



MPB SERIES

GENERAL dV/dt PULSE CAPACITOR

METALLIZED POLYPROPYLENE CAPACITOR ▲ THT type

Low dissipation factor at high frequency

Flame retardant plastic case, epoxy resin sealed, UL 94V-0

Self-healing property

High insulation resistance

High stability of capacitance and dissipation factor

SPECIFICATION

Item		Characteristics				
Related Documents		IEC 60384-16				
Rated Temperature Range		-40°C to +85°C				
Usable Temperature Range ^{Note 1}		-40°C to +110°C				
Capacitance Range	C _R	0.01μF to 3.3μF				
Capacitance Tolerance	ΔC	±3% ▲ ±5% ▲ ±10%				
Rated DC Voltage	V _{R DC}	100V _{DC} ▲ 250V _{DC} ▲ 400V _{DC} ▲ 630V _{DC} ▲ 1000V _{DC}				
Rated AC Voltage	V _{R AC}	63V _{AC} ▲ 160V _{AC} ▲ 200V _{AC} ▲ 250V _{AC} ▲ 250V _{AC}				
Dissipation Factor	tan δ	f (kHz)	C ≤ 0.1μF	0.1 < C ≤ 1μF	1μF < C ≤ 3μF	3μF < C ≤ 3.3μF
		1	≤ 0.1%	≤ 0.1%	≤ 0.1%	≤ 0.1%
		100	≤ 0.4%	≤ 0.7%	≤ 1.2%	≤ 1.8%
Insulation Resistance ^{Note 2}	R _{INS}	C _R ≤ 0.33μF			C _R > 0.33μF	
		≥ 30GΩ			≥ 10GΩ x μF	
Withstand Voltage ^{Note 3}	V _W	1.6 x V _R applied for 2 sec. (cut off current 10mA)				
Maximum Pulse Rise Slope dV/dt	Pitch (mm)	100V _{DC}	250V _{DC}	400V _{DC}	630V _{DC}	1000V _{DC}
	7.5	130V/μs	240V/μs	450V/μs	550V/μs	-
	10	110V/μs	220V/μs	350V/μs	420V/μs	-
	15	100V/μs	200V/μs	300V/μs	400V/μs	450V/μs
	22.5	70V/μs	130V/μs	200V/μs	250V/μs	300V/μs
	27.5	50V/μs	100V/μs	150V/μs	180V/μs	200V/μs

Notes:

- For V_{RDC} 100V to 630V ▲ Derating ratio of rated voltage +85°C to +110°C
For V_{RDC} 1000V ▲ Derating ratio of rated voltage +85°C to +110°C
- Terminal to terminal at 20°C ± 5°C
- Terminal to terminal at 20°C ± 5°C

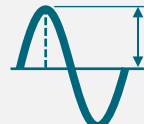
1.5% per °C for rated DC voltage

2% per °C for rated DC voltage / 1.25% per °C for rated AC voltage

Voltage charge time: 1minute; Voltage charge: 100V_{DC}

Slow-up voltage speed: C ≤ 10μF: 5sec / C > 10μF: 10sec

APPLICATIONS

Electronic Ballast	Filter Circuits	Pulse Applications	Switch Mode Power Supplies
			

ELECTRICAL CHARACTERISTICS

V_R	C_R (μF)	Dimensions (mm)			P (mm)	$\phi d \pm 0.05$ (mm)	Part Number ^{Note}
		W ± 0.3	H ± 0.3	T ± 0.3			
100V _{DC} ▲ 63V _{AC}	0.047	10	8	4	7.5	0.6	MPB-473□0100DB□07□
	0.056	10	8	4	7.5	0.6	MPB-563□0100DB□07□
	0.068	10	9	4	7.5	0.6	MPB-683□0100DB□07□
	0.082	10	10	5	7.5	0.6	MPB-823□0100DB□07□
	0.1	10	10	5	7.5	0.6	MPB-104□0100DB□07□
	0.12	10	10	5	7.5	0.6	MPB-124□0100DB□07□
	0.15	10	12	6	7.5	0.6	MPB-154□0100DB□07□
	0.18	10	12	6	7.5	0.6	MPB-184□0100DB□07□
	0.22	13	11	5	10	0.6	MPB-224□0100DB□10□
	0.27	13	12	6	10	0.6	MPB-274□0100DB□10□
	0.33	13	13	7	10	0.6	MPB-334□0100DB□10□
	0.39	13	13	7	10	0.6	MPB-394□0100DB□10□
	0.47	13	14	8	10	0.6	MPB-474□0100DB□10□
	0.56	18	13	7	15	0.8	MPB-564□0100DB□15□
	0.68	18	14.5	7.5	15	0.8	MPB-684□0100DB□15□
	0.82	18	15.5	8	15	0.8	MPB-824□0100DB□15□
	1	18	16	9	15	0.8	MPB-105□0100DB□15□
	1.2	18	18	10	15	0.8	MPB-125□0100DB□15□
	1.5	18	19	11	15	0.8	MPB-155□0100DB□15□
	1.8	26	18	9	22.5	0.8	MPB-185□0100DB□22□
	2.2	26	18.5	10	22.5	0.8	MPB-225□0100DB□22□
	2.7	26	20	11	22.5	0.8	MPB-275□0100DB□22□
	3.3	26	25	15	22.5	0.8	MPB-335□0100DB□22□
250V _{DC} ▲ 160V _{AC}	0.022	10	8	4	7.5	0.6	MPB-223□0250DB□07□
	0.027	10	8	4	7.5	0.6	MPB-273□0250DB□07□
	0.033	10	9	4	7.5	0.6	MPB-333□0250DB□07□
	0.039	10	9	4	7.5	0.6	MPB-393□0250DB□07□
	0.047	10	10	5	7.5	0.6	MPB-473□0250DB□07□
	0.056	10	10	5	7.5	0.6	MPB-563□0250DB□07□
	0.068	10	10	5	7.5	0.6	MPB-683□0250DB□07□
	0.082	10	12	6	7.5	0.6	MPB-823□0250DB□07□
	0.1	10	12	6	7.5	0.6	MPB-104□0250DB□07□
	0.12	13	12	6	10	0.6	MPB-124□0250DB□10□
	0.15	13	12	6	10	0.6	MPB-154□0250DB□10□
	0.18	13	13	7	10	0.6	MPB-184□0250DB□10□
	0.22	13	13	7	10	0.6	MPB-224□0250DB□10□
	0.27	18	12.5	6	15	0.8	MPB-274□0250DB□15□
	0.33	18	13	7	15	0.8	MPB-334□0250DB□15□
	0.39	18	14	7.5	15	0.8	MPB-394□0250DB□15□
	0.47	18	14.5	7.5	15	0.8	MPB-474□0250DB□15□
	0.56	18	16	9	15	0.8	MPB-564□0250DB□15□
	0.68	18	18	9	15	0.8	MPB-684□0250DB□15□
	0.82	18	19	10	15	0.8	MPB-824□0250DB□15□
	1	18	19	11	15	0.8	MPB-105□0250DB□15□

Note: Enter the appropriate tolerance lead length code and lead configuration □ from the product code table

