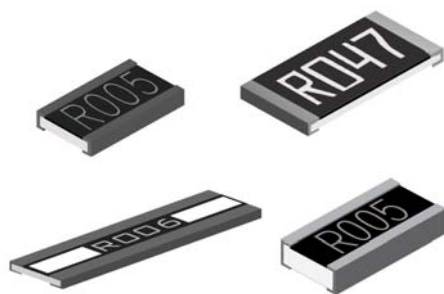


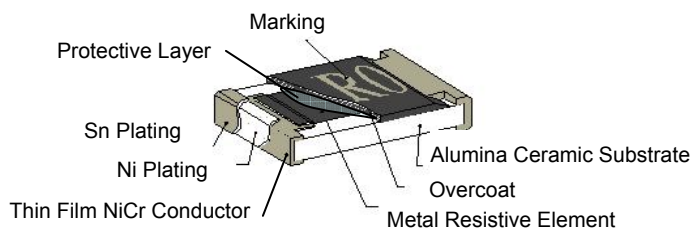
Current Sensing Chip Resistor – CS Series



Features

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

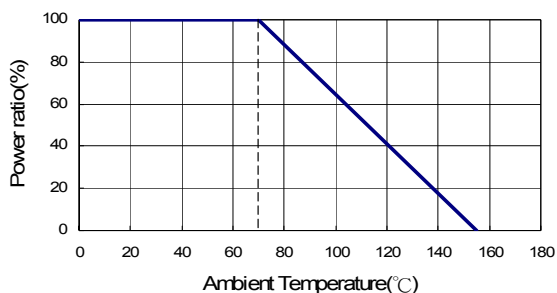
Construction



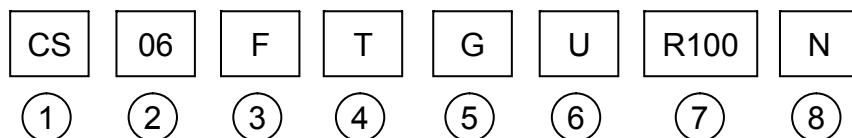
Applications

- 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)

Derating Curve



Part Numbering



① Product Type

Product Type	Description
CS	Current Sensing Chip Resistor

② Dimensions (L×W)

Codes	Dimensions (LxW)	
CS02	1.00×0.50mm	0402
CS03	1.60×0.80mm	0603
CS05	2.00×1.25mm	0805
CS06	3.10×1.55mm	1206
CS10	5.00×2.50mm	2010
CS12	6.30×3.10mm	2512
CS25	3.10×6.30mm	1225
CS37	3.75×2.00mm	3720
CS75	7.50×2.00mm	7520

③ Resistance Tolerance

Codes	Resistance Tolerance
J	$\pm 5\%$
H	$\pm 3\%$
G	$\pm 2\%$
F	$\pm 1\%$

④ Packaging

Codes	Type
T	Taping Reel
B	Bulk

⑧ Marking

Codes	Type
	Standard*
N	No Marking

* Please consult with us.

⑤ TCR

Codes	Type
E	± 100 PPM/ $^{\circ}$ C
K	± 150 PPM/ $^{\circ}$ C
F	± 200 PPM/ $^{\circ}$ C
G	± 300 PPM/ $^{\circ}$ C
H	± 400 PPM/ $^{\circ}$ C
I	± 500 PPM/ $^{\circ}$ C
J	± 600 PPM/ $^{\circ}$ C

⑥ Power Rating

Codes	Type
	Standard
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

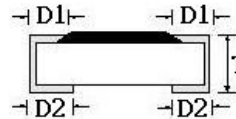
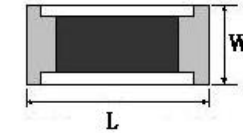
Codes	Type
R010	0.010 Ω
R100	0.100 Ω
1R00	1.000 Ω

