

SINLOON®

電流感測貼片電阻  
Power Rated: 1/10W ~ 3W

CS Series  
Current Sensing Chip Resistor

□ FEATURE

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

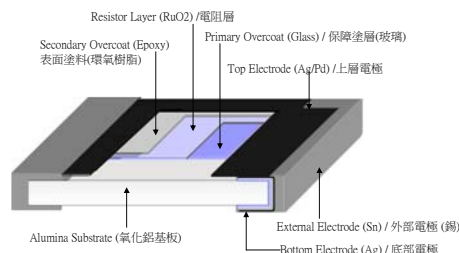
□ Applications

- ◆ 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: CS01JTGZR100 (CS-0201  $\pm 5\%$  T/Reel 300ppm 1/20W 100m)

Power	Size	Type	Tolerance	Package	TCR(°C)	Power	Resistance	Packing	Reel
1/20W	0201	CS01	J = $\pm 5\%$	T: Reel	E = $\pm 100$ ppm	Z: 1/20W	m5=R0005 $\Omega$	10K Reel	7" Reel
1/16W	0402	CS02	G = $\pm 2\%$	B: Bulk	K = $\pm 150$ ppm	Y: 1/16W	5m=R005 $\Omega$	10K Reel	7" Reel
1/10W	0603	CS03	F = $\pm 1\%$	O: Other	F = $\pm 200$ ppm	X: 1/10W	50m=R05 $\Omega$	5K Reel	7" Reel
1/8W	0805	CS05			G = $\pm 300$ ppm	W: 1/8W	100m=R1 $\Omega$	5K Reel	7" Reel
1/4W	1206	CS06			H = $\pm 400$ ppm	V: 1/4W	1000m=1 $\Omega$	5K Reel	7" Reel
1/2W	1210	CS11			I = $\pm 500$ ppm	U: 1/2W	1R = 1R00	4K Reel	7" Reel
1/2W	2010	CS10			J = $\pm 600$ ppm	T: 3/4W		4K Reel	7" Reel
1W	2512	CS12			Z = $\pm 1000$ ppm	S: 1W		4K Reel	7" Reel
1W	3720	CS37				R: 1.5W		4K Reel	7" Reel
1.5W	2512	CS12				Q: 2W		4K Reel	7" Reel
2W	2512	CS12				N: 3W		4K Reel	7" Reel
2W	7520	CS75						4K Reel	7" Reel
3W	1225	CS25						4K Reel	7" Reel

Fig-1

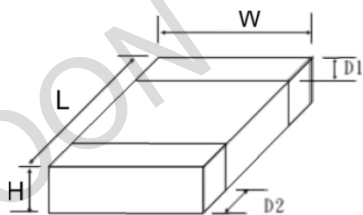
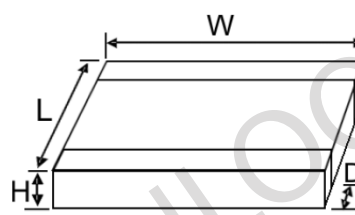


Fig-2



□ DIMENSION

Power	Size	Type	L	W	H	D1	D2	Figure
1/20W	0201	CS01	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-1
1/16W	0402	CS02	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	0603	CS03	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	0805	CS05	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	1206	CS06	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	1210	CS11	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	
1/2W	2010	CS10	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	2512	CS12	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	Fig-2
1W	3720	CS37	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	2512	CS12	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	Fig-1
2W	2512	CS12	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	Fig-1
2W	7520	CS75	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	Fig-2
3W	1225	CS25	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	Fig-2

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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	Z-CS01	100 ~ 150m	±1%, ±2%, ±5%	±1000	-55°C ~ +155°C
			151 ~ 500m		±600	
			501 ~ 1000m		±300	
1/16W	0402	Y-CS02	50mΩ~100mΩ	±1%, ±2%, ±5%	±400	
			101mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/10W	0603	X-CS03	20mΩ~50mΩ	±1%, ±2%, ±5%	±600	
			51mΩ~100mΩ		±400	
			101 mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/8W	0805	W-CS05	20mΩ~50mΩ	±1%, ±2%, ±5%	±600	
			51mΩ~100mΩ		±400	
			101 mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/4W	1206	V-CS06	20mΩ~50mΩ	±1%, ±2%, ±5%	±600	
			51mΩ~100mΩ		±400	
			101 mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/2W	1210	U-CS11	20mΩ~50mΩ	±1%, ±2%, ±5%	±600	
			51mΩ~100mΩ		±400	
			101 mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1/2W	2010	U-CS10	10mΩ~20mΩ	±1%, ±2%, ±5%	±600	
			21mΩ~50mΩ		±400	
			51mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1W	2512	S-CS12	10mΩ~20mΩ	±1%, ±2%, ±5%	±600	
			21mΩ~50mΩ		±400	
			51mΩ~500mΩ		±300	
			501mΩ~1000mΩ		±200	
1W	3720	S-CS37	10mΩ~19mΩ	±2%, ±5%	±300	
			20mΩ~500mΩ		±150	
2W	7520	Q-CS75	1mΩ~4mΩ	±2%, ±5%	±300	
			5mΩ~10mΩ		±200	
			11mΩ~350mΩ		±150	
3W	1225	N-CS25	3m ~ 5m	±1%, ±2%, ±5%	±300	
			6m ~ 20m		±200	
			21m ~ 30m		±150	
			31m ~ 250m		±100	
			251m ~ 500m		±200	

