

| | | | | |
|----------|-----|--------|---------|------|
| D max | 5 | >5 ≤ 7 | >7 < 16 | ≥ 16 |
| Ød ±0.05 | 0.5 | 0.6 | 0.8 | 1 |

All dimensions are in mm.

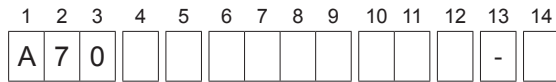
**METALLIZED POLYPROPYLENE CAPACITOR
MULTIPURPOSE APPLICATIONS**

Typical applications: temperature compensation circuits, timing, oscillator circuits, power factor correction and coupling capacitor in SMPS applications.

PRODUCT CODE: **A70**

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:



- Digit 1 to 3 Series code.
- Digit 4 d.c. rated voltage:
G =160V I =250V M= 400V P = 630V
- Digit 5 Length (mm):
F=11; H=14; K=20.5; Q=28; T=33
- Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.
- Digit 10 to 11 Mechanical version and/or packaging (table1)
- Digit 12 Identifies the dimensions and electrical characteristics.
- Digit 13 Internal use
- Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

GENERAL TECHNICAL DATA

- Dielectric:** polypropylene film.
- Plates:** aluminium layer deposited by evaporation under vacuum.
- Winding:** non-inductive type.
- Leads:** tinned wire.
- Protection:** polyester tape wrapping and thermosetting resin end fill.
- Marking:** Manufacturer's logo, series (1.70), dielectric code (MKP), capacitance, tolerance, D.C. rated voltage.
- Climatic category:** 55/105/56 IEC 60068-1
- Operating temperature range:** -55 to +105°C
- Related documents:** IEC 60384-16

Winding scheme

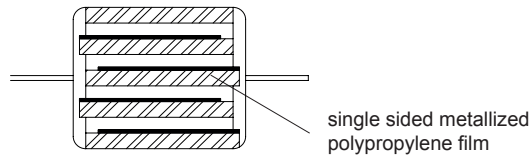


Table 1 (for more detailed information, please refer to page 14).

| Standard packaging style | Ordering code (Digit 10 to 11) |
|--------------------------|--------------------------------|
| Reel Ø 355 mm | 26 |
| Loose | AA |

**METALLIZED POLYPROPYLENE CAPACITOR
MULTIPURPOSE APPLICATIONS**

PRODUCT CODE: A70

| Rated Cap. | 160Vdc/90Vac | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|--------------|-------|------------------|---|-----------------|
| | D max | L max | | | |
| 0.022 μF | 5.0 | 11.0 | 5 | 1.60 E3 | A70GF 2220--0-- |
| 0.033 μF | 5.0 | 11.0 | 5 | 1.60 E3 | A70GF 2330--0-- |
| 0.047 μF | 5.0 | 11.0 | 5 | 1.60 E3 | A70GF 2470--0-- |
| 0.068 μF | 5.5 | 14.0 | 5 | 1.60 E3 | A70GH2680--0-- |
| 0.10 μF | 5.5 | 14.0 | 5 | 1.60 E3 | A70GH3100--0-- |
| 0.15 μF | 6.5 | 14.0 | 5 | 1.60 E3 | A70GH3150--0-- |
| 0.22 μF | 7.5 | 14.0 | 5 | 1.60 E3 | A70GH3220--0-- |
| 0.33 μF | 7.0 | 20.5 | 3 | 0.96 E3 | A70GK3330--0-- |
| 0.47 μF | 8.0 | 20.5 | 3 | 0.96 E3 | A70GK3470--0-- |
| 0.68 μF | 8.0 | 28.0 | 2 | 0.64 E3 | A70GQ3680--0-- |
| 1.0 μF | 9.5 | 28.0 | 2 | 0.64 E3 | A70GQ4100--0-- |
| 1.5 μF | 11.0 | 28.0 | 2 | 0.64 E3 | A70GQ4150--0-- |
| 2.2 μF | 12.0 | 33.0 | 1 | 0.32 E3 | A70GT 4220--0-- |
| 3.3 μF | 14.5 | 33.0 | 1 | 0.32 E3 | A70GT 4330--0-- |
| 4.7 μF | 17.0 | 33.0 | 1 | 0.32 E3 | A70GT 4470--0-- |

