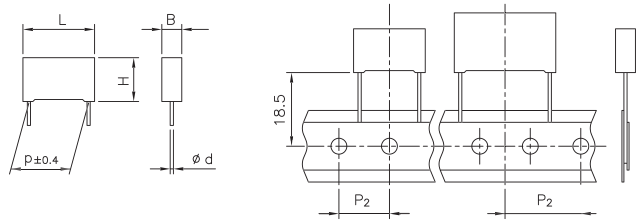
R60
MKT Series

Loose Taped

Fig.1 Fig. 2



Ød ±0.05	p = 10	p >10
	0.6	0.8

All dimensions are in mm.

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

Typical applications: blocking, coupling, decoupling, by-passing, interference suppression in low voltage applications (i.e.: AUTOMOTIVE).

PRODUCT CODE: **R60**

Note: Special version, in compliance with DIN 44122 is available upon request.

Construction:

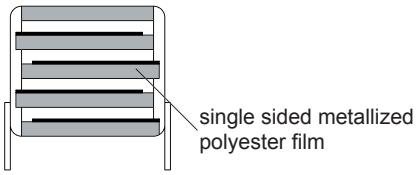
- **STACKED technology for pitch 10mm (Rated Voltage from 63 to 630Vdc)**
- **WOUND technology from pitch 10 to 27.5mm (Rated Voltage from 63 to 1000Vdc)**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
10.0	All	B +0.2	H +0.1	L +0.2
15.0	<7.5	B +0.2	H +0.1	L +0.3
15.0	≥7.5	B +0.2	H +0.1	L +0.5
22.5	All	B +0.2	H +0.1	L +0.3
27.5	All	B +0.2	H +0.1	L +0.3
37.5	All	B +0.3	H +0.1	L +0.3

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: 55/105/56 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



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	0										-	

Digit 1 to 3 Series code.
Digit 4 d.c. rated voltage:
D = 63V E =100V G= 160V I = 250V
M =400V P =630V Q=1000V
Digit 5 Pitch:
F=10mm; I=15mm; N=22.5mm; R=27.5mm; W=37.5mm
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 (table1)
Digit 12 Identifies the dimensions and electrical characteristics.
Digit 13 Internal use
Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

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

Standard packaging style	Lead length	Taping style			Ordering code
	(mm)	P_2 (mm)	Fig. (No.)	Pitch (mm)	(Digit 10 to 11)
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø 355mm		12.70	1	10.0/15.0	GY
REEL Ø 500mm		12.70	1	10.0/15.0	CK
REEL Ø 500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4^{+2}				AA
Loose, long leads (p=10mm)	$17^{+1/-2}$				Z3
Loose, long leads (p≥15mm)	30^{+5} $25^{+2/-1}$				40 50

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

R60

MKT Series

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

STACKED VERSION

Rated Cap.	63Vdc/40Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1.0 µF	4.0	9.0	13.0	10.0	50	6.3 E3	R60DF4100--6--
1.5 µF	5.0	11.0	13.0	10.0	50	6.3 E3	R60DF4150--6--
2.2 µF	5.0	11.0	13.0	10.0	50	6.3 E3	R60DF4220--6--
3.3 µF	6.0	12.0	13.0	10.0	50	6.3 E3	R60DF4330--6--

Rated Cap.	100Vdc/63Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.33 µF	4.0	9.0	13.0	10.0	75	15 E3	R60EF3330--6--
0.47 µF	4.0	9.0	13.0	10.0	75	15 E3	R60EF3470--6--
0.68 µF	4.0	9.0	13.0	10.0	75	15 E3	R60EF3680--6--
1.0 µF	5.0	11.0	13.0	10.0	75	15 E3	R60EF4100--6--
1.5 µF	5.0	11.0	13.0	10.0	75	15 E3	R60EF4150--6--

