

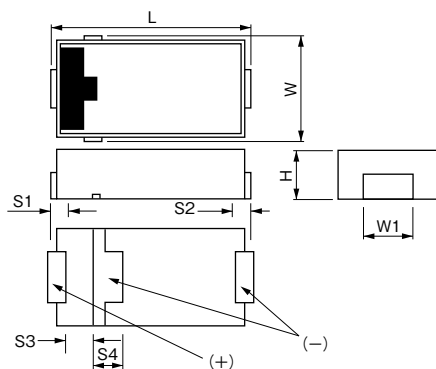
TPL series is designed with an unique face down terminal structure to achieve low ESL and low ESR performance.



## Specifications

Items	Condition	Specifications				
Rated voltage (V)	—	1.8	2.0	2.5	4.0	6.3
Surge voltage (V)	—	2.1	2.3	2.9	4.6	7.2
Category temperature range (°C)	—	-55 to +105				
Capacitance tolerance (%)	120Hz/20°C	M: ±20				
Rated capacitance range (μF)	120Hz/20°C	100 to 560				
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 (2R5TPL330M9U, XTPL470M7U:1,000h) ※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% of the initial value			
		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	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

RV	1.8	2.0	2.5	4.0	6.3
100					D12T
150				D12T	D15T
220		D12T, D2T	D15T	D15T	D15T
330			D15T, D2T		
470	D15T	D2T	D2T		
560		D2T			

(unit: mm)

Size code	L ±0.3	W ±0.2	H ±0.1	S1/S2 ±0.2	S3 ±0.1	S4 ±0.2	W1 ±0.1
D12T	7.3	4.3	1.1	1.1	1.1	2.3	2.8
D15T	7.3	4.3	1.4	1.1	1.1	2.3	2.8
D2T	7.3	4.3	1.8	1.1	1.1	2.3	2.8

**TPL 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	ESL (nHmax) *Typical value	Maximum allowable ripple current (mA <sub>rms</sub> ) 100kHz*1	MSL	
												Reflow temp. ≤ 260°C	Reflow temp. ≤ 250°C
D12T	6TPL100MD	6.3	105	100	6.3	105	10.0	126.0	25	1.0	2100	3	2a
	4TPL150MD	4.0	105	150	4.0	105	10.0	120.0	25	1.0	2100	3	2a
	2TPL220MD	2.0	105	220	2.0	105	10.0	88.0	25	1.0	2100	3	2a
D15T	6TPL220MAU	6.3	85	220	5.0	105	10.0	277.2	25	0.9	2100	3	2a
	6TPL150MU	6.3	105	150	6.3	105	10.0	189.0	25	0.9	2100	3	2a
	4TPL220MKU	4.0	105	220	4.0	105	10.0	176.0	20	0.9	2400	3	2a
	2R5TPL330MFU	2.5	105	330	2.5	105	10.0	165.0	15	0.9	2800	3	2a
	2R5TPL330M9U	2.5	105	330	2.5	105	10.0	165.0	9	0.9	3600	3	2a
	2R5TPL220MIU	2.5	105	220	2.5	105	10.0	110.0	18	0.9	2500	3	2a
	<b>XTPL470M7U*2</b>	1.8	105	470	1.8	105	10.0	169.2	7	0.9	4000	3	2a
D2T	2R5TPL470M9	2.5	105	470	2.5	105	10.0	117.5	9	0.8	3900	3	2a
	2R5TPL470M8	2.5	105	470	2.5	105	10.0	235.0	8	0.8	4100	3	2a
	2R5TPL470M7	2.5	105	470	2.5	105	10.0	235.0	7	0.8	4400	3	2a
	2R5TPL330M9	2.5	105	330	2.5	105	10.0	82.5	9	0.8	3900	3	2a
	2R5TPL330M8	2.5	105	330	2.5	105	10.0	165.0	8	0.8	4100	3	2a

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

**TPLF 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	ESL (nHmax) *Typical value	Maximum allowable ripple current (mA <sub>rms</sub> ) 100kHz*1	MSL	
												Reflow temp. ≤ 260°C	Reflow temp. ≤ 250°C
D2T	<b>ETPLF330M6*2</b>	2.5	105	330	2.5	105	10.0	165.0	6	0.5	4700	3	2a
	<b>ETPLF330M5*2</b>	2.5	105	330	2.5	105	10.0	165.0	5	0.5	5200	3	2a
	2TPLF560M5	2.0	105	560	2.0	105	10.0	224.0	5	0.5	5200	3	2a
	<b>2TPLF560M4E</b>	2.0	105	560	2.0	105	10.0	224.0	4/500kHz	0.5	5200	3	2a
	2TPLF470M6	2.0	105	470	2.0	105	10.0	188.0	6	0.5	4700	3	2a
	2TPLF470M5	2.0	105	470	2.0	105	10.0	188.0	5	0.5	5200	3	2a
	2TPLF470M4E	2.0	105	470	2.0	105	10.0	188.0	4/500kHz	0.5	5200	3	2a
	<b>2TPLF220M5</b>	2.0	105	220	2.0	105	10.0	88.0	5	0.5	5200	3	2a

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