

# CARBON FILM RESISTOR

## MELF & MINI-MELF CM, CML TYPE

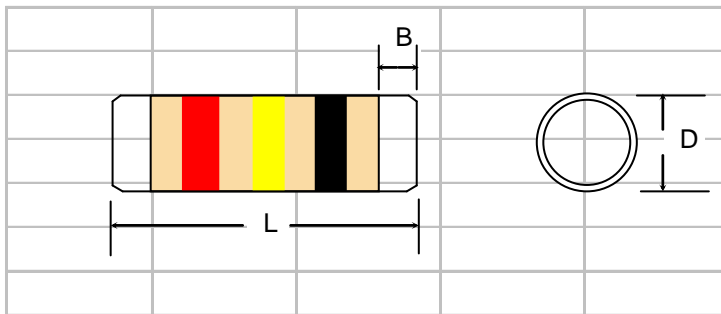
### ■ Features

- SMD enabled structure.
- Conformal Multi-layer Coating Against Humidity
- Lower current noise than thick film flat chip resistor
- Excellent solderability.

### ■ Applications

- Telecommunication
- Automotive
- Medical Equipment
- Consumer Products

### ■ Construction and Dimension



Body Color : Ivory

Marking: Color code 3 bands

Type	Body Length (L)	Body Diameter (D)	Soldering spot (B)
CM204	3.5±0.2mm	1.4±0.15mm	0.5mm Min.
CM207	5.9±0.2mm	2.2±0.20mm	0.5mm Min.
CML207	5.9±0.2mm	2.2±0.20mm	0.5mm Min.
CM309	8.5±0.3mm	3.2±0.20mm	0.8mm Min.
CML309	8.5±0.3mm	3.2±0.20mm	0.8mm Min.

## ■ General Specification

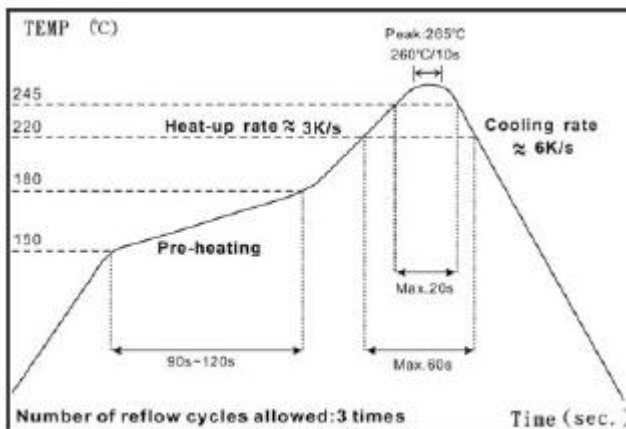
Type	Power Rating (at 70°C)	Max. Working Voltage	Max. Overload Voltage	Resistance Range		Resistance Tolerance	Standard Resistance Value
				Min.	Max.		
CM204	0.25W	250V	500V	0 & 1 Ω	1MΩ	5%	E-24
CM207	0.5W	300V	600V	0 & 1 Ω	1MΩ	5%	E-24
CML207	1W	350V	700V	0 & 1 Ω	1MΩ	5%	E-24
CM309	1W	350V	700V	0 & 1 Ω	10MΩ	5%	E-24
CML309	2W	350V	700V	0 & 1 Ω	10MΩ	5%	E-24

\* For zero-ohm jumper, resistance value is under 20 mΩ.

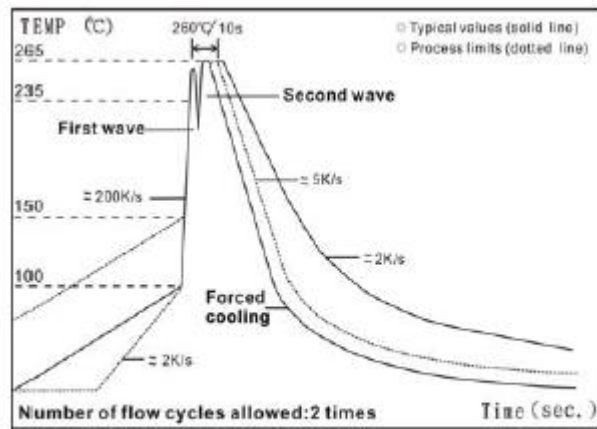
\* Operating Voltage= $\sqrt{P * R}$  or Max. operating voltage listed above, whichever is lower.

\* Overload Voltage= $2.5 * \sqrt{P * R}$  or Max. overload voltage listed above, whichever is lower.

## ■ Soldering Condition



IR Reflow Soldering



Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260° C : 10s
- (2) Time of wave soldering at maximum temperature point 260° C : 10s
- (3) Time of soldering iron at maximum temperature point 410° C : 5s

