

## Product Line Chart

- For general electronic devices - For communication devices
- For computer control devices - For power circuits

### Metallized polyester

<b>MTBS.MTB</b>
Tape wrapped and standard product
100 ~ 630V.DC 0.022 ~ 10 $\mu$ F

P.133

<b>MDDSA</b>
Resin coated dip type small-sized product
100 ~ 630V.DC 0.01 ~ 10 $\mu$ F

P.127

<b>MDD(5)</b>
Resin coated dip type
450V.DC 0.47 ~ 2.2 $\mu$ F

P.128

<b>MDD(5Y)</b>
Resin coated dip type
450V.DC 1.0 ~ 2.2 $\mu$ F

P.129

<b>WMTB</b>
Tape wrapped and product for large current
630V.DC 0.22 ~ 2.2 $\mu$ F

P.133

<b>MKC-JS</b>
Resin-encased product
100V.DC 0.1 ~ 1.5 $\mu$ F

P.130

<b>MML-F</b>
Caseless chip product
100 ~ 630V.DC 0.01 ~ 1.0 $\mu$ F

P.123

### Metallized polypropylene

<b>MDD-P</b>
Resin coated dip type standard product
250 ~ 630V.DC 0.027 ~ 1.0 $\mu$ F

P.132

<b>WMTB-P</b>
Tape wrapped and product for high frequency and large current
1200 V.DC 0.1 ~ 1.0 $\mu$ F

P.133

<b>MTB-P</b>
Tape wrapped and product for high frequency
250 ~ 630V.DC 0.027 ~ 1.0 $\mu$ F

P.132

## High heat resistance, for high-frequency current

### Metallized polyphenylene sulfide

<b>MDD-HF</b>
Resin coated dip type standard product
100,250V.DC 0.01 ~ 0.33 $\mu$ F

P.131

<b>MMX-E</b>
Caseless chip product
50 ~ 250V.DC 0.01 ~ 0.22 $\mu$ F

P.120

<b>MML-E</b>
Caseless chip product
100,250V.DC 0.01 ~ 0.22 $\mu$ F

P.122

<b>MMX-EC</b>
High temperature caseless chip product
100V.DC 0.01 ~ 0.22 $\mu$ F

P.121

### Metellized polyethylene naphthalate

<b>MML-N</b>
Caseless chip product
400,630V.DC 0.01 ~ 0.1 $\mu$ F

P.124

## Product Table

Table of plastic film capacitor types

Series	Features	Operating temperature range	Standard product	Small-sized product	High-reliability product	Thin-shaped product	Operating voltage V. DC	Capacitance range $\mu\text{F}$	Page
MMX-E	Metallized PPS film chip capacitor	-40 ~ +105°C (+125°C)		○	○	○	50,63,100,250	0.01 ~ 0.22	120
MMX-EC	Metallized PPS film chip capacitor	-40 ~ +105°C (+125°C)		○	○	○	100	0.01 ~ 0.22	121
MML-E	Metallized PPS film chip capacitor	-40 ~ +105°C (+125°C)		○	○	○	100,250	0.01 ~ 0.22	122
MML-F	Metallized polyester film chip capacitor	-40 ~ +85°C (+105°C)		○	○	○	100,160,630	0.01 ~ 1.0	123
MML-N	Metallized PEN film chip capacitor	-40 ~ +85°C (+105°C)		○	○	○	400,630	0.01 ~ 0.1	124
MDDSA	Metallized polyester, resin dip type, small-sized product	-40 ~ +85°C (+105°C)		○	○		100 ~ 630	0.01 ~ 10.0	127
MDD(5)	Metallized polyester, resin dip type, for PFC circuit	-40 ~ +85°C		○	○		450	0.47 ~ 2.2	128
MDD(5Y)	Metallized polyester, resin dip type, for PFC circuit	-40 ~ +85°C		○	○		450	1.0 ~ 2.2	129
MKC-JS	Metallized polyester, resin encased type	-40 ~ +85°C (+105°C)		○	○		100	0.1 ~ 1.5	130
MDD-HF	Metallized PPS film capacitor, resin dip type	-40 ~ +105°C (+125°C)	○		○		100,250	0.01 ~ 0.33	131
MDD-P	Metallized polypropylene, resin dip type	-40 ~ +85°C	○		○		250,400,630	0.027 ~ 1.0	132
MTB-P	Metallized polypropylene, tape wrapped type	-40 ~ +85°C	○		○		250,400,630	0.027 ~ 1.0	132
MTBS MTB	Metallized polyester, tape wrapped type	-40 ~ +85°C	○		○		100 ~ 630	0.022 ~ 10.0	133
WMTB WMTB-P	Tape wrapped type for large frequency and large current	-40 ~ +85°C	○		○		630,1200	0.1 ~ 2.2	133

## Precautions in using Plastic Film Capacitors

### 1. When DC-rated Types Are Used in AC Circuits

The plastic film capacitor voltage ratings are usually expressed in volts DC (V.DC).

#### (1) Use in AC circuits

When DC-rated types are used in AC-rated circuits, unexpected heat generation or other contingencies can take place. Therefore, ensure that the voltages listed in the following conversion table (Table 1) are not exceeded. Since the AC rating may vary with the product type, contact your local Hitachi AIC agent for details.

