



Current Sensing Resistors

Chip CS Series / 贴片电流感测电阻

Chip Current Sensing Resistor Features

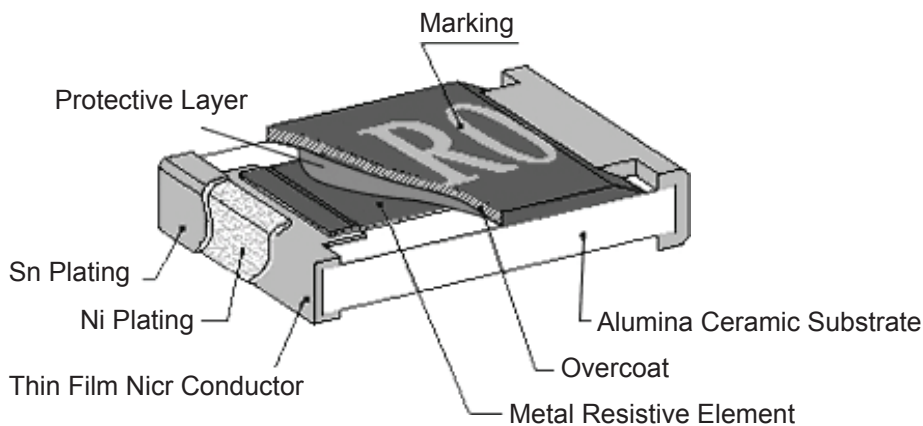
- 3W Rating in 1W size, 1225 Package
- Low TCR from ± 100 PPM $\sim \pm 600$ PPM/ $^{\circ}$ C
- Resistance Values from 1 to 1000m ohms
- High Purity Alumina Substrate for High Power Dissipation
- Products with Pb-free Terminations Meet RoHS Requirements

Applications

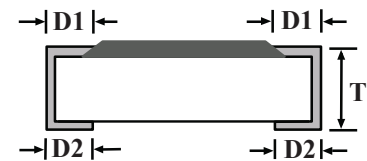
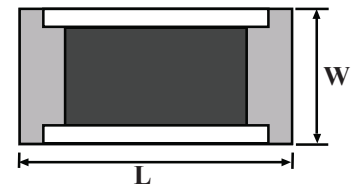
- Power Management Applications
- Switching Power Supply
- Over Current Protection in Audio Application
- Voltage Regulation Module (VRM)
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Automotive Engine Control
- Disk Driver
- Portable Devices (PDA, Cell phone)



Chip Current Sensing Resistor Construction



0402/0603/0805/1206/2010/2512



1225/3720/7520



CS Resistor Dimensions (Unit: mm)

Type	L	W	T	D1	D2
CS02 (0402)	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
CS03 (0603)	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
CS05 (0805)	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
CS06 (1206)	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
CS10 (2010)	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
CS12 (2512)	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
CS25 (1225)	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
CS37 (3720)	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
CS75 (7520)	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



Current Sensing Resistors

Standard Electrical Specifications - Chip Current Sensing Resistors

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

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

CS Resistors - High Power Rating Electrical Specifications

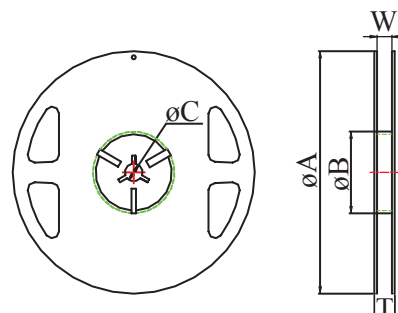
Type	Power Rating at 70°C	Operating Temp. Range	Resistance Tolerance	Resistance Range
CS05***V****	1/4W	-55 ~ +155°C	±1% ±2% ±5%	100mΩ~1Ω
CS06***U****	1/2W			100mΩ~1Ω
CS10***T****	1W			100mΩ~1Ω
CS12***A****	1.5W			100mΩ~1Ω

CS Resistors - Low TCR (±100ppm) Electrical Specifications

Type	Power Rating at 70°C	Operating Temp. Range	Resistance Tolerance	Resistance Range
CS06**EV****	1/4W	-55 ~ +155°C	±1% ±2% ±5%	100mΩ~1Ω
CS10**EQ****	3/4W			100mΩ~1Ω
CS12**ET****	1W			100mΩ~1Ω
CS75**ES****	2W			1mΩ~5mΩ

