

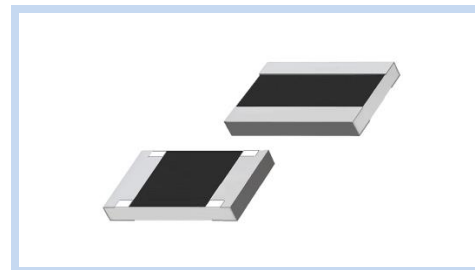
Current Sensing Resistor Metal Film Low-Ohmic Type

CSL Series

MERITEK

FEATURES

- High Precision Current Sensing
- High Power Capability
- Applications: Consumer electronics, Computer, Communication devices, Measuring instrument, Industrial/ Power Supply, Battery Management System



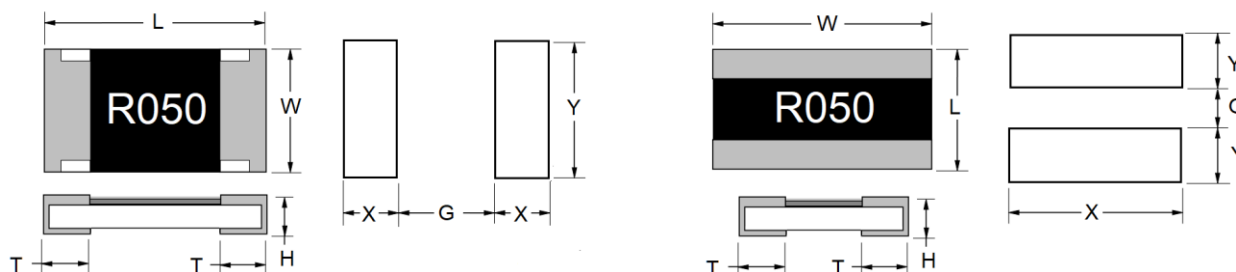
PART NUMBERING SYSTEM



CSL (1) 0402 (2) D (3) V (4) R100 (5) F (6)

No	Item	Code	Description	
(1)	Meritek Series	CSL	Current Sensing Resistor, Metal Film Low Ohmic Type	
(2)	Size Code	0402	0402: 1.0 x 0.5 mm	0201, 0603, 0805, 1206, 1210, 2010, 2512
(3)	TCR	D	D: $\pm 50\text{PPM}/^{\circ}\text{C}$	E: $\pm 100\text{PPM}/^{\circ}\text{C}$, F: $\pm 200\text{PPM}/^{\circ}\text{C}$, K: $\pm 150\text{PPM}/^{\circ}\text{C}$
(4)	Power Rating	V	V: 1/4W	W: 1/8W, O: 1/3W, U: 1/2W, T: 1.0W, S: 2.0W
(5)	Resistance	R100	R100: 0.100 Ω	R056: 0.056 Ω , 1R00: 1.00 Ω , 10R0: 10 Ω
(6)	Tolerance	F	F: $\pm 1\%$	D: $\pm 0.5\%$, G: $\pm 2\%$, J: $\pm 5\%$

DIMENSIONS



Unit: mm

Size	L	W	H	I1	I2	X	Y	G
0201	0.60 \pm 0.03	0.30 \pm 0.03	0.26 \pm 0.05	0.15 \pm 0.05	0.15 \pm 0.05	0.85	0.35	0.25
0402	1.00 \pm 0.10	0.50 \pm 0.05	0.35 \pm 0.05	0.20 \pm 0.10	0.25 \pm 0.10	1.60	0.70	0.50
0603	1.60 \pm 0.10	0.80 \pm 0.10	0.45 \pm 0.10	0.25 \pm 0.15	0.30 \pm 0.15	2.40	1.00	0.80
0805	2.00 \pm 0.10	1.25 \pm 0.10	0.55 \pm 0.10	0.35 \pm 0.20	0.40 \pm 0.20	2.90	1.45	1.30
1206	3.10 \pm 0.10	1.60 \pm 0.10	0.55 \pm 0.10	0.40 \pm 0.20	0.45 \pm 0.20	4.20	1.80	2.20
1206*	3.30 \pm 0.15	1.70 \pm 0.20	0.65 \pm 0.20	0.20 \pm 0.15	0.68 \pm 0.20	4.80	1.84	1.20
1210	3.10 \pm 0.10	2.50 \pm 0.15	0.55 \pm 0.10	0.50 \pm 0.20	0.50 \pm 0.20	4.40	2.70	2.00
2010	5.00 \pm 0.20	2.50 \pm 0.15	0.55 \pm 0.10	0.60 \pm 0.25	0.60 \pm 0.25	6.60	2.70	3.80
2512	6.30 \pm 0.15	3.20 \pm 0.20	0.55 \pm 0.10	0.60 \pm 0.25	0.60 \pm 0.25	8.10	3.40	4.90
2512 (3W)	6.30 \pm 0.15	3.20 \pm 0.15	0.70 \pm 0.15	0.65 \pm 0.25	0.65 \pm 0.25	8.10	3.40	4.90
0612	1.60 \pm 0.15	3.20 \pm 0.20	0.55 \pm 0.15	0.30 \pm 0.20	0.50 \pm 0.20	2.60	3.20	0.50
1020	2.50 \pm 0.15	5.00 \pm 0.15	0.55 \pm 0.15	0.40 \pm 0.20	0.50 \pm 0.20	4.05	5.50	1.00
1225	3.20 \pm 0.20	6.30 \pm 0.20	0.55 \pm 0.15	0.60 \pm 0.25	0.80 \pm 0.25	5.20	7.00	1.20

