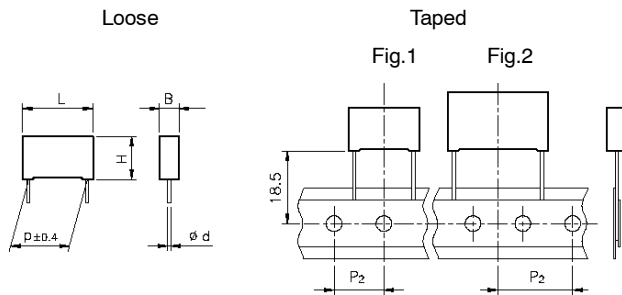


POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES A.C. APPLICATIONS

Typical applications: electronic lighting (i.e. car headlamp and ballast), pulse applications with high A.C. voltage and HIGH current.

PRODUCT CODE: R77

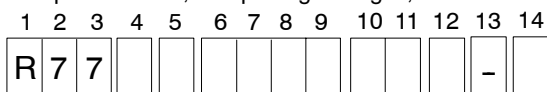


∅ d ± 0.05	p = 10	p ≥ 15
	0.6	0.8

All dimensions are in mm.

PRODUCT CODE SYSTEM

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



Digit 1 to 3 Series code.

Digit 4 a.c. rated voltage:

L = 250V 3 = 300V N = 400V
5 = 500V 7 = 700V 9 = 900V

Digit 5 Pitch:

F=10mm; l=15mm; N=22.5mm; R=27.5mm

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:
H=2.5%; J=5%; K=10%

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.

Plates: double sided metallized polyester film.

Winding: non-inductive type.

Leads: tinned wire.

Protection: plastic case, epoxy resin filled.

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

Marking: manufacturer's logo, series (R77), dielectric code (MKP), capacitance, tolerance, A.C. rated voltage, manufacturing date code.

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

Operating temperature range: -55 to +105°C

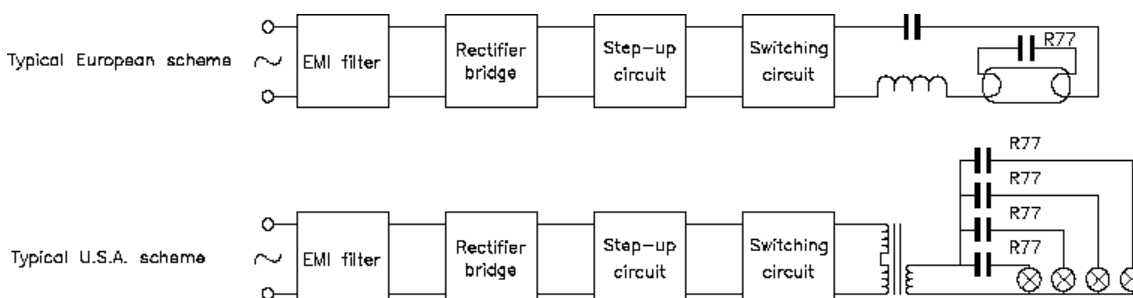
Related documents: IEC 60384-16; IEC 60384-17
CECC 31200

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

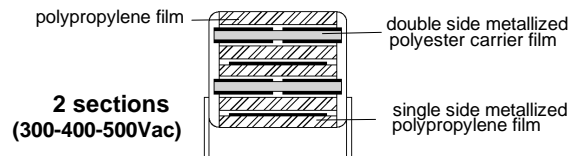
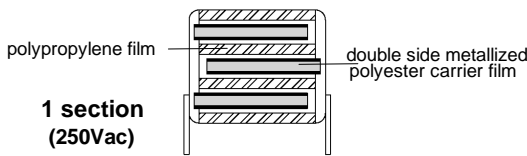
Standard packaging style	Lead length (mm)	Taping style			Ordering code (Digit 10 to 11)
		P ₂ (mm)	Fig. (No.)	Pitch (mm)	
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
REEL ∅ 355mm		12.70	1	10.0/15.0	GY
REEL ∅ 500mm		12.70	1	10.0/15.0	CK
REEL ∅ 500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4 +2				AA
Loose, long leads	30 +5				50

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

Typical application: LAMP CAPACITOR IN ELECTRONIC BALLAST



MMKP Series
**POLYPROPYLENE CAPACITOR WITH DOUBLE
 SIDED METALLIZED FILM ELECTRODES**
A.C. APPLICATIONS
 PRODUCT CODE: R77



