

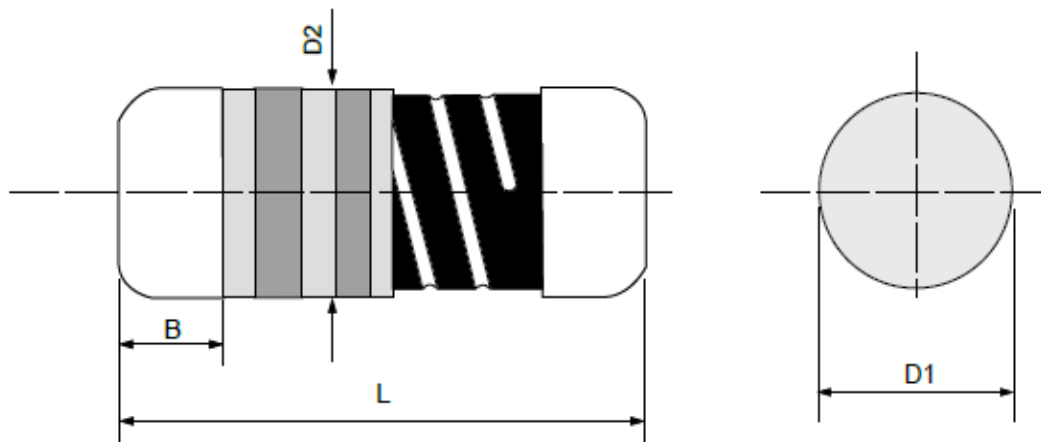
CM - Carbon Film MELF Resistor

Specifications Per

- IEC 60115-1
- 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



■ DIMENSION

Type	Body Length (L , mm)	Cap Diameter (D1 , mm)	Body Diameter (D2 , mm)	Soldering Spot (B, mm)	Net Weight Per 1,000 pcs
CM16	3.52 ± 0.15	1.35 ± 0.1	$D1 + 0.02 / -0.15$	0.6 Min.	17 grams
CM204	3.52 ± 0.15	1.35 ± 0.1	$D1 + 0.02 / -0.15$	0.6 Min.	17 grams
CM207	5.90 ± 0.20	2.20 ± 0.1	$D1 + 0.02 / -0.2$	1.0 Min.	66 grams
CM52	5.90 ± 0.20	2.20 ± 0.1	$D1 + 0.02 / -0.2$	1.0 Min.	66 grams
CM101	5.90 ± 0.20	2.20 ± 0.1	$D1 + 0.02 / -0.2$	1.0 Min.	66 grams
CM201	8.50 ± 0.50	3.00 ± 0.2	$D1 + 0.05 / -0.35$	1.3 Min.	186 grams

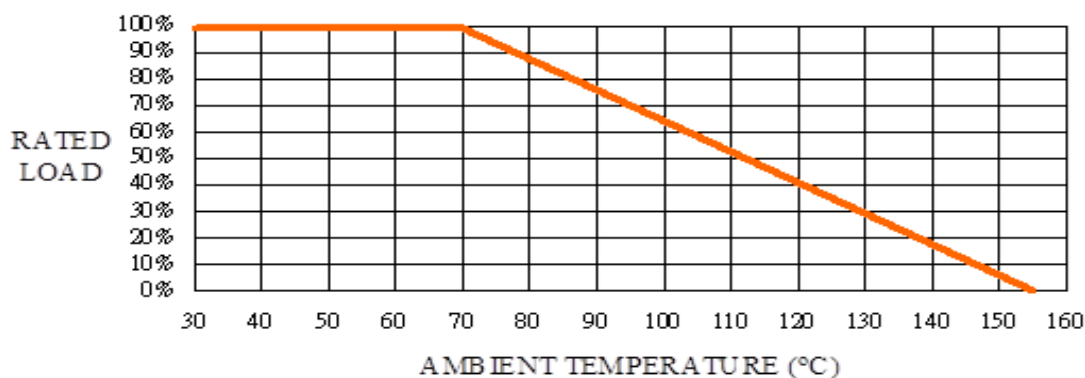
■ GENERAL SPECIFICATIONS

Type	Power Rating (at 70°C)	Maximum Working Voltage	Maximum Overload Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Value
CM16	1/6W	200V	300V	0.51Ω	1MΩ	±5%	E-24
CM204	1/4W	200V	300V	0.51Ω	1MΩ	±5%	E-24
CM207	1/3W	200V	300V	0.51Ω	1MΩ	±5%	E-24
CM52	1/2W	350V	600V	0.51Ω	10MΩ	±5%	E-24
CM101	1W	350V	600V	0.51Ω	10MΩ	±5%	E-24
CM201	2W	350V	700V	0.51Ω	10MΩ	±5%	E-24

For zero ohm jumper, please see ZMM series. For 10m~510mΩ please see CMS series.

Special sizes, values, and specifications not listed available on special order.

