

Specifications Per

• IEC 60115-1

Features

- High power handling with superior reliability and stability
- Conformal multi-layer coating against humidity
- SMD enabled structure with excellent solderability
- HeatSinkTM technology for better heat dissipation
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency

DIMENSIONS

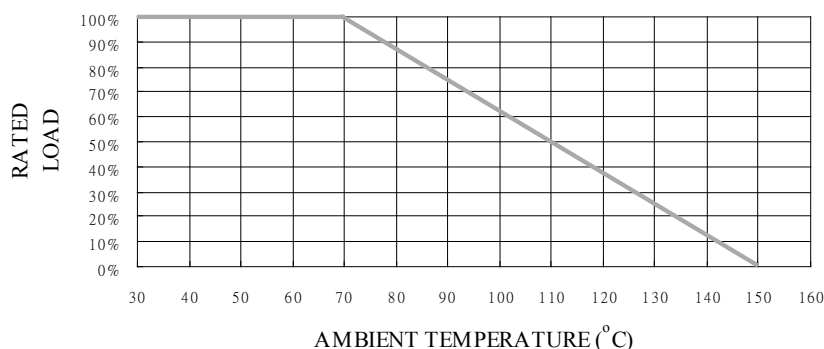
Type	Body Length (L, mm)	Body Diameter (D, mm)	Soldering Spot (B, mm)	Net Weight Per 1000 pcs
CSM204	3.52 ± 0.08	1.35 ± 0.1	0.6 Min.	17 grams
CSM52	5.90 ± 0.20	2.20 ± 0.1	1.0 Min.	66 grams
CSM101	5.90 ± 0.20	2.20 ± 0.1	1.0 Min.	66 grams
CSM201	8.50 ± 1.00	3.00 ± 0.2	1.3 Min.	186 grams
CSM301	10.5 ± 1.00	4.00 ± 0.5	1.6 Min.	446 grams

GENERAL SPECIFICATIONS

Type	Power Rating (at 70°C)	Maximum Working Voltage	Maximum Overload Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Values
CSM204	1/4W	200V	400V	10mΩ	510mΩ	±1%~5%	E-24 / E-96
CSM52	1/2W	250V	500V	10mΩ	510mΩ	±1%~5%	E-24 / E-96
CSM101	1W	250V	500V	10mΩ	510mΩ	±1%~5%	E-24 / E-96
CSM201	2W	300V	600V	10mΩ	510mΩ	±1%~5%	E-24 / E-96
CSM301	3W	350V	700V	10mΩ	510mΩ	±1%~5%	E-24 / E-96

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

POWER DERATING CURVE



■ TECHNICAL SUMMARY

Characteristics	Limits
Dielectric Withstanding Voltage, VAC or VDC	CSM204: 200 CSM52, CSM101: 500 CSM201, CSM301: 700
Temperature Coefficient, PPM / °C	±50, ±100, ±200, ±300, ±600
Operating Temperature Range, °C	-55 ~ +150
Insulation Resistance, MΩ	>10 ⁴
Tin Whisker (JESD201 Temperature Cycling & High Temp. / Humidity Storage), μm	<5
Power Derating, linear	100% at 70 °C, down to zero at 150 °C

* Not applicable to all resistance values. Please check with us regarding the PPM of specific resistance value(s).

■ PART NUMBER

Example: CSM201JR510TKZTR2K5

CSM201	J	R510	TKZ	TR2K5
Type	Tolerance*	Resistance	TCR	Packaging
	F (1%) G (2%) J (5%)	0.51Ω 4-character code containing - 3 significant digits 1 letter multiplier <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 the datasheet.**	5-character code TR = Tape Reel (pieces per reel) CSM204 3K0 = 3,000 6K0 = 6,000*** 10K = 10,000*** <u>CSM52/CSM101</u> 2K0 = 2,000 6K0 = 6,000*** 10K = 10,000*** <u>CSM201</u> 2K5 = 2,500 <u>CSM301</u> 2K0 = 2,000

* Listed values may not be applicable to all resistance values. Please check with us before placing order.

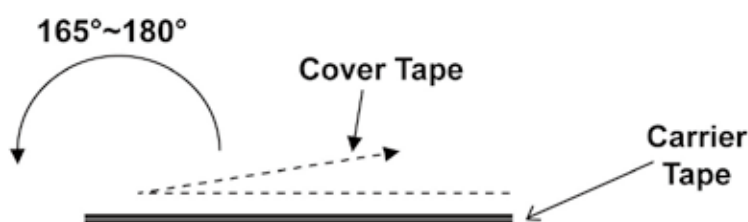
** For the availabilities of non-default temperature coefficient, please check with us. Reference for TCR letter codes can be found in section (4) of Part Number Construction in the Appendices.

*** upon request

■ COVER TAPE PEELING SPECIFICATION

Recommended peeling force:

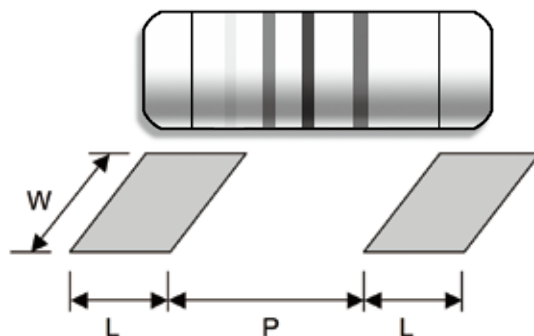
CSM204, CSM52, CSM101: 50±5gf CSM201, CSM301: 70±10gf



■ PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits
Short Time Overload	IEC 60115-1 4.13 2 seconds 2.5x rated voltage (not over max. overload voltage)	±1%, 2%: ±0.75% ±5%: ±2%
Load Life 1,000 hours	IEC 60115-1 4.25.1 Rated load with 1.5 hours ON, 0.5 hours OFF, at (70±2)°C	±3%
Load Life In Humidity	IEC 60115-1 4.24 56 days rated load at 40°C and (93±3)% relative humidity	±3%
Periodic Electric Overload	IEC 60115-1 4.39 3.9x rated voltage (not over max. overload voltage) with 0.1s ON, 2.5s OFF for 1,000 cycles	±5%
Resistance To Soldering Heat	IEC 60115-1 4.18.2 Dip the resistor into a solder bath measured (260±5)°C and hold it for 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
Thermal Endurance	IEC 60115-1 4.25.3 1000 hours at 150°C without load	±1%
Thermal Shock	IEC 60115-1 4.19 -55°C 30minutes, +150°C 30minutes, 5 cycles	±2%
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 4KV source	± 5%
Climatic test	IEC 60115-1 4.23 4.23.2 - dry heat: 16 hours 150°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 150°C each 1 Min.	± 2%
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%
Bending test	IEC 60115-1 4.33 Pressing depth 2mm, 3 times	± 0.5%
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.)
CSM204	Reflow	1.0	2.0 ± 0.2	1.6
	Wave	1.2	2.0 ± 0.2	1.6
CSM52	Reflow	2.0	3.0 ± 0.3	3.0
	Wave	2.5	3.0 ± 0.3	3.0
CSM101	Reflow	2.0	3.0 ± 0.3	3.0
	Wave	2.5	3.0 ± 0.3	3.0
CSM201	Reflow	3.0	4.9 ± 0.3	3.7
	Wave	3.5	4.8 ± 0.3	4.0
CSM301	Reflow (Not recommended)	4.0	6.2 ± 0.4	4.5
	Wave	4.5	6.0 ± 0.4	5.0

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

■ SUGGESTED PAD LAYOUT FOR KELVIN (4-WIRE) SENSING