Rated Cap.	250Vac* (1 section)				Max dv/dt (V/μs)	Max K ₀ (V ² /μs)	Part Number
	B	H	L	p			
0.010μF	4.0	9.0	13.0	10.0	1500	190 E4	R77LF2100--0--
0.012μF	4.0	9.0	13.0	10.0	1500	190 E4	R77LF2120--0--
0.015μF	5.0	11.0	13.0	10.0	1500	190 E4	R77LF2150--0--
0.018μF	6.0	12.0	13.0	10.0	1500	190 E4	R77LF2180--0--
0.022μF	6.0	12.0	13.0	10.0	1500	190 E4	R77LF2220--0--
0.027μF	6.0	12.0	18.0	15.0	900	110 E4	R77LI 2270--0--
0.033μF	6.0	12.0	18.0	15.0	900	110 E4	R77LI 2330--0--
0.039μF	6.0	12.0	18.0	15.0	900	110 E4	R77LI 2390--0--
0.047μF	7.5	13.5	18.0	15.0	900	110 E4	R77LI 2470--0--
0.056μF	7.5	13.5	18.0	15.0	900	110 E4	R77LI 2560--0--
0.068μF	8.5	14.5	18.0	15.0	900	110 E4	R77LI 2680--0--
0.082μF	10.0	16.0	18.0	15.0	900	110 E4	R77LI 2820--0--
0.10μF	10.0	16.0	18.0	15.0	900	110 E4	R77LI 3100--0--

Mechanical version and packaging (Table 1)
 Internal use

Tolerance: H (± 2.5%); J (± 5%); K (± 10%)

Rated Cap.	400Vac (2 sections)				Max dv/dt (V/μs)	Max K ₀ (V ² /μs)	Part Number
	B	H	L	p			
5600pF	5.0	11.0	18.0	15.0	3300	660 E4	R77NI 1560--0--
6800pF	5.0	11.0	18.0	15.0	3300	660 E4	R77NI 1680--0--
8200pF	5.0	11.0	18.0	15.0	3300	660 E4	R77NI 1820--0--
0.010μF	6.0	12.0	18.0	15.0	3300	660 E4	R77NI 2100--0--
0.012μF	6.0	12.0	18.0	15.0	3300	660 E4	R77NI 2120--0--
0.015μF	7.5	13.5	18.0	15.0	3300	660 E4	R77NI 2150--0--
0.018μF	7.5	13.5	18.0	15.0	3300	660 E4	R77NI 2180--0--
0.022μF	8.5	14.5	18.0	15.0	3300	660 E4	R77NI 2220--0--
0.027μF	10.0	16.0	18.0	15.0	3300	660 E4	R77NI 2270--0--
0.033μF	10.0	16.0	18.0	15.0	3300	660 E4	R77NI 2330--0--
0.027μF	6.0	15.0	26.5	22.5	2100	420 E4	R77NN2270--0--
0.033μF	7.0	16.0	26.5	22.5	2100	420 E4	R77NN2330--0--
0.039μF	7.0	16.0	26.5	22.5	2100	420 E4	R77NN2390--0--
0.047μF	8.5	17.0	26.5	22.5	2100	420 E4	R77NN2470--0--
0.056μF	8.5	17.0	26.5	22.5	2100	420 E4	R77NN2560--0--
0.068μF	10.0	18.5	26.5	22.5	2100	420 E4	R77NN2680--0--
0.082μF	10.0	18.5	26.5	22.5	2100	420 E4	R77NN2820--0--
0.10μF	11.0	20.0	26.5	22.5	2100	420 E4	R77NN3100--0--

