

電流感測貼片電阻

CS Series
Current Sensing Chip Resistor

FEATURE

- ◆ 3W Rating in size, 1225 Package
- ◆ Low TCR from ± 100 PPM $\sim \pm 600$ PPM/ $^{\circ}$ C
- ◆ Resistance Values from 1m to 1000 m Ω
- ◆ High Purity Alumina Substrate for High Power Dissipation
- ◆ Rated Power : 0.0625W \sim 3W

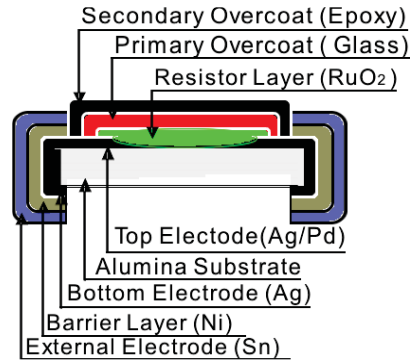
Applications

- ◆ Power Management Applications
- ◆ Switching Power Supply
- ◆ Over Current Protection in Audio Application
- ◆ Voltage Regulation Module (VRM)
- ◆ DC-DC Converter, Battery Pack, Charger, Adaptor
- ◆ Automotive Engine Control
- ◆ Disk Driver
- ◆ Portable Devices (PDA, Cell phone)

FIGURE



CONSTRUCTION



ORDERING INFORMATION

Example: NCS25JFR05

Power	Size	Type	Tolerance	TCR($^{\circ}$ C)	Resistance	Packing	Figure
1/20W (Z)	0201	ZCS01	J = $\pm 5\%$	D= ± 50 ppm	m5=R0005 Ω	10K Reel	Fig-1
1/16W (Y)	0402	YCS02	G = $\pm 2\%$	E= ± 100 ppm	5m=R005 Ω	10K Reel	
1/10W (X)	0603	XCS03	F = $\pm 1\%$	K= ± 150 ppm	50m=R05 Ω	5K Reel	
1/8W (X)	0805	WCS05	D = $\pm 0.5\%$	F= ± 200 ppm	100m=R1 Ω	5K Reel	
1/4W (V)	1206	VCS06	C = $\pm 0.25\%$	G= ± 300 ppm	1000m=1 Ω	5K Reel	
1/2W (U)	1210	UCS11	B = $\pm 0.1\%$	H= ± 400 ppm	1R = 1R00	4K Reel	
3/4W (T)	2010	TCS10	T = $\pm 0.01\%$	I= ± 500 ppm		4K Reel	
1W (S)	2512	SCS12		J= ± 600 ppm		4K Reel	
1W (S)	3720	SCS37				4K Reel	
1.5W @	2512	RCS12				4K Reel	
2W (Q)	2512	QCS12				4K Reel	
2W (Q)	7520	QCS75				4K Reel	
3W (N)	1225	NCS25				4K Reel	

Body Marking

Fig-1



Fig-2



Fig-3

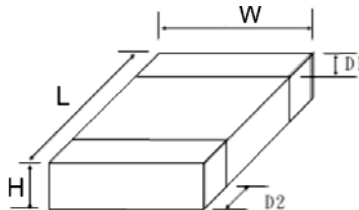
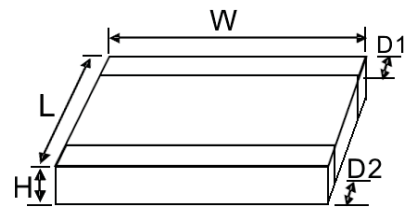


