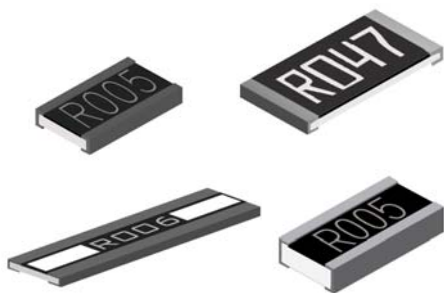


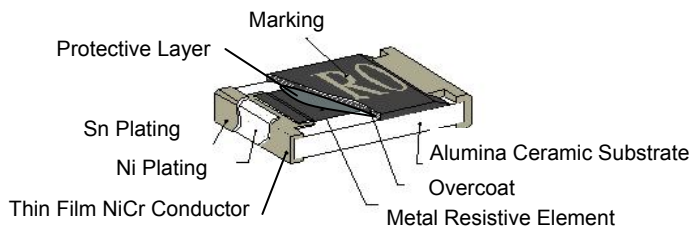
Current Sensing Chip Resistor – CS Series



Features

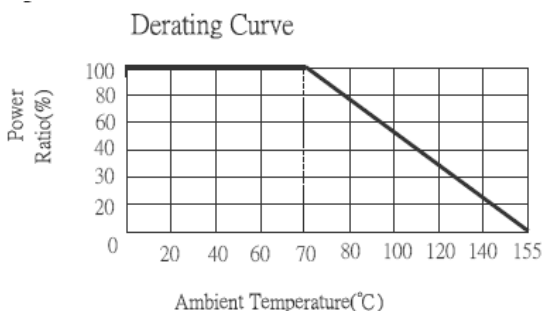
- 3W Rating in 1W size, 1225 Package
- Low TCR from ± 100 PPM $\sim \pm 600$ PPM/ $^{\circ}$ C
- Resistance Values from 1 to 1000 m ohms
- High Purity Alumina Substrate for High Power Dissipation

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)



Part Numbering

CS 12 J T G S R010

① ② ③ ④ ⑤ ⑥ ⑦

① Product Type

Product Type	Description
CS	Current Sensing Chip Resistor

② Dimensions (LxW)

Codes	Dimensions (LxW)	Part Number
CS02	1.00x0.50mm	0402
CS03	1.60x0.80mm	0603
CS05	2.00x1.25mm	0805
CS06	3.10x1.55mm	1206
CS10	5.00x2.50mm	2010
CS12	6.30x3.10mm	2512
CS25	3.10x6.30mm	1225
CS37	3.75x2.00mm	3720
CS75	7.50x2.00mm	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

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

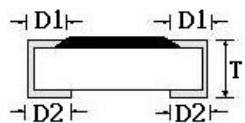
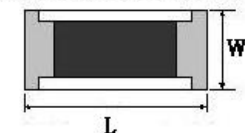
Codes	Type
R010	0.010 Ω
R100	0.100 Ω
1R00	1.000 Ω

Dimensions

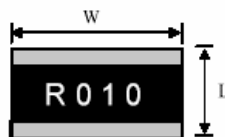
Unit: mm

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

0402/0603/0805/1206/2010/2512



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)	1/2W			3mΩ~10mΩ 11mΩ~19mΩ 20mΩ~50mΩ 51mΩ~200mΩ	±450 ±300 ±200 ±150	
CS12 (2512)	1W				10mΩ~19mΩ 20mΩ~500mΩ	±300 ±150
CS25 (1225)	3W				±2%, ±5%	1mΩ~4mΩ
CS37 (3720)	1W			±1%, ±2%, ±5%	5mΩ~10mΩ 11mΩ~350mΩ	±200 ±150
CS75 (7520)	2W					

High Power Rating Electrical Specifications

Item Type	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□□TQ□□□□	3/4W			100mΩ~1000mΩ
CS12□□TA□□□□	1.5W			100mΩ~1000mΩ

Low TCR Electrical Specifications

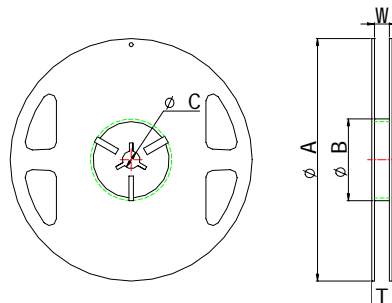
Item Type	Power Rating at 70°C	Operating Temp. Range	Resistance Tolerance	Resistance Range	TCR (PPM/°C)
CS06□TE□□□□	1/4W	-55 ~ +155°C	±1% ±2% ±5%	100mΩ~1000mΩ	±100
CS10□TE□□□□	1/2W			100mΩ~1000mΩ	±100
CS12□TE□□□□	1W			100mΩ~1000mΩ	±100
CS75□TE□□□□	2 W			1mΩ~5mΩ	±100

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

kareatar is capable of manufacturing the optional spec based on customer's requirement.