Note: *(10m Ω \leq R < 39m Ω)

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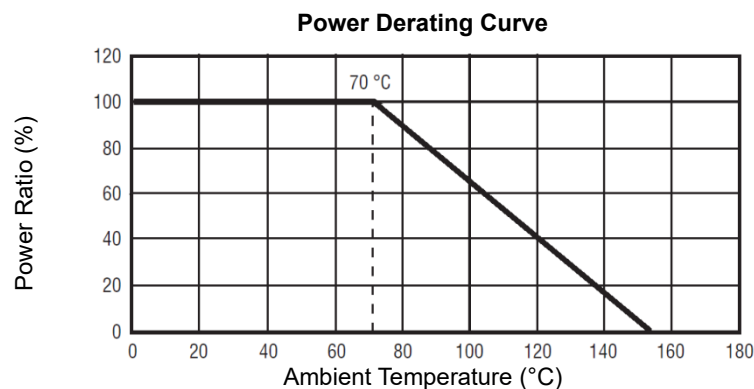
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ELECTRICAL CHARACTERISTICS

Size	Rated Power at 70°C	Max. Rated Current	Max. Overload Current	Resistance Range		
	(W)	(A)	(A)	(PPM/°C)	(Ω)	(±%)
0201	1/20	1.00	2.50	±100 ±50	50m ≤ R < 100m 100m ≤ R ≤ 10	±0.5%, ±1.0%, ±2.0%, ±5.0%
	1/10	1.41	3.16			
	1/5	2.00	4.47			
0402	1/16	1.12	2.80	±100 ±50	50m ≤ R < 100m 100m ≤ R ≤ 10	±0.5%, ±1.0%, ±2.0%, ±5.0%
	1/8	1.58	3.54			
	1/4	2.24	5.00			
0603	1/10	1.41	3.54	±100 ±50	50m ≤ R < 100m 100m ≤ R ≤ 10	±0.5%, ±1.0%, ±2.0%, ±5.0%
	1/5	2.00	4.47			
	2/5	2.83	6.32			
0805	1/8	1.79	4.48	±150 ±100 ±50	39m ≤ R < 50m 50m ≤ R < 100m 100m ≤ R ≤ 10	±0.5%, ±1.0%, ±2.0%, ±5.0%
	1/4	2.53	5.66			
	1/2	3.58	8.00			
1206	1/4	2.53	6.33	±150 ±100 ±50	39m ≤ R < 50m 50m ≤ R < 100m 100m ≤ R ≤ 10	±0.5%, ±1.0%, ±2.0%, ±5.0%
	1/2	3.58	8.00			
	1.0	5.06	11.32			
1210	1/2	3.58	8.95	±50	470m ≤ R ≤ 10	±0.25%
	1.0	5.06	11.32			
2010	3/4	2.74	6.85	±50	100m ≤ R ≤ 10	±0.5%, ±1.0%, ±2.0%, ±5.0%
	1.5	3.87	8.66			
2512	1.0	3.16	7.91	±50	470m ≤ R ≤ 10	±0.25%
	2.0	4.47	10.00			
	3.0	5.48	12.25			
1206	1/4	5.00	12.50	±200	10m ≤ R < 39m	±1.0%, ±2.0%, ±5.0%
	1/2	7.07	15.81			
0612	1.0	10.00	22.36	±150	10m ≤ R < 20m	±1.0%, ±2.0%, ±5.0%
1020	2.0	14.14	31.62	±100	20m ≤ R ≤ 500m	±5.0%
1225	3.0	17.32	38.73	±100	100m ≤ R ≤ 500m	±0.5%