Fig-4



DIMENSION

Power	Size	Type	L	W	H	D1	D2	Figure
1/20W (Z)	0201	ZCS01	0.58 \pm 0.05	0.29 \pm 0.05	0.23 \pm 0.10	0.12 \pm 0.10	0.15 \pm 0.10	Fig-3
1/16W (Y)	0402	YCS02	1.00 \pm 0.05	0.50 \pm 0.05	0.32 \pm 0.10	0.25 \pm 0.10	0.20 \pm 0.10	
1/10W (X)	0603	XCS03	1.60 \pm 0.10	0.80 \pm 0.10	0.45 \pm 0.10	0.30 \pm 0.20	0.30 \pm 0.20	
1/8W (W)	0805	WCS05	2.00 \pm 0.15	1.25 \pm 0.15	0.55 \pm 0.10	0.30 \pm 0.20	0.40 \pm 0.25	
1/4W (V)	1206	VCS06	3.05 \pm 0.15	1.55 \pm 0.15	0.55 \pm 0.10	0.50 \pm 0.30	0.40 \pm 0.25	
1/2W (U)	1210	UCS11	3.00 \pm 0.15	2.50 \pm 0.15	0.55 \pm 0.10	0.50 \pm 0.30	0.40 \pm 0.25	
3/4W (T)	2010	TCS10	5.00 \pm 0.20	2.45 \pm 0.15	0.60 \pm 0.15	0.60 \pm 0.30	0.50 \pm 0.25	
1W (S)	2512	SCS12	6.35 \pm 0.20	3.15 \pm 0.15	0.60 \pm 0.10	0.60 \pm 0.30	0.55 \pm 0.25	
1W (S)	3720	SCS37	2.00 \pm 0.20	3.75 \pm 0.20	0.60 \pm 0.10	0.40 \pm 0.20	0.40 \pm 0.20	
1.5W (R)	2512	RCS12	6.35 \pm 0.20	3.15 \pm 0.15	0.74 \pm 0.10	0.60 \pm 0.30	0.55 \pm 0.25	
2W (Q)	2512	QCS12	6.35 \pm 0.20	3.15 \pm 0.15	0.74 \pm 0.10	0.60 \pm 0.30	0.55 \pm 0.25	
2W (Q)	7520	QCS75	2.00 \pm 0.20	7.50 \pm 0.30	0.60 \pm 0.10	0.40 \pm 0.20	0.40 \pm 0.20	
3W (N)	1225	NCS25	3.10 \pm 0.15	6.30 \pm 0.15	0.90 \pm 0.15	0.60 \pm 0.30	0.55 \pm 0.25	

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GENERAL ELECTRICAL SPECIFICATION

Power	Size	Type	Resistance Range (Ω)	Tolerance	T.C.R. (ppm/°C)	Operating Temp. Range
1/20W	0201	ZCS01	100 ~ 150m	±1%,±2%,±5%	±1000	-55°C ~ +155°C
			151 ~ 500m		±600	
			501 ~ 1000m		±300	
1/16W	0402	YCS02	50mΩ~100mΩ	±1%,±2%,±5%	±400	
			101mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/10W	0603	XCS03	20mΩ~50mΩ	±1%,±2%,±5%	±600	
			51mΩ~100mΩ		±400	
			101 mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/8W	0805	WCS05	20mΩ~50mΩ	±1%,±2%,±5%	±600	
			51mΩ~100mΩ		±400	
			101 mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/4W	1206	VCS06	20mΩ~50mΩ	±1%,±2%,±5%	±600	
			51mΩ~100mΩ		±400	
			101 mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/2W	1210	UCS11	20mΩ~50mΩ	±1%,±2%,±5%	±600	
			51mΩ~100mΩ		±400	
			101 mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
3/4W	2010	TCS10	10mΩ~20mΩ	±1%,±2%,±5%	±600	
			21mΩ~50mΩ		±400	
			51mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1W	2512	SCS12	10mΩ~20mΩ	±1%,±2%,±5%	±600	
			21mΩ~50mΩ		±400	
			51mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1W	3720	SCS37	10mΩ~19mΩ	±2%,±5%	±300	
			20mΩ~500mΩ		±150	
2W	7520	QCS75	1mΩ~4mΩ	±2%,±5%	±300	
			5mΩ~10mΩ		±200	
			11mΩ~350mΩ		±150	
3W	1225	NCS25	3m ~ 5m	±1%,±2%,±5%	±300	
			6m ~ 20m		±200	
			21m ~ 30m		±150	
			31m ~ 250m		±100	
			251m ~ 8000m		±200	



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GENERAL ELECTRICAL SPECIFICATION

High Power Rating Electrical Specification

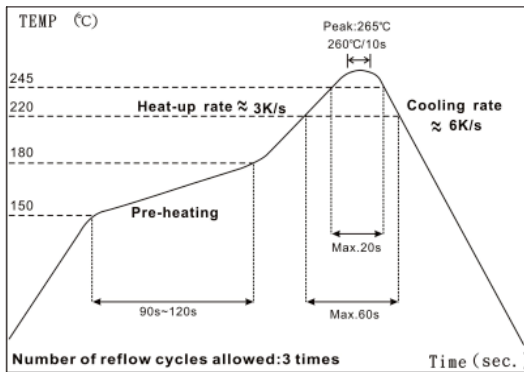
Power	Size	Type	Resistance Range (Ω)	Tolerance	T.C.R.	Operating
					(ppm/°C)	Temp.Range
1/8W	0603	WCS05	51m ~ 100m	±1%,±2%,±5%	±400	-55°C ~ +155°C
			101m ~ 500m		±300	
			510m ~ 1000m		±200	
1/4W	0805	VCS05	51m ~ 100m	±1%,±2%,±5%	±400	
			101m ~ 500m		±300	
			510m ~ 1000m		±200	
1/2W	1206	UCS06	10m ~ 20m	±1%,±2%,±5%	±600	
3/4W	1210	TCS11	21m ~ 50m		±400	
1W	2010	SCS10	51m ~ 500m		±300	
1.5W	2512	RCS12	501m ~ 1000m		±200	
2W	2512	QCS12				

