



Metallized Polyester Film Capacitors (MKT-S)

Series/Type: **B32538**

The following products presented in this data sheet are being withdrawn.

| Ordering Code | Substitute Product | Date of Withdrawal | Deadline Last Orders | Last Shipments |
|---------------|--------------------|--------------------|----------------------|----------------|
| B32538* | B32537 | 2007-02-09 | 2007-03-31 | 2007-09-30 |

For further information please contact your nearest EPCOS sales office, which will also support you in selecting a suitable substitute. The addresses of our worldwide sales network are presented at www.epcos.com/sales.

High reliability (wound)
Typical applications

- Test and measurement equipment
- Rough environments

Climatic

- Max. operating temperature: 125 °C
- Climatic category (IEC 60068-1): 55/100/56

Features

- Optimum self-healing capability
- Excellent short circuit protection
- Very high reliability

Construction

- Dielectric: polyethylene terephthalate (polyester, PET)
- Construction with structured metallization
- Tubular winding
- Insulating sleeve
- Face ends sealed with epoxy resin

Terminals

- Central axial leads, lead-free tinned

Marking

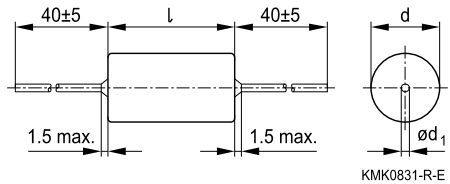
Manufacturer's logo,
 style(MKT-S), rated capacitance (coded),
 capacitance tolerance (code letter),
 rated voltage, date of manufacture (coded)

Delivery mode

Bulk (untaped)

Taped (Ammo pack)

For notes on taping, refer to chapter "Taping and packing".

Dimensional drawing


Dimensions in mm

| | | | |
|---------------------|------|------------|-----|
| Diameter d | <7.8 | 7.8 ... 16 | >16 |
| Lead diameter d_1 | 0.6 | 0.8 | 1.0 |

When bending leads take care to leave a clearance of 1 mm to the capacitor body.



Overview of types

| Type | B32538 | | | | |
|------------------|--------|-----|-----|-----|-----|
| V_R (VDC) | 50 | 100 | 160 | 250 | 630 |
| V_{rms} (VAC) | 20 | 35 | 60 | 90 | 200 |
| C_R (μ F) | | | | | |
| 0.033 | | | | | |
| 0.047 | | | | | |
| 0.068 | | | | | |
| 0.10 | | | | | |
| 0.15 | | | | | |
| 0.22 | | | | | |
| 0.33 | | | | | |
| 0.47 | | | | | |
| 0.68 | | | | | |
| 1.0 | | | | | |
| 1.5 | | | | | |
| 2.2 | | | | | |
| 3.3 | | | | | |
| 4.7 | | | | | |
| 6.8 | | | | | |
| 10 | | | | | |
| 22 | | | | | |
| 47 | | | | | |
| 100 | | | | | |