Table 1 Equivalent AC rating for DC-rated products

Rated DC voltage	Maximum permitted operating AC voltage (50 or 60Hz)			
	MTBS, MTB	MDDSA	MDD-P	MTB-P
100V.DC	63V.AC	40V.AC	—	
250V.DC	150V.AC	100V.AC	150V.AC	
400V.DC	200V.AC	150V.AC	200V.AC	
630V.DC	250V.AC	200V.AC	250V.AC	

#### (2) Use at high frequency

If the capacitors are used at a high frequency, they can deteriorate or become defective due to its spontaneous heat generation. To avoid such problems, be sure that the capacitors are used within the ranges defined in Figs. 1, 2, and 3. Since the permitted limits vary with the product type, contact your local Hitachi AIC agent for details.

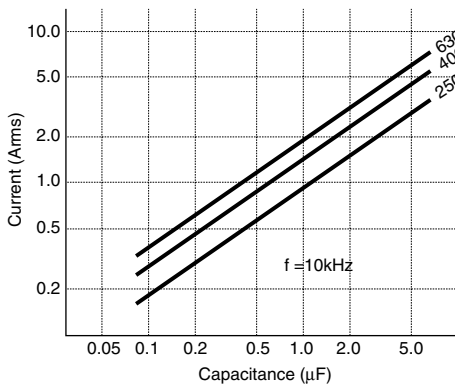


Fig. 1 Metallized polyester capacitors (MDDSA, MTB types)

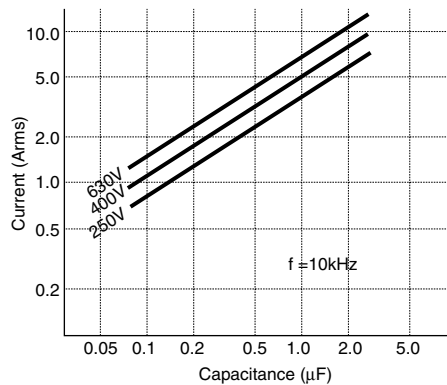


Fig. 2 Metallized polypropylene capacitors (MDD-P and MTB-P types)

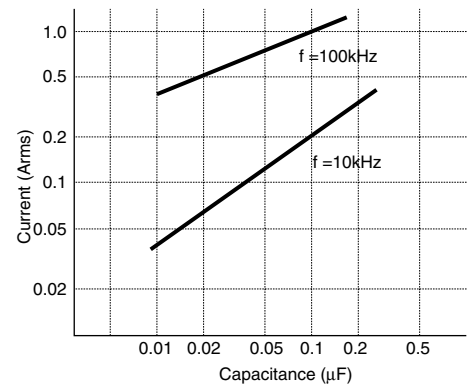


Fig. 3 Metallized PPS film capacitors (MDD-HF, MMX-E and MML-E types)

### 2. Operating Temperature

The operating temperature varies with the type of the plastic film used as the capacitor dielectric.

#### (1) Relationship between operating temperature and voltage rating tolerance

The operating temperature and maximum voltage rating vary with the capacitor film type. Be sure that the operating temperature does not exceed the value determined by adding the ambient temperature value to the spontaneous temperature rise value which is explained in paragraph 2 below. For the resulting voltage derating factor, see Figs. 4, 5, or 6.

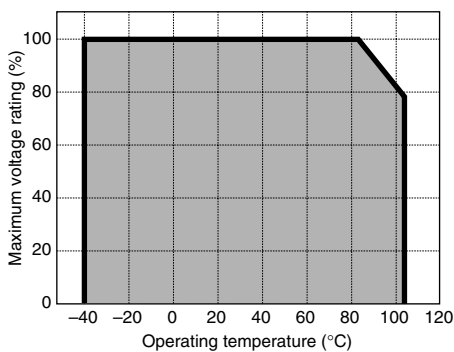


Fig. 4 Metallized polyester capacitors temperature derating diagram (MDDSA types)

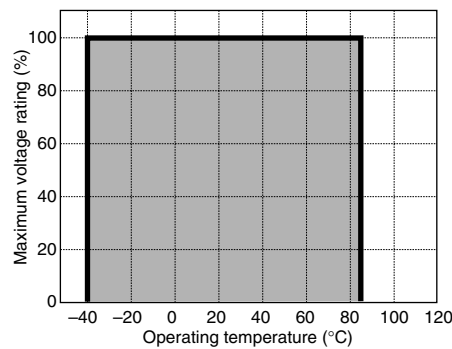


Fig. 5 Metallized polypropylene capacitors temperature derating diagram (MDD-P and MTB-P types)

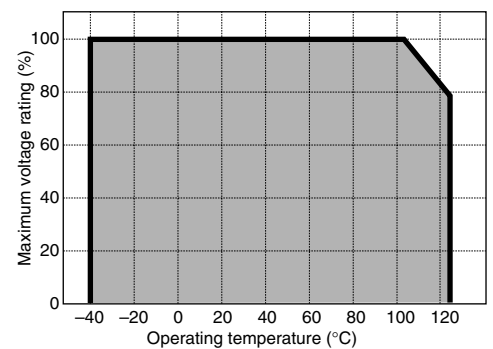


Fig. 6 Metallized PPS film capacitors temperature derating diagram (MDD-HF, MMX-E and MML-E types)

## (2) Spontaneous temperature rise

If capacitor spontaneous heat generation is significant at a high frequency, the capacitors can deteriorate or burn out. Therefore, the capacitors must be used in such a manner that the spontaneous temperature rise in a no-airflow environment (at an ambient temperature of 40°C) does not exceed the permitted limit listed in Table 2.

