

METALLIZED POLYESTER FILM CAPACITOR MINIATURE TYPE

Typical applications: this series combines small size, good performances in by-passing, blocking and interference suppression in low voltage applications (i.e.: AUTOMOTIVE).

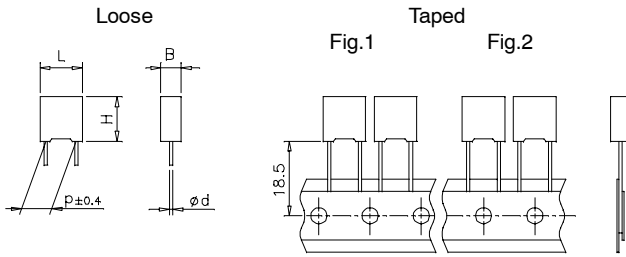
PRODUCT CODE: **R66**

p = 7.5 mm

Note: R66 series has replaced the R84 series (available only upon request). For new design we suggest the use of the R66 series.

Construction:

STACKED and WOUND technology



| | | |
|------------|-----|-------|
| B max | 2.5 | ≥ 3.5 |
| ∅ d ± 0.05 | 0.5 | 0.6 |

All dimensions are in mm

PRODUCT CODE SYSTEM

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

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| R | 6 | 6 | | | | | | | | | | - | |

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:

D = 63V E = 100V I = 250V

M = 400V P = 630V

Digit 5 Pitch: D = 7.5mm

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 (table 1)

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: polyester film (polyethylene terephthalate).

Plates: aluminium layer deposited by evaporation under vacuum.

Winding: non-inductive type.

Leads: tinned wire.

Protection: plastic case, thermosetting resin filled.

Box material is solvent resistant and flame retardant according to UL94 V0.

Marking: Manufacturer's logo, capacitance, tolerance, D.C. rated voltage.

Climatic category: 55/100/56 IEC 60068-1

Operating temperature range: -55 to +105°C

For stacked technology an upper operating temperature of +125°C is allowed for a max operating time of 1000h.

Related documents: IEC 60384-2

Winding scheme

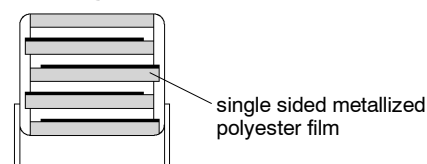


Table 1 (for more detailed information, please refer to page 15).

| Standard packaging style | Lead length (mm) | Taping style Figure No. | Ordering code (Digit 10 to 11) |
|--------------------------|------------------|-------------------------|--------------------------------|
| AMMO-PACK | | 1 | DQ |
| AMMO-PACK | | 2 | 28 |
| REEL ∅ 355mm | | 1 | CK |
| Loose, short leads | 4 +2 | | AA |
| Loose, long leads | 17 +1/-2 | | Z3 |

Note: Ammo-pack is the preferred packaging for taped version.

NEW

STACKED VERSION

| Rated Cap. | 63Vdc/40Vac | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|-------------|------|------|-----|------------------|---|----------------|
| | B | H | L | p | | | |
| 0.33μF | 2.5 | 7.0 | 10.0 | 7.5 | 120 | 15 E3 | R66DD3330--6-- |
| 0.47μF | 3.0 | 8.0 | 10.0 | 7.5 | 120 | 15 E3 | R66DD3470--6-- |
| 0.68μF | 3.5 | 8.5 | 10.5 | 7.5 | 120 | 15 E3 | R66DD3680--6-- |
| 1.0μF | 4.0 | 9.0 | 10.5 | 7.5 | 120 | 15 E3 | R66DD4100--6-- |
| 1.5μF | 5.0 | 11.0 | 10.5 | 7.5 | 120 | 15 E3 | R66DD4150--6-- |
| 2.2μF | 6.0 | 12.0 | 10.5 | 7.5 | 120 | 15 E3 | R66DD4220--6-- |
| 3.3μF | 6.0 | 12.0 | 10.5 | 7.5 | 120 | 15 E3 | R66DD4330--6-- |

