

Metal Chip Resistor Current Sensing Type

CSM series

MERITEK

FEATURE

- Operating Temperature: -55 ~ +155°C
- High power rating
- Low resistance resistor for current detection
- Designed for current sense circuits in power electronic systems
- Metal foil construction ensures high reliability and performance with very low and stable TCR



PART NUMBERING SYSTEM

CSM 0603 E W R010 F
(1) (2) (3) (4) (5) (6)



No	Item	Code	Description	Series Reference
(1)	Meritek Series	CSM	Current Sensing Metal Chip Resistor	SMD Type
(2)	Size Code	0603	0603	0805, 1206, 2010, 2512
(3)	TCR	E	E: ±100 (PPM/°C)	D: ±50 (PPM/°C), E: ±100 (PPM/°C)
(4)	Power Rating	W	W: 1/8W	T: 1W, Q: 3/4W, U: 1/2W, V: 1/4W
(5)	Resistance	R010	R010: 0.01Ω	R010: 0.01Ω ~ R100: 0.1Ω
(6)	Tolerance	F	F: ±1%	D: ±0.5%, G: ±2%, J: ±5%

ELECTRICAL CHARACTERISTIC

Size	Power Rating at 70°C	Operating Temperature	Resistance (mΩ)				TCR (PPM/°C)
			±0.5%	±1%	±2%	±5%	
0603	1/8W	-55 ~ +155°C	-	10 ~ 19			±100
			-	20 ~ 100			±50 ±100
0805	1/4W	-55 ~ +155°C	-	10 ~ 19			±100
			30 ~ 100	20 ~ 100			±50 ±100
1206	1/2W	-55 ~ +155°C	-	10 ~ 19			±100
			30 ~ 100	20 ~ 100			±50 ±100
2010	3/4W	-55 ~ +155°C	-	10 ~ 19			±100
			30 ~ 100	20 ~ 100			±50 ±100
2512	1W	-55 ~ +155°C	-	10 ~ 19			±100
			30 ~ 100	20 ~ 100			±50 ±100

Notes:

1. CSM series can be designed based on customer's requirement.

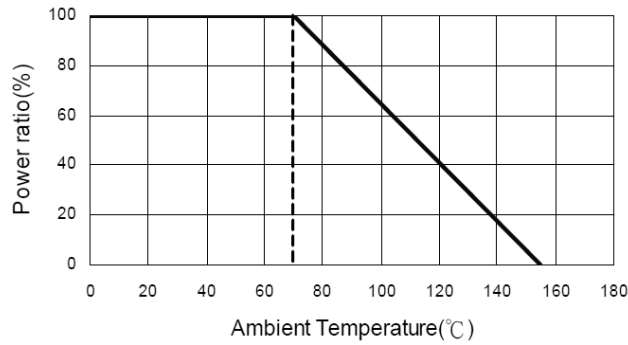
2. Operating Voltage = $\sqrt{(P \cdot R)}$, Overload Voltage = $2.5 \cdot \sqrt{(P \cdot R)}$, Operating Current = $\sqrt{(P/R)}$

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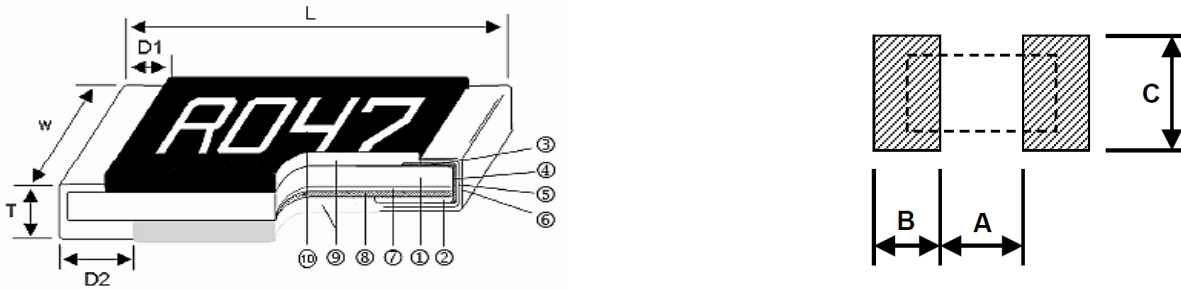
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POWER DERATING CURVE



