

Specifications Per

• IEC 60115-1

Features

- Low ohmic value
- High power handling with superior reliability and stability
- Conformal multi-layer coating against humidity
- SMD enabled structure with excellent solderability
- Excellent in heat dissipation than chip resistor (Especially suitable for air cooling)
- Stronger mechanical structure to endure vibration and thermal shock
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency

DIMENSIONS

Type	Body Length (L, mm)	Cap Diameter (D1, mm)	Body Diameter (D2, mm)	Soldering Spot (B, mm)	Net Weight Per 1000 pcs
CSM204	3.52 ± 0.15	1.35 ± 0.1	D1+0.02/ -0.15	0.6 Min.	17 grams
CSM101	5.90 ± 0.20	2.20 ± 0.1	D1+0.02/ -0.2	1.0 Min.	66 grams
CSM201	8.50 ± 0.50	3.00 ± 0.2	D1+0.05/ -0.35	1.3 Min.	186 grams
CSM301	10.5 ± 0.50	4.00 ± 0.5	D1+0.05/ -0.45	1.6 Min.	446 grams

GENERAL SPECIFICATIONS

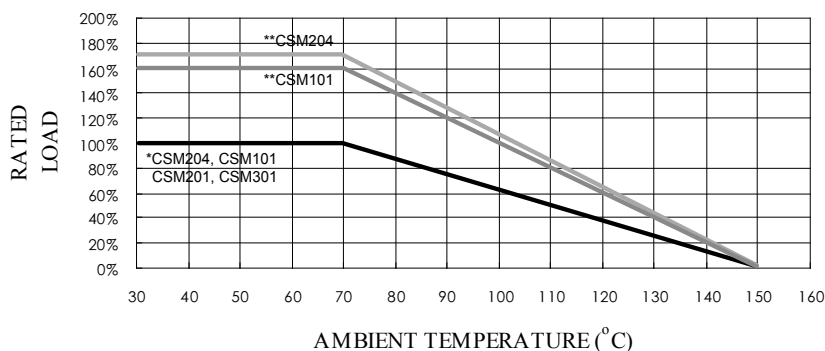
Type	Power Rating (at 70°C)	Up Grade Power Rating*	Maximum Working Voltage**	Maximum Overload Voltage***	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Values
CSM204	1/2W	0.8W	$\sqrt{P \times R}$	$2.5 \times \sqrt{P \times R}$	10mΩ	510mΩ	±1%~5%	E-24 / E-96
CSM101	1W	1.6W	$\sqrt{P \times R}$	$2.5 \times \sqrt{P \times R}$	10mΩ	510mΩ	±1%~5%	E-24 / E-96
CSM201	2W	-	$\sqrt{P \times R}$	$2.5 \times \sqrt{P \times R}$	10mΩ	510mΩ	±1%~5%	E-24 / E-96
CSM301	3W	-	$\sqrt{P \times R}$	$2.5 \times \sqrt{P \times R}$	10mΩ	510mΩ	±1%~5%	E-24 / E-96

*Wind Speed : 1m/s Please refer to the Power Derating Curve.

** Rated Continuous Maximum Working Voltage (RCWV) should be determined from $RCWV = \sqrt{\text{Power Rating} \times \text{Resistance Values}}$

*** Short-time Overload (STOL) test should be determined from $STOL = 2.5 \times RCWV$

POWER DERATING CURVE



*At 70°C

** Upgrade Power Rating (Wind Speed : 1m/s)

■ TECHNICAL SUMMARY

Characteristics	Limits
Dielectric Withstanding Voltage, VAC or VDC	CSM204: 200 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
Failure Rate in Time, pcs / 10 ⁹ device hours	<1.5

* 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>OHM 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) <u>CSM204</u> 3K0 = 3,000 6K0 = 6,000*** 10K = 10,000*** <u>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.

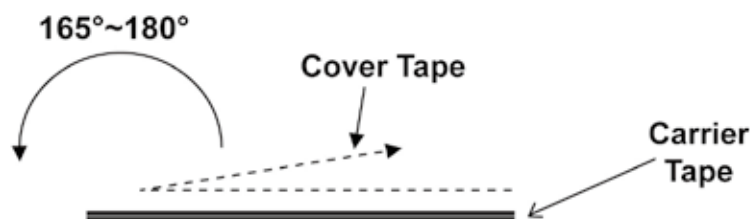
** For the availabilities of non-default temperature coefficient, please check with us. Reference for TCR letter codes can be found in section (4) of Part Number Construction in the Appendices.

*** upon request

■ COVER TAPE PEELING SPECIFICATION

Recommended peeling force:

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



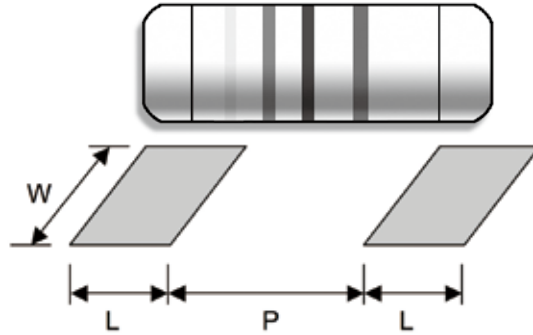
■ PERFORMANCE SPECIFICATIONS

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	IEC 60115-1 4.25.1 Rated load (not over max. working voltage) 1,000 hours 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 (not over max. working voltage) 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.coverage
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 2KV for CSM204 or 4KV for CSM52, CSM101, CSM201, CSM301 (For continuous surge application please see Surge Performance paragraph)	±0.5%
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.	±0.5%
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

Quality • Reliability
Cost-Down via Innovation

CSM

■ SUGGESTED PAD LAYOUT



Type	Soldering Mode	Pad Length (L, mm, Min.)	Pad Spacing (P, mm)	Pad Width (W, mm, Min.)
CSM204	Reflow	1.3	1.6 ± 0.1	1.6
	Wave	1.5	1.5 ± 0.1	1.8
CSM101	Reflow	2.0	3.0 ± 0.1	3.0
	Wave	2.5	3.0 ± 0.1	3.0
CSM201	Reflow	3.0	4.9 ± 0.3	3.7
	Wave	3.5	4.8 ± 0.3	4.0
CSM301	Reflow	4.0	6.2 ± 0.4	5.0
	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