ELECTRICAL CHARACTERISTICS

V_R	C_R (μF)	Dimensions (mm)			P (mm)	$\phi d \pm 0.05$ (mm)	Part Number ^{Note}
		W ± 0.3	H ± 0.3	T ± 0.3			
250V _{DC} ▲ 160V _{AC}	1.2	26	18	9	22.5	0.8	MPB-125□0250DB□22□
	1.5	26	19	10	22.5	0.8	MPB-155□0250DB□22□
	1.8	26	20	11	22.5	0.8	MPB-185□0250DB□22□
	2.2	26	22	12.5	22.5	0.8	MPB-225□0250DB□22□
	2.7	26	24	14	22.5	0.8	MPB-275□0250DB□22□
	3.3	26	25	15	22.5	0.8	MPB-335□0250DB□22□
400V _{DC} ▲ 200V _{AC}	0.01	10	8	4	7.5	0.6	MPB-103□0400DB□07□
	0.012	10	8	4	7.5	0.6	MPB-123□0400DB□07□
	0.015	10	10	5	7.5	0.6	MPB-153□0400DB□07□
	0.018	10	10	5	7.5	0.6	MPB-183□0400DB□07□
	0.022	10	10	5	7.5	0.6	MPB-223□0400DB□07□
	0.027	10	11	5	7.5	0.6	MPB-273□0400DB□07□
	0.033	10	12	6	7.5	0.6	MPB-333□0400DB□07□
	0.039	13	11	5.5	10	0.6	MPB-393□0400DB□10□
	0.047	13	11	5.5	10	0.6	MPB-473□0400DB□10□
	0.056	13	12	6	10	0.6	MPB-563□0400DB□10□
	0.068	13	13	7	10	0.6	MPB-683□0400DB□10□
	0.082	13	13	7	10	0.6	MPB-823□0400DB□10□
	0.1	13	14	8	10	0.6	MPB-104□0400DB□10□
	0.12	18	12	6	15	0.8	MPB-124□0400DB□15□
	0.15	18	13	7	15	0.8	MPB-154□0400DB□15□
	0.18	18	13.5	7.5	15	0.8	MPB-184□0400DB□15□
	0.22	18	14.5	7.5	15	0.8	MPB-224□0400DB□15□
	0.27	18	16	9	15	0.8	MPB-274□0400DB□15□
	0.33	18	16.5	10	15	0.8	MPB-334□0400DB□15□
	0.39	18	17.5	11	15	0.8	MPB-394□0400DB□15□
	0.47	26	17	8	22.5	0.8	MPB-474□0400DB□22□
	0.56	26	18	9	22.5	0.8	MPB-564□0400DB□22□
	0.68	26	19	10	22.5	0.8	MPB-684□0400DB□22□
	0.82	26	20	11	22.5	0.8	MPB-824□0400DB□22□
	1	26	21.5	12	22.5	0.8	MPB-105□0400DB□22□
	1.2	26	24	14	22.5	0.8	MPB-125□0400DB□22□
	1.5	26	25	15	22.5	0.8	MPB-155□0400DB□22□

Note: Enter the appropriate tolerance lead length code and lead configuration □ from the product code table

ELECTRICAL CHARACTERISTICS

V_R	C_R (μF)	Dimensions (mm)			P (mm)	$\phi d \pm 0.05$ (mm)	Part Number ^{Note}
		W ± 0.3	H ± 0.3	T ± 0.3			
630V _{DC} ▲ 250V _{AC}	0.01	10	10	5	7.5	0.6	MPB-103□0630DB□07□
	0.012	10	11	5	7.5	0.6	MPB-123□0630DB□07□
	0.015	10	12	6	7.5	0.6	MPB-153□0630DB□07□
	0.018	10	12	6	7.5	0.6	MPB-183□0630DB□07□
	0.022	13	11	5.5	10	0.6	MPB-223□0630DB□10□
	0.027	13	12	6	10	0.6	MPB-273□0630DB□10□
	0.033	13	13	7	10	0.6	MPB-333□0630DB□10□
	0.039	13	13	7	10	0.6	MPB-393□0630DB□10□
	0.047	13	14	8	10	0.6	MPB-473□0630DB□10□
	0.056	13	14	8	10	0.6	MPB-563□0630DB□10□
	0.047	18	11	5	15	0.8	MPB-473□0630DB□15□
	0.068	18	13	7	15	0.8	MPB-683□0630DB□15□
	0.082	18	13.5	7.5	15	0.8	MPB-823□0630DB□15□
	0.1	18	14	8	15	0.8	MPB-104□0630DB□15□
	0.12	18	15.5	8	15	0.8	MPB-124□0630DB□15□
	0.15	18	16.5	10	15	0.8	MPB-154□0630DB□15□
	0.18	18	18	10	15	0.8	MPB-184□0630DB□15□
	0.22	18	19	11	15	0.8	MPB-224□0630DB□15□
	0.27	26	18	9	22.5	0.8	MPB-274□0630DB□22□
	0.33	26	19	10	22.5	0.8	MPB-334□0630DB□22□
	0.39	26	20	11	22.5	0.8	MPB-394□0630DB□22□
	0.47	26	21.5	12	22.5	0.8	MPB-474□0630DB□22□
	0.56	26	23	14.5	22.5	0.8	MPB-564□0630DB□22□
	0.68	26	25	15	22.5	0.8	MPB-684□0630DB□22□
	0.82	26	25.5	16.5	22.5	0.8	MPB-824□0630DB□22□
	1	31	25.5	16	27.5	0.8	MPB-105□0630DB□27□
	1.2	31	27.5	18	27.5	0.8	MPB-125□0630DB□27□

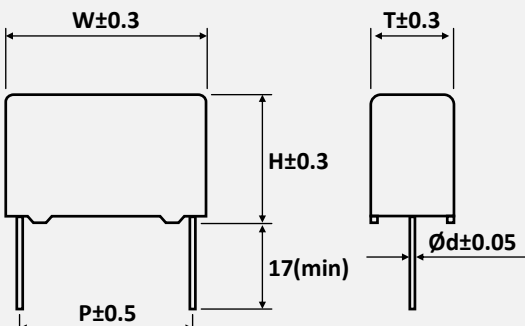
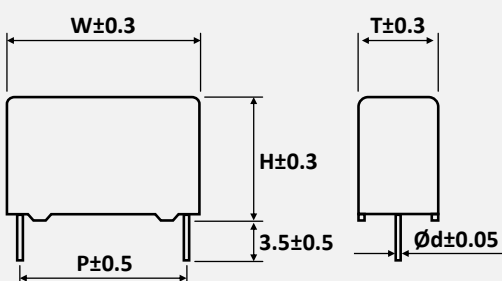
Note: Enter the appropriate tolerance lead length code and lead configuration □ from the product code table

