

Current Sense Chip Resistor **multicomp**PRO

RoHS
Compliant

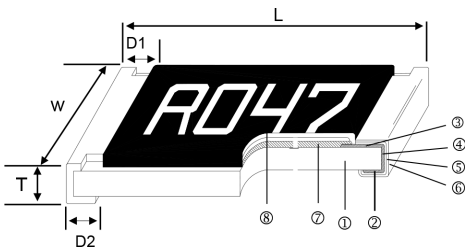


Features

- Resistance values from 10mΩ to 1Ω
- Low TCR
- High purity alumina substrate for high power dissipation

Applications

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



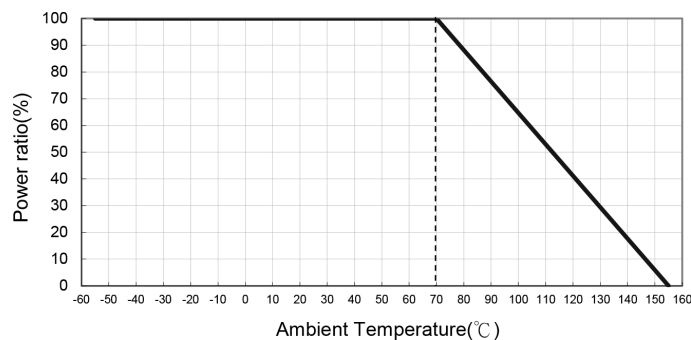
1	Alumina Substrate	4	Edge Electrode	7	Resistor Layer
2	Bottom Electrode	5	Barrier Layer	8	Overcoat
3	Top Electrode	6	External Electrode		

Dimensions : Millimetres

Dimensions

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g) (1000pcs)
MCCSN05	0805	2 ±0.1	1.25 ±0.1	0.55 ±0.1	0.3 ±0.2	0.4 ±0.25	4.6
MCCSN06	1206	3.1 ±0.1	1.55 ±0.1	0.55 ±0.1	0.5 ±0.3	0.4 ±0.25	8.7
MCCSN13	1210	3.1 ±0.1	2.6 ±0.15	0.55 ±0.1	0.50 ±0.3	0.5 ±0.25	16
MCCSN10	2010	5 ±0.1	2.5 ±0.15	0.6 ±0.15	0.6 ±0.3	0.5 ±0.25	23.7
MCCSN12	2512	6.35 ±0.1	3.1 ±0.15	0.6 ±0.1	0.6 ±0.3	0.5 ±0.25	40

Derating Curve

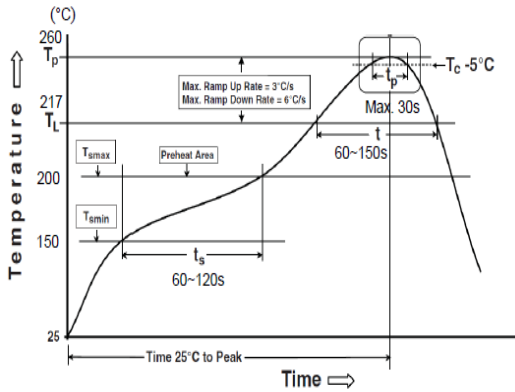


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Soldering Condition (Ref. IPC/JEDEC J-STD-020 & J-STD-002)