Rated Cap.	160Vdc/90Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.22 µF	4.0	9.0	13.0	10.0	100	32 E3	R60GF3220--6--
0.33 µF	4.0	9.0	13.0	10.0	100	32 E3	R60GF3330--6--
0.47 µF	5.0	11.0	13.0	10.0	100	32 E3	R60GF3470--6--
0.68 µF	6.0	12.0	13.0	10.0	100	32 E3	R60GF3680--6--

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

Rated Cap.	250Vdc/160Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.10 µF	4.0	9.0	13.0	10.0	150	75 E3	R60IF 3100--6--
0.15 µF	4.0	9.0	13.0	10.0	150	75 E3	R60IF 3150--6--
0.22 µF	5.0	11.0	13.0	10.0	150	75 E3	R60IF 3220--6--
0.33 µF	5.0	11.0	13.0	10.0	150	75 E3	R60IF 3330--6--
0.47 µF	6.0	12.0	13.0	10.0	150	75 E3	R60IF 3470--6--

Rated Cap.	400Vdc/200Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.033 µF	4.0	9.0	13.0	10.0	175	140 E3	R60MF2330--6--
0.047 µF	4.0	9.0	13.0	10.0	175	140 E3	R60MF2470--6--
0.068 µF	4.0	9.0	13.0	10.0	175	140 E3	R60MF2680--6--
0.10 µF	5.0	11.0	13.0	10.0	175	140 E3	R60MF3100--6--
0.15 µF	6.0	12.0	13.0	10.0	175	140 E3	R60MF3150--6--

Rated Cap.	630Vdc/220*Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.010 µF	4.0	9.0	13.0	10.0	200	250 E3	R60PF2100--6--
0.015 µF	4.0	9.0	13.0	10.0	200	250 E3	R60PF2150--6--
0.022 µF	4.0	9.0	13.0	10.0	200	250 E3	R60PF2220--6--
0.033 µF	5.0	11.0	13.0	10.0	200	250 E3	R60PF2330--6--
0.047 µF	5.0	11.0	13.0	10.0	200	250 E3	R60PF2470--6--

Mechanical version and packaging (Table1)
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 K_0 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 167).

R60

MKT Series

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

WOUND VERSION

Rated Cap.	63Vdc/40Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.68 µF	5.0	11.0	18.0	15.0	2.5	0.32 E3	R60DI 3680--3--
1.0 µF	5.0	11.0	18.0	15.0	2.5	0.32 E3	R60DI 4100--3--
1.5 µF	5.0	11.0	18.0	15.0	2.5	0.32 E3	R60DI 4150--3--
2.2 µF	6.0	12.0	18.0	15.0	2.5	0.32 E3	R60DI 4220--3--
3.3 µF	7.5	13.5	18.0	15.0	2.5	0.32 E3	R60DI 4330--3--
3.3 µF	9.0	12.5	18.0	15.0	2.5	0.32 E3	R60DI 4330--L--
4.7 µF	8.5	14.5	18.0	15.0	2.5	0.32 E3	R60DI 4470--3--
4.7 µF	13.0	12.0	18.0	15.0	2.5	0.32 E3	R60DI 4470--L--
6.8 µF	10.0	16.0	18.0	15.0	2.5	0.32 E3	R60DI 4680--3--
3.3 µF	6.0	15.0	26.5	22.5	1.5	0.19 E3	R60DN4330--3--
4.7 µF	7.0	16.0	26.5	22.5	1.5	0.19 E3	R60DN4470--3--
6.8 µF	7.0	16.0	26.5	22.5	1.5	0.19 E3	R60DN4680--3--
10.0 µF	8.5	17.0	26.5	22.5	1.5	0.19 E3	R60DN5100--3--
15.0 µF	11.0	20.0	26.5	22.5	1.5	0.19 E3	R60DN5150--3--
10.0 µF	9.0	17.0	32.0	27.5	1.0	0.13 E3	R60DR5100--3--
15.0 µF	9.0	17.0	32.0	27.5	1.0	0.13 E3	R60DR5150--4--
22.0 µF	11.0	20.0	32.0	27.5	1.0	0.13 E3	R60DR5220--4--
33.0 µF	13.0	22.0	32.0	27.5	1.0	0.13 E3	R60DR5330--4--
47.0 µF	14.0	28.0	32.0	27.5	1.0	0.13 E3	R60DR5470--4--
68.0 µF	18.0	33.0	32.0	27.5	1.0	0.13 E3	R60DR5680--4--
100.0 µF	22.0	37.0	32.0	27.5	1.0	0.13 E3	R60DR6100--0--
22.0 µF	11.0	22.0	41.5	37.5	0.8	0.10 E3	R60DW5220--3--
33.0 µF	11.0	22.0	41.5	37.5	0.8	0.10 E3	R60DW5330--4--
47.0 µF	13.0	24.0	41.5	37.5	0.8	0.10 E3	R60DW5470--4--
68.0 µF	19.0	32.0	41.5	37.5	0.8	0.10 E3	R60DW5680--3--
100.0 µF	19.0	32.0	41.5	37.5	0.8	0.10 E3	R60DW6100--4--
150.0 µF	20.0	40.0	41.5	37.5	0.8	0.10 E3	R60DW6150--0--
220.0 µF	24.0	44.0	41.5	37.5	0.8	0.10 E3	R60DW6220--0--