| Rated Cap. | 400Vdc/200Vac | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|---------------|------|------|-----|------------------|---|----------------|
| | B | H | L | p | | | |
| 6800pF | 2.5 | 7.0 | 10.0 | 7.5 | 275 | 220 E3 | R66MD1680--6-- |
| 0.010μF | 2.5 | 7.0 | 10.0 | 7.5 | 275 | 220 E3 | R66MD2100--6-- |
| 0.015μF | 2.5 | 7.0 | 10.0 | 7.5 | 275 | 220 E3 | R66MD2150--6-- |
| 0.022μF | 3.0 | 8.0 | 10.0 | 7.5 | 275 | 220 E3 | R66MD2220--6-- |
| 0.033μF | 3.5 | 8.5 | 10.5 | 7.5 | 275 | 220 E3 | R66MD2330--6-- |
| 0.047μF | 4.0 | 9.0 | 10.5 | 7.5 | 275 | 220 E3 | R66MD2470--6-- |
| 0.068μF | 5.0 | 11.0 | 10.5 | 7.5 | 275 | 220 E3 | R66MD2680--6-- |
| 0.10μF | 6.0 | 12.0 | 10.5 | 7.5 | 275 | 220 E3 | R66MD3100--6-- |
| 0.15μF | 6.0 | 12.0 | 10.5 | 7.5 | 275 | 220 E3 | R66MD3150--6-- |

| Rated Cap. | 100Vdc/63Vac | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|--------------|------|------|-----|------------------|---|-----------------|
| | B | H | L | p | | | |
| 0.068μF | 2.5 | 7.0 | 10.0 | 7.5 | 150 | 30 E3 | R66ED 2680--6-- |
| 0.10μF | 2.5 | 7.0 | 10.0 | 7.5 | 150 | 30 E3 | R66ED 3100--6-- |
| 0.15μF | 2.5 | 7.0 | 10.0 | 7.5 | 150 | 30 E3 | R66ED 3150--6-- |
| 0.22μF | 2.5 | 7.0 | 10.0 | 7.5 | 150 | 30 E3 | R66ED 3220--6-- |
| 0.33μF | 3.5 | 8.5 | 10.5 | 7.5 | 150 | 30 E3 | R66ED 3330--6-- |
| 0.47μF | 3.5 | 8.5 | 10.5 | 7.5 | 150 | 30 E3 | R66ED 3470--6-- |
| 0.68μF | 4.0 | 9.0 | 10.5 | 7.5 | 150 | 30 E3 | R66ED 3680--6-- |
| 1.0μF | 5.0 | 11.0 | 10.5 | 7.5 | 150 | 30 E3 | R66ED 4100--6-- |
| 1.5μF | 6.0 | 12.0 | 10.5 | 7.5 | 150 | 30 E3 | R66ED 4150--6-- |

| Rated Cap. | 630Vdc/220Vac* | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|----------------|------|------|-----|------------------|---|-----------------|
| | B | H | L | p | | | |
| 1000pF | 2.5 | 7.0 | 10.0 | 7.5 | 300 | 378 E3 | |
| 1500pF | 2.5 | 7.0 | 10.0 | 7.5 | 300 | 378 E3 | |
| 2200pF | 2.5 | 7.0 | 10.0 | 7.5 | 300 | 378 E3 | |
| 3300pF | 2.5 | 7.0 | 10.0 | 7.5 | 300 | 378 E3 | |
| 4700pF | 2.5 | 7.0 | 10.0 | 7.5 | 300 | 378 E3 | |
| 6800pF | 3.0 | 8.0 | 10.0 | 7.5 | 300 | 378 E3 | |
| 0.010μF | 3.5 | 8.5 | 10.5 | 7.5 | 300 | 378 E3 | R66PD 2100--6-- |
| 0.015μF | 4.0 | 9.0 | 10.5 | 7.5 | 300 | 378 E3 | R66PD 2150--6-- |
| 0.022μF | 5.0 | 11.0 | 10.5 | 7.5 | 300 | 378 E3 | R66PD 2220--6-- |
| 0.033μF | 6.0 | 12.0 | 10.5 | 7.5 | 300 | 378 E3 | R66PD 2330--6-- |
| 0.047μF | 6.0 | 12.0 | 10.5 | 7.5 | 300 | 378 E3 | R66PD 2470--6-- |