Table 2 Maximum permitted spontaneous temperature rises

Capacitor type	Designation	Spontaneous temperature rise
Metallized polyester capacitor	MPET	10°C
Metallized polypropylene capacitor	MPP	5°C
Metallized polyphenylene sulfide film capacitor	MPPS	10°C
Metallized polyphenylene naphthalate film capacitor	MPEN	10°C

## 3. Soldering lead-attached capacitors (MDDSA, MTB, MDD-P, and MTB-P types)

When soldering capacitor leads to a printed circuit board or the like, use care not to exceed the temperature limits shown in Figs. 7 and 8, because long-time heating can incur property deterioration or short-circuiting.

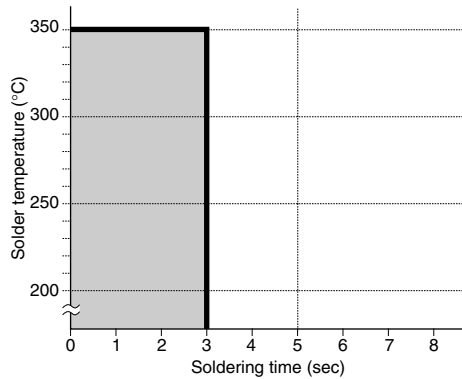


Fig. 7 Temperature limits for soldering by solder iron

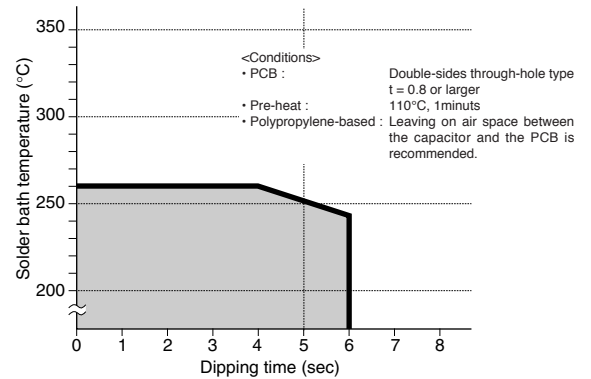


Fig. 8 Temperature limits for solder dip

## 4. Soldering Metallized Film Chip Capacitors (Lead Free Products :Complies with RoHS)

Reflow soldering is generally used for mounting chip capacitors on printed boards.

However, the soldering conditions vary with the circuit board material, packaging density, heat source, and other relevant factors used.

### 4.1 MPPS Capacitors

MML-E type,MMX-E type,MMX-EC type

#### (1) In the case of Reflow

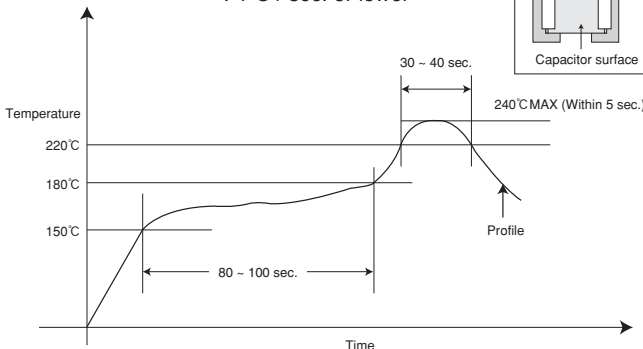
MML-E type,MMX-E type

Perform reflow soldering within the following conditions.

Measuring side : Substrate surface and Capacitor surface

Number of Soldering : Maximum Two Cycles

Heating/Cooling temperature slope : 4°C / sec. or lower



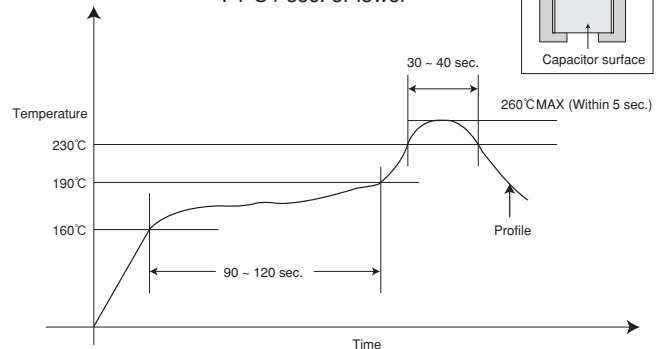
MMX-EC type

Perform reflow soldering within the following conditions.

Measuring side : Substrate surface and Capacitor surface

Number of Soldering : Maximum Two Cycles

Heating/Cooling temperature slope : 4°C / sec. or lower



#### (2) Please do not use Flow Soldering

#### (3) When using soldering iron

Be sure that the iron tip does not touch directly to the capacitor body.

Be sure to preheat solder land area sufficiently before soldering by iron.

#### MML-E type

Iron Tip Temperature

: Max.330°C

Soldering duration

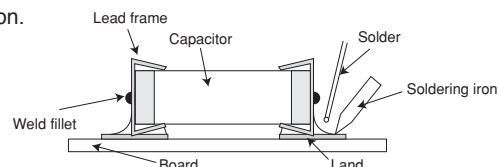
: Max.3 sec.

