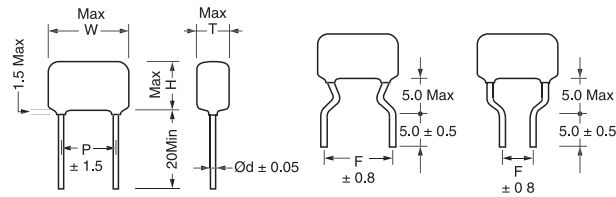


Straight lead type

Single formed lead type



METALLIZED POLYESTER FILM CAPACITOR

Typical applications:

Small size, achieved by our unique manufacturing method. Highly reliable because of its self-healing performance. Uniform flame-retardant epoxy resin coating through the latest resin technology. This provides miniature size and light weight.

PRODUCT CODE: **MMC**

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 to 6 The rated capacitance of the capacitor is defined by an exponential code where positions 4-5 express the two first capacitance figures and position 6 expresses the number of zeros that must be added to obtain the Rated Capacitance in pF.
- Digit 7 It defines the capacitance tolerance percentage, according to IEC 62 Standard, when possible. At present, the following tolerances have been defined: J=±5%; K=±10%
- Digit 8 It defines the product voltage according to page 21.
- Digit 9 to 13 Indicate leads / packaging according to page 20.
- Digit 14 to 15 Internal use

GENERAL TECHNICAL DATA

- Dielectric:** polyester film (polyethylene terephthalate).
- Plates:** aluminium layer deposited by evaporation under vacuum.
- Winding:** non-inductive type.
- Leads:** tinned wire.
- Protection:** thermosetting resin.

Rated Cap.	250 Vdc						Max dv/dt (V/µs)	Part Number	Number of pieces for packing unit	
	W	H	T	P	F	Ø d			Taped (ammopack)	Loose (box)
1000 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	110	MMC102-I- - - - -	1000	2000
1500 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	110	MMC152-I- - - - -	1000	2000
2200 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	75	MMC222-I- - - - -	1000	2000
3300 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	75	MMC332-I- - - - -	1000	2000
4700 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	75	MMC472-I- - - - -	1000	2000
6800 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	75	MMC682-I- - - - -	1000	2000
0.010 µF	10.3	7.4	4.3	7.5	5.0/7.5	0.6	75	MMC103-I- - - - -	1000	2000
0.015 µF	10.3	7.5	4.4	7.5	5.0/7.5	0.6	75	MMC153-I- - - - -	1000	2000
0.022 µF	10.3	7.5	4.4	7.5	5.0/7.5	0.6	75	MMC223-I- - - - -	1000	2000
0.033 µF	10.3	7.5	4.4	7.5	5.0/7.5	0.6	75	MMC333-I- - - - -	1000	2000
0.047 µF	10.3	7.9	4.4	7.5	5.0/7.5	0.6	75	MMC473-I- - - - -	1000	2000
0.068 µF	10.3	7.5	4.5	7.5	5.0/7.5	0.6	75	MMC683-I- - - - -	1000	2000
0.10 µF	10.3	8.4	5.8	7.5	5.0/7.5	0.6	75	MMC104-I- - - - -	1000	2000
0.15 µF	10.3	10.8	6.0	7.5	5.0/7.5	0.6	75	MMC154-I- - - - -	1000	2000
0.22 µF	12.5	10.3	5.5	10.0	5.0/7.5/10.0	0.6	50	MMC224-I- - - - -	1000	1500
0.33 µF	12.5	11.5	6.5	10.0	5.0/7.5/10.0	0.6	50	MMC334-I- - - - -	500	1500
0.47 µF	18.0	12.5	5.3	15.0	5.0/7.5/15.0	0.6	30	MMC474-I- - - - -	500	1000
0.68 µF	18.0	13.5	6.0	15.0	5.0/7.5/15.0	0.8	30	MMC684-I- - - - -	400	500
1.0 µF	18.0	15.0	7.4	15.0	5.0/7.5/15.0	0.8	30	MMC105-I- - - - -	400	500
1.5 µF	18.0	16.8	9.0	15.0	7.5/15.0	0.8	30	MMC155-I- - - - -	300	500
2.2 µF	25.0	16.3	8.5	22.5	22.5	0.8	18	MMC225-I- - - - -		250
3.3 µF	25.0	18.0	10.3	22.5	22.5	0.8	18	MMC335-I- - - - -		200
4.7 µF	25.0	21.5	12.0	22.5	22.5	0.8	18	MMC475-I- - - - -		200
6.8 µF	30.0	22.4	13.0	27.5	27.5	0.8	14	MMC685-I- - - - -		100
10.0 µF	30.0	25.8	15.9	27.5	27.5	0.8	14	MMC106-I- - - - -		100