| Rated Cap. | 250Vdc/160Vac | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|---------------|------|------|-----|------------------|---|-----------------|
| | B | H | L | p | | | |
| 0.022μF | 2.5 | 7.0 | 10.0 | 7.5 | 200 | 100 E3 | R66ID 2220--6-- |
| 0.033μF | 2.5 | 7.0 | 10.0 | 7.5 | 200 | 100 E3 | R66ID 2330--6-- |
| 0.047μF | 2.5 | 7.0 | 10.0 | 7.5 | 200 | 100 E3 | R66ID 2470--6-- |
| 0.068μF | 3.0 | 8.0 | 10.0 | 7.5 | 200 | 100 E3 | R66ID 2680--6-- |
| 0.10μF | 3.5 | 8.5 | 10.5 | 7.5 | 200 | 100 E3 | R66ID 3100--6-- |
| 0.15μF | 4.0 | 9.0 | 10.5 | 7.5 | 200 | 100 E3 | R66ID 3150--6-- |
| 0.22μF | 5.0 | 11.0 | 10.5 | 7.5 | 200 | 100 E3 | R66ID 3220--6-- |
| 0.33μF | 6.0 | 12.0 | 10.5 | 7.5 | 200 | 100 E3 | R66ID 3330--6-- |

Mechanical version and packaging (Table 1)

Internal use

Tolerance: J (± 5%); K (± 10%); M (± 20%)

In progress

Mechanical version and packaging (Table 1)

Internal use

Tolerance: J (± 5%); K (± 10%); M (± 20%)

All dimensions are in mm.

Note: 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.

* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 109).

WOUND VERSION

| Rated Cap. | 63Vdc/40Vac | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|-------------|------|------|-----|------------------|---|----------------|
| | B | H | L | p | | | |
| 0.10μF | 2.5 | 7.0 | 10.0 | 7.5 | 5 | 0.63 E3 | R66DD3100--0-- |
| 0.15μF | 2.5 | 7.0 | 10.0 | 7.5 | 5 | 0.63 E3 | R66DD3150--0-- |
| 0.22μF | 3.5 | 8.5 | 10.5 | 7.5 | 5 | 0.63 E3 | R66DD3220--0-- |
| 0.33μF | 3.5 | 8.5 | 10.5 | 7.5 | 5 | 0.63 E3 | R66DD3330--0-- |
| 0.47μF | 4.0 | 9.0 | 10.5 | 7.5 | 5 | 0.63 E3 | R66DD3470--0-- |
| 0.68μF | 5.0 | 11.0 | 10.5 | 7.5 | 5 | 0.63 E3 | R66DD3680--0-- |
| 1.0μF | 6.0 | 12.0 | 10.5 | 7.5 | 5 | 0.63 E3 | R66DD4100--0-- |

| Rated Cap. | 400Vdc/200Vac | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|---------------|------|------|-----|------------------|---|----------------|
| | B | H | L | p | | | |
| 3300pF | 2.5 | 7.0 | 10.0 | 7.5 | 30 | 24 E3 | R66MD1330--0-- |
| 4700pF | 2.5 | 7.0 | 10.0 | 7.5 | 30 | 24 E3 | R66MD1470--0-- |
| 6800pF | 2.5 | 7.0 | 10.0 | 7.5 | 30 | 24 E3 | R66MD1680--0-- |
| 0.010μF | 2.5 | 7.0 | 10.0 | 7.5 | 30 | 24 E3 | R66MD2100--0-- |
| 0.015μF | 3.5 | 8.5 | 10.5 | 7.5 | 30 | 24 E3 | R66MD2150--0-- |
| 0.022μF | 3.5 | 8.5 | 10.5 | 7.5 | 30 | 24 E3 | R66MD2220--0-- |
| 0.033μF | 4.0 | 9.0 | 10.5 | 7.5 | 30 | 24 E3 | R66MD2330--0-- |
| 0.047μF | 5.0 | 11.0 | 10.5 | 7.5 | 30 | 24 E3 | R66MD2470--0-- |
| 0.068μF | 5.0 | 11.0 | 10.5 | 7.5 | 30 | 24 E3 | R66MD2680--0-- |
| 0.10μF | 6.0 | 12.0 | 10.5 | 7.5 | 30 | 24 E3 | R66MD3100--0-- |

