Surface Mount Current Detecting Chip Resistors

CS Surface Mount Current Detecting Resistors Save Space and Weight

Preview

Token Electronics has launched the CS series, a family of ultra small low-value current-sense surface-mount chip resistors. These smaller sizes save space on the circuit board, allowing the production of smaller and lighter products.

The new series complements Token's existing LRC Series, offering metal resistive film on ceramic construction but providing increased choice for product designers in the form of more smaller sizes options of 0201, 0402, 0603, 0805, 1206, 2010, 2512, 1225, 3720, and 7520.

Designed for current detecting in power electronic systems, the fully RoHS compliant CS series is suitable for a range of applications including the monitoring of power usage and battery life; and provision of output protection for power supplies; as well as for a range of consumer and automotive products such as satellite navigation, handheld PDAs and digital set-top boxes.

The series offers ohmic values as low as 1mΩ to minimise power consumption and has an ambient temperature range of -55°C to +155°C.

Exhibiting a resistance range up to 1Ω and excellent heat dissipation qualities, the series offers designers enhanced power handling capabilities and protection from the threat of localised heating, resulting in the production of a more energy efficient product.

As demand continues to grow for reduced size, handheld and portable devices operating at low voltages, designers will look to manufacturers to produce smaller and smaller current sense resistors. Token expects that demand for its latest range of small size resistors will be high.

Contact us with your specific needs.

Features

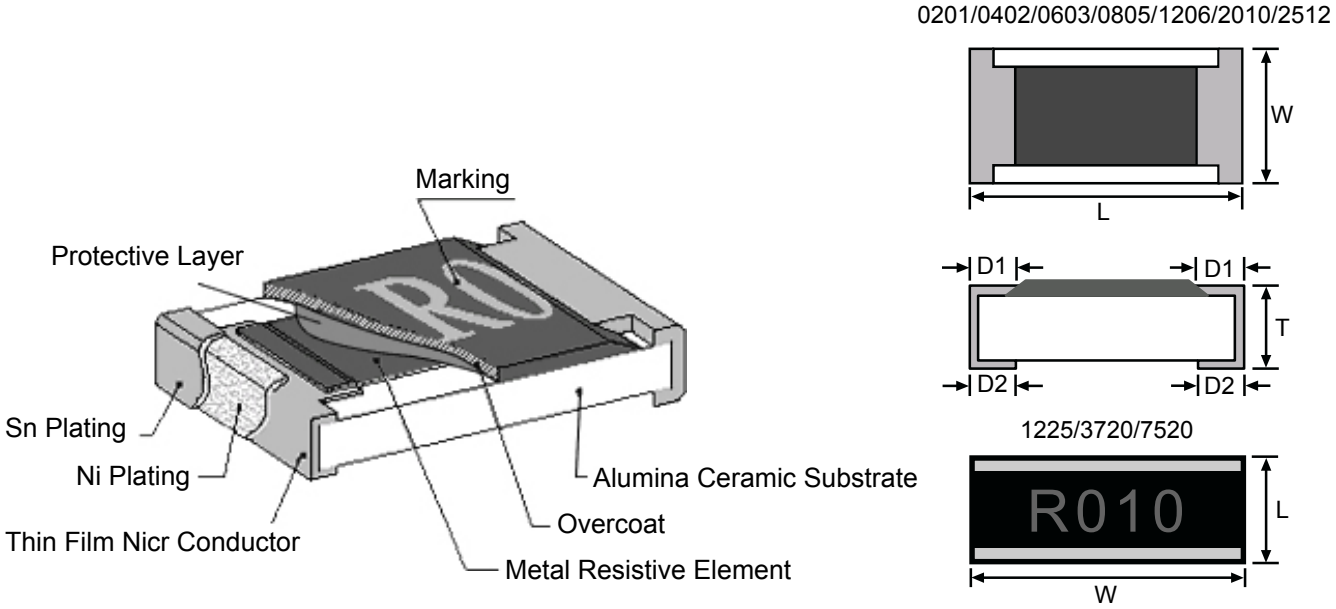
- Low TCR ±50, ±100PPM/°C
- Resistance Values from 1mΩ to 1 Ω.
- 3W Power Rating in 1W size, 1225 Package.
- Long size Terminations with Higher Power Rating.
- High Purity Alumina Substrate for High Power Dissipation.
- Products with Pb-free Terminations Meet RoHS Requirments.