All dimensions are in mm.

METALLIZED POLYESTER FILM CAPACITOR

PRODUCT CODE: MMC

Rated Cap.	400 Vdc						Max dv/dt (V/μs)	Part Number	Number of pieces for packing unit	
	W	H	T	P	F	Ø d			Taped (ammopack)	Loose (box)
1000 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC102 -M - - - - -	1000	2000
1500 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC152 -M - - - - -	1000	2000
2200 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC222 -M - - - - -	1000	2000
3300 pF	10.3	7.0	4.0	7.5	5.0	0.6	150	MMC332 -M - - - - -	1000	2000
4700 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC472 -M - - - - -	1000	2000
6800 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC682 -M - - - - -	1000	2000
0.010 μF	10.3	7.6	4.4	7.5	5.0/7.5	0.6	150	MMC103 -M - - - - -	1000	2000
0.015 μF	10.3	7.8	4.4	7.5	5.0/7.5	0.6	150	MMC153 -M - - - - -	1000	2000
0.022 μF	10.3	7.9	4.5	7.5	5.0/7.5	0.6	150	MMC223 -M - - - - -	1000	2000
0.033 μF	10.3	9.0	5.5	7.5	5.0/7.5	0.6	150	MMC333 -M - - - - -	1000	2000
0.047 μF	12.5	8.3	5.2	10.0	5.0/7.5/10.0	0.6	110	MMC473 -M - - - - -	1000	2000
0.068 μF	12.5	10.5	5.5	10.0	5.0/7.5/10.0	0.6	110	MMC683 -M - - - - -	1000	2000
0.10 μF	12.5	12.0	6.0	10.0	5.0/7.5/10.0	0.6	110	MMC104 -M - - - - -	1000	2000
0.15 μF	18.0	12.0	5.5	15.0	5.0/7.5/15.0	0.6	60	MMC154 -M - - - - -	500	2000
0.22 μF	18.0	13.0	6.5	15.0	5.0/7.5/15.0	0.6	60	MMC224 -M - - - - -	400	2000
0.33 μF	18.0	14.0	7.7	15.0	5.0/7.5/15.0	0.8	60	MMC334 -M - - - - -	300	500
0.47 μF	18.0	16.5	8.5	15.0	5.0/7.5/15.0	0.8	60	MMC474 -M - - - - -	300	5000
0.68 μF	25.0	16.0	8.2	22.5	22.5	0.8	35	MMC684 -M - - - - -		250
1.0 μF	25.0	17.7	10.0	22.5	22.5	0.8	35	MMC105 -M - - - - -		200
1.5 μF	30.0	19.5	10.0	27.5	27.5	0.8	30	MMC155 -M - - - - -		200
2.2 μF	30.0	19.8	10.4	27.5	27.5	0.8	30	MMC225 -M - - - - -		100
3.3 μF	30.0	22.3	13.0	27.5	27.5	0.8	30	MMC335 -M - - - - -		100
4.7 μF	30.0	25.5	15.8	27.5	27.5	0.8	30	MMC475 -M - - - - -		100

