



## Film Capacitors

### Metallized Polypropylene Film Capacitors (MFP)

**Series/Type:** B32686C  
**Date:** August 2004

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**4 pins (wound)**
**Typical applications**

- Smoothing
- Snubbing
- Filtering

**Climatic**

- Max. operating temperature: 100 °C
- Climatic category (IEC 60068-1): 55/100/56

**Construction**

- Dielectric: polypropylene (PP)
- Film metallized on one side and metal foils internally connected in series
- Plastic case (UL 94 V-0)
- Epoxy resin sealing (UL 94 V-0)

**Features**

- Very high pulse strength, high current
- Highest possible contact reliability
- Self-healing properties

**Terminals**

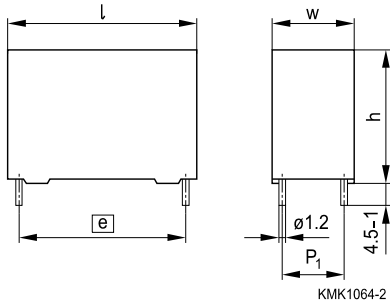
- 4 pins
- Parallel wire leads, lead-free tinned
- Special lead lengths available on request

**Marking**

Manufacturer's logo, series number, style (MFP), rated capacitance, cap. tolerance (code letter), rated DC voltage, date of manufacture (coded)

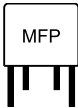
**Delivery mode**

Bulk (untaped)

**Dimensional drawing**


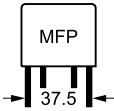
Dimensions in mm

Lead spacing	Pin spacing	Pin code
$e \pm 0.4$	$P_1$	
37.5	16.0	580
	20.3	590



**Overview of available types**

Lead spacing	37.5 mm			
Type	B32686C			
$V_R$ (VDC)	1000	1250	1600	2000
$V_{rms}$ (VAC)	400	450	450	500
$C_R$ (nF)				
120				
150				
220				
270				
330				
390				
470				
560				
680				


**B32686C**
**4 pins (wound)**
**Electrical specifications, ordering codes and packing units**

$V_R$	$V_{rms}$ $f \leq 1\text{kHz}$ VAC	$C_R$ nF	Max. dimensions $w \times h \times l$ mm	$I_{rms}$ 100 kHz A	ESR 100 kHz m $\Omega$	Ordering code (composition see below)	Pin spacing $P_1$	pcs./ unit
1000	400	470	28.0 × 37.0 × 42.0	10.0	5	B32686C0474+580	16.0	27
		470	28.0 × 37.0 × 42.0	10.0	5	B32686C0474+590	20.3	27
		560	28.0 × 37.0 × 42.0	11.0	3	B32686C0564+580	16.0	27
		560	28.0 × 37.0 × 42.0	11.0	3	B32686C0564+590	20.3	27
		680	30.0 × 45.0 × 42.0	12.0	3	B32686C0684+580	16.0	27
		680	30.0 × 45.0 × 42.0	12.0	3	B32686C0684+590	20.3	27
1250	450	330	28.0 × 37.0 × 42.0	10.0	5	B32686C7334+580	16.0	27
		330	28.0 × 37.0 × 42.0	10.0	5	B32686C7334+590	20.3	27
		390	28.0 × 37.0 × 42.0	11.0	5	B32686C7394+580	16.0	27
		390	28.0 × 37.0 × 42.0	11.0	5	B32686C7394+590	20.3	27
		470	30.0 × 45.0 × 42.0	12.0	5	B32686C7474+580	16.0	27
		470	30.0 × 45.0 × 42.0	12.0	5	B32686C7474+590	20.3	27
1600	450	220	28.0 × 37.0 × 42.0	10.5	7	B32686C1224+580	16.0	27
		220	28.0 × 37.0 × 42.0	10.5	7	B32686C1224+590	20.3	27
		270	28.0 × 37.0 × 42.0	11.5	7	B32686C1274+580	16.0	27
		270	28.0 × 37.0 × 42.0	11.5	7	B32686C1274+590	20.3	27
2000	500	120	28.0 × 37.0 × 42.0	9.0	13	B32686C2124+580	16.0	27
		120	28.0 × 37.0 × 42.0	9.0	13	B32686C2124+590	20.3	27
		150	28.0 × 37.0 × 42.0	10.0	10	B32686C2154+580	16.0	27
		150	28.0 × 37.0 × 42.0	10.0	10	B32686C2154+590	20.3	27

Further E series and intermediate capacitance values on request.

