

# Film Capacitors

## Metallized Polypropylene Film Capacitors (MKP)

**Series/Type:**        **B32754 ... B32758**

**Date:**                February 2021

## MKP AC filtering

### Typical applications

- Output AC filtering for power converters, UPS, motor drives

### Climatic

- Max. operating temperature: 105 °C
- Climatic category (IEC 60068-1:2013): 40/105/56

### Construction

- Dielectric: Polypropylene (PP)
- Plastic case (UL 94 V-0)
- Epoxy resin sealing (UL 94 V-0)

### Features

- THB Grade III Test A (refer to IEC60384-14:2013/AMD1:2016)
- Optimized AC voltage performance
- High ripple current/frequency handling capability
- AEC-Q200D compliant
- UL 810 construction
- For PCB mounting

### Terminals

- Parallel wire leads, lead-free tinned
- 2-pin and 4-pin versions
- Standard lead lengths: 6 – 1 mm
- Special lead lengths available on request

### Marking

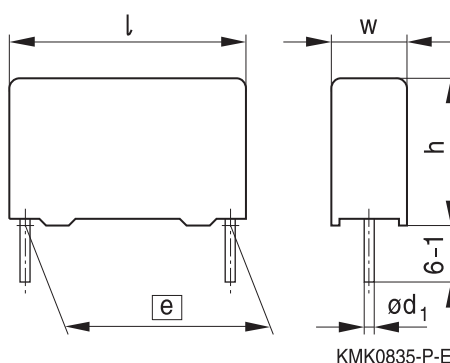
Manufacturer's logo, lot number, series number, rated capacitance (code), capacitance tolerance (code with letter), rated AC voltage, date of manufacture (code), approval

### Delivery mode

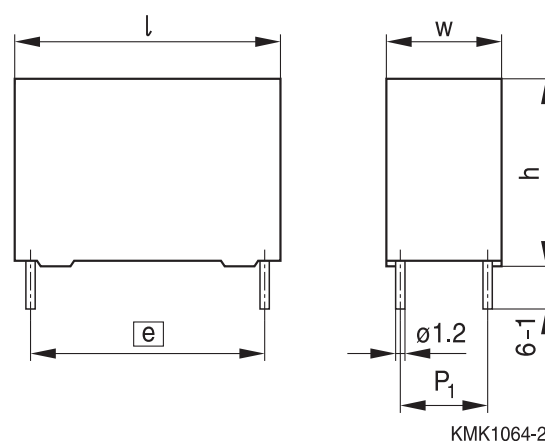
Bulk (untaped, lead length 6 – 1 mm)

### Dimensional drawings

#### 2-pin version



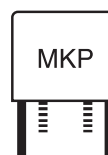
#### 4-pin version



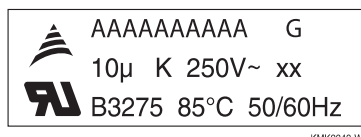
Dimensions in mm

| Version | Lead spacing<br>$e \pm 0.4$ | Lead diameter<br>$d_1 \pm 0.05$ | Type    |
|---------|-----------------------------|---------------------------------|---------|
| 2-pin   | 27.5                        | 0.8                             | B32754C |
| 2-pin   | 37.5                        | 1.0                             | B32756C |
| 4-pin   | 37.5                        | 1.0 <sup>1)</sup> /1.2          | B32756G |
| 4-pin   | 52.5                        | 1.2                             | B32758G |

1) For box dimensions 22.0 × 45.0 × 42.0 mm



## Marking example (position of marks can vary)



## Ordering code examples

| B                  | 3275   | 4                                | C                        | 3                                                                            | 105                       | K                                 |
|--------------------|--------|----------------------------------|--------------------------|------------------------------------------------------------------------------|---------------------------|-----------------------------------|
| Components class   | Series | Lead space (mm)                  | Pin number               | Rated voltage                                                                | Rated capacitance         | Capacitance tolerance             |
| Passive components | MKP    | 4 = 27.5<br>6 = 37.5<br>8 = 52.5 | C = 2 pins<br>G = 4 pins | 2 = 250 V AC<br>3 = 310 V AC<br>4 = 400 V AC<br>7 = 275 V AC<br>8 = 350 V AC | 105 = 1000 nF<br>= 1.0 μF | J = ±5%<br>K = ±10%<br>+ = K or J |

## Voltage ratings

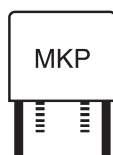
|             |          |          |          |          |          |
|-------------|----------|----------|----------|----------|----------|
| $V_{R, DC}$ | 500 V DC | 550 V DC | 580 V DC | 580 V DC | 800 V DC |
| $V_{R, AC}$ | 350 V AC | 380 V AC | 430 V AC | 480 V AC | 560 V AC |
| $V_{RMS}$   | 250 V AC | 275 V AC | 310 V AC | 350 V AC | 400 V AC |

### Note:

$V_{R, AC}$  is maximum operating peak recurrent voltage of either polarity of a reversing type waveform, not an RMS value.

## Approval

| Approval mark | Standards                  | Certificate    |
|---------------|----------------------------|----------------|
|               | UL 810 (construction only) | E323128, Vol 1 |

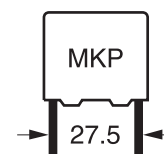


# B32754 ... B32758

## MKP AC filtering

### Overview of available types

| Lead spacing     | 27.5 mm |     |     |     |     | 37.5 mm |     |     |     |     | 52.5 mm |     |     |     |     |
|------------------|---------|-----|-----|-----|-----|---------|-----|-----|-----|-----|---------|-----|-----|-----|-----|
| Type             | B32754  |     |     |     |     | B32756  |     |     |     |     | B32758  |     |     |     |     |
| Page             | 5       |     |     |     |     | 7       |     |     |     |     | 9       |     |     |     |     |
| $V_{RMS}$ (V AC) | 250     | 275 | 310 | 350 | 400 | 250     | 275 | 310 | 350 | 400 | 250     | 275 | 310 | 350 | 400 |
| $C_R$ (μF)       |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 1.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 1.5              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 2.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 2.5              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 3.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 3.5              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 4.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 4.5              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 5.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 6.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 7.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 8.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 9.0              |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 10               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 12               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 14               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 15               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 20               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 22               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 25               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 30               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 33               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 35               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 40               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 45               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 50               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 55               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 60               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 65               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |
| 70               |         |     |     |     |     |         |     |     |     |     |         |     |     |     |     |


**Ordering codes and packing units (lead spacing 27.5 mm)**

| $V_{RMS}$ | $V_R$ | $C_R^{1)}$ | Max. dimensions<br>$w \times h \times l$ | $P_1$ | Ordering code<br>(composition see<br>below) | $I_{RMS}^{2)}$<br>85 °C<br>10 kHz<br>A | $ESR_{typ}$<br>10 kHz<br>mΩ | Untaped  |
|-----------|-------|------------|------------------------------------------|-------|---------------------------------------------|----------------------------------------|-----------------------------|----------|
| V AC      | V DC  | μF         | mm                                       | mm    |                                             |                                        |                             | pcs./MOQ |
| 250       | 500   | 1.0        | 11.0 × 19.0 × 31.5                       | —     | B32754C2105+000                             | 3.5                                    | 21.9                        | 2352     |
|           |       | 2.0        | 12.5 × 21.5 × 31.5                       | —     | B32754C2205+000                             | 5.0                                    | 12.2                        | 2100     |
|           |       | 3.0        | 14.0 × 24.5 × 31.5                       | —     | B32754C2305K000                             | 6.5                                    | 8.7                         | 1848     |
|           |       | 4.0        | 16.0 × 32.0 × 31.5                       | —     | B32754C2405+000                             | 8.5                                    | 6.1                         | 1064     |
|           |       | 5.0        | 16.0 × 32.0 × 31.5                       | —     | B32754C2505+000                             | 9.0                                    | 5.4                         | 1064     |
|           |       | 6.0        | 18.0 × 33.0 × 31.5                       | —     | B32754C2605+000                             | 10.5                                   | 4.6                         | 952      |
|           |       | 7.0        | 22.0 × 36.5 × 31.5                       | —     | B32754C2705+000                             | 12.5                                   | 3.8                         | 784      |
|           |       | 8.0        | 22.0 × 36.5 × 31.5                       | —     | B32754C2805+000                             | 13.0                                   | 3.6                         | 784      |
|           |       | 9.0        | 22.0 × 36.5 × 31.5                       | —     | B32754C2905+000                             | 13.5                                   | 3.4                         | 784      |
|           |       | 10         | 22.0 × 36.5 × 31.5                       | —     | B32754C2106K000                             | 13.5                                   | 3.2                         | 784      |
|           |       | 12         | 22.0 × 48.0 × 31.5                       | —     | B32754C2126+000                             | 14.0                                   | 3.0                         | 320      |
|           |       | 14         | 22.0 × 48.0 × 31.5                       | —     | B32754C2146K000                             | 14.0                                   | 2.8                         | 320      |
| 275       | 550   | 1.0        | 11.0 × 19.0 × 31.5                       | —     | B32754C7105+000                             | 3.5                                    | 21.3                        | 2352     |
|           |       | 1.5        | 12.5 × 21.5 × 31.5                       | —     | B32754C7155+000                             | 4.5                                    | 14.4                        | 2100     |
|           |       | 2.0        | 13.5 × 23.0 × 31.5                       | —     | B32754C7205+000                             | 5.5                                    | 10.9                        | 1932     |
|           |       | 2.5        | 15.0 × 24.5 × 31.5                       | —     | B32754C7255+000                             | 6.5                                    | 8.9                         | 1680     |
|           |       | 3.0        | 16.0 × 32.0 × 31.5                       | —     | B32754C7305+000                             | 8.0                                    | 7.1                         | 1064     |
|           |       | 4.0        | 16.0 × 32.0 × 31.5                       | —     | B32754C7405+000                             | 8.5                                    | 6.0                         | 1064     |
|           |       | 5.0        | 18.0 × 33.0 × 31.5                       | —     | B32754C7505K000                             | 10.0                                   | 5.0                         | 952      |
|           |       | 6.0        | 22.0 × 36.5 × 31.5                       | —     | B32754C7605+000                             | 12.0                                   | 4.1                         | 784      |
|           |       | 7.0        | 22.0 × 36.5 × 31.5                       | —     | B32754C7705+000                             | 12.5                                   | 3.7                         | 784      |
|           |       | 8.0        | 22.0 × 48.0 × 31.5                       | —     | B32754C7805+000                             | 13.0                                   | 3.4                         | 320      |
|           |       | 9.0        | 22.0 × 48.0 × 31.5                       | —     | B32754C7905+000                             | 13.5                                   | 3.4                         | 320      |
|           |       | 10         | 22.0 × 48.0 × 31.5                       | —     | B32754C7106+000                             | 14.0                                   | 3.1                         | 320      |

MOQ = Minimum Order Quantity, consisting of 4 packing units.

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

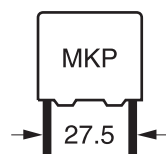
+ = Capacitance tolerance code:

K = ±10%

J = ±5%

1) Capacitance value measured at 1 kHz

2) Max. ripple current  $I_{RMS}$  at 85 °C, 10 kHz for  $\Delta T \leq 15$  °C at  $\Delta ESR_{typ} \leq \pm 5$  %



## B32754

### MKP AC filtering

#### Ordering codes and packing units (lead spacing 27.5 mm)

| $V_{RMS}$ | $V_R$ | $C_R^{(3)}$ | Max. dimensions<br>$w \times h \times l$ | $P_1$ | Ordering code<br>(composition see<br>below) | $I_{RMS}^{(4)}$<br>85 °C<br>10 kHz<br>A | $ESR_{typ}$<br>10 kHz<br>mΩ | Untaped<br>pcs./MOQ |
|-----------|-------|-------------|------------------------------------------|-------|---------------------------------------------|-----------------------------------------|-----------------------------|---------------------|
| V AC      | V DC  | μF          | mm                                       | mm    |                                             |                                         |                             |                     |
| 310       | 580   | 1.0         | 11.0 × 21.0 × 31.5                       | —     | B32754C3105+000                             | 4.0                                     | 20.3                        | 2352                |
|           |       | 1.5         | 13.5 × 23.0 × 31.5                       | —     | B32754C3155+000                             | 5.0                                     | 13.6                        | 1932                |
|           |       | 2.0         | 14.0 × 24.5 × 31.5                       | —     | B32754C3205K000                             | 6.0                                     | 10.9                        | 1848                |
|           |       | 2.5         | 16.0 × 32.0 × 31.5                       | —     | B32754C3255+000                             | 7.0                                     | 8.3                         | 1064                |
|           |       | 3.0         | 18.0 × 27.5 × 31.5                       | —     | B32754C3305+000                             | 8.0                                     | 7.0                         | 1428                |
|           |       | 3.5         | 18.0 × 33.0 × 31.5                       | —     | B32754C3355+000                             | 9.0                                     | 6.2                         | 952                 |
|           |       | 4.0         | 19.0 × 30.0 × 31.5                       | —     | B32754C3405K000                             | 9.5                                     | 5.8                         | 896                 |
|           |       | 4.5         | 21.0 × 31.0 × 31.5                       | —     | B32754C3455+000                             | 10.0                                    | 5.1                         | 784                 |
|           |       | 5.0         | 22.0 × 36.5 × 31.5                       | —     | B32754C3505+000                             | 11.0                                    | 4.6                         | 784                 |
|           |       | 6.0         | 22.0 × 36.5 × 31.5                       | —     | B32754C3605K000                             | 12.0                                    | 4.1                         | 784                 |
|           |       | 7.0         | 22.0 × 48.0 × 31.5                       | —     | B32754C3705+000                             | 13.0                                    | 4.0                         | 320                 |
|           |       | 8.0         | 22.0 × 48.0 × 31.5                       | —     | B32754C3805+000                             | 14.0                                    | 3.4                         | 320                 |
| 350       | 580   | 9.0         | 22.0 × 48.0 × 31.5                       | —     | B32754C3905K000                             | 14.0                                    | 3.3                         | 320                 |
|           |       | 1.0         | 11.0 × 21.0 × 31.5                       | —     | B32754C8105+000                             | 5.0                                     | 11.7                        | 2352                |
|           |       | 1.5         | 13.5 × 23.0 × 31.5                       | —     | B32754C8155+000                             | 6.0                                     | 8.0                         | 1932                |
|           |       | 2.0         | 15.0 × 24.5 × 31.5                       | —     | B32754C8205K000                             | 7.5                                     | 6.4                         | 1680                |
|           |       | 2.5         | 16.0 × 32.0 × 31.5                       | —     | B32754C8255+000                             | 9.0                                     | 5.0                         | 1064                |
|           |       | 3.0         | 18.0 × 33.0 × 31.5                       | —     | B32754C8305+000                             | 10.5                                    | 4.3                         | 952                 |
|           |       | 3.5         | 18.0 × 33.0 × 31.5                       | —     | B32754C8355+000                             | 11.0                                    | 3.9                         | 952                 |
|           |       | 4.0         | 21.0 × 31.0 × 31.5                       | —     | B32754C8405K000                             | 11.5                                    | 3.6                         | 784                 |
|           |       | 4.5         | 22.0 × 36.5 × 31.5                       | —     | B32754C8455+000                             | 12.0                                    | 3.2                         | 784                 |
|           |       | 5.0         | 22.0 × 36.5 × 31.5                       | —     | B32754C8505+000                             | 13.0                                    | 3.0                         | 784                 |
| 400       | 800   | 6.0         | 22.0 × 48.0 × 31.5                       | —     | B32754C8605+000                             | 14.0                                    | 2.8                         | 320                 |
|           |       | 7.0         | 22.0 × 48.0 × 31.5                       | —     | B32754C8705+000                             | 14.0                                    | 2.6                         | 320                 |
|           |       | 1.0         | 14.0 × 24.5 × 31.5                       | —     | B32754C4105K000                             | 6.0                                     | 9.5                         | 1848                |
|           |       | 1.5         | 18.0 × 27.5 × 31.5                       | —     | B32754C4155+000                             | 8.0                                     | 6.4                         | 1428                |
|           |       | 2.0         | 21.0 × 31.0 × 31.5                       | —     | B32754C4205+000                             | 10.0                                    | 4.9                         | 784                 |
|           |       | 2.5         | 22.0 × 36.5 × 31.5                       | —     | B32754C4255+000                             | 12.0                                    | 4.2                         | 784                 |
|           |       | 3.0         | 22.0 × 36.5 × 31.5                       | —     | B32754C4305K000                             | 13.0                                    | 3.8                         | 784                 |
|           |       | 4.0         | 22.0 × 48.0 × 31.5                       | —     | B32754C4405+000                             | 14.0                                    | 3.2                         | 320                 |

MOQ = Minimum Order Quantity, consisting of 4 packing units.

