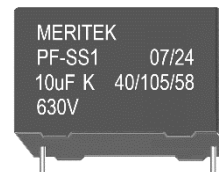


FEATURE

- Self Healing Property
- High Ripple Current Capability
- Low Losses, High Frequency Performance
- Applications: Pulse Circuit, Switch-Mode Power Supply, Direct Mount on IGBT Modules, Snubbing, High Frequency AC Loads
- THB-IIIB, 85°C, 85% RH,VR, 1000h



ELECTRICAL CHARACTERISTICS

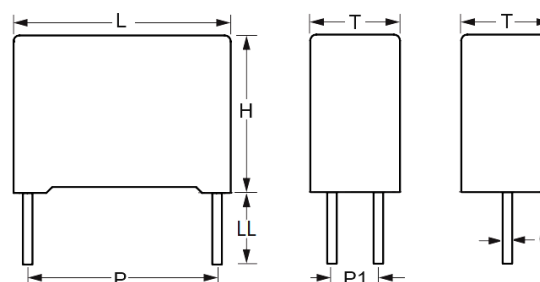
Item	Characteristic				
Operating Temperature	-40~+105°C (85°C~105°C Decreasing factor 1.25% per °C for Rated Voltage)				
Capacitance Range	0.01 μF~10 μF, ±5%(J), ±10%(K) at +25°C				
Climatic Category	40/105/56 IEC60068-1				
Dissipation Factor	0.001, at 1KHz; at 25°C				
DC Operating Voltage	100	250	400	630	--
Overvoltage	110% of Vr	115%	120%	130%	Max duration Per day
	30% of On-Load	30mins	5mins	1min	
Insulation Resistance	RC > 10,000MΩ*μF for C > 0.33 μF		Between leads, at 100 V, 60 sec		
	R > 30,000MΩ for C ≤ 0.33 μF		Between leads, at 100 V, 60 sec		
Withstanding Voltage	(1.5* VR) VDC for 10sec		Between Terminal, at 25°C±5°C		
	2000VAC, for 60sec		Between Terminal and Case, at 25 ±2°C		
Self-inductance	<1nH		per mm of lead spacing		
Life Expectancy	100,000 hours		at hot spot temperature THS		

DIMENSIONS

No of Pin	P ± 0.5 mm	d ± 0.05 mm	L ± 0.5 mm
2-pin	10.0	0.6	13
2-pin	15.0	0.6, 0.8	18
2-pin	22.5	0.8	26
2-pin	27.5	0.8	32

Note:

1. L ± 0.5 mm, H ± 0.5 mm, T ± 0.5 mm. See the table below for dimension
2. LL Options: 3mm, 4mm, 5mm, 7mm, 15mm Min, Taping, and N/A



PART NUMBERING SYSTEM

PF 456K 12 540 SS1 5
(1) (2) (3) (4) (5) (6)

No	Item	Code	Description	
(1)	Product Code	PF	Power Film Capacitor, Metallized PP Film	
(2)	Nominal Capacitance	456K	45 μ F $\pm 10\%$ (K)	First two digits: Significant, Third: Multiplier
(3)	Rated DC Voltage Code	12	12: 1200VDC	First two digits of Operating DC Voltage, V _{NDC}
(4)	Internal Code	540	5: 52.5mm pitch, 4: 4pins, 0: Case code	See the electrical specification table below
(5)	Series Code	SS1	Pulse Capacitor Series, Box Type	
(6)	Option Code	5	5: LL 5mm Bulk package	Blank: LL: 15mm min, 4: LL 4mm, Bulk package

ELECTRICAL SPECIFICATION – 100VDC (10)

