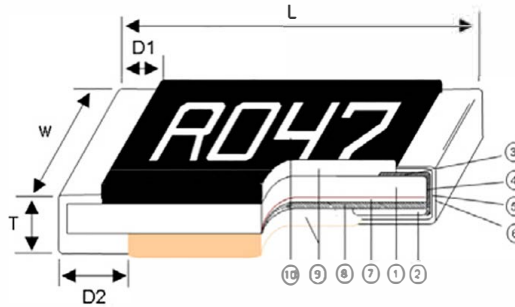


Current Sensing Metal Chip Resistor – CRM Series



Construction



① Alumina Substrate	⑤ Barrier Layer (Ni)	⑨ Primary Overcoat (Epoxy)
② Bottom Electrode (Cu)	⑥ External Electrode (Sn)	⑩ Marking (Epoxy)
③ Top Electrode (NiCr)	⑦ Adhesive (Acrylic)	
④ Edge Electrode (NiCr)	⑧ Resistor Layer (Alloy)	

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

Dimensions

Unit: mm

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	1.55±0.10	0.85±0.10	0.40±0.10	0.30±0.15	0.45±0.15
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	2.00±0.15	1.25±0.15	0.52±0.10	0.30±0.20	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	3.05±0.15	1.55±0.15	0.55±0.15	0.50±0.25	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	5.00±0.20	2.50±0.20	0.55±0.15	0.60±0.30	0.90±0.30
CRM25	2512	10 - 29	6.30±0.20	3.15±0.20	0.58±0.15	0.60±0.30	1.80±0.30
		30 - 100	6.30±0.20	3.15±0.20	0.55±0.15	0.60±0.30	1.20±0.30

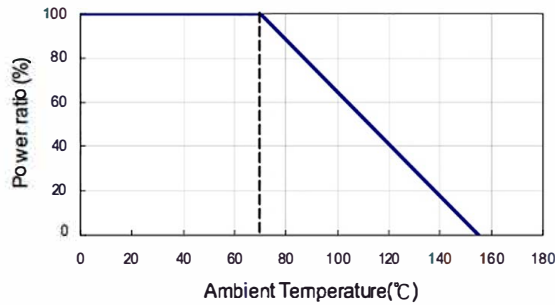
Applications

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

Part Numbering

CRM	12	F	R100	CT	-	100
Product Type	Dimensions (L×W)	Resistance Tolerance	Resistance	Packaging Code		TCR (PPM/°C)
	06: 0603 10: 0805 12: 1206 20: 2010 25: 2512	F: ±1% G: ±2% J: ±5%	R010: 0.01Ω R100: 0.1Ω 1R00: 1Ω	CT: Tape and Reel		50: ±50 70: ±70 100: ±100

Derating Curve



Standard Electrical Specifications

Type	Item	Power Rating at 70°C	Operating Temp. Range	Resistance Range (mΩ)			TCR (PPM/°C)
				±1%	±2%	±5%	
CRM06 (0603)		1/8W	-55 ~ +155°C	10 - 19			±100
				20 - 100			±50 ±100
CRM10 (0805)	1/4W	10 - 19			±100		
		20 - 100			±50 ±100		
CRM12 (1206)	1/2W	10 - 19			±100		
		20 - 100			±50 ±100		
CRM20 (2010)	3/4W	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= $\sqrt{P/R}$

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

Environmental Characteristics

Item	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% min. coverage	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 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)	-55°C to +155°C, 5 cycles

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

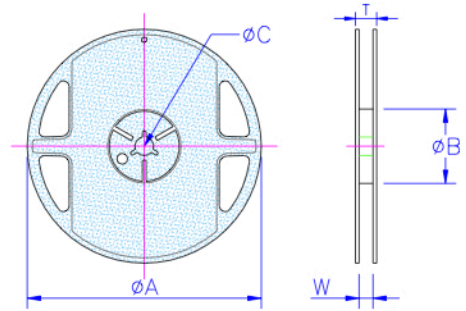
Storage Temperature: 25±3°C; Humidity < 80%RH

■ Packaging

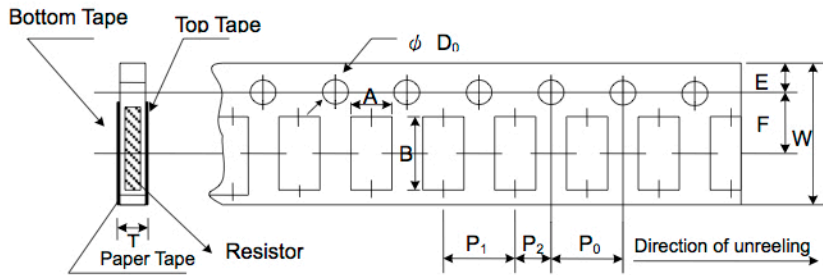
Packaging Quantity & Reel Specifications

Unit: mm

Type	ΦA	ΦB	ΦC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
CRM06	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CRM10	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CRM12	178.0±1.0	60.0+1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
CRM20	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
CRM25	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000



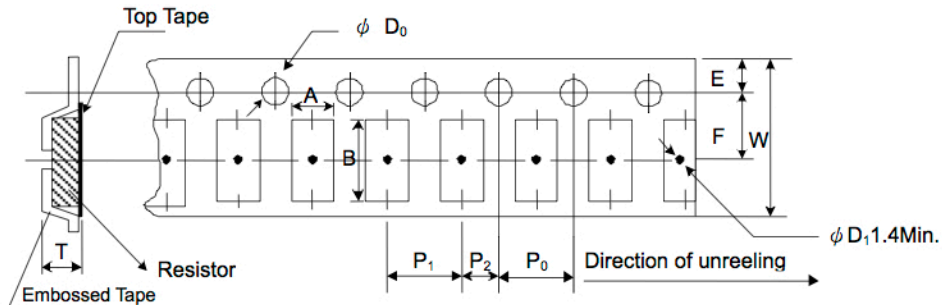
Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	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	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
CRM12	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

Embossed Plastic Tape Specifications



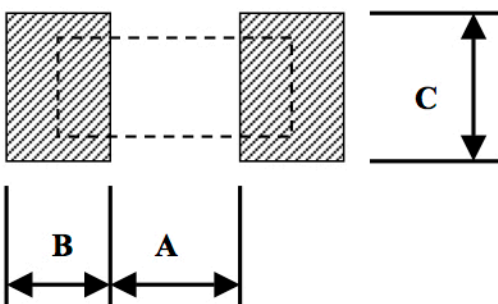
Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	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	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

Pad Layout

Unit: mm

■ Recommend Land Pattern



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