Further E series and intermediate capacitance values on request.

#### Composition of ordering code

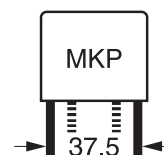
+ = Capacitance tolerance code:

K = ±10%

J = ±5%

3) Capacitance value measured at 1 kHz

4) Max. ripple current  $I_{RMS}$  at 85 °C, 10 kHz for  $\Delta T \leq 15$  °C at  $\Delta ESR_{typ} \leq \pm 5$  %



# Ordering codes and packing units (lead spacing 37.5 mm)

| $V_{RMS}$ | $V_R$ | $C_R^{1)}$ | Max. dimensions<br>$w \times h \times l$ | $P_1$ | Ordering code<br>(composition see<br>below) | $I_{RMS}^{2)}$<br>85 °C<br>10 kHz<br>A | $ESR_{typ}$<br>10 kHz<br>mΩ | Untaped<br>pcs./MOQ |
|-----------|-------|------------|------------------------------------------|-------|---------------------------------------------|----------------------------------------|-----------------------------|---------------------|
| V AC      | V DC  | μF         | mm                                       | mm    |                                             |                                        |                             |                     |
| 250       | 500   | 5.0        | 18.0 × 32.5 × 42.0                       | —     | B32756C2505+000                             | 8.0                                    | 7.6                         | 720                 |
|           |       | 6.0        | 18.0 × 32.5 × 42.0                       | —     | B32756C2605+000                             | 9.0                                    | 6.5                         | 720                 |
|           |       | 7.0        | 18.0 × 32.5 × 42.0                       | —     | B32756C2705+000                             | 9.0                                    | 6.1                         | 720                 |
|           |       | 8.0        | 18.0 × 32.5 × 42.0                       | —     | B32756C2805+000                             | 10.0                                   | 5.9                         | 720                 |
|           |       | 9.0        | 18.0 × 32.5 × 42.0                       | —     | B32756C2905+000                             | 10.5                                   | 5.3                         | 720                 |
|           |       | 10         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G2106+000                             | 13.0                                   | 4.1                         | 640                 |
|           |       | 12         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G2126+000                             | 14.0                                   | 3.8                         | 640                 |
|           |       | 15         | 22.0 × 45.0 × 42.0                       | 10.2  | B32756G2156+000                             | 15.0                                   | 3.2                         | 560                 |
|           |       | 20         | 28.0 × 42.5 × 42.0                       | 10.2  | B32756G2206+000                             | 19.0                                   | 2.4                         | 440                 |
|           |       | 22         | 30.0 × 45.0 × 42.0                       | 20.3  | B32756G2226+000                             | 21.0                                   | 2.2                         | 400                 |
|           |       | 25         | 33.0 × 48.0 × 42.0                       | 20.3  | B32756G2256+000                             | 23.0                                   | 2.0                         | 180                 |
|           |       | 30         | 33.0 × 48.0 × 42.0                       | 20.3  | B32756G2306K000                             | 24.0                                   | 1.8                         | 180                 |
| 275       | 550   | 5.0        | 18.0 × 32.5 × 42.0                       | —     | B32756C7505+000                             | 8.0                                    | 7.6                         | 720                 |
|           |       | 6.0        | 18.0 × 32.5 × 42.0                       | —     | B32756C7605+000                             | 9.0                                    | 6.5                         | 720                 |
|           |       | 7.0        | 18.0 × 32.5 × 42.0                       | —     | B32756C7705+000                             | 9.0                                    | 6.1                         | 720                 |
|           |       | 8.0        | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G7805+000                             | 12.0                                   | 4.7                         | 640                 |
|           |       | 9.0        | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G7905+000                             | 13.0                                   | 4.3                         | 640                 |
|           |       | 10         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G7106+000                             | 13.0                                   | 4.1                         | 640                 |
|           |       | 12         | 22.0 × 45.0 × 42.0                       | 10.2  | B32756G7126+000                             | 14.0                                   | 3.6                         | 560                 |
|           |       | 15         | 28.0 × 42.5 × 42.0                       | 10.2  | B32756G7156+000                             | 18.0                                   | 2.8                         | 440                 |
|           |       | 20         | 30.0 × 45.0 × 42.0                       | 20.3  | B32756G7206K000                             | 20.0                                   | 2.3                         | 400                 |
|           |       | 22         | 33.0 × 48.0 × 42.0                       | 20.3  | B32756G7226+000                             | 23.0                                   | 2.0                         | 180                 |

MOQ = Minimum Order Quantity, consisting of 4 packing units.

Further E series and intermediate capacitance values on request.

## Composition of ordering code

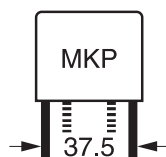
+ = Capacitance tolerance code:

K = ±10%

J = ±5%

1) Capacitance value measured at 1 kHz

2) Max. ripple current  $I_{RMS}$  at 85 °C, 10 kHz for  $\Delta T \leq 15$  °C at  $\Delta ESR_{typ} \leq \pm 5$  %



# B32756

## MKP AC filtering

### Ordering codes and packing units (lead spacing 37.5 mm)

| $V_{RMS}$ | $V_R$ | $C_R^{(3)}$ | Max. dimensions<br>$w \times h \times l$ | $P_1$ | Ordering code<br>(composition see<br>below) | $I_{RMS}^{(4)}$<br>85 °C<br>10 kHz<br>A | $ESR_{typ}$<br>10 kHz<br>mΩ | Untaped  |
|-----------|-------|-------------|------------------------------------------|-------|---------------------------------------------|-----------------------------------------|-----------------------------|----------|
| V AC      | V DC  | μF          | mm                                       | mm    |                                             |                                         |                             | pcs./MOQ |
| 310       | 580   | 5.0         | 18.0 × 32.5 × 42.0                       | —     | B32756C3505+000                             | 9.0                                     | 7.6                         | 720      |
|           |       | 6.0         | 18.0 × 32.5 × 42.0                       | —     | B32756C3605+000                             | 9.5                                     | 6.4                         | 720      |
|           |       | 7.0         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G3705+000                             | 12.0                                    | 5.3                         | 640      |
|           |       | 8.0         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G3805+000                             | 12.5                                    | 4.7                         | 640      |
|           |       | 9.0         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G3905+000                             | 13.0                                    | 4.3                         | 640      |
|           |       | 10          | 22.0 × 45.0 × 42.0                       | 10.2  | B32756G3106+000                             | 14.0                                    | 3.9                         | 560      |
|           |       | 12          | 22.0 × 45.0 × 42.0                       | 10.2  | B32756G3126K000                             | 14.5                                    | 3.5                         | 560      |
|           |       | 14          | 28.0 × 42.5 × 42.0                       | 10.2  | B32756G3146K000                             | 17.0                                    | 2.9                         | 440      |
|           |       | 15          | 30.0 × 45.0 × 42.0                       | 20.3  | B32756G3156+000                             | 19.0                                    | 2.6                         | 400      |
|           |       | 20          | 33.0 × 48.0 × 42.0                       | 20.3  | B32756G3206K000                             | 22.0                                    | 2.2                         | 180      |
| 350       | 580   | 5.0         | 18.0 × 32.5 × 42.0                       | —     | B32756C8505+000                             | 12.0                                    | 4.3                         | 720      |
|           |       | 6.0         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G8605+000                             | 15.0                                    | 3.4                         | 640      |
|           |       | 7.0         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G8705+000                             | 16.0                                    | 3.0                         | 640      |
|           |       | 8.0         | 22.0 × 45.0 × 42.0                       | 10.2  | B32756G8805+000                             | 17.0                                    | 2.7                         | 560      |
|           |       | 9.0         | 22.0 × 45.0 × 42.0                       | 10.2  | B32756G8905+000                             | 18.0                                    | 2.5                         | 560      |
|           |       | 10          | 28.0 × 42.5 × 42.0                       | 10.2  | B32756G8106+000                             | 20.0                                    | 2.1                         | 440      |
|           |       | 12          | 30.0 × 45.0 × 42.0                       | 20.3  | B32756G8126+000                             | 23.0                                    | 1.8                         | 400      |
|           |       | 15          | 33.0 × 48.0 × 42.0                       | 20.3  | B32756G8156+000                             | 26.0                                    | 1.5                         | 180      |
| 400       | 800   | 1.0         | 12.0 × 22.0 × 42.0                       | —     | B32756C4105K000                             | 5.0                                     | 15.2                        | 1620     |
|           |       | 2.0         | 16.0 × 28.5 × 42.0                       | —     | B32756C4205+000                             | 8.0                                     | 7.7                         | 800      |
|           |       | 3.0         | 18.0 × 32.5 × 42.0                       | —     | B32756C4305K000                             | 10.0                                    | 5.5                         | 720      |
|           |       | 4.0         | 20.0 × 39.5 × 42.0                       | 10.2  | B32756G4405+000                             | 13.5                                    | 3.8                         | 640      |
|           |       | 5.0         | 22.0 × 45.0 × 42.0                       | 10.2  | B32756G4505+000                             | 15.0                                    | 3.2                         | 560      |
|           |       | 6.0         | 28.0 × 42.5 × 42.0                       | 10.2  | B32756G4605+000                             | 18.5                                    | 2.6                         | 440      |
|           |       | 7.0         | 30.0 × 45.0 × 42.0                       | 20.3  | B32756G4705+000                             | 20.5                                    | 2.3                         | 400      |
|           |       | 8.0         | 33.0 × 48.0 × 42.0                       | 20.3  | B32756G4805+000                             | 23.0                                    | 2.0                         | 180      |
|           |       | 9.0         | 33.0 × 48.0 × 42.0                       | 20.3  | B32756G4905K000                             | 24.0                                    | 1.9                         | 180      |

MOQ = Minimum Order Quantity, consisting of 4 packing units.

Further E series and intermediate capacitance values on request.

#### Composition of ordering code

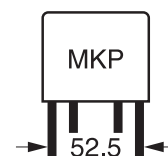
+ = Capacitance tolerance code:

K = ±10%

J = ±5%

3) Capacitance value measured at 1 kHz

4) Max. ripple current  $I_{RMS}$  at 85 °C, 10 kHz for  $\Delta T \leq 15$  °C at  $\Delta ESR_{typ} \leq \pm 5$  %



# Ordering codes and packing units (lead spacing 52.5 mm)

| $V_{RMS}$ | $V_R$ | $C_R^{(1)}$ | Max. dimensions<br>$w \times h \times l$ | $P_1$ | Ordering code<br>(composition see<br>below) | $I_{RMS}^{(2)}$<br>85 °C<br>10 kHz<br>A | $ESR_{typ}$<br>10 kHz<br>mΩ | Untaped<br>pcs./MOQ |
|-----------|-------|-------------|------------------------------------------|-------|---------------------------------------------|-----------------------------------------|-----------------------------|---------------------|
| V AC      | V DC  | μF          | mm                                       | mm    |                                             |                                         |                             |                     |
| 250       | 500   | 20          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G2206+000                             | 18.0                                    | 3.7                         | 280                 |
|           |       | 22          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G2226+000                             | 19.0                                    | 3.4                         | 280                 |
|           |       | 25          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G2256+000                             | 19.5                                    | 3.3                         | 280                 |
|           |       | 30          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G2306+000                             | 20.0                                    | 3.1                         | 280                 |
|           |       | 35          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G2356K000                             | 21.0                                    | 2.8                         | 280                 |
|           |       | 40          | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G2406+000                             | 24.0                                    | 2.4                         | 108                 |
|           |       | 45          | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G2456K000                             | 25.0                                    | 2.2                         | 108                 |
|           |       | 50          | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G2506+000                             | 27.0                                    | 2.0                         | 96                  |
|           |       | 55          | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G2556+000                             | 28.0                                    | 1.8                         | 96                  |
|           |       | 60          | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G2606K000                             | 29.0                                    | 1.8                         | 96                  |
|           |       | 65          | 45.0 × 57.0 × 57.5                       | 20.3  | B32758G2656+000                             | 31.0                                    | 1.6                         | 140                 |
|           |       | 70          | 45.0 × 57.0 × 57.5                       | 20.3  | B32758G2706K000                             | 32.0                                    | 1.6                         | 140                 |
| 275       | 550   | 20          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G7206+000                             | 17.0                                    | 3.7                         | 280                 |
|           |       | 22          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G7226+000                             | 18.0                                    | 3.4                         | 280                 |
|           |       | 25          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G7256+000                             | 19.0                                    | 3.3                         | 280                 |
|           |       | 30          | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G7306+000                             | 22.0                                    | 2.6                         | 108                 |
|           |       | 35          | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G7356+000                             | 23.0                                    | 2.4                         | 108                 |
|           |       | 40          | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G7406+000                             | 26.0                                    | 2.1                         | 96                  |
|           |       | 45          | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G7456+000                             | 27.0                                    | 2.0                         | 96                  |
|           |       | 50          | 45.0 × 57.0 × 57.5                       | 20.3  | B32758G7506+000                             | 30.0                                    | 1.8                         | 140                 |
|           |       | 55          | 45.0 × 57.0 × 57.5                       | 20.3  | B32758G7556K000                             | 31.0                                    | 1.8                         | 140                 |
| 310       | 580   | 20          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G3206+000                             | 19.0                                    | 3.7                         | 280                 |
|           |       | 22          | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G3226+000                             | 20.0                                    | 3.4                         | 280                 |
|           |       | 25          | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G3256+000                             | 22.0                                    | 3.0                         | 108                 |
|           |       | 30          | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G3306+000                             | 23.0                                    | 2.6                         | 108                 |
|           |       | 35          | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G3356+000                             | 26.0                                    | 2.3                         | 96                  |
|           |       | 40          | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G3406K000                             | 28.0                                    | 2.1                         | 96                  |
|           |       | 45          | 45.0 × 57.5 × 57.5                       | 20.3  | B32758G3456+000                             | 30.0                                    | 1.9                         | 140                 |

MOQ = Minimum Order Quantity, consisting of 4 packing units.