Chip Current Sensing Resistor Marking for 0603

Marking	Value
1R0	1.000Ω
R10	0.100Ω
R01	0.010Ω
<u>101</u>	0.101Ω
<u>035</u>	0.035Ω



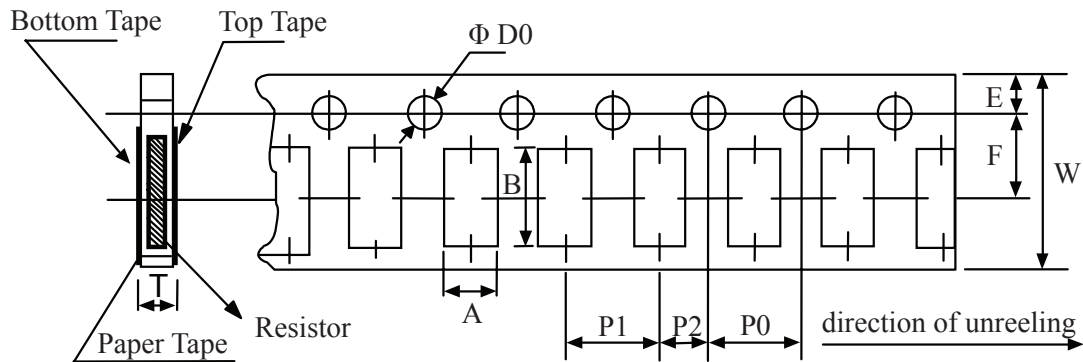


Current Sensing Resistors

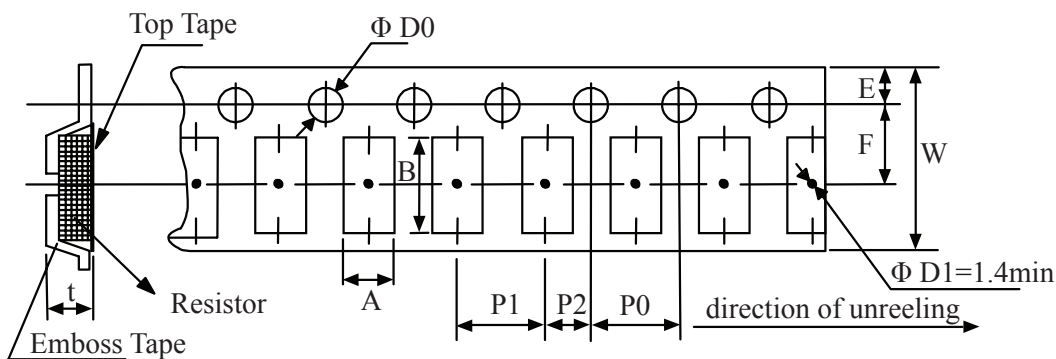
CS Resistors - Packaging Quantity & Reel Specifications (Unit: mm)

Type	ΦA	ΦB	ΦC	W	T	Paper Tape	Emboss Plastic Tape
CS02	178±1	60.0+0.5	13.0±0.20	9.00±0.50	12.0±0.15	10,000	-
CS03	178±1	60.0+0.5	13.0±0.20	9.00±0.50	12.0±0.15	5,000	-
CS05	178±1	60.0+0.5	13.0±0.20	9.00±0.50	12.0±0.15	5,000	-
CS06	178±1	60.0+0.5	13.0±0.20	9.00±0.50	12.0±0.15	5,000	-
CS10	178±1	60.2±0.5	13.0±0.50	13.2±1.50	16.0±0.20	-	4,000
CS12	178±1	60.2±0.5	13.0±0.50	13.2±1.50	16.0±0.20	-	4,000
CS25	178±1	60.2±0.5	13.0±0.50	13.2±1.50	16.0±0.20	-	2,000
CS37	178±1	60.2±0.5	13.0±0.50	13.2±1.50	16.0±0.20	-	4,000
CS75	178±1	60.2±0.5	13.0±0.50	17.0±0.50	19.0±1.00	-	4,000

