

# CURRENT SENSING METAL CHIP RESISTOR

## - CRM SERIES -

### FEATURES

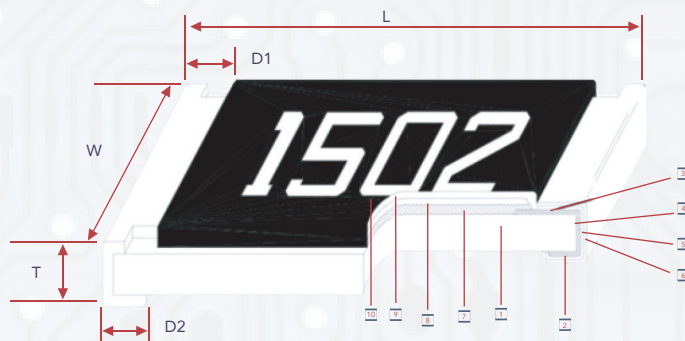
- SMD Type designed for automatic insertion
- High power rating in small size
- Low resistance resistor for current detection
- Metal foil construction ensures high reliability and performance with very low and stable TCR
- Designed for current sense circuits in power electronic systems
- Pb-Free to Meet RoHS Requirements

### APPLICATIONS

- Power Management Applications
- Switching Power Supply
- Over Current Protection in Audio Applications
- Voltage Regulation Module (VRM)
- DC-DC Converter, Battery Pack, Charger, Adapter



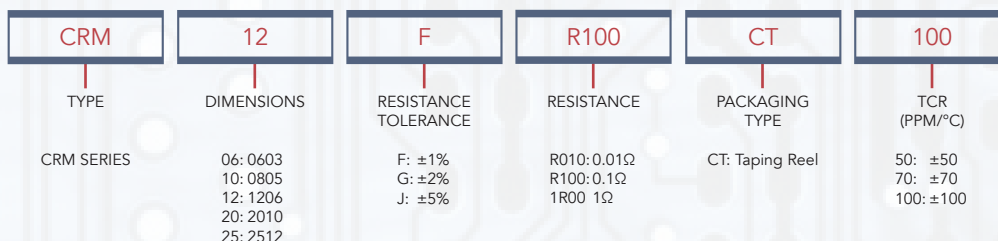
### CONSTRUCTION



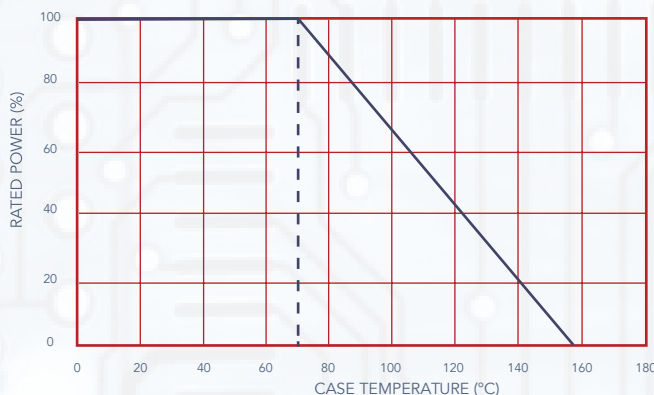
- |                         |                           |                               |
|-------------------------|---------------------------|-------------------------------|
| 1 Alumina Substrate     | 5 Barrier Layer (Ni)      | 9 Primary Overcoat (glass)    |
| 2 Bottom Electrode (Ag) | 6 External Electrode (Sn) | 10 Secondary Overcoat (Epoxy) |
| 3 Top Electrode (Ag-pd) | 7 Acrylic Layer           |                               |
| 4 Edge Electrode (NiCr) | 8 Resistor Layer          |                               |

TYPE	SIZE (INCH)	RESISTANCE RANGE (mΩ)	L	W	T	D1	D2
CRM06	0603	10-29	1.55±0.10	0.85±0.10	0.40±0.10	0.30±0.15	0.45±0.15
		30-100					
CRM10	0805	10-29	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.50±0.20
		30-100			0.52±0.10		0.35±0.20
CRM12	1206	10-29	3.05±0.15	1.55±0.15	0.58±0.15	0.50±0.25	0.90±0.25
		30-100			0.55±0.15		0.60±0.25
CRM20	2010	10-29	5.00±0.20	2.50±0.20	0.58±0.15	0.60±0.30	1.50±0.30
		30-100			0.55±0.15		0.90±0.30
CRM25	2512	10-29	6.30±0.20	3.15±0.20	0.58±0.15		1.80±0.30
		30-100			0.55±0.15		1.20±0.30

### PART NUMBERING



### DERATING CURVE



## STANDARD ELECTRICAL SPECIFICATIONS

TYPE	POWER RATING AT 70°C	OPERATING TEMP RANGE	RESISTANCE RANGE			T.C.R. (PPM / °C)
			±1%	±2%	±5%	
CRM06 (0603)	1/8 W	-55~+155°C	10-19			±100
			20-100			±50 ±100
CRM10 (0805)	1/4 W		10-19			±100
			20-100			±50 ±100
CRM12 (1206)	1/2 W		10-19			±100
			20-100			±50 ±100
CRM20 (2010)	3/4 W		10-19			±100
			20-100			±50 ±100
CRM25 (2512)	1W		10-19			±100
			20-100			±50   ±70 ±100

Operating Voltage -  $\sqrt{P \cdot R}$ ; Overload Voltage -  $2.5 \cdot \sqrt{P \cdot R}$ ; Operating Current -  $\sqrt{P \cdot R}$   
 Cal-Chip is capable of manufacturing the optional spec based on customer's requirement.