Rated Cap.	100Vdc/63Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.33 µF	5.0	11.0	18.0	15.0	3.0	0.6 E3	R60EI 3330--3--
0.47 µF	5.0	11.0	18.0	15.0	3.0	0.6 E3	R60EI 3470--3--
0.68 µF	5.0	11.0	18.0	15.0	3.0	0.6 E3	R60EI 3680--3--
1.0 µF	5.0	11.0	18.0	15.0	3.0	0.6 E3	R60EI 4100--3--
1.5 µF	7.5	13.5	18.0	15.0	3.0	0.6 E3	R60EI 4150--3--
2.2 µF	8.5	14.5	18.0	15.0	3.0	0.6 E3	R60EI 4220--3--
2.2 µF	9.0	12.5	18.0	15.0	3.0	0.6 E3	R60EI 4220--L--
3.3 µF	10.0	16.0	18.0	15.0	3.0	0.6 E3	R60EI 4330--3--
3.3 µF	13.0	12.0	18.0	15.0	3.0	0.6 E3	R60EI 4330--L--
4.7 µF	11.0	19.0	18.0	15.0	3.0	0.6 E3	R60EI 4470--3--
1.5 µF	6.0	15.0	26.5	22.5	2.0	0.4 E3	R60EN4150--3--
2.2 µF	6.0	15.0	26.5	22.5	2.0	0.4 E3	R60EN4220--3--
3.3 µF	7.0	16.0	26.5	22.5	2.0	0.4 E3	R60EN4330--3--
4.7 µF	8.5	17.0	26.5	22.5	2.0	0.4 E3	R60EN4470--3--
6.8 µF	10.0	18.5	26.5	22.5	2.0	0.4 E3	R60EN4680--3--
10.0 µF	13.0	22.0	26.5	22.5	2.0	0.4 E3	R60EN5100--3--
4.7 µF	9.0	17.0	32.0	27.5	1.5	0.3 E3	R60ER4470--3--
6.8 µF	9.0	17.0	32.0	27.5	1.5	0.3 E3	R60ER4680--3--
10.0 µF	9.0	17.0	32.0	27.5	1.5	0.3 E3	R60ER5100--4--
15.0 µF	11.0	20.0	32.0	27.5	1.5	0.3 E3	R60ER5150--4--
22.0 µF	13.0	22.0	32.0	27.5	1.5	0.3 E3	R60ER5220--4--
33.0 µF	14.0	28.0	32.0	27.5	1.5	0.3 E3	R60ER5330--4--
47.0 µF	18.0	33.0	32.0	27.5	1.5	0.3 E3	R60ER5470--4--
68.0 µF	22.0	37.0	32.0	27.5	1.5	0.3 E3	R60ER5680--0--
15.0 µF	11.0	22.0	41.5	37.5	1.0	0.2 E3	R60EW5150--4--
22.0 µF	11.0	22.0	41.5	37.5	1.0	0.2 E3	R60EW5220--4--
33.0 µF	13.0	24.0	41.5	37.5	1.0	0.2 E3	R60EW5330--4--
47.0 µF	16.0	28.5	41.5	37.5	1.0	0.2 E3	R60EW5470--4--
68.0 µF	19.0	32.0	41.5	37.5	1.0	0.2 E3	R60EW5680--5--
100.0 µF	20.0	40.0	41.5	37.5	1.0	0.2 E3	R60EW6100--0--
150.0 µF	24.0	44.0	41.5	37.5	1.0	0.2 E3	R60EW6150--0--

