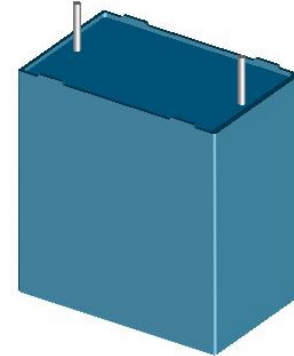


# Metallized Polypropylene Film Capacitor

## Class X2, 310Vac/350Vac, THB version

**APPLICATIONS**

- For applications in the AC mains requiring a long lifetime-expectancy
- For connections across the line or in series to the mains
- For EMI suppression
- For capacitive power-supplies and capacitive voltage-dividers
- For AC filtering, e.g. in PV inverters and UPS systems



**FEATURES**

- Very high robustness under severe ambient-conditions
- Long lifetime-expectancy
- Reliable self-healing
- Excellent resistance to active and passive flammability
- Inner series-connection leads to an increased robustness against Corona (Partial discharges)

**MARKING**

- Manufacturer' logo
- Rated capacitance
- Capacitance tolerance
- Rated voltage
- Manufacturing date

**CONSTRUCTION**

- Dielectric: PP film with inner series connection
- Electrodes: Metallized dielectric film
- Plastic case (flame retardant)
- THB-grade epoxy resin sealing (UL-94 V-0)
- Terminals: Tinned copper wire

TECHNICAL DATA AND SPECIFICATION			
Rated Voltage	310 VAC 50/60Hz		350 VAC 50/60Hz
Maximum continuous DC voltage	560 VDC		630 VDC
Rated capacitance range	0.1µF - 25 µF		0.1µF - 20 µF
Capacitance tolerance	±5 %, ±10 %, ± 20 %		
Temperature Range	-40 °C to +110 °C		
Climatic Category	40/110/56		
Voltage proof	Between terminals	1600 VDC (2s)	
	Between terminals to case	2200 VAC (1min)	
Insulation resistance (20°C, 100V, 1min)	C ≤ 0.33 µF	15000 MΩ	
	C > 0.33 µF	5000s	
Dissipation Factor (20°C)	0.1 µF ≤ C ≤ 1.0 µF	≤ 0.001 (1kHz)	≤ 0.004 (10kHz)
	1.0 µF < C ≤ 10.0 µF	≤ 0.002 (1kHz)	-
	C > 10.0 µF	≤ 0.003 (1kHz)	-
Damp heat test with loading (THB test: temperature, humidity and biased voltage applied)	85 °C, 85% RH, 240VAC (Ur=310VAC) or 310VAC (Ur=350VAC), 1000 hours Capacitance change (ΔC/C): ≤ 10% Dissipation factor change(Δtan δ): ≤ 0.005 (at 1 kHz) Insulation resistance change: Minimum 50% of the rated value		

Notes

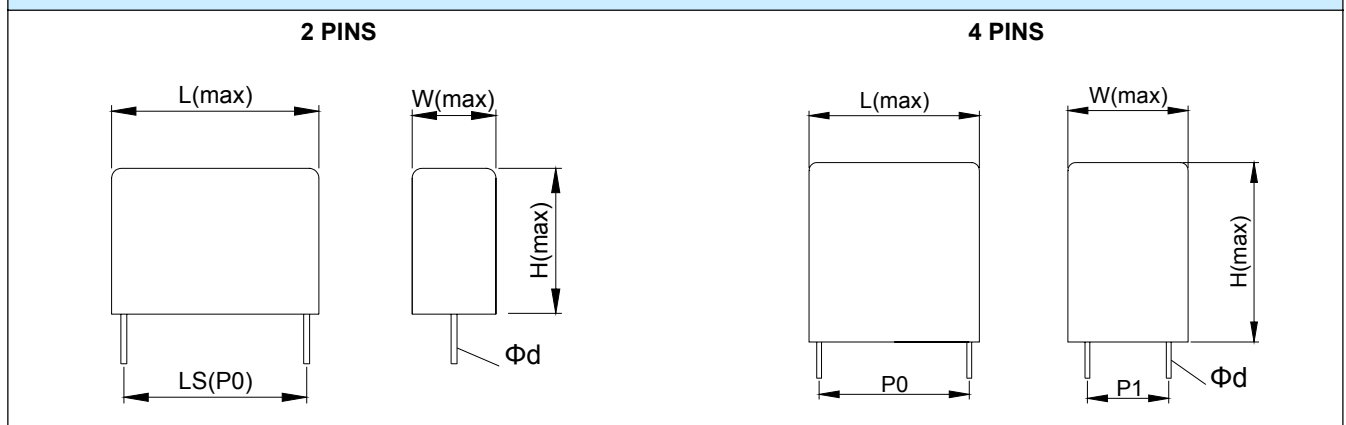
- For more detailed data and test requirements, contact [devtech@bm-cap.com](mailto:devtech@bm-cap.com)
- For general information like characteristics and definitions used for film capacitors follow the link: [www.bm-cap.com](http://www.bm-cap.com)