Further E series and intermediate capacitance values on request.

## Composition of ordering code

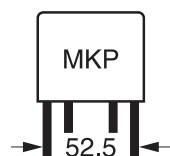
+ = Capacitance tolerance code:

K = ±10%

J = ±5%

1) Capacitance value measured at 1 kHz

2) Max. ripple current  $I_{RMS}$  at 85 °C, 10 kHz for  $\Delta T \leq 15$  °C at  $\Delta ESR_{typ} \leq \pm 5$  %


**B32758**
**MKP AC filtering**
**Ordering codes and packing units (lead spacing 52.5 mm)**

| $V_{RMS}$ | $V_R$ | $C_R^{3)}$ | Max. dimensions<br>$w \times h \times l$ | $P_1$ | Ordering code<br>(composition see<br>below) | $I_{RMS}^{4)}$<br>85 °C<br>10 kHz<br>A | $ESR_{typ}$<br>10 kHz<br>mΩ | Untaped  |
|-----------|-------|------------|------------------------------------------|-------|---------------------------------------------|----------------------------------------|-----------------------------|----------|
| V AC      | V DC  | μF         | mm                                       | mm    |                                             |                                        |                             | pcs./MOQ |
| 350       | 580   | 15         | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G8156+000                             | 21.0                                   | 2.6                         | 280      |
|           |       | 20         | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G8206+000                             | 26.0                                   | 2.0                         | 108      |
|           |       | 22         | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G8226+000                             | 27.0                                   | 1.9                         | 108      |
|           |       | 25         | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G8256K000                             | 28.0                                   | 1.8                         | 108      |
|           |       | 30         | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G8306+000                             | 29.0                                   | 1.5                         | 96       |
|           |       | 33         | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G8336K000                             | 30.0                                   | 1.4                         | 96       |
|           |       | 35         | 45.0 × 57.5 × 57.5                       | 20.3  | B32758G8356+000                             | 32.0                                   | 1.3                         | 140      |
| 400       | 800   | 9.0        | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G4905+000                             | 20.0                                   | 3.0                         | 280      |
|           |       | 10         | 30.0 × 45.0 × 57.5                       | 20.3  | B32758G4106+000                             | 21.0                                   | 2.8                         | 280      |
|           |       | 12         | 35.0 × 50.0 × 57.5                       | 20.3  | B32758G4126+000                             | 25.0                                   | 2.3                         | 108      |
|           |       | 15         | 38.0 × 57.5 × 57.5                       | 20.3  | B32758G4156+000                             | 28.0                                   | 1.9                         | 96       |
|           |       | 20         | 45.0 × 57.5 × 57.5                       | 20.3  | B32758G4206+000                             | 32.0                                   | 1.6                         | 140      |

MOQ = Minimum Order Quantity, consisting of 4 packing units.

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

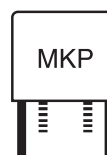
+ = Capacitance tolerance code:

K = ±10%

J = ±5%

3) Capacitance value measured at 1 kHz

4) Max. ripple current  $I_{RMS}$  at 85 °C, 10 kHz for  $\Delta T \leq 15$  °C at  $\Delta ESR_{typ} \leq \pm 5$  %



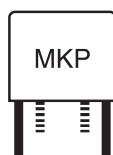
## Technical data

Reference standard: IEC 61071:2007, all data given at T = 20 °C unless otherwise specified.

|                                                                                                                                                                                                          |                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature range (case)                                                                                                                                                                       | Upper category temperature, $T_{op,max}$ +105 °C<br>Rated temperature $T_{max}$ +85 °C<br>Lower category temperature $T_{min}$ -40 °C<br>Note:<br>At T > 85 °C derating for $V_{RMS}$ or $V_R$ should be 1.5%/°C                             |
| Dissipation factor $\tan \delta$ (in $10^{-3}$ )<br>at 20 °C and 1kHz (upper limit values)                                                                                                               | 1.0, $C_R \leq 55 \mu F$<br>1.2, $C_R > 55 \mu F$                                                                                                                                                                                            |
| Insulation resistance $R_{ins}$ after 1min,<br>given as time constant<br>$\tau = C_R \cdot R_{ins}$ ,<br>(Minimum as-delivered values with<br>rel. humidity $\leq 65\%$ )<br>Measuring voltage: 500 V DC | 10 000 s                                                                                                                                                                                                                                     |
| DC test voltage between terminals                                                                                                                                                                        | $1.5 \cdot V_R$ for 10 s or $1.6 \cdot V_R$ for 2 s                                                                                                                                                                                          |
| Test voltage between terminal to case                                                                                                                                                                    | 2000 V AC at 50/60Hz Hz, 60 s (typical test)                                                                                                                                                                                                 |
| Maximum peak current (A)                                                                                                                                                                                 | $I_{P,max} = C_R \cdot \frac{dV}{dt}$                                                                                                                                                                                                        |
| THB to high robustness under<br>high humidity, refer to<br>IEC 60384-14:2013/AMD1:2016<br>Grade III Test A                                                                                               | Temperature T: 60 °C $\pm 2$ °C<br>Relative humidity: 95% $\pm 2\%$<br>Applied voltage: $V_{RMS}$ (50/60Hz)<br>Test duration: 1344 h                                                                                                         |
| Criteria for passing THB test                                                                                                                                                                            | Capacitance change $ \Delta C/C_0  \leq 10\%$<br>Dissipation factor change $\Delta \tan \delta \leq 0.005$<br>Insulation resistance $R_{ins} \geq 50\%$ specified limit                                                                      |
| Change of temperature                                                                                                                                                                                    | In accordance with IEC 60068-2-14:2009 (Test Nb)                                                                                                                                                                                             |
| Reliability:<br>Failure rate $\lambda$<br>Service life $t_{SL}$                                                                                                                                          | 10 fit ( $< 10 \times 10^{-9}/h$ ) at $0.5 \times V_{RMS}$ , 40 °C<br>$\geq 60\,000$ h at $V_{RMS}$ (50/60Hz) at 70 °C<br>For conversion to other operating conditions and<br>temperatures, refer to chapter "Quality, 2 Reliability".       |
| Failure criteria:<br>Total failure<br>Failure due to variation of parameters                                                                                                                             | Short/open circuit<br>Capacitance change $ \Delta C/C_0  \geq 10\%$<br>Dissipation factor change $\Delta \tan \delta > 4 \cdot$ upper limit values<br>Insulation resistance $R_{ins}$<br>or time constant $\tau = C_R \cdot R_{ins} < 500$ s |

Note:

1000 hrs / 85 °C / 85% relative humidity with  $V_{RMS}$  available on request, based on special design.



B32754 ... B32758

MKP AC filtering

# Pulse handling capability

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

"k0" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V<sup>2</sup>/μs.

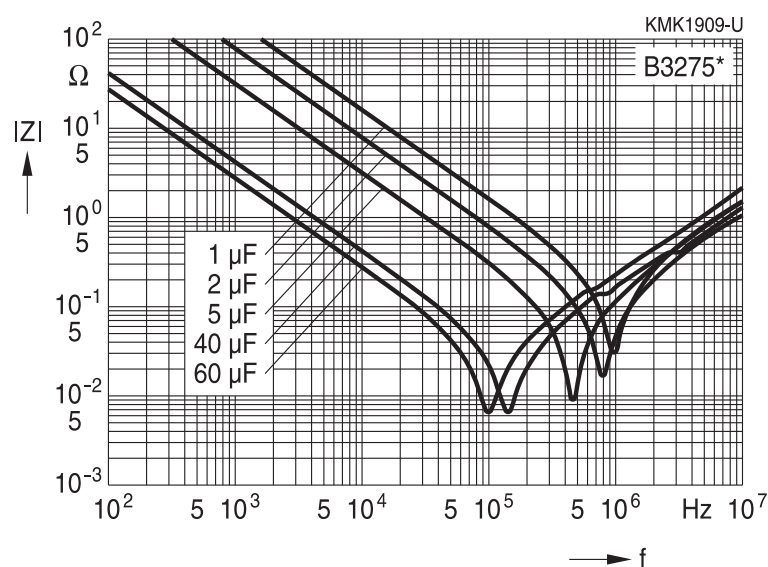
Note:

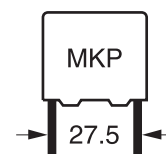
The values of dV/dt and k0 provided below must not be exceeded in order to avoid damaging the capacitor. These parameters are given for isolated pulses in such a way that the heat generated by one pulse will be completely dissipated before applying the next pulse. For a train of pulses, please refer to the curves of permissible AC voltage-current versus frequency

| Lead spacing            | 27.5 mm       |     |     |     |     | 37.5 mm |     |     |     |     |
|-------------------------|---------------|-----|-----|-----|-----|---------|-----|-----|-----|-----|
| Type                    | B32754        |     |     |     |     | B32756  |     |     |     |     |
| V <sub>R</sub> (V DC)   | 500           | 550 | 580 | 580 | 800 | 500     | 550 | 580 | 580 | 800 |
| V <sub>RMS</sub> (V AC) | 250           | 275 | 310 | 350 | 400 | 250     | 275 | 310 | 350 | 400 |
|                         | dV/dt in V/μs |     |     |     |     |         |     |     |     |     |
|                         | 50            | 55  | 68  | 80  | 100 | 25      | 30  | 35  | 50  | 60  |

| Lead spacing            | 52.5 mm       |     |     |     |     |
|-------------------------|---------------|-----|-----|-----|-----|
| Type                    | B32758        |     |     |     |     |
| V <sub>R</sub> (V DC)   | 500           | 550 | 580 | 580 | 800 |
| V <sub>RMS</sub> (V AC) | 250           | 275 | 310 | 350 | 400 |
|                         | dV/dt in V/μs |     |     |     |     |
|                         | 13            | 15  | 17  | 25  | 30  |

# Impedance Z versus frequency f (typical values)



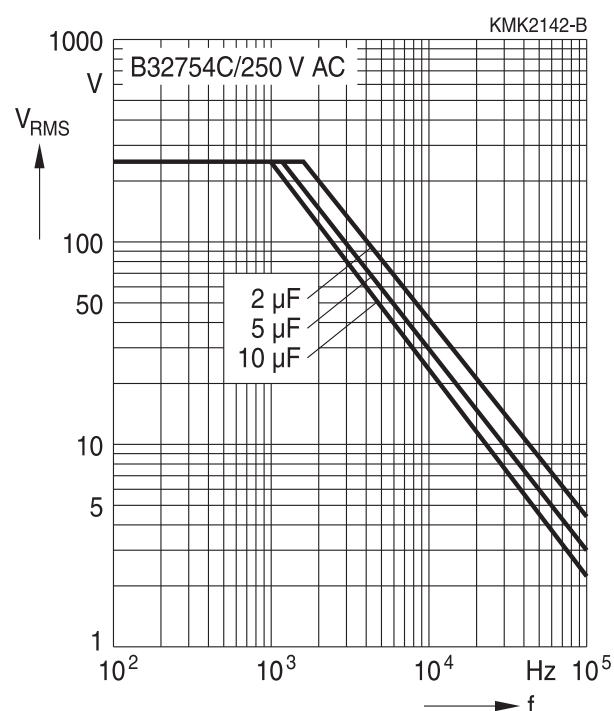


# **Permissible AC voltage $V_{RMS}$ versus frequency $f$ (for sinusoidal waveforms, $T_A \leq 85^\circ\text{C}$ )**

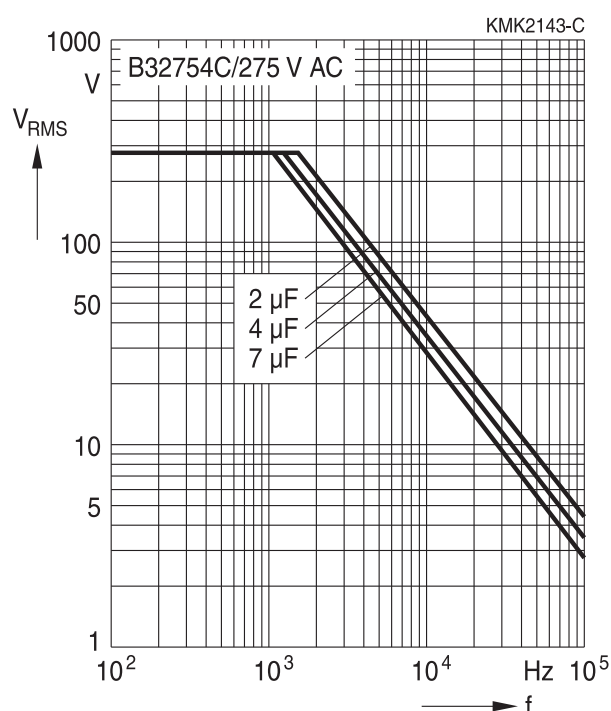
For  $T_A > 85^\circ\text{C}$ , please refer to derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