Reflow Profiles	
Profile Feature	Pb-Free Assembly
Preheat	
Min. Temperature (T _{min})	150°C
Max Temperature (T _{max})	200°C
Preheating time (t _s) from (T _{min} to T _{max})	60-120 seconds
Ramp-up rate (T _L to T _p)	3°C/second max.
Liquidous temperature (T _L)	217°C
Time (t _L) maintained above T _L	60-150 seconds
Min. Peak temperature (T _p min)	235°C
Max. Peak temperature (T _p max)	260°C
Time (t _p) within 5°C of the specified classification temperature (T _c)	30 seconds max.
Ramp-down rate (T _p to T _L)	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Resistance Range (mΩ)			TCR (PPM/°C)
				±1% (E24 & E96) ¹	±2% (E24)	±5% (E24)	
MCCSN05 (0805)	1/8W	-55°C to +155°C	2.5A	20 - 50 51 - 100 102 - 196 200 - 1000	20 - 50 51 - 100 110 - 180 200 - 1000	±600 ±400 ±300 ±200	
MCCSN06 (1206)	1/4W		5A	10 - 20	10 - 20	±600	
MCCSN13 (1210)	1/2W		7.07A	22 - 50	22 - 50	±400	
MCCSN10 (2010)	3/4W		8.66A	51 - 91	51 - 91	±300	
MCCSN12 (2512)	1W		10A	100 - 1000	100 - 1000	±200	

High Power Ultra High Power Rating Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Resistance Range (mΩ)			TCR (PPM/°C)
				±1% (E24 & E96) ¹	±2% (E24)	±5% (E24)	
MCCSN05 (0805)	1/4W	-55°C to +155°C	2.21A	20 - 50 51 - 100 102 - 196 200 - 1000	20 - 50 51 - 100 110 - 180 200 - 1000	±600 ±400 ±300 ±200	
MCCSN06 (1206)	1/2W		7.07A	10 - 20	10 - 20	±600	
MCCSN13 (1210)	3/4W		8.66A	22 - 50	22 - 50	±400	
MCCSN10 (2010)	1W		10A	51 - 91	51 - 91	±300	
MCCSN12 (2512)	1.5W		12.2A	100 - 1000	100 - 1000	±200	

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High Power Ultra High Power Rating Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Resistance Range (mΩ)			TCR (PPM/°C)
				±1% (E24 & E96) ¹	±2% (E24)	±5% (E24)	
MCCSN05 (0805)	1/4W	-55°C to +155°C	1.58A	100 - 196 200 - 499 500 - 1000	100 - 180 200 - 470 500 - 1000	±100 ±75 ±50	
MCCSN06 (1206)	1/2W		2.58A	75 - 100 102 - 147 150 - 1000	75 - 100 110 - 140 150 - 1000	±100 ±75 ±50	
MCCSN13 (1210)	3/4W		3.87A	50 - 147 150 - 1000	50 - 140 150 - 1000	±75 ±50	
MCCSN10 (2010)	1W		4.47A				
MCCSN12 (2512)	1.5W		5.47A				

*: Ultra High Power

*1: The nominal resistance value for less than 100mΩ is in E-24 series, other requirement of resistance value please contact our sales office.

Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	JIS-C-5201-1 4.8 IEC-60115-1 4.8 At 25°C/ -55°C and 25°C/+125°C, 25°C is the reference temperature Low TCR: At 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(0.5%+0.05Ω)	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
	±(1%+0.05Ω) For ≤50mR & all High power, Ultra High Power	
Insulation Resistance	≥10G	JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. Overload Voltage for 1 minute
Endurance	±(1%+0.05Ω)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
	±(2%+0.05Ω) For ≤50mΩ & all High power, Ultra High Power	
Damp Heat with Load	±(0.5%+0.05Ω)	JIS-C-5201-1 4.24 IEC-60115-1 4.24 40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
	±(1%+0.05Ω) For ≤50mΩ & all High power, Ultra High Power	