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GENERAL ELECTRICAL SPECIFICATION

High Power Rating Electrical Specification

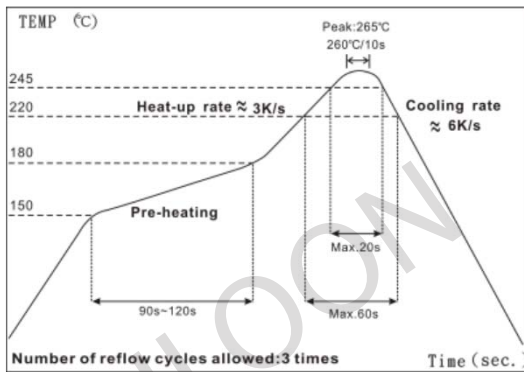
Power	Size	Type	Resistance Range (Ω)	Tolerance	T.C.R.	Operating
					(ppm/°C)	Temp.Range
1/8W	0603	W-CS05	51m ~ 100m	±1%,±2%,±5%	±400	-55°C ~ +155°C
			101m ~ 500m		±300	
			510m ~ 1000m		±200	
1/4W	0805	V-CS05	51m ~ 100m	±1%,±2%,±5%	±400	
			101m ~ 500m		±300	
			510m ~ 1000m		±200	
1/2W	1206	U-CS06	10m ~ 20m	±1%,±2%,±5%	±600	
3/4W	1210	T-CS11	21m ~ 50m		±400	
1W	2010	S-CS10	51m ~ 500m		±300	
1.5W	2512	R-CS12	501m ~ 1000m		±200	
2W	2512	Q-CS12				

Low TCR Rating Electrical Specification

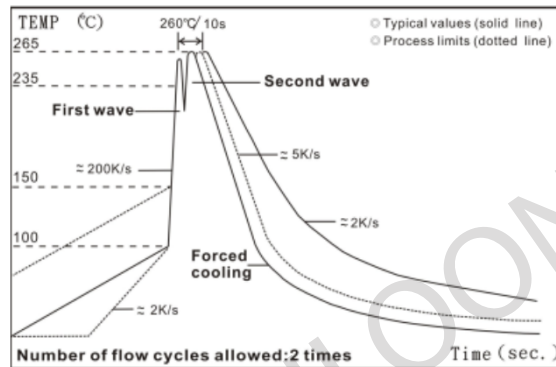
Power	Size	Type	Resistance	Tolerance	T.C.R.	Operating
			Range		(ppm/°C)	Temp.Range
1/4W	1206	V-CS06	100mΩ~1000mΩ	±1%,±2%,±5%	±100	-55°C ~ +155°C
1/2W	1210	U-CS11	100mΩ~1000mΩ			
1/2W	2010	U-CS10	100mΩ~1000mΩ			
1W	2512	S-CS12	20mΩ~1000mΩ			
1W	3720	S-CS37	100mΩ~500mΩ			
2W	7520	Q-CS75	50mΩ~350mΩ			

\* 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	$\pm(0.5\% + 0.05\Omega)$ $\Delta R \pm 1\%$ 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	$\pm(0.5\% + 0.05\Omega)$	MIL-STD-202F Method 107G -55°C ~ 150°C, 100cycles
6	Endurance	$\pm(1\% + 0.05\Omega)$	MIL-STD-202F Method 108A RCWV, 70°C, 1.5 hours on, 0.5 hours off Total 1000~1048 hours
7	Humidity ( Steady State )	$\pm(0.5\% + 0.05\Omega)$	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	$\pm(0.5\% + 0.05\Omega)$	JIS-C-5202-7.2 96hours @ +155°C without load
9	Low Temperature Operation	$\pm(0.5\% + 0.05\Omega)$	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 $\pm 5^\circ\text{C}$ , 2 $\pm 0.5$ (sec)
12	Resistance to Soldering Heat	$\pm(0.5\% + 0.05\Omega)$	MIL-STD-202F Method 210E 260 $\pm 5^\circ\text{C}$ , 10 $\pm 1$ seconds