ELECTRICAL CHARACTERISTICS

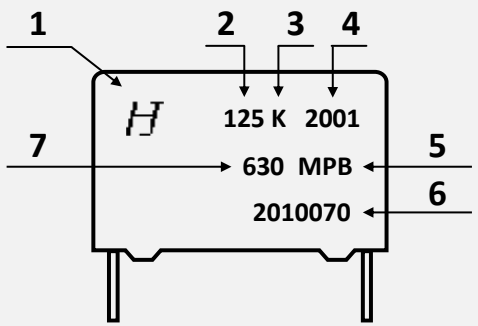
V_R	C_R (μF)	Dimensions (mm)			P (mm)	$\phi d \pm 0.05$ (mm)	Part Number ^{Note}
		W ± 0.3	H ± 0.3	T ± 0.3			
1000V _{DC} ▲ 250V _{AC}	0.01	18	11	5	15	0.8	MPB-103□1000DB□15□
	0.012	18	11	5	15	0.8	MPB-123□1000DB□15□
	0.015	18	11	5	15	0.8	MPB-153□1000DB□15□
	0.018	18	11	5	15	0.8	MPB-183□1000DB□15□
	0.022	18	11	5	15	0.8	MPB-223□1000DB□15□
	0.027	18	12	6	15	0.8	MPB-273□1000DB□15□
	0.033	18	12	6	15	0.8	MPB-333□1000DB□15□
	0.039	18	13	7	15	0.8	MPB-393□1000DB□15□
	0.047	18	13	7	15	0.8	MPB-473□1000DB□15□
	0.056	18	14	8	15	0.8	MPB-563□1000DB□15□
	0.068	18	14.5	8.5	15	0.8	MPB-683□1000DB□15□
	0.082	18	16	10	15	0.8	MPB-823□1000DB□15□
	0.1	18	18	10	15	0.8	MPB-104□1000DB□15□
	0.12	26	17	8	22.5	0.8	MPB-124□1000DB□22□
	0.15	26	18	9	22.5	0.8	MPB-154□1000DB□22□
	0.18	26	18.5	10	22.5	0.8	MPB-184□1000DB□22□
	0.22	26	20	11	22.5	0.8	MPB-224□1000DB□22□
	0.27	31	20	10	27.5	0.8	MPB-274□1000DB□27□
	0.33	31	20	11	27.5	0.8	MPB-334□1000DB□27□
	0.39	31	22	13	27.5	0.8	MPB-394□1000DB□27□
	0.47	31	23.5	14	27.5	0.8	MPB-474□1000DB□27□
	0.56	31	24.5	15	27.5	0.8	MPB-564□1000DB□27□
	0.68	31	26	18	27.5	0.8	MPB-684□1000DB□27□
	0.82	31	28	18	27.5	0.8	MPB-824□1000DB□27□
	1	31	33	18	27.5	0.8	MPB-105□1000DB□27□

Note: Enter the appropriate tolerance lead length code and lead configuration □ from the product code table

PACKAGE OUTLINE ▲ All dimensions in mm

Long Leads	Short Leads
 Diagram showing dimensions for Long Leads: W± 0.3, H± 0.3, T± 0.3, P± 0.5, $\phi d \pm 0.05$, and 17(min).	 Diagram showing dimensions for Short Leads: W± 0.3, H± 0.3, T± 0.3, P± 0.5, 3.5± 0.5, and $\phi d \pm 0.05$.

PRODUCT MARKING

Marking					Details	
					No.	Description
					1	Manufacturer Logo *
					2	Nominal capacitance in μF
					3	Capacitance tolerance
					4	Date code
					5	Series name
					6	DC rated voltage
					7	Production no.
$P \leq 10\text{mm}$	H	P 15 to 27.5mm	H	$P > 27.5\text{mm}$	HJC	

DATE CODE & APPLICATION CATEGORY

Example:

Date code

2001: 2001 = 1st week of 2020

Lot number

2010070: 20 = Year, here 2020
1 = Month, here January
0001 to XXXX = Serial number

20		01	
Year		Week	
19	2019	01	1 st
20	2020	02	2 nd
21	2021	03	3 rd
22	2022	04	4 th
23	2023	05	5 th
...	...	...	...
30	2030	53	53 rd

PRODUCT CODE

Example: MPB series ▲ 1.2 μF ▲ 630V_{DC} ▲ $\pm 10\%$ ▲ P=27.5mm ▲ Bulk ▲ Straight leads ▲ 17mm lead length

MPB-		125		K		0630		D		B		1		27		1	
Series		Capacitance Code ^{Note1} (pF)		Capacitance Tolerance (%)		Rated Voltage (V _{DC})		Voltage Type		Packaging Type		Lead Configuration ^{Note2}		Pitch (mm)		Lead Length (mm)	
Code	Series	Code	μF	Code	Tol.	Code	VDC	Code	Type	Code	Type	Code	Style	Code	mm	Code	mm
MPB-	MPB	103	0.01	H	± 3	0100	100	D	DC	B	Bulk	1	SL	07	7.5	1	17.0
		333	0.033	J	± 5	0250	250							10	10.0	2	3.5
		564	0.56	K	± 10	0400	400							15	15.0		
		125	1.2			0630	630							22	22.5		
		335	3.3											27	27.5		

Note:

- Capacitance code expressed in pF. The first two digits represent significant figures. The last digit specifies the total number of zeros to be added.
- SL = Straight leads