| Rated Cap. | 100Vdc/63Vac | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|--------------|------|------|-----|------------------|---|----------------|
| | B | H | L | p | | | |
| 0.047μF | 2.5 | 7.0 | 10.0 | 7.5 | 6 | 1.2 E3 | R66ED2470--0-- |
| 0.068μF | 2.5 | 7.0 | 10.0 | 7.5 | 6 | 1.2 E3 | R66ED2680--0-- |
| 0.10μF | 3.5 | 8.5 | 10.5 | 7.5 | 6 | 1.2 E3 | R66ED3100--0-- |
| 0.15μF | 3.5 | 8.5 | 10.5 | 7.5 | 6 | 1.2 E3 | R66ED3150--0-- |
| 0.22μF | 3.5 | 8.5 | 10.5 | 7.5 | 6 | 1.2 E3 | R66ED3220--0-- |
| 0.33μF | 5.0 | 11.0 | 10.5 | 7.5 | 6 | 1.2 E3 | R66ED3330--0-- |
| 0.47μF | 6.0 | 12.0 | 10.5 | 7.5 | 6 | 1.2 E3 | R66ED3470--0-- |

| Rated Cap. | 630Vdc/220Vac* | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|----------------|------|------|-----|------------------|---|----------------|
| | B | H | L | p | | | |
| 1000pF | 2.5 | 7.0 | 10.0 | 7.5 | 40 | 50 E3 | R66PD1100--0-- |
| 1500pF | 2.5 | 7.0 | 10.0 | 7.5 | 40 | 50 E3 | R66PD1150--0-- |
| 2200pF | 2.5 | 7.0 | 10.0 | 7.5 | 40 | 50 E3 | R66PD1220--0-- |
| 3300pF | 3.5 | 8.5 | 10.5 | 7.5 | 40 | 50 E3 | R66PD1330--0-- |
| 4700pF | 3.5 | 8.5 | 10.5 | 7.5 | 40 | 50 E3 | R66PD1470--0-- |
| 6800pF | 3.5 | 8.5 | 10.5 | 7.5 | 40 | 50 E3 | R66PD1680--0-- |
| 0.010μF | 4.0 | 9.0 | 10.5 | 7.5 | 40 | 50 E3 | R66PD2100--0-- |
| 0.015μF | 5.0 | 11.0 | 10.5 | 7.5 | 40 | 50 E3 | R66PD2150--0-- |
| 0.022μF | 6.0 | 12.0 | 10.5 | 7.5 | 40 | 50 E3 | R66PD2220--0-- |

| Rated Cap. | 250Vdc/160Vac | | | | Max dv/dt (V/μs) | Max K ₀ (V ² /μs) | Part Number |
|------------|---------------|------|------|-----|------------------|---|----------------|
| | B | H | L | p | | | |
| 0.015μF | 2.5 | 7.0 | 10.0 | 7.5 | 15 | 7.5 E3 | R66ID2150--0-- |
| 0.022μF | 2.5 | 7.0 | 10.0 | 7.5 | 15 | 7.5 E3 | R66ID2220--0-- |
| 0.033μF | 2.5 | 7.0 | 10.0 | 7.5 | 15 | 7.5 E3 | R66ID2330--0-- |
| 0.047μF | 3.5 | 8.5 | 10.5 | 7.5 | 15 | 7.5 E3 | R66ID2470--0-- |
| 0.068μF | 3.5 | 8.5 | 10.5 | 7.5 | 15 | 7.5 E3 | R66ID2680--0-- |
| 0.10μF | 4.0 | 9.0 | 10.5 | 7.5 | 15 | 7.5 E3 | R66ID3100--0-- |
| 0.15μF | 5.0 | 11.0 | 10.5 | 7.5 | 15 | 7.5 E3 | R66ID3150--0-- |
| 0.22μF | 6.0 | 12.0 | 10.5 | 7.5 | 15 | 7.5 E3 | R66ID3220--0-- |