Rated Cap.	450 Vdc						Max dv/dt (V/μs)	Part Number	Number of pieces for packing unit	
	W	H	T	P	F	Ø d			Taped (ammopack)	Loose (box)
1000 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC102 -X - - - - -	1000	2000
1500 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC152 -X - - - - -	1000	2000
2200 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC222 -X - - - - -	1000	2000
3300 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC332 -X - - - - -	1000	2000
4700 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC472 -X - - - - -	1000	2000
6800 pF	10.3	7.0	4.0	7.5	5.0/7.5	0.6	150	MMC682 -X - - - - -	1000	2000
0.010 μF	10.3	7.6	4.4	7.5	5.0/7.5	0.6	150	MMC103 -X - - - - -	1000	2000
0.015 μF	10.3	7.8	4.4	7.5	5.0/7.5	0.6	150	MMC153 -X - - - - -	1000	2000
0.022 μF	10.3	7.9	4.5	7.5	5.0/7.5	0.6	150	MMC223 -X - - - - -	1000	2000
0.033 μF	10.3	9.0	5.5	7.5	5.0/7.5	0.6	150	MMC333 -X - - - - -	1000	2000
0.047 μF	12.5	8.3	5.2	10.0	5.0/7.5/10.0	0.6	110	MMC473 -X - - - - -	1000	1600
0.068 μF	12.5	10.5	5.5	10.0	5.0/7.5/10.0	0.6	110	MMC683 -X - - - - -	1000	1500
0.10 μF	12.5	12.0	6.0	10.0	5.0/7.5/10.0	0.6	110	MMC104 -X - - - - -	1000	1000
0.15 μF	18.0	12.0	5.5	15.0	5.0/7.5/10.0	0.6	60	MMC154 -X - - - - -	500	1000
0.22 μF	18.0	13.0	6.5	15.0	5.0/7.5/10.0	0.6	60	MMC224 -X - - - - -	400	500
0.33 μF	18.0	14.0	7.7	15.0	5.0/7.5/10.0	0.8	60	MMC334 -X - - - - -	300	500
0.47 μF	18.0	16.5	8.5	15.0	5.0/7.5/10.0	0.8	60	MMC474 -X - - - - -	300	500
0.68 μF	25.0	16.0	8.2	22.5	22.5	0.8	35	MMC684 -X - - - - -		250
1.0 μF	25.0	17.7	10.0	22.5	22.5	0.8	35	MMC105 -X - - - - -		200
1.5 μF	30.0	19.5	10.0	27.5	27.5	0.8	30	MMC155 -X - - - - -		200
2.2 μF	30.0	23.0	12.5	27.5	27.5	0.8	30	MMC225 -X - - - - -		100
3.3 μF	30.0	26.5	15.5	27.5	27.5	0.8	30	MMC335 -X - - - - -		100

All dimensions are in mm.