| Rated Cap. | 400Vdc/220Vac* | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|----------------|-------|------------------|---|-----------------|
| | D max | L max | | | |
| 6800 pF | 5.0 | 11.0 | 25.0 | 20.0 E3 | A70MF 1680--0-- |
| 0.010 μF | 5.5 | 14.0 | 13.5 | 11.0 E3 | A70MH2100--0-- |
| 0.015 μF | 6.0 | 14.0 | 13.5 | 11.0 E3 | A70MH2150--0-- |
| 0.022 μF | 6.0 | 14.0 | 13.5 | 11.0 E3 | A70MH2220--0-- |
| 0.033 μF | 6.5 | 14.0 | 13.5 | 11.0 E3 | A70MH2330--0-- |
| 0.047 μF | 8.0 | 14.0 | 13.5 | 11.0 E3 | A70MH2470--0-- |
| 0.068 μF | 7.0 | 20.5 | 10.0 | 8.0 E3 | A70MK2680--0-- |
| 0.10 μF | 8.0 | 20.5 | 10.0 | 8.0 E3 | A70MK3100--0-- |
| 0.15 μF | 8.0 | 28.0 | 6.5 | 5.2 E3 | A70MQ3150--0-- |
| 0.22 μF | 9.5 | 28.0 | 6.5 | 5.2 E3 | A70MQ3220--0-- |
| 0.33 μF | 11.0 | 28.0 | 6.5 | 5.2 E3 | A70MQ3330--0-- |
| 0.47 μF | 13.0 | 28.0 | 6.5 | 5.2 E3 | A70MQ3470--0-- |
| 0.68 μF | 13.5 | 33.0 | 4.0 | 3.2 E3 | A70MT 3680--0-- |
| 1.0 μF | 16.5 | 33.0 | 4.0 | 3.2 E3 | A70MT 4100--0-- |
| 1.5 μF | 20.0 | 33.0 | 4.0 | 3.2 E3 | A70MT 4150--0-- |

| Rated Cap. | 250Vdc/200Vac | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|---------------|-------|------------------|---|-----------------|
| | D max | L max | | | |
| 0.010 μF | 5.0 | 11.0 | 11.0 | 5.5 E3 | A70IF 2100--0-- |
| 0.015 μF | 5.0 | 11.0 | 11.0 | 5.5 E3 | A70IF 2150--0-- |
| 0.022 μF | 5.5 | 14.0 | 10.0 | 5.0 E3 | A70IH 2220--0-- |
| 0.033 μF | 5.5 | 14.0 | 10.0 | 5.0 E3 | A70IH 2330--0-- |
| 0.047 μF | 6.0 | 14.0 | 10.0 | 5.0 E3 | A70IH 2470--0-- |
| 0.068 μF | 7.0 | 14.0 | 10.0 | 5.0 E3 | A70IH 2680--0-- |
| 0.10 μF | 8.5 | 14.0 | 10.0 | 5.0 E3 | A70IH 3100--0-- |
| 0.15 μF | 7.5 | 20.5 | 7.0 | 3.5 E3 | A70IK 3150--0-- |
| 0.22 μF | 9.0 | 20.5 | 7.0 | 3.5 E3 | A70IK 3220--0-- |
| 0.33 μF | 8.5 | 28.0 | 4.0 | 2.0 E3 | A70IQ 3330--0-- |
| 0.47 μF | 10.0 | 28.0 | 4.0 | 2.0 E3 | A70IQ 3470--0-- |
| 0.68 μF | 11.5 | 28.0 | 4.0 | 2.0 E3 | A70IQ 3680--0-- |
| 1.0 μF | 12.5 | 33.0 | 2.5 | 1.3 E3 | A70IT 4100--0-- |
| 1.5 μF | 15.0 | 33.0 | 2.5 | 1.3 E3 | A70IT 4150--0-- |
| 2.2 μF | 18.0 | 33.0 | 2.5 | 1.3 E3 | A70IT 4220--0-- |
| 3.3 μF | 21.5 | 33.0 | 2.5 | 1.3 E3 | A70IT 4330--0-- |