Low TCR Rating Electrical Specification

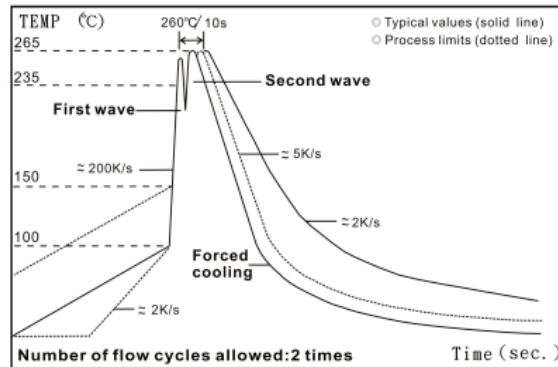
Power	Size	Type	Resistance	Tolerance	T.C.R.	Operating
			Range		(ppm/°C)	Temp.Range
1/4W	1206	VCS06	100mΩ~1000mΩ	±1%,±2%,±5%	±100	-55°C ~ +155°C
1/2W	1210	UCS11	100mΩ~1000mΩ			
3/4W	2010	TCS10	100mΩ~1000mΩ			
1W	2512	SCS12	20mΩ~1000mΩ			
1W	3720	SCS37	100mΩ~500mΩ			
2W	7520	QCS75	50mΩ~350mΩ			

* Operating Voltage = $\sqrt{P8R}$; Overload Voltage = $2.5 * \sqrt{P*R}$; Operating Current = $\sqrt{P/R}$

SOLDERING CONDITION



IR Reflow Soldering



Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s



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BELIABILITY TEST

No.	Item	Specification	Test Method
1	Temperature Coefficient of Resistance	As Spec	MIL-STD-202F Method 304 +25/-55/+25/+125/+25°C
2	Short Time Overload	±(0.5% + 0.05Ω) ΔR±1% for high power rating	JIS-C-5202-5.5 RCWV*2.5 or Max Overloading Voltage 5 seconds
3	Dielectric Withstand Voltage	by Type	MIL-STD-202F Method 301 Apply Max Overload Voltage for 1 minute
4	Insulation Resistance	>1000MΩ	MIL-STD-202F Method 302 Apply 100VDC for 1minute
5	Thermal Shock	±(0.5% + 0.05Ω)	MIL-STD-202F Method 107G -55°C ~ 150°C, 100cycles
6	Endurance	±(1% + 0.05Ω)	MIL-STD-202F Method 108A RCWV, 70°C, 1.5 hours on, 0.5 hours off Total 1000~1048 hours
7	Humidity (Steady State)	±(0.5% + 0.05Ω)	MIL-STD-202F Method 103B 40°C , 90~95%RH , RCWV 1.5 hours ON 0.5 hours OFF , total 1000 ~ 1048 hours
8	Resistance to Dry Heat	±(0.5% + 0.05Ω)	JIS-C-5202-7.2 96hours @ +155°C without load
9	Low Temperature Operation	±(0.5% + 0.05Ω)	JIS-C-5202-7.1 1hour, -65°C followed by 45 minutes of RCWV
10	Bending Strength	AS SPEC.	JIS-C-5202-6.1.4 Bending Amplitude 3mm for 10 seconds
11	Solderability	95%min coverage	MIL-STD-202F Method 208H 245°C ±5°C, 2±0.5 (sec)
12	Resistance to Soldering Heat	±(0.5% + 0.05Ω)	MIL-STD-202F Method 210E 260±5°C, 10±1 seconds