CAP		Tol	Dimensions (mm)					dv/dt	Peak Current	No of Pin	Part Number
(uF)	Code	%	L	H	T	P	d	(V/us)	(A)		
0.10	104	J,K	13.0	11.0	5.0	10.0	0.6	180	18	2	PF104%10102SS1x
0.22	224	J,K	13.0	12.0	6.0	10.0	0.6	180	39.6	2	PF224%10102SS1x
0.33	334	J,K	18.0	12.0	6.0	15.0	0.6	100	33	2	PF334%10152SS1x
0.47	474	J,K	18.0	13.5	7.5	15.0	0.8	100	47	2	PF474%10152SS1x
0.68	684	J,K	18.0	14.5	8.5	15.0	0.8	100	68	2	PF684%10152SS1x
0.82	824	J,K	18.0	16.0	10	15.0	0.8	100	82	2	PF824%10152SS1x
1.0	105	J,K	18.0	16.0	10	15.0	0.8	100	100	2	PF105%10152SS1x
1.5	155	J,K	26.0	19.0	10	22.5	0.8	60	90	2	PF155%10222SS1x
2.2	225	J,K	32.0	20.0	11	27.5	0.8	50	110	2	PF225%10272SS1x
3.3	335	J,K	32.0	22.0	13	27.5	0.8	50	165	2	PF335%10272SS1x
4.7	475	J,K	32.0	24.5	13	27.5	0.8	50	235	2	PF475%10272SS1x
5.6	565	J,K	32.0	28.0	14	27.5	0.8	50	280	2	PF565%10272SS1x
6.8	685	J,K	32.0	33.0	18	27.5	0.8	50	3400	2	PF685%10272SS1x
8.2	825	J,K	32.0	33.0	18	27.5	0.8	50	4100	2	PF825%10272SS1x
10	106	J,K	32.0	37.0	22	27.5	0.8	50	500	2	PF106%10272SS1x
12	126	J,K	32.0	37.0	22	27.5	0.8	50	600	2	PF126%10272SS1x

Note: % denoted to tolerance: $\pm 5\%$ (J), $\pm 10\%$ (K) at 25°C, x denoted to option code, see the parts number system

ELECTRICAL SPECIFICATION – 250VDC (25)

CAP		Tol	Dimensions (mm)					dv/dt	Peak Current	No of Pin	Part Number
(uF)	Code	%	L	H	T	P	d	(V/us)	(A)		
0.033	333	J,K	13.0	11.0	5.0	10.0	0.6	550	18.15	2	PF333%25102SS1x
0.047	473	J,K	13.0	11.0	5.0	10.0	0.6	550	25.85	2	PF473%25102SS1x
0.068	683	J,K	13.0	11.0	5.0	10.0	0.6	550	37.4	2	PF683%25102SS1x
0.082	823	J,K	13.0	11.0	5.0	10.0	0.6	550	45.1	2	PF823%25102SS1x
0.10	104	J,K	13.0	11.0	5.0	10.0	0.6	550	55	2	PF104%25102SS1x
0.15	154	J,K	13.0	12.0	6.0	10.0	0.6	550	82.5	2	PF154%25102SS1x
0.22	224	J,K	18.0	11.0	5.0	15.0	0.6	300	66	2	PF224%25152SS1x
0.33	334	J,K	18.0	12.0	6.0	15.0	0.6	300	99	2	PF334%25152SS1x
0.47	474	J,K	18.0	13.5	7.5	15.0	0.8	300	141	2	PF474%25152SS1x
0.56	564	J,K	18.0	13.5	7.5	15.0	0.8	300	168	2	PF564%25152SS1x
0.68	684	J,K	18.0	14.5	8.5	15.0	0.8	300	204	2	PF684%25152SS1x
0.82	824	J,K	18.0	16.0	10	15.0	0.8	300	246	2	PF824%25152SS1x
1.2	105	J,K	18.0	16.0	10	15.0	0.8	300	360	2	PF105%25152SS1x
1.2	125	J,K	26.0	17.0	8.5	22.5	0.8	125	150	2	PF125%25222SS1x
1.5	155	J,K	26.0	19.0	10	22.5	0.8	125	187.5	2	PF155%25222SS1x
2.2	225	J,K	26.0	20.0	11	22.5	0.8	125	275	2	PF225%25222SS1x
3.3	335	J,K	26.0	23.0	13	22.5	0.8	125	412.5	2	PF335%25222SS1x
4.7	475	J,K	32.0	24.5	13	27.5	0.8	100	470	2	PF475%25272SS1x
5.6	565	J,K	32.0	28.0	14	27.5	0.8	100	560	2	PF565%25272SS1x
6.8	685	J,K	32.0	33.0	18	27.5	0.8	100	680	2	PF685%25272SS1x
8.2	825	J,K	32.0	33.0	18	27.5	0.8	100	820	2	PF825%25272SS1x
10	106	J,K	32.0	37.0	22	27.5	0.8	100	1000	2	PF106%25272SS1x

Note: % denoted to tolerance: $\pm 5\%$ (J), $\pm 10\%$ (K) at 25°C, x denoted to option code, see the parts number system

ELECTRICAL SPECIFICATION – 400VDC(40)