REFERENCE DATA

Fig. 1 • Capacitance Drift vs. Ambient Temperature

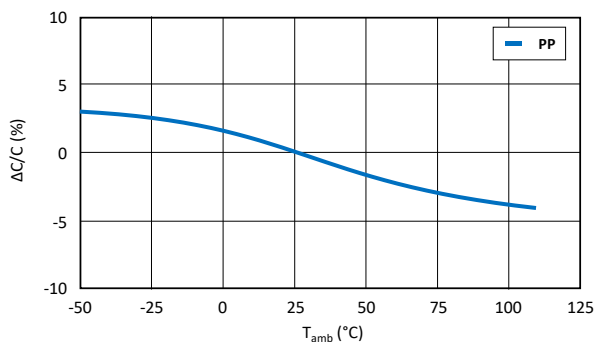


Fig. 2 • Insulation Resistance vs. Ambient Temperature

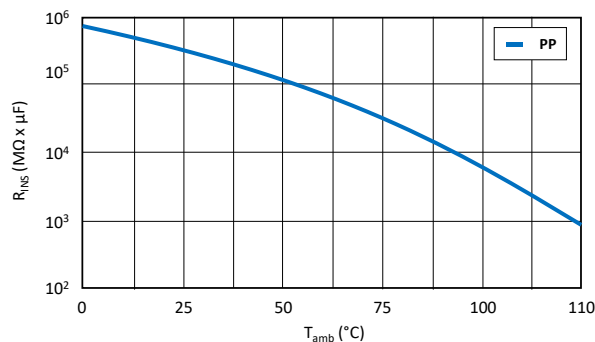


Fig. 3 • Dissipation Factor vs. Ambient Temperature

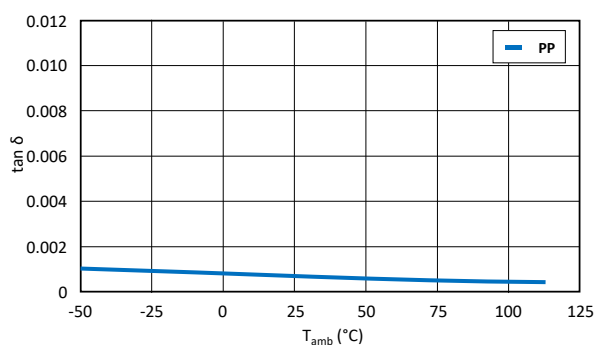


Fig. 4 • Dissipation Factor vs. Frequency

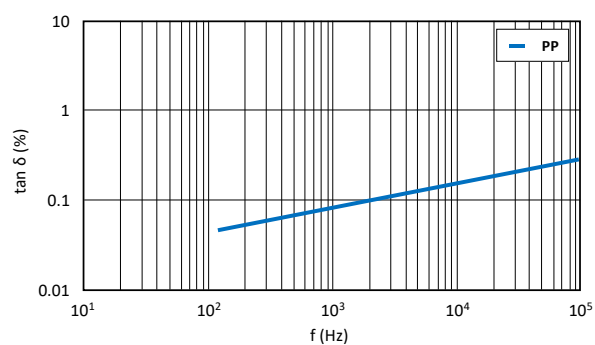


Fig. 5 • Capacitance Drift vs. Frequency

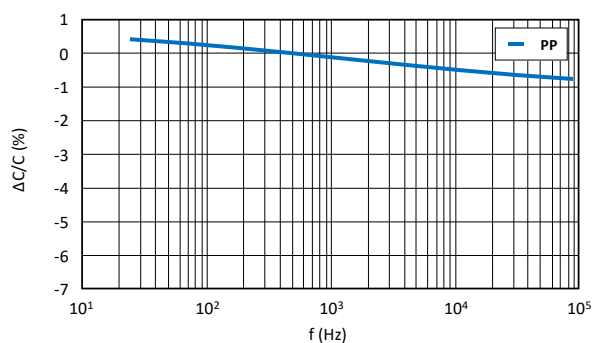
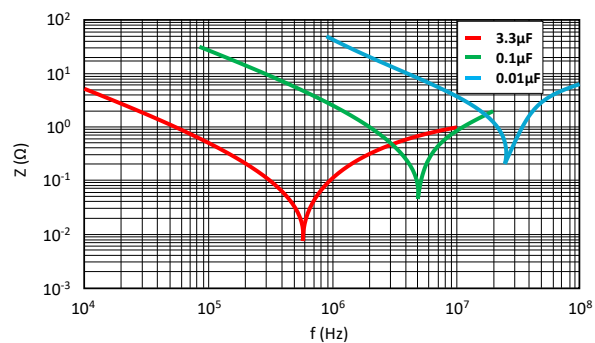
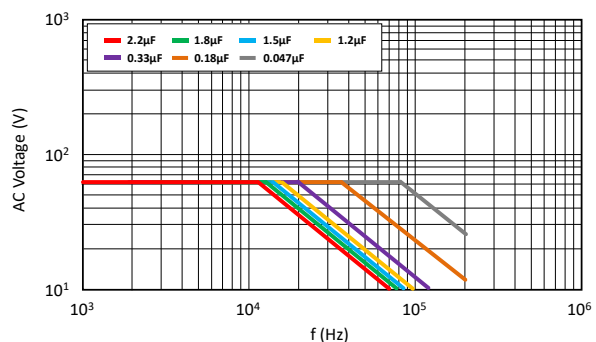
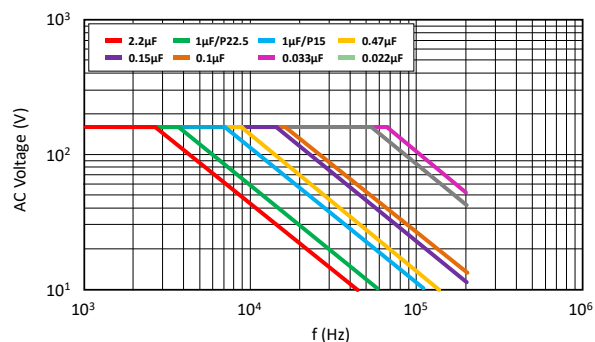
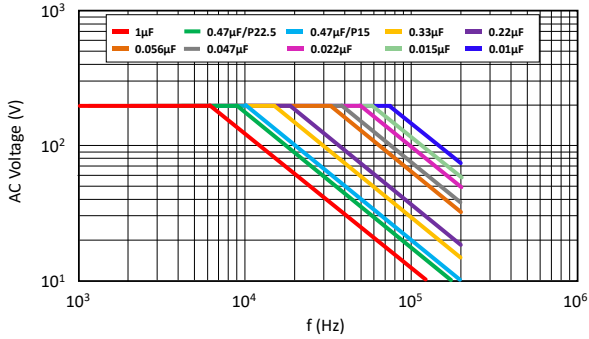
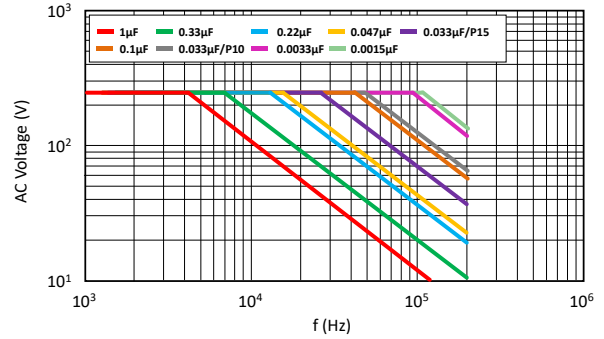
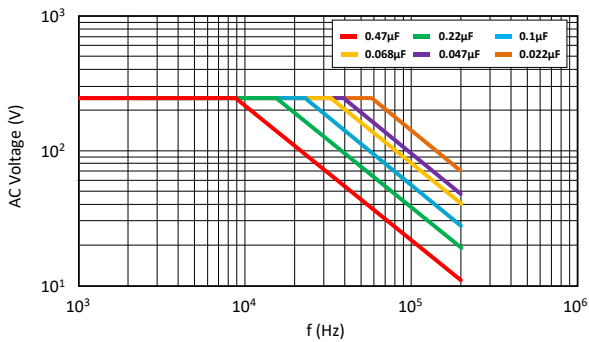
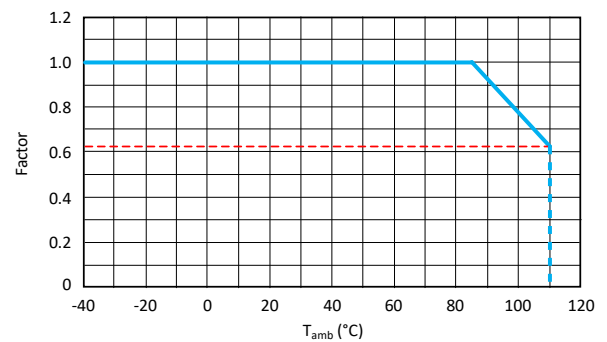
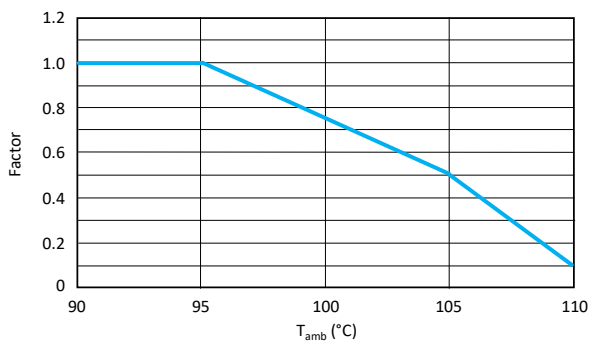
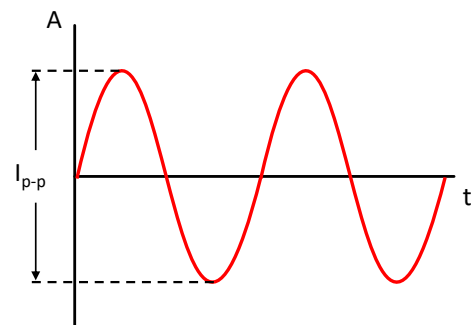