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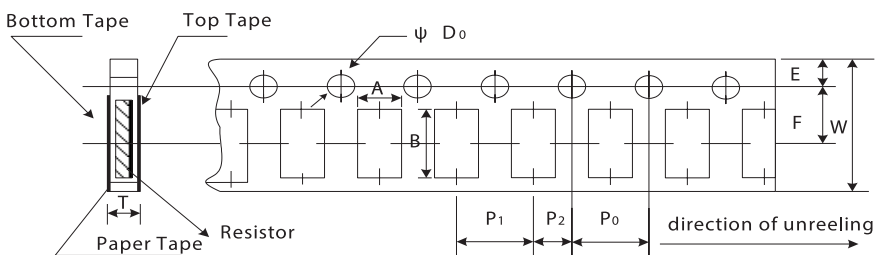
Item	Requirement	Test Method
Dry Heat	$\pm(1\%+0.05\Omega)$	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 at +155°C for 1000 hrs
	$\pm(2\%+0.05\Omega)$ For $\leq 50m\Omega$ & all High power, Ultra High Power	
Bending Strength	$\pm(1\%+0.05\Omega)$	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once for 60 seconds with 3mm 2010, 2512 sizes: 2mm
Solderability	95% min. Coverage	JIS-C-5201-1 4.17 IEC-60115-1 4.17 245 \pm 5°C for 3 seconds
Resistance to Soldering Heat	$\pm(0.5\%+0.05\Omega)$	JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times Max. Operating Voltage for 1 minute CSN05:300V CSN06/13/10:400V; CSN12:500V
Leaching	Individual leaching area $\leq 5\%$ Total leaching area $\leq 10\%$	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260 \pm 5°C for 30 seconds
Rapid Change of Temperature	$\pm(0.5\%+0.05\Omega)$	JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +155°C, 5 cycles

RCWV(Rated continuous working voltage)= $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower

Storage Temperature: 15°C to 28°C; Humidity < 80%RH

Shelf Life: 2 years from production date.

Paper Tape Specifications



Dimensions : Millimetres

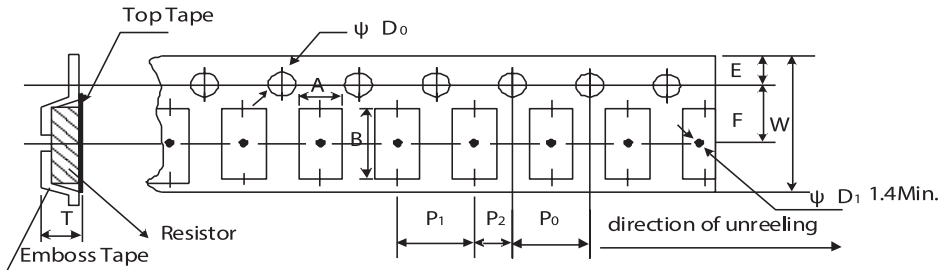
Type	A mm	B mm	W mm	E mm	F mm	P ₀ mm	P ₁ mm	P ₂ mm	ΦD ₀ mm	T mm
MCCSN05	1.6 \pm 0.1	2.4 \pm 0.2	8 \pm 0.2	1.75 \pm 0.1	3.5 \pm 0.05	4 \pm 0.1	4 \pm 0.05	2 \pm 0.05	1.5 \pm 0.1,-0	0.85 \pm 0.1
MCCSN06	1.9 \pm 0.1	3.5 \pm 0.2	8 \pm 0.2	1.75 \pm 0.1	3.5 \pm 0.05	4 \pm 0.1	4 \pm 0.05	2 \pm 0.05	1.5 \pm 0.1,-0	0.85 \pm 0.1
MCCSN13	2.9 \pm 0.1	3.5 \pm 0.2	8 \pm 0.2	1.75 \pm 0.1	3.5 \pm 0.05	4 \pm 0.1	4 \pm 0.05	2 \pm 0.05	1.5 \pm 0.1,-0	0.85 \pm 0.1

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Emboss Plastic Tape Specifications

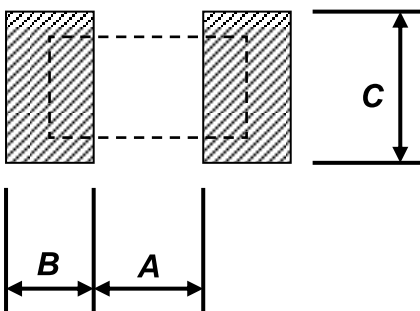


Type	A mm	B mm	W mm	E mm	F mm	P ₀ mm	P ₁ mm	P ₂ mm	ΦD ₀ mm	T mm
MCCSN10	2.8 ±0.1	5.4 ±0.2	12 ±0.3	1.75 ±0.1	5.5 ±0.05	4 ±0.05	4 ±0.1	2 ±0.05	1.5+0.1	1 ±0.2
MCCSN12	3.5 ±0.1	6.7 ±0.1	12 ±0.3	1.75 ±0.1	5.5 ±0.05	4 ±0.05	4 ±0.1	2 ±0.05	1.5+0.1	1 ±0.2