Soldering Iron Capacity

: Max.30W

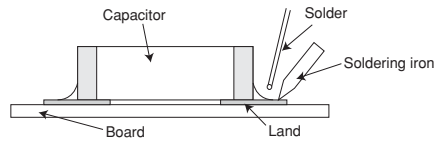
Resoldering

: Not available



## MMX-E type, MMX-EC type

Iron Tip Temperature	: Max.330°C
Soldering duration	: Max.3 sec.
Solder Iron Capacity	: Max.30W
Resoldering	: Not available



### (4) Storage conditions

Before open the packaging

Temperature	: 35°C or lower
Humidity	: 75% or lower
Storage Period	: One year after the time capacitors packed at our factory

After open the packaging

Temperature	: 30°C or lower
Humidity	: 70% or lower
Storage Period	: One month

### (5) Cleaning

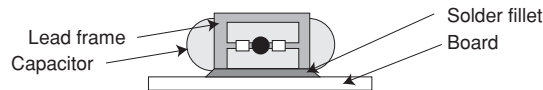
**In case of cleaning, use Freon-substitute-based solvent under the following conditions.**

(Single or combination for 5 minutes)

- Immersion cleaning (50°C or lower)
- Vapor cleaning
- Ultrasonic cleaning (50°C or lower, 42kHz, 20W / l )

### (6) Mounting Cautions before soldering

- Be sure to control amount of solder paste to form fillets only at the lead frame area. (applicable for MML-E type only)  
If capacitor is heated with the electrode metal and solder paste being conducted, melting temperature of the electrode metal might be lowered and result the electrode being melted.



- Please carry out precedence evaluation before mass production running.  
Since the heat load to the capacitors is completely different by the reflow furnace (type, capacity) mounting part density, and part heat capacity, the precedence evaluation by mounting conditions is necessary.  
Check the capacitance of the capacitors does not change after reflow testing.

### (7) For land dimensions, consult your local Hitachi AIC agent.

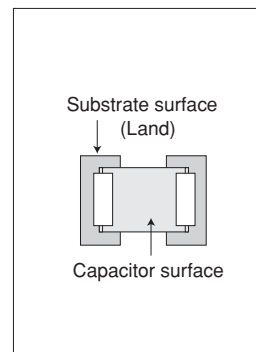
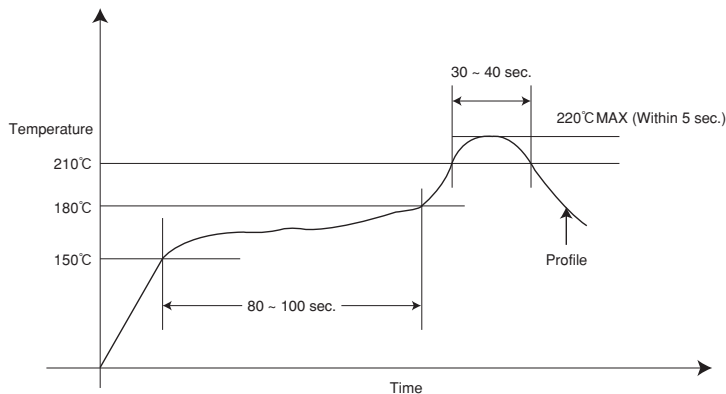
## 4.2 MPET Capacitors

MML-F type

### (1) In the case of Reflow

Perform reflow soldering within the following conditions.

Measuring side	: Substrate surface and Capacitor surface
Number of Soldering	: Maximum Two Cycles
Heating/Cooling temperature slope	: 4°C / sec. or lower

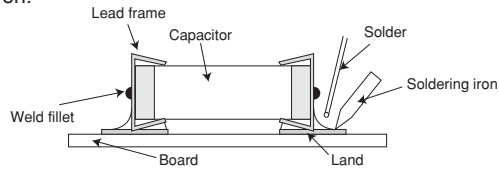


### (2) Please do not use Flow Soldering

### (3) When using soldering iron

Be sure that the iron tip does not touch directly to the capacitor body.  
Be sure to preheat solder land area sufficiently before soldering by iron.

Iron Tip Temperature	: Max.330°C
Soldering duration	: Max.3 sec.
Solder Iron Capacity	: Max.30W
Resoldering	: Not available



### (4) Storage conditions

Before open the packaging  
 Temperature : 35°C or lower  
 Humidity : 75% or lower  
 Storage Period : Six (6) months after the time capacitors packed at our factory

After open the packaging  
 Temperature : 30°C or lower  
 Humidity : 70% or lower  
 Storage Period : One month

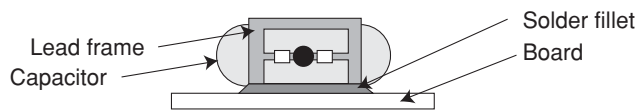
### (5) Cleaning

**In case of cleaning, use Freon-substitute-based solvent under the following conditions.**

- (Single or combination for 5 minutes)
- Immersion cleaning(50°C or lower)
  - Vapor cleaning
  - Ultrasonic cleaning (50°C or lower, 42kHz, 20W / l )

### (6) Mounting Cautions before soldering

- Be sure to control amount of solder paste to form fillets only at the lead frame area.  
If capacitor is heated with the electrode metal and solder paste being conducted, melting temperature of the electrode metal might be lowered and result the electrode being melted.



- Please carry out precedence evaluation before mass production running.  
Since the heat load to the capacitors is completely different by the reflow furnace (type, capacity) mounting part density, and part heat capacity, the precedence evaluation by mounting conditions is necessary.  
Check the capacitance of the capacitors does not change after reflow testing.

### (7) For land dimensions, consult your local Hitachi AIC agent.

## 5. For Use in Rapid Charging and Discharging

Specially designed capacitors are available for rapid charging / discharging applications (e.g., photo flashes, igniters, etc.)  
When such capacitors are needed, contact your local Hitachi AIC agent.

## 6. Resonance Sound

Applying a high-frequency voltage to the capacitors may generate a resonance sound.  
This is because the capacitor film mechanically vibrates owing to the Coulomb force which is exerted between the different poles.  
Although this does not adversely affect electrical performance, bear it in mind when using the capacitors.