Note: Operating temperature: -55°C ~ +155°C

POWER DERATING CURVE



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RELIABILITY TEST CONDITION AND REQUIREMENT

Item	Test Method	Condition	Requirement								
Temperature Coefficient (TCR)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	-55°C~+155°C, 25°C is the reference temperature	Refer to Electrical Specifications								
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	Standard power: 6.25*RCWV whichever is lower for 5s	±(1.0%+0.001Ω)								
Insulation Resistance	JIS-C-5201-1 4.8 IEC-60115-1 4.8	Apply 100VDC for 1 minute	≥10GΩ								
Dielectric Withstanding Voltage	JIS-C5201-1 4.7	0805, 1206, 1210, 2010, 2512 applied 500VAC for 1 minute. 0201, 0402, 0603 applied 300VAC for 1 minute.	No short or burned on the appearance								
Core Body Strength	JIS-C5201-1 4.15	Central part pressurizing force : 10N, 10 seconds	No broken								
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245±5°C for 3±0.5 seconds	>95% coverage No visual damage								
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5°C for 10 seconds	±(1.0%+0.001Ω) No visual damage								
Leaching	JIS-C-5201-1 4.18 IEC-600068-2-58 8.2.1	260±5°C For 30 seconds	>95% coverage No visual damage								
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55°C ~ +155, 300 cycles	±(1.0%+0.001Ω) No visual damage								
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40±2°C, 90~95% R.H., RCWV or Max. working current whichever is less for 1000hrs with 1.5hrs "ON" and 0.5hr "OFF"	±(1.0%+0.001Ω)								
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	±(0.5%+0.05Ω)								
Endurance	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2°C, RCWV or Max. working current whichever is less for 1000hrs with 1.5hrs "ON" and 0.5hr "OFF"	±(1.0%+0.001Ω)								
High Temperature Exposure	JIS-C5201-1 4.25 IEC-60068-2-2	155±°C for 1,000 hours +48/-0 hours.	±(1.0%+0.001Ω)								
Resistance to Solvent	JIS-C-5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 60 seconds. Then the resistor is left in the room for 48 hours.	±(1.0%+0.001Ω) No visual damage								
Terminal Strength	JIS-C5201-1 4.32 AEC Q200-006	Pressurizing force for 10 seconds 0201, 0402, 0603 : 8N; 0805 and above : 17.7N	No broken								
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	<table border="1"> <thead> <tr> <th>Deflection/5sec</th> <th>Size</th> </tr> </thead> <tbody> <tr> <td>5mm</td> <td>0201, 0402, 0603, 0805</td> </tr> <tr> <td>3mm</td> <td>1206, 1210</td> </tr> <tr> <td>2mm</td> <td>2010, 2512</td> </tr> </tbody> </table>	Deflection/5sec	Size	5mm	0201, 0402, 0603, 0805	3mm	1206, 1210	2mm	2010, 2512	±(1.0%+0.001Ω) No visual damage
Deflection/5sec	Size										
5mm	0201, 0402, 0603, 0805										
3mm	1206, 1210										
2mm	2010, 2512										

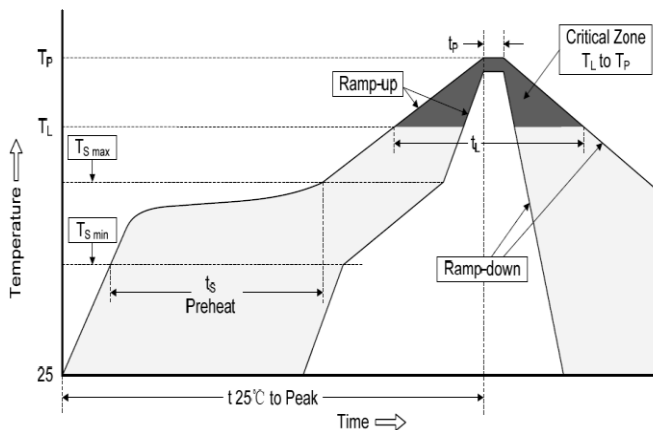
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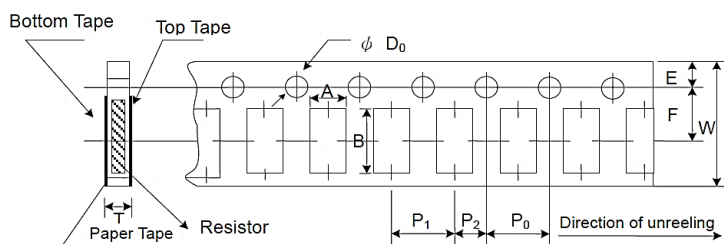
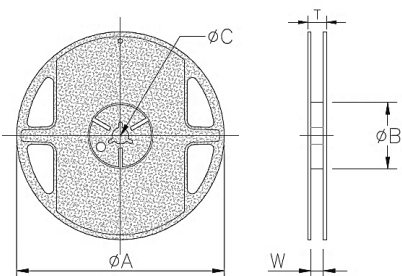
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SOLDERING RECOMMENDATION

