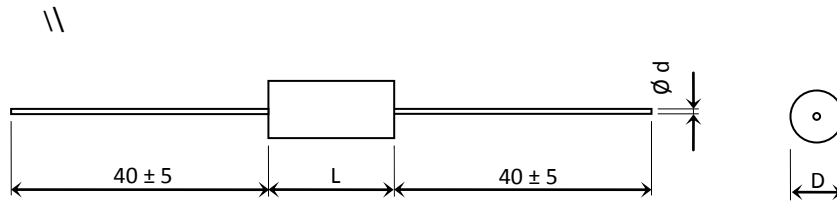


Type MCM

Polyester capacitors



$D \leq 6 = \text{Ø } d \ 0.6$
 $D > 6.5 = \text{Ø } d \ 0.8$
 $L \geq 44 = \text{Ø } d \ 1$
 Version 4 leads also available

All dimensions are in mm

GENERAL TECHNICAL DATA

| | |
|---------------------|---|
| Dielectric | polyester film |
| Plates | aluminium layer deposited by evaporation under vacuum |
| Winding | non-inductive type |
| Leads | tinned copper wire |
| Construction | axial leads, cylindrical type |
| Protection | polyester wrapping sealed with epoxy resin |
| Marking | manufacturer's name or logo, type, capacitance, tolerance, D.C. rated voltage and manufacturing date code |
| Climatic category | 55/100/56 IEC 60068-1 |
| Standard references | IEC 60384-2 |

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr) 63 Vdc - 100 Vdc - 250 Vdc - 400 Vdc - 630 Vdc - 1000 Vdc

Category voltage (Vc) up to 85 °C Vc = Vr

For temperature between +85 °C and +100 °C a decreasing factor of 1.25% per degree °C on the rated voltage (dc and ac) has to be applied

Capacitance values normal values in compliance with IEC standard series
E6 - E12 - E24 - E48 - E96 (IEC 60063 Norm)
Other values available upon request

Capacitance tolerances ±5% (J) ; ±10% (K) ; ±20% (M) measured at 1 kHz

Total self-inductance (L) max 1 nH per 1 mm lead and capacitor length

Dissipation factor (tgδ) ≤ 80 x 10⁻⁴ at 1 kHz for C ≤ 1µF

At +25°C ±5°C ≤ 100 x 10⁻⁴ at 1 kHz for C > 1µF

Insulation resistance for Vr > 100 Vdc: ≥ 30000 MΩ for C ≤ 0.33 µF
≥ 10000 s for C > 0.33 µF
for Vr ≤ 100 Vdc: ≥ 3750 MΩ for C ≤ 0.33 µF
≥ 1250 s for C > 0.33 µF

Test conditions

Temperature: +25°C ±5°C

Voltage charge time: 1 min

Voltage charge: 50V for Vr<100Vdc and 100V for Vr≥100Vdc

Test voltage between terminals

1.6 x Vr applied for 2 s at 25°C ± 5 °C.

L max (mm)

| Maximum pulse rise time (V/µs) | Vr | ≤14.5 | 18.5 | 27 | 34 | 40 | 59 |
|--------------------------------|------|-------|------|-----|----|----|----|
| 63 | 4 | 2 | 1.5 | 1 | | | |
| 100 | 5 | 3 | 2 | 1 | 1 | | |
| 250 | 10 | 7 | 4 | 2.5 | 2 | | |
| 400 | 13.5 | 10 | 6.5 | 4 | 3 | | |
| 630 | 20 | 15 | 10 | 6 | 4 | 2 | |
| 1000 | 50 | 30 | 15 | 10 | 8 | 6 | |

If the working voltage (V) is lower than the rated voltage (Vr), the capacitor can work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value with the ratio Vr/V

Reliability

at temperature +40 °C and voltage applied 0.5 x Vr

Failure rate ≤ 1 FIT

(1 Fit = 1 x 10⁻⁹ failure/comp. x h)

Failure criteria short or open circuit

capacitance change |ΔC/C| >10%;

dissipation factor change Δ tgδ > 2 x initial limit

insulation resistance > 0.005 x initial limit

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| QUALITY TEST | |
|---------------------|--|
| Damp heat test | at temperature + 40 °C ± 2°C, RH 93% ± 2% , test duration 56 days capacitance change $ \Delta C/C \leq 5\%$ dissipation factor change $\Delta \text{tg}\delta \leq 50 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit |
| Long term stability | at standard environmental conditions after 2 years capacitance change $ \Delta C/C $ $\leq 3\%$ for $C \leq 0.1 \mu\text{F}$ $\leq 2\%$ for $C > 0.1 \mu\text{F}$ |
| Soldering | test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen) capacitance change $ \Delta C/C \leq 2\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ for $C \leq 1 \mu\text{F}$ at 10 kHz $\leq 20 \times 10^{-4}$ for $C > 1 \mu\text{F}$ at 1 kHz insulation resistance \geq initial limit |
| Life test | at temperature +85 °C ± 2° C , voltage applied 1.25 x Vr(d.c.), test duration 2000 h capacitance change $ \Delta C/C \leq 5\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ for $C \leq 1 \mu\text{F}$ at 10 kHz $\leq 20 \times 10^{-4}$ for $C > 1 \mu\text{F}$ at 1 kHz insulation resistance $\geq 50\%$ initial limit |