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

All dimensions are in mm.

Rated Cap.	160Vdc/90Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.33 µF	5.0	11.0	18.0	15.0	9.0	2.90 E3	R60GI 3330--3--
0.47 µF	5.0	11.0	18.0	15.0	9.0	2.90 E3	R60GI 3470--3--
0.68 µF	5.0	11.0	18.0	15.0	9.0	2.90 E3	R60GI 3680--3--
1.0 µF	7.5	13.5	18.0	15.0	9.0	2.90 E3	R60GI 4100--3--
1.5 µF	8.5	14.5	18.0	15.0	9.0	2.90 E3	R60GI 4150--3--
1.5 µF	9.0	12.5	18.0	15.0	9.0	2.90 E3	R60GI 4150--L--
2.2 µF	10.0	16.0	18.0	15.0	9.0	2.90 E3	R60GI 4220--3--
2.2 µF	13.0	12.0	18.0	15.0	9.0	2.90 E3	R60GI 4220--L--
3.3 µF	11.0	19.0	18.0	15.0	9.0	2.90 E3	R60GI 4330--3--
1.5 µF	6.0	15.0	26.5	22.5	5.5	1.70 E3	R60GN4150--3--
2.2 µF	7.0	16.0	26.5	22.5	5.5	1.70 E3	R60GN4220--3--
3.3 µF	8.5	17.0	26.5	22.5	5.5	1.70 E3	R60GN4330--3--
4.7 µF	11.0	20.0	26.5	22.5	5.5	1.70 E3	R60GN4470--3--
6.8 µF	13.0	22.0	26.5	22.5	5.5	1.70 E3	R60GN4680--3--
3.3 µF	9.0	17.0	32.0	27.5	3.0	0.96 E3	R60GR4330--3--
4.7 µF	9.0	17.0	32.0	27.5	3.0	0.96 E3	R60GR4470--3--
6.8 µF	9.0	17.0	32.0	27.5	3.0	0.96 E3	R60GR4680--4--
10.0 µF	9.0	17.0	32.0	27.5	3.0	0.96 E3	R60GR5100--4--
15.0 µF	11.0	20.0	32.0	27.5	3.0	0.96 E3	R60GR5150--4--
22.0 µF	13.0	22.0	32.0	27.5	3.0	0.96 E3	R60GR5220--4--
33.0 µF	14.0	28.0	32.0	27.5	3.0	0.96 E3	R60GR5330--0--
47.0 µF	18.0	33.0	32.0	27.5	3.0	0.96 E3	R60GR5470--0--
68.0 µF	22.0	37.0	32.0	27.5	3.0	0.96 E3	R60GR5680--0--
10.0 µF	11.0	22.0	41.5	37.5	2.0	0.64 E3	R60GW5100--3--
15.0 µF	11.0	22.0	41.5	37.5	2.0	0.64 E3	R60GW5150--4--
22.0 µF	11.0	22.0	41.5	37.5	2.0	0.64 E3	R60GW5220--4--
33.0 µF	13.0	24.0	41.5	37.5	2.0	0.64 E3	R60GW5330--4--
47.0 µF	16.0	28.5	41.5	37.5	2.0	0.64 E3	R60GW5470--4--
68.0 µF	19.0	32.0	41.5	37.5	2.0	0.64 E3	R60GW5680--0--
100.0 µF	20.0	40.0	41.5	37.5	2.0	0.64 E3	R60GW6100--0--
150.0 µF	30.0	45.0	41.5	37.5	2.0	0.64 E3	R60GW6150--0--