DIMENSIONS



Size	Resistance (mΩ)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	A (mm)	B (mm)	C (mm)
0603	10 ~ 29	1.55±0.10	0.85±0.10	0.40±0.10	0.30±0.15	0.45±0.15	0.40	1.20	0.90
	30 ~ 100	1.55±0.10	0.85±0.10	0.40±0.10	0.30±0.15	0.35±0.15	0.70	1.05	0.90
0805	10 ~ 29	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.50±0.20	0.80	1.10	1.35
	30 ~ 100	2.00±0.15	1.25±0.15	0.52±0.10	0.30±0.20	0.35±0.20	1.00	1.00	1.35
1206	10 ~ 29	3.05±0.15	1.55±0.15	0.58±0.15	0.50±0.25	0.90±0.25	0.90	1.70	1.70
	30 ~ 100	3.05±0.15	1.55±0.15	0.55±0.15	0.50±0.25	0.60±0.25	1.50	1.40	1.70
2010	10 ~ 29	5.00±0.20	2.50±0.20	0.58±0.15	0.60±0.30	1.50±0.30	1.70	2.35	2.50
	30 ~ 100	5.00±0.20	2.50±0.20	0.55±0.15	0.60±0.30	0.90±0.30	2.80	1.80	2.50
2512	10 ~ 29	6.30±0.20	3.15±0.20	0.58±0.15	0.60±0.30	1.80±0.30	2.30	2.90	3.10
	30 ~ 100	6.30±0.20	3.15±0.20	0.55±0.15	0.60±0.30	1.20±0.30	3.60	2.25	3.10

CONSTRUCTION

Item	Construction	Item	Construction	Item	Construction
1	Alumina Substrate	5	Barrier Layer	9	Primary Overcoat
2	Bottom Electrode	6	External Electrode	10	Marking
3	Top Electrode	7	Adhesive	-	-
4	Edge Electrode	8	Resistor Layer	-	-

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RELIABILITY TEST CONDITION AND REQUIREMENT

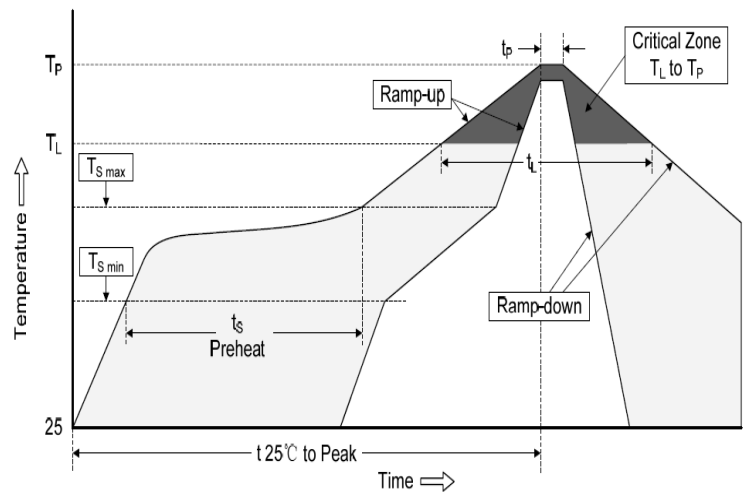
Test	Standard	Condition	Requirement
Temperature Coefficient of Resistance (T.C.R.)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	-55°C ~ +125°C, 25°C is the reference temperature	As Specified
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	5X rated power for 5 seconds	$ \Delta R/R \leq 0.5\%+0.05\Omega$
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply Max Overload Voltage for 1 minute	I.R. $\geq 10G\Omega$
Endurance	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 hrs "OFF".	$ \Delta R/R \leq 1\%+0.05\Omega$
Damp Heat with Load	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 hrs "OFF".	$ \Delta R/R \leq 1\%+0.05\Omega$
Dry Heat	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2	at +155°C for 1000 hrs	$ \Delta R/R \leq 0.5\%+0.05\Omega$
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds with 3 mm, 2010,2512 sizes: 2mm	$ \Delta R/R \leq 1.0\%+0.05\Omega$
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245±5°C for 3 seconds	95% min. coverage
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5°C for 10 seconds	$ \Delta R/R \leq 0.5\%+0.05\Omega$
Voltage Proof	JIS-C-5201-1 4.7 IEC-60115-1 4.7	1.42 times Max Operating Voltage for 1 minute	No breakdown or flashover
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5°C for 30 seconds	Individual leaching area $\leq 5\%$ Total leaching area $\leq 10\%$
Thermal Shock	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55°C ~ +155°C, 5 cycles	$ \Delta R/R \leq 0.5\%+0.05\Omega$