## **Lead spacing 27.5 mm**

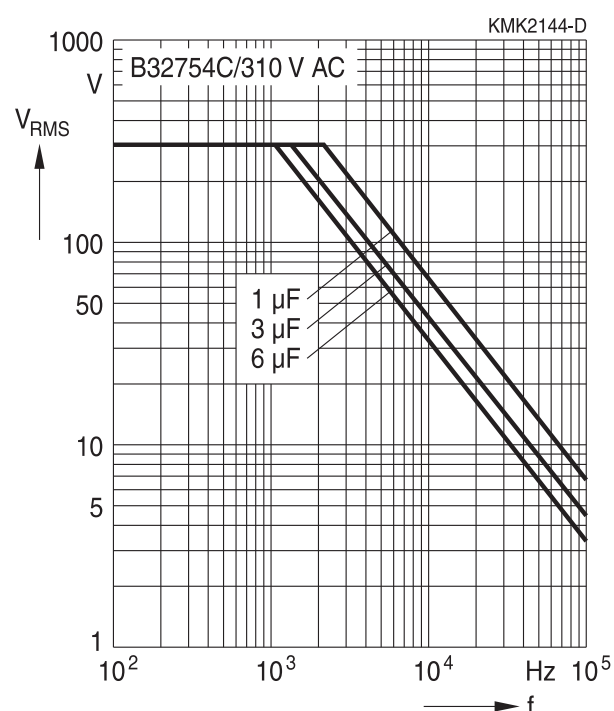
### **500 V DC/250 V AC**



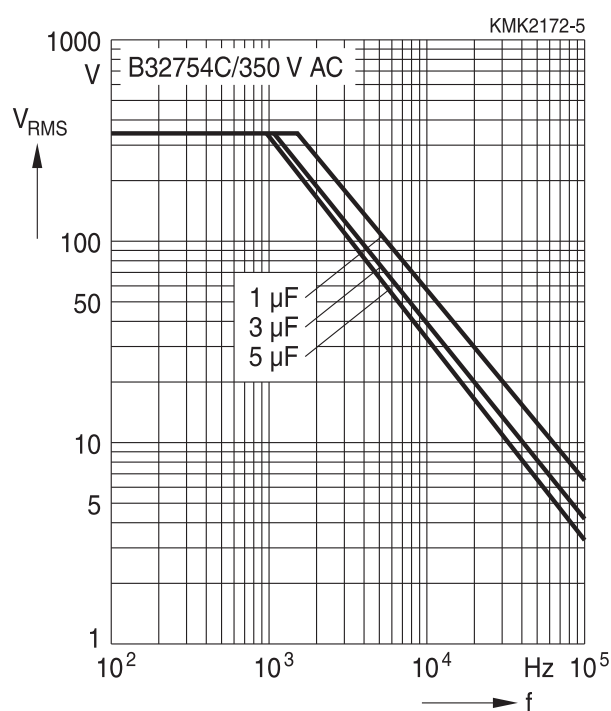
### **550 V DC/275 V AC**

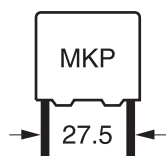


### **580 V DC/310 V AC**



### **580 V DC/350 V AC**





**B32754**

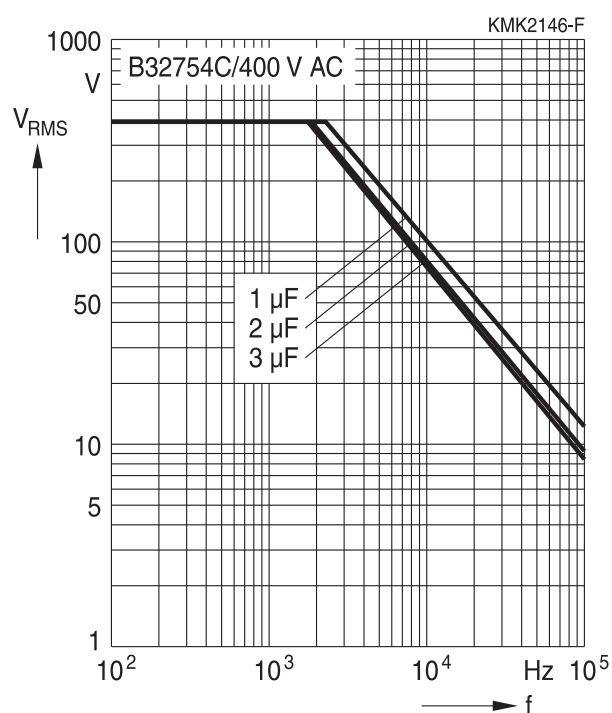
**MKP AC filtering**

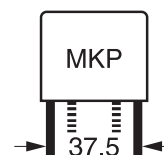
**Permissible AC voltage  $V_{\text{RMS}}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 85^\circ\text{C}$ )**

For  $T_A > 85^\circ\text{C}$ , please refer to derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

**Lead spacing 27.5 mm**

800 V DC/400 V AC



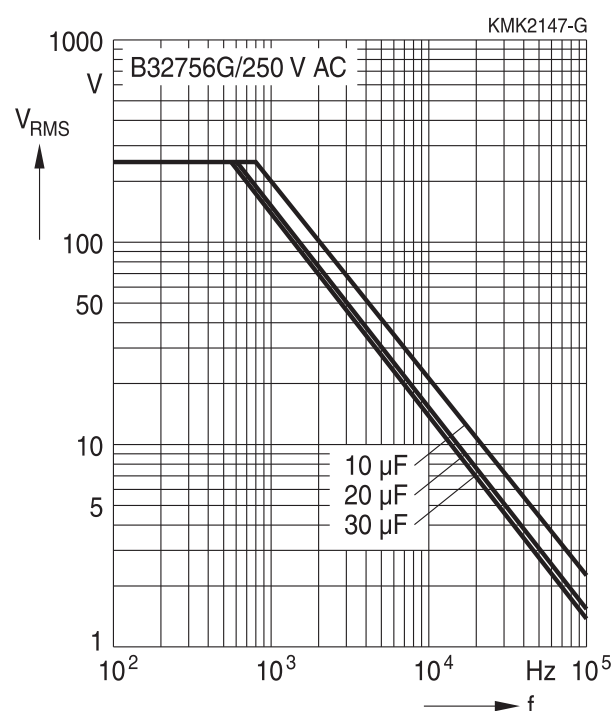


# **Permissible AC voltage $V_{RMS}$ versus frequency $f$ (for sinusoidal waveforms, $T_A \leq 85^\circ\text{C}$ )**

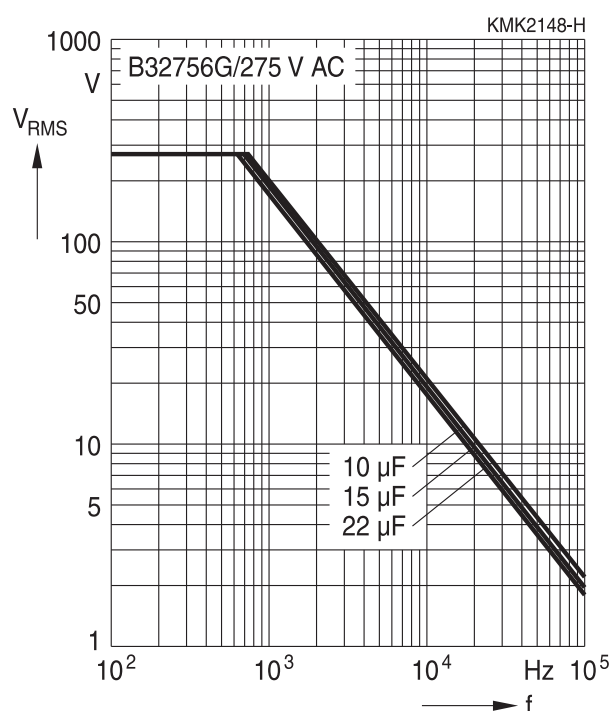
For  $T_A > 85^\circ\text{C}$ , please refer to derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

## **Lead spacing 37.5 mm (2 pins, 4 pins)**

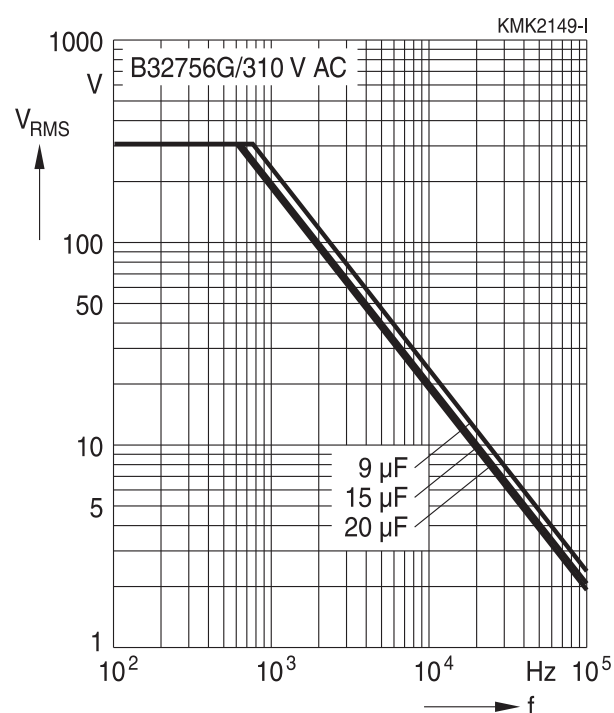
500 V DC/250 V AC



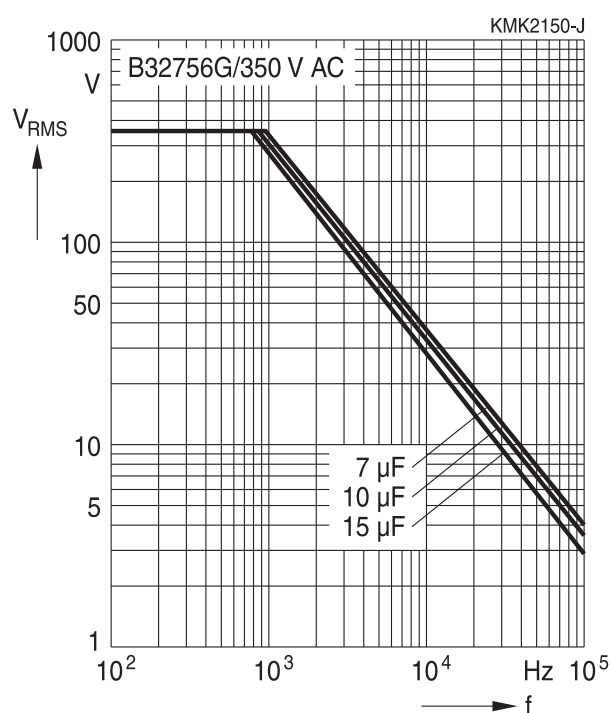
550 V DC/275 V AC

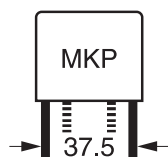


580 V DC/310 V AC



580 V DC/350 V AC





**B32756**

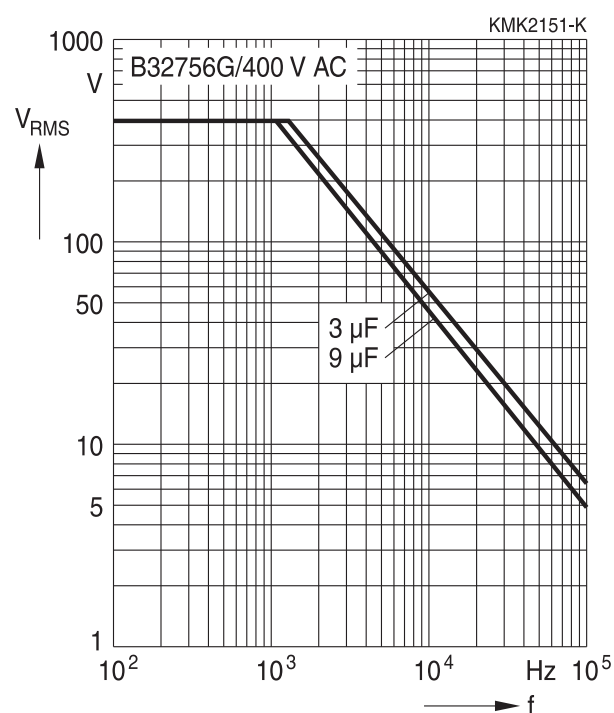
**MKP AC filtering**

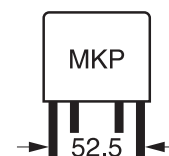
**Permissible AC voltage  $V_{\text{RMS}}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 85^\circ\text{C}$ )**

For  $T_A > 85^\circ\text{C}$ , please refer to derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

**Lead spacing 37.5 mm (2 pins, 4 pins)**

800 V DC/400 V AC



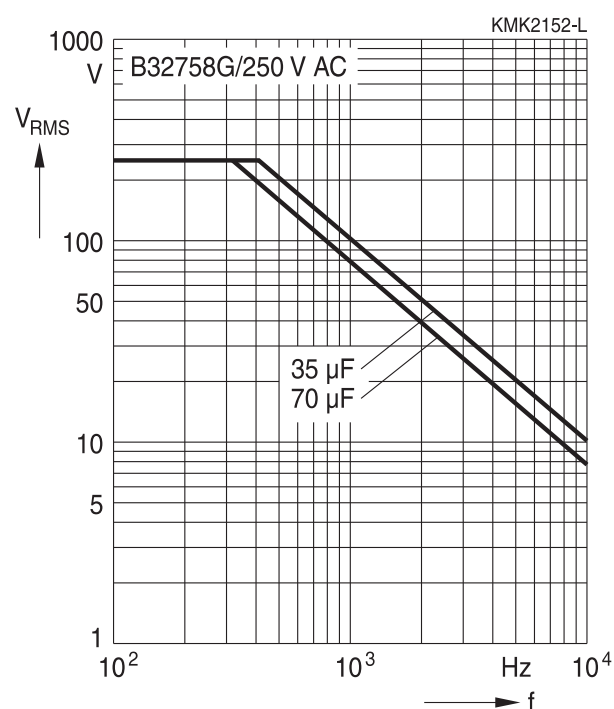


# Permissible AC voltage $V_{RMS}$ versus frequency $f$ (for sinusoidal waveforms, $T_A \leq 85^\circ\text{C}$ )

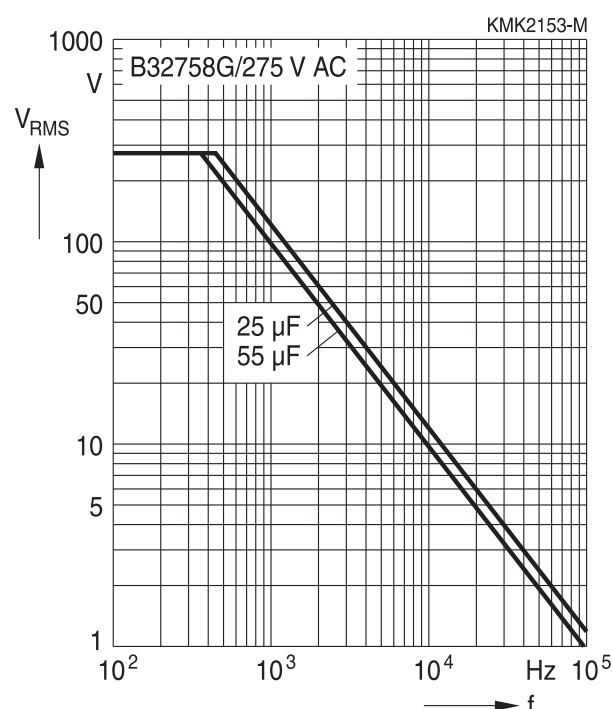
For  $T_A > 85^\circ\text{C}$ , please refer to derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