0402/0603/0805/1206/2010/2512

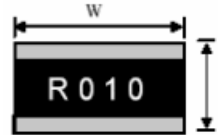
Dimensions

Unit: mm

Codes	L	W	T	D1	D2
CS02	1.00±0.05	0.50±0.05	0.32±0.10	0.25±0.10	0.20±0.10
CS03	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
CS05	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.25
CS06	3.05±0.15	1.55±0.15	0.55±0.10	0.50±0.30	0.40±0.25
CS10	5.00±0.20	2.45±0.15	0.60±0.15	0.60±0.30	0.50±0.25
CS12	6.35±0.20	3.15±0.15	0.60±0.10	0.60±0.30	0.55±0.25
CS25	3.10±0.15	6.30±0.15	0.90±0.15	0.60±0.30	0.55±0.25
CS37	2.00±0.20	3.75±0.20	0.60±0.10	0.40±0.20	0.40±0.20
CS75	2.00±0.20	7.50±0.30	0.60±0.10	0.40±0.20	0.40±0.20



1225/3720/7520



Standard Electrical Specifications

Item 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 101mΩ~500mΩ 501mΩ~1000mΩ	±400 ±300 ±200	
CS03 (0603)	1/10W			20mΩ~50mΩ 51mΩ~100mΩ 101 mΩ~500mΩ 501mΩ~1000mΩ	±600 ±400 ±300 ±200	
CS05 (0805)	1/8W			20mΩ~50mΩ 51mΩ~100mΩ 101mΩ~500mΩ 501mΩ~1000mΩ	±600 ±400 ±300 ±200	
CS06 (1206)	1/4W			10mΩ~20mΩ 21mΩ~50mΩ 51mΩ~500mΩ 501mΩ~1000mΩ	±600 ±400 ±300 ±200	
CS10 (2010)	3/4W			3mΩ~5mΩ 6mΩ~20mΩ 21mΩ~30mΩ 31mΩ~3000mΩ	±300 ±200 ±150 ±100	
CS12 (2512)	1W				10mΩ~19mΩ 20mΩ~500mΩ	±300 ±150
CS25 (1225)	3W				1mΩ~4mΩ	±300
CS37 (3720)	1W			±1%, ±2%, ±5%	5mΩ~10mΩ 11mΩ~350mΩ	±200 ±150
CS75 (7520)	2W				±1%, ±2%, ±5%	±150

High Power Rating Electrical Specifications

Type	Item	Power Rating at 70°C	Operating Temp. Range	Resistance Tolerance	Resistance Range
CS05	□TV□□□□	1/4W	-55 ~ +155°C	±1%, ±2%, ±5%	100mΩ~1000mΩ
CS06	□TU□□□□	1/2W			100mΩ~1000mΩ
CS10	□TT□□□□	1W			100mΩ~1000mΩ
CS12	□TA□□□□	1.5W			100mΩ~1000mΩ

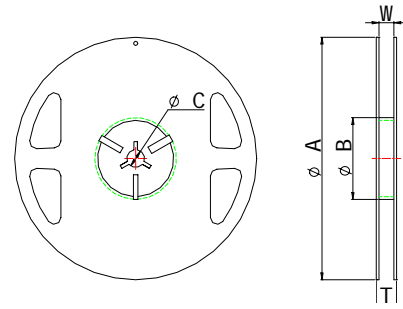
Low TCR Electrical Specifications

Type	Item	Power Rating at 70°C	Operating Temp. Range	Resistance Tolerance	Resistance Range	TCR (PPM/°C)
CS06	□TE□□□□	1/4W	-55 ~ +155°C	±1% ±2% ±5%	100mΩ~1000mΩ	±100
CS10	□TE□□□□	3/4W			100mΩ~1000mΩ	±100
CS12	□TE□□□□	1W			100mΩ~1000mΩ	±100
CS75	□TE□□□□	2 W			1mΩ~5mΩ	±100