\* Storage Temperature :25 $\pm 3^\circ\text{C}$ ; Humidity <80%RH

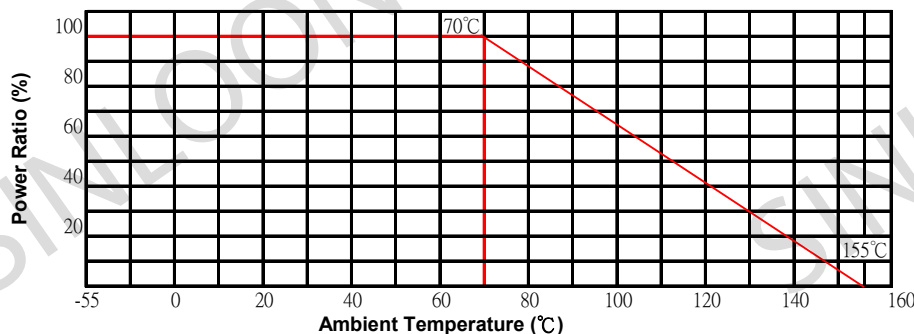
**VOLTAGE RATING OR CURRENT RATING**

Resistance Range:  $\geq 1\Omega$

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:

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

**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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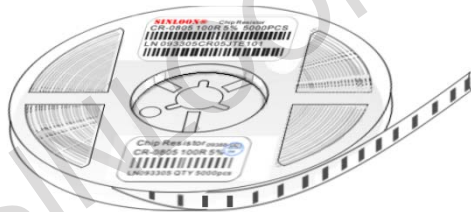
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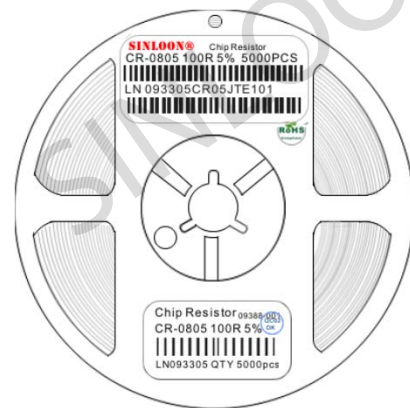
□ PACKAGE SPECIFICATION

Power	Size	Type	Quantity(ea)			  品質承諾標誌 QUALITY COMMITMENT
			Paper Reel Tape	In Box	Carton	
1/20W	0201	Z-CS01	10,000 Pcs	7" Reel	100K pcs	600K pcs
1/16W	0402	Y-CS02	10,000 Pcs	7" Reel	100K pcs	600K pcs
1/10W	0603	X-CS03	5,000 Pcs	7" Reel	50K pcs	300K pcs
1/8W	0805	W-CS05	5,000 Pcs	7" Reel	50K pcs	300K pcs
1/4W	1206	V-CS06	5,000 Pcs	7" Reel	40K pcs	300K pcs
1/2W	1210	U-CS11	5,000 Pcs	7" Reel	40K pcs	300K pcs
1/2W	2010	U-CS10	4,000 Pcs	7" Reel	20K pcs	240K pcs
1W	2512	S-CS12	4,000 Pcs	7" Reel	20K pcs	240K pcs
1W	3720	S-CS37	2,000 Pcs	7" Reel	20K pcs	120K pcs
1.5W	2512	R-CS12	2,000 Pcs	7" Reel	20K pcs	120K pcs
2W	2512	Q-CS12	2,000 Pcs	7" Reel	20K pcs	120K pcs
2W	7520	Q-CS75	2,000 Pcs	7" Reel	20K pcs	120K pcs
3W	1225	N-CS25	2,000 Pcs	7" Reel	20K pcs	120K pcs

Paper Reel Tape Fig-1



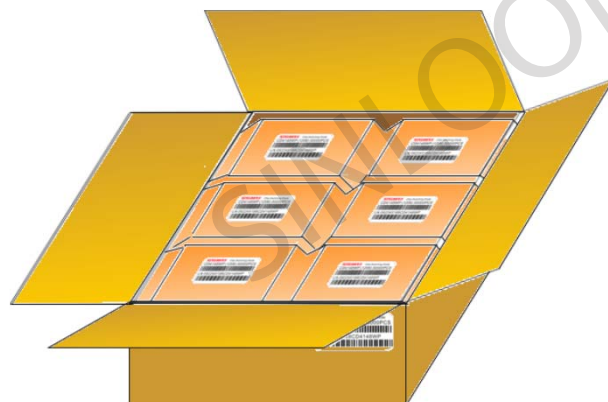
Reel Tape Label Fig-2



Inner Box Fig-3



Carton Box Fig-4



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