## Lead spacing 52.5 mm

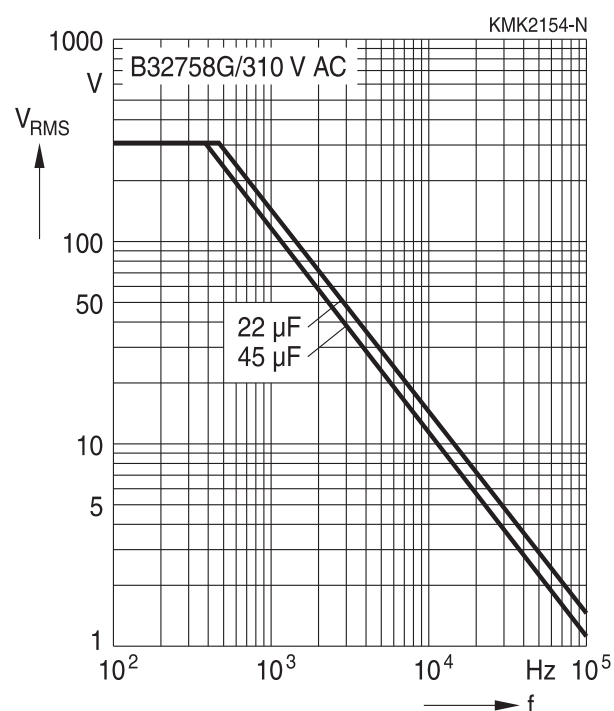
### 500 V DC/250 V AC



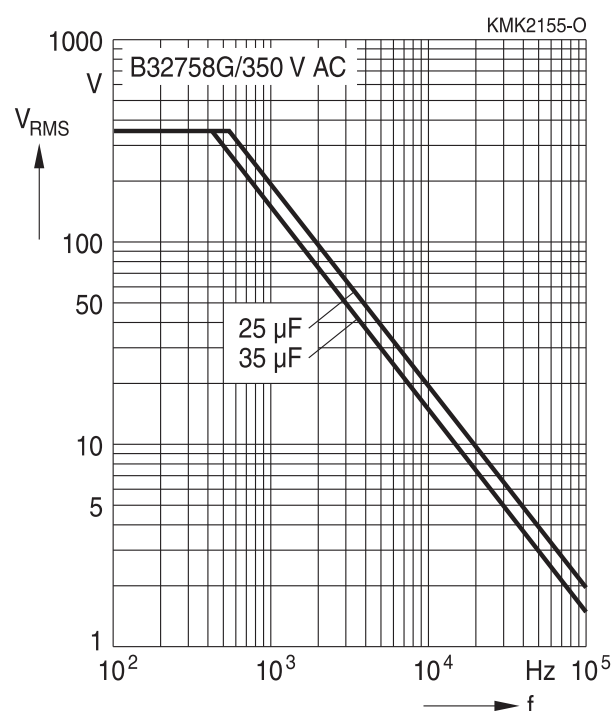
### 550 V DC/275 V AC

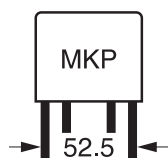


### 580 V DC/310 V AC



### 580 V DC/350 V AC





**B32758**

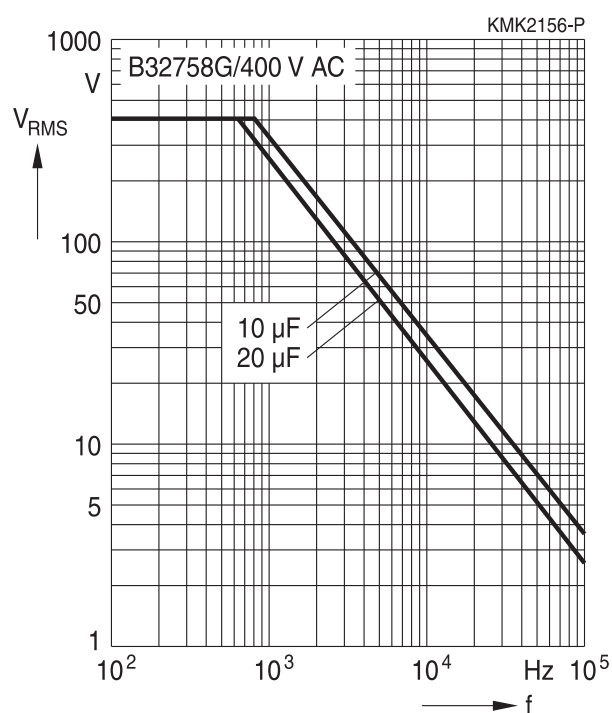
**MKP AC filtering**

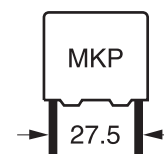
**Permissible AC voltage  $V_{RMS}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 85^\circ\text{C}$ )**

For  $T_A > 85^\circ\text{C}$ , please refer to derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

**Lead spacing 52.5 mm**

800 V DC/400 V AC



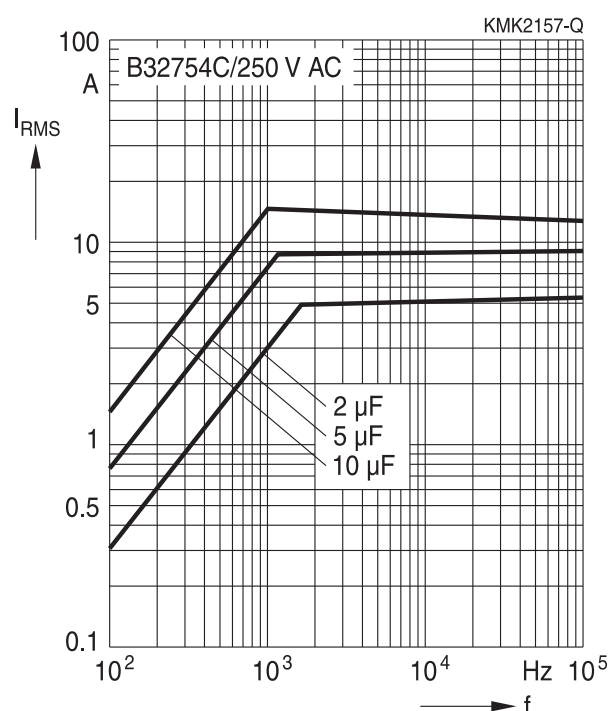


# Permissible current $I_{RMS}$ versus frequency $f$ (for sinusoidal waveforms $T_A \leq 85^\circ\text{C}$ )

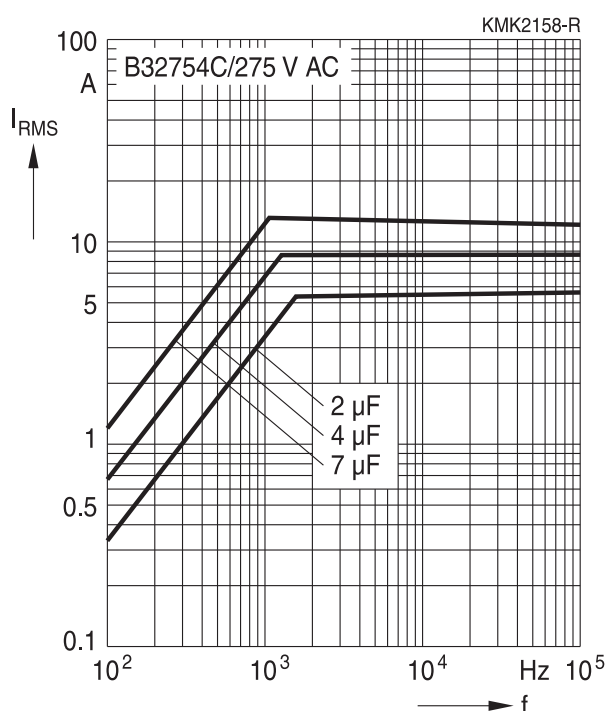
For  $T_A > 85^\circ\text{C}$ , please use the derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

## Lead spacing 27.5 mm

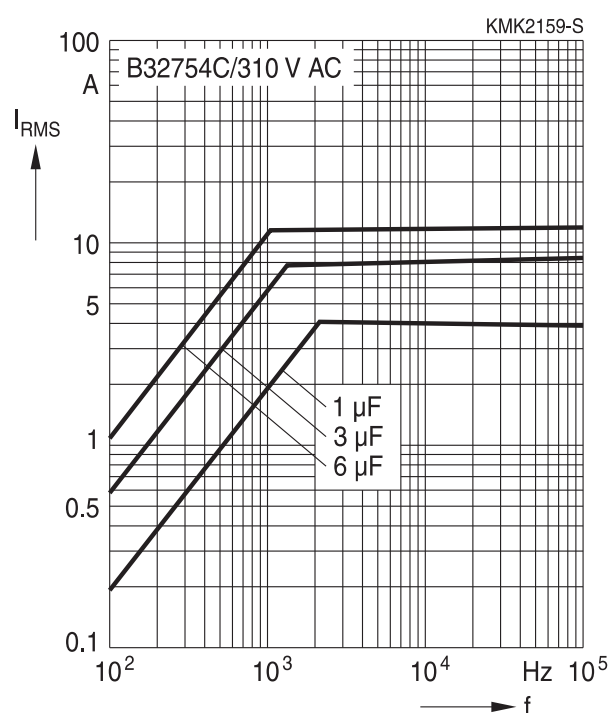
500 V DC/250 V AC



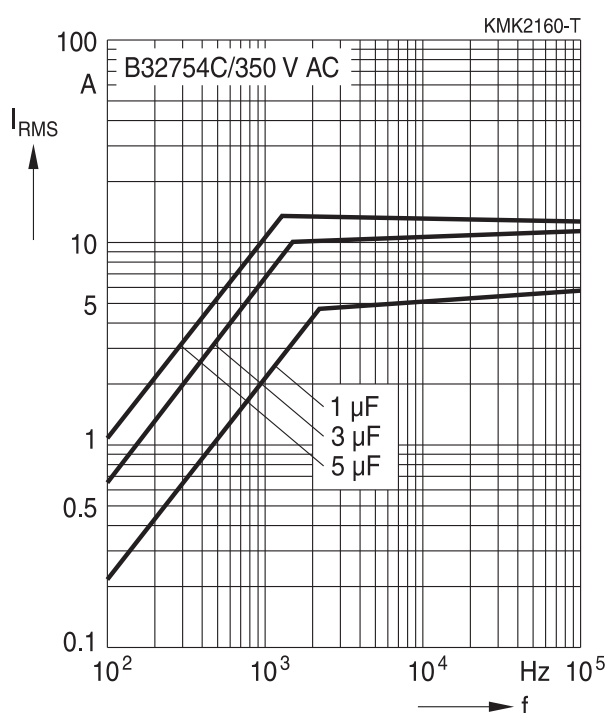
550 V DC/275 V AC

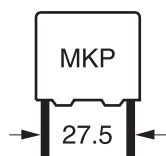


580 V DC/310 V AC



580 V DC/350 V AC





**B32754**

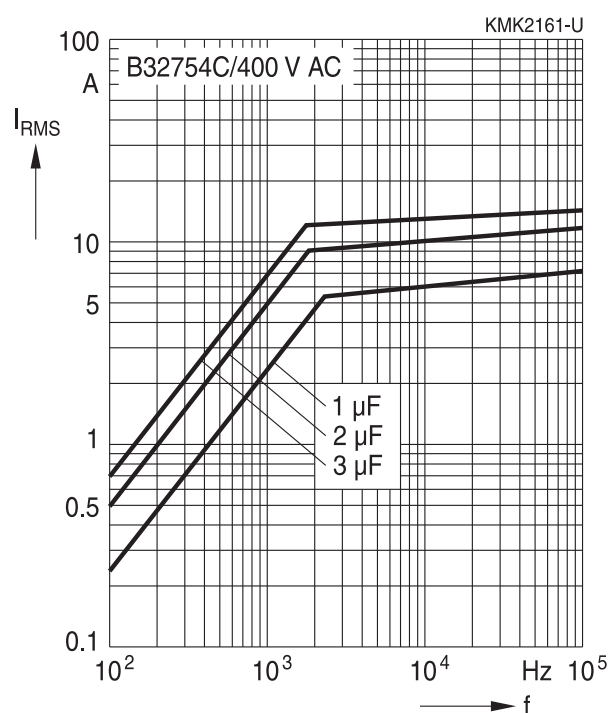
**MKP AC filtering**

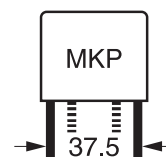
**Permissible current  $I_{RMS}$  versus frequency  $f$  (for sinusoidal waveforms  $T_A \leq 85^\circ\text{C}$ )**

For  $T_A > 85^\circ\text{C}$ , please use the derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

**Lead spacing 27.5 mm**

800 V DC/400 V AC



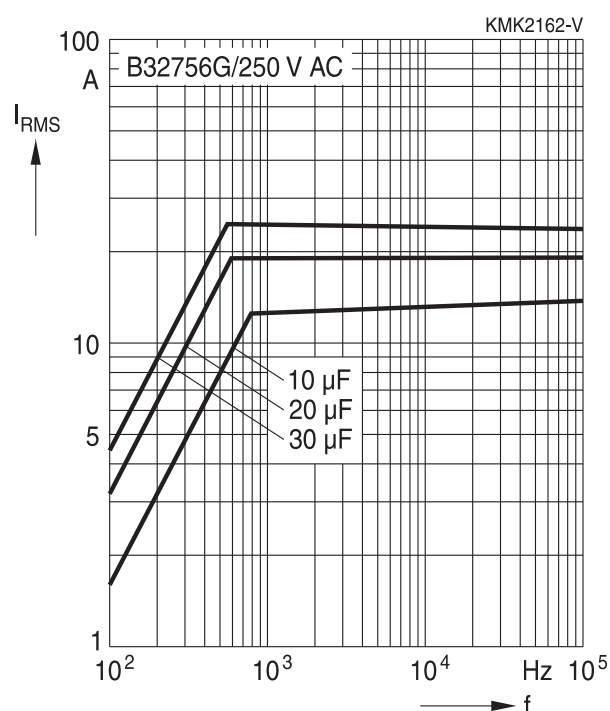


# Permissible current $I_{RMS}$ versus frequency $f$ (for sinusoidal waveforms $T_A \leq 85^\circ C$ )

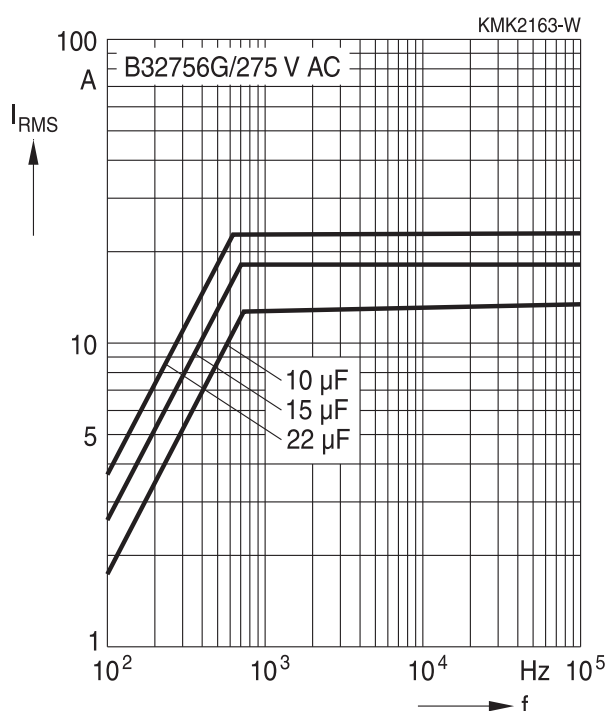
For  $T_A > 85^\circ C$ , please use the derating curve. The maximum component surface temperature must be lower than  $105^\circ C$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ C$ .

