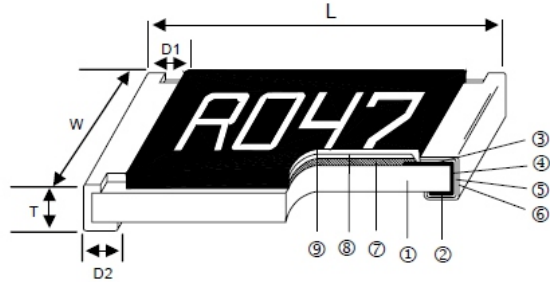




# Current Sensing Thick Film Chip Resistor

## Construction



① Alumina Substrate	④ Edge Electrode (NiCr)	⑦ Resistor Layer (RuO <sub>2</sub> /Ag)
② Bottom Electrode (Ag)	⑤ Barrier Layer (Ni)	⑧ Primary Overcoat (Glass)
③ Top Electrode (Ag-Pd)	⑥ External Electrode (Sn)	⑨ Secondary Overcoat (Epoxy)

## Features

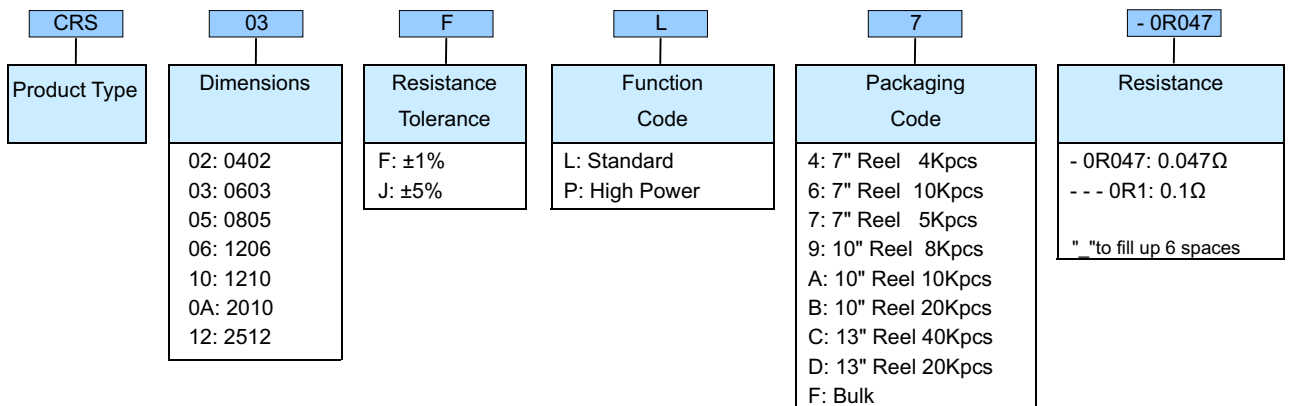
- Low inductance
- Highly reliable multilayer electrode construction
- Higher component and equipment reliability
- Reduced size of final equipment reliability

## Applications

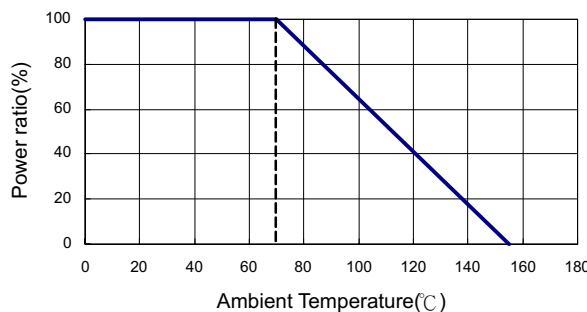
- Power Management Applications
- Switching Power Supply
- Over Current Protection in Audio Application
- Voltage Regulation Module (VRM)
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Automotive Engine Control
- Disk Driver

