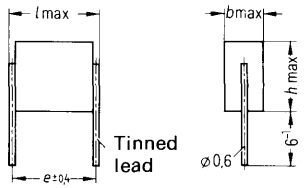
Metallized polycarbonate layer capacitors – Standard version
(previous designation: MKM layer capacitors)

Self-healing layer capacitor with polycarbonate dielectric.
Mechanical protection by insulating plates. When mounting, attention must be given to the surface leakage paths and air paths to adjacent live parts.

Connections: Parallel leads, tinned, plug-in, lead spacing 7.5 mm and 10 mm.
Suitable for use in single-clad printed circuit boards. Molded types on request.



Dimensions in mm

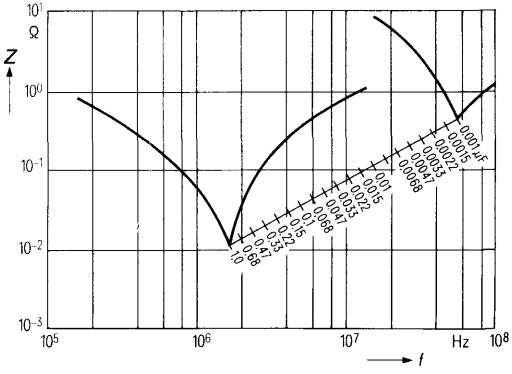
Type	*e*
B 32540	7.5 mm
B 32541	10 mm

Climatic category in accordance with DIN 40040	**F M E**
Minimum limit temperature	**F** – 55 °C/– 67 °F
Maximum limit temperature	**M** +100 °C/+212 °F
Humidity category	**E** average relative humidity ≦ 75%; rare and slight dew precipitation permitted

Rated voltage U_R		100 Vdc		250 Vdc	
Rated capacitance C_R µF	Tolerance	LS[1] 7.5 mm	LS 10 mm	LS 7.5 mm	LS 10 mm
		Dimensions $b \times h \times l$ Ordering code			
0,001	± 10% ≙ K			2,6 × 7,3 × 9 B 32540-C 3102-K	
0,0015				2,6 × 7,3 × 9 B 32540-C 3152-K	
0,0022				2,5 × 7,3 × 9 B 32540-C 3222-K	
0,0033				2,3 × 7,3 × 9 B 32540-C 3332-K	
0,0047				2,3 × 7,3 × 9 B 32540-C 3472-K	
0,0068				2,7 × 7,3 × 9 B 32540-C 3682-K	
0,01	±5% ≙ J ±10% ≙ K			2,3 × 7,3 × 9 B 32540-C 3103-*	3,2 × 6,6 × 11,5 B 32541-C 3103-*
0,015				2,9 × 7,3 × 9 B 32540-C 3153-*	3,2 × 6,6 × 11,5 B 32541-C 3153-*
0,022				2,6 × 7,3 × 9 B 32540-C 3223-*	3,2 × 6,6 × 11,5 B 32541-C 3223-*
0,033				2,6 × 7,3 × 9 B 32540-C 3333-*	3,7 × 6,6 × 11,5 B 32541-C 3333-*
0,047				3,2 × 7,3 × 9 B 32540-C 3473-*	3,2 × 6,6 × 11,5 B 32541-C 3473-*
0,068		2,6 × 8,1 × 9 B 32540-C 1683-*		3,5 × 9,1 × 9 B 32540-C 3683-*	3,2 × 6,6 × 11,5 B 32541-C 3683-*
0,1		3,2 × 8,1 × 9 B 32540-C 1104-*		3,9 × 11,5 × 9 B 32540-C 3104-*	3,5 × 8,3 × 11,5 B 32541-C 3104-*
0,15		3,6 × 10 × 9 B 32540-C 1154-*			4,2 × 9,6 × 11,5 B 32541-C 3154-*
0,22		4,7 × 10 × 9 B 32540-C 1224-*	3,5 × 9,5 × 11,5 B 32541-C 1224-*		4,9 × 11,5 × 11,5 B 32541-C 3224-*
0,33		5,5 × 11,5 × 9 B 32540-C 1334-*	4,1 × 11,5 × 11,5 B 32541-C 1334-*		
0,47		7,2 × 12,5 × 9 B 32540-C 1474-*	5,3 × 11,5 × 11,5 B 32541-C 1474-*		
0,68		8 × 13 × 9 B 32540-C 1684-*	7,1 × 11,5 × 11,5 B 32541-C 1684-*		
1,0			9,8 × 11,5 × 11,5 B 32541-C 1105-*		