Operating Current $I = \sqrt{P/R}$, Operating Voltage $V = \sqrt{P \cdot R}$

Marking for 0603

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



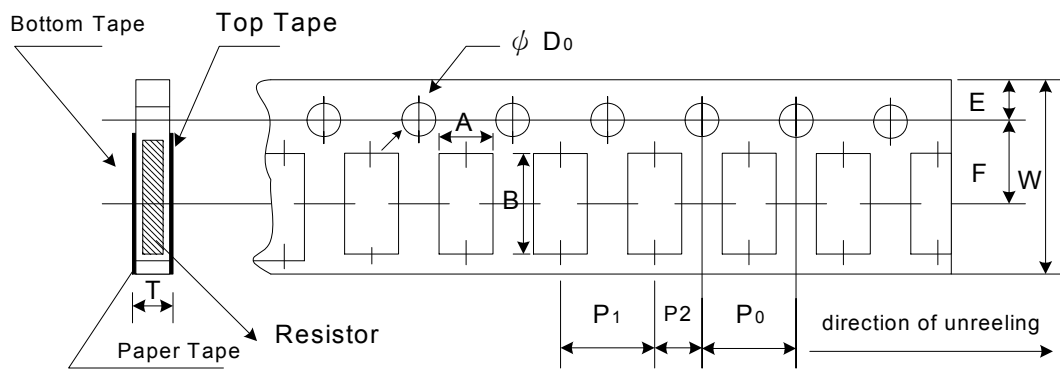
Packaging

Packaging Quantity & Reel Specifications

Unit: mm

Packaging Codes	ΦA	ΦB	ΦC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
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±1.500	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	-	2,000
CS75	178±1	60.2±0.5	13.0±0.50	17.0±0.50	19.0±1.00	-	2,000

Paper Tape Specifications

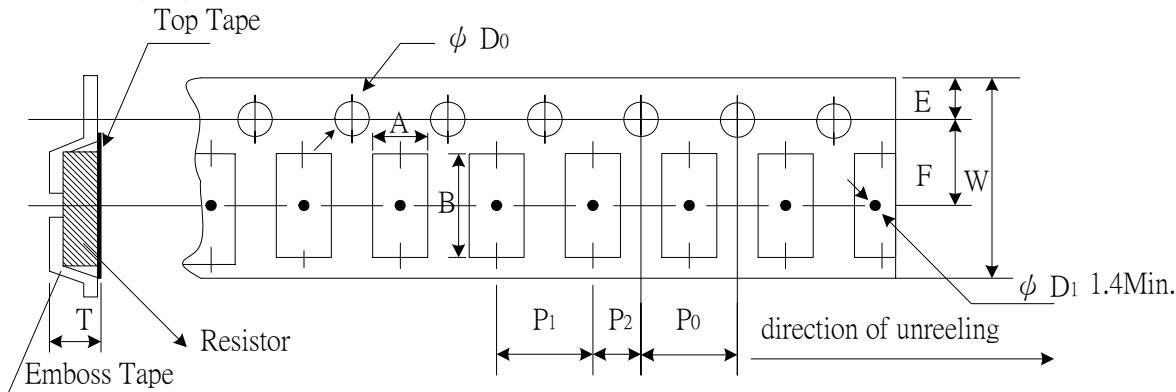


Unit: mm

Codes	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	3.5±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	3.5±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	3.5±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	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05

Packaging

Emboss Plastic Tape Specifications



Unit: mm

Codes	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	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

Environmental Characteristics

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%	JIS-C-5202-5.5 RCWV*2.5 or Max Overloading Voltage 5 seconds
	ΔR±1% for high power rating	
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%	MIL-STD-202F Method 107G -55°C ~ 150°C, 100cycles
6 Load Life	±1%	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%	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%	JIS-C-5202-7.2 96hours @ +155°C without load
9 Low Temperature Operation	±0.5%	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%	MIL-STD-202F Method 210E 260±5°C, 10±1 seconds

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