

- RoHS compliance
- Low ESR
- Large capacitance

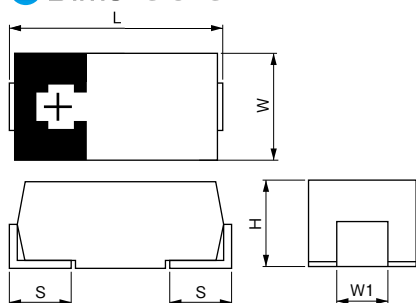
TPF series achieves low ESR and high capacitance in the standard form.



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))			
		DF		Within+40%, -20% of the initial value (Except for the above model)			
		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



(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

Size list

RV : Rated voltage

RV μF	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 (mΩmax) 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	10.0	132.0	6	4400	—	2a
	2TPF220M6	2.0	105	220	2.0	105	10.0	88.0	6	4400	—	2a
D3L	10TPF150ML	10	105	150	10	105	10.0	150.0	15	3600	—	2a
	6TPF330M9L	6.3	105	330	6.3	105	10.0	207.9	9	3900	3	2a
	6TPF220ML	6.3	105	220	6.3	105	10.0	138.6	12	4000	3	2a
	6TPF220M9L	6.3	105	220	6.3	105	10.0	138.6	9	3900	3	2a
	6TPF220M5L	6.3	105	220	6.3	105	10.0	138.6	5	4000	3	2a
	4TPF470ML	4.0	105	470	4.0	105	10.0	188.0	10	4400	3	2a
	4TPF470M5EL※2	4.0	105	470	4.0	105	10.0	188.0	5/500kHz	4400	3	2a
	4TPF330ML	4.0	105	330	4.0	105	10.0	132.0	12	4000	3	2a
	2R5TPF680ML	2.5	105	680	2.5	105	10.0	170.0	10	4400	3	2a
	2R5TPF680M7L	2.5	105	680	2.5	105	10.0	170.0	7	4400	3	2a
	2R5TPF680M6L	2.5	105	680	2.5	105	10.0	170.0	6	4400	3	2a
	2R5TPF470ML	2.5	105	470	2.5	105	10.0	117.5	10	4400	3	2a
	2R5TPF470M7L	2.5	105	470	2.5	105	10.0	117.5	7	4400	3	2a
	2R5TPF470M6L	2.5	105	470	2.5	105	10.0	117.5	6	4400	3	2a
	2R5TPF330M7L	2.5	105	330	2.5	105	10.0	82.5	7	4400	3	2a
D4	6TPF470MAH	6.3	105	470	6.3	105	10.0	296.1	10	4400	3	2a
	4TPF680MAH	4.0	105	680	4.0	105	10.0	272.0	10	4400	3	2a
	ETPF1000M6H	2.5	105	1000	2.5	105	10.0	250.0	6	5600	3	2a
	ETPF1000M5H	2.5	105	1000	2.5	105	10.0	250.0	5	6100	3	2a
	ETPF680M5H	2.5	105	680	2.5	105	10.0	170.0	5	6100	3	2a
	ETPF470M5H	2.5	105	470	2.5	105	10.0	117.5	5	6100	3	2a

※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

POSCAPPOSCAP
Line-upGuidelines and
precautions for use

Selection guide

Series system diagram

Image of case size

Products list

Explanation of part numbers

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Fundamental structure

Characteristics

Reliability

Surface mount type

TPU

TPH

TPG

TPSF

TPE

TPB/TPC

TPL·TPLF

TPF

TA

TV

TH

TQC

Catalog Deletion and EOL models

※ Red letters : New models