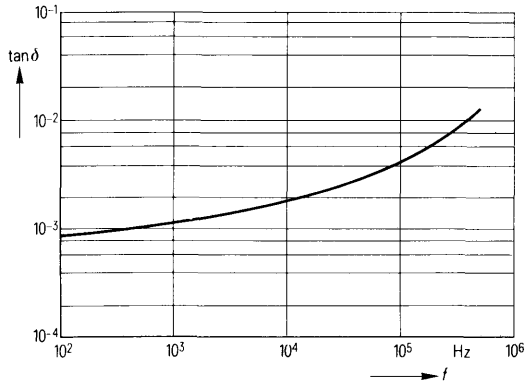
* When ordering, the code letter for the requested tolerance must be substituted for *.

[1] Lead spacing

Test category in accordance with DIN 40045 or IEC publication 68-1 Damp heat test in accordance with DIN 40046, sheet 5 or IEC publication 68-2-3	**55/100/21** **Conditions** Test temperature: +40 °C/+104 °F Relative humidity: $(93 \pm \frac{2}{3})$ % Test duration: 21 days **Test criteria** Capacitance change $\frac{\Delta C}{C}$: $\leqq \pm 5\%$ ($\leqq 0.1$ µF); $\leqq \pm 3\%$ (> 0.1 µF) Dissipation factor change $\Delta \tan \delta$: $\leqq 5 \times 10^{-3}$ at 1 kHz; $\leqq 7 \times 10^{-3}$ at 10 kHz Insulation resistance: $\geqq 10\%$ of the minimum value at delivery
Resistance to vibration Test F_C: Vibration partial test B 1 in accordance with DIN 40046, sheet 8 and IEC publication 68-2-6	Duration of endurance conditioning: 6 hours Frequency range: 10 to 55 Hz Displacement amplitude: 0.75 mm (conforming to max. 98.1 m/s² or 10 g)
Solder conditions	Temperature of the solder bath: max. 255 °C/491 °F Soldering duration: max. 5 s
Capacitance drift i_z	±3%
Self inductance	approx. 6 nH
Impedance Z as a function of frequency f (typical values)	

Dissipation factor tan δ
as a function of frequency f

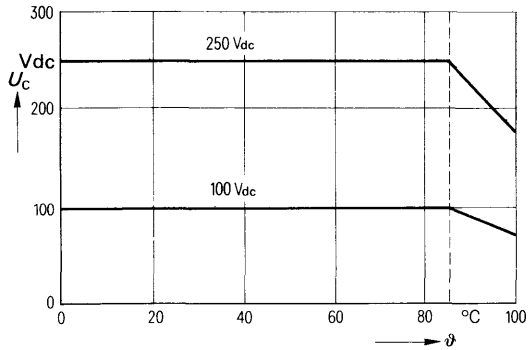
average values
measured at 23 °C (73.4 °F)
and $C \leqq 0.1$ µF



Maximum values

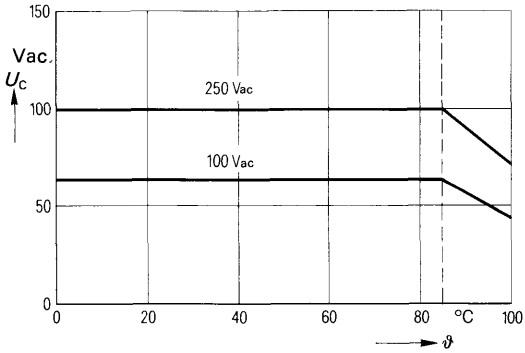
3×10^{-3}	at 1 kHz
10×10^{-3}	at 10 kHz

Category voltage U_C
at dc operation
as a function of ambient
temperature ϑ



max. 2,000 hours	$1.25 \times U_C$
for milliseconds	$1.50 \times U_C$
(e. g. switchings)	