## Lead spacing 37.5 mm (2 pins, 4 pins)

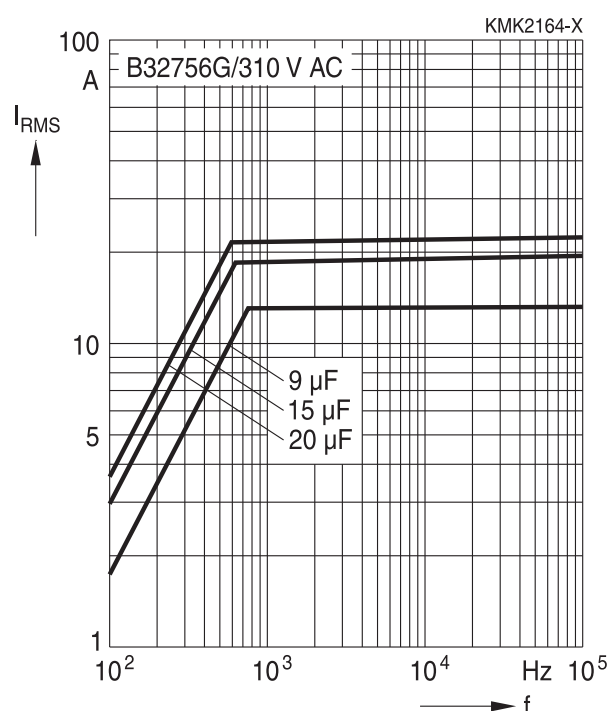
500 V DC/250 V AC



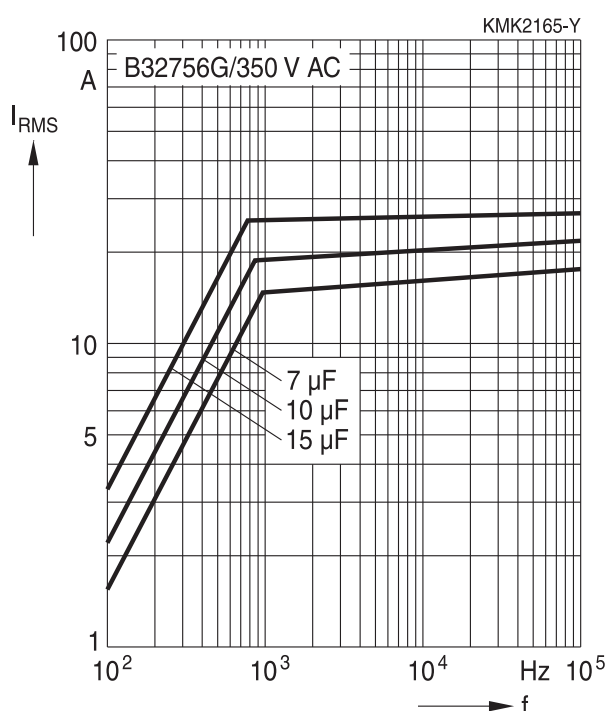
550 V DC/275 V AC

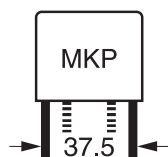


580 V DC/310 V AC



580 V DC/350 V AC





**B32756**

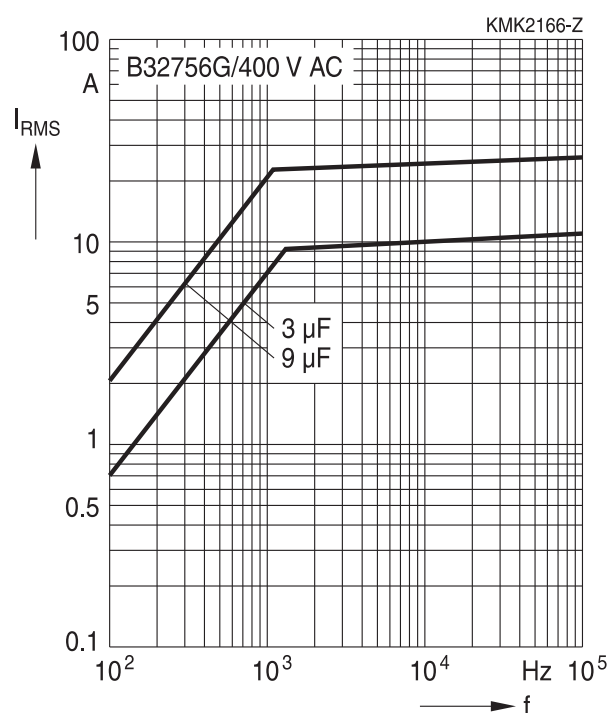
**MKP AC filtering**

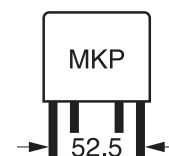
**Permissible current  $I_{RMS}$  versus frequency  $f$  (for sinusoidal waveforms  $T_A \leq 85^\circ\text{C}$ )**

For  $T_A > 85^\circ\text{C}$ , please use the derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

**Lead spacing 37.5 mm (2 pins, 4 pins)**

800 V DC/400 V AC



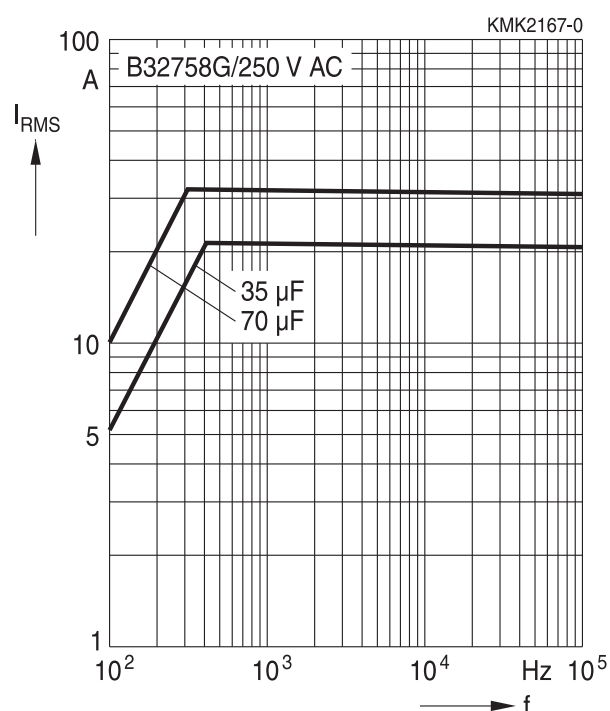


# Permissible current $I_{RMS}$ versus frequency $f$ (for sinusoidal waveforms $T_A \leq 85^\circ\text{C}$ )

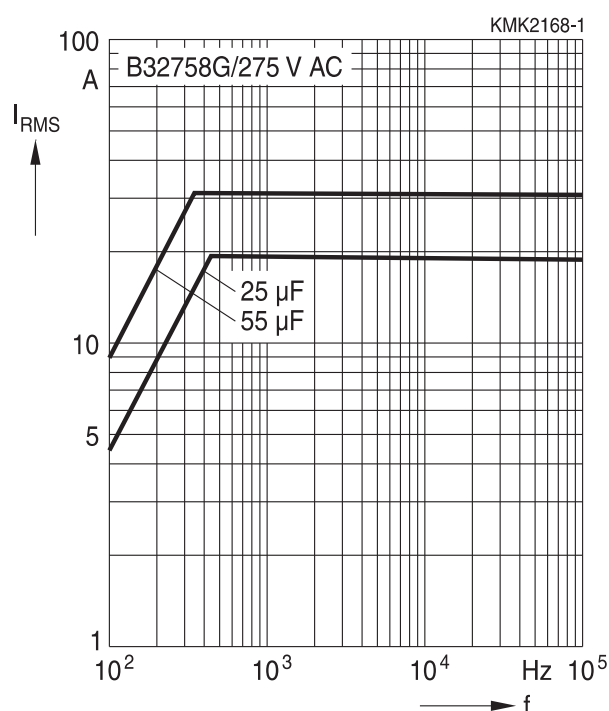
For  $T_A > 85^\circ\text{C}$ , please use the derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

## Lead spacing 52.5 mm

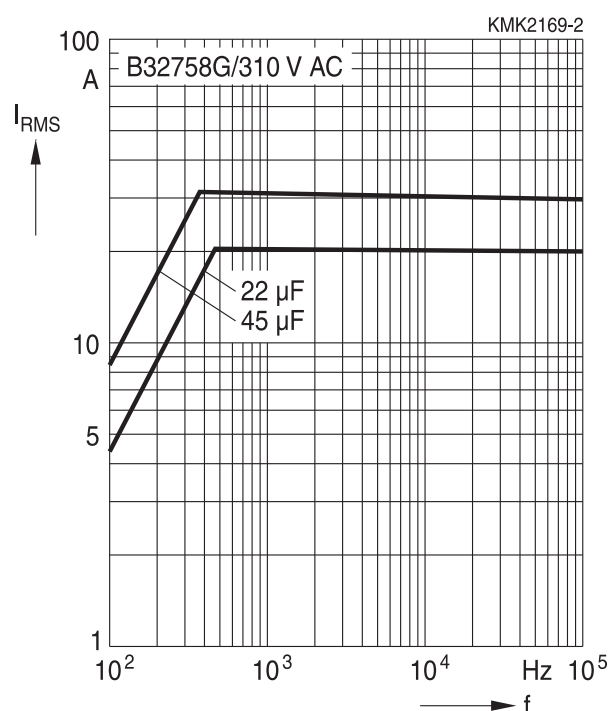
500 V DC/250 V AC



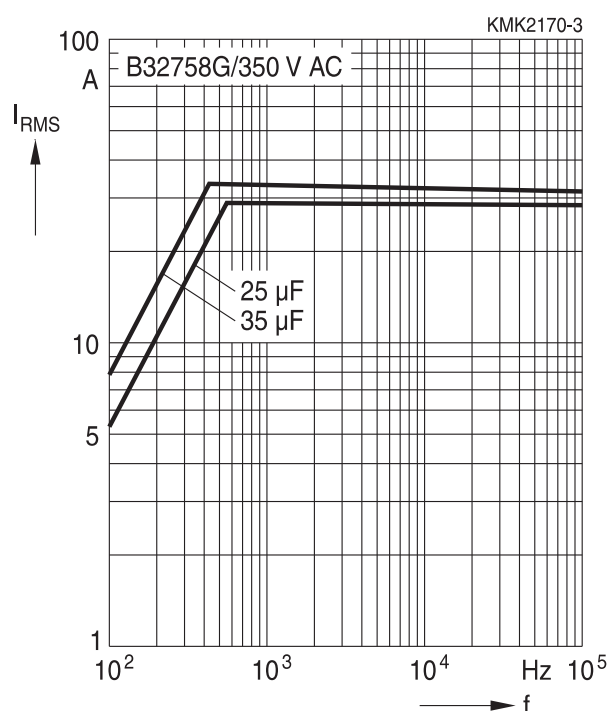
550 V DC/275 V AC

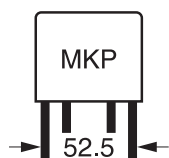


580 V DC/310 V AC



580 V DC/350 V AC





**B32758**

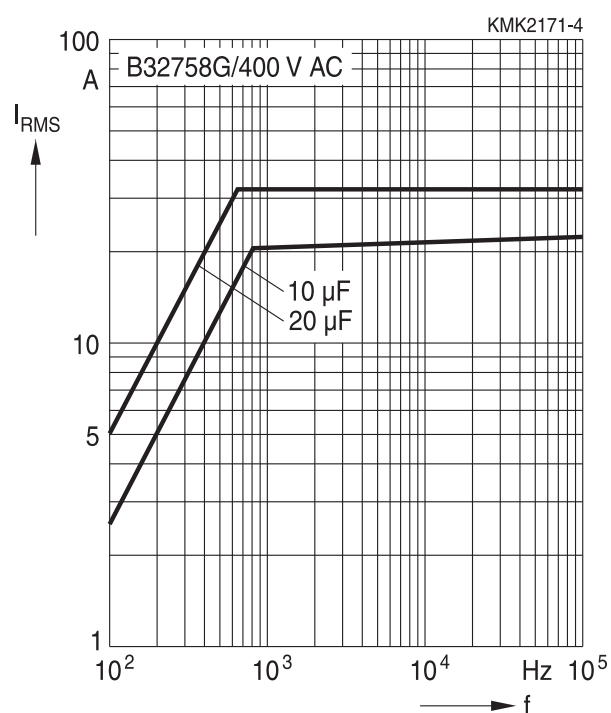
**MKP AC filtering**

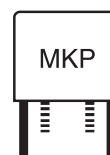
**Permissible current  $I_{RMS}$  versus frequency  $f$  (for sinusoidal waveforms  $T_A \leq 85^\circ\text{C}$ )**

For  $T_A > 85^\circ\text{C}$ , please use the derating curve. The maximum component surface temperature must be lower than  $105^\circ\text{C}$  and maximum temperature rise between case and free ambient shall be lower than  $15^\circ\text{C}$ .

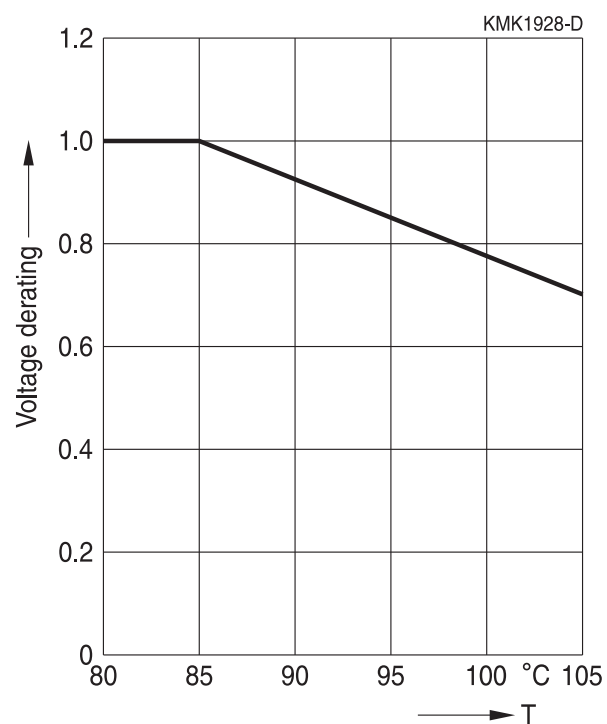
**Lead spacing 52.5 mm**

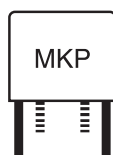
800 V DC/400 V AC





# **Maximum permissible continuous DC voltage versus temperature T**





B32754 ... B32758

MKP AC filtering

## Maximum AC voltage ( $V_{RMS}$ ) versus temperature $T_A \leq 85^\circ\text{C}$

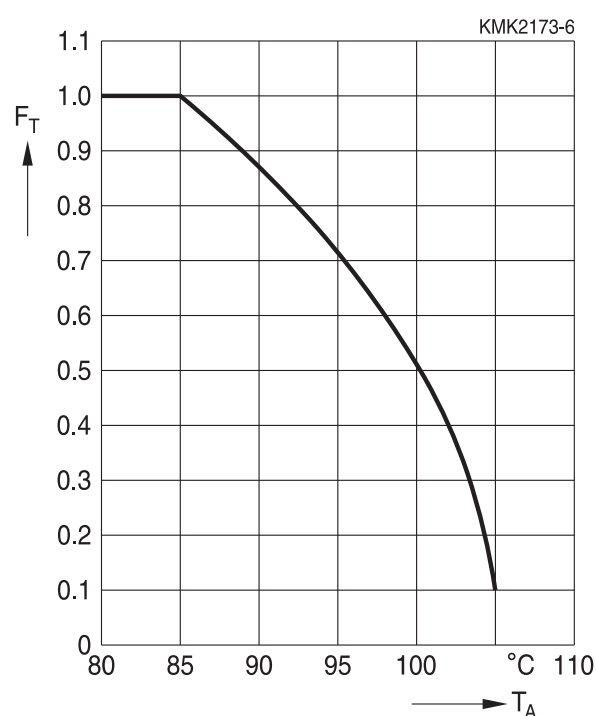
The graphs described in the previous section for the maximum AC voltage versus frequency are valid for moderate temperature:  $T_A \leq 85^\circ\text{C}$  in MKP. For temperatures higher than these limits, we have to consider additional effects depending on the frequency and dielectric:

### Low frequency ( $f < f_1$ )

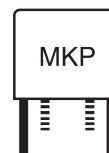
For frequency below  $f_1$  (the frequency is the  $V_{RMS}$  begin to derating versus frequency), a derating of the  $V_{RMS}$  versus the working temperature has to be applied, following the rules defined above.

