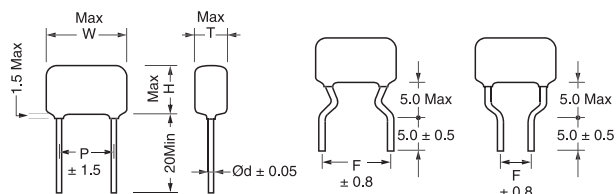


Straight lead type

Single formed lead type



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

METALLIZED POLYESTER FILM CAPACITOR

Typical applications:

Smaller version of MMC type.
 Very 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: **MMX**

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	7.3	6.5	3.7	5.0	5.0	0.6	200	MMX102 - I - - - - -	2000	2000
1500 pF	7.3	6.5	3.7	5.0	5.0	0.6	200	MMX152 - I - - - - -	2000	2000
2200 pF	7.3	6.5	3.7	5.0	5.0	0.6	160	MMX222 - I - - - - -	2000	2000
3300 pF	7.3	6.5	3.7	5.0	5.0	0.6	150	MMX332 - I - - - - -	2000	2000
4700 pF	7.3	6.5	3.7	5.0	5.0	0.6	150	MMX472 - I - - - - -	2000	2000
6800 pF	7.3	6.5	3.7	5.0	5.0	0.6	120	MMX682 - I - - - - -	2000	2000
0.010 µF	7.3	6.5	3.7	5.0	5.0	0.6	120	MMX103 - I - - - - -	2000	2000
0.015 µF	7.3	6.5	3.7	5.0	5.0	0.6	120	MMX153 - I - - - - -	2000	2000
0.022 µF	7.3	6.5	3.7	5.0	5.0	0.6	120	MMX223 - I - - - - -	2000	2000
0.033 µF	7.3	6.5	3.7	5.0	5.0	0.6	120	MMX333 - I - - - - -	2000	2000
0.047 µF	7.3	7.0	4.0	5.0	5.0	0.6	120	MMX473 - I - - - - -	1000	2000
0.068 µF	7.3	7.5	4.6	5.0	5.0	0.6	120	MMX683 - I - - - - -	1000	2000
0.10 µF	7.3	8.5	5.5	5.0	5.0	0.6	120	MMX104 - I - - - - -	1000	2000
0.15 µF	9.8	11.5	6.0	5.0	5.0	0.6	120	MMX154 - I - - - - -	1000	2000
0.22 µF	9.8	11.3	5.0	7.5	5.0/7.5	0.6	75	MMX224 - I - - - - -	1000	1500
0.33 µF	9.8	12.5	6.0	7.5	5.0/7.5	0.6	75	MMX334 - I - - - - -	1000	1500
0.47 µF	12.5	14.4	4.8	10.0	5.0/7.5/10.0	0.6	50	MMX474 - I - - - - -	1000	1000
0.68 µF	12.5	15.2	5.8	10.0	5.0/7.5/10.0	0.6	50	MMX684 - I - - - - -	1000	500
1.0 µF	15.0	16.0	6.2	12.5	7.5/10.0/12.5	0.6	40	MMX105 - I - - - - -	400	500
1.5 µF	15.0	17.5	7.8	12.5	7.5/10.0/12.5	0.6	40	MMX155 - I - - - - -	400	500
2.2 µF	20.3	17.8	7.3	17.5	7.5/10.0/12.5	0.8	26	MMX225 - I - - - - -	400	250
3.3 µF	20.3	21.0	9.0	17.5	7.5/10.0/12.5	0.8	26	MMX335 - I - - - - -	300	200
4.7 µF	20.3	23.8	10.7	17.5	7.5/10.0/12.5	0.8	26	MMX475 - I - - - - -		200
6.8 µF	25.5	23.5	12.0	22.5	17.5/22.5	0.8	18	MMX685 - I - - - - -		100
10.0 µF	25.5	27.5	13.8	22.5	17.5/22.5	0.8	18	MMX106 - I - - - - -		100

All dimensions are in mm.

