

## 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% (2R5TPE220MAFB(MAZB,MAPB), 2R5TPE330MAZB,2TPE330MFB(MAFB,MADGB) ETPE330MA9GB(MAFB),2TPE470MAJGB)					
			Within+40%, -20% of the initial value (Except for the above model)					
		DF	≤ 1.5 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					

## Marking and dimensions

Rated capacitance※3

Rated voltage※1

Lot. No.※2

※1 The rated voltage is as follows.

R.V.	2.0	2.5	4.0	6.3	8.0	10
Mark	d	e	g	j	k	A

※2 Lot.No.shows roughly manufacturing date.

※3 The rated capacitance is as follows.

Capacitance(μF)	47	100	120	150	220	330	470
Mark	S7	A8	C8	E8	J8	N8	S8

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

(unit : mm)

## Recommended land pattern dimension of PWB

Size code	a	b	c
B2	1.6	2.7	1.4

(unit : mm)

## Size list

RV:Rated voltage

μF \ RV	2.0	2.5	4.0	6.3	8.0	10.0
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 (mΩ max) 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	138.6	35	1400	3	3
	<b>6TPE220MAPB※2</b>	6.3	85	220	5.0	105	10	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
	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
	<b>ETPE330MAFB※2</b>	2.5	85	330	2.0	105	8.0	165.0	15	2700	3	3
	<b>ETPE330MA9GB※2</b>	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
	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	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

# Surface mount type

# TPE Series



RoHS compliance, Halogen free

Low profile: 1.5mm and Large capacitance: 6.3V470μF (D15E)

Low ESR: 7mΩ (D2E)

## 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 <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,9), 2R5TPE1000M (I,F), 2R5TPE1500M (F,C))			
			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			

## Marking and 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

Rated capacitance  
Anode (+)  
Rated voltage※1  
Lot. No.※2

※1 The rated voltage is as follows.

R.V.	2.5	4.0	6.3	10
Mark	e	g	j	A

※2 Lot.No.shows roughly manufacturing date.

## Recommended land pattern dimension of PWB

(unit : mm)

Size code	a	b	c
D15E	2.4	2.9	3.7
D2E	2.4	2.9	3.7
D3L	2.4	2.9	3.7
D4	2.4	2.9	3.7

## Size list

RV:Rated voltage

μF	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
D2E	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
D2E	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
	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	9/500kHz	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
	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
	4TPE470MAL	4.0	105	470	4.0	105	10	188.0	10	4400	3	2a
D4	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
D4	6TPE470MI	6.3	105	470	6.3	105	15	296.1	18	3500	3	2a
	6TPE330MAA	6.3	85	330	5.0	105	15	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

※1 100k to 500kHz,45°C



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