Rated Cap.	250Vdc/160Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.10 µF	5.0	11.0	18.0	15.0	12	6.0 E3	R60II 3100--3--
0.15 µF	5.0	11.0	18.0	15.0	12	6.0 E3	R60II 3150--3--
0.22 µF	5.0	11.0	18.0	15.0	12	6.0 E3	R60II 3220--3--
0.33 µF	5.0	11.0	18.0	15.0	12	6.0 E3	R60II 3330--3--
0.47 µF	6.0	12.0	18.0	15.0	12	6.0 E3	R60II 3470--3--
0.68 µF	7.5	13.5	18.0	15.0	12	6.0 E3	R60II 3680--3--
0.68 µF	9.0	12.5	18.0	15.0	12	6.0 E3	R60II 3680--L--
1.0 µF	8.5	14.5	18.0	15.0	12	6.0 E3	R60II 4100--3--
1.0 µF	13.0	12.0	18.0	15.0	12	6.0 E3	R60II 4100--L--
1.5 µF	10.0	16.0	18.0	15.0	12	6.0 E3	R60II 4150--3--
0.47 µF	6.0	15.0	26.5	22.5	8	4.0 E3	R60IN 3470--3--
0.68 µF	6.0	15.0	26.5	22.5	8	4.0 E3	R60IN 3680--3--
1.0 µF	6.0	15.0	26.5	22.5	8	4.0 E3	R60IN 4100--3--
1.5 µF	7.0	16.0	26.5	22.5	8	4.0 E3	R60IN 4150--3--
2.2 µF	10.0	18.5	26.5	22.5	8	4.0 E3	R60IN 4220--3--
3.3 µF	11.0	20.0	26.5	22.5	8	4.0 E3	R60IN 4330--3--
1.5 µF	9.0	17.0	32.0	27.5	5	2.5 E3	R60IR 4150--3--
2.2 µF	9.0	17.0	32.0	27.5	5	2.5 E3	R60IR 4220--3--
3.3 µF	9.0	17.0	32.0	27.5	5	2.5 E3	R60IR 4330--4--
4.7 µF	9.0	17.0	32.0	27.5	5	2.5 E3	R60IR 4470--4--
6.8 µF	11.0	20.0	32.0	27.5	5	2.5 E3	R60IR 4680--4--
10.0 µF	13.0	22.0	32.0	27.5	5	2.5 E3	R60IR 5100--4--
15.0 µF	14.0	28.0	32.0	27.5	5	2.5 E3	R60IR 5150--4--
22.0 µF	18.0	33.0	32.0	27.5	5	2.5 E3	R60IR 5220--0--
33.0 µF	22.0	37.0	32.0	27.5	5	2.5 E3	R60IR 5330--0--
4.7 µF	11.0	22.0	41.5	37.5	4	2.0 E3	R60IW 4470--3--
6.8 µF	11.0	22.0	41.5	37.5	4	2.0 E3	R60IW 4680--4--
10.0 µF	11.0	22.0	41.5	37.5	4	2.0 E3	R60IW 5100--4--
15.0 µF	13.0	24.0	41.5	37.5	4	2.0 E3	R60IW 5150--4--
22.0 µF	16.0	28.5	41.5	37.5	4	2.0 E3	R60IW 5220--4--
33.0 µF	19.0	32.0	41.5	37.5	4	2.0 E3	R60IW 5330--4--
47.0 µF	20.0	40.0	41.5	37.5	4	2.0 E3	R60IW 5470--0--
68.0 µF	24.0	44.0	41.5	37.5	4	2.0 E3	R60IW 5680--0--

