

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**

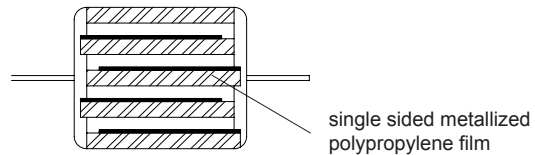


Table 1 (for more detailed information, please refer to page 14).

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 <sub>0</sub> (V <sup>2</sup> /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 <sub>0</sub> (V <sup>2</sup> /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 <sub>0</sub> (V <sup>2</sup> /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 <sub>0</sub> (V <sup>2</sup> /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<sub>R</sub>), 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<sub>R</sub>/V. The pulse characteristic K<sub>0</sub> 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**

≥1×10<sup>5</sup> MΩ for C ≤ 0.33 µF (5×10<sup>5</sup> MΩ)\*  
≥30000 s for C > 0.33 µF (150000 s)\*

\*Typical value

**Test voltage between terminations:**

1.6xV<sub>R</sub> 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<sup>-4</sup> at 1kHz

Insulation resistance: ≥50% of initial limit.

**Endurance:**

**Test conditions**

Temperature: +85°C±2°C

Test duration: 2000 h

Voltage applied: 1.25xV<sub>R</sub>

**Performance**

Capacitance change |ΔC/C|: ≤3%

DF change (Δtgδ): ≤10×10<sup>-4</sup> at 10kHz for C≤1µF  
≤10×10<sup>-4</sup> 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<sup>-4</sup> at 10kHz for C≤1µF  
≤10×10<sup>-4</sup> at 1kHz for C>1µF

Insulation resistance: ≥ initial limit.

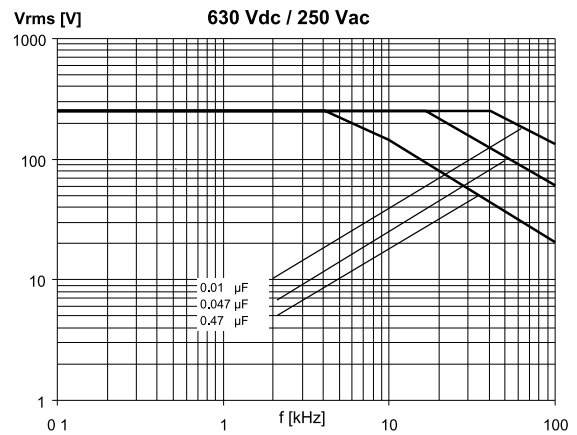
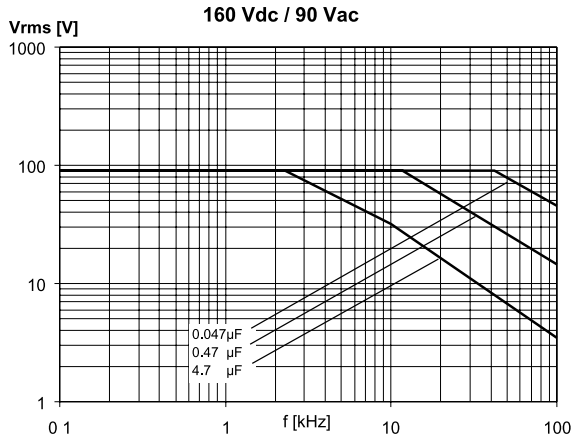
**Long term stability** (after two years):

**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<sub>r.m.s.</sub>) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