Ordering codes and packing units

| V_R | V_{rms} $f \leq 60 \text{ Hz}$ | C_R | Max. dimensions $d \times l$ mm | Ordering code (composition see below) | Ammo pack pcs./unit | Untaped pcs./unit |
|-------|-------------------------------------|---------------|---------------------------------------|---|------------------------|----------------------|
| VDC | VAC | μF | | | | |
| 50 | 20 | 0.47 | 6.1 × 16.0 | B32538B5474+*** | 1100 | 50 |
| | | 0.68 | 6.3 × 16.0 | B32538B5684+*** | 1000 | 50 |
| | | 1.0 | 6.9 × 16.0 | B32538B5105+*** | 950 | 50 |
| | | 1.5 | 7.6 × 16.0 | B32538B5155+*** | 870 | 50 |
| | | 2.2 | 7.4 × 20.0 | B32538B5225+*** | 900 | 50 |
| | | 3.3 | 8.2 × 20.0 | B32538B5335+*** | 800 | 50 |
| | | 4.7 | 9.3 × 20.0 | B32538B5475+*** | 700 | 20 |
| | | 6.8 | 10.8 × 20.0 | B32538B5685+*** | 400 | 20 |
| | | 10 | 12.6 × 20.0 | B32538B5106+*** | 350 | 20 |
| 100 | 35 | 0.10 | 6.2 × 16.0 | B32538B1104+*** | 1000 | 50 |
| | | 0.15 | 6.4 × 16.0 | B32538B1154+*** | 1000 | 50 |
| | | 0.22 | 6.9 × 16.0 | B32538B1224+*** | 950 | 50 |
| | | 0.33 | 7.0 × 16.0 | B32538B1334+*** | 950 | 50 |
| | | 0.47 | 6.7 × 16.0 | B32538B1474+*** | 950 | 50 |
| | | 0.68 | 6.7 × 16.0 | B32538B1684+*** | 950 | 50 |
| | | 1.0 | 6.7 × 20.0 | B32538B1105+*** | 950 | 50 |
| | | 1.5 | 7.4 × 20.0 | B32538B1155+*** | 900 | 50 |
| | | 2.2 | 8.0 × 20.0 | B32538B1225+*** | 800 | 50 |
| | | 3.3 | 9.2 × 20.0 | B32538B1335+*** | 700 | 20 |
| | | 4.7 | 10.4 × 20.0 | B32538B1475+*** | 400 | 20 |
| | | 6.8 | 9.0 × 32.5 | B32538B1685+*** | 700 | 20 |
| | | 10 | 10.7 × 32.5 | B32538B1106+*** | 400 | 20 |
| | | 22 | 14.6 × 32.5 | B32538B1226+*** | PU on request | 20 |
| | | 47 | 20.2 × 32.5 | B32538B1476+*** | PU on request | 20 |
| | | 100 | 28.2 × 32.5 | B32538B1107+*** | PU on request | 20 |

Further E series and intermediate capacitance values on request.

Composition of ordering code

+ = Capacitance tolerance code:

M = ±20%

K = ±10%

*** = Packaging code:

007 = Ammo pack

000 = Untaped

Ordering codes and packing units

| V_R | V_{rms} $f \leq 60$ Hz VAC | C_R μF | Max. dimensions $d \times l$ mm | Ordering code (composition see below) | Ammo pack pcs./unit | Untaped pcs./unit |
|-------|------------------------------------|------------------|---------------------------------------|---|------------------------|----------------------|
| 160 | 60 | 0.10 | 6.1×16.0 | B32538B2104+*** | 1100 | 50 |
| | | 0.15 | 6.2×16.0 | B32538B2154+*** | 1000 | 50 |
| | | 0.22 | 6.4×16.0 | B32538B2224+*** | 1000 | 50 |
| | | 0.33 | 7.0×16.0 | B32538B2334+*** | 950 | 50 |
| | | 0.47 | 6.9×20.0 | B32538B2474+*** | 950 | 50 |
| | | 0.68 | 7.5×20.0 | B32538B2684+*** | 870 | 50 |
| | | 1.0 | 8.3×20.0 | B32538B2105+*** | 800 | 50 |
| | | 1.5 | 10.5×20.0 | B32538B2155+*** | 400 | 20 |
| | | 2.2 | 11.0×20.0 | B32538B2225+*** | 400 | 20 |
| | | 3.3 | 10.0×32.5 | B32538B2335+*** | 450 | 20 |
| | | 4.7 | 11.3×32.5 | B32538B2475+*** | 380 | 20 |
| | | 6.8 | 13.1×32.5 | B32538B2685+*** | PU on request | 20 |
| | | 10 | 15.3×32.5 | B32538B2106+*** | PU on request | 20 |
| 250 | 90 | 0.10 | 6.7×16.0 | B32538B3104+*** | 950 | 50 |
| | | 0.15 | 7.2×16.0 | B32538B3154+*** | 900 | 50 |
| | | 0.22 | 7.3×16.0 | B32538B3224+*** | 900 | 50 |
| | | 0.33 | 7.3×20.0 | B32538B3334+*** | 900 | 50 |
| | | 0.47 | 8.0×20.0 | B32538B3474+*** | 800 | 50 |
| | | 0.68 | 9.0×20.0 | B32538B3684+*** | 700 | 20 |
| | | 1.0 | 10.3×20.0 | B32538B3105+*** | 400 | 20 |
| | | 1.5 | 12.0×20.0 | B32538B3155+*** | 380 | 20 |
| | | 2.2 | 14.0×20.0 | B32538B3225+*** | 300 | 20 |
| | | 3.3 | 12.6×32.5 | B32538B3335+*** | 350 | 20 |
| | | 4.7 | 14.5×32.5 | B32538B3475+*** | PU on request | 20 |
| | | 6.8 | 17.0×32.5 | B32538B3685+*** | PU on request | 20 |
| | | 10 | 20.1×32.5 | B32538B3106+000 | — | 20 |

Further E series and intermediate capacitance values on request.