* Low TCR

Recommend Land Pattern

Pad Layout (Except For CSN12: Ultra High Power Rating & Low TCR Series)



Type	A (mm)	B (mm)	C (mm)
MCCSN05	1	1	1.35 ±0.2
MCCSN06	2	1.15	1.7 ±0.2
MCCSN13	2	1.15	2.5 ±0.2
MCCSN10	3.6	1.4	2.5 ±0.2
MCCSN12	4.90	1.6	3.2 ±0.2

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Part Number Table

Description	Part Number
Current Sense Chip Resistor, 0805, 1%, 1/4W, 330mΩ	MCCSN05FTFVR330
Current Sense Chip Resistor, 0805, 1%, 1/8W, 220mΩ	MCCSN05FTFWR220
Current Sense Chip Resistor, 0805, 1%, 1/8W, 330mΩ	MCCSN05FTFWR330
Current Sense Chip Resistor, 0805, 1%, 1/8W, 470mΩ	MCCSN05FTFWR470
Current Sense Chip Resistor, 0805, 1%, 1/8W, 560mΩ	MCCSN05FTFWR560
Current Sense Chip Resistor, 0805, 1%, 1/8W, 680mΩ	MCCSN05FTFWR680
Current Sense Chip Resistor, 0805, 1%, 1/4W, 150mΩ	MCCSN05FTGVR150
Current Sense Chip Resistor, 0805, 1%, 1/4W, 100mΩ	MCCSN05FTHVR100
Current Sense Chip Resistor, 0805, 1%, 1/8W, 100mΩ	MCCSN05FTHWR100
Current Sense Chip Resistor, 0805, 1%, 1/4W, 33mΩ	MCCSN05FTJVR033
Current Sense Chip Resistor, 0805, 1%, 1/4W, 47mΩ	MCCSN05FTJVR047
Current Sense Chip Resistor, 1206, 1%, 1/2W, 100mΩ	MCCSN06FTEUR100
Current Sense Chip Resistor, 1206, 1%, 1/2W, 100mΩ	MCCSN06FTFUR100
Current Sense Chip Resistor, 1206, 1%, 1/2W, 150mΩ	MCCSN06FTFUR150
Current Sense Chip Resistor, 1206, 1%, 1/2W, 220mΩ	MCCSN06FTFUR220
Current Sense Chip Resistor, 1206, 1%, 1/2W, 330mΩ	MCCSN06FTFUR330
Current Sense Chip Resistor, 1206, 1%, 1/2W, 470mΩ	MCCSN06FTFUR470
Current Sense Chip Resistor, 1206, 1%, 1/2W, 680mΩ	MCCSN06FTFUR680
Current Sense Chip Resistor, 1206, 1%, 1/4W, 100mΩ	MCCSN06FTFVR100
Current Sense Chip Resistor, 1206, 1%, 1/4W, 120mΩ	MCCSN06FTFVR120
Current Sense Chip Resistor, 1206, 1%, 1/4W, 1Ω	MCCSN06FTFV1R00
Current Sense Chip Resistor, 1206, 1%, 1/4W, 220mΩ	MCCSN06FTFVR220
Current Sense Chip Resistor, 1206, 1%, 1/4W, 270mΩ	MCCSN06FTFVR270
Current Sense Chip Resistor, 1206, 1%, 1/4W, 330mΩ	MCCSN06FTFVR330
Current Sense Chip Resistor, 1206, 1%, 1/4W, 470mΩ	MCCSN06FTFVR470
Current Sense Chip Resistor, 1206, 1%, 1/4W, 510mΩ	MCCSN06FTFVR510
Current Sense Chip Resistor, 1206, 1%, 1/4W, 560mΩ	MCCSN06FTFVR560
Current Sense Chip Resistor, 1206, 1%, 1/4W, 680mΩ	MCCSN06FTFVR680
Current Sense Chip Resistor, 1206, 1%, 1/2W, 68mΩ	MCCSN06FTGUR068
Current Sense Chip Resistor, 1206, 1%, 1/2W, 22mΩ	MCCSN06FTHUR022
Current Sense Chip Resistor, 1206, 1%, 1/2W, 33mΩ	MCCSN06FTHUR033
Current Sense Chip Resistor, 1206, 1%, 1/2W, 47mΩ	MCCSN06FTHUR047
Current Sense Chip Resistor, 1206, 1%, 1/4W, 22mΩ	MCCSN06FTHVR022
Current Sense Chip Resistor, 1206, 1%, 1/4W, 33mΩ	MCCSN06FTHVR033
Current Sense Chip Resistor, 1206, 1%, 1/2W, 10mΩ	MCCSN06FTJUR010