Fig. 6 • Impedance vs. Frequency • Typical Curve


Fig. 7 • Max. RMS Voltage vs. Frequency • 100V_{DC}/63V_{AC}

Fig. 8 • Max. RMS Voltage vs. Frequency • 250V_{DC}/160V_{AC}


REFERENCE DATA

Fig. 9 • Max. RMS Voltage vs. Frequency - 400V_{DC}/200V_{AC}

Fig. 10 • Max. RMS Voltage vs. Frequency - 630V_{DC}/250V_{AC}

Fig. 11 • Max. RMS Voltage vs. Frequency - 1000V_{DC}/250V_{AC}

Fig. 12 • Max. DC and AC Voltage vs. Temperature

Fig. 13 • Permissible Current Derating by Temperature

Fig. 14 • Max. RMS Current - Wave Form


MAXIMUM RMS CURRENT

V _R	C _R (μF)	P (mm)	I _{RMS} (A _{RMS}) at f							
			15.75kHz	35kHz	45kHz	65kHz	80kHz	100kHz	130kHz	200kHz
100V _{DC} ▲ 63V _{AC}	0.047	7.5	1.40	1.50	1.55	1.65	1.75	1.85	1.90	2.00
	0.18	7.5	2.05	2.30	2.40	2.50	2.60	2.70	2.75	2.90
	0.33	10	2.10	2.20	2.25	2.30	2.35	2.45	2.25	2.65
	1	15	6.60	7.00	7.10	7.25	7.50	7.60	7.80	8.00
	1.2	15	7.00	7.50	7.60	7.80	8.00	8.10	8.20	8.50
	1.5	15	7.15	7.90	8.00	8.15	8.50	8.80	8.90	9.00
	1.8	22.5	8.90	9.10	9.30	9.40	9.50	9.60	9.50	9.30
	2.2	22.5	9.20	9.40	9.50	9.60	9.80	9.90	10.00	9.90
	3.3	27.5	7.10	7.50	7.70	7.80	7.90	8.00	7.90	7.80
250V _{DC} ▲ 160V _{AC}	0.022	7.5	0.62	0.75	0.80	0.88	0.92	0.96	1.05	1.15
	0.033	7.5	0.63	1.30	1.38	1.50	1.55	1.65	1.75	1.95
	0.039	7.5	0.66	1.48	1.56	1.64	1.69	1.75	1.92	2.12
	0.047	7.5	0.79	1.60	1.63	1.72	1.76	1.83	2.01	2.21
	0.068	7.5	1.16	1.71	1.74	1.83	1.93	1.98	2.18	2.40
	0.082	7.5	1.43	1.76	1.82	1.93	1.98	2.03	2.24	2.46
	0.1	7.5	1.61	1.82	1.85	1.98	2.07	2.09	2.30	2.53
	0.15	10	1.82	2.04	2.11	2.26	2.36	2.42	2.66	2.93
	0.33	15	3.50	4.00	4.10	4.30	4.45	4.60	5.06	5.57
	0.39	15	4.40	5.00	5.20	5.30	5.35	5.46	6.01	6.61
	0.47	15	4.80	5.15	5.25	5.35	5.40	5.50	6.05	6.65
	1	15	6.40	7.00	7.15	7.60	7.90	8.00	8.10	8.50
	2.2	22.5	8.75	9.10	9.40	9.60	9.70	9.80	9.50	9.00
	3.3	22.5	8.90	9.30	9.50	9.70	9.80	9.90	9.70	9.50

Note: Maximum capacitor surface temperature T_s ≤ 110°C; Maximum body temperature rise ΔT ≤ 10°C

$$I_{RMS} = \frac{I_{p-p}}{2 \cdot \sqrt{2}}$$

MAXIMUM RMS CURRENT

V _R	C _R (μF)	P (mm)	I _{RMS} (A) at f							
			15.75kHz	35kHz	45kHz	65kHz	80kHz	100kHz	130kHz	200kHz
400V _{DC} ▲ 200V _{AC}	0.01	7.5	0.55	0.69	0.73	0.82	0.88	0.92	0.99	1.20
	0.012	7.5	0.57	0.70	0.76	0.85	0.91	9.50	1.03	1.25
	0.015	7.5	0.60	0.75	0.80	0.89	0.94	1.00	1.10	1.30
	0.018	7.5	0.80	1.00	1.20	1.40	1.55	1.65	1.70	1.95
	0.022	7.5	1.00	1.30	1.45	1.55	1.65	1.75	1.80	2.05
	0.027	7.5	1.30	1.55	1.65	1.75	1.85	1.95	2.10	2.25
	0.033	7.5	1.50	1.75	1.90	2.10	2.30	2.45	2.65	2.80
	0.039	10	1.20	1.50	1.70	1.95	2.10	2.20	2.40	2.60
	0.047	10	1.40	1.75	1.85	2.10	2.20	2.30	2.50	2.80
	0.056	10	1.55	1.95	2.10	2.30	2.50	2.60	2.80	3.15
	0.068	10	1.70	2.05	2.20	2.40	2.53	2.65	2.85	3.20
	0.082	10	2.00	2.21	2.29	2.45	2.55	2.70	2.95	3.25
	0.1	10	2.25	2.45	2.55	2.65	2.75	2.90	3.05	3.45
	0.12	15	2.40	2.88	3.00	3.18	3.30	3.40	3.70	4.00
	0.15	15	2.50	2.95	3.10	3.40	3.60	3.80	4.00	4.40
	0.18	15	2.75	3.25	3.50	3.80	4.05	4.35	4.55	4.95
	0.22	15	3.00	3.60	3.80	4.15	4.25	4.60	4.90	5.30
	0.27	15	3.30	3.85	4.15	4.55	4.75	5.00	5.30	5.80
	0.33	15	3.60	4.20	4.60	5.00	5.15	5.60	5.90	6.30
	0.39	15	3.80	4.85	5.00	5.30	5.40	5.60	6.40	7.00
	0.47	22.5	4.20	5.00	5.20	5.70	6.00	6.30	6.70	7.30
	0.56	22.5	4.40	5.10	5.35	5.80	6.10	6.40	6.85	7.45
	0.68	22.5	4.50	5.20	5.45	5.95	6.30	6.65	7.00	7.55
	0.82	22.5	4.55	5.35	5.55	6.20	6.50	6.85	7.20	7.65
	1	22.5	4.60	5.60	6.00	6.50	6.80	7.10	7.50	7.80
	1.2	22.5	4.85	5.90	6.40	6.80	7.30	7.50	8.00	7.90
	1.5	22.5	5.20	6.20	6.80	7.20	7.80	8.00	8.30	8.00