CAP		Tol	Dimensions (mm)					dv/dt	Peak Current	No of Pin	Part Number
(uF)	Code	%	L	H	T	P	d	(V/us)	(A)		
0.015	153	J,K	13.0	11.0	5.0	10.0	0.6	1200	18	2	PF153%40102SS1x
0.022	223	J,K	13.0	11.0	5.0	10.0	0.6	1200	26.4	2	PF223%40102SS1x
0.033	333	J,K	13.0	11.0	5.0	10.0	0.6	1200	39.6	2	PF333%40102SS1x
0.047	473	J,K	13.0	11.0	5.0	10.0	0.6	1200	56.4	2	PF473%40102SS1x
0.068	683	J,K	13.0	12.0	6.0	10.0	0.6	1200	81.6	2	PF683%40102SS1x
0.082	823	J,K	18.0	11.0	5.0	15.0	0.6	800	65.6	2	PF823%40152SS1x
0.10	104	J,K	18.0	11.0	5.0	15.0	0.6	800	80	2	PF104%40152SS1x
0.15	154	J,K	18.0	12.0	6.0	15.0	0.6	800	120	2	PF154%40152SS1x
0.22	224	J,K	18.0	13.5	7.5	15.0	0.8	800	176	2	PF224%40152SS1x
0.33	334	J,K	18.0	14.5	8.5	15.0	0.8	800	264	2	PF334%40152SS1x
0.47	474	J,K	18.0	16.0	10	15.0	0.8	800	376	2	PF474%40152SS1x
0.68	684	J,K	26.0	19.0	10	22.5	0.8	300	204	2	PF684%40222SS1x
0.82	824	J,K	26.0	19.0	10	22.5	0.8	300	246	2	PF824%40222SS1x
1.0	105	J,K	26.0	20.0	11	22.5	0.8	300	300	2	PF105%40222SS1x
1.5	155	J,K	26.0	23.0	13	22.5	0.8	300	450	2	PF155%40222SS1x
2.2	225	J,K	32.0	24.5	13	27.5	0.8	130	286	2	PF225%40272SS1x
3.3	335	J,K	32.0	33.0	18	27.5	0.8	130	429	2	PF335%40272SS1x
4.7	475	J,K	32.0	37.0	22	27.5	0.8	130	611	2	PF475%40272SS1x

Note: % denoted to tolerance: $\pm 5\%$ (J), $\pm 10\%$ (K) at 25°C, x denoted to option code, see the parts number system

ELECTRICAL SPECIFICATION – 630VDC (63)

CAP		Tol	Dimensions (mm)					dv/dt	Peak Current	No of Pin	Part Number
(uF)	Code	%	L	H	T	P	d	(V/us)	(A)		
0.010	103	J,K	13.0	11.0	5.0	10.0	0.6	1500	15	2	PF103%63102SS1x
0.015	153	J,K	13.0	11.0	5.0	10.0	0.6	1500	22.5	2	PF153%63102SS1x
0.022	223	J,K	13.0	12.0	6.0	10.0	0.6	1500	33	2	PF223%63102SS1x
0.033	333	J,K	18.0	11.0	5.0	15.0	0.6	1000	33	2	PF333%63152SS1x
0.047	473	J,K	18.0	11.0	5.0	15.0	0.6	1000	47	2	PF473%63152SS1x
0.068	683	J,K	18.0	12.0	6.0	15.0	0.6	1000	68	2	PF683%63152SS1x
0.082	823	J,K	18.0	12.0	6.0	15.0	0.6	1000	82	2	PF823%63152SS1x
0.10	104	J,K	18.0	13.5	7.5	15.0	0.8	1000	100	2	PF104%63152SS1x
0.15	154	J,K	18.0	14.5	8.5	15.0	0.8	1000	150	2	PF154%63152SS1x
0.22	224	J,K	18.0	16.0	10	15.0	0.8	1000	220	2	PF224%63152SS1x
0.33	334	J,K	18.0	19.0	11	15.0	0.8	1000	330	2	PF334%63152SS1x
0.47	474	J,K	26.0	20.0	11	22.5	0.8	400	188	2	PF474%63222SS1x
0.68	684	J,K	26.0	23.0	13	22.5	0.8	400	272	2	PF684%63222SS1x
0.82	824	J,K	32.0	22.0	13	27.5	0.8	180	147.6	2	PF824%63272SS1x
1.0	105	J,K	32.0	22.0	13	27.5	0.8	180	1800	2	PF105%63272SS1x
1.5	155	J,K	32.0	28.0	14	27.5	0.8	180	270	2	PF155%63272SS1x
2.2	225	J,K	32.0	33.0	18	27.5	0.8	180	396	2	PF225%63272SS1x
3.3	225	J,K	32.0	37.0	22	27.5	0.8	180	594	2	PF225%63272SS1x

