

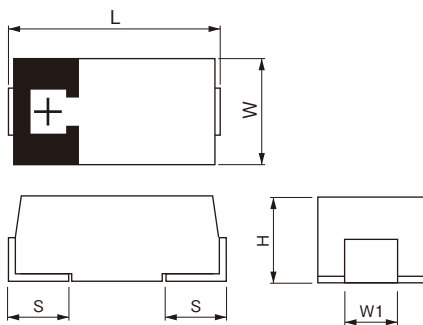
TPE series has low ESR and can aid in creating thinner and smaller products. This page focuses on the smaller packages within the series.



## Specifications

Items	Condition	Specifications					
		2.0	2.5	4.0	6.3	8.0	10
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 <sub>20°C</sub>	0.6 to 2.0			
		+105°C	Z/Z <sub>20°C</sub>	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)				
			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				
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



(unit: mm)

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

## 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
	ETPE330MA9GB*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
	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	2.0	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

\*1 100k to 500kHz, 45°C \*2 Under development

**Selection guide**

- Series system diagram
- Image of case size
- Products list
- Packing specifications (SMD type)
- Packing specifications (Radial lead type)

**Technical data**

- Recommended soldering condition
- Fundamental structure
- Characteristics
- Reliability

**Surface mount type**

- SVPF
- SVPE
- SVPS
- SVPD
- SVPC
- SVPB
- SVPA
- SVQP
- SVP

**Radial lead type**

- SEPF
- SEPC
- SEQP
- SEP

Catalog Deletion and EOL series

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precautions for use

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- Explanation of part numbers
- Packing specifications

**Technical data**

- Marking
- Recommended land pattern dimension
- Recommended soldering condition
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- Reliability

**Surface mount type**

- TPU
- TPH
- TPG
- TPSF
- TPE**
- TPB/TPC
- TPL·TPLF
- TPF
- TA
- TV
- TH
- TQC

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SVPS	
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Catalog Deletion and EOL models	

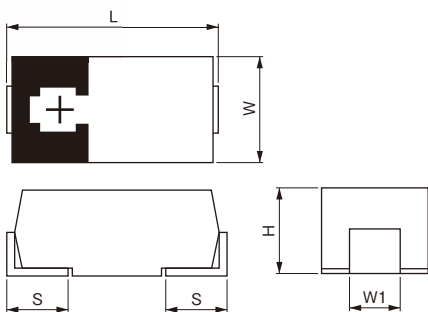
TPE series has low ESR and can aid in creating thinner and smaller products.



## Specifications

Items	Condition	Specifications				
		2.5	4.0	6.3	10	
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 <sub>20°C</sub>	0.6 to 2.0		
		+105°C	Z/Z <sub>20°C</sub>	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		
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



(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

## Size list

RV : Rated voltage

RV	2.5	4.0	6.3	10.0
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	
1,000	D4			
1,500	D4			