**COMPOSITION OF ORDERING CODE**

B43	15	E	104	K	310	R06
Series code	Lead spacing (mm)	Version	Capacitance Code (pF)	Capacitance Tolerance	Voltage (VAC)	Packaging
X2, Metallized Polypropylene	15=15 22=22.5 27=27.5 37=37.5 52=52.5	E / Q	First two digits represent significant figures of capacitance value. Third digit specifies number of zeros.	J= ±5% K = ±10% M = ±20%	310 / 350	R06 = Straight terminals, untapped (lead length 6 ± 1 mm)

**MARKING AND APPROVALS**


Approval Marks	Standards	Certificate
	EN/IEC 60384-14	Pending
	UL 60384-14, CSA E60384-14	Pending
	IEC 60384-14	Pending

**DIMENSIONS AND ORDERING CODE**


Number of wires	Lead spacing ±0.5mm	Lead diameter ±0.08mm	Type
2pin	15	0.8	B4315
2pin	22.5	0.8	B4322
2pin	27.5	0.8	B4327
2pin/4pin	37.5	1.0	B4337
2pin/4pin	52.5	1.2	B4352

310 VAC						
LS (mm)	CAP (µF)	DIMENSION (mm)			P1 (mm)	ORDERING CODE
		w	h	l		
15	0.10	7	13	18	-	B4315E104+310***
	0.12	7.5	13.5	18	-	B4315E124+310***
	0.15	8	14.5	18	-	B4315E154+310***
	0.18	9	15	18	-	B4315E184+310***
	0.22	9	17.5	18	-	B4315E224+310***
	0.27	10	17	18	-	B4315E274+310***
	0.33	11	18	18	-	B4315E334+310***
	0.39	11.5	20	18	-	B4315E394+310***
	0.47	12.5	21	18	-	B4315E474+310***
22.5	0.10	6	13.5	26.5	-	B4322E104+310***
	0.12	6	13.5	26.5	-	B4322E124+310***
	0.15	7	16	26.5	-	B4322E154+310***
	0.18	7	16	26.5	-	B4322E184+310***
	0.22	7	16	26.5	-	B4322E224+310***
	0.27	8	17	26.5	-	B4322E274+310***
	0.33	8.5	17	26.5	-	B4322E334+310***
	0.39	9	18	26.5	-	B4322E394+310***
	0.47	10	18.5	26.5	-	B4322E474+310***
	0.56	11	20	26.5	-	B4322E564+310***
	0.68	12	21.5	26.5	-	B4322E684+310***
	0.82	12	22	26.5	-	B4322E824+310***
	1.0	13	24.5	26.5	-	B4322E105+310***
	1.2	14.5	26.5	26.5	-	B4322E125+310***
	1.5	16	26	26.5	-	B4322E155+310***
27.5	0.22	7	16	32	-	B4327E224+310***
	0.33	8	17	32	-	B4327E334+310***
	0.39	8	17	32	-	B4327E394+310***
	0.47	9	17	32	-	B4327E474+310***
	0.56	10	20	32	-	B4327E564+310***
	0.68	10	20	32	-	B4327E684+310***
	0.82	11	20	32	-	B4327E824+310***
	1.0	11	24	32	-	B4327E105+310***
	1.2	12	24	32	-	B4327E125+310***
1.5	14	25	32	-	B4327E155+310***	