Marking for 0603

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



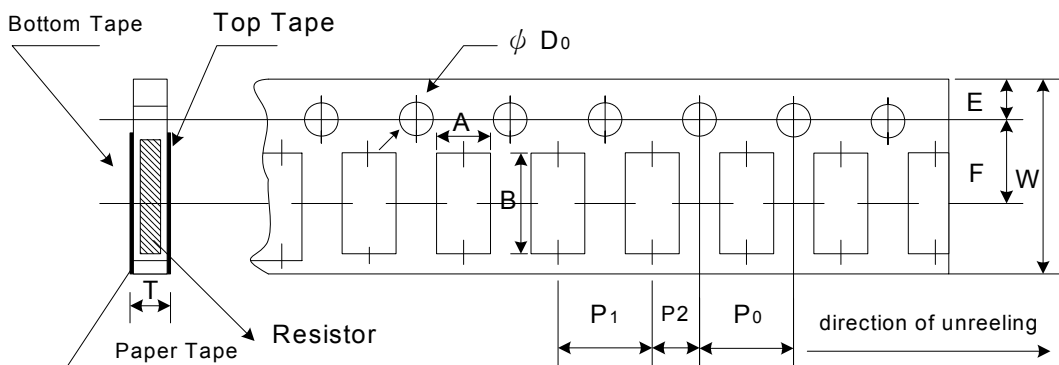
Packaging

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

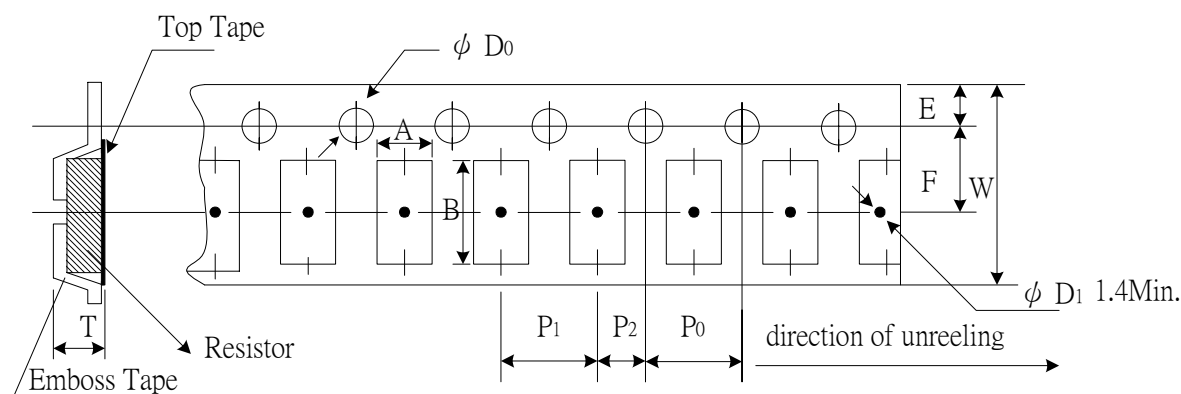


Unit: mm

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
2	Short Time Overload	MIL-STD-202F Method 304 +25/-55/+25/+125/+25°C
		±(0.5% + 0.05Ω) ΔR±1% for high power rating
3	Dielectric Withstand Voltage	JIS-C-5202-5.5 RCWV*2.5 or Max Overloading Voltage 5 seconds
4	Insulation Resistance	by Type
5	Thermal Shock	MIL-STD-202F Method 301 Apply Max Overload Voltage for 1 minute
6	Load Life	MIL-STD-202F Method 302 Apply 100VDC for 1minute
7	Humidity (Steady State)	MIL-STD-202F Method 107G -55°C ~ 150°C, 100cycles
8	Resistance to Dry Heat	MIL-STD-202F Method 108A RCWV, 70°C, 1.5 hours on, 0.5 hours off Total 1000~1048 hours
9	Low Temperature Operation	MIL-STD-202F Method 103B 40°C, 90~95%RH, RCWV 1.5 hours ON, 0.5 hours OFF, total 1000 ~ 1048 hours
10	Bending Strength	JIS-C-5202-7.2 96hours @ +155°C without load
11	Solderability	JIS-C-5202-7.1 1hour, -65°C followed by 45 minutes of RCWV
12	Resistance to Soldering Heat	JIS-C-5202-6.1.4 Bending Amplitude 3mm for 10 seconds
		MIL-STD-202F Method 208H 235°C±5°C, 2±0.5 (sec)
		MIL-STD-202F Method 210E 260±5°C, 10±1 seconds

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