**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
D15E	6TPE470MAZU	6.3	85	470	5.0	105	10	296.1	35	1700	3	2a
	10TPE68M	10	105	68	10	105	10	68.0	25	2400	3	2a
	6TPE330MAP	6.3	85	330	5.0	105	10	207.9	25	2400	3	2a
	6TPE220MAP	6.3	85	220	5.0	105	10	138.6	25	2400	3	2a
	6TPE220M	6.3	105	220	6.3	105	10	138.6	25	2400	3	2a
	6TPE220MI	6.3	105	220	6.3	105	10	138.6	18	2800	3	2a
	6TPE150M	6.3	105	150	6.3	105	10	94.5	25	2400	3	2a
	6TPE150MI	6.3	105	150	6.3	105	10	94.5	18	2800	3	2a
	6TPE150MF	6.3	105	150	6.3	105	10	94.5	15	3100	3	2a
	6TPE100M	6.3	105	100	6.3	105	10	63.0	25	2400	3	2a
	6TPE100MI	6.3	105	100	6.3	105	10	63.0	18	2800	3	2a
	4TPE330M	4.0	105	330	4.0	105	10	132.0	25	2400	3	2a
	4TPE330MI	4.0	105	330	4.0	105	10	132.0	18	2800	3	2a
	4TPE220M	4.0	105	220	4.0	105	10	88.0	25	2400	3	2a
	4TPE220MI	4.0	105	220	4.0	105	10	88.0	18	2800	3	2a
4TPE220MF	4.0	105	220	4.0	105	10	88.0	15	3100	3	2a	
D2E	4TPE150MI	4.0	105	150	4.0	105	10	60.0	18	2800	3	2a
	2R5TPE470MI	2.5	105	470	2.5	105	10	117.5	18	2800	3	2a
	2R5TPE470MF	2.5	105	470	2.5	105	10	117.5	15	3100	3	2a
	2R5TPE470MC	2.5	105	470	2.5	105	10	117.5	12	3500	3	2a
	2R5TPE470M9	2.5	105	470	2.5	105	10	117.5	9	3900	3	2a
	2R5TPE470M7	2.5	105	470	2.5	105	10	117.5	7	4400	3	2a
	2R5TPE330M	2.5	105	330	2.5	105	10	82.5	25	2400	3	2a
	2R5TPE330MI	2.5	105	330	2.5	105	10	82.5	18	2800	3	2a
	2R5TPE330MF	2.5	105	330	2.5	105	10	82.5	15	3100	3	2a
	2R5TPE330MC	2.5	105	330	2.5	105	10	82.5	12	3500	3	2a
	2R5TPE330M9	2.5	105	330	2.5	105	10	82.5	9	3900	3	2a
	2R5TPE330M7	2.5	105	330	2.5	105	10	82.5	7	4400	3	2a
	2R5TPE220M	2.5	105	220	2.5	105	10	55.0	25	2400	3	2a
	2R5TPE220MI	2.5	105	220	2.5	105	10	55.0	18	2800	3	2a
	2R5TPE220MF	2.5	105	220	2.5	105	10	55.0	15	3100	3	2a
2R5TPE220M9	2.5	105	220	2.5	105	10	55.0	9	3900	3	2a	
D3L	10TPE220ML	10	105	220	10	105	10	220.0	25	2400	—	2a
	10TPE220MIL	10	105	220	10	105	10	220.0	18	2800	—	2a
	6TPE330MAL	6.3	85	330	5.0	105	10	207.9	25	2400	3	2a
	6TPE330MA9EL	6.3	85	330	5.0	105	10	207.9	9/500k	3900	3	2a
	6TPE330ML	6.3	105	330	6.3	105	10	207.9	25	2400	3	2a
	6TPE330MIL	6.3	105	330	6.3	105	10	207.9	18	2800	3	2a
	6TPE330MFL	6.3	105	330	6.3	105	10	207.9	15	3100	3	2a
	4TPE470MAL	4.0	105	470	4.0	105	10	188.0	10	4400	3	2a
	4TPE470ML	4.0	105	470	4.0	105	10	188.0	25	2400	3	2a
	4TPE470MIL	4.0	105	470	4.0	105	10	188.0	18	2800	3	2a
	4TPE470MFL	4.0	105	470	4.0	105	10	188.0	15	3100	3	2a
	4TPE470MCL	4.0	105	470	4.0	105	10	188.0	12	3500	3	2a
	2R5TPE680MFL	2.5	105	680	2.5	105	10	170.0	15	3100	3	2a
	2R5TPE680MCL	2.5	105	680	2.5	105	10	170.0	12	3500	3	2a
	10TPE330M	10	105	330	10	105	10	330.0	25	3000	—	2a
6TPE680M	6.3	105	680	6.3	105	15	428.4	25	3000	3	2a	
6TPE680MI	6.3	105	680	6.3	105	15	428.4	18	3500	3	2a	
6TPE470M	6.3	105	470	6.3	105	15	296.1	25	3000	3	2a	
6TPE470MI	6.3	105	470	6.3	105	15	296.1	18	3500	3	2a	
6TPE330MAA	6.3	85	330	5.0	105	10	207.9	10	4400	3	2a	
2R5TPE1000MF	2.5	105	1000	2.5	105	15	250.0	15	3900	3	2a	
2R5TPE1500MF	2.5	105	1500	2.5	105	15	375.0	15	3900	—	2a	
2R5TPE1500MC	2.5	105	1500	2.5	105	15	375.0	12	4400	—	2a	

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- SVQ

**Radial lead type**

- SEPF
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Catalog Deletion and EOL series

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Guidelines and precautions for use

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- TPF
- TA
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- TH
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Catalog Deletion and EOL models

※ Red letters : New models