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

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 K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

R60

MKT Series

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

WOUND VERSION

Rated Cap.	400Vdc/200Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.047 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 2470--3--
0.068 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 2680--3--
0.10 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 3100--3--
0.15 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 3150--3--
0.22 µF	6.0	12.0	18.0	15.0	20.0	16.0 E3	R60MI 3220--3--
0.33 µF	7.5	13.5	18.0	15.0	20.0	16.0 E3	R60MI 3330--3--
0.33 µF	9.0	12.5	18.0	15.0	20.0	16.0 E3	R60MI 3330--L--
0.47 µF	8.5	14.5	18.0	15.0	20.0	16.0 E3	R60MI 3470--3--
0.47 µF	13.0	12.0	18.0	15.0	20.0	16.0 E3	R60MI 3470--L--
0.68 µF	11.0	19.0	18.0	15.0	20.0	16.0 E3	R60MI 3680--3--
0.22 µF	6.0	15.0	26.5	22.5	10.0	8.0 E3	R60MN3220--3--
0.33 µF	6.0	15.0	26.5	22.5	10.0	8.0 E3	R60MN3330--3--
0.47 µF	6.0	15.0	26.5	22.5	10.0	8.0 E3	R60MN3470--3--
0.68 µF	7.0	16.0	26.5	22.5	10.0	8.0 E3	R60MN3680--3--
1.0 µF	10.0	18.5	26.5	22.5	10.0	8.0 E3	R60MN4100--3--
1.5 µF	11.0	20.0	26.5	22.5	10.0	8.0 E3	R60MN4150--3--
0.68 µF	9.0	17.0	32.0	27.5	8.5	3.4 E3	R60MR3680--3--
1.0 µF	9.0	17.0	32.0	27.5	8.5	3.4 E3	R60MR4100--3--
1.5 µF	9.0	17.0	32.0	27.5	8.5	3.4 E3	R60MR4150--4--
2.2 µF	11.0	20.0	32.0	27.5	8.5	3.4 E3	R60MR4220--4--
3.3 µF	13.0	22.0	32.0	27.5	8.5	3.4 E3	R60MR4330--4--
4.7 µF	14.0	28.0	32.0	27.5	8.5	3.4 E3	R60MR4470--4--
6.8 µF	18.0	33.0	32.0	27.5	8.5	3.4 E3	R60MR4680--4--
10.0 µF	22.0	37.0	32.0	27.5	8.5	3.4 E3	R60MR5100--4--
3.3 µF	11.0	22.0	41.5	37.5	6.0	2.4 E3	R60MW4330--3--
4.7 µF	11.0	22.0	41.5	37.5	6.0	2.4 E3	R60MW4470--4--
6.8 µF	13.0	24.0	41.5	37.5	6.0	2.4 E3	R60MW4680--4--
10.0 µF	16.0	28.5	41.5	37.5	6.0	2.4 E3	R60MW5100--4--
15.0 µF	24.0	44.0	41.5	37.5	6.0	2.4 E3	R60MW5150--3--
22.0 µF	24.0	44.0	41.5	37.5	6.0	2.4 E3	R60MW5220--4--
33.0 µF	30.0	45.0	41.5	37.5	6.0	2.4 E3	R60MW5330--4--