310 VAC						
LS (mm)	CAP (µF)	DIMENSION (mm)			P1 (mm)	ORDERING CODE
		w	h	l		
27.5	1.8	16	25	32	-	B4327E185+310***
	2.2	16	30	32	-	B4327E225+310***
	2.7	18	30	32	-	B4327E275+310***
	3.3	22	31	32	-	B4327E335+310***
	3.9	22	36.5	32	-	B4327E395+310***
	4.7	25	35	32	-	B4327E475+310***
	37.5	1.0	11	21	42	-
1.2		11	21	42	-	B4337E125+310***
1.5		12.5	24	42	-	B4337E155+310***
1.8		12.5	24	42	-	B4337E185+310***
2.2		14.5	26	42	-	B4337E225+310***
2.7		16	27.5	42	-	B4337E275+310***
3.3		17	29	42	-	B4337E335+310***
3.9		18.5	31.5	42	10.2	B4337E395+310***
4.7		19	35	42	10.2	B4337E475+310***
5.6		22.5	35.5	42	10.2	B4337E565+310***
6.8		24	38	42	10.2	B4337E685+310***
8.2	28	38	42	10.2	B4337E825+310***	
10.0	30	45	42	10.2	B4337E106+310***	
52.5	10.0	30	45	58	20.3	B4152E106+310***
	12.0	30	45	58	20.3	B4352E126+310***
	15.0	30	45	58	20.3	B4352E156+310***
	18.0	35	45	58	20.3	B4352E186+310***
	20.0	35	50	58	20.3	B4352E206+310***
	25.0	38	53	58	20.3	B4352E256+310***

**Notes**

- (1) Further intermediate capacitance values on request.
- (2) "+" = Capacitance tolerance code:  
J = ±5%, K = ±10%, M = ±20%.
- (3) "\*\*\*\*" = Packaging code:  
R06 = Straight terminals, untapped (lead length 6 ± 1 mm)  
R17 = Straight terminals, untapped (lead length 17 ± 1 mm)
- (4) Special packings available on request.



350 VAC							350 VAC						
LS (mm)	CAP ( $\mu$ F)	DIMENSION (mm)			P1 (mm)	ORDERING CODE	LS (mm)	CAP ( $\mu$ F)	DIMENSION (mm)			P1 (mm)	ORDERING CODE
		w	h	l					w	h	l		
15	0.10	7.5	13.5	18	-	B4315Q104+350***	27.5	1.8	16	30	32	-	B4327Q185+350***
	0.12	8	14	18	-	B4315Q124+350***		2.2	18	33	32	-	B4327Q225+350***
	0.15	9	15	18	-	B4315Q154+350***		2.7	20	35	32	-	B4327Q275+350***
	0.18	9.5	16	18	-	B4315Q184+350***		3.3	22	37	32	-	B4327Q335+350***
	0.22	10	17.5	18	-	B4315Q224+350***		3.9	27.5	39.5	32	-	B4327Q395+350***
	0.27	11	18.5	18	-	B4315Q274+350***		4.7	27.5	39.5	32	-	B4327Q475+350***
	0.33	12	19.5	18	-	B4315Q334+350***		37.5	1.0	12	22	42	-
	0.39	12.5	22	18	-	B4315Q394+350***	1.2		12	22	42	-	B4337Q125+350***
0.47	14	22	18	-	B4315Q474+350***	1.5	14		25	42	-	B4337Q155+350***	
22.5	0.10	6.5	14	26.5	-	B4322Q104+350***	1.8		14.5	26	42	-	B4337Q185+350***
	0.12	6.5	14	26.5	-	B4322Q124+350***	2.2		17	26	42	-	B4337Q225+350***
	0.15	7	16	26.5	-	B4322Q154+350***	2.7		18	29	42	10.2	B4337Q275+350***
	0.18	7	16	26.5	-	B4322Q184+350***	3.3		19	32	42	10.2	B4337Q335+350***
	0.22	8	17	26.5	-	B4322Q224+350***	3.9		20	35	42	10.2	B4337Q395+350***
	0.27	8.5	17	26.5	-	B4322Q274+350***	4.7		22.5	35.5	42	10.2	B4337Q475+350***
	0.33	9	18	26.5	-	B4322Q334+350***	5.6		24	39	42	10.2	B4337Q565+350***
	0.39	10	19	26.5	-	B4322Q394+350***	6.8		29	41	42	10.2	B4337Q685+350***
	0.47	11	20	26.5	-	B4322Q474+350***	8.2		30	45	42	10.2	B4337Q825+350***
	0.56	12	21.5	26.5	-	B4322Q564+350***	10.0		35	46	42	10.2	B4337Q106+350***
	0.68	12	24	26.5	-	B4322Q684+350***	52.5	10.0	30	45	58	20.3	B4152Q106+350***
	0.82	13	24.5	26.5	-	B4322Q824+350***		12.0	30	45	58	20.3	B4352Q126+350***
	1.0	14.5	26.5	26.5	-	B4322Q105+350***		15.0	35	50	58	20.3	B4352Q156+350***
1.2	17.5	25	26.5	-	B4322Q125+350***	18.0		38	53	58	20.3	B4352Q186+350***	
1.5	18.5	28	26.5	-	B4322Q155+350***	20.0		43	57.5	58	20.3	B4352Q206+350***	
27.5	0.22	7	16	32	-	B4327Q224+350***							
	0.33	8	17	32	-	B4327Q334+350***							
	0.39	9	17	32	-	B4327Q394+350***							
	0.47	10.5	18.5	32	-	B4327Q474+350***							
	0.56	11	20	32	-	B4327Q564+350***							
	0.68	11	20	32	-	B4327Q684+350***							
	0.82	12	24	32	-	B4327Q824+350***							
	1.0	13	25	32	-	B4327Q105+350***							
	1.2	14	25	32	-	B4327Q125+350***							
1.5	15	30	32	-	B4327Q155+350***								