■ POWER DERATING CURVE



■ TECHNICAL SUMMARY

Characteristics	Limits			
Dielectric Withstanding Voltage, VAC or DC	CM16		200	
	CM204		200	
	CM207		500	
	CM52		500	
	CM101		500	
	CM201		700	
Temperature Coefficient, PPM / °C	CM6 & CM204		CM207/ CM52/ CM101/ CM201	
	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 ⁴			
Tin Whisker (JESD201 Temperature Cycling & High Temp. /Humidity Storage), μm	<5			

■ PART NUMBER

Example : CM204J10K0TKZTR3K0

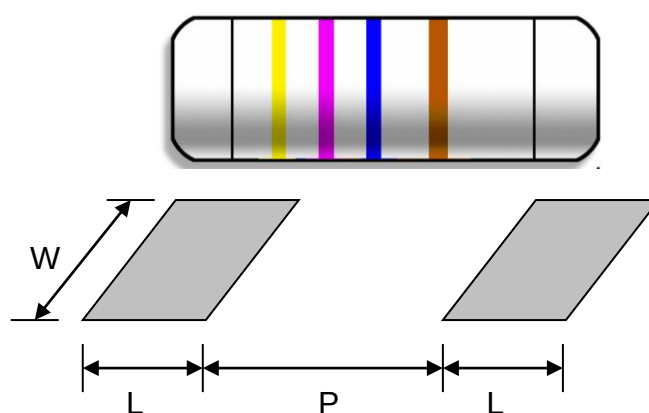
CM204	J	10K0	TKZ	TR3K0
Type	Tolerance	Resistance	TC	Packaging
	J (5%)	10KΩ 4-character code containing - 3 significant digits 1 letter multiplier <u>OHM</u> <u>MULTIPLIER</u> R = 1 K = 10 ³ M = 10 ⁶ G = 10 ⁹	3-character code TKZ = Default Product Temperature Coefficient. Information of typical product temperature coefficient can be found in the Technical Summary section of datasheet.	5-character code TR = Tape Reel (pieces per reel) <u>CM16/CM204</u> 3K0 = 3,000 6K0 = 6,000 10K = 10,000 <u>CM207/CM52</u> <u>CM101</u> 2K0 = 2,000 6K0 = 6,000 10K = 10,000 <u>CM201</u> 2K5 = 2,500

■ PERFORMANCE SPECIFICATIONS

Tests Characteristics	Test Conditions	Limits
Short Time Overload	IEC 60115-1 4.13 5 seconds 2.5x rated voltage (not over max. overload voltage)	± 1%
Load Life In Humidity	IEC 60115-1 4.24 56 days rated load (not over max. working voltage) at (40±2)°C and (93±3)% relative humidity	± 5%
Load Life 1,000 hours	IEC 60115-1 4.25.1 Rated load (not over max. working voltage) with 1.5 hours ON, 0.5 hours OFF, at (70±2)°C	± 3%
Periodic Electric Overload	IEC 60115-1 4.37 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	IEC 60115-1 4.18.2 Dip the resistor into a solder bath having a temperature of (260±5)°C and hold it for a 10±1 seconds	± 1%
Solderability	IEC 60115-1 4.17.2 Solder area covered after (235±3)°C/ (2±0.2) seconds with flux applied	95% Min.
Vibration	IEC 60115-1 4.22 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	IEC 60115-1 4.25.3 1,000 hours at 155°C without load	± 1%
Thermal Shock	IEC 60115-1 4.19 -55°C 30minutes, +155°C 30 minutes, 5 cycles	± 1%
Single pulse high voltage overload	IEC 60115-1 4.27 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)	IEC 60115-1 4.38 3 positive & 3 negative discharges with 2KV for CM16, CM204 or 4KV for CM207, CM52, CM101, CM201 (For continuo us surge application please see Surge Performance paragraph)	± 5%

Climatic test	IEC 60115-1 4.23 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	IEC 60115-1 4.33 Pressing depth 2mm, 3 times	± 0.25%
Flammability	IEC 60115-1 4.35 Needle flame test 10s	No burning after 30s

■ SUGGESTED PAD LAYOUT



Type	Soldering mode	Pad Length (L, mm, min.)	Pad Spacing (P, mm)	Pad Width (W, mm, min.)
CM16	Reflow	1.3	1.6 ± 0.1	1.6
	Wave	1.5	1.5 ± 0.1	1.8
CM204	Reflow	1.3	1.6 ± 0.1	1.6
	Wave	1.5	1.5 ± 0.1	1.8
CM207	Reflow	2.0	3.0 ± 0.1	3.0
	Wave	2.5	3.0 ± 0.1	3.0
CM52	Reflow	2.0	3.0 ± 0.1	3.0
	Wave	2.5	3.0 ± 0.1	3.0
CM101	Reflow	2.0	3.0 ± 0.1	3.0
	Wave	2.5	3.0 ± 0.1	3.0
CM201	Reflow	3.0	4.9 ± 0.3	3.7
	Wave	3.5	4.8 ± 0.3	4.0

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

■ COVER TAPE PEELING SPECIFICATION

Recommended peeling force:

CM16, CM204, CM207, CM52, CM101: 50±5gf

CM201: 70±10gf