Rated Cap.	630Vdc/220*Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
4700 pF	4.0	9.0	13.0	10.0	40	50 E3	R60PF 1470--3--
6800 pF	4.0	9.0	13.0	10.0	40	50 E3	R60PF 1680--3--
0.033 µF	5.0	11.0	18.0	15.0	25	31 E3	R60PI 2330--3--
0.047 µF	5.0	11.0	18.0	15.0	25	31 E3	R60PI 2470--3--
0.068 µF	6.0	12.0	18.0	15.0	25	31 E3	R60PI 2680--3--
0.10 µF	7.5	13.5	18.0	15.0	25	31 E3	R60PI 3100--3--
0.15 µF	8.5	14.5	18.0	15.0	25	31 E3	R60PI 3150--3--
0.10 µF	6.0	15.0	26.5	22.5	12	15 E3	R60PN3100--3--
0.15 µF	6.0	15.0	26.5	22.5	12	15 E3	R60PN3150--3--
0.22 µF	7.0	16.0	26.5	22.5	12	15 E3	R60PN3220--3--
0.33 µF	10.0	18.5	26.5	22.5	12	15 E3	R60PN3330--3--
0.33 µF	9.0	17.0	32.0	27.5	10	12 E3	R60PR3330--3--
0.47 µF	9.0	17.0	32.0	27.5	10	12 E3	R60PR3470--4--
0.68 µF	11.0	20.0	32.0	27.5	10	12 E3	R60PR3680--4--
1.0 µF	11.0	20.0	32.0	27.5	10	12 E3	R60PR4100--5--
1.5 µF	18.0	33.0	32.0	27.5	10	12 E3	R60PR4150--3--
2.2 µF	18.0	33.0	32.0	27.5	10	12 E3	R60PR4220--4--
3.3 µF	22.0	37.0	32.0	27.5	10	12 E3	R60PR4330--4--
4.7 µF	22.0	37.0	32.0	27.5	10	12 E3	R60PR4470--4--
1.0 µF	11.0	22.0	41.5	37.5	8	9.6 E3	R60PW4100--3--
1.5 µF	11.0	22.0	41.5	37.5	8	9.6 E3	R60PW4150--4--
2.2 µF	13.0	24.0	41.5	37.5	8	9.6 E3	R60PW4220--4--
3.3 µF	16.0	28.5	41.5	37.5	8	9.6 E3	R60PW4330--4--
4.7 µF	19.0	32.0	41.5	37.5	8	9.6 E3	R60PW4470--4--
6.8 µF	20.0	40.0	41.5	37.5	8	9.6 E3	R60PW4680--0--
10.0 µF	24.0	44.0	41.5	37.5	8	9.6 E3	R60PW5100--4--

