
Surge voltage (V)		-		2.9	4.6	7.2	12
Category temperature range (°C)		-		-55 to +105			
Capacitance tolerance (%)		120Hz/20°C		M: ±20			
Rated capacitance range (μF)		120Hz/20°C		68 to 1,500			
Dissipation Factor (DF)		120Hz/20°C		Please see the attached characteristics list			
Leakage current		Rated voltage applied, after 5 minutes		Please see the attached characteristics list			
Equivalent series resistance (ESR)		100kHz/20°C		Please see the attached characteristics list			
Characteristics of impedance ratio at high temp. and low temp.	100kHz/+20°C	-55°C	Z/Z _{20°C}	0.6 to 2.0			
		+105°C	Z/Z _{20°C}	0.6 to 2.0			
Endurance	105°C, 2,000h, rated voltage applied *Rated temp. 85°C products: 85°C, 1,000h, rated voltage applied 6TPE330MAP, 6TPE470MAZU, 85°C, 2,000h	ΔC/C		Within ±20% of the initial value			
		DF		≤ 1.5 times of the initial limit			
		LC		Within the initial limit			
Damp heat (Steady State)	60°C, 90 to 95%RH, 500h, No-applied voltage	ΔC/C		Within +50%, -20% of the initial value (2R5TPE470M (I,F,C,9,7), 2R5TPE330M (I,F,C,9,7), 2R5TPE220M (I,F,C,9,7), 2R5TPE1000M (I,F), 2R5TPE1500M (F,C)) Within +40%, -20% of the initial value (Except for the above model)			
		DF		≤ 1.5 times of the initial limit			
		LC		≤ 3 times of the initial limit			
		LC		≤ 3 times of the initial limit			
Surge	105°C, 1,000 cycles, 1kΩ discharge resistance, surge voltage applied *Rated temp. 85°C products: 85°C	ΔC/C		Within ±5% of the initial value			
		DF		Within the initial limit			
		LC		≤ 3 times of the initial limit			

Dimensions



Size list

RV : Rated voltage

μF \ RV	2.0	2.5	4.0	6.3	10
68					D2E
100				D2E	
150			D2E	D2E	
220		D2E	D2E	D2E	D3L
330		D2E	D2E	D2E, D3L, D4	D4
470		D2E	D3L	D4, D15E	
680		D3L	D4	D4	
1,000		D4			
1,500		D4			

(unit: mm)

Size code	L ±0.3	W ±0.2	H ±0.2*1	S ±0.2	W1 ±0.1
D15E	7.3	4.3	1.4	1.1	2.4
D2E	7.3	4.3	1.8	1.3	2.4
D3L	7.3	4.3	2.8	1.3	2.4
D4	7.3	4.3	3.8	1.3	2.4

*1 ±0.1: D2E, D15E

TPE series characteristics list

Size code	Part number	Rated voltage (V)	Rated temperature (°C)	Rated capacitance (μF)	Category voltage (V)	Category temperature (°C)	DF (% max)	LC (μA) max/5min.	ESR (mΩmax) 100kHz/20°C	Maximum allowable ripple current (mA rms) 100kHz*1	Reflow temp. ≤260°C	Reflow temp. ≤250°C	MSL
D15E	6TPE470MAZU*2	6.3	85	470	5.0	105	10.0	296.1	35	1700	3	2a	
D2E	10TPE68M	10	105	68	10	105	10.0	68.0	25	2400	3	2a	
	6TPE330MAP	6.3	85	330	5.0	105	10.0	207.9	25	2400	3	2a	
	6TPE220MAP	6.3	85	220	5.0	105	10.0	138.6	25	2400	3	2a	
	6TPE220M	6.3	105	220	6.3	105	10.0	138.6	25	2400	3	2a	
	6TPE220MI	6.3	105	220	6.3	105	10.0	138.6	18	2800	3	2a	
	6TPE150M	6.3	105	150	6.3	105	10.0	94.5	25	2400	3	2a	
6TPE150MI	6.3	105	150	6.3	105	10.0	94.5	18	2800	3	2a		