Note: % denoted to tolerance: $\pm 5\%$ (J), $\pm 10\%$ (K) at 25°C, x denoted to option code, see the parts number system

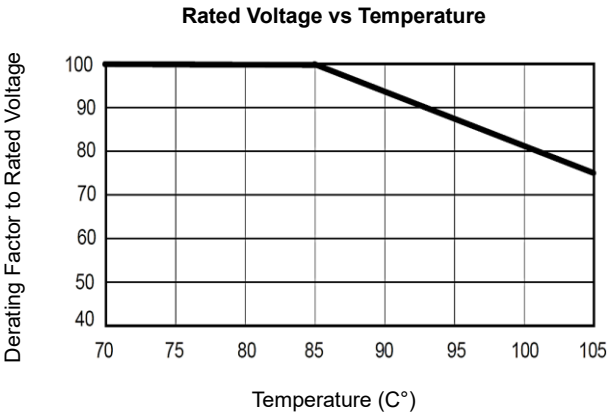
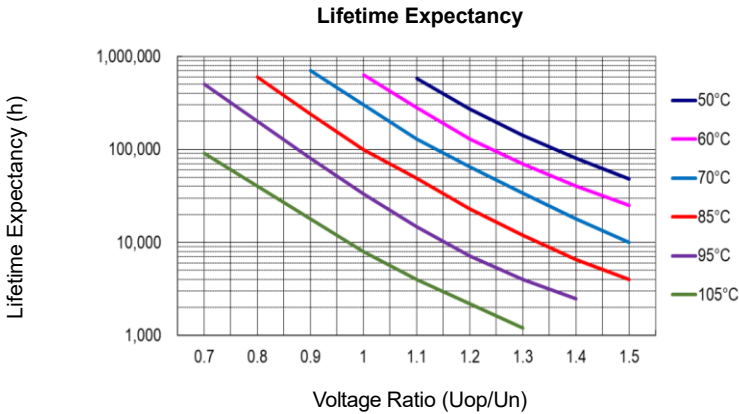
ENVIRONMENTAL TEST

Item	Test Condition	Performance					
Solderability	Soldering temperature: +245 ±5°C, Immersion duration: 2 ±0.5 seconds	More than 95% of Coverage					
Soldering Heat Resistance	Preheat temperature 100°C~120°C, Preheat Duration: 100 sec max, Soldering Temperature: +260 ±5°C, Immersion Duration: ≤10 seconds, Depth: 1.5 ±0.5 mm Soldering Temperature: +400°C, Immersion Duration: ≤3 seconds Stabilized for 1.5 ±0.5hr at ordinary condition before measurements	ΔC/C: ≤ ± 2% DF: ≤ 15*10 ⁻⁴ at 1 KHz IR: ≥ 50% of initial limit					
Humidity Resistance	Temperature: +40°C ± 2°C, RH: 90% to 95%, Duration: 1344 +24/-0 hours	ΔC/C: ≤ ±5% DF: ≤ 15*10 ⁻⁴ at 1 KHz IR: ≥ 50% of initial limit					
Rapid Temperature Change	High Temperature: +105 ± 5°C, Low Temperature: -40 ± 5°C Temperature Cycle: Total 5 cycles, 30 min ± 10% for each temperature	ΔC/C: ≤ ±3% DF: ≤ 15*10 ⁻⁴ at 1 KHz IR: ≥50% of initial limit					
Temperature Cycle	Test Temperature Cycle: Total 5 cycles, Each cycle includes					ΔC/C: ≤ ± 5% DF: ≤ 15*10 ⁻⁴ at 1 KHz IR: ≥ 50% of initial limit	
	Cycle	1	2	3	4		5
	Temp (°C)	+20±2	-40±3	+20±2	+105±3		+20±2
	Time (mins)	3	30	3	30		3
Damp Heat Loading	Temperature: +40 ± 2°C, RH: 90% to 95%, Duration: 1000+24/-0 hours Loading Voltage: rated voltage					ΔC/C: ≤ ± 10% DF: ≤ 50*10 ⁻⁴ at 1 KHz IR: ≥ 50% of initial limit	
High Temperature Loading	Temperature: +85 ±2 °C, Duration: 1000 hours Apply 125% of Rated Voltage for 1,000 +24/-0 hours.					ΔC/C: ≤ ± 5% DF: ≤ 15*10 ⁻⁴ at 1 KHz IR: ≥ 50% of initial limit	
Biased Humidity	Temperature: +85 ±2°C, Humidity: 85% RH, Duration: 1000 +24/0 hours Loading Voltage: rated voltage Stabilized for 4 hours at standard temperature and humidity before measurements.					ΔC/C: ≤ ± 10% DF: ≤ 150*10 ⁻⁴ at 1 KHz IR: ≥ 50% of initial limit	
Resistance to solvent	Solvent: propanol (isopropyl alcohol) Temperature: 23 ±5°C, Immersion time: 5 ±0.5min, Drying time: 5 mins Mechanical treatment: 10 rubbing (with cotton-wool)					ΔC/C: ≤ ± 1% DF: ≤ 15*10 ⁻⁴ at 1 KHz IR: ≥ 50% of initial limit	
Terminal Strength	Item	0.50 < D ≤0.80mm	0.80 < D ≤1.25mm	Condition		No visible damage	
	Tension	10N	20N	Make two successive bends in each direction			
	Bending	5N	10N				
Vibration Resistance	Frequency Change: 10--55--10 Hz, Vibration Distance: 1.5 mm Direction: X, Y, Z, Duration: 2 ±1 hours each direction					ΔC/C: ≤ ± 1% DF: ≤ 15*10 ⁻⁴ at 1 KHz IR: ≥ 50% of initial limit	
Mechanical Shock	Pulse-shape: half-sine wave, Acceleration: 500 m/s2, Duration of pulse: 11 ms						
Bump	Total number of bumps: 1000 times or 4000 times, Acceleration: 400 m/s2, Pulse duration: 6 ms						