Note: Maximum capacitor surface temperature T_s ≤ 110°C; Maximum body temperature rise ΔT ≤ 10°C

$$I_{RMS} = \frac{I_{p-p}}{2 \cdot \sqrt{2}}$$

MAXIMUM RMS CURRENT

V _R	C _R (μF)	P (mm)	I _{RMS} (A) at f							
			15.75kHz	35kHz	45kHz	65kHz	80kHz	100kHz	130kHz	200kHz
630V _{DC} ▲ 250V _{AC}	0.00082	7.5	0.02	0.07	0.09	0.17	0.19	0.22	0.25	0.35
	0.0015	7.5	0.06	0.10	0.12	0.20	0.25	0.30	0.40	0.55
	0.0033	7.5	0.29	0.38	0.42	0.48	0.52	0.56	0.65	0.71
	0.0047	7.5	0.32	0.42	0.46	0.52	0.56	0.60	0.70	0.77
	0.0068	7.5	0.35	0.46	0.50	0.57	0.62	0.67	0.75	0.85
	0.01	7.5	0.39	0.55	0.62	0.73	0.78	0.88	0.95	1.15
	0.012	7.5	0.45	0.73	0.94	1.06	1.10	1.16	1.27	1.49
	0.015	10	0.41	0.88	1.16	1.30	1.34	1.41	1.60	1.82
	0.022	10	0.61	1.32	1.38	1.49	1.54	1.60	1.82	1.98
	0.027	10	0.75	1.38	1.57	1.68	1.74	1.87	1.98	2.18
	0.033	10	0.91	1.71	1.79	1.90	1.98	2.11	2.26	2.42
	0.047	10	1.30	1.90	2.00	2.10	2.30	2.35	2.50	2.90
	0.1	10	1.68	2.00	2.15	2.40	2.50	2.60	2.70	3.00
	0.22	10	2.13	2.50	2.70	2.90	3.15	3.20	3.30	3.80
	0.033	15	0.83	1.54	1.65	1.76	1.87	1.98	2.09	2.20
	0.047	15	1.29	1.85	1.93	2.07	2.15	2.26	2.42	2.64
	0.056	15	1.55	2.25	2.45	2.80	3.00	3.10	3.30	3.60
	0.068	15	1.70	2.50	2.90	3.10	3.40	3.60	3.85	4.07
	0.082	15	1.90	2.70	3.05	3.25	3.55	3.70	3.95	4.25
	0.1	15	2.50	2.90	3.15	3.40	3.65	3.80	4.15	4.50
	0.12	15	2.75	3.00	3.30	3.60	3.85	4.10	4.50	4.90
	0.15	15	3.20	4.00	4.20	4.80	5.00	5.20	5.35	5.55
	0.22	15	3.90	4.46	4.68	5.05	5.25	5.45	5.65	5.85
	0.15	22.5	3.85	4.40	4.84	4.99	5.12	5.35	5.55	5.85
	0.22	22.5	4.05	4.68	4.90	5.23	5.39	5.50	5.72	5.95
	0.33	22.5	4.55	5.15	5.35	5.75	6.00	6.25	6.55	6.85
	1	27.5	7.04	8.08	8.47	9.07	9.41	9.79	10.00	9.90
	0.47	30	9.60	10.00	10.20	10.50	10.63	10.75	11.00	11.25
	4.7	37.5	6.66	7.16	7.60	8.45	8.83	9.42	9.55	9.35
	4.7	45	6.00	6.50	6.70	7.30	7.60	8.00	8.15	8.05

Note: Maximum capacitor surface temperature T_s ≤ 110°C; Maximum body temperature rise ΔT ≤ 10°C

$$I_{RMS} = \frac{I_{p-p}}{2 \cdot \sqrt{2}}$$

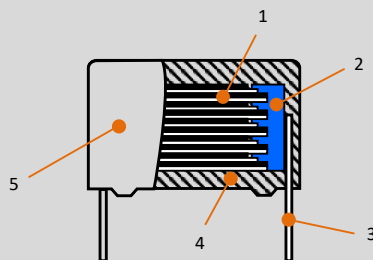
MAXIMUM RMS CURRENT

V _R	C _R (μF)	P (mm)	I _{RMS} (A) at f							
			15.75kHz	35kHz	45kHz	65kHz	80kHz	100kHz	130kHz	200kHz
1000V _{DC} ▲ 250V _{AC}	0.0047	7.5	0.55	0.70	0.78	0.88	0.92	1.00	1.20	1.40
	0.012	15	0.40	0.46	0.48	0.51	0.53	0.55	0.61	0.66
	0.022	15	0.62	1.40	1.65	1.76	1.87	1.98	2.18	2.40
	0.027	15	0.66	1.48	1.76	1.87	1.98	2.09	2.30	2.53
	0.033	15	0.72	1.82	1.99	2.26	2.42	2.62	2.80	3.00
	0.047	15	0.79	2.20	2.34	2.55	2.75	2.86	3.15	3.46
	0.056	15	1.05	2.75	2.86	3.08	3.30	3.52	3.87	4.26
	0.068	15	2.26	2.86	3.08	3.40	3.60	3.91	4.30	4.70
	0.082	15	2.40	3.03	3.25	3.52	3.74	4.07	4.48	4.92
	0.1	15	2.38	2.90	3.10	3.40	3.60	3.80	4.20	4.60
	0.068	22.5	2.00	2.40	2.66	2.86	3.08	3.19	3.51	3.86
	0.1	22.5	2.20	2.75	2.92	3.19	3.40	3.61	3.97	4.36
	0.22	22.5	3.10	3.85	4.18	4.60	4.84	5.06	5.56	6.12
	0.33	22.5	4.85	5.35	5.55	6.05	6.35	6.65	7.00	7.45
	0.47	22.5	6.40	7.00	7.30	7.60	7.80	8.00	8.25	8.70
	0.33	27.5	5.00	5.50	5.88	6.06	6.12	6.18	6.25	6.30
	0.47	27.5	5.30	5.80	6.20	6.70	7.00	7.30	7.60	8.00
	0.68	27.5	7.67	8.22	8.27	8.47	8.72	8.76	8.89	9.23
	1	27.5	9.50	10.00	10.20	10.50	10.70	10.90	11.00	10.90
	1.5	27.5	10.50	11.20	11.80	11.90	11.95	12.00	12.20	12.00
	2.2	37.5	11.00	12.20	12.60	13.20	13.60	14.10	13.90	13.50

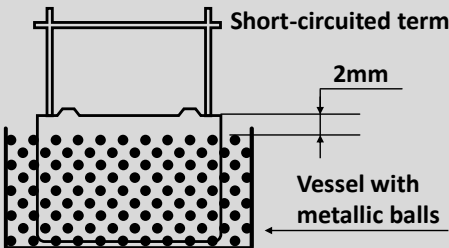
Note: Maximum capacitor surface temperature T_s ≤ 110°C; Maximum body temperature rise ΔT ≤ 10°C

$$I_{RMS} = \frac{I_{p-p}}{2 \cdot \sqrt{2}}$$

TECHNICAL SPECIFICATION

No.	Category	Specification								
1	Scope	This specification applies to capacitors for electronics applications. Reference standards: IEC 60384-16								
2	Product Name	Metallized polypropylene film capacitor, Type MPB								
3	Construction	Dimensions:		Refer to dimensions drawing						
										