**■ Specification and Test method**

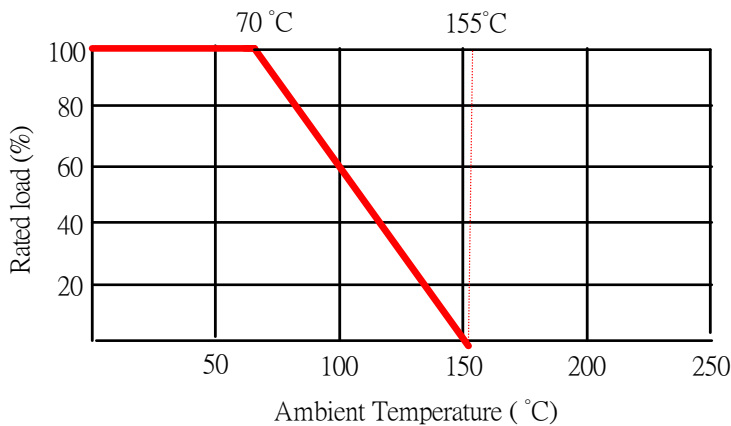
Item	Requirement	Test Method
Short Time Overload	$\Delta R \pm 1\%$	RCWV*2.5 or Max. Overload voltage whichever is lower
Insulation Resistance	$\geq 10G$	Max. Overload voltage for 1 minute
Endurance	$\Delta R \pm 3\%$	70±2°C, RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Damp Heat with Load	$\Delta R \pm 5\%$	40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Dry Heat	$\Delta R \pm 2\%$	at +155°C for 1000 hrs
Solderability	95% min. coverage	245±5°C for 3 seconds
Resistance to Soldering Heat	$\Delta R \pm 1\%$	260±5°C for 10 seconds

RCWV(Rated continuous working voltage)= $\sqrt{P \cdot R}$  or Max. Operating voltage whichever is lower.

Storage Temperature: 25±3°C; Humidity < 80%RH

Reference standards : JIS-C 5201-1

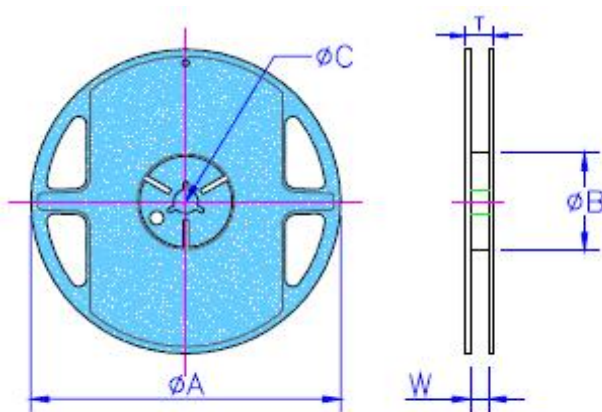
**■ Derating Curve**



## ■ Part Numbering

<u><b>CM204</b></u>	<u><b>J</b></u>	-	<u><b>10KR</b></u>
Type	Tolerance		Ohmic Value
CM204	J = ±5%		10R=10Ω
CM207			120R=120Ω
CML207			1K2R=1.2KΩ
CM309			1MR=1MΩ
CML309			

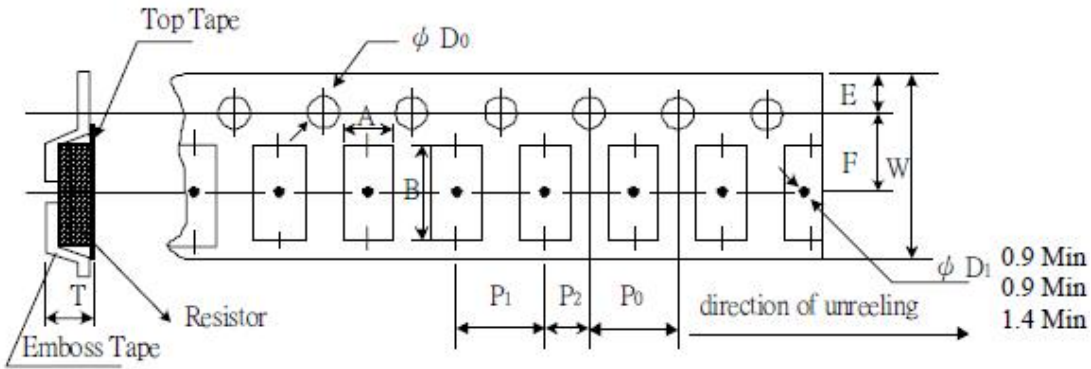
## ■ Packaging



## ■ Packaging Quantity & Reel Specifications

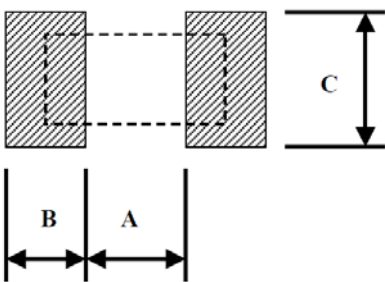
Type	Reel Diameter	ΦA	ΦB	ΦC	W	T	Emboss
	Diameter	(mm)	(mm)	(mm)	(mm)	(mm)	Plastic Tape (EA)
CM204	7 inch	178.5±1.5	60.0+1.0	13.0±0.2	9.0±0.5	12.0±0.15	3,000
CM/CML207	7 inch	178.5±1.5	60.0+1.0	13.0±0.2	13.2±0.5	16.0±0.20	2,000
CM/CML309	13 inch	330.0±1.0	100.0+1.0	13.0±0.2	17.0±0.5	21.5±0.20	2,500

**■ Emboss Plastic Tape Specifications**



Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
CM204	1.55±0.10	3.65±0.10	8.0±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	1.65±0.10
CM/CML207	2.40±0.10	6.15±0.10	12.0±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	2.50±0.10
CM/CML309	3.50±0.10	8.85±0.10	16.0±0.10	1.75±0.10	7.50±0.05	4.00±0.10	9.00±0.10	2.00±0.05	1.50+0.10	3.50±0.10

**■ Recommend Land Pattern**



Type	Soldering Mode	A	B	C
		(mm)	(mm)	(mm)
CM204	Reflow	1.6	1.3	1.6
	Wave	1.5	1.5	1.8
CM/CML207	Reflow	3.0	2.0	3.0
	Wave	3.0	2.5	3.0
CM/CML309	Reflow	4.9	3.0	3.9
	Wave	4.8	3.5	4.0