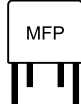
**Composition of ordering code**

+ = Capacitance tolerance code:

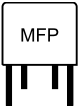
M = ±20%

K = ±10%

J = ±5%


**Technical data**

Operating temperature range	Max. operating temperature $T_{op,max}$	+100 °C	
	Upper category temperature $T_{max}$	+100 °C	
	Lower category temperature $T_{min}$	-55 °C	
	Rated temperature $T_R$	+85 °C	
Dissipation factor $\tan \delta$ at 20 °C (upper limit values)	1.0 · 10 <sup>-3</sup> (at 10 kHz)		
	3.0 · 10 <sup>-3</sup> (at 10 kHz)		
Insulation resistance $R_{ins}$ or time constant $\tau = C_R \cdot R_{ins}$ at 20 °C, rel. humidity ≤ 65% (minimum as-delivered values)	$C_R \leq 0.33 \mu F$	$C_R > 0.33 \mu F$	
	100 GΩ	30000 s	
DC test voltage	2.0 · $V_R$ , 2 s		
Category voltage $V_C$ (continuous operation with $V_{DC}$ or $V_{AC}$ at $f \leq 1$ kHz)	$T_A$ (°C)	DC voltage derating	AC voltage derating
	$T_A \leq 85$ $85 < T_A \leq 100$	$V_C = V_R$ $V_C = V_R \cdot (165 - T_A)/80$	$V_{C,rms} = V_{rms}$ $V_{C,rms} = V_{rms} \cdot (165 - T_A)/80$
Operating voltage $V_{op}$ for short operating periods ( $V_{DC}$ or $V_{AC}$ at $f \leq 1$ kHz)	$T_A$ (°C)	DC voltage (max. hours)	AC voltage (max. hours)
	$T_A \leq 85$ $85 < T_A \leq 100$	$V_{op} = 1.25 \cdot V_C$ (2000 h) $V_{op} = 1.25 \cdot V_C$ (1000 h)	$V_{op} = 1.0 \cdot V_{C,rms}$ (2000 h) $V_{op} = 1.0 \cdot V_{C,rms}$ (1000 h)
Damp heat test Limit values after damp heat test	56 days/40 °C/93% relative humidity		
	Capacitance change $ \Delta C/C $	≤ 2%	
	Dissipation factor change $\Delta \tan \delta$	≤ 1.0 · 10 <sup>-3</sup> (at 10 kHz)	
	Insulation resistance $R_{ins}$ or time constant $\tau = C_R \cdot R_{ins}$	≥ 50% of minimum as-delivered values	
Reliability: Failure rate $\lambda$ Service life $t_{SL}$	1 fit (≤ 1 · 10 <sup>-9</sup> /h) at 0.5 · $V_R$ , 40 °C 200 000 h at 1.0 · $V_R$ , 40 °C For conversion to other operating conditions and temperatures, refer to chapter "Quality assurance", page .		
Failure criteria: Total failure Failure due to variation of parameters	Short circuit or open circuit Capacitance change $ \Delta C/C $ > 10% Dissipation factor $\tan \delta$ 4 · upper limit value Insulation resistance $R_{ins}$ < 1500 MΩ ( $C_R \leq 0.33 \mu F$ ) or time constant $\tau = C_R \cdot R_{ins}$ < 500 s ( $C_R > 0.33 \mu F$ )		



**B32686C**

**4 pins (wound)**

**Pulse handling capability**

"dV/dt" represents the maximum permissible voltage change per unit of time for non-sinusoidal voltages, expressed in V/ $\mu$ s.