## 7. Others

- For further details, refer to EIAJ RCR-2350B, Precautions and Guidelines for Using Electronic Device Fixed Plastic Film Capacitors.
- If you have any questions, feel free to contact your local Hitachi AIC agent.

## Packaging of Plastic Film Capacitors

The following packaging types are available for automatic mounting.

Capacitor type	MMX-E MMX-EC MML-E	MMLF	MDDSA	MDD-HF	MKC-JS
Lead taping *1			○	○	
Carrier tape	○	○			
Stick magazine					○

\*1 : For capacitors having a lead pitch of 15 mm or less.

## Chip Series Capacitor Taping

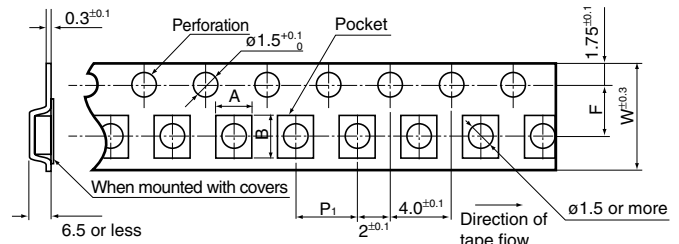
(Unit : mm)

Type	Capacitor rating			Carrier taping (Fig. 1)				Taping reel (Fig. 2)	
	Rated voltage (V.DC)	Capacitance (μF)	Code	A ±0.3	B ±0.3	W ±0.3	P <sub>1</sub> ±0.1	A ±4.0	Number of packings/Reel
MMX-E	50	0.010	1H-103	4.5	5.5	12.0	8.0	250	2000
	50	0.012	1H-123	4.5	5.5	12.0	8.0	250	2000
	50	0.015	1H-153	4.5	5.5	12.0	8.0	250	2000
	50	0.018	1H-183	4.5	5.5	12.0	8.0	250	2000
	50	0.022	1H-223	4.5	5.5	12.0	8.0	250	2000
	50	0.027	1H-273	4.5	5.5	12.0	8.0	250	2000
	50	0.033	1H-333	4.5	5.5	12.0	8.0	250	2000
	50	0.039	1H-393	4.5	5.5	12.0	8.0	250	2000
	50	0.047	1H-473	4.5	5.5	12.0	8.0	250	2000
	50	0.056	1H-563	5.1	6.2	12.0	8.0	250	2000
	50	0.068	1H-683	5.1	6.2	12.0	8.0	250	2000
	50	0.082	1H-823	5.5	6.2	12.0	8.0	330	2000
	50	0.10	1H-104	5.5	6.2	12.0	8.0	330	2000
	50	0.12	1H-124	4.8	7.7	12.0	8.0	330	2000
	50	0.15	1H-154	6.2	7.5	12.0	8.0	330	2000
	50	0.18	1H-184	6.2	7.5	12.0	8.0	330	2000
	50	0.22	1H-224	6.2	7.5	12.0	8.0	330	2000
	63	0.010	1J-103	5.1	6.2	12.0	8.0	250	2000
	63	0.012	1J-123	5.1	6.2	12.0	8.0	250	2000
	63	0.015	1J-153	5.1	6.2	12.0	8.0	250	2000
63	0.018	1J-183	5.1	6.2	12.0	8.0	250	2000	
63	0.022	1J-223	5.1	6.2	12.0	8.0	250	2000	
63	0.027	1J-273	5.1	6.2	12.0	8.0	250	2000	
63	0.033	1J-333	5.1	6.2	12.0	8.0	250	2000	
63	0.039	1J-393	5.1	6.2	12.0	8.0	250	2000	
63	0.047	1J-473	5.1	6.2	12.0	8.0	250	2000	
63	0.056	1J-563	5.1	6.2	12.0	8.0	250	2000	
63	0.068	1J-683	5.5	6.2	12.0	8.0	330	2000	
63	0.082	1J-823	5.5	6.2	12.0	8.0	330	2000	
63	0.10	1J-104	6.3	6.3	12.0	8.0	330	2000	
63	0.12	1J-124	6.3	6.3	12.0	8.0	330	2000	
63	0.15	1J-154	6.3	6.3	12.0	8.0	330	2000	
63	0.18	1J-184	6.4	7.4	16.0	8.0	330	2000	
63	0.22	1J-224	6.4	7.4	16.0	8.0	330	2000	
100	0.010	2A-103	5.0	6.3	12.0	8.0	330	2000	
100	0.012	2A-123	5.0	6.3	12.0	8.0	330	2000	
100	0.015	2A-153	5.0	6.3	12.0	8.0	330	2000	
100	0.018	2A-183	6.0	8.1	16.0	8.0	250	2000	
100	0.022	2A-223	6.0	8.1	16.0	8.0	250	2000	
100	0.027	2A-273	6.6	9.1	16.0	8.0	330	2000	
100	0.033	2A-333	6.6	9.1	16.0	8.0	330	2000	
100	0.039	2A-393	6.0	8.1	16.0	8.0	250	2000	
100	0.047	2A-473	6.0	8.1	16.0	8.0	250	2000	
100	0.056	2A-563	6.6	9.1	16.0	8.0	330	2000	
100	0.068	2A-683	6.6	9.1	16.0	8.0	330	2000	
100	0.082	2A-823	6.6	9.1	16.0	8.0	330	2000	
100	0.10	2A-104	6.6	9.1	16.0	8.0	330	2000	
100	0.12	2A-124	6.6	9.1	16.0	8.0	330	2000	
100	0.15	2A-154	7.4	8.4	16.0	12.0	330	1000	
100	0.18	2A-184	7.6	10.6	16.0	12.0	330	1000	
100	0.22	2A-224	7.6	10.6	16.0	12.0	330	1000	
250	0.010	2E-103	5.0	6.3	12.0	8.0	330	2000	
250	0.012	2E-123	5.0	6.3	12.0	8.0	330	2000	
250	0.015	2E-153	5.0	6.3	12.0	8.0	330	2000	
250	0.018	2E-183	6.0	8.1	16.0	8.0	250	2000	
250	0.022	2E-223	6.0	8.1	16.0	8.0	250	2000	
250	0.027	2E-273	6.6	9.1	16.0	8.0	330	2000	
250	0.033	2E-333	6.6	9.1	16.0	8.0	330	2000	
250	0.039	2E-393	6.6	9.1	16.0	8.0	330	2000	
250	0.047	2E-473	6.9	10.5	16.0	12.0	330	1000	
250	0.056	2E-563	7.6	10.6	16.0	12.0	330	1000	
250	0.068	2E-683	7.6	10.6	16.0	12.0	330	1000	
250	0.082	2E-823	7.6	10.6	16.0	12.0	330	1000	
250	0.10	2E-104	8.4	10.5	16.0	12.0	330	1000	