| Rated Cap. | 630Vdc/250Vac* | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|----------------|-------|------------------|---|-----------------|
| | D max | L max | | | |
| 1000 pF | 5.0 | 11.0 | 30 | 38.0 E3 | A70PF 1100--0-- |
| 1500 pF | 5.0 | 11.0 | 30 | 38.0 E3 | A70PF 1150--0-- |
| 2200 pF | 5.0 | 11.0 | 30 | 38.0 E3 | A70PF 1220--0-- |
| 3300 pF | 5.0 | 11.0 | 30 | 38.0 E3 | A70PF 1330--0-- |
| 4700 pF | 5.0 | 11.0 | 30 | 38.0 E3 | A70PF 1470--0-- |
| 6800 pF | 5.5 | 14.0 | 20 | 25.0 E3 | A70PH 1680--0-- |
| 0.010 μF | 6.0 | 14.0 | 20 | 25.0 E3 | A70PH 2100--0-- |
| 0.015 μF | 7.0 | 14.0 | 20 | 25.0 E3 | A70PH 2150--0-- |
| 0.022 μF | 8.5 | 14.0 | 20 | 25.0 E3 | A70PH 2220--0-- |
| 0.033 μF | 7.5 | 20.5 | 15 | 19.0 E3 | A70PK 2330--0-- |
| 0.047 μF | 8.5 | 20.5 | 15 | 19.0 E3 | A70PK 2470--0-- |
| 0.068 μF | 8.5 | 28.0 | 10 | 13.0 E3 | A70PQ 2680--0-- |
| 0.10 μF | 10.0 | 28.0 | 10 | 13.0 E3 | A70PQ 3100--0-- |
| 0.15 μF | 11.5 | 28.0 | 10 | 13.0 E3 | A70PQ 3150--0-- |
| 0.22 μF | 12.5 | 33.0 | 6 | 7.6 E3 | A70PT 3220--0-- |
| 0.33 μF | 15.0 | 33.0 | 6 | 7.6 E3 | A70PT 3330--0-- |
| 0.47 μF | 17.5 | 33.0 | 6 | 7.6 E3 | A70PT 3470--0-- |
| 0.68 μF | 21.0 | 33.0 | 6 | 7.6 E3 | A70PT 3680--0-- |

Mechanical version and packaging (Table1) _____
Internal use _____
Tolerance: J (±5%); K (±10%); M (±20%) _____

Mechanical version and packaging (Table1) _____
Internal use _____
Tolerance: J (±5%); K (±10%); M (±20%) _____

All dimensions are in mm.

Note 1: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K₀ depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

Note 2: Special version for line applications (rated voltage 250 Vac) available upon request.

* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

**METALLIZED POLYPROPYLENE CAPACITOR
MULTIPURPOSE APPLICATIONS**

PRODUCT CODE: A70

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 160 Vdc - 250Vdc
400 Vdc - 630 Vdc

Rated temperature (T_R): +85°C

Temperature derated voltage:
for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 4.7µF

Capacitance values:

E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz):

±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L):

max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):

$tg\delta \times 10^{-4}$ at +25°C ±5°C

| kHz | C<0.1 µF | 0.1 µF to 1 µF | >1 µF |
|-----|----------|----------------|-------|
| 1 | ≤ 6 | ≤ 6 | ≤ 6 |
| 10 | ≤10 | ≤20 | |
| 100 | ≤30 | | |

Insulation resistance:

Test conditions

Temperature: +25°C ± 5°C

Voltage charge time: 1 min

Voltage charge: 100Vdc

Performance

≥1×10⁵ MΩ for C ≤ 0.33 µF (5×10⁵ MΩ)*
≥30000 s for C > 0.33 µF (150000 s)*

*Typical value

Test voltage between terminations:

1.6xV_R applied for 2 s at +25°C ±5°C.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

Temperature: +40°C±2°C

Relative humidity (RH): 93% ±2%

Test duration: 56 days

Performance

Capacitance change |ΔC/C|: ≤2%

DF change (Δtgδ): ≤10×10⁻⁴ at 1kHz

Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions

Temperature: +85°C±2°C

Test duration: 2000 h

Voltage applied: 1.25xV_R

Performance

Capacitance change |ΔC/C|: ≤3%

DF change (Δtgδ): ≤10×10⁻⁴ at 10kHz for C≤1µF
≤10×10⁻⁴ at 1kHz for C>1µF

Insulation resistance: ≥50% of initial limit.