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

Rated Cap.	1000Vdc/250Vac* Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
1000 pF	4.0	9.0	13.0	10.0	60	120 E3	R60QF 1100--0--
1500 pF	4.0	9.0	13.0	10.0	60	120 E3	R60QF 1150--0--
2200 pF	4.0	9.0	13.0	10.0	60	120 E3	R60QF 1220--0--
3300 pF	4.0	9.0	13.0	10.0	60	120 E3	R60QF 1330--0--
4700 pF	5.0	11.0	13.0	10.0	60	120 E3	R60QF 1470--0--
6800 pF	6.0	12.0	13.0	10.0	60	120 E3	R60QF 1680--0--
0.010 µF	5.0	11.0	18.0	15.0	30	60 E3	R60QI 2100--0--
0.015 µF	5.0	11.0	18.0	15.0	30	60 E3	R60QI 2150--3--
0.022 µF	6.0	12.0	18.0	15.0	30	60 E3	R60QI 2220--3--
0.033 µF	7.5	13.5	18.0	15.0	30	60 E3	R60QI 2330--3--
0.033 µF	9.0	12.5	18.0	15.0	30	60 E3	R60QI 2330--L--
0.047 µF	10.0	16.0	18.0	15.0	30	60 E3	R60QI 2470--0--
0.047 µF	13.0	12.0	18.0	15.0	30	60 E3	R60QI 2470--L--
0.068 µF	11.0	19.0	18.0	15.0	30	60 E3	R60QI 2680--0--
0.033 µF	6.0	15.0	26.5	22.5	15	30 E3	R60QN2330--0--
0.047 µF	6.0	15.0	26.5	22.5	15	30 E3	R60QN2470--0--
0.068 µF	7.0	16.0	26.5	22.5	15	30 E3	R60QN2680--3--
0.10 µF	8.5	17.0	26.5	22.5	15	30 E3	R60QN3100--3--
0.15 µF	13.0	22.0	26.5	22.5	15	30 E3	R60QN3150--0--
0.15 µF	9.0	17.0	32.0	27.5	12	24 E3	R60QR3150--3--
0.22 µF	9.0	17.0	32.0	27.5	12	24 E3	R60QR3220--4--
0.33 µF	11.0	20.0	32.0	27.5	12	24 E3	R60QR3330--4--
0.47 µF	13.0	22.0	32.0	27.5	12	24 E3	R60QR3470--4--
0.68 µF	14.0	28.0	32.0	27.5	12	24 E3	R60QR3680--4--
1.00 µF	18.0	33.0	32.0	27.5	12	24 E3	R60QR4100--4--
1.50 µF	22.0	37.0	32.0	27.5	12	24 E3	R60QR4150--4--
0.47 µF	11.0	22.0	41.5	37.5	10	20 E3	R60QW3470--3--
0.68 µF	11.0	22.0	41.5	37.5	10	20 E3	R60QW3680--4--
1.00 µF	13.0	24.0	41.5	37.5	10	20 E3	R60QW4100--4--
1.50 µF	16.0	28.5	41.5	37.5	10	20 E3	R60QW4150--4--
2.20 µF	19.0	32.0	41.5	37.5	10	20 E3	R60QW4220--3--
3.30 µF	24.0	44.0	41.5	37.5	10	20 E3	R60QW4330--0--
4.70 µF	30.0	45.0	41.5	37.5	10	20 E3	R60QW4470--4--

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 K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

Note 2: Rated voltages higher than 1000Vdc are available upon request.

* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 167).

R60

MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 63 Vdc -100 Vdc - 160 Vdc - 250 Vdc 400 Vdc - 630 Vdc-1000 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 (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 220µF

Capacitance values:

E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**

±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:** (lead length ~2mm)

Pitch (mm)	10	15	22.5	27.5	37.5
L(nH) ≈	9	10	18	18	22

Dissipation factor (DF):

tgδ 10^{-4} at +25°C ±5°C

kHz	C≤1µF	C>1µF
1	≤100	≤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 (50000 MΩ)*
≥1250 s for C >0.33µF (5000 s)*

For V_R >100 Vdc
≥30000 MΩ for C ≤0.33µF (50000 MΩ)*
≥10000 s for C >0.33µF (17000 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|: ≤5%
DF change (Δtgδ): ≤50x10^{-4} at 1kHz
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions

Temperature: +105°C±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_C

Performance

Capacitance change |ΔC/C|: ≤5%
DF change (Δtgδ): ≤50x10^{-4} at 10kHz for C≤1µF
≤30x10^{-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|: ≤2%
DF change (Δtgδ): ≤50x10^{-4} at 10kHz for C≤1µF
≤30x10^{-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|: ≤3% for C ≤0.1µF
≤2% for C >0.1µF

RELIABILITY:

Reference MIL HDB 217

Application conditions:

Temperature: +40°C±2°C
Voltage: 0.5xV_R
Failure rate: ≤5 FIT
(1 FIT = 1x10^{-9} failures/componentsxh)

Failure criteria:

Short or open circuit
Capacitance change |ΔC/C|: >10%
DF change (Δtgδ): >2xinitial limit.
Insulation resistance: <0.005xinitial limit.