

Specifications

Items	Condition			Specifications				
Rated voltage (V)	—			2.0	2.5	4.0	6.3	10
Surge voltage (V)	—			2.3	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			150 to 1000				
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	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(2TPF220M6,2TPF330M6,ETPF1000M6H(5H))				
				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				
		ΔC/C		Within±5% of the initial value				
		DF		Within the initial limit				
Surge	105°C, 1,000 cycles, 1kΩ discharge resistance, surge voltage applied	LC		≤ 3 times of the initial limit				

Marking and dimensions

Technical drawing of a capacitor showing top, side, and end views with dimensions L, W, H, S, W1. It also shows the marking on the capacitor: Anode (+), Rated capacitance (e.g., 470), and Rated voltage (e.g., 2.5).

※1 The rated voltage is as follows.

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

※2 Lot.No.shows roughly manufacturing date.

(unit : mm)

Size code	L ±0.3	W ±0.2	H ±0.2※1	S ±0.2	W1 ±0.1
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

※1 ±0.1:D2E

Recommended land pattern dimension of PWB

(unit : mm)			
Size code	a	b	c
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	2.0	2.5	4.0	6.3	10.0
150						D3L
220	D2E				D3L	
330	D2E		D3L	D3L	D3L	
470			D4,D3L	D3L	D4	
680			D4,D3L	D4		
1,000			D4			

TPF 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
D2E	2TPF330M6	2.0	105	330	2.0	105	10	132.0	6	4700	—	2a
	2TPF220M6	2.0	105	220	2.0	105	10	88.0	6	4700	—	2a
D3L	10TPF150ML	10	105	150	10	105	10	150.0	15	3600	—	2a
	6TPF330M9L	6.3	105	330	6.3	105	10	207.9	9	3900	3	2a
	6TPF220ML	6.3	105	220	6.3	105	10	138.6	12	4000	3	2a
	6TPF220M9L	6.3	105	220	6.3	105	10	138.6	9	4600	3	2a
	6TPF220M5L	6.3	105	220	6.3	105	10	138.6	5	6100	3	2a
	4TPF470ML	4.0	105	470	4.0	105	10	188.0	10	4400	3	2a
	4TPF330ML	4.0	105	330	4.0	105	10	132.0	12	4000	3	2a
	2R5TPF680ML	2.5	105	680	2.5	105	10	170.0	10	4400	3	2a
	2R5TPF680M7L	2.5	105	680	2.5	105	10	170.0	7	4400	3	2a
	2R5TPF680M6L	2.5	105	680	2.5	105	10	170.0	6	4400	3	2a
	2R5TPF470ML	2.5	105	470	2.5	105	10	117.5	10	4400	3	2a
	2R5TPF470M7L	2.5	105	470	2.5	105	10	117.5	7	4400	3	2a
	2R5TPF470M6L	2.5	105	470	2.5	105	10	117.5	6	4400	3	2a
	2R5TPF330M7L	2.5	105	330	2.5	105	10	82.5	7	4400	3	2a
	6TPF470MAH	6.3	105	470	6.3	105	10	296.1	10	4400	3	2a
	4TPF680MAH	4.0	105	680	4.0	105	10	272.0	10	4400	3	2a
D4	ETPF1000M6H	2.5	105	1000	2.5	105	10	250.0	6	5600	3	2a
	ETPF1000M5H	2.5	105	1000	2.5	105	10	250.0	5	6100	3	2a
	ETPF680M5H	2.5	105	680	2.5	105	10	170.0	5	6100	3	2a
	ETPF470M5H	2.5	105	470	2.5	105	10	117.5	5	6100	3	2a

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