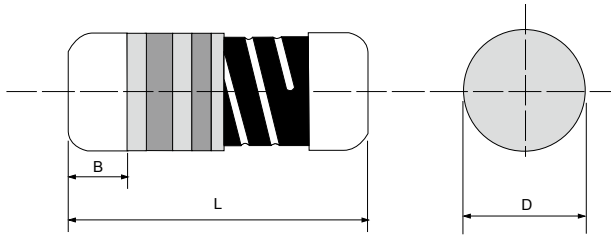


# CM Carbon Film MELF Resistor

Quality • Reliability  
Cost-Down via Technology

CM



## Specifications Per

- IEC 60115-1, IEC 60115-2
- MIL-R-226848

## Features

- SMD enabled structure
- Excellent solderability termination
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency

## DIMENSIONS

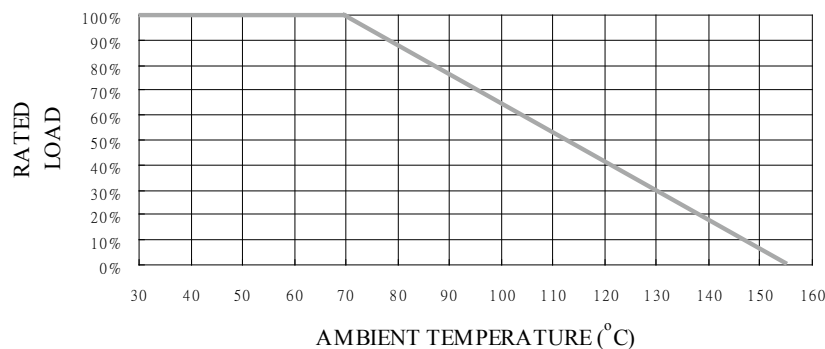
Type	Body Length (L, mm)	Body Diameter (D, mm)	Soldering Spot (B, mm)	Net Weight Per 1000 pcs
CM16	3.52 ± 0.08	1.35 ± 0.1	0.6 Min.	17 grams
CM204	3.52 ± 0.08	1.35 ± 0.1	0.6 Min.	17 grams
CM207	5.90 ± 0.20	2.20 ± 0.1	1.0 Min.	66 grams
CM52	5.90 ± 0.20	2.20 ± 0.1	1.0 Min.	66 grams

## GENERAL SPECIFICATIONS

Type	Power Rating (at 70°C)	Maximum Working Voltage	Maximum Overload Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Values
CM16	1/6W	200V	300V	0, 0.1Ω	1MΩ	±5%	E-24
CM204	1/4W	200V	300V	0, 0.1Ω	1MΩ	±5%	E-24
CM207	1/3W	300V	600V	0, 0.1Ω	10MΩ	±5%	E-24
CM52	1/2W	350V	600V	0, 0.1Ω	10MΩ	±5%	E-24

For zero ohm jumper, please see ZMM series. For 1 m~100mΩ please see CSM series.  
Special sizes, values, and specifications not listed available on special order.

## POWER DERATING CURVE



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## TECHNICAL SUMMARY

Characteristics	Limits			
Dielectric Withstanding Voltage, VAC or DC	CM16,CM204: 200, CM207,CM52: 500			
Temperature Coefficient, PPM / °C	CM16 & CM204		CM207 & CM52	
	1Ω~33K	±300	1Ω~33K	±300
	33K~330K	- 500	33K~330K	- 500
	330K~470K	- 700	330K~470K	- 700
	470K~910K	-1000	470K-1M	-1000
Over 910K	-1500	Over 1M	-1500	
Operating Temperature Range, °C	-55 ~ +155			
Insulation Resistance, MΩ	>10 <sup>4</sup>			
Tin Whisker (JESD201 Temperature Cycling & High Temp. /Humidity Storage), μm	<5			

## PART NUMBER

Example: CM204J10K0TKZTR3K0

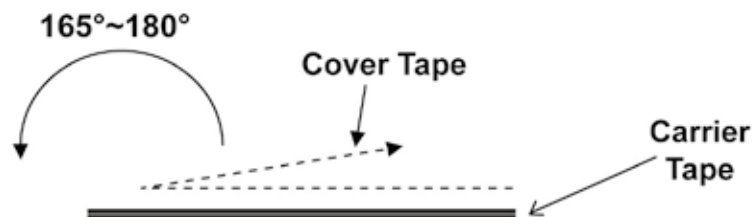
CM204	J	10K0	TKZ	TR3K0
Type	Tolerance	Resistance	TCR	Packaging
	J (5%)	10KΩ <b>4-character code</b> containing - 3 significant digits 1 letter multiplier  <u>MULTIPLIER</u> R = 1 K = 10 <sup>3</sup> M = 10 <sup>6</sup> G = 10 <sup>9</sup>	<b>3-character code</b>  TKZ = Default Product Temperature Coefficient.  Information of typical product temperature coefficient can be found in the Technical Summary section of the datasheet.	<b>5-character code</b>  TR = Tape Reel  (pieces per reel) <u>CM16/CM204</u> 3K0 = 3,000 6K0 = 6,000* 10K = 10,000*  <u>CM207/CM52</u> 2K0 = 2,000 6K0 = 6,000* 10K = 10,000*