* Storage Temperature :25±3°C; Humidity <80%RH

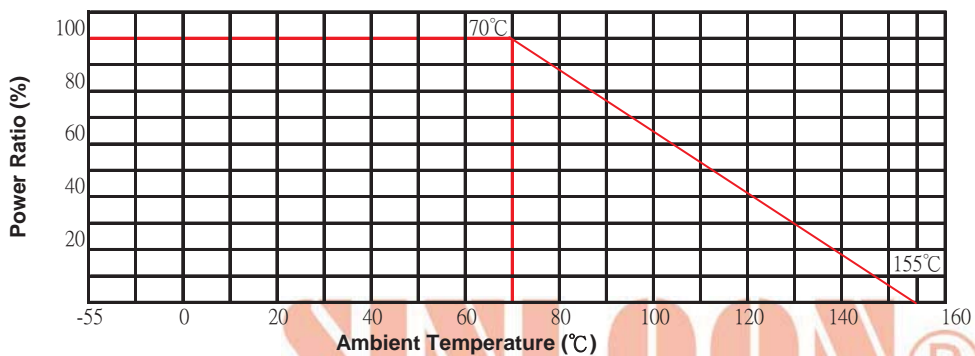
VOLTAGE RATING OR CURRENT RATING

Resistance Range: ≥ 1Ω

Rated Voltage: The resistor shall have a DC continuous working voltage or a RMS AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined formula as following:

$$E = \sqrt{R \times P} \quad P = \text{Power rating (W)} \quad R = \text{Nominal resistance (}\Omega\text{)}$$

POWER DERATING CURVE



In case resistors operating ambient temperature in excess of the temperature range -55°C ~+155°C power ratio will be derated in accordance with the figure as shown on the right.




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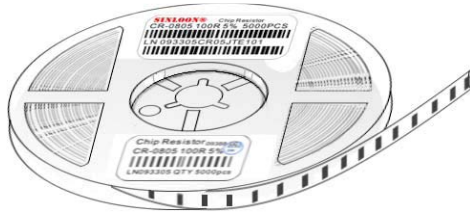
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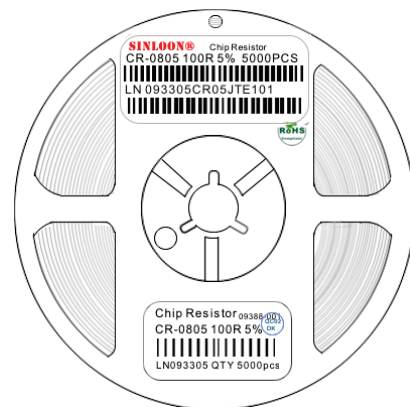
PACKAGE SPECIFICATION

Power	Size	Type	Quantity(ea)			SINLOON®	
			Paper Reel Tape	In Box	Carton		
1/20W (Z)	0201	ZCS01	10,000 Pcs	7" Reel	100K pcs	600K pcs	 <p>品質承諾標誌 QUALITY COMMITMENT</p>
1/16W (Y)	0402	YCS02	10,000 Pcs	7" Reel	100K pcs	600K pcs	
1/10W (X)	0603	XCS03	5,000 Pcs	7" Reel	50K pcs	300K pcs	
1/8W (W)	0805	WCS05	5,000 Pcs	7" Reel	50K pcs	300K pcs	
1/4W (V)	1206	VCS06	5,000 Pcs	7" Reel	40K pcs	300K pcs	
1/2W (U)	1210	UCS11	5,000 Pcs	7" Reel	40K pcs	300K pcs	
3/4W (T)	2010	TCS10	4,000 Pcs	7" Reel	20K pcs	240K pcs	
1W (S)	2512	SCS12	4,000 Pcs	7" Reel	20K pcs	240K pcs	
1W (S)	3720	SCS37	2,000 Pcs	7" Reel	20K pcs	120K pcs	
1.5W (R)	2512	RCS12	2,000 Pcs	7" Reel	20K pcs	120K pcs	
2W (Q)	2512	QCS12	2,000 Pcs	7" Reel	20K pcs	120K pcs	
2W (Q)	7520	QCS75	2,000 Pcs	7" Reel	20K pcs	120K pcs	
3W (N)	1225	NCS25	2,000 Pcs	7" Reel	20K pcs	120K pcs	

Paper Reel Tape Fig-1



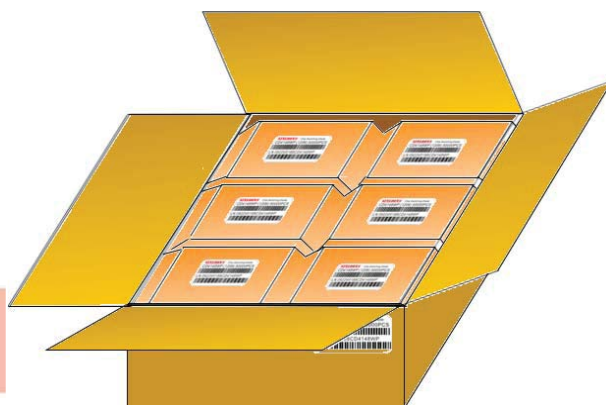
Reel Tape Label Fig-2



Inner Box Fig-3



Carton Box Fig-4



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