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Description	Part Number
Current Sense Chip Resistor, 1206, 1%, 1/2W, 15mΩ	MCCSN06FTJUR015
Current Sense Chip Resistor, 1210, 1%, 1/2W, 100mΩ	MCCSN13FTFUR100
Current Sense Chip Resistor, 1210, 1%, 1/2W, 220mΩ	MCCSN13FTFUR220
Current Sense Chip Resistor, 1210, 1%, 1/2W, 390mΩ	MCCSN13FTFUR390
Current Sense Chip Resistor, 1210, 1%, 3/4W, 1Ω	MCCSN13FTDQ1R00
Current Sense Chip Resistor, 2010, 1%, 1W, 330mΩ	MCCSN10FTDTR330
Current Sense Chip Resistor, 2512, 1%, 1W, 100mΩ	MCCSN12FTFTR100
Current Sense Chip Resistor, 2512, 1%, 1W, 120mΩ	MCCSN12FTFTR120
Current Sense Chip Resistor, 2512, 1%, 1W, 150mΩ	MCCSN12FTFTR150
Current Sense Chip Resistor, 2512, 1%, 1W, 180mΩ	MCCSN12FTFTR180
Current Sense Chip Resistor, 2512, 1%, 1W, 1Ω	MCCSN12FTFT1R00
Current Sense Chip Resistor, 2512, 1%, 1W, 200mΩ	MCCSN12FTFTR200
Current Sense Chip Resistor, 2512, 1%, 1W, 220mΩ	MCCSN12FTFTR220
Current Sense Chip Resistor, 2512, 1%, 1W, 270mΩ	MCCSN12FTFTR270
Current Sense Chip Resistor, 2512, 1%, 1W, 330mΩ	MCCSN12FTFTR330
Current Sense Chip Resistor, 2512, 1%, 1W, 390mΩ	MCCSN12FTFTR390
Current Sense Chip Resistor, 2512, 1%, 1W, 470mΩ	MCCSN12FTFTR470
Current Sense Chip Resistor, 2512, 1%, 1W, 560mΩ	MCCSN12FTFTR560
Current Sense Chip Resistor, 2512, 1%, 1W, 680mΩ	MCCSN12FTFTR680
Current Sense Chip Resistor, 2512, 1%, 1W, 820mΩ	MCCSN12FTFTR820
Current Sense Chip Resistor, 2512, 1%, 1W, 47mΩ	MCCSN12FTHTR047
Current Sense Chip Resistor, 2512, 1%, 1W, 10mΩ	MCCSN12FTJTR010
Current Sense Chip Resistor, 2512, 1%, 1W, 15mΩ	MCCSN12FTJTR015
Current Sense Chip Resistor, 2512, 5%, 1W, 470mΩ	MCCSN12JTFR470

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