### High frequencies ( $f_1 \leq f$ )

For frequency below  $f_1$  (The frequency is the  $V_{RMS}$  begin to derating versus frequency), a derating of the  $V_{RMS}$  versus the working temperature has to be applied, following the rules defined as below:

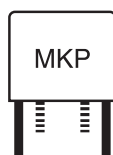


Derating factor  $F_T$  for  $V_{RMS}$  versus  $T_A$



## Testing and Standards

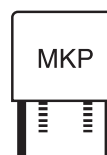
| Test                         | Reference           | Conditions of test                                                                                                                                                                                                 | Performance requirements                                                                                |
|------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Electrical parameters        | IEC 61071:2007      | Voltage between terminals:<br>1.5 V <sub>R</sub> , 60 s<br><br>Terminals and enclosure:<br>2000 V AC, 60 s<br><br>Insulation resistance R <sub>ins</sub><br>Capacitance C <sub>R</sub><br>Dissipation factor tan δ | Within specified limits<br>No visible damage<br>No flashover                                            |
| Robustness of terminations   | IEC 60068-2-21:2006 | Tensile strength (test U <sub>a</sub> 1)<br>Wire diameter   Section   Tensile force                                                                                                                                | Within specified specification                                                                          |
|                              |                     | 0.5 < d <sub>1</sub> ≤ 0.8 mm   ≤ 0.5 m <sup>2</sup>   10 N<br>0.8 < d <sub>1</sub> ≤ 1.25 mm   ≤ 1.2 m <sup>2</sup>   20 N<br>Duration: 10 s +/- 1 s                                                              |                                                                                                         |
|                              |                     | Bending U <sub>b</sub> method 1<br>Wire diameter   Section   Tensile force                                                                                                                                         |                                                                                                         |
|                              |                     | 0.5 < d <sub>1</sub> ≤ 0.8 mm   ≤ 0.5 m <sup>2</sup>   10 N<br>0.8 < d <sub>1</sub> ≤ 1.25 mm   ≤ 1.2 m <sup>2</sup>   20 N<br>4 × 90 °C<br>Duration: 2 s to 3 s / bend                                            |                                                                                                         |
| Resistance to soldering heat | IEC 60068-2-20:2008 | Solder bath temperature at 260 ± 5 °C, immersion for 10 seconds                                                                                                                                                    | ΔC/C <sub>0</sub> ≤ 0.5%<br>Increase of tan δ ≤ 0.005                                                   |
| Vibration                    | IEC 60068-2-6:2007  | 10 Hz to 55 Hz:<br>Amplitude ± 0.35 mm or acceleration 98 m/s <sup>2</sup><br><br>Test duration: 10 frequency cycles, 3 axes offset from each other by 90°, 1 octave/min, Visual examination                       | No visible damage                                                                                       |
| Bump                         | IEC 60068-2-6:2007  | Pulse shape: half sine<br>Acceleration: 490 m/s <sup>2</sup><br>Duration of pulse: 11 ms<br>Visual examination                                                                                                     | No visible damage<br> ΔC/C <sub>0</sub>   ≤ 0.5%<br>Increase of tan δ ≤ 0.005 compared to initial value |



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## MKP AC filtering

| Test                                                                            | Reference                       | Conditions of test                                                                                                                                                                                                                                                                                                                                                                                        | Performance requirements                                                                                                                                |
|---------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| THB test<br>(Grade III<br>Test A, high<br>robustness<br>under high<br>humidity) | IEC 60384-14:<br>2013/AMD1:2016 | 60 °C / 95% relative humidity / $V_{RMS}$ /<br>1344 h                                                                                                                                                                                                                                                                                                                                                     | No visible damage<br>$ \Delta C/C_0  \leq 10\%$<br>$\Delta \tan \delta$ (1 kHz) $\leq 0.005$<br>$R_{ins} \geq 50\%$ specified limit                     |
| Temperature<br>cycling                                                          | AEC-Q200:2010                   | $T_A$ = lower category temperature<br>$T_R$ = rated temperature<br>1000 cycles, duration $t=30$ min                                                                                                                                                                                                                                                                                                       | No visible damage<br>$ \Delta C/C_0  \leq 3\%$                                                                                                          |
| Surge test                                                                      | IEC 61071:2007                  | $1.1 \cdot V_R$ or $I_{test} = 1.1 I_{max.}$<br>Number of discharges: 5<br>Time lapse: every 2 min (10 min total)<br>within 5 min after the surge discharge<br>test<br><br>Duration: 10 s; $1.5 \cdot V_R$ at $T_A$                                                                                                                                                                                       | No visible damage<br>$ \Delta C/C_0  \leq 1\%$<br>$\tan \delta$ (10 kHz) $\leq 1.2$<br>initial $\tan \delta +0.0001$                                    |
| Self-healing                                                                    | IEC 61071:2007                  | $1.5 \cdot V_R$ ; duration 10 s<br>Number of clearings: $\leq 5$<br>Clearing = voltage drop of 5%<br>Increase the voltage at 100 V/s till<br>5 clearings occur with a maximum of<br>$2.5 \cdot V_R$ for a duration of 10 s                                                                                                                                                                                | $ \Delta C/C_0  \leq 0.5\%$<br>$\tan \delta$ (10 kHz) $\leq 1.12$<br>initial $\tan \delta +0.0001$                                                      |
| Environ-<br>mental                                                              | IEC 61071:2007                  | 1. Change of temperature acc. to<br>IEC 60068-2-14, test $N_b$<br>$T_{max.} = 85$ °C, $T_{min.} = -40$ °C,<br>Transition time:<br>1 h, equiv. to 1 °C/min, 5 cycles<br>2. Damp heat steady state acc. to<br>IEC 60068-2-78, test $C_a$<br>$T = 40$ °C $\pm 2$ °C, RH = 93% $\pm 3$ %,<br>Duration: 56 days<br>3. DC voltage between terminal,<br>$1.5 \cdot V_R$ at ambient temperature<br>Duration: 10 s | No puncturing or<br>flashover<br>Self-healing punctures<br>permitted<br>$ \Delta C/C_0  \leq 2\%$<br>Increase of<br>$\tan \delta$ (10 kHz) $\leq 0.015$ |
| Thermal<br>stability test<br>under<br>overload<br>conditions                    | IEC 61071:2007                  | Natural cooling $T_A \pm 5$ °C<br>$1.21 \cdot P_{max.} = (V_2/2) \cdot W_2 \cdot C \cdot \tan \delta =$<br>$1.21 \cdot (I_{max.}^2/W_2 \cdot C) \cdot \tan \delta_2$ with<br>$W_2 = 2 \cdot \pi \cdot f_2$ for $I_{max.}$<br>(see specific reference data)<br>$f_2 = 10$ kHz, duration 48 h<br>Measure the temperature every 1.5 h<br>during the last 6 h                                                 | Temperature rise $< 1$ °C<br>$ \Delta C/C_0  \leq 2\%$<br>Increase of<br>$\tan \delta$ (10 kHz) $\leq 1.2$<br>initial $\tan \delta +0.015$              |



| Test                            | Reference      | Conditions of test                                                                                                                                                                                                                                                                                                                                                       | Performance requirements                                                                            |
|---------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Endurance test between terminal | IEC 61071:2007 | Sequence:<br>$1.25 \cdot V_{RMS}$ at $T_{max.} = 85\text{ °C}$<br>$1.0 \cdot V_{RMS}$ at $T_{max.} = 105\text{ °C}$<br>Duration: 500 h<br>$1000 \times$ discharge at $1.4 \cdot I$<br>(max.repetitive peak current in continuous operation)<br>$1.25 \cdot V_{RMS}$ at $T_{max.} = 85\text{ °C}$<br>$1.0 \cdot V_{RMS}$ at $T_{max.} = 105\text{ °C}$<br>Duration: 500 h | $ \Delta C/C_0  \leq 3\%$<br>Increase of $\tan \delta$<br>$\leq 0.015$<br>compared to initial value |

## Mounting guidelines

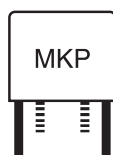
### 1 Soldering

#### 1.1 Solderability of leads

The solderability of terminal leads is tested to IEC 60068-2-20, test Ta, method 1.

Before a solderability test is carried out, terminals are subjected to accelerated ageing (to IEC 60068-2-2, test Ba: 4 h exposure to dry heat at 155 °C). Since the ageing temperature is far higher than the upper category temperature of the capacitors, the terminal wires should be cut off from the capacitor before the ageing procedure to prevent the solderability being impaired by the products of any capacitor decomposition that might occur.

|                         |                                                                            |
|-------------------------|----------------------------------------------------------------------------|
| Solder bath temperature | $235 \pm 5\text{ °C}$                                                      |
| Soldering time          | $2.0 \pm 0.5\text{ s}$                                                     |
| Immersion depth         | $2.0 +0/-0.5\text{ mm}$ from capacitor body or seating plane               |
| Evaluation criteria:    |                                                                            |
| Visual inspection       | Wetting of wire surface by new solder $\geq 90\%$ ,<br>free-flowing solder |



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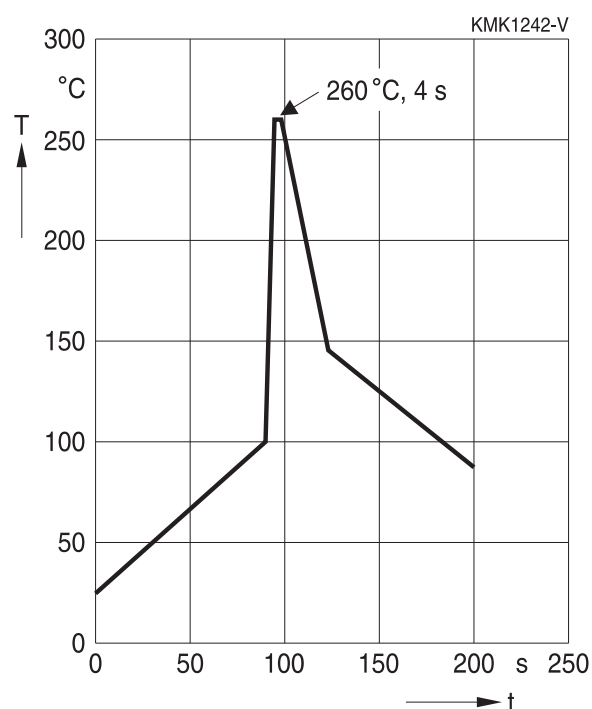
**MKP AC filtering**

## 1.2 Resistance to soldering heat

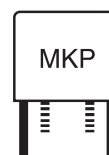
Resistance to soldering heat is tested to IEC 60068-2-20, test Tb, method 1.

Conditions:

| Series                                                                                          | Solder bath temperature | Soldering time                                                                                             |
|-------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------|
| MKT boxed (except $2.5 \times 6.5 \times 7.2$ mm)<br>coated<br>uncoated (lead spacing $>10$ mm) | $260 \pm 5$ °C          | $10 \pm 1$ s                                                                                               |
| MFP                                                                                             |                         |                                                                                                            |
| MKP (lead spacing $>7.5$ mm)                                                                    |                         |                                                                                                            |
| MKT boxed (case $2.5 \times 6.5 \times 7.2$ mm)                                                 |                         | $5 \pm 1$ s                                                                                                |
| MKP (lead spacing $\leq 7.5$ mm)                                                                |                         | $<4$ s                                                                                                     |
| MKT uncoated (lead spacing $\leq 10$ mm)<br>insulated (B32559)                                  |                         | recommended soldering<br>profile for MKT uncoated<br>(lead spacing $\leq 10$ mm) and<br>insulated (B32559) |



|                      |                                                                                     |
|----------------------|-------------------------------------------------------------------------------------|
| Immersion depth      | 2.0 +0/−0.5 mm from capacitor body or seating plane                                 |
| Shield               | Heat-absorbing board, (1.5 ±0.5) mm thick, between capacitor body and liquid solder |
| Evaluation criteria: |                                                                                     |
| Visual inspection    | No visible damage                                                                   |
| $\Delta C/C_0$       | 2% for MKT/MKP/MFP<br>5% for EMI suppression capacitors                             |
| $\tan \delta$        | As specified in sectional specification                                             |



### 1.3 General notes on soldering

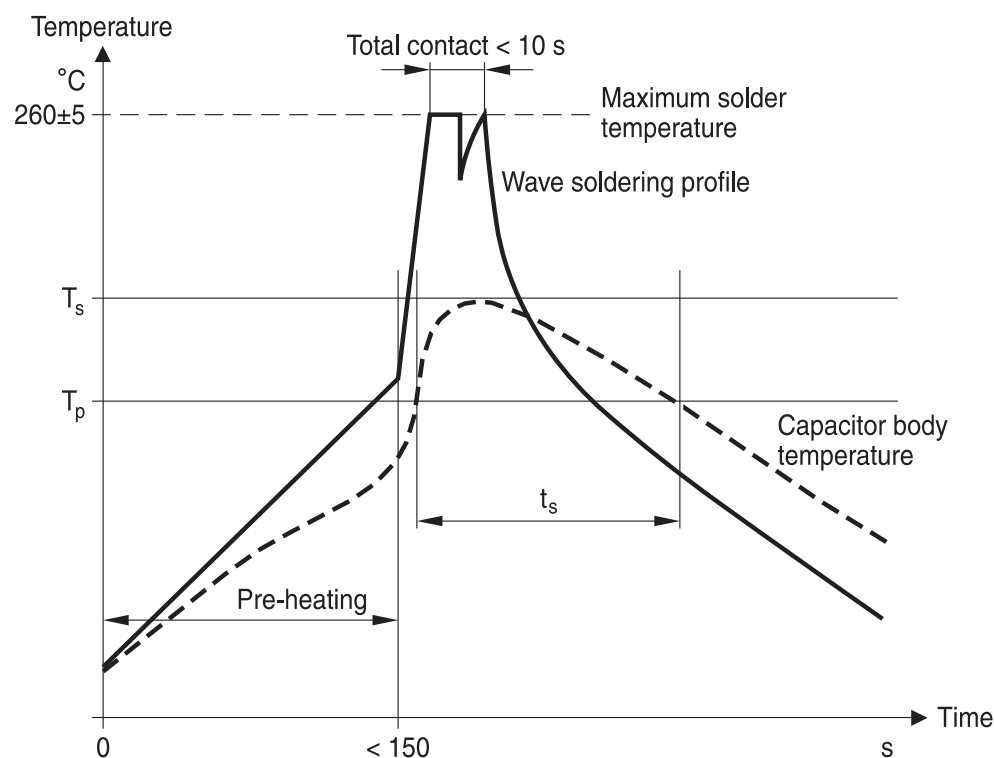
Permissible heat exposure loads on film capacitors are primarily characterized by the upper category temperature  $T_{max}$ . Long exposure to temperatures above this type-related temperature limit can lead to changes in the plastic dielectric and thus change irreversibly a capacitor's electrical characteristics. For short exposures (as in practical soldering processes) the heat load (and thus the possible effects on a capacitor) will also depend on other factors like:

- Pre-heating temperature and time
- Forced cooling immediately after soldering
- Terminal characteristics:  
diameter, length, thermal resistance, special configurations (e.g. crimping)
- Height of capacitor above solder bath
- Shadowing by neighboring components
- Additional heating due to heat dissipation by neighboring components
- Use of solder-resist coatings

The overheating associated with some of these factors can usually be reduced by suitable countermeasures. For example, if a pre-heating step cannot be avoided, an additional or reinforced cooling process may possibly have to be included.