TPE series characteristics list

Size code	Part number	Rated voltage (V)	Rated temperature (°C)	Rated capacitance (μF)	Category voltage (V)	Category temperature (°C)	DF (% max)	LC (μA) max/5min.	ESR (mΩmax) 100kHz/20°C	Maximum allowable ripple current (mA rms) 100kHz*1	MSL	
											Reflow temp. ≤260°C	Reflow temp. ≤250°C
D2E	6TPE150MF	6.3	105	150	6.3	105	10.0	94.5	15	3100	3	2a
	6TPE100M	6.3	105	100	6.3	105	10.0	63.0	25	2400	3	2a
	6TPE100MI	6.3	105	100	6.3	105	10.0	63.0	18	2800	3	2a
	4TPE330M	4.0	105	330	4.0	105	10.0	132.0	25	2400	3	2a
	4TPE330MI	4.0	105	330	4.0	105	10.0	132.0	18	2800	3	2a
	4TPE220M	4.0	105	220	4.0	105	10.0	88.0	25	2400	3	2a
	4TPE220MI	4.0	105	220	4.0	105	10.0	88.0	18	2800	3	2a
	4TPE220MF	4.0	105	220	4.0	105	10.0	88.0	15	3100	3	2a
	4TPE150MI	4.0	105	150	4.0	105	10.0	60.0	18	2800	3	2a
	2R5TPE470MI	2.5	105	470	2.5	105	10.0	117.5	18	2800	3	2a
	2R5TPE470MF	2.5	105	470	2.5	105	10.0	117.5	15	3100	3	2a
	2R5TPE470MC	2.5	105	470	2.5	105	10.0	117.5	12	3500	3	2a
	2R5TPE470M9	2.5	105	470	2.5	105	10.0	117.5	9	3900	3	2a
	2R5TPE470M7	2.5	105	470	2.5	105	10.0	117.5	7	4400	3	2a
	2R5TPE330M	2.5	105	330	2.5	105	10.0	82.5	25	2400	3	2a
	2R5TPE330MI	2.5	105	330	2.5	105	10.0	82.5	18	2800	3	2a
	2R5TPE330MF	2.5	105	330	2.5	105	10.0	82.5	15	3100	3	2a
	2R5TPE330MC	2.5	105	330	2.5	105	10.0	82.5	12	3500	3	2a
	2R5TPE330M9	2.5	105	330	2.5	105	10.0	82.5	9	3900	3	2a
	2R5TPE330M7	2.5	105	330	2.5	105	10.0	82.5	7	4400	3	2a
	2R5TPE220M	2.5	105	220	2.5	105	10.0	55.0	25	2400	3	2a
	2R5TPE220MI	2.5	105	220	2.5	105	10.0	55.0	18	2800	3	2a
	2R5TPE220MF	2.5	105	220	2.5	105	10.0	55.0	15	3100	3	2a
	2R5TPE220MC	2.5	105	220	2.5	105	10.0	55.0	12	3500	3	2a
2R5TPE220M9	2.5	105	220	2.5	105	10.0	55.0	9	3900	3	2a	
2R5TPE220M7	2.5	105	220	2.5	105	10.0	55.0	7	4400	3	2a	
D3L	10TPE220ML	10	105	220	10	105	10.0	220.0	25	2400	—	2a
	10TPE220MIL	10	105	220	10	105	10.0	220.0	18	2800	—	2a
	6TPE330ML	6.3	105	330	6.3	105	10.0	207.9	25	2400	3	2a
	6TPE330MIL	6.3	105	330	6.3	105	10.0	207.9	18	2800	3	2a
	6TPE330MFL	6.3	105	330	6.3	105	10.0	207.9	15	3100	3	2a
	4TPE470ML	4.0	105	470	4.0	105	10.0	188.0	25	2400	3	2a
	4TPE470MIL	4.0	105	470	4.0	105	10.0	188.0	18	2800	3	2a
	4TPE470MFL	4.0	105	470	4.0	105	10.0	188.0	15	3100	3	2a
	4TPE470MCL	4.0	105	470	4.0	105	10.0	188.0	12	3500	3	2a
	2R5TPE680ML	2.5	105	680	2.5	105	10.0	170.0	25	2400	3	2a
2R5TPE680MFL	2.5	105	680	2.5	105	10.0	170.0	15	3100	3	2a	
2R5TPE680MCL	2.5	105	680	2.5	105	10.0	170.0	12	3500	3	2a	
D4	10TPE330M	10	105	330	10	105	10.0	330.0	25	3000	—	2a
	6TPE680M	6.3	105	680	6.3	105	15.0	428.4	25	3000	3	2a
	6TPE680MI	6.3	105	680	6.3	105	15.0	428.4	18	3500	3	2a
	6TPE470M	6.3	105	470	6.3	105	15.0	296.1	25	3000	3	2a
	6TPE470MI	6.3	105	470	6.3	105	15.0	296.1	18	3500	3	2a
	6TPE330MAA	6.3	85	330	5.0	105	10.0	207.9	10	4400	3	2a
	4TPE680MI	4.0	105	680	4.0	105	15.0	272.0	18	3500	3	2a
	4TPE680MF	4.0	105	680	4.0	105	15.0	272.0	15	3900	3	2a
	2R5TPE1000MI	2.5	105	1000	2.5	105	15.0	250.0	18	3500	3	2a
	2R5TPE1000MF	2.5	105	1000	2.5	105	15.0	250.0	15	3900	3	2a
	2R5TPE1500MF	2.5	105	1500	2.5	105	15.0	375.0	15	3900	—	2a
2R5TPE1500MC	2.5	105	1500	2.5	105	15.0	375.0	12	4400	—	2a	

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