Rated Cap.	500Vac (2 sections)				Max dv/dt (V/μs)	Max K ₀ (V ² /μs)	Part Number
	B	H	L	p			
1000pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1100--0--
1200pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1120--0--
1500pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1150--0--
1800pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1180--0--
2200pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1220--0--
2700pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1270--0--
3300pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1330--0--
3900pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1390--0--
4700pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1470--0--
5600pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1560--0--
6800pF	6.0	12.0	18.0	15.0	4500	1200 E4	R775I 1680--0--
8200pF	6.0	12.0	18.0	15.0	4500	1200 E4	R775I 1820--0--
0.010μF	7.5	13.5	18.0	15.0	4500	1200 E4	R775I 2100--0--
0.012μF	7.5	13.5	18.0	15.0	4500	1200 E4	R775I 2120--0--
0.015μF	8.5	14.5	18.0	15.0	4500	1200 E4	R775I 2150--0--
0.018μF	10.0	16.0	18.0	15.0	4500	1200 E4	R775I 2180--0--
0.022μF	10.0	16.0	18.0	15.0	4500	1200 E4	R775I 2220--0--
0.018μF	6.0	15.0	26.5	22.5	2500	650 E4	R775N2180--0--
0.022μF	7.0	16.0	26.5	22.5	2500	650 E4	R775N2220--0--
0.027μF	7.0	16.0	26.5	22.5	2500	650 E4	R775N2270--0--
0.033μF	8.5	17.0	26.5	22.5	2500	650 E4	R775N2330--0--
0.039μF	10.0	18.5	26.5	22.5	2500	650 E4	R775N2390--0--
0.047μF	10.0	18.5	26.5	22.5	2500	650 E4	R775N2470--0--
0.056μF	11.0	20.0	26.5	22.5	2500	650 E4	R775N2560--0--
0.068μF	11.0	20.0	32.0	27.5	1100	290 E4	R775R2680--0--
0.082μF	11.0	20.0	32.0	27.5	1100	290 E4	R775R2820--0--
0.10μF	13.0	22.0	32.0	27.5	1100	290 E4	R775R3100--0--

Mechanical version and packaging (Table 1)

Internal use

Tolerance: H (± 2.5%); J (± 5%); K (± 10%)

Mechanical version and packaging (Table 1)

Internal use

Tolerance: H (± 2.5%); J (± 5%); K (± 10%)

All dimensions are in mm.

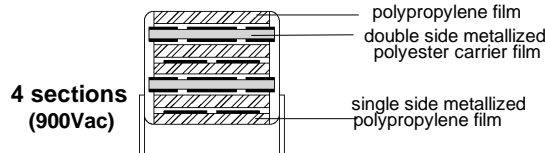
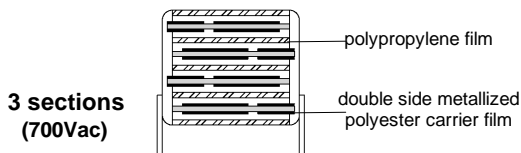
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
 The pulse characteristic K₀ depends on the voltage wave-form and in any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

* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 105).

MMKP Series
**POLYPROPYLENE CAPACITOR WITH DOUBLE
 SIDED METALLIZED FILM ELECTRODES**

A.C. APPLICATIONS

PRODUCT CODE: R77



Rated Cap.	700Vac (3 sections)				Max dv/dt (V/μs)	Max K ₀ (V ² /μs)	Part Number
	B	H	L	p			
1000pF	5.0	11.0	18.0	15.0	9500	3000 E4	R7771 1100--0--
1200pF	5.0	11.0	18.0	15.0	9500	3000 E4	R7771 1120--0--
1500pF	5.0	11.0	18.0	15.0	9500	3000 E4	R7771 1150--0--
1800pF	5.0	11.0	18.0	15.0	9500	3000 E4	R7771 1180--0--
2200pF	5.0	11.0	18.0	15.0	9500	3000 E4	R7771 1220--0--
2700pF	6.0	12.0	18.0	15.0	9500	3000 E4	R7771 1270--0--
3300pF	6.0	12.0	18.0	15.0	9500	3000 E4	R7771 1330--0--
3900pF	7.5	13.5	18.0	15.0	9500	3000 E4	R7771 1390--0--
4700pF	7.5	13.5	18.0	15.0	9500	3000 E4	R7771 1470--0--
5600pF	8.5	14.5	18.0	15.0	9500	3000 E4	R7771 1560--0--
6800pF	8.5	14.5	18.0	15.0	9500	3000 E4	R7771 1680--0--
8200pF	10.0	16.0	18.0	15.0	9500	3000 E4	R7771 1820--0--
8200pF	6.0	15.0	26.5	22.5	4500	1400 E4	R777N1820--0--
0.010μF	6.0	15.0	26.5	22.5	4500	1400 E4	R777N2100--0--
0.012μF	7.0	16.0	26.5	22.5	4500	1400 E4	R777N2120--0--
0.015μF	8.5	17.0	26.5	22.5	4500	1400 E4	R777N2150--0--
0.018μF	10.0	18.5	26.5	22.5	4500	1400 E4	R777N2180--0--
0.022μF	10.0	18.5	26.5	22.5	4500	1400 E4	R777N2220--0--
0.027μF	11.0	20.0	26.5	22.5	4500	1400 E4	R777N2270--0--