### Recommendations

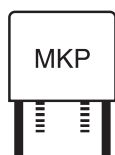
As a reference, the recommended wave soldering profile for our film capacitors is as follows:



$T_s$ : Capacitor body maximum temperature at wave soldering

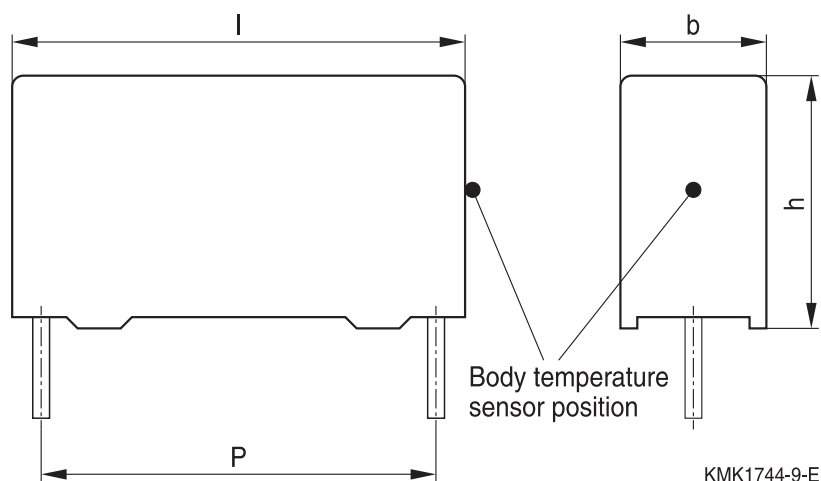
$T_p$ : Capacitor body maximum temperature at pre-heating

KMK1745-A-E



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**MKP AC filtering**



Body temperature should follow the description below:

- MKP capacitor
  - During pre-heating:  $T_p \leq 110\text{ °C}$
  - During soldering:  $T_s \leq 120\text{ °C}$ ,  $t_s \leq 45\text{ s}$
- MKT capacitor
  - During pre-heating:  $T_p \leq 125\text{ °C}$
  - During soldering:  $T_s \leq 160\text{ °C}$ ,  $t_s \leq 45\text{ s}$

When SMD components are used together with leaded ones, the film capacitors should not pass into the SMD adhesive curing oven. The leaded components should be assembled after the SMD curing step.

Leaded film capacitors are not suitable for reflow soldering.

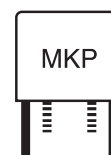
In order to ensure proper conditions for manual or selective soldering, the body temperature of the capacitor ( $T_s$ ) must be  $\leq 120\text{ °C}$ .

One recommended condition for manual soldering is that the tip of the soldering iron should be  $< 360\text{ °C}$  and the soldering contact time should be no longer than 3 seconds.

For uncoated MKT capacitors with lead spacings  $\leq 10\text{ mm}$  (B32560/B32561) the following measures are recommended:

- pre-heating to not more than  $110\text{ °C}$  in the preheater phase
- rapid cooling after soldering

Please refer to our Film Capacitors Data Book in case more details are needed.

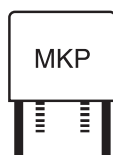


## Cautions and warnings

- Do not exceed the upper category temperature (UCT).
- Do not apply any mechanical stress to the capacitor terminals.
- Avoid any compressive, tensile or flexural stress.
- Do not move the capacitor after it has been soldered to the PC board.
- Do not pick up the PC board by the soldered capacitor.
- Do not place the capacitor on a PC board whose PTH hole spacing differs from the specified lead spacing.
- Do not exceed the specified time or temperature limits during soldering.
- Avoid external energy inputs, such as fire or electricity.
- Avoid overload of the capacitors.
- Consult us if application is with severe temperature and humidity condition.
- There are no serviceable or repairable parts inside the capacitor. Opening the capacitor or any attempts to open or repair the capacitor will void the warranty and liability of TDK Electronics.
- Please note that the standards referred to in this publication may have been revised in the meantime.

The table below summarizes the safety instructions that must always be observed. A detailed description can be found in the relevant sections of the chapters "General technical information" and "Mounting guidelines".

| Topic                   | Safety information                                                                                                                                                                                                                                                                                                                      | Reference chapter<br>"General technical<br>information" |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Storage conditions      | Make sure that capacitors are stored within the specified range of time, temperature and humidity conditions.                                                                                                                                                                                                                           | 4.5<br>"Storage conditions"                             |
| Flammability            | Avoid external energy, such as fire or electricity (passive flammability), avoid overload of the capacitors (active flammability) and consider the flammability of materials.                                                                                                                                                           | 5.3<br>"Flammability"                                   |
| Resistance to vibration | Do not exceed the tested ability to withstand vibration. The capacitors are tested to IEC 60068-2-6:2007. TDK Electronics offers film capacitors specially designed for operation under more severe vibration regimes such as those found in automotive applications. Consult our catalog "Film Capacitors for Automotive Electronics". | 5.2<br>"Resistance to vibration"                        |



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**MKP AC filtering**

| Topic                                          | Safety information                                                                                                                                                                                                | Reference chapter<br>"Mounting guidelines"         |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Soldering                                      | Do not exceed the specified time or temperature limits during soldering.                                                                                                                                          | 1 "Soldering"                                      |
| Cleaning                                       | Use only suitable solvents for cleaning capacitors.                                                                                                                                                               | 2 "Cleaning"                                       |
| Embedding of capacitors in finished assemblies | When embedding finished circuit assemblies in plastic resins, chemical and thermal influences must be taken into account.<br>Caution: Consult us first, if you also wish to embed other uncoated component types! | 3 "Embedding of capacitors in finished assemblies" |

### Display of ordering codes for TDK Electronics products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.

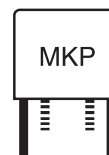
Detailed information can be found on the Internet under  
[www.tdk-electronics.tdk.com/orderingcodes](http://www.tdk-electronics.tdk.com/orderingcodes).

### Correlation of data sheet values and modelling tool outputs

Data sheet values and results of design tools may deviate as they have not been derived in the same context.

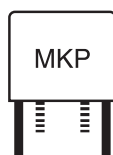
While data sheets show individual parameter statements without considering a possible dependency to other parameters. Tools model a complete given scenario as input and processed inside the tool.

Furthermore as we constantly strive to improve our models, the results of tools can change over time and be a non-binding indication only.



## Symbols and terms

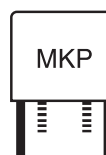
| Symbol               | English                                                                   | German                                                                          |
|----------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| $\alpha$             | Heat transfer coefficient                                                 | Wärmeübergangszahl                                                              |
| $\alpha_C$           | Temperature coefficient of capacitance                                    | Temperaturkoeffizient der Kapazität                                             |
| A                    | Capacitor surface area                                                    | Kondensatoroberfläche                                                           |
| $\beta_C$            | Humidity coefficient of capacitance                                       | Feuchtekoeffizient der Kapazität                                                |
| C                    | Capacitance                                                               | Kapazität                                                                       |
| $C_R$                | Rated capacitance                                                         | Nennkapazität                                                                   |
| $\Delta C$           | Absolute capacitance change                                               | Absolute Kapazitätsänderung                                                     |
| $\Delta C/C$         | Relative capacitance change (relative deviation of actual value)          | Relative Kapazitätsänderung (relative Abweichung vom Ist-Wert)                  |
| $\Delta C/C_R$       | Capacitance tolerance (relative deviation from rated capacitance)         | Kapazitätstoleranz (relative Abweichung vom Nennwert)                           |
| dt                   | Time differential                                                         | Differentielle Zeit                                                             |
| $\Delta t$           | Time interval                                                             | Zeitintervall                                                                   |
| $\Delta T$           | Absolute temperature change (self-heating)                                | Absolute Temperaturänderung (Selbsterwärmung)                                   |
| $\Delta \tan \delta$ | Absolute change of dissipation factor                                     | Absolute Änderung des Verlustfaktors                                            |
| $\Delta V$           | Absolute voltage change                                                   | Absolute Spannungsänderung                                                      |
| dV/dt                | Time differential of voltage function (rate of voltage rise)              | Differentielle Spannungsänderung (Spannungsflankensteilheit)                    |
| $\Delta V/\Delta t$  | Voltage change per time interval                                          | Spannungsänderung pro Zeitintervall                                             |
| E                    | Activation energy for diffusion                                           | Aktivierungsenergie zur Diffusion                                               |
| ESL                  | Self-inductance                                                           | Eigeninduktivität                                                               |
| ESR                  | Equivalent series resistance                                              | Ersatz-Serienwiderstand                                                         |
| f                    | Frequency                                                                 | Frequenz                                                                        |
| $f_1$                | Frequency limit for reducing permissible AC voltage due to thermal limits | Grenzfrequenz für thermisch bedingte Reduzierung der zulässigen Wechselspannung |
| $f_2$                | Frequency limit for reducing permissible AC voltage due to current limit  | Grenzfrequenz für strombedingte Reduzierung der zulässigen Wechselspannung      |
| $f_r$                | Resonant frequency                                                        | Resonanzfrequenz                                                                |
| $F_D$                | Thermal acceleration factor for diffusion                                 | Therm. Beschleunigungsfaktor zur Diffusion                                      |
| $F_T$                | Derating factor                                                           | Deratingfaktor                                                                  |
| i                    | Current (peak)                                                            | Stromspitze                                                                     |
| $I_C$                | Category current (max. continuous current)                                | Kategoriestrom (max. Dauerstrom)                                                |



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## MKP AC filtering

| Symbol           | English                                                  | German                                            |
|------------------|----------------------------------------------------------|---------------------------------------------------|
| $I_{RMS}$        | (Sinusoidal) alternating current, root-mean-square value | (Sinusförmiger) Wechselstrom                      |
| $i_z$            | Capacitance drift                                        | Inkonstanz der Kapazität                          |
| $k_0$            | Pulse characteristic                                     | Impulskennwert                                    |
| $L_S$            | Series inductance                                        | Serieninduktivität                                |
| $\lambda$        | Failure rate                                             | Ausfallrate                                       |
| $\lambda_0$      | Constant failure rate during useful service life         | Konstante Ausfallrate in der Nutzungsphase        |
| $\lambda_{test}$ | Failure rate, determined by tests                        | Experimentell ermittelte Ausfallrate              |
| $P_{diss}$       | Dissipated power                                         | Abgegebene Verlustleistung                        |
| $P_{gen}$        | Generated power                                          | Erzeugte Verlustleistung                          |
| $Q$              | Heat energy                                              | Wärmeenergie                                      |
| $\rho$           | Density of water vapor in air                            | Dichte von Wasserdampf in Luft                    |
| $R$              | Universal molar constant for gases                       | Allg. Molarkonstante für Gas                      |
| $R$              | Ohmic resistance of discharge circuit                    | Ohmscher Widerstand des Entladekreises            |
| $R_i$            | Internal resistance                                      | Innenwiderstand                                   |
| $R_{ins}$        | Insulation resistance                                    | Isolationswiderstand                              |
| $R_P$            | Parallel resistance                                      | Parallelwiderstand                                |
| $R_S$            | Series resistance                                        | Serienwiderstand                                  |
| $S$              | severity (humidity test)                                 | Schärfegrad (Feuchtetest)                         |
| $t$              | Time                                                     | Zeit                                              |
| $T$              | Temperature                                              | Temperatur                                        |
| $\tau$           | Time constant                                            | Zeitkonstante                                     |
| $\tan \delta$    | Dissipation factor                                       | Verlustfaktor                                     |
| $\tan \delta_D$  | Dielectric component of dissipation factor               | Dielektrischer Anteil des Verlustfaktors          |
| $\tan \delta_P$  | Parallel component of dissipation factor                 | Parallelanteil des Verlustfaktors                 |
| $\tan \delta_S$  | Series component of dissipation factor                   | Serienanteil des Verlustfaktors                   |
| $T_A$            | Temperature of the air surrounding the component         | Temperatur der Luft, die das Bauteil umgibt       |
| $T_{max}$        | Upper category temperature                               | Obere Kategorietemperatur                         |
| $T_{min}$        | Lower category temperature                               | Untere Kategorietemperatur                        |
| $t_{OL}$         | Operating life at operating temperature and voltage      | Betriebszeit bei Betriebstemperatur und -spannung |
| $T_{op}$         | Operating temperature, $T_A + \Delta T$                  | Betriebstemperatur, $T_A + \Delta T$              |
| $T_R$            | Rated temperature                                        | Nenntemperatur                                    |
| $T_{ref}$        | Reference temperature                                    | Referenztemperatur                                |
| $t_{SL}$         | Reference service life                                   | Referenz-Lebensdauer                              |



| Symbol      | English                                                     | German                                      |
|-------------|-------------------------------------------------------------|---------------------------------------------|
| $V_{AC}$    | AC voltage                                                  | Wechselspannung                             |
| $V_C$       | Category voltage                                            | Kategoriespannung                           |
| $V_{C,RMS}$ | Category AC voltage                                         | (Sinusförmige)<br>Kategorie-Wechselspannung |
| $V_{CD}$    | Corona-discharge onset voltage                              | Teilentlade-Einsatzspannung                 |
| $V_{ch}$    | Charging voltage                                            | Ladespannung                                |
| $V_{DC}$    | DC voltage                                                  | Gleichspannung                              |
| $V_{FB}$    | Fly-back capacitor voltage                                  | Spannung (Flyback)                          |
| $V_i$       | Input voltage                                               | Eingangsspannung                            |
| $V_o$       | Output voltage                                              | Ausgangsspannung                            |
| $V_{op}$    | Operating voltage                                           | Betriebsspannung                            |
| $V_p$       | Peak pulse voltage                                          | Impuls-Spitzenspannung                      |
| $V_{pp}$    | Peak-to-peak voltage Impedance                              | Spannungshub                                |
| $V_R$       | Rated voltage                                               | Nennspannung                                |
| $\hat{V}_R$ | Amplitude of rated AC voltage                               | Amplitude der Nenn-Wechselspannung          |
| $V_{RMS}$   | (Sinusoidal) alternating voltage,<br>root-mean-square value | (Sinusförmige) Wechselspannung              |
| $V_{SC}$    | S-correction voltage                                        | Spannung bei Anwendung "S-correction"       |
| $V_{sn}$    | Snubber capacitor voltage                                   | Spannung bei Anwendung<br>"Beschaltung"     |
| $Z$         | Impedance                                                   | Scheinwiderstand                            |
| $e$         | Lead spacing                                                | Rastermaß                                   |

## Important notes

The following applies to all products named in this publication:

1. 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, we are 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 a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **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.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.tdk-electronics.tdk.com/material](http://www.tdk-electronics.tdk.com/material)). Should you have any more detailed questions, please contact our sales offices.
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6. Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply**.

## Important notes

7. **Our manufacturing sites serving the automotive business apply the IATF 16949 standard.** The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements ("CSR") TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System.** For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.
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