## Notes

- (1) Further intermediate capacitance values on request.
- (2) "+" = Capacitance tolerance code:  
J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$ .
- (3) "\*\*\*\*" = Packaging code:  
R06 = Straight terminals, untapped (lead length  $6 \pm 1$  mm)  
R17 = Straight terminals, untapped (lead length  $17 \pm 1$  mm)
- (4) Special packings available on request.

**PULSE HANDLING CAPABILITY**

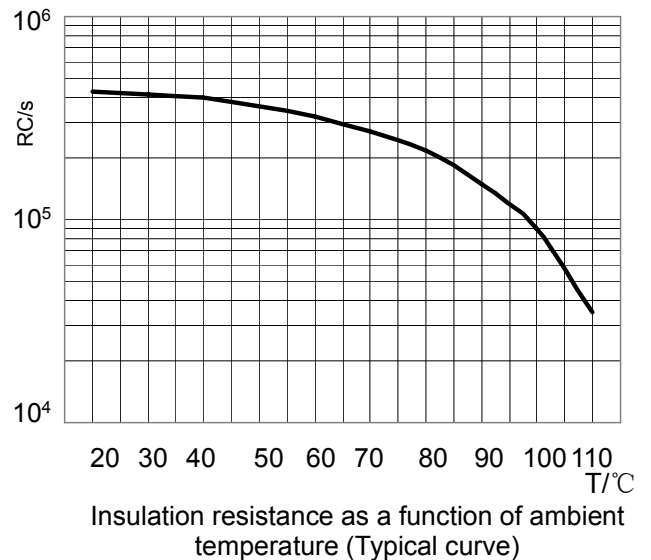
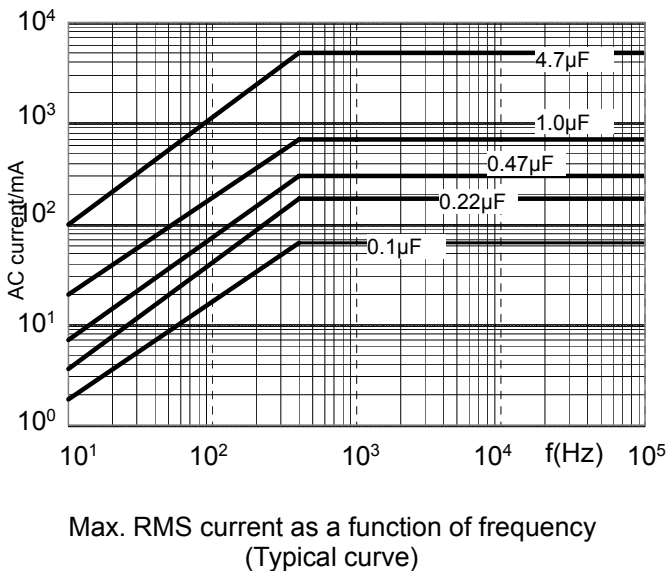
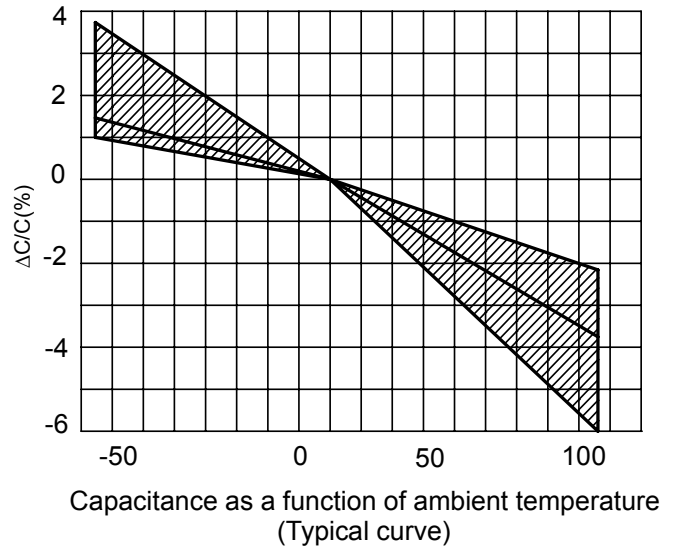
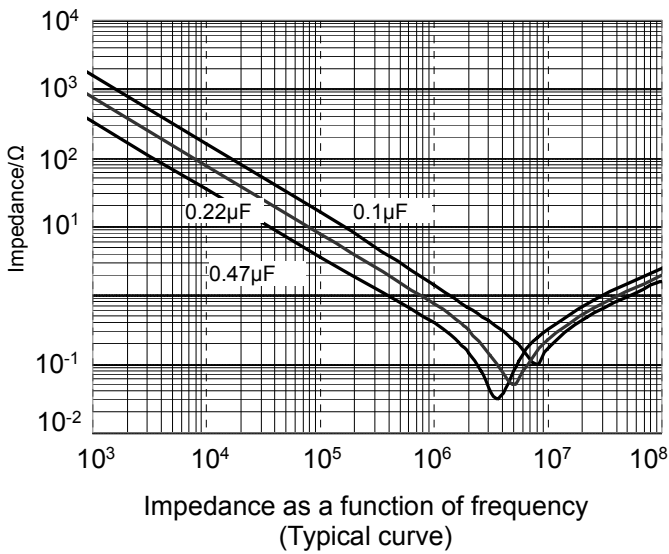
“dV/dt” represents the maximum permissible voltage change per unit of time for non-sinusoidal voltages, expressed in V/μs.