METALLIZED POLYESTER FILM CAPACITOR

PRODUCT CODE: MMC

Rated Cap.	630 Vdc						Max dv/dt (V/μs)	Part Number	Number of pieces for packing unit	
	W	H	T	P	F	Ø d			Taped (ammopack)	Loose (box)
1000 pF	10.3	7.5	4.5	7.5	5.0/7.5	0.6	260	MMC102 -P - - - - -	1000	2000
1500 pF	10.3	7.5	4.5	7.5	5.0/7.5	0.6	260	MMC152 -P - - - - -	1000	2000
2200 pF	10.3	7.5	4.5	7.5	5.0/7.5	0.6	260	MMC222 -P - - - - -	1000	2000
3300 pF	10.3	7.5	4.5	7.5	5.0	0.6	260	MMC332 -P - - - - -	1000	2000
4700 pF	10.3	7.5	4.5	7.5	5.0/7.5	0.6	260	MMC472 -P - - - - -	1000	2000
6800 pF	10.3	7.5	4.5	7.5	5.0/7.5	0.6	260	MMC682 -P - - - - -	1000	2000
0.010 μF	12.5	7.5	4.0	10.0	5.0/7.5/10.0	0.6	190	MMC103 -P - - - - -	1000	2000
0.015 μF	12.5	8.2	5.0	10.0	5.0/7.5/10.0	0.6	190	MMC153 -P - - - - -	1000	2000
0.022 μF	12.5	10.5	5.3	10.0	5.0/7.5/10.0	0.6	190	MMC223 -P - - - - -	1000	1600
0.033 μF	12.5	11.0	6.0	10.0	5.0/7.5/10.0	0.6	190	MMC333 -P - - - - -	1000	1500
0.047 μF	12.5	13.0	6.5	10.0	5.0/7.5/10.0	0.6	190	MMC473 -P - - - - -	500	1000
0.068 μF	18.0	11.0	6.0	15.0	5.0/7.5/15.0	0.6	100	MMC683 -P - - - - -	500	1000
0.10 μF	18.0	13.0	6.5	15.0	5.0/7.5/15.0	0.6	100	MMC104 -P - - - - -	400	500
0.15 μF	18.0	14.5	8.0	15.0	5.0/7.5/15.0	0.6	100	MMC154 -P - - - - -	300	500
0.22 μF	18.0	16.5	9.0	15.0	5.0/7.5/15.0	0.6	100	MMC224 -P - - - - -	300	500
0.33 μF	25.0	17.5	8.0	22.5	22.5	0.8	55	MMC334 -P - - - - -		250
0.47 μF	25.0	19.0	9.5	22.5	22.5	0.8	55	MMC474 -P - - - - -		150
0.68 μF	25.0	21.5	11.5	22.5	22.5	0.8	55	MMC684 -P - - - - -		150
1.0 μF	30.0	21.0	11.5	27.5	27.5	0.8	46	MMC105 -P - - - - -		100
1.5 μF	30.0	24.0	14.3	27.5	27.5	0.8	46	MMC155 -P - - - - -		100
2.2 μF	30.0	27.3	17.5	27.5	27.5	0.8	46	MMC225 -P - - - - -		80

Rated Cap.	1000 Vdc						Max dv/dt (V/μs)	Part Number	Number of pieces for packing unit
	W	H	T	P	F	Ø d			Loose (box)
1000 pF	15.5	11.0	6.0	12.5	10.0	0.6	290	MMC102 -Q - - - - -	1500
1500 pF	15.5	11.0	6.0	12.5	10.0	0.6	290	MMC152 -Q - - - - -	1500
2200 pF	15.5	11.5	6.0	12.5	10.0	0.6	290	MMC222 -Q - - - - -	1500
3300 pF	15.5	11.5	6.0	12.5	10.0	0.6	290	MMC332 -Q - - - - -	1000
4700 pF	15.5	12.5	7.0	12.5	10.0	0.6	290	MMC472 -Q - - - - -	1000
6800 pF	15.5	11.0	6.0	12.5	10.0	0.6	290	MMC682 -Q - - - - -	1000
0.010 μF	15.5	11.0	6.0	12.5	12.5	0.6	290	MMC103 -Q - - - - -	1000
0.015 μF	15.5	12.5	7.0	12.5	12.5	0.6	290	MMC153 -Q - - - - -	1000
0.022 μF	15.5	15.5	7.5	12.5	12.5	0.8	290	MMC223 -Q - - - - -	1000
0.033 μF	21.0	14.0	6.5	17.5	12.5	0.8	190	MMC333 -Q - - - - -	500
0.047 μF	21.0	15.5	7.5	17.5	12.5	0.8	190	MMC473 -Q - - - - -	300
0.068 μF	21.0	18.0	8.5	17.5	12.5	0.8	190	MMC683 -Q - - - - -	300
0.10 μF	21.0	20.0	10.0	17.5	12.5	0.8	190	MMC104 -Q - - - - -	300
0.15 μF	26.0	20.0	10.0	22.5	17.5	0.8	130	MMC154 -Q - - - - -	250
0.22 μF	26.0	23.0	12.0	22.5	17.5	0.8	130	MMC224 -Q - - - - -	150
0.33 μF	31.0	24.0	13.0	27.5	22.5	0.8	100	MMC334 -Q - - - - -	100
0.47 μF	31.0	27.5	15.5	27.5	22.5	0.8	100	MMC474 -Q - - - - -	100

All dimensions are in mm.