Mechanical version and packaging (Table 1)

Internal use

Tolerance: H (± 2.5%); J (± 5%); K (± 10%)

Rated Cap.	900Vac (4 sections)				Max dv/dt (V/μs)	Max K ₀ (V ² /μs)	Part Number
	B	H	L	p			
1000pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1100--0--
1200pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1120--0--
1500pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1150--0--
1800pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1180--0--
2200pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1220--0--
2700pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1270--0--
3300pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1330--0--
3900pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1390--0--
4700pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1470--0--
5600pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1560--0--
6800pF	7.0	16.0	26.5	22.5	9500	3800 E4	R779N1680--0--
8200pF	7.0	16.0	26.5	22.5	9500	3800 E4	R779N1820--0--
0.010μF	8.5	17.0	26.5	22.5	9500	3800 E4	R779N2100--0--
0.012μF	10.0	18.5	26.5	22.5	9500	3800 E4	R779N2120--0--
0.015μF	10.0	18.5	26.5	22.5	9500	3800 E4	R779N2150--0--
0.018μF	11.0	20.0	26.5	22.5	9500	3800 E4	R779N2180--0--

Mechanical version and packaging (Table 1)

Internal use

Tolerance: H (± 2.5%); J (± 5%); K (± 10%)

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.
 The dv/dt test is carried out at 2 times the above values.

**POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES
A.C. APPLICATIONS**

PRODUCT CODE: R77

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):

250Vac (630Vdc) - 300Vac (800Vdc)
400Vac (1000Vdc) - 500Vac (1300Vdc)
700Vac (1600Vdc) - 900Vac (2000Vdc)

Rated temperature (T_R): + 85°C for V_R (d.c.)
+105°C for V_R (a.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.) has to be applied.

Capacitance range:

1000pF to 0.1µF

Capacitance values:

E12 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz):

± 2.5% (H); ± 5% (J); ± 10% (K).

Total self inductance : (L)

(Lead length ≈ 2 mm)

Pitch (mm)	10	15	22.5	27.5
L (nH) ≈	9	10	18	18

Dissipation factor (DF):

tgδ × 10⁻⁴ at +25°C ± 5°C

kHz	tgδ × 10 ⁻⁴
10	≤ 6
100	≤ 10

Insulation resistance:

Test conditions

Temperature: +25°C ± 5°C

Voltage charge time: 1 min

Voltage charge: 100Vdc

Performance

≥ 1 × 10⁵ MΩ (Typ.value: 5x 10⁵ MΩ)

Test voltage between terminations:

1.6 × V_R applied for 2 s at 25°C ± 5°C

TEST METHOD AND PERFORMANCE

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: +105°C ± 2°C

Test duration: 2000 h

Voltage applied: 1.25 × V_R (a.c.) at 50Hz

Performance

Capacitance change |ΔC/C|: ≤ 2%

DF change (Δtgδ): ≤ 10 × 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|: ≤ 1%

DF change (Δtgδ): ≤ 10 × 10⁻⁴ at 10kHz

Insulation resistance: ≥ initial limit.

Long term stability (after two years):