Applications

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

Dimensions (Unit: mm)



Type	L (Unit: mm)	W (Unit: mm)	T (Unit: mm)	D1 (Unit: mm)	D2 (Unit: mm)
CS01 (0201)	0.58±0.05	0.29±0.05	0.23±0.05	0.12±0.05	0.15±0.05
CS02 (0402)	1.00±0.05	0.50±0.05	0.32±0.10	0.25±0.10	0.20±0.10
CS03 (0603)	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
CS05 (0805)	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.25
CS06 (1206)	3.05±0.15	1.55±0.15	0.55±0.10	0.50±0.30	0.40±0.25
CS13 (1210)	3.00±0.15	2.50±0.15	0.55±0.10	0.50±0.30	0.50±0.25
CS10 (2010)	5.00±0.20	2.45±0.15	0.60±0.15	0.60±0.30	0.50±0.25
CS12 (2512)	6.35±0.20	3.15±0.15	0.60±0.10	0.60±0.30	0.55±0.25
CS12 (2512)(2W)(10~99mΩ)	6.35±0.20	3.15±0.15	0.74±0.10	0.60±0.30	0.55±0.25
CS12 (2512)(2W)(100~1000mΩ)	6.35±0.20	3.15±0.15	0.74±0.10	0.60±0.30	2.70±0.10
CS25 (1225)	3.10±0.15	6.30±0.15	0.90±0.15	0.60±0.30	0.55±0.25
CS37 (3720)	2.00±0.20	3.75±0.20	0.60±0.10	0.40±0.20	0.40±0.20
CS75 (7520)	2.00±0.20	7.50±0.30	0.60±0.10	0.40±0.20	0.40±0.20

Standard Electrical Specifications

Type	Power Rating at 70°C	Operating Temp. Range	Resistance Tolerance	Resistance Range	TCR (PPM/°C)
CS01 (0201)	1/20W	-55 ~ +155°C	±1% ±2% ±5%	100mΩ~149mΩ 150mΩ~500mΩ 501mΩ~1000mΩ	±1000PPM/°C ±600PPM/°C ±300PPM/°C
CS02 (0402)	1/16W			50mΩ~100mΩ 101mΩ~500mΩ 501mΩ~1Ω	±400PPM/°C ±300PPM/°C ±200PPM/°C
CS03 (0603)	1/10W			20mΩ~50mΩ 51mΩ~100mΩ 101mΩ~500mΩ 501mΩ~1Ω	±600PPM/°C ±400PPM/°C ±300PPM/°C ±200PPM/°C
CS05 (0805)	1/8W			20mΩ~50mΩ 51mΩ~100mΩ 101mΩ~500mΩ 501mΩ~1Ω	±600PPM/°C ±400PPM/°C ±300PPM/°C ±200PPM/°C
CS06 (1206)	1/4W			10mΩ~20mΩ 21mΩ~50mΩ 51mΩ~500mΩ 501mΩ~1Ω	±600PPM/°C ±400PPM/°C ±300PPM/°C ±200PPM/°C
CS13 (1210)	1/2W				
CS10 (2010)	3/4W				
CS12 (2512)	1W				
CS25 (1225)	3W			3mΩ~5mΩ 6mΩ~20mΩ 21mΩ~30mΩ 31mΩ~200mΩ	±300PPM/°C ±200PPM/°C ±150PPM/°C ±100PPM/°C ±200PPM/°C
CS37 (3720)	1W			10mΩ~19mΩ 20mΩ~500mΩ	±300PPM/°C ±150PPM/°C
CS75 (7520)	2W		±2%,±5%	1mΩ~4mΩ	±300PPM/°C
			±1%,±2%,±5%	5mΩ~10mΩ 11mΩ~350mΩ	±200PPM/°C ±150PPM/°C

Note:Token has the ability to manufacture following options based on customer's requirement.