"k<sub>0</sub>" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V<sup>2</sup>/ $\mu$ s.

*Note:*

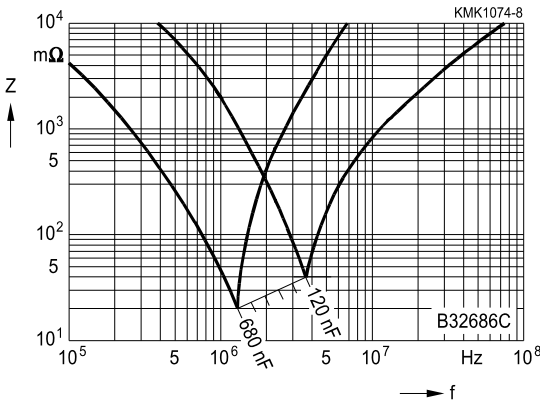
*The values of dV/dt and k<sub>0</sub> provided below must not be exceeded in order to avoid damaging the capacitor.*

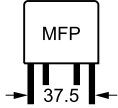
**dV/dt and k<sub>0</sub> values**

Lead spacing		37.5 mm	
V <sub>R</sub> (VDC)	V <sub>rms</sub> (VAC)	dV/dt in V/ $\mu$ s	k <sub>0</sub> in V <sup>2</sup> / $\mu$ s
1000	400	2 000	4 000 000
1250	450	2 800	7 000 000
1600	450	3 500	11 000 000
2000	500	4 500	18 000 000

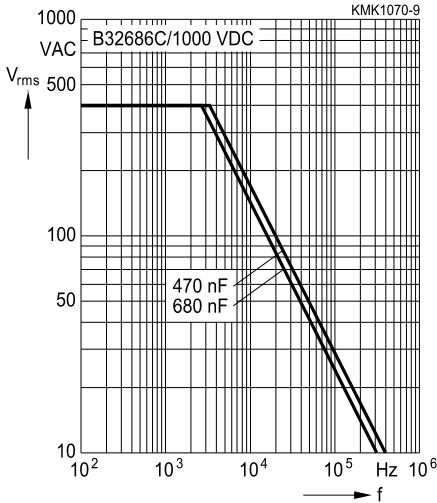
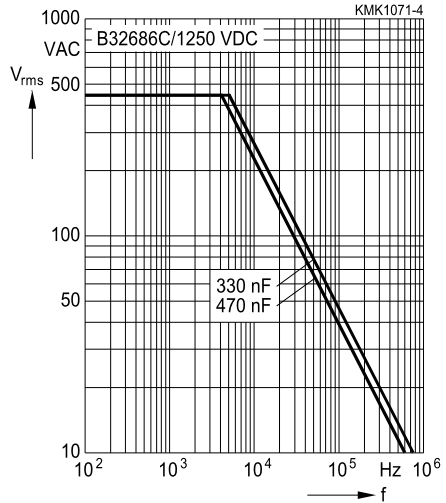
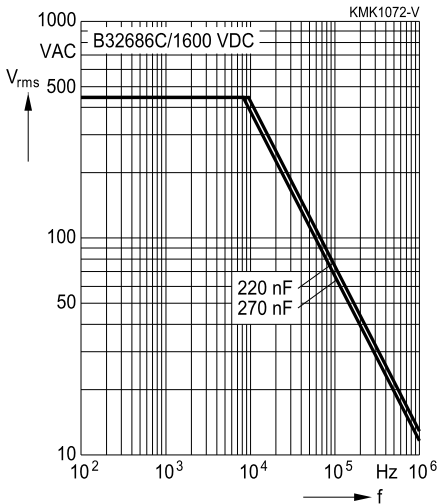
**Impedance Z versus frequency f**

(typical values)




**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )**

 For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 37.5 mm**
**1000 VDC/400 VAC**

**1250 VDC/450 VAC**

**1600 VDC/450 VAC**

**2000 VDC/500 VAC**