		1 = Element		Metallized Polypropylene film						
		2 = Metal spray		Special solder. (Lead Free) compliant to RoHS directive						
		3 = Lead wire		Tinned wire (Cu wire) or tinned copper clad-steel wire (CP wire). (Lead Free) compliant to RoHS directive						
		4 = Inner coating		Epoxy resin filled. (UL-94V-0 Standard)						
5 = Outer coating		Plastic case. (UL-94V-0 Standard)								
4	Atmospheric and Temperature Characteristics	Standard atmospheric conditions. Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:								
		Ambient temperature:		15 to 35°C						
		Relative humidity		45% to 85%						
		Air pressure		86 to 106 kPa						
		If there may be any doubt on the results, measurements shall be made within the following limits.								
		Ambient temperature:		20°C ± 5°C						
		Relative humidity:		60 to 70%						
		Operating temperature range								
		Lowest operating temperature:		-40°C						
		Maximum operating temperature:		+110°C (case-temperature) with specified voltage-derating						
The capacitor can be operated up to 110°C case-temperature (according to the power to be dissipated). For V _{RDC} 100V to 630V ▲ Derating ratio of rated voltage +85°C to +110°C: 1.5% per °C for V _{RDC} For V _{RDC} 1000V ▲ Derating ratio of rated voltage +85°C to +110°C: 2% per °C for V _{RDC} / 1.25% per °C for V _{RAC} The temperature is measured at the hottest point of the case when the capacitor has reached its thermal equilibrium.										
Rated temperature range		-40°C to +85°C								
Rated temperature range is the range of ambient temperature for which the capacitor can be operated continuously at rated voltage.										
5	Electrical Characteristics	Rated voltage:		V _R at 85°C	100V _{DC}	250V _{DC}	400V _{DC}	630V _{DC}	1000V _{DC}	
		Category voltage:		Up to 85°C	V _C = V _R					
		Rated upper limit temperature:		+85°C						
		Usable upper limit temperature:		+110°C						
		Capacitance range:		0.01μF to 3.3μF						
		Capacitance tolerance:		±5% (J), ±10% (K), ±20% (M)					Measured at 1kHz, 1V	

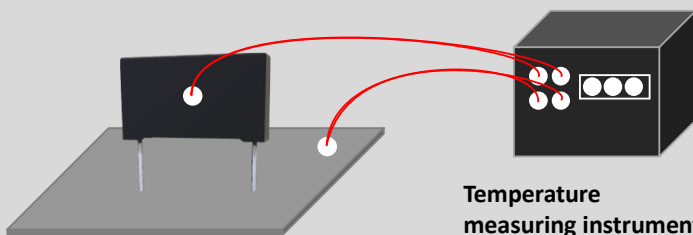
TECHNICAL SPECIFICATION

No.	Category	Specification																		
5	Electrical Characteristics	Dissipation factor tanδ (%): LCR meter: HP-4284A, at 20°C ± 5°C																		
		<table><tr><td>f (kHz)</td><td>C ≤ 0.1μF</td><td>0.1μF < C ≤ 1μF</td><td>1μF < C ≤ 3μF</td><td>3μF < C ≤ 5μF</td><td>5μF < C ≤ 10μF</td></tr><tr><td>1</td><td>≤ 0.10%</td><td>≤ 0.10%</td><td>≤ 0.10%</td><td>≤ 0.10%</td><td>≤ 0.10%</td></tr><tr><td>100</td><td>≤ 0.40%</td><td>≤ 0.70%</td><td>≤ 1.20%</td><td>≤ 1.80%</td><td>≤ 2.80%</td></tr></table>	f (kHz)	C ≤ 0.1μF	0.1μF < C ≤ 1μF	1μF < C ≤ 3μF	3μF < C ≤ 5μF	5μF < C ≤ 10μF	1	≤ 0.10%	≤ 0.10%	≤ 0.10%	≤ 0.10%	≤ 0.10%	100	≤ 0.40%	≤ 0.70%	≤ 1.20%	≤ 1.80%	≤ 2.80%
		f (kHz)	C ≤ 0.1μF	0.1μF < C ≤ 1μF	1μF < C ≤ 3μF	3μF < C ≤ 5μF	5μF < C ≤ 10μF													
		1	≤ 0.10%	≤ 0.10%	≤ 0.10%	≤ 0.10%	≤ 0.10%													
		100	≤ 0.40%	≤ 0.70%	≤ 1.20%	≤ 1.80%	≤ 2.80%													
		Insulation resistance between terminals																		
		Test conditions:																		
		Temperature:	20°C ± 5°C																	
		Voltage charge:	100V _{DC}																	
		Performance:	C ≤ 0.33μF			C > 0.33μF														
			After voltage charge 1 minute > 30GΩ			After voltage charge 1 minute > 10GΩ x μF														
		Test voltage between terminals																		
		1.6 × V _{RDC} applied for 2 sec, at 20°C ±5°C																		
		Cut off current:	10mA																	
		Ramp/rise time:	C ≤ 10μF: 5 sec			C > 10μF: 10 sec														
Performance:	There shall be no dielectric breakdown or other damage																			
Dielectric strength between terminal and enclosure																				
Apply 200% of rated voltage between terminals and enclosure for 2 to 5 sec																				
Method of the test described as below																				
Put the small metallic balls with 1 mm diameter in a vessel. The test capacitor shall be submerged with the small metallic balls. Distance of the metallic balls and the terminals shall be kept about 2 mm as shown in fig. 1. The test voltage shall be applied between the short-circuited terminals and the metallic balls			 Short-circuited terminal 2mm Vessel with metallic balls Fig. 1																	
Performance:	There shall be no dielectric breakdown or other damage																			
Test Item	The test capacitor shall be kept in the testing oven and kept at condition of following table, and it shall be repeated for 5 cycles successively. After the test, the capacitor shall be let alone at the ordinary condition for 2 hours																			
	Conditions			Performance																
Rapid change of temperature (IEC68-2-14 Na)	Step	Temperature	Time	Capacitance change ΔC/C ≤ ± 10% tan δ change ≤ 0.1% at 1kHz R insulation ≥ 50 % of limit value																
	1	-40 ± 3°C	30 ± 3 min																	
	2	Ordinary	3 min or less																	
	3	+110 ± 2°C	30 ± 3 min																	
	4	Ordinary	3 min or less																	