Notes:

- RCWV(Rated Continuous Working Voltage)= $\sqrt{(P \cdot R)}$ or Max operating voltage, whichever is lower
- Overload Voltage = $2.5 \cdot \sqrt{(P \cdot R)}$ or Max overload voltage, whichever is lower

RECOMMENDED SOLDERING PROFILES

Reflow Condition		
Pre Heat	Temp. Min $T_{s(min)}$	150°C
	Temp. Max $T_{s(max)}$	180°C
	Time (min. to max.) (t_s)	90-120 seconds
Average ramp up rate (T_L) to peak		3°C/second max.
$T_{s(max)}$ to T_L (Ramp-up rate)		3°C/second max.
Reflow	Temp. (T_L)	220°C
	Time (min. to max.) (t_L)	60 seconds max.
Peak Temperature (T_P)		260°C ~265°C
Time within 5°C of actual peak Temperature (t_p)		10 seconds max.
Ramp-down Rate		6°C/second



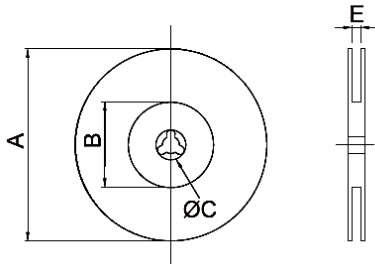
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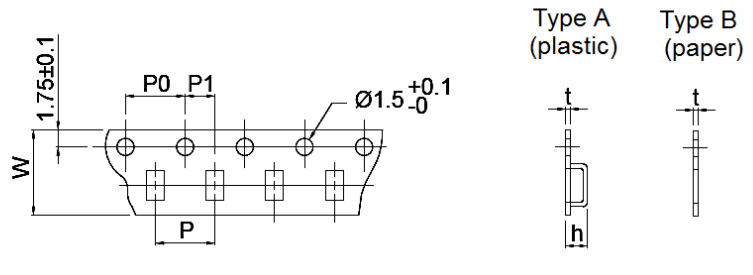
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PACKAGING DIMENSION

CARRIER TAPE REELS



TAPE DIMENSIONS (mm)



Series	Reel Dimension (mm)				Tape Dimensions (mm)						Parts Per Reel	
	A ±2.0	B ±1.0	C ±0.7	E ±1.0	W ±0.20	P ±0.10	P0 ±0.05	P1 ±0.05	H ±0.20	T ±0.10	Type	7"
CSM0603	178.0	60.0	13.5	9.5	8.00	4.00	4.00	2.00	-	0.70	B	5,000
CSM0805	178.0	60.0	13.5	9.5	8.00	4.00	4.00	2.00	-	0.85	B	5,000
CSM1206	178.0	60.0	13.5	9.5	8.00	4.00	4.00	2.00	-	0.85	B	5,000
CSM2010	178.0	60.0	13.5	13.5	8.00	4.00	4.00	2.00	1.00	-	A	4,000
CSM2512	178.0	60.0	13.5	13.5	8.00	4.00	4.00	2.00	1.00	-	A	4,000

*Specifications subject to change without notice.