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



PACKAGING SPECIFICATIONS



Size	Reel Dimension (mm)							
	Quantity	Tape Width	Diameter	ϕA	ϕB	ϕC	W	T
0201	Paper 10K	8mm	7"	178.0±2.0	60±1.0	13.0±1.0	9.0±0.1	11.5±2.0
0402	Paper 10K	8mm	7"	178.0±2.0	60±1.0	13.0±1.0	9.0±0.1	11.5±2.0
0603	Paper 5K	8mm	7"	178.0±2.0	60±1.0	13.0±1.0	9.0±0.1	11.5±2.0
0805	Paper 5K	8mm	7"	178.0±2.0	60±1.0	13.0±1.0	9.0±0.1	11.5±2.0
1206, 0612	Paper 5K	8mm	7"	178.0±2.0	60±1.0	13.0±1.0	9.0±0.1	11.5±2.0
1210	Paper 5K	8mm	7"	178.0±2.0	60±1.0	13.0±1.0	9.0±0.1	11.5±2.0

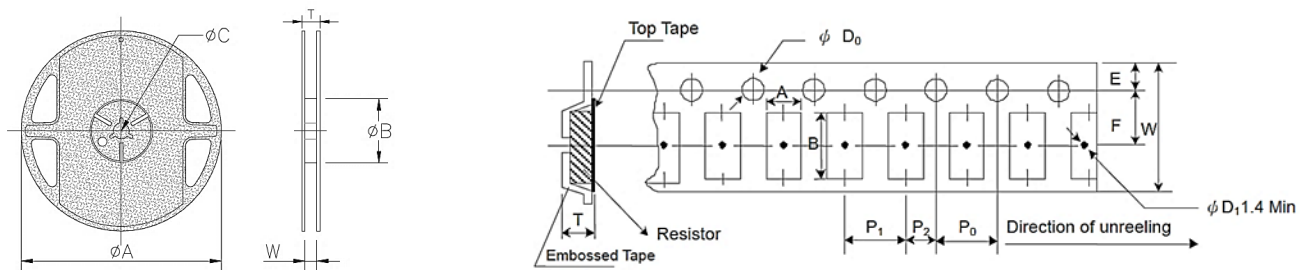
Size	Paper Tape Dimension (mm)									
	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	T
0201	0.45±0.1	0.75±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.10	2.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.35±0.1
0402	0.70±0.1	1.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.10	2.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.45±0.1
0603	1.05±0.2	1.80±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.60±0.1
0805	1.55±0.2	2.30±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.75±0.1
1206	1.90±0.2	3.50±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.75±0.1
1210	2.85±0.2	3.50±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.75±0.1
0612	2.85±0.2	3.50±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.75±0.1

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PACKAGING SPECIFICATIONS



Size	Reel Dimension (mm)							
	Quantity	Tape Width	Diameter	ϕA	ϕB	ϕC	W	T
2010, 1020	Plastic 4K	12mm	7"	178.0±2.0	60±1.0	13.0±1.0	13.0±0.1	16.0±2.0
2512, 1225	Plastic 4K	12mm	7"	178.0±2.0	60±1.0	13.0±1.0	13.0±0.1	16.0±2.0

Size	Plastic Tape Dimension (mm)									
	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD_0	T
2010, 1020	2.8±0.2	5.6±0.2	12.0±0.1	1.75±0.1	5.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.85±0.15
2512, 1225	3.40±0.2	6.75±0.2	12.0±0.1	1.75±0.1	5.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.50 ^{+0.1/-0}	0.85±0.15

*Specifications subject to change without notice.