(Unit : mm)

Type	Capacitor rating			Carrier taping (Fig. 1)				Taping reel (Fig. 2)	
	Rated voltage (V.DC)	Capacitance (μF)	Code	A ±0.3	B ±0.3	W ±0.3	P <sub>1</sub> ±0.1	A ±4.0	Number of packings/Reel
MMX-EC	100	0.010	2A-103	5.0	6.3	12.0	8.0	330	2000
	100	0.012	2A-123	5.0	6.3	12.0	8.0	330	2000
	100	0.015	2A-153	5.0	6.3	12.0	8.0	330	2000
	100	0.018	2A-183	6.0	8.1	16.0	8.0	250	2000
	100	0.022	2A-223	6.0	8.1	16.0	8.0	250	2000
	100	0.027	2A-273	6.6	9.1	16.0	8.0	330	2000
	100	0.033	2A-333	6.6	9.1	16.0	8.0	330	2000
	100	0.039	2A-393	6.0	8.1	16.0	8.0	250	2000
	100	0.047	2A-473	6.0	8.1	16.0	8.0	250	2000
	100	0.056	2A-563	6.6	9.1	16.0	8.0	330	2000
	100	0.068	2A-683	6.6	9.1	16.0	8.0	330	2000
	100	0.082	2A-823	6.6	9.1	16.0	8.0	330	2000
	100	0.10	2A-104	6.6	9.1	16.0	8.0	330	2000
	100	0.12	2A-124	6.6	9.1	16.0	8.0	330	2000
	100	0.15	2A-154	7.4	8.4	16.0	12.0	330	1000
	100	0.18	2A-184	7.6	10.6	16.0	12.0	330	1000
	100	0.22	2A-224	7.6	10.6	16.0	12.0	330	1000

### Embossed Tape

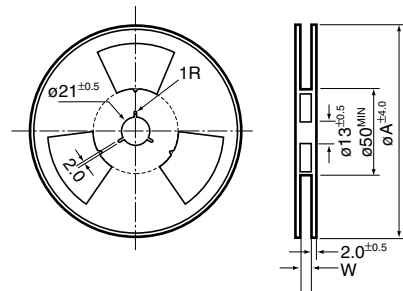


(Unit : mm)

Symbol	Tape Width (W)	
	12.0	16.0
F	5.5±0.05	7.5±0.1

Fig. 1

### Taping Reel



(Unit : mm)

Symbol	Reel Diameter (A)			
	250		330	
W	14.0±1.5	17.4±1.0	14.0±1.5	17.4±1.0

Fig. 2

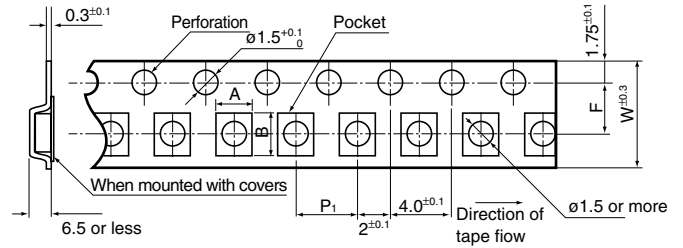
## Packaging of Plastic Film Capacitors

### Chip Series Capacitor Taping

(Unit : mm)