METALLIZED POLYESTER FILM CAPACITOR

PRODUCT CODE: MMX

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	9.8	5.5	3.5	5.0	5.0	0.6	150	MMX102 - M - - - - -	2000	2000
1500 pF	9.8	5.5	3.5	5.0	5.0	0.6	150	MMX152 - M - - - - -	2000	2000
2200 pF	9.8	5.5	3.5	5.0	5.0	0.6	150	MMX222 - M - - - - -	2000	2000
3300 pF	9.8	6.0	4.2	5.0	5.0	0.6	150	MMX332 - M - - - - -	1000	2000
4700 pF	9.8	6.0	4.2	5.0	5.0	0.6	150	MMX472 - M - - - - -	1000	2000
6800 pF	9.8	6.5	4.4	5.0	5.0	0.6	150	MMX682 - M - - - - -	1000	2000
0.010 μF	9.8	6.8	3.5	5.0	5.0	0.6	150	MMX103 - M - - - - -	2000	2000
0.015 μF	9.8	6.8	4.0	5.0	5.0	0.6	150	MMX153 - M - - - - -	1000	2000
0.022 μF	9.8	6.8	4.0	5.0	5.0	0.6	150	MMX223 - M - - - - -	1000	2000
0.033 μF	9.8	6.8	4.2	5.0	5.0	0.6	150	MMX333 - M - - - - -	1000	2000
0.047 μF	9.8	7.2	4.2	5.0	5.0	0.6	150	MMX473 - M - - - - -	1000	1600
0.068 μF	9.8	8.3	4.4	5.0	5.0	0.6	150	MMX683 - M - - - - -	1000	1500
0.10 μF	9.8	10.8	4.5	5.0	5.0	0.6	150	MMX104 - M - - - - -	1000	1000
0.15 μF	12.5	10.7	4.6	5.0	5.0	0.6	110	MMX154 - M - - - - -	1000	1000
0.22 μF	12.5	10.5	5.8	7.5	5.0/7.5	0.6	110	MMX224 - M - - - - -	1000	1000
0.33 μF	12.5	14.3	5.8	7.5	5.0/7.5	0.6	110	MMX334 - M - - - - -	1000	500
0.47 μF	12.5	15.5	7.0	10.0	5.0/7.5/10.0	0.6	110	MMX474 - M - - - - -	500	500
0.68 μF	17.8	14.8	6.5	10.0	5.0/7.5/10.0	0.6	60	MMX684 - M - - - - -	400	500
1.0 μF	17.8	16.3	7.5	12.5	7.5/10.0/12.5	0.6	60	MMX105 - M - - - - -	400	500
1.5 μF	25.5	16.0	7.8	12.5	7.5/10.0/12.5	0.6	35	MMX155 - M - - - - -	300	200
2.2 μF	25.5	18.8	8.8	17.5	7.5/10.0/12.5	0.8	35	MMX225 - M - - - - -		200
3.3 μF	25.5	21.0	11.0	17.5	7.5/10.0/12.5	0.8	35	MMX335 - M - - - - -		100
4.7 μF	25.5	23.6	12.5	17.5	7.5/10.0/12.5	0.8	35	MMX475 - 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)
0.10 μF	9.8	10.8	4.5	7.5	5.0/7.5	0.6	150	MMX104 - X - - - - -	1000	1000
0.15 μF	12.5	10.7	4.6	10.0	5.0/7.5	0.6	110	MMX154 - X - - - - -	1000	1000
0.22 μF	12.5	10.5	5.8	10.0	5.0/7.5	0.6	110	MMX224 - X - - - - -	1000	1000
0.33 μF	12.5	14.3	5.8	10.0	5.0/7.5	0.6	110	MMX334 - X - - - - -	1000	500
0.47 μF	12.5	15.5	7.0	10.0	5.0/7.5	0.6	110	MMX474 - X - - - - -	500	500
0.68 μF	17.8	14.8	6.5	15.0	5.0/7.5/15.0	0.8	60	MMX684 - X - - - - -	400	500
1.0 μF	17.8	16.3	7.5	15.0	5.0/7.5/15.0	0.8	60	MMX105 - X - - - - -	400	500
1.5 μF	25.5	16.0	7.8	22.5	17.5/22.5	0.8	35	MMX155 - X - - - - -		200
2.2 μF	25.5	18.8	8.8	22.5	17.5/22.5	0.8	35	MMX225 - X - - - - -		200