Type	Size (Inch)	L	W	T	D1	D2	Weight(g) (1000pcs)
CRS-02	402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.20±0.10	0.62
CRS-03	603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	2.042
CRS-05	805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.40±0.20	4.368
CRS-06	1206	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.25	0.50±0.20	8.947
CRS-10	1210	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.25	0.50±0.20	15.959
CRS-0A	2010	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.20	24.241
CRS-12	2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.25	0.50±0.20	39.448

## Part Numbering



## Derating Curve





## Current Sensing Thick Film Chip Resistor

### Standard Electrical Specifications

Type	Item	Power Rating at 70°C	Operating Temp. Range	Resistance Range (mΩ)		TCR (PPM/°C)
				±1%	±5%	
	CRS-02 (0402)	1/16W	-55 ~ +155°C	50 - 99 100 - 499 500 - 976		±800 ±500 ±200
	CRS-03 (0603)	1/10W	-55 ~ +155°C	20 - 47 50 - 99 100 - 499 500 - 976		±1200 ±800 ±500 ±200
	CRS-05 (0805)	1/8W	-55 ~ +155°C	10 - 18 20 - 47 50 - 99		±1500 ±1200 ±800
	CRS-06 (1206)	1/4W		100 - 499 500 - 976		±500 ±200
	CRS-10 (1210)	1/3W	-55 ~ +155°C	10 - 18 20 - 47		±1500 ±800
	CRS-0A (2010)	3/4W		50 - 99		±800
	CRS-12 (2512)	1W		100 - 499		±200
				500 - 976		±200

Operating Voltage =  $\sqrt{P \cdot R}$

Overload Voltage =  $2.5 \cdot \sqrt{P \cdot R}$

### High Power Rating Electrical Specifications

Type	Item	Power Rating at 70°C	Operating Temp. Range	Resistance Range (mΩ)		TCR (PPM/°C)
				±1%	±5%	
	CRS-02 (0402)	1/10W	-55 ~ +155°C	50 - 99 100 - 499 500 - 976		±800 ±500 ±200
	CRS-03 (0603)	1/8W	-55 ~ +155°C	20 - 47 50 - 99 100 - 499 500 - 976		±1200 ±800 ±500 ±200
	CRS-05 (0805)	1/4W	-55 ~ +155°C	10 - 18 20 - 47 50 - 99		±1500 ±1200 ±800
	CRS-06 (1206)	1/3W		100 - 499 500 - 976		±500 ±200
	CRS-10 (1210)	1/2W	-55 ~ +155°C	10 - 18 20 - 47		±1500 ±800
	CRS-0A (2010)	1W		50 - 99		±800
	CRS-12 (2512)	2W		100 - 499		±200
				500 - 976		±200

Operating Voltage =  $\sqrt{P \cdot R}$

Overload Voltage =  $2.5 \cdot \sqrt{P \cdot R}$

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



**Current Sensing Thick Film Chip Resistor**

**Environmental Characteristics**

Item	Requirement		Test Method
	±1%	±5%	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		-55°C~+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05Ω)	±(2.0%+0.05Ω)	RCWV*2.5 or Max. overload voltage for 5 seconds, 2 seconds for high power series
Insulation Resistance	≥10G		Max. overload voltage for 1 minute
Endurance	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Dry Heat	±(1.0%+0.05Ω)	±(1.5%+0.10Ω)	at +155°C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)	Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Solderability	95% min. coverage		245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover		1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤ 10%		260±5°C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	-55°C to +155°C, 5 cycles

■ Reference Standards: IEC 60115-1, 60068-2-58; JIS-C 5201-1

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

**Marking for 0603**

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

non-E24 / E96 series product is with no marking



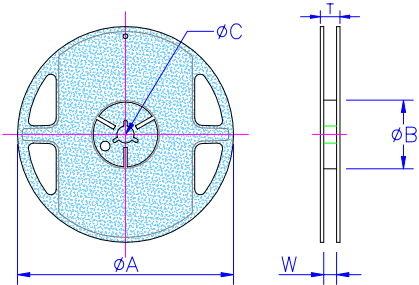
# Current Sensing Thick Film Chip Resistor