“k<sub>0</sub>” represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V<sup>2</sup>/μs.

**dV/dt and k<sub>0</sub> values**

LS (mm)	15	22.5	27.5	37.5	52.5
dV/dt (V/μs)	100	85	60	45	30
k <sub>0</sub> (V <sup>2</sup> /μs)	86000	73100	51600	38700	25800

**CHARACTERISTICS CURVE**



**Notes**

- For more detailed data and test requirements, contact [devtech@bm-cap.com](mailto:devtech@bm-cap.com)

**RESISTANCE TO SOLDERING HEAT**

**Soldering process**

Internal temperature of the capacitor must be kept as follows:

Polyester:	Preheating:	$T_{max.} \leq 125^{\circ} C$
	Soldering:	$T_{max.} \leq 135^{\circ} C$
Polypropylene:	Preheating:	$T_{max.} \leq 100^{\circ} C$
	Soldering:	$T_{max.} \leq 110^{\circ} C$

**Single wave soldering**

Soldering bath temperature:  $T \leq 260^{\circ} C$

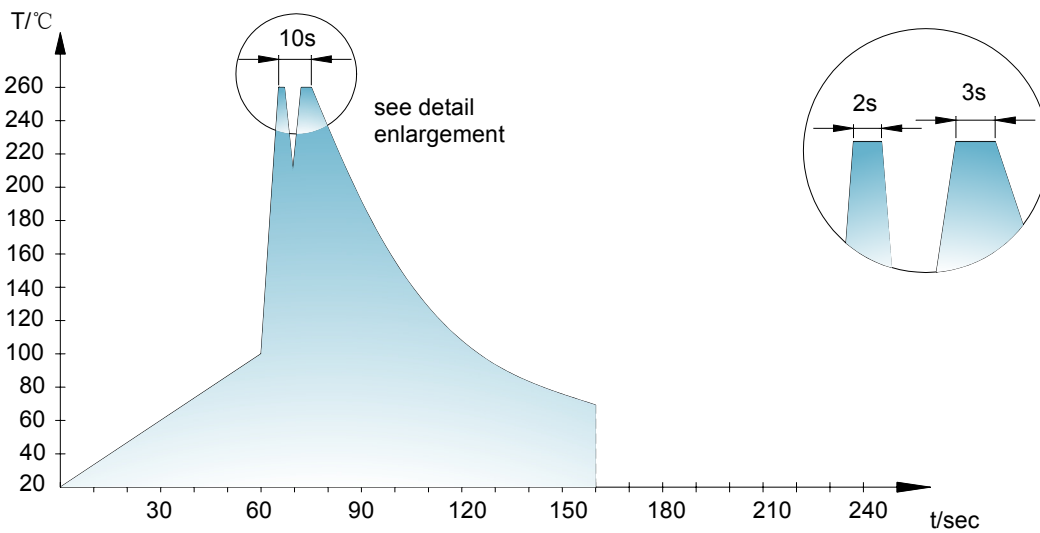
Dwell time:  $t \leq 5$  sec

**Double wave soldering**

Soldering bath temperature:  $T \leq 260^{\circ} C$

Dwell time:  $\Sigma t \leq 5$  sec

Due to different soldering processes and heat requirements the graphs are to be regarded as a recommendation only.



Typical temperature/time graph for double wave soldering

**INSPECTION REQUIREMENTS**

TEST	REFERENCE	CONDITIONS	REQUIREMENTS
Electrical parameters	IEC 60384-14	Voltage between terminals: $4.3 \times V_R$ (DC), 2s Voltage between terminals and enclosure: $2 V_R + 1500$ V AC, 1min	Within specified limits
Robustness of terminations	IEC 60068-2-21	Tensile strength (test Ua1) Wire diameter                      Tensile force $0.5 < d \leq 0.8$ mm      10 N $0.8 < d \leq 1.25$ mm    20 N	Capacitance and $\tan \delta$ within specified limits
Resistance to soldering heat	IEC 60068-2-20, test Tb, method 1A	Solder bath temperature at $260 \pm 5^{\circ} C$ , immersion for 10 seconds	$\Delta C/C \leq 5\%$ $\tan \delta$ within specified limits
Rapid change of temperature	IEC 60384-16	T A = lower category temperature T B = upper category temperature Five cycles, duration $t = 30$ min.	No visible damage $\Delta C/C \leq 5\%$ $\tan \delta$ within specified limits

