Chip Current Sensing Resistor on AlN substrate Specification

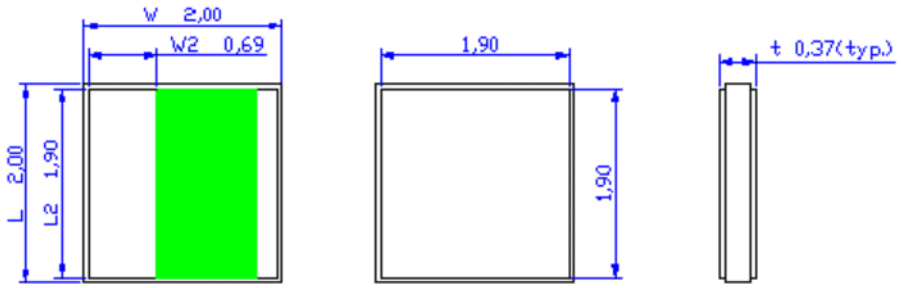
Scope

This specification applies of Chip Current Sensing Resistor on AlN substrate rectangular type. The high power Chip Current Sensing Resistor on AlN substrate(CCSN) series which are a kind of thin film chip resistor utilizes the excellent thermal properties of AlN to allow ultra high power rating with miniature case size for hybrid (chip and wire) assemblies.

The CCSNs are 100 % electrically tested and visually inspected to MIL-STD-883, method 2032 class H, class K, or commercial inspection per internal standards.

Dimensions

Type (inch size)	Dimensions(mm)				
	L	W	t	L2 (BOND PAD)	W2 (BON PAD)
CCSN0808	2.0±0.10	2.0±0.10	0.37±0.10	1.9±0.1	0.69±0.1



Features

- Chip size 0808
- Resistance value from 0.5 to 5Ω
- Lead free, RoHs compliant for global applications and halogen free

Application

- Gate resistor for IGBT based power converters
- Current limiting for LED lighting applications
- High power applications
- Alternative energy
- Hybrid assemblies

Part Numbers

CCSN	08	M	D	J	P	C	5R00
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

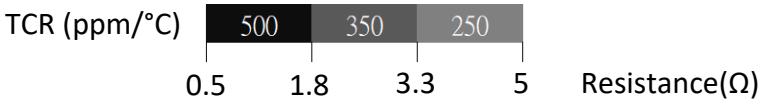
(1)Series Name: CCSN (Chip Current Sensing Resistor on AlN substrate)
(2)Chip size: 0808
(3)TCR Code: J=± 500ppm, W=± 350ppm, M=± 250ppm
(4)Packaging Material: on Dicing tape (D)
(5)Resistance Tolerance: ± 2% (G), ± 5% (J) , ± 10% (K), , ± 25% (L)
(6)Power rating: C=1W, E=2W, H=3W, P=4W
(7)Visual Class: C=Commercial, H=Class H, K=Class K
(8)Resistance Code: Ex: 5R00 means 5Ω,etc.

Electrical Specification

Item	Power Rating	Resistance Range(Ω)	Operation Temp. Range	TCR Typ. (PPM/℃)	Thermal Resistivity Typ. (K/W)
CCSN0808	Up to 4W*	0.5 to 5	-55~+125℃	±250**	Down to 1.5

* Power rating determined by application specific heat sink properties. Film temperature should be not exceeded 200 °C.
** See list "TCR (ppm/°C) and Resistance(Ω)" for more details.