Resistance to soldering heat:

Test conditions

Solder bath temperature: +260°C±5°C

Dipping time (with heat screen): 10 s ±1 s

Performance

Capacitance change |ΔC/C|: ≤1%

DF change (Δtgδ): ≤10×10⁻⁴ at 10kHz for C≤1µF
≤10×10⁻⁴ at 1kHz for C>1µF

Insulation resistance: ≥ initial limit.

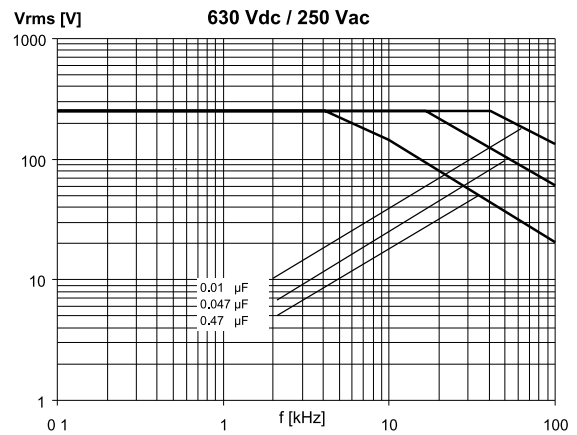
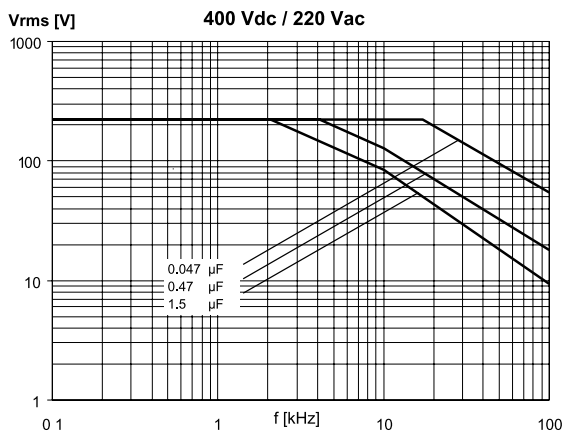
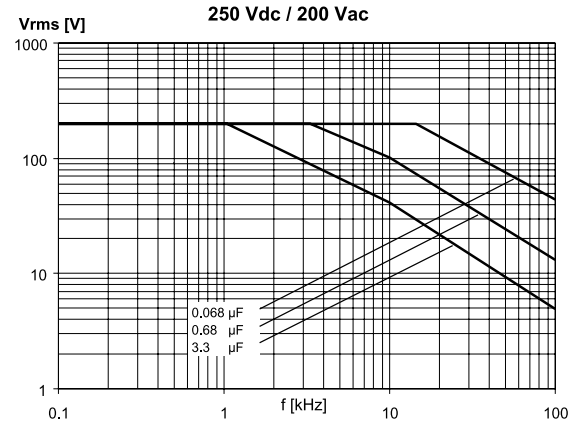
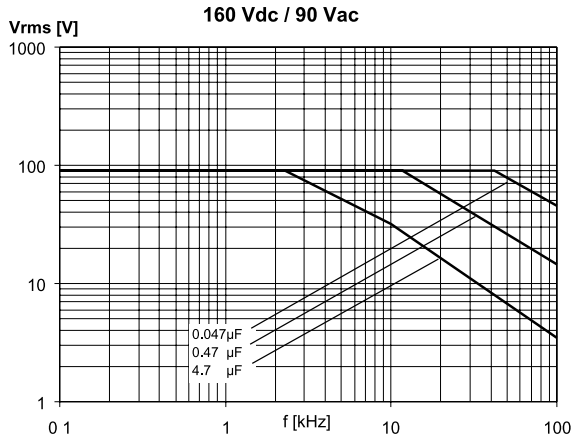
Long term stability (after two years):

Storage: standard environmental conditions (see page 12).

Performance

Capacitance change |ΔC/C|: ≤0.5%

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)



**METALLIZED POLYPROPYLENE CAPACITOR
MULTIPURPOSE APPLICATIONS**

PRODUCT CODE: **A70**

MAX. CURRENT (I_{r.m.s.}) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