Mechanical version and packaging (Table 1)

Internal use

Tolerance: J (± 5%); K (± 10%); M (± 20%)

Mechanical version and packaging (Table 1)

Internal use

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All dimensions are in mm.

Note: 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.

* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 109).

**METALLIZED POLYESTER FILM CAPACITOR
MINIATURE TYPE**

p = 7.5 mm

PRODUCT CODE: R66

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 63 Vdc - 100 Vdc - 250 Vdc
400 Vdc - 630 Vdc

Rated temperature (T_R): +85°C

Temperature derated voltage:

for temperatures between +85°C and the upper operating temperature (+105°C for wound technology and +125°C for stacked technology) a decreasing factor of 1.25% per degree °C on the rated voltage V_R has to be applied.

Capacitance range: 1000pF to 3.3µF

Capacitance values:

E6 series (IEC 60063 Norm).

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

Total self-inductance (L): ≈8nH
(lead length ~2mm)

Dissipation factor (DF):

tgδ × 10⁻⁴. at +25°C ±5°C

| kHz | tgδ × 10 ⁻⁴ |
|-----|------------------------|
| 1 | ≤100 |
| 10 | ≤150 |

Insulation resistance:

Test conditions

Temperature: +25°C ±5°C

Voltage charge time: 1 min

Voltage charge: 50 Vdc for V_R < 100 Vdc
100 Vdc for V_R ≥ 100 Vdc

Performance

For V_R ≤ 100 Vdc

≥ 3750 MΩ for C ≤ 0.33µF (5000 MΩ)*

≥ 1250 s for C > 0.33µF (5000 s)*

For V_R > 100 Vdc

≥ 30000MΩ (50000 MΩ)*

*Typical value

Test voltage between terminals:

1.6 × V_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|: ≤5%

DF change (Δtgδ): ≤50 × 10⁻⁴ at 1kHz

Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions

Temperature: +100°C ±2°C

Test duration: 2000 h

Voltage applied: 1.25 × V_C

Performance

Capacitance change |ΔC/C|: ≤5%

DF change (Δtgδ): ≤50 × 10⁻⁴ at 10kHz

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|: ≤2%

DF change (Δtgδ): ≤50 × 10⁻⁴ at 10kHz

Insulation resistance: ≥ initial limit.

Long term stability (after two years):

Storage

standard environmental conditions (see page 11).

Performance

Capacitance change |ΔC/C|: ≤3% for C ≤ 0.1µF
≤2% for C > 0.1µF

RELIABILITY

Reference MIL HDB 217

Application conditions:

Temperature: +40°C ±2°C

Voltage: 0.5 × V_R

Failure rate: ≤2 FIT

(1 FIT = 1 × 10⁻⁹ failures/components × h)

Failure criteria:

(according to DIN 44122)