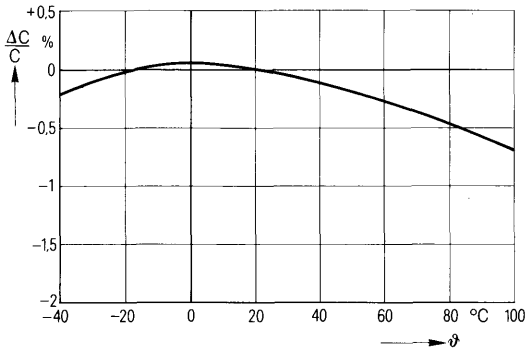
Category voltage U_C[1]
at ac operation
as a function of ambient temperature ϑ



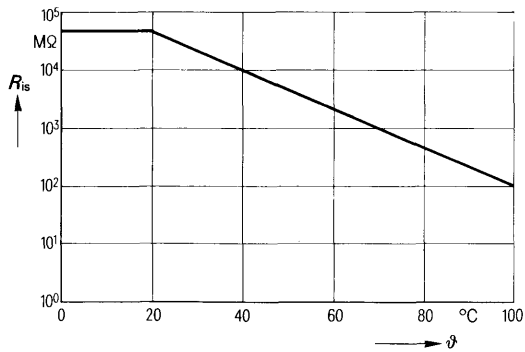
max. 2000 hours $1.25 \times U_C$

Reversible capacitance change $\frac{\Delta C}{C}$

as a function of temperature ϑ
at 1 kHz (typical values)



Insulation resistance R_{is}
as a function of temperature ϑ



[1] When an ac voltage is superimposed to a dc voltage, the sum of the dc voltage and the amplitude of the ac voltage shall not exceed the rated voltage.

Insulation resistance[1]		
Minimum value at delivery for capacitors	for $C \leqq 0.33$ µF	for $C > 0.33$ µF
with U_R = 100 V	3 000 MΩ	1 000 s
with U_R = 250 V	7 500 MΩ	–
Average value at delivery for capacitors		
with U_R = 100 V	>30 000 MΩ	>10 000 s
with U_R = 250 V	>75 000 MΩ	–

Pulse handling capability (voltage rate of rise U_{pp}/τ and pulse characteristic k_0). Maximum permissible voltage change per time unit at non-sinusoidal voltage load (pulse, sawtooth).

Rated voltage U_R		B 32 540 (LS[2] 7.5)	B 32 541 (LS[2] 10)
100 Vdc	U_{pp}/τ	10 V/µs	5 V/µs
	k_0	2 000 V²/µs	1 000 V²/µs
250 Vdc	U_{pp}/τ	20 V/µs	10 V/µs
	k_0	10 000 V²/µs	5 000 V²/µs

For a voltage swing $U_{pp} < U_R$ the value of the permissible voltage rate of rise U_{pp}/τ can be multiplied by the factor U_R/U_{pp}. For periodic pulse load the data of the nomogram has to be taken into account. See also "General Technical Data", para. 5.2.6.

Ac power handling capacity at higher frequencies

The maximum permissible peak voltage $\hat{U}$ for sinusoidal and non-sinusoidal voltage load (pulse sawtooth, trapezoidal voltages) can be obtained from the nomogram.