\*upon request

## COVER TAPE PEELING SPECIFICATION

Recommended peeling force:

CM16, CM204, CM207, CM52: 50±5gf



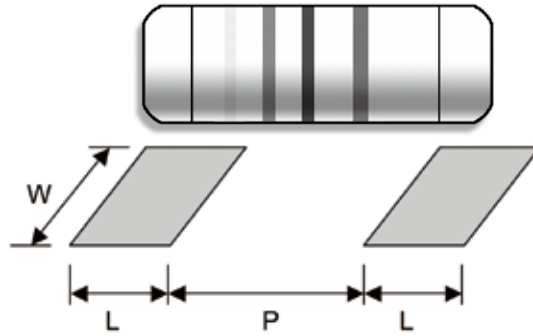
## ■ PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits
Short Time Overload	<b>IEC 60115-1 4.13</b> 5 seconds 2.5x rated voltage (not over max. overload voltage)	± 1%
Load Life In Humidity	<b>IEC 60115-1 4.24</b> 56 days rated load at (40±2)°C and (93±3)% relative humidity	± 5%
Load Life 1,000 hours	<b>IEC 60115-1 4.25.1</b> Rated load with 1.5 hours ON, 0.5 hours OFF, at (70±2)°C	± 3%
Periodic Electric Overload	<b>IEC 60115-1 4.39</b> 3.9x rated voltage (not over max. overload voltage) with 0.1s ON, 2.5s OFF for 1,000 cycles	± 2%
Resistance To Soldering Heat	<b>IEC 60115-1 4.18.2</b> Dip the resistor into a solder bath measured (260±5)°C and hold it for 10±1 seconds	± 1%
Solderability	<b>IEC 60115-1 4.17.2</b> Solder area covered after (230±3)°C/(2±0.2) seconds with flux applied	95% Min.
Vibration	<b>IEC 60115-1 4.22</b> Six hours in each parallel and axial direction with a simple harmonic motion having an amplitude of 1.52mm and 10 to 2,000 Hz.	± 1%
Thermal Endurance	<b>IEC 60115-1 4.25.3</b> 1000 hours at 155°C without load	± 1%
Thermal Shock	<b>IEC 60115-1 4.19</b> -55°C 30minutes, +155°C 30minutes, 5 cycles	± 1%
Single pulse high voltage overload	<b>IEC 60115-1 4.27</b> 10 pulses of 10/700µs at 10x rated voltage (not over max. overload voltage) with interval of 60 sec.	± 2%
Electrostatic discharge (Human body model)	<b>IEC 60115-1 4.38</b> 3 positive & 3 negative discharges with 4KV source	± 5%
Climatic test	<b>IEC 60115-1 4.23</b> 4.23.2 - dry heat: 16 hours 155°C 4.23.3 - damp heat: 24 hours 55°C with 95% relative humidity 4.23.4 - cold: 2 hours -55°C 4.23.5 - negative air pressure: 2 hour 8.5KPa at (25±10)°C 4.23.6 - damp heat cyclic: 5 days 55°C with 95% relative humidity 4.23.7 - DC load: rated voltage at -55°C and 155°C each 1 Min.	± 2%
Bending test	<b>IEC 60115-1 4.33</b> Pressing depth 2mm, 3 times	± 0.25%
Flammability	<b>IEC 60115-1 4.35</b> Needle flame test 10s	No burning after 30s

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■ SUGGESTED PAD LAYOUT



CM

Type	Soldering Mode	Pad Length (L, mm, Min.)	Pad Spacing (P, mm)	Pad Width (W, mm, Min.)
CM16	Reflow	1.0	2.0 ± 0.2	1.6
	Wave	1.2	2.0 ± 0.2	1.6
CM204	Reflow	1.0	2.0 ± 0.2	1.6
	Wave	1.2	2.0 ± 0.2	1.6
CM207	Reflow	2.0	3.0 ± 0.3	3.0
	Wave	2.5	3.0 ± 0.3	3.0
CM52	Reflow	2.0	3.0 ± 0.3	3.0
	Wave	2.5	3.0 ± 0.3	3.0

For better heat dissipation / lower heat resistance, increase W & L.