Type	Capacitor rating			Carrier taping (Fig. 1)				Taping reel (Fig. 2)	
	Rated voltage (V.DC)	Capacitance (μF)	Code	A ±0.3	B ±0.3	W ±0.3	P <sub>1</sub> ±0.1	A ±4.0	Number of packings/Reel
M M L I E	100	0.010	2A-103	6.6	9.1	16.0	8.0	250	1000
	100	0.012	2A-123	6.6	9.1	16.0	8.0	250	1000
	100	0.015	2A-153	6.6	9.1	16.0	8.0	250	1000
	100	0.018	2A-183	6.6	9.1	16.0	8.0	250	1000
	100	0.022	2A-223	6.6	9.1	16.0	8.0	250	1000
	100	0.027	2A-273	6.6	9.1	16.0	8.0	250	1000
	100	0.033	2A-333	6.6	9.1	16.0	8.0	250	1000
	100	0.039	2A-393	6.6	9.1	16.0	8.0	250	1000
	100	0.047	2A-473	6.6	9.1	16.0	8.0	250	1000
	100	0.056	2A-563	6.6	9.1	16.0	8.0	250	1000
	100	0.068	2A-683	6.6	9.1	16.0	8.0	250	1000
	100	0.082	2A-823	7.4	8.4	16.0	12.0	330	1000
	100	0.10	2A-104	7.4	8.4	16.0	12.0	330	1000
	100	0.12	2A-124	7.4	8.4	16.0	12.0	330	1000
	100	0.15	2A-154	7.4	8.4	16.0	12.0	330	1000
	100	0.18	2A-184	8.0	11.4	24.0	12.0	330	1000
	100	0.22	2A-224	8.0	11.4	24.0	12.0	330	1000
	250	0.010	2E-103	6.6	9.1	16.0	8.0	250	1000
	250	0.012	2E-123	6.6	9.1	16.0	8.0	250	1000
	250	0.015	2E-153	6.6	9.1	16.0	8.0	250	1000
	250	0.018	2E-183	6.6	9.1	16.0	8.0	250	1000
	250	0.022	2E-223	6.6	9.1	16.0	8.0	250	1000
	250	0.027	2E-273	6.6	9.1	16.0	8.0	250	1000
	250	0.033	2E-333	7.4	8.4	16.0	12.0	330	1000
	250	0.039	2E-393	7.4	8.4	16.0	12.0	330	1000
250	0.047	2E-473	7.4	8.4	16.0	12.0	330	1000	
250	0.056	2E-563	7.4	8.4	16.0	12.0	330	1000	
250	0.068	2E-683	8.0	11.4	24.0	12.0	330	1000	
250	0.082	2E-823	8.0	11.4	24.0	12.0	330	1000	
250	0.10	2E-104	8.0	11.4	24.0	12.0	330	1000	
M M L I F	100	0.47	2A-474	7.4	8.4	16.0	12.0	330	1000
	100	1.0	2A-105	8.0	11.4	24.0	12.0	330	1000
	160	1.0	2C-105	10.0	11.5	24.0	12.0	330	1000
	630	0.010	2J-103	8.0	11.4	24.0	12.0	330	1000
	630	0.015	2J-153	8.0	11.4	24.0	12.0	330	1000
630	0.022	2J-223	8.0	11.4	24.0	12.0	330	1000	
630	0.033	2J-333	10.0	11.5	24.0	12.0	330	1000	

#### Embossed Tape

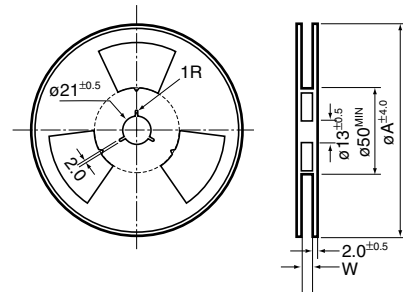


(Unit : mm)

Symbol	Tape Width (W)		
	12.0	16.0	24.0
F	5.5±0.05	7.5±0.1	11.5±0.1

Fig. 1

#### Taping Reel



(Unit : mm)

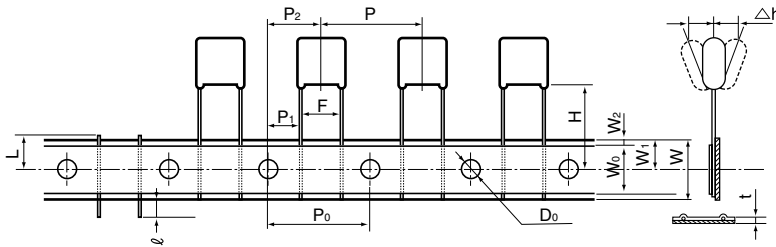
Symbol	Reel Diameter (A)				
	250		330		
W	14.0±1.5	17.4±1.0	14.0±1.5	17.4±1.0	25.4±1.0

Fig. 2

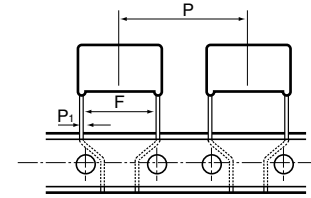
## Lead Taping for Dip Type Capacitor

Taping types and outline drawings

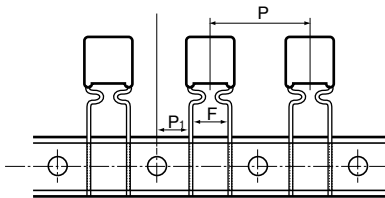
Taping type A



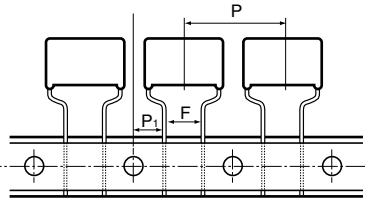
Taping type B



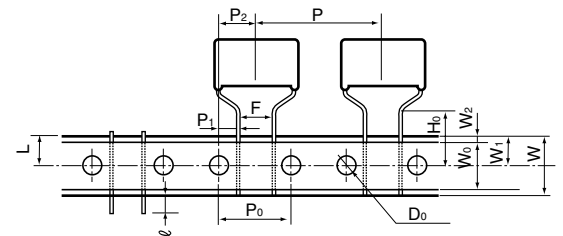
Taping type C



Taping type D



Taping type E



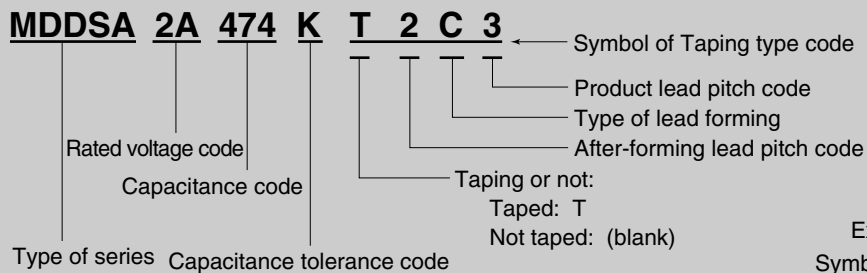
(Unit : mm)

