Current Sensing Metal Chip Resistors
CSM Series

RoHS Compliant

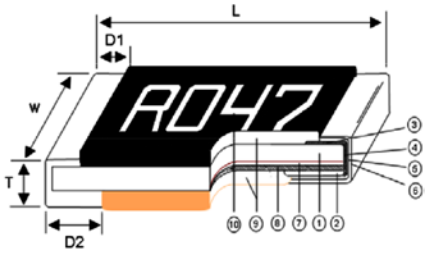
Features:

- 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

Applications

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

Construction

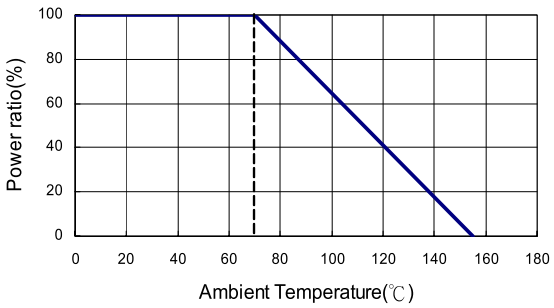


1	Alumina Substrate	5	Barrier Layer (Ni)	9	Primary Overcoat (Epoxy)
2	Bottom Electrode (Cu)	6	External Electrode (Sn)	10	Marking (Epoxy)
3	Top Electrode (NiCr)	7	Adhesive (Acrylic)		
4	Edge Electrode (NiCr)	8	Resistor Layer (Alloy)		

Dimensions

Type	Size (Inch)	Resistance Range (mΩ)	L	W	T	D1	D2
MCCSM06	1206	10 - 29	3.05 ±0.15	1.55 ±0.15	0.58 ±0.15	0.5 ±0.25	0.9 ±0.25
		30 - 100	3.05 ±0.15	1.55 ±0.15	0.55 ±0.15	0.5 ±0.25	0.6 ±0.25
MCCSM12	2512	10 - 29	6.3 ±0.2	3.15 ±0.2	0.58 ±0.15	0.6 ±0.3	1.8 ±0.3
		30 - 100	6.3 ±0.2	3.15 ±0.2	0.55 ±0.15	0.6 ±0.3	1.2 ±0.3

Derating Curve

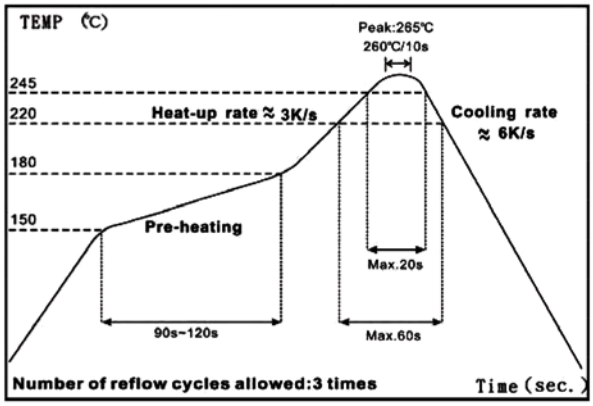


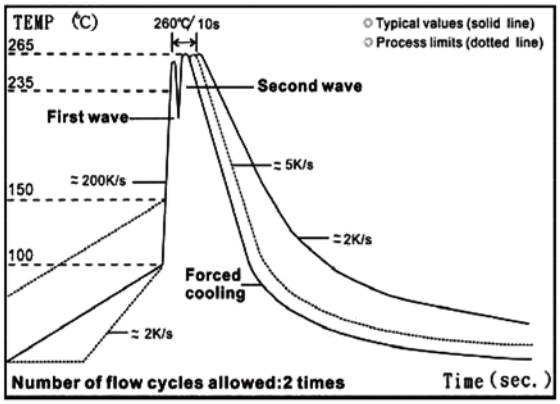
Standard Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Resistance Range (mΩ)			TCR (PPM/°C)
			±1%	±2%	±5%	
MCCSM06 (1206)	1/2W	-55°C to +155°C	10 - 19			±100
			20 - 100			±50 ±100
MCCSM12 (2512)	1W		10 - 19			±100
			20 - 100			±50 ±100

Operating Voltage=√(P*R) ; Overload Voltage=2.5*√(P*R) ; Operating Current=√(P/R)

Soldering Condition





IR Reflow Soldering — Wave Soldering (Flow Soldering)

(1) Time of IR reflow soldering at maximum temperature point 260°C :10s
(2) Time of wave soldering at maximum temperature point 260°C : 10s
(3) Time of soldering iron at maximum temperature point 410°C : 5s

Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	-55°C to +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 to 95% R.H. Max. working voltage for 1,000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”

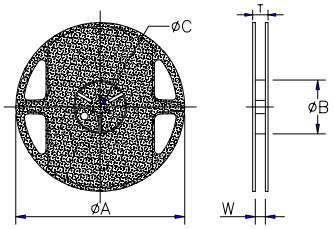
Environmental Characteristics

Item	Requirement	Test Method
Dry Heat	±(0.5%+0.05Ω)	at +155°C for 1,000 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