TCR (ppm/°C) and Resistance(Ω)



Performances

Environmental Performance

No.	Item	Test Condition	Specification
1	Short Time Overload*	5 times rated power for 5 sec. (JIS-C5202-5.5)	ΔR: ±(1%+0.0005Ω)
2	Temperature Coefficient of Resistance (T.C.R.)	+25°C /+125°C. (JIS-C5202-5.2) $TCR\ (\text{ppm/℃}) = \frac{\Delta R}{R \times \Delta t} \times 10^6$	Refer to electrical specification.
3	Biased humidity**	The specimens shall be placed in a chamber and subjected to a relative humidity of 85% percent and a temperature of 85 ±2°C for the period of 1000 hr. (MIL-STD-202, Method 103)	ΔR: ±(1%+0.0005Ω)
4	High Temperature Exposure	The chip (mounted on board) is exposed in the heat chamber 150±3℃ for 100 hrs. (JIS-C5202-7.2)	ΔR: ±(1%+0.0005Ω)
5	Low Temperature Operation	The chip (mounted on board) is exposed in the cooling chamber -65±5°C, 45 min.	ΔR: ±(1%+0.0005Ω)
6	Load Life	Load Life Stability, 1000 h, Film Temperature < 200 °C	ΔR: ±(1%+0.0005Ω)
7	Rapid change of temperature	The chip (mounted on board) is exposed, -55±3°C (30min.)/+155±2°C (30min.) for 5 cycles. The following conditions as the following figure. (JIS-C5202-7.4)	ΔR: ±(1%+0.0005Ω)

* The Film temperature should be not exceeded 200 °C.
**Au pads are sensitive to high moisture environments. Adequate application-level packaging is required to protect the components and wire bonds from moisture related damage.

Data Sheet of Chip Current Sensing Resistor on AlN substrate

Content	Standard Specification	
Raw Material	Substrate Material	AlN
	Thickness	0.37mm±0.1mm (REF)
	Size	2.0mm (REF)* 2.0mm (REF)
Processing	Plating	Cu: Top: 60um (Typ.)/Bottom: 60um (Typ.) Ni: 4.5±1.5um Pd: 0.05um(min) Au: 0.05um(min)
	Dimension Tolerance	±0.10mm

Characteristics of Ceramic Materials

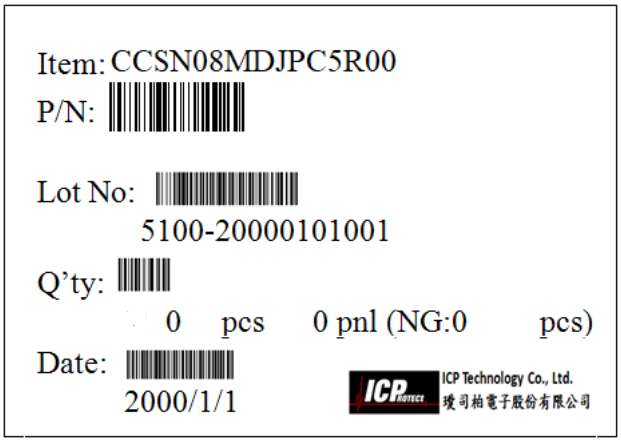
Item		AlN
Sintered Density (g/cm^3)		3.3
Functional Characteristics	Flexural Strength (Mpa)	≧300
Thermal Characteristics	Coefficient of thermal expansion (ppm/°C)	4.0
	Thermal conductivity (W/mK)	170~200
Electric Characteristics	Dielectric constant (1MHz)	9.0
	Volume resistivity (Ωcm)	$>10^{14}$
	Dielectric strength (KV/mm)	15

Shelf life

Vacuum package: Ag: 1 month, Au: 3 months

Tear vacuum package and normal condition (5℃~35℃, RH 40%~75%): 7 days.

Label



Lot No.:5100-20000101 001

System code

Production Date

Serial Number

Package

Panel vacuum package

Box pack

ECN

Engineering Change Notice：The customer will be informed with ECN if there is significant modification on the characteristics and materials described in Approval Sheet.

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版次 Version	日期 Date	改訂履歷 Reversion history:	作成 Maker
第 1 版 Ver.A	2022 年 08 月 01 日	Released to prototype	Bob
第 2 版 Ver.B	2022 年 09 月 26 日	First vision	Bob