Vibration	IEC 60384-14	Test F <sub>c</sub> : vibration sinusoidal Displacement: 0.75 mm Acceleration: 98 m/s <sup>2</sup> Frequency: 10 Hz ... 500 Hz Test duration: 3 orthogonal axes, 2 hours each axe	No visible damage
Bump	IEC 60384-14	Test E <sub>b</sub> : Total 4000 bumps with 400 m/s <sup>2</sup> mounted on PCB 6 ms duration	No visible damage $\Delta C/C \leq 5\%$ $\tan \delta$ within specified limits
Damp Heat Steady State	IEC 60384-14	Test C <sub>a</sub> 40 °C / 93% RH / 56 days	No visible damage $\Delta C/C \leq 5\%$ $\Delta \tan \delta \leq 0.008, C \leq 1 \mu F$ $\Delta \tan \delta > 0.005, C > 1 \mu F$ Voltage proof IR $\geq 50\%$ of initial limit
Impulse test Endurance	IEC 60384-14	3 impulses T <sub>B</sub> / 1.25 V <sub>R</sub> / 1000 hours, 1000 V <sub>rms</sub> for 0.1 s every hour	No visible damage $\Delta C/C \leq 10\%$ $\Delta \tan \delta \leq 0.008, C \leq 1 \mu F$ $\Delta \tan \delta > 0.005, C > 1 \mu F$ Voltage proof IR $\geq 50\%$ of initial limit
Passive flammability	IEC 60384-14	Flame applied for a period of time depending on capacitor volume	B
Active flammability	IEC 60384-14	20 discharges at 2.5 kV + V <sub>R</sub>	The cheesecloth shall not burn with a flame
Damp heat test with loading (THB test)	IEC 60384-14	85 °C, 85% RH, 240VAC (U <sub>r</sub> =310VAC) or 310VAC (U <sub>r</sub> =350VAC), 1000 hours	$\Delta C/C: \leq 10\%$ $\Delta \tan \delta: \leq 0.005$ (at 1 kHz) IR: $\geq 50\%$ of the rated value

### IMPORTANT NOTES

Some parts of this publication contain statements about the suitability of our products for certain areas of application. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application. As a rule, BM is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an BM product with the properties described in the product specification is suitable for use in a particular customer application.

In individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or lifesaving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.