Paper Tape Specifications (Unit: mm) - Chip Current Sensing Resistors



Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
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

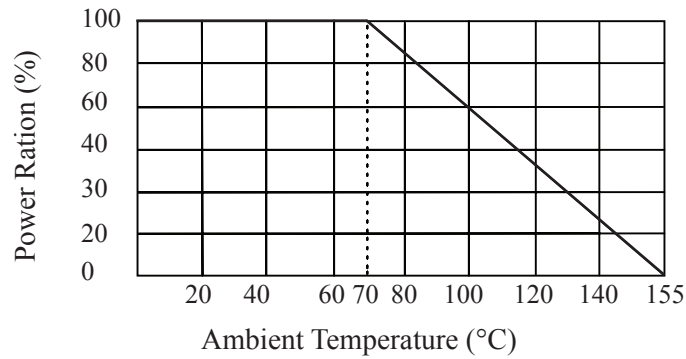


Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
CS10	2.85±0.10	5.45±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20
CS12	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20
CS25	3.38±0.10	6.68±0.10	12.0±0.30	1.75±0.10	5.5±0.10	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	1.45±0.20
CS37	2.50±0.20	4.45±0.20	12.0±0.30	1.75±0.01	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.50±0.10
CS75	2.50±0.20	8.30±0.20	16.0±0.30	1.75±0.01	7.8±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.50±0.10





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► Environmental Characteristics - Chip Current Sensing Resistor

Item	Specification	Test Method
Temperature Coefficient of Resistance	As Spec	MIL-STD-202F Method 304 +25/-55/+25/+125/+25°C
Short Time Overload	$\pm(0.5\% + 0.05\Omega)$	JIS-C-5202-5.5
	$\Delta R \pm 1\%$ for high power rating	RCWV*2.5 or Max Overloading Voltage 5seconds
Dielectric Withstand Voltage	by Type	MIL-STD-202F Method 301 Apply Max Overload Voltage for 1 minute
Insulation Resistance	>1000M Ω	MIL-STD-202F Method 302 Apply 100VDC for 1minute
Thermal Shock	$\pm(0.5\% + 0.05\Omega)$	MIL-STD-202F Method 107G -55°C~150°C, 100cycles
Load Life	$\pm(1\% + 0.05\Omega)$	MIL-STD-202F Method 108A RCWV, 70°C, 1.5 hours on , 0.5 hours off , 1000~1048 hours
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
Resistance to dry heat	$\pm(0.5\% + 0.05\Omega)$	JIS-C-5202-7.2 96hours @ +155°C without load
Low Temperature Operation	$\pm(0.5\% + 0.05\Omega)$	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 \pm 5°C, 2 \pm 0.5 (sec)
Resistance to Soldering Heat	$\pm(0.5\% + 0.05\Omega)$	MIL-STD-202F Method 210E 260 \pm 5°C, 10 \pm 1 second

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





Current Sensing Resistors

► How to Order

CS	12	J	T	G	S	R010
①	②	③	④	⑤	⑥	⑦

① Product Type

② Dimensions (L×W)

Code	Dimensions (L×W)	
02	1.00×0.50mm	0402
03	1.60×0.80mm	0603
05	2.00×1.25mm	0805
06	3.10×1.55mm	1206
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

③ Resistance Tolerance

Code	Resistance Tolerance
J	±5%
H	±3%
G	±2%
F	±1%

④ Packaging

Code	Packaging
T	Taping Reel
P	Bulk

⑤ TCR

Code	TCR
E	±100ppm/°C
K	±150ppm/°C
F	±200ppm/°C
G	±300ppm/°C
H	±400ppm/°C
I	±500ppm/°C
J	±600ppm/°C

⑥ Power Rating

Code	Power Rating
R	3W
S	2W
A	1.5W
T	1W
Q	3/4W
U	1/2W
V	1/4W
W	1/8W
X	1/10W
Y	1/16W
Z	1/32W

⑦ Resistance

Code	Resistance
1R00	1.000Ω
R100	0.100Ω
R050	0.050Ω
R015	0.015Ω
R010	0.010Ω
R001	0.001Ω