## ENVIRONMENTAL CHARACTERISTICS

ITEMS	REQUIREMENT	TEST METHOD
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	-55°C ~+125°C, 25°C is the reference temperature
Short Time Overload	±(0.5%+0.05Ω)	5 X Rated Power for 5 seconds
Insulation Resistance	≥10G	Max. overload voltage for 1 minute
Endurance	±(1.0% + 0.05Ω)	70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	±(1.0% + 0.05Ω)	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	±(0.5% + 0.05Ω)	at +155°C for 1000 hrs
Bending Strength	As Spec	Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Solderability	95% coverage Min.	245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5% + 0.05Ω)	260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover	1.42 times RCWW (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)	-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



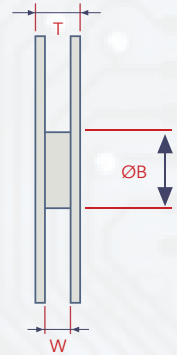
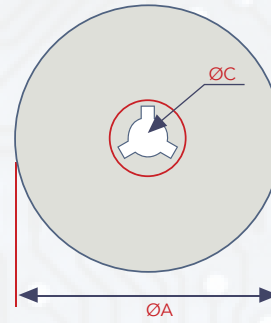
**Cal-Chip**  
 Electronics Inc.

# PACKAGING

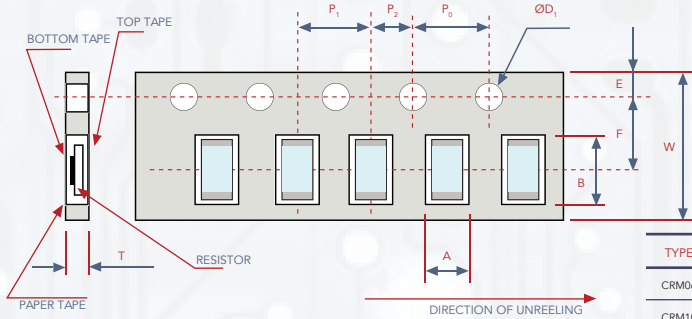
## - Packaging Quantity & Reel Specifications

UNIT: MM

TYPE	ØA	ØB	ØC	W	T	PAPER TAPE (EA)	EMBOSS PLASTIC TAPE (EA)
CRM06	178±1.0	60.0±1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CRM10							-
CRM12							-
CRM20				-	-		
CRM25				-	4,000		

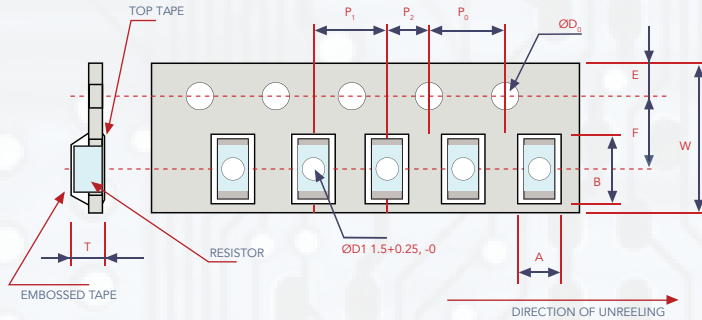


## - Paper Tape Specifications



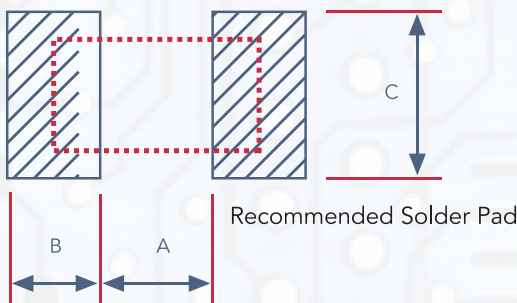
TYPE	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ØD <sub>1</sub>	T
CRM06	1.60±0.10	2.40±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
CRM10										
CRM12	1.90±0.10	3.50±0.20								

## - Embossed Plastic Tape Specifications



TYPE	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ØD <sub>0</sub>	T
CRM20	2.80±0.10	5.50±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
CRM25	3.50±0.10	6.70±0.10								

## RECOMMEND LAND PATTERN



TYPE	RESISTANCE RANGE	A	B	C
CRM06	10 - 29MΩ	0.40	1.20	0.9
	30 - 100MΩ	0.70	1.05	
CRM10	10 - 29MΩ	0.80	1.10	1.35
	30 - 100MΩ	1.00	1.00	
CRM12	10 - 29MΩ	0.9	1.70	1.70
	30 - 100MΩ	1.50	1.40	
CRM20	10 - 29MΩ	1.70	2.35	2.50
	30 - 100MΩ	2.80	1.80	
CRM25	10 - 29MΩ	2.30	2.90	3.10
	30 - 100MΩ	3.60	2.25	