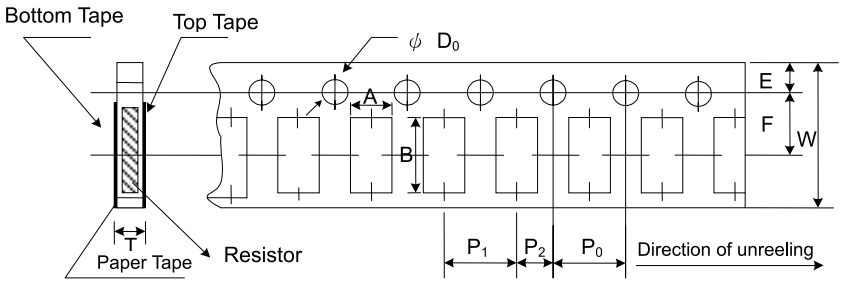
Packaging Quantity & Reel Specifications



Type	ΦA	ΦB	ΦC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
MCCSM06	178 ±1	60 +1	13.5 ±0.7	9.5 ±0.1	11.5 ±1	5,000	-
MCCSM12	178 ±1	60 +1	13.5 ±0.7	13.5 ±1	15.5 ±1	-	4,000

Unit: mm

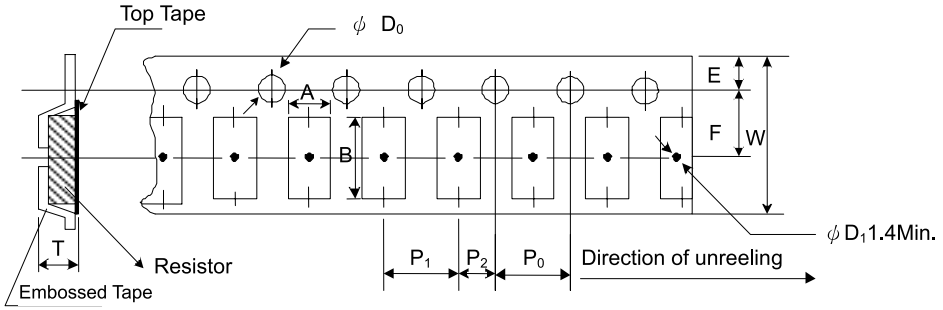
Paper Tape Specifications



Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
MCCSM06	1.9 ±0.1	3.5 ±0.2	8 ±0.2	1.75 ±0.1	3.5 ±0.05	4 ±0.1	4 ±0.05	2 ±0.05	1.5 +0.1,-0	0.85 ±0.1

Unit: mm

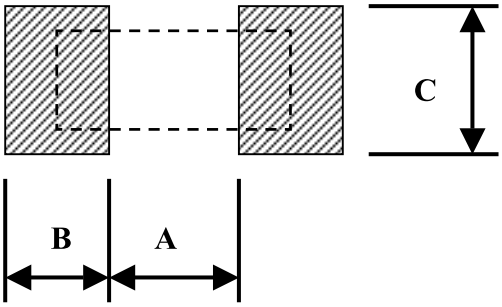
Embossed Plastic Tape Specifications



Type	A	B	W	E	F	Po	P1	P2	ΦD0	T
MCCSM12	3.5 ±0.1	6.7 ±0.1	12 ±0.1	1.75 ±0.1	5.5±0.05	4 ±0.05	4 ±0.1	2 ±0.05	1.5 +0.1	1 ±0.2

Unit: mm

Recommend Land Pattern



Type	Resistance Range	A	B	C
MCCSM06	10-29mΩ	0.9	1.7	1.7
	30-100mΩ	1.5	1.4	1.7
MC CSM12	10-29mΩ	2.3	2.9	3.1
	30-100mΩ	3.6	2.25	3.1

Unit: mm

Part Number Table

Description	Part Number
Resistor, current sense, 0R022, 0.5W, 1%	MCCSM06FTDUR022
Resistor, current sense, 0R033, 0.5W, 1%	MCCSM06FTDUR033
Resistor, current sense, 0R047, 0.5W, 1%	MCCSM06FTDUR047
Resistor, current sense, 0R068, 0.5W, 1%	MCCSM06FTDUR068
Resistor, current sense, 0R033, 1W, 1%	MCCSM12FTDTR033
Resistor, current sense, 0R047, 1W, 1%	MCCSM12FTDTR047
Resistor, current sense, 0R022, 1W, 1%	MCCSM12FTDTR022
Resistor, current sense, 0R051, 1W, 1%	MCCSM12FTDTR051
Resistor, current sense, 0R068, 1W, 1%	MCCSM12FTDTR068
Resistor, current sense, 0R075, 1W, 1%	MCCSM12FTDTR075