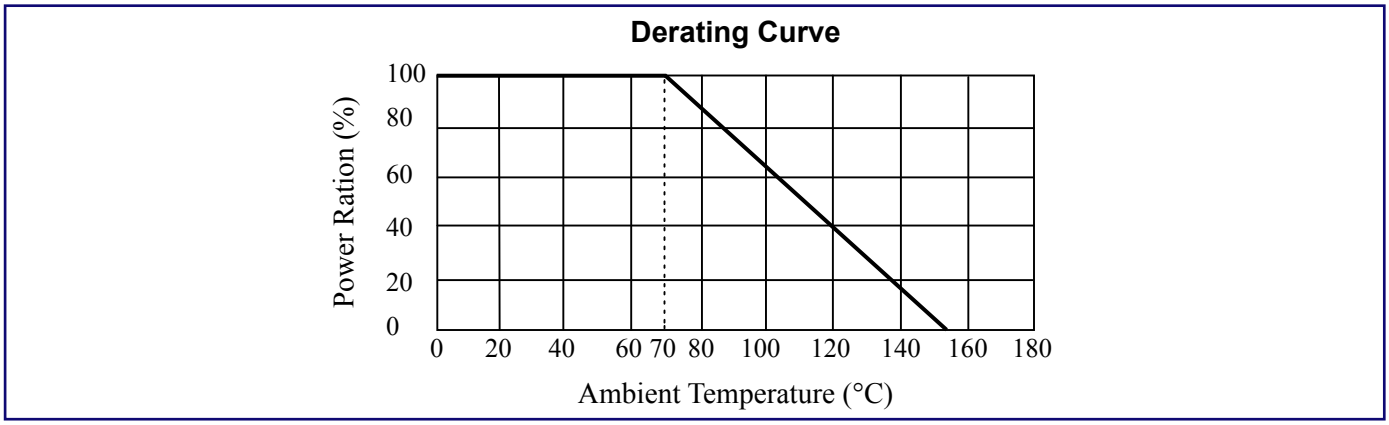
Low TCR Electrical Specifications

Type	Power Rating at 70°C	Operating Temp. Range	Resistance Tolerance	Resistance Range	TCR
CS06*TRE**	1/4W	-55 ~ +155°C	±1% ±2% ±5%	100mΩ~1000mΩ	±100PPM/°C
CS13*TRE**	1/2W			100mΩ~1000mΩ	±100PPM/°C
CS10*TRE**	3/4W			100mΩ~1000mΩ	±100PPM/°C
CS12*TRE**	1W			20mΩ~1000mΩ	±100PPM/°C
CS37*TRE**	1W			100mΩ~500mΩ	±100PPM/°C
CS75*TRE**	2W			50mΩ~350mΩ	±100PPM/°C

High Power Rating Electrical Specifications

Type	Power Rating at 70°C	Operating Temp. Range	Resistance Tolerance	Resistance Range	TCR
CS03*TR*W**	1/8W	-55 ~ +155°C	±1% ±2% ±5%	51mΩ~100mΩ 101mΩ~500mΩ 501mΩ~1000mΩ	±400PPM/°C ±300PPM/°C ±200PPM/°C
CS05*TR*V**	1/4W 1/2W				
CS06*TR*U**	1/2W			10mΩ~20mΩ 21mΩ~50mΩ 51mΩ~500mΩ 501mΩ~1000mΩ	±600PPM/°C ±400PPM/°C ±300PPM/°C ±200PPM/°C
CS13*TR*Q**	3/4W				
CS10*TR*T**	1W				
CS12*TR*A**	1.5W				
CS12*TR*S**	2W				