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	9.8	5.5	3.5	5.0	5.0/7.5	0.6	260	MMX102 - P - - - - -	2000	2000
1500 pF	9.8	5.5	3.5	5.0	5.0/7.5	0.6	260	MMX152 - P - - - - -	2000	2000
2200 pF	9.8	5.5	3.5	5.0	5.0/7.5	0.6	260	MMX222 - P - - - - -	2000	2000
3300 pF	9.8	6.0	4.2	5.0	5.0/7.5	0.6	260	MMX332 - P - - - - -	1000	2000
4700 pF	9.8	6.0	4.2	5.0	5.0/7.5	0.6	260	MMX472 - P - - - - -	1000	2000
6800 pF	9.8	6.5	4.4	5.0	5.0/7.5	0.6	260	MMX682 - P - - - - -	1000	2000
0.010 μF	9.8	7.7	4.2	5.0	5.0/7.5	0.6	260	MMX103 - P - - - - -	1000	2000
0.015 μF	9.8	8.0	4.2	5.0	5.0/7.5	0.6	260	MMX153 - P - - - - -	1000	2000
0.022 μF	9.8	8.3	5.0	5.0	5.0/7.5	0.6	260	MMX223 - P - - - - -	1000	1600
0.033 μF	9.8	11.3	5.0	5.0	5.0/7.5	0.6	260	MMX333 - P - - - - -	1000	1500
0.047 μF	9.8	11.0	6.3	5.0	5.0/7.5	0.6	260	MMX473 - P - - - - -	1000	1000
0.068 μF	12.5	10.5	5.8	5.0	5.0/7.5/10.0	0.6	190	MMX683 - P - - - - -	1000	1000
0.10 μF	12.5	13.8	5.8	5.0	5.0/7.5/10.0	0.6	190	MMX104 - P - - - - -	1000	500
0.15 μF	12.5	13.8	7.7	5.0	5.0/7.5/10.0	0.6	190	MMX154 - P - - - - -	1000	500
0.22 μF	12.5	15.8	9.0	7.5	5.0/7.5/10.0	0.6	190	MMX224 - P - - - - -	500	500
0.33 μF	17.8	14.8	8.0	7.5	5.0/7.5/15.0	0.8	100	MMX334 - P - - - - -	300	400
0.47 μF	17.8	17.3	9.0	10.0	5.0/7.5/15.0	0.8	100	MMX474 - P - - - - -	300	400
0.68 μF	17.8	20.3	10.5	10.0	5.0/7.5/15.0	0.8	100	MMX684 - P - - - - -		200
1.0 μF	25.5	20.8	9.5	12.5	17.5/22.5	0.8	60	MMX105 - P - - - - -		100
1.5 μF	25.5	23.0	11.8	12.5	17.5/22.5	0.8	60	MMX155 - P - - - - -		100
2.2 μF	25.5	26.8	14.3	17.5	17.5/22.5	0.8	60	MMX225 - P - - - - -		100

All dimensions are in mm

ELECTRICAL CHARACTERISTICS

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

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 μ F
 400 Vdc: from 0.0010 to 4.7 μ F
 450 Vdc: from 0.10 to 2.2 μ F
 630 Vdc: from 0.0010 to 2.2 μ F

Capacitance values:

E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz):

\pm 5% (J), \pm 10% (K)

Total self-inductance (L):

max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):

80×10^{-4} at 1kHz

Insulation resistance:

$C \leq 0.33 \mu$ F 15000 M Ω or more

$C > 0.33 \mu$ F 5000 Ω F or more

TEST METHOD AND PERFORMANCE**Damp heat, steady state:****Test conditions**

Temperature: +40°C \pm 2°C

Relative humidity (RH): 93% \pm 2%

Test duration: 500 h

Performance

Capacitance change $|\Delta C/C|$: \leq 7%

DF change ($\Delta \text{tg} \delta$): $\leq 110 \times 10^{-4}$ at 1kHz

Insulation resistance: $C \leq 0.33 \mu$ F 2700 M Ω or more

$C > 0.33 \mu$ F 900 Ω F or more

Endurance:**Test conditions**

Temperature: +85°C \pm 2°C

Test duration: 1000 h

Voltage applied: $1.25 \times V_R$

Performance

Capacitance change $|\Delta C/C|$: \leq 7%

DF change ($\Delta \text{tg} \delta$): $\leq 110 \times 10^{-4}$ at 1kHz

Insulation resistance: $C \leq 0.33 \mu$ F 2700 M Ω or more

$C > 0.33 \mu$ F 900 Ω F or more

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