Composition of ordering code

+ = Capacitance tolerance code:
M = $\pm 20\%$
K = $\pm 10\%$

*** = Packaging code:
007 = Ammo pack
000 = Untaped

Ordering codes and packing units

| V_R | V_{rms} $f \leq 60$ Hz | C_R | Max. dimensions $d \times l$ mm | Ordering code (composition see below) | Ammo pack pcs./unit | Untaped pcs./unit |
|-------|-----------------------------|-----------------|---------------------------------------|---|------------------------|----------------------|
| VDC | VAC | μF | | | | |
| 630 | 200 | 0.033 | 6.7×16.0 | B32538B8333+*** | 950 | 50 |
| | | 0.047 | 7.3×16.0 | B32538B8473+*** | 900 | 50 |
| | | 0.068 | 7.2×20.0 | B32538B8683+*** | 900 | 50 |
| | | 0.10 | 7.9×20.0 | B32538B8104+*** | 800 | 50 |
| | | 0.15 | 9.0×20.0 | B32538B8154+*** | 700 | 20 |
| | | 0.22 | 10.5×20.0 | B32538B8224+*** | 400 | 20 |
| | | 0.33 | 12.0×20.0 | B32538B8334+*** | 380 | 20 |
| | | 0.47 | 13.9×20.0 | B32538B8474+*** | 300 | 20 |
| | | 0.68 | 12.3×32.5 | B32538B8684+*** | 350 | 20 |
| | | 1.0 | 14.3×32.5 | B32538B8105+*** | PU on request | 20 |
| | | 1.5 | 17.0×32.5 | B32538B8155+*** | PU on request | 20 |
| | | 2.2 | 20.0×32.5 | B32538B8225+000 | – | 20 |
| | | 3.3 | 23.9×32.5 | B32538B8335+000 | – | 20 |
| 4.7 | 28.1×32.5 | B32538B8475+000 | – | 20 | | |

Further E series and intermediate capacitance values on request.

Composition of ordering code

+ = Capacitance tolerance code:

M = $\pm 20\%$

K = $\pm 10\%$

*** = Packaging code:

007 = Ammo pack

000 = Untaped

Technical data

| | | | | | |
|--|--|---|--|--|----------|
| Operating temperature range | Max. operating temperature $T_{op,max}$ +125 °C | | | | |
| | Upper category temperature T_{max} +100 °C | | | | |
| | Lower category temperature T_{min} -55 °C | | | | |
| | Rated temperature T_R +85 °C | | | | |
| Dissipation factor $\tan \delta$ (in 10^{-3}) at 20 °C (upper limit values) | C_R (μ F) | ≤ 0.47 | $0.47 < C_R \leq 4.7$ | $4.7 < C_R \leq 10.0$ | > 10.0 |
| | at 1 kHz | 7 | 8 | 8 | 10 |
| | at 10 kHz | 15 | 22 | 25 | – |
| Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$ at 20 °C, rel. humidity $\leq 65\%$ (minimum as-delivered values) | C_R | | | | |
| | $\leq 0.33 \mu$ F | $> 15000 \text{ M}\Omega$ | | | |
| | $> 0.33 \mu$ F | $> 5000 \text{ s}$ | | | |
| DC test voltage | $1.4 \cdot V_R, 2 \text{ s}$ | | | | |
| Category voltage V_C (continuous operation with V_{DC} or V_{AC} at $f \leq 60 \text{ Hz}$) | T_A (°C) | DC voltage derating | | AC voltage derating | |
| | $T_A \leq 85$ $85 < T_A \leq 100$ | $V_C = V_R$ $V_C = V_R \cdot (165 - T_A)/80$ | | $V_{C,rms} = V_{rms}$ $V_{C,rms} = V_{rms} \cdot (165 - T_A)/80$ | |
| Operating voltage V_{op} for short operating periods (V_{DC} or V_{AC} at $f \leq 60 \text{ Hz}$) | T_A (°C) | DC voltage (max. hours) | | AC voltage (max. hours) | |
| | $T_A \leq 100$ $100 < T_A \leq 125$ | $V_{op} = 1.25 \cdot V_C$ (2000 h) $V_{op} = 0.5 \cdot V_R$ (1000 h) | | $V_{op} = 1.0 \cdot V_{C,rms}$ (2000 h) $V_{op} = 0.5 \cdot V_{rms}$ (1000 h) | |
| Damp heat test Limit values after damp heat test | 56 days/40 °C/93% relative humidity | | | | |
| | Capacitance change $ \Delta C/C $ | | $\leq 5\%$ | | |
| | Dissipation factor change $\Delta \tan \delta$ | | $\leq 5 \cdot 10^{-3}$ (at 1 kHz) | | |
| | Insulation resistance R_{ins} | | $\geq 50\%$ of minimum as-delivered values | | |
| Reliability: Failure rate λ Service life t_{SL} | 1 fit ($\leq 1 \cdot 10^{-9}/\text{h}$) at $0.5 \cdot V_R, 40 \text{ °C}$ 200 000 h at $1.0 \cdot V_R, 40 \text{ °C}$ For conversion to other operating conditions and temperatures, refer to chapter "Quality assurance", page . | | | | |
| Failure criteria: Total failure Failure due to variation of parameters | Short circuit or open circuit | | | | |
| | Capacitance change $ \Delta C/C $ | | $> 10\%$ | | |
| | Dissipation factor $\tan \delta$ | | $> 1.5 \cdot$ upper limit value | | |
| | Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$ | | $< 150 \text{ M}\Omega$ ($C_R \leq 0.33 \mu$ F) $< 50 \text{ s}$ ($C_R > 0.33 \mu$ F) | | |

Pulse handling capability

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

"k₀" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V²/ μ s.

Note:

The values of dV/dt and k₀ provided below must not be exceeded in order to avoid damaging the capacitor.

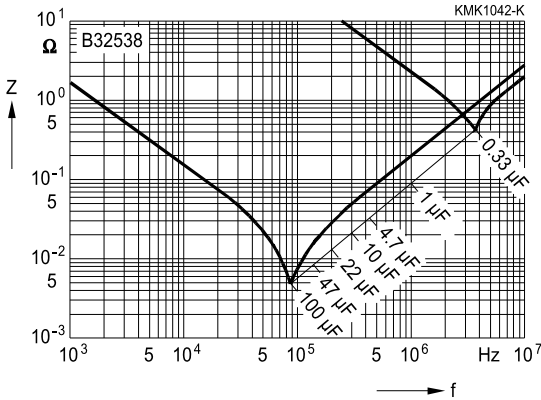
dV/dt values

| Length of capacitor | | 16 mm | 20 mm | 32.5 mm |
|-----------------------|-------------------------|---------------------|-------|---------|
| V _R VDC | V _{rms} VAC | dV/dt in V/ μ s | | |
| 50 | 20 | 2.5 | 1.5 | – |
| 100 | 35 | 13 | 9 | 6 |
| 160 | 60 | 20 | 12 | 8 |
| 250 | 90 | 23 | 16 | 10 |
| 630 | 200 | 40 | 26 | 18 |

k₀ values

| Length of capacitor | | 16 mm | 20 mm | 32.5 mm |
|-----------------------|-------------------------|--|--------|---------|
| V _R VDC | V _{rms} VAC | k ₀ in V ² / μ s | | |
| 50 | 20 | 250 | 150 | – |
| 100 | 35 | 2 600 | 1 800 | 1 200 |
| 160 | 60 | 6 400 | 3 840 | 2 560 |
| 250 | 90 | 11 500 | 8 000 | 5 000 |
| 630 | 200 | 50 400 | 32 800 | 22 700 |

Impedance Z versus frequency f
(typical values)



Permissible AC voltage V_{rms} versus frequency f

Values can be obtained on request. In specific cases please provide a scaled voltage/ time graph and state operating conditions.