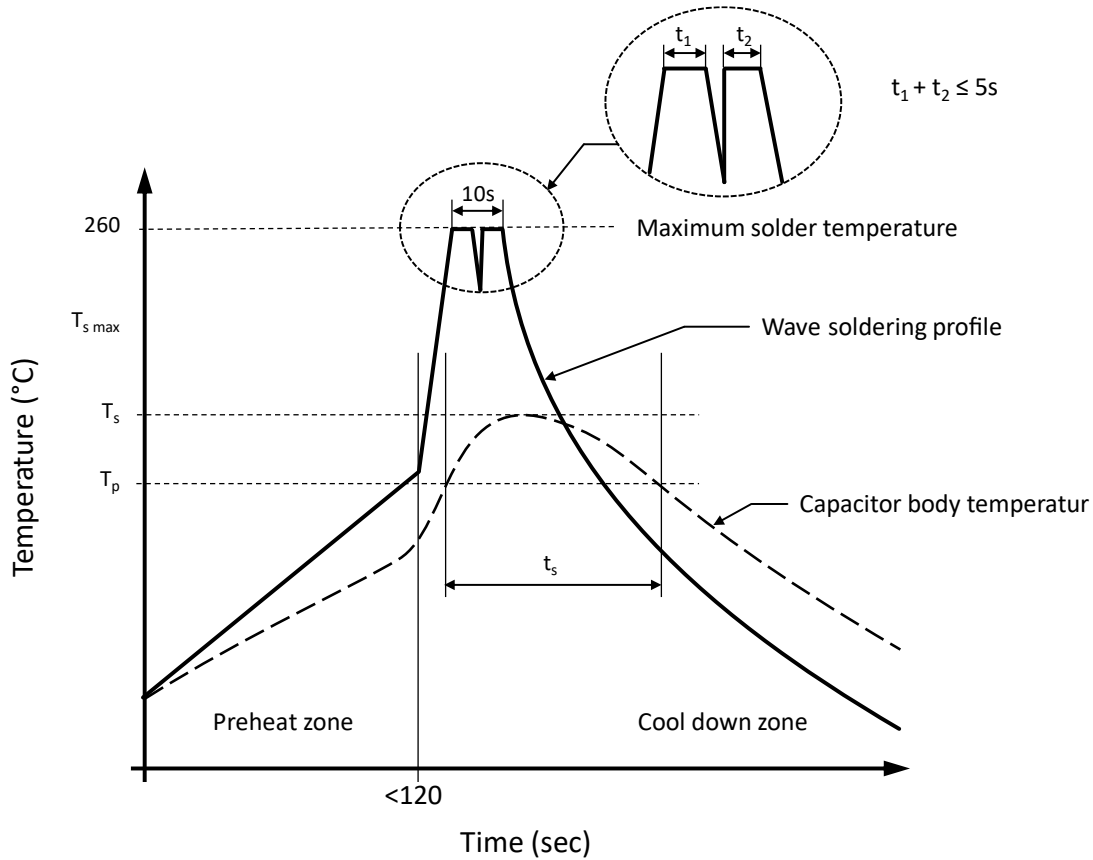
TECHNICAL SPECIFICATION

No.	Category	Specification		
		Test Item	Conditions	Performance
6	Mechanical Characteristics	Robustness of terminations (IEC68-2-21)	Tensile Ua1	There shall be no such mechanical damage as terminal damage etc.
			A load of 10 N (1.0kg) shall be gradually applied to the terminal in the axial direction and held thus for 10 sec	
			Bending Ub methode 1	
			While a load of 500g applied to the lead wire, the body of the capacitor shall be bent 90° and returned to the original position. This operation shall be conducted in a few seconds. Then the body shall be bent 90° at the same speed in the opposite direction and returned to the original position	
7	Endurance Characteristics	Solderability (IEC68-2-20 Ta)	Solder bath: 245°C ± 5°C Immersion time: 2.5±0.5sec Visual examination	At least 95% of the circumferential face of lead wire up to immersed level shall be covered with new solder
		Resistance to soldering heat (IEC 68-2-20 Tb)	Solder bath: 260 °C ± 5 °C Immersion time: 10±1sec Thickness of heat shunt (Printed wiring board): 1.6mm Capacitance at 1kHz tan δ at 1kHz	Capacitance change $ \Delta C/C \leq \pm 1\%$ tan δ change $\leq 0.1\%$ at 1kHz
		Vibration proof (IEC68-2-6 Fc)	The frequency shall be varied form from 10Hz to 55Hz at 1.5mm amplitude and back to 10Hz in approximately 1-minute intervals. This motion shall be applied for a period of 2 hours in each of 3 mutually perpendicular directions. During the last 30 min of vibration in each direction, checks shall be made for open or short-circuit and interruption	Bending strength: There shall be no open or short-circuiting and the connections must be stabilized.
				Appearance: There shall be no such mechanical damage as terminal damage etc.
		Damp heat steady state (IEC68-2-3 Ca)	The capacitor shall be stored at a temperature of 40 ± 2°C and relative humidity of 90% to 95% for 1000 hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurement shall be made	Capacitance change $ \Delta C/C \leq \pm 3\%$ tan δ change $\leq 0.1\%$ at 1kHz R insulation $\geq 50\%$ of limit value
		Electrical endurance (IEC 60384-2)	125% of category voltage shall be applied to the capacitor at a temperature of 110 ± 2°C for 1000 hours. Then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurement shall be made. The load resistor in series with the capacitor shall be 20Ω to 1kΩ.	Capacitance change $ \Delta C/C \leq \pm 10\%$ tan δ change $\leq 0.4\%$ at 1kHz R insulation $\geq 50\%$ of limit value

TECHNICAL SPECIFICATION

No.	Category	Specification		
7	Endurance Characteristics	Test Item	Conditions	Performance
		Method of measuring inherent temperature rise ΔT	Inherent temperature of capacitor shall be measured by keeping away from heat influence of surrounding components after attaching thermocouple to the capacitor as show below. (They shall be measured in normal temperature). Measurement shall be down by soldering capacitor on the opposite side of the printed circuit board etc. in case of being influenced by heat of surrounding components. Besides, they shall be measured in calm condition by putting capacitor into box etc. in case of being influence by convection or wind.	Less than +10°C
 Temperature measuring instrument				
8	Storage conditions	It should be noted that the solderability of the terminals may be deteriorated when stored barely in an atmosphere for a long period.		
		It should not be located in particularly high temperature and high humidity, it must submit to the following conditions (Keeping in the original package)		
		Temperature: 5°C to 35°C		
		Relative humidity: $\leq 70\%$		
		Storage period: ≤ 12 months (Following the manufacturing date marked on the label in package bag)		
		Avoid wetting the capacitor by water, oil, salt and/or poisonous gas.		
		If used the capacitor that overdue the storage time, it should be test, the characteristics of the capacitor or contact with our technical engineer.		

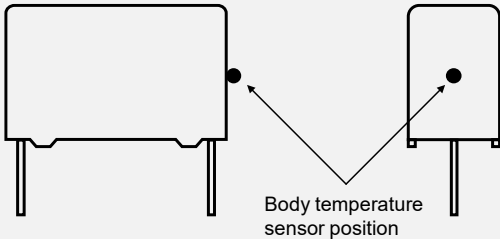
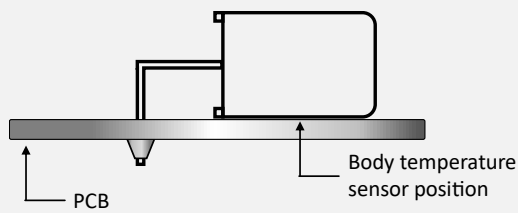
RECOMMENDED WAVE SOLDERING PROFILE ▲ THT PACKAGE



Capacitor body temperature should follow the description below:

Profile Features		Polypropylene Film Capacitor	Polyester Film Capacitor
Capacitor body maximum temperature at preheating	T_p	$\leq 110^\circ\text{C} / 120 \text{ seconds}$	$\leq 125^\circ\text{C} / 120 \text{ seconds}$
Capacitor body maximum temperature at wave soldering	T_s	$\leq 120^\circ\text{C} / t_s \leq 45 \text{ seconds}$	$\leq 150^\circ\text{C} / t_s \leq 45 \text{ seconds}$

DETERMINING THE CAPACITOR BODY TEMPERATURE

Vertical Mounting	Horizontal Mounting
 Body temperature sensor position	 PCB Body temperature sensor position
The body temperature sensor position is defined as the highest temperature point around the capacitor body.	If there is 90 degree bending product, the sensor position shall be between product and PCB

REVISION TABLE

Revision	Date	Status	Notes
001	01/10/2021	Initial release	Initial publication

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