Short or open circuit

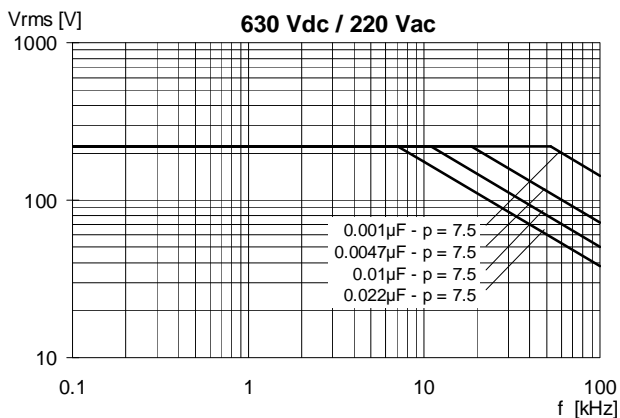
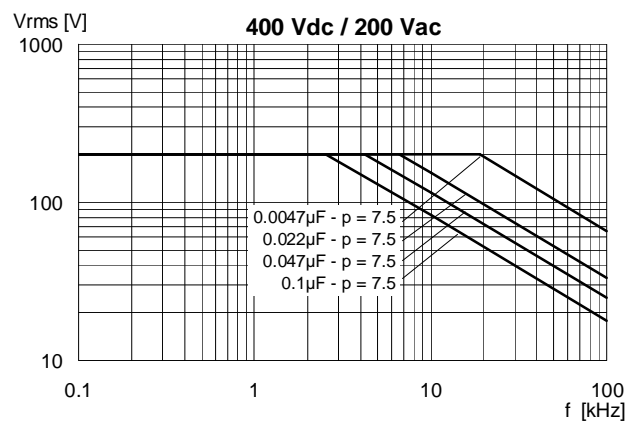
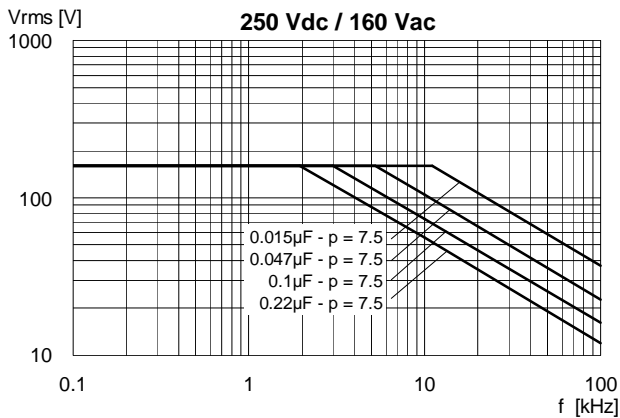
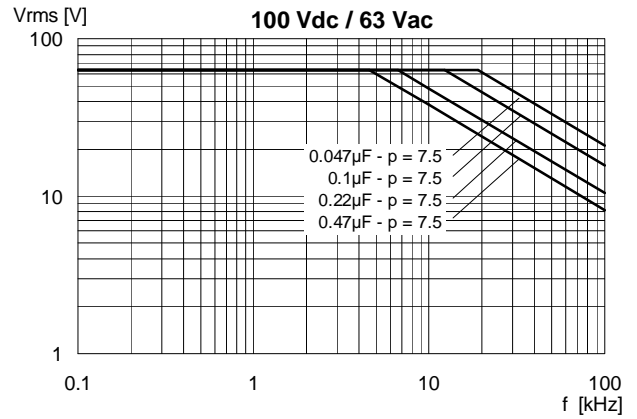
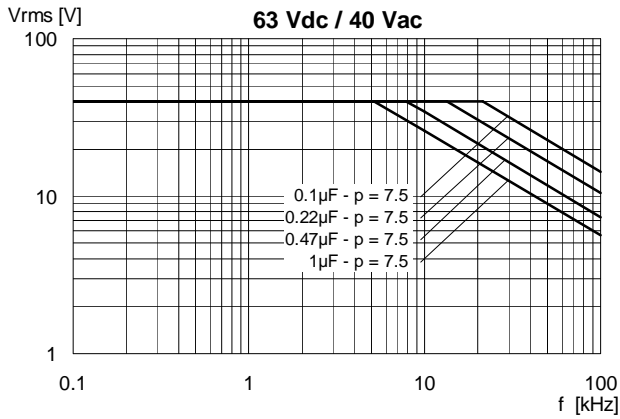
Capacitance change |ΔC/C|: >10%

DF change (Δtgδ): >2 × initial limit.

Insulation resistance: <0.005 × initial limit.

MKT Series
METALLIZED POLYESTER FILM CAPACITOR
MINIATURE TYPE
 p = 7.5 mm
 PRODUCT CODE: R66

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / $T_h \leq 40^\circ\text{C}$)



Note: p (pitch) in mm.