| Rated Capacitance | 63 Vdc - 40 Vac | | 100 Vdc - 63 Vac | | 250 Vdc - 160 Vac | | 400 Vdc - 200 Vac | | 630 Vdc - 220 Vac* | | 1000 Vdc - 250 Vac* | |
|-------------------|-----------------|----|------------------|----|-------------------|----|-------------------|----|--------------------|----|---------------------|----|
| | D | L | D | L | D | L | D | L | D | L | D | L |
| 1000 pF | | | | | | | | | | | 5 | 13 |
| 1500 | | | | | | | | | | | 5 | 13 |
| 2200 | | | | | | | | | | | 5 | 13 |
| 3300 | | | | | | | | | 5.5 | 11 | 5 | 13 |
| 4700 | | | | | | | 5 | 11 | 5.5 | 13 | 5.5 | 13 |
| 6800 | | | | | | | 5 | 11 | 5.5 | 13 | 6 | 13 |
| 0.01 μF | | | | | | | 5 | 11 | 5.5 | 13 | 6 | 17 |
| 0.015 | | | | | | | 6 | 11 | 6 | 13 | 6.5 | 17 |
| 0.022 | | | | | | | 5 | 13 | 6 | 13 | 8.5 | 17 |
| 0.033 | | | | | 6 | 11 | 5 | 13 | 7 | 17 | 7 | 25 |
| 0.047 | | | | | 6 | 13 | 6 | 13 | 8 | 17 | 8 | 25 |
| 0.068 | | | | | 6 | 13 | 7 | 13 | 9 | 17 | 9 | 25 |
| 0.1 | 5.5 | 11 | 6 | 11 | 6 | 13 | 7 | 17 | 10 | 17 | 11 | 25 |
| 0.15 | 6.5 | 11 | 5 | 13 | 6.5 | 13 | 9 | 17 | 8.5 | 25 | 12 | 32 |
| 0.22 | 6 | 13 | 6 | 13 | 7 | 17 | 7 | 25 | 11 | 25 | 14 | 32 |
| 0.33 | 6.5 | 13 | 6 | 17 | 8 | 17 | 8.5 | 25 | 13 | 25 | 17 | 32 |
| 0.47 | 7 | 13 | 7 | 17 | 9 | 17 | 9.5 | 25 | 14 | 32 | 20 | 32 |
| 0.68 | 6 | 17 | 8.5 | 17 | 8 | 25 | 11 | 32 | 16 | 32 | 24 | 32 |
| 1 | 7 | 17 | 10 | 17 | 10 | 25 | 13 | 32 | 20 | 32 | 23 | 44 |
| 1.5 | 8 | 17 | 8 | 25 | 10 | 32 | 16 | 32 | 24 | 32 | 28 | 44 |
| 2.2 | 8 | 25 | 10 | 25 | 12 | 32 | 20 | 32 | 30 | 32 | 33 | 57 |
| 3.3 | 9 | 25 | 11 | 25 | 14 | 32 | 24 | 32 | 28 | 44 | | |
| 4.7 | 12 | 25 | 12 | 32 | 17 | 32 | 22 | 44 | 30 | 57 | | |
| 6.8 | 13 | 32 | 15 | 32 | 22 | 32 | 26 | 44 | | | | |
| 10 | 15.5 | 32 | 18 | 32 | 25 | 32 | | | | | | |
| 15 | 19 | 32 | 22 | 32 | 24 | 44 | | | | | | |
| 15 | | | 16 | 44 | | | | | | | | |
| 22 | 22 | 32 | 25 | 32 | 30 | 44 | | | | | | |
| 22 | | | 19 | 44 | | | | | | | | |

All dimension are in mm

* Not suitable for across-the-line applications

| DIMENSION TOLERANCE | | |
|---------------------|-----|-----|
| L | L± | D± |
| 10 | 1 | 1 |
| 13 | 1.5 | 1 |
| 17 | 1.5 | 1.5 |
| 25 | 2 | 1.5 |
| 32 | 2 | 2 |
| 44 | 2 | 2 |
| 57 | 2 | 2 |