Notes:

1. Ambient Temp: 15°C to 35°C, Relative Humidity (R.H.): 45% to 75%, Air Pressure: 86kpa to 106kpa
2. Storage needs to be kept indoors at -10~+40°C and relative humidity of under 75% without any sudden temperature changes, direct sunlight and corrosive gas around
3. Do not apply and exceeding vibration, shock (dropping) and pressure
4. Reference Standards: IEC 60068, IEC 68, IEC 61071, MIL-STD-202, IEC 60384

CHARACTERISTIC CURVE



SIZE CODE TABLE

Size Code	Dimension						Pitch		Lead Wire	
	W	Tolerance	H	Tolerance	T	Tolerance	P	Tolerance	Ød	Tolerance
C13	13	0.5	11	0.5	5	0.5	10	0.5	0.6	0.05
C16	13	0.5	12	0.5	6	0.5	10	0.5	0.6	0.05
E14	18	0.5	11	0.5	5	0.5	15	0.5	0.6	0.05
E17	18	0.5	12	0.5	6	0.5	15	0.5	0.6	0.05
E21	18	0.5	13	0.5	7	0.5	15	0.5	0.8	0.05
E29	18	0.5	13.5	0.5	7.5	0.5	15	0.5	0.8	0.05
E34	18	0.5	14.5	0.5	8.5	0.5	15	0.5	0.8	0.05
E43	18	0.5	16	0.5	10	0.5	15	0.5	0.8	0.05
E45	18	0.5	18	0.5	10	0.5	15	0.5	0.8	0.05
E47	18	0.5	19	0.5	11	0.5	15	0.5	0.8	0.05
F20	26	0.5	17	0.5	8.5	0.5	22.5	0.5	0.8	0.05
F24	26	0.5	19	0.5	10	0.5	22.5	0.5	0.8	0.05
F26	26	0.5	20	0.5	11	0.5	22.5	0.5	0.8	0.05
F29	26	0.5	23	0.5	13	0.5	22.5	0.5	0.8	0.05
G18	32	0.8	20	0.8	11	0.8	27.5	0.5	0.8	0.05
G21	32	0.8	22	0.8	13	0.8	27.5	0.5	0.8	0.05
G22	32	0.8	24.5	0.8	13	0.8	27.5	0.5	0.8	0.05
G26	32	0.8	28	0.8	14	0.8	27.5	0.5	0.8	0.05
G34	32	0.8	33	0.8	18	0.8	27.5	0.5	0.8	0.05
G40	32	0.8	37	0.8	22	0.8	27.5	0.5	0.8	0.05

*Specifications subject to change without notice.