The following limit values $\hat{U}_l$ are not allowed to be exceeded:

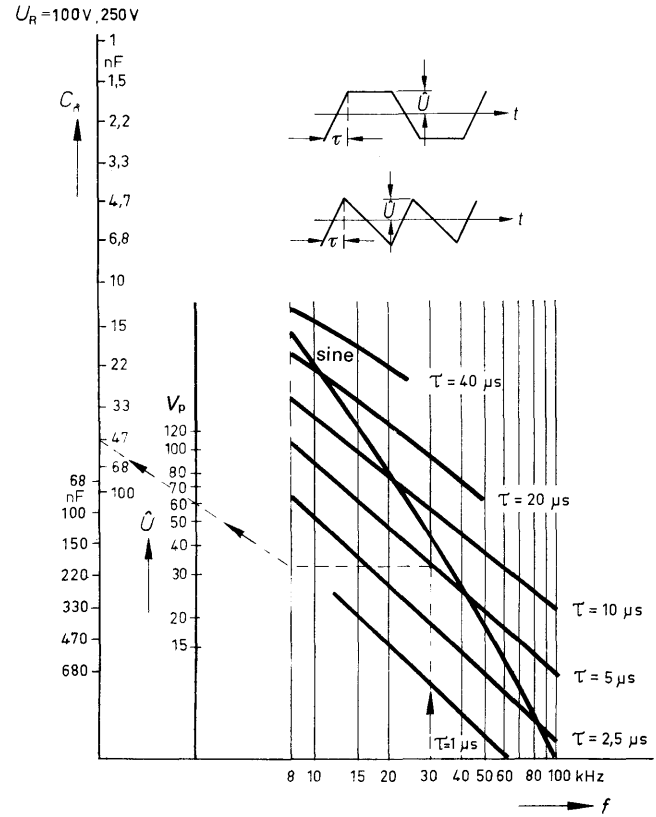
Rated voltage U_R	100 V	250 V
Limit voltage $\hat{U}_l$	85 V	140 V

[1] The indicated values are applicable at the time of delivery. During operational life the insulation may decrease for a short period to about 10% of the values at the time of delivery, especially when the maximum permissible humidity of 95% is applied for a long period, or when the capacitor is operated close to the maximum limit temperature.
[2] Lead spacing.

B 32 540, lead spacing = 7.5 mm

Nomogram for determining the permissible peak Voltage $\hat{U}$

The nomogram is based on 10 °C (18 °F) inherent temperature rise of the capacitor; this must be taken into account when considering the permissible max. temperature.
With trapezoidal voltage load the second harmonic frequency must be assumed.
Capacitance (nF)



Example given:

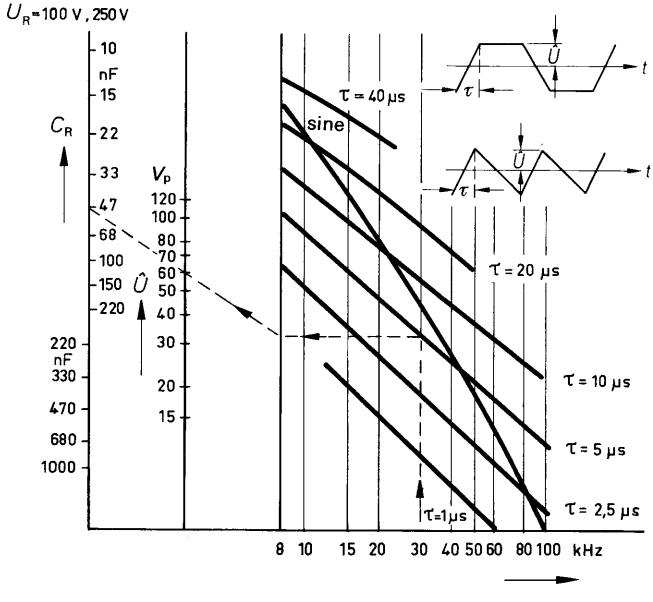
f = 30 kHz (repetition frequency)
τ = 5 µs (rise time)
C_R = 47 nF (capacitance)

According to the dashed line on the graph above this gives a peak voltage $\hat{U}$ of about 60 V.

B 32541, lead spacing = 10 mm

Nomogram for determining the permissible peak Voltage $\hat{U}$

The nomogram is based on 10 °C (18 °F) inherent temperature rise of the capacitor; this must be taken into account when considering the permissible max. temperature.
With trapezoidal voltage load the second harmonic frequency must be assumed.



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