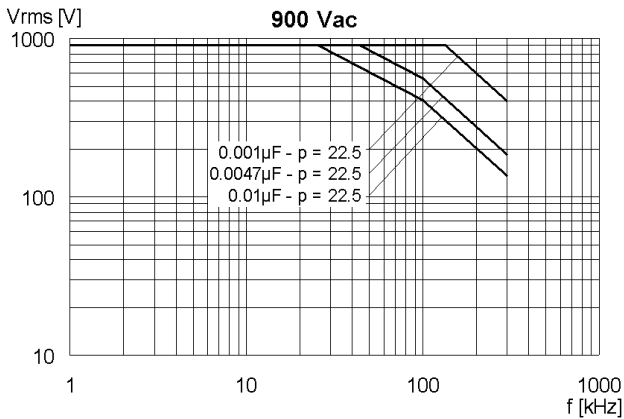
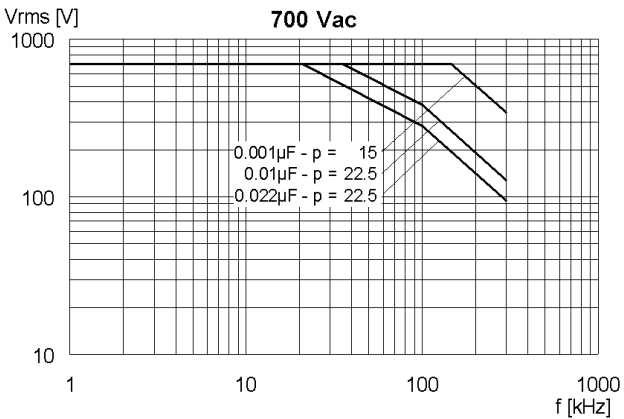
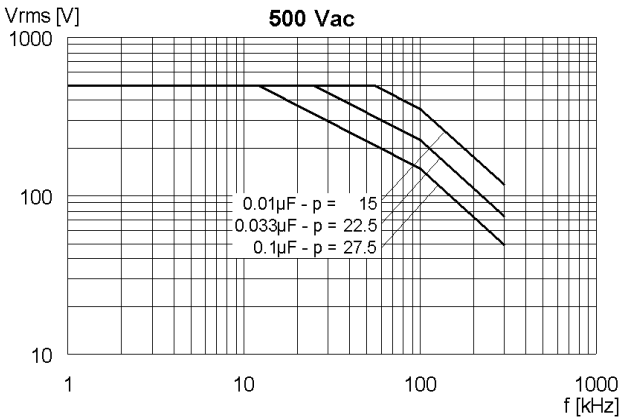
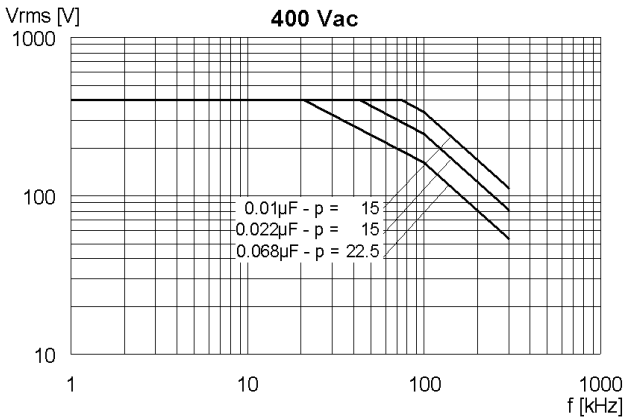
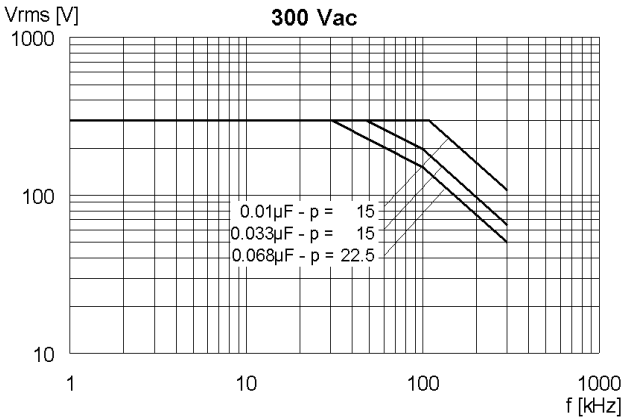
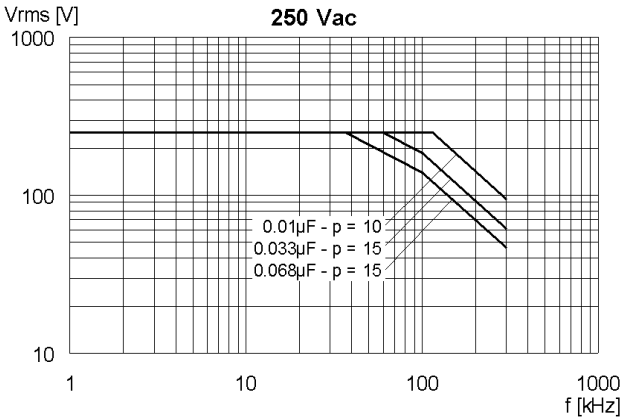
Storage: standard environmental conditions (see page 10).

Performance

Capacitance change |ΔC/C|: ≤ 0.5%

**MMKP Series
POLYPROPYLENE CAPACITOR WITH DOUBLE
SIDED METALLIZED ELECTRODES
A.C. APPLICATIONS**

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



Note: p (pitch) in mm.