Rated Cap.	1250 Vdc						Max dv/dt (V/μs)	Part Number	Number of pieces for packing unit Loose (box)
	W	H	T	P	F	Ø d			
1000 pF	15.5	11.0	6.0	12.5	10.0	0.6	350	MMC102 -R - - - - -	1500
1500 pF	15.5	11.0	6.0	12.5	10.0	0.6	350	MMC152 -R - - - - -	1500
2200 pF	15.5	11.5	6.0	12.5	10.0	0.6	350	MMC222 -R - - - - -	1500
3300 pF	15.5	11.5	6.0	12.5	10.0	0.6	350	MMC332 -R - - - - -	1000
4700 pF	15.5	12.5	7.0	12.5	10.0	0.6	350	MMC472 -R - - - - -	1000
6800 pF	15.5	15.0	7.5	12.5	10.0	0.6	350	MMC682 -R - - - - -	1000
0.010 μF	21.0	12.5	5.0	17.5	12.5	0.6	230	MMC103 -R - - - - -	500
0.015 μF	21.0	13.5	6.0	17.5	12.5	0.6	230	MMC153 -R - - - - -	500
0.022 μF	21.0	15.0	7.0	17.5	12.5	0.8	230	MMC223 -R - - - - -	250
0.033 μF	26.0	16.0	6.5	22.5	17.5	0.8	170	MMC333 -R - - - - -	250
0.047 μF	26.0	17.0	8.0	22.5	17.5	0.8	170	MMC473 -R - - - - -	250
0.068 μF	31.0	17.5	8.0	27.5	22.5	0.8	140	MMC683 -R - - - - -	250
0.10 μF	31.0	19.5	10.0	27.5	22.5	0.8	140	MMC104 -R - - - - -	150
0.15 μF	31.0	23.0	12.0	27.5	22.5	0.8	140	MMC154 -R - - - - -	150
0.22 μF	31.0	26.5	14.5	27.5	22.5	0.8	140	MMC224 -R - - - - -	150

All dimensions are in mm.

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 250 Vdc, 400 Vdc, 450 Vdc, 630Vdc, 1000 Vdc, 1250 Vdc

Rated temperature (T_R): -40 ~ +85°C (+105°C)

Temperature derated voltage:

for temperatures between +85°C and +105°C a decreasing factor of 1.50% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 250 Vdc: from 0.0010 to 10.0 μF
 400 Vdc: from 0.0010 to 4.7 μF
 450 Vdc: from 0.0010 to 3.3 μF
 630 Vdc: from 0.0010 to 2.2 μF
 1000 Vdc: from 0.0010 to 0.47 μF
 1250 Vdc: from 0.0010 to 0.22 μF

Capacitance values:

E12 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz): ±5% (J), ±10% (K)

Total self-inductance (L):

max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):

80x10⁻⁴ at 1kHz

Insulation resistance: C≤0.33 μF 15000 MΩ or more
 C>0.33 μF 5000 ΩF or more

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

Temperature: +40°C±2°C
 Relative humidity (RH): 93% ±2%
 Test duration: 500 h

Performance

Capacitance change |ΔC/C|: ≤7%
 DF: ≤110x10⁻⁴ at 1kHz
 Insulation resistance: C≤0.33 μF 2700 MΩ or more
 C>0.33 μF 900 ΩF or more

Endurance:

Test conditions

Temperature: +85°C±2°C
 Test duration: 1000 h
 Voltage applied: 1.25xV_R

Performance

Capacitance change |ΔC/C|: ≤7%
 DF: ≤110x10⁻⁴ at 1kHz
 Insulation resistance: C≤0.33 μF 2700 MΩ or more
 C>0.33 μF 900 ΩF or more

MAX. CURRENT (I_{r.m.s.}) VERSUS FREQUENCY