Item	Code	Dimension	Dimension tolerance	Individual dimensions											
				Not formed (straight)					Formed						
				T					T2C2	T2C3	T2I4	T2I5	T2I6		
				A	A	A	B	B	C	C	D	E	E		
Formed or not															
Taping type code															
Outline drawing															
Product lead pitch (F)			Each dimensions	—	5.0	7.5	10.0	12.5	15.0	5.0	7.5	10.0	12.5	15.0	
Taping dimensions			—	Each dimensions	±1.0	±1.0	±1.5	±1.5	±1.5	±1.0	±1.0	±1.5	±1.5	±1.5	
Taping dimensions	1	Taping lead pitch	F	Each dimensions	±0.5	5.0	7.5	10.0	12.5	15.0	5.0	5.0	5.0	5.0	5.0
	2	Feed hole pitch	P <sub>0</sub> (*1)	12.7	±0.3										
	3	Feed hole displacement	P <sub>2</sub>	6.35	±1.3										
	4	Inter-product distance	P (*2)	—	±1.0	12.7	12.7	12.7	25.4	25.4	12.7	12.7	12.7	25.4	25.4
	5	Tape width	W (*3)	18.0	+1.0 -0.5										
	6	Adhesive tape width	W <sub>0</sub>	12.5	MIN										
	7	Feed hole displacement	W <sub>1</sub>	9.0	±0.5										
	8	Adhesive tape displacement	W <sub>2</sub> (*3)	3.0	MAX										
	9	Length to hole center	H	20.5	±0.75										
	10	Lead clinch height	H <sub>0</sub> (*4)	16.0	±0.5										
	11	Feed hole diameter	D <sub>0</sub>	4.0	±0.2										
	12	Non-standard product cutting position	L	11.0	MAX										
	13	Lead displacement length	ℓ	1.0	MAX										
	14	Tape thickness (overall)	t	0.6	±0.3										
	15	Inolation limits	Δh (*5)	0	±2.0										
Other		Subject to JIS C 0806-2													

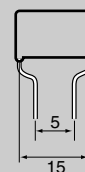
- (\*1) Maximum allowance of pitch tolerance for 20 pitch should be ±1.0mm.
- (\*2) Measuring point is upper end of taping and between center of lead wire.
- (\*3) Adhesive tape should not be exceeded to the carrier tape.
- (\*4) Measuring point is at the bottom of forming crinch.
- (\*5) Measuring point is top of the component.

## Product Symbol for Dip Type Capacitor

Example : MDDSA Series 100V.DC 0.47 $\mu$ F  $\pm$ 10% Taping type C



Examples of taping code  
 Symbol: C Examples: 2C3  
 Symbol: I Examples: 2I6



Lead pitch codes-product and after-forming

Code	2	3	4	5	6
Dimension (F)	5	7.5	10	12.5	15

## Taping Types and Packed Quantities for MDDSA Type Capacitor

Capacitance		Rated voltage (Code)							
		100V.DC (2A)		250V.DC (2E)		400V.DC (2G)		630V.DC (2J)	
$\mu$ F	Code	Taping type	Quantity per pack	Taping type	Quantity per pack	Taping type	Quantity per pack	Taping type	Quantity per pack
0.010	103	A, C	2000	A, C	2000	A, C	2000	A, D	2000
0.012	123	A, C	2000	A, C	2000	A, C	2000	A, D	2000
0.015	153	A, C	2000	A, C	2000	A, C	2000	A, D	1500
0.018	183	A, C	2000	A, C	2000	A, C	2000	A, D	1500
0.022	223	A, C	2000	A, C	2000	A, C	2000	A, D	1500
0.027	273	A, C	2000	A, C	2000	A, C	2000	A, D	1500
0.033	333	A, C	2000	A, C	2000	A, C	1500	A, D	1000
0.039	393	A, C	2000	A, C	2000	A, C	2000	A, D	1000
0.047	473	A, C	2000	A, C	2000	A, D	2000	A, D	1000
0.056	563	A, C	2000	A, C	2000	A, D	1500	B, E	500
0.068	683	A, C	2000	A, C	2000	A, D	1500	B, E	500
0.082	823	A, C	2000	A, C	2000	A, D	1500	B, E	500
0.10	104	A, C	2000	A, C	1500	A, D	1500	B, E	500
0.12	124	A, C	2000	A, C	1500	B, E	500	B, E	500
0.15	154	A, C	2000	A, C	1000	B, E	500	B, E	500
0.18	184	A, C	2000	A, D	1500	B, E	500		
0.22	224	A, C	2000	A, D	1500	B, E	500		
0.27	274	A, C	1500	A, D	1000	B, E	500		
0.33	334	A, C	1500	A, D	1000	B, E	500		
0.39	394	A, C	1000	B, E	500	B, E	500		
0.47	474	A, C	1000	B, E	500	B, E	500		
0.56	564	A, D	1500	B, E	500				
0.68	684	A, D	1500	B, E	500				
0.82	824	A, D	1000	B, E	500				
1.0	105	A, D	1000	B, E	500				
1.2	125	B, E	500	B, E	500				
1.5	155	B, E	500						
1.8	185	B, E	500						
2.2	225	B, E	500						
2.7	275	B, E	500						
3.3	335	B, E	400						