Power Derating Curve



Environmental Characteristics

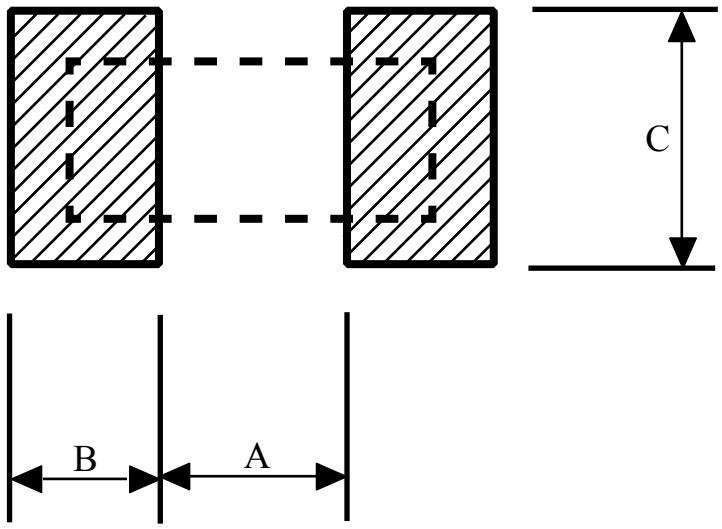
Item	Specification	Test Method
Temperature Coefficient of Resistance	As Spec	MIL-STD-202F Method 304 +25/-55/+25/+125/+25°C
Short Time Overload	±(0.5% + 0.05Ω) ΔR±1% for high power rating	JIS-C-5202-5.5 RCWV*2.5 or Max Overloading Voltage 5seconds
Dielectric Withstand Voltage	by Type	MIL-STD-202F Method 301 Apply Max Overload Voltage for l minute
Insulation Resistance	>1000MΩ	MIL-STD-202F Method 302 Apply 100VDC for 1minute
Thermal Shock	±(0.5% + 0.05Ω)	MIL-STD-202F Method 107G -55°C~150°C, 100cycles
Load Life	±(1% + 0.05Ω)	MIL-STD-202F Method 108A RCWV, 70°C, 1.5 hours on , 0.5 hours off , 1000~1048 hours
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
Resistance to dry heat	±(0.5% + 0.05Ω)	JIS-C-5202-7.2 96hours @ +155°C without load
Low Temperature Operation	±(0.5% + 0.05Ω)	JIS-C-5202-7.1 1hour, -65°C followed by 45minutes of RCWV
Bending Strength	As Spec	JIS-C-5202-6.1.4 Bending Amplitude 3mm for 10seconds
Solderability	95%min coverage	MIL-STD-202F Method 208H 260°C±5°C, 2±0.5 (sec)
Resistance to Soldering Heat	±(0.5% + 0.05Ω)	MIL-STD-202F Method 210E 260±5°C, 10±1 second

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

(CS) Marking for 0603

Marking	Value
1R0	1.000Ω
R10	0.100Ω
R01	0.010Ω
101	0.101Ω
035	0.035Ω

Except For CS12: High Power Rating Series Recommend Land Pattern

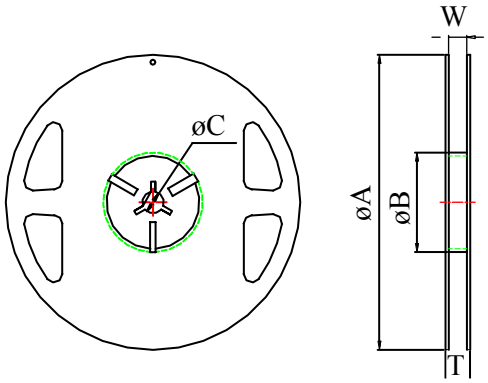


Codes	A	B	C
CS01	0.25	0.30	0.40±0.2
CS02	0.50	0.50	0.60±0.2
CS03	0.80	1.00	0.90±0.2
CS05	1.00	1.00	1.35±0.2
CS06	2.00	1.15	1.70±0.2
CS13	2.00	1.15	2.50±0.2
CS10	3.60	1.40	2.50±0.2
CS12	4.90	1.60	3.10±0.2
CS25	2.00	2.00	6.40±0.2
CS37	1.00	1.80	3.90±0.2
CS75	1.00	1.80	7.60±0.2