## ■ Packaging

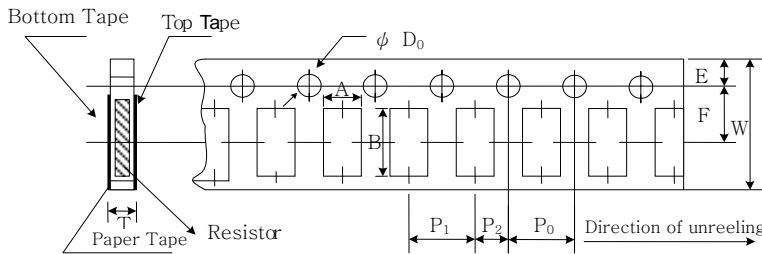
Reel Specifications & Packaging Quantity

Unit:mm

Type	Packaging Quantity	Tape Width	Reel Diameter	ΦA	ΦB	ΦC	W	T
CRS-02	Paper	10K	7inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.20	9.0±0.5	12.5±0.5
		20K						
		40K						
CRS-03	Paper	5K	10inch	254±1.0	100±0.5	13.0±0.20	9.5±0.5	13.5±0.5
CRS-05		10K						
CRS-06		20K						
CRS-10		...						
CRS-0A	Embossed	4k	7inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.5	13.0±0.5	15.5±0.5
CRS-12		8K						



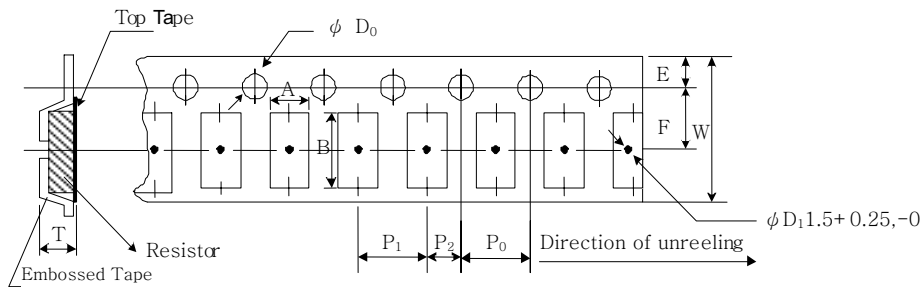
### Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
CRS-02	0.65±0.10	1.15±0.10	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.50+0.1,-0	0.45±0.10
CRS-03	1.10±0.10	1.90±0.10	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.70±0.10
CRS-05	1.60±0.10	2.40±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
CRS-06	1.90±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
CRS-10	2.90±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10

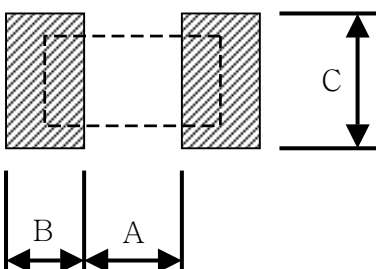
### Embossed Plastic Tape Specifications



Unit: mm

Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
CRS-0A	2.80±0.10	5.50±0.10	12.0±0.30	1.75±0.10	5.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1,-0	1.2 <sup>+0</sup>
CRS-12	3.50±0.10	6.70±0.10	12.0±0.30	1.75±0.10	5.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.1,-0	1.2 <sup>+0</sup>

### ■ Recommend Land Pattern



Type	A	B	C
CRS-02	0.50	0.45	0.60
CRS-03	0.90	0.60	0.90
CRS-05	1.20	0.70	1.30
CRS-06	2.00	0.90	1.60
CRS-10	2.00	0.90	2.80
CRS-0A	3.80	0.90	2.80
CRS-12	3.80	1.60	3.50

Unit: mm