For CS12 High Power Rating Series Recommend Land Pattern

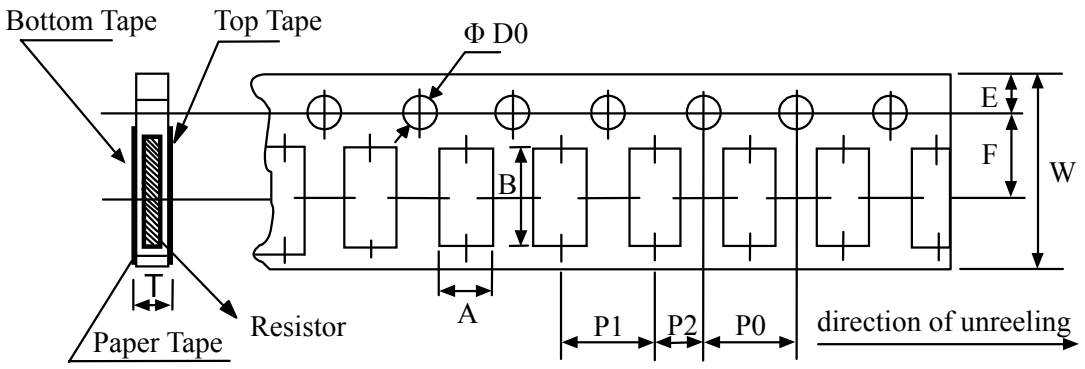
Codes	Resistance Range	A	B	C
CS12	10~99mΩ	4.90	1.60	3.10±0.2
CS12	100~1000mΩ	1.00	3.55	3.10±0.2

Packing Quantity & Reel Specifications



Type	ΦA	ΦB	ΦC	W	T	Paper Tape(EA)	Emboss Plastic Tape(EA)
CS01	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
CS02	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
CS03	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
CS05	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
CS06	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
CS13	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
CS10	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
CS12	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
CS12(2W)	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS25	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS37	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	2,000
CS75	178.0±1.0	60.0±1.0	13.5±0.7	17.5±1.0	19.5±1.0	-	2,000

Paper Tape Specifications



Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
CS01	0.40±0.05	0.70±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.05	0.42±0.02
CS02	0.70±0.05	1.16±0.05	8.00±0.10	1.75±0.05	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.05	0.40±0.03
CS03	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
CS05	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
CS06	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
CS13	2.75±0.05	3.40±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.55±0.05	0.75±0.05

How to Order

CS	12	J	TR	G	A	R100	N
❶	❷	❸	❹	❺	❻	❼	❽

❶ Part Number

❷ Dimensions (L×W)

Code	Dimensions (L×W)	
01	0.58×0.29	0201
02	1.00×0.50mm	0402
03	1.60×0.80mm	0603
05	2.00×1.25mm	0805
06	3.10×1.55mm	1206
13	3.00×2.50	1210
10	5.00×2.50mm	2010
12	6.30×3.10mm	2512
25	3.10×6.30mm	1225
37	3.75×2.00mm	3720
75	7.50×2.00mm	7520

❸ Resistance Tolerance

Code	Resistance Tolerance
J	±5%
G	±2%
F	±1%

❹ Packaging

Code	Packaging
TR	Taping Reel
P	Bulk

❺ TCR

Code	TCR
E	±100ppm/°C
K	±150ppm/°C
F	±200ppm/°C
G	±300ppm/°C
H	±400ppm/°C
J	±600ppm/°C
R	±1000ppm/°C

❻ Power Rating

Code	Power Rating
S	2W
A	1.5W
T	1W
Q	3/4W
U	1/2W
V	1/4W
W	1/8W

❼ Resistance

Code	Resistance
R010	0.01Ω
R100	0.100Ω
1R00	1.000Ω

❽ Marking

Code	Resistance
	Standard
N	No Marking

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