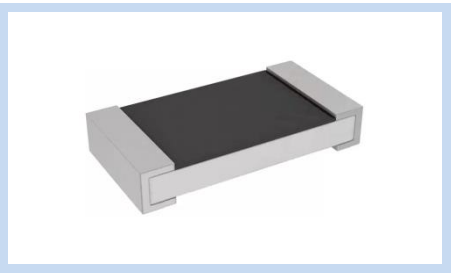
Metal Alloy Low-Ohmic Resistor
Current Sensing Type

MLR Series

MERITEK

FEATURE



- Wide operating temperature range: -55°C ~ 170°C
- Extremely low resistance down to 0.2mΩ
- Low TCR down to ±25ppm/°C
- Low thermal EMF (>1uV/°C)
- Excellent frequency response
- Material: copper-manganese alloy and iron-chromium aluminum alloy

PART NUMBERING SYSTEM

RoHS

MLR	1206	3	R001	J
(1)	(2)	(3)	(4)	(5)

No	Item	Code	Description	Series References
(1)	**Meritek Series**	**MLR**	Metal Alloy Resistor series	Low-Ohmic Current Sensing Type
(2)	**Size**	**1206**	EIA size 3.2x1.6mm	1206, 2010, 2512, 2725, 2728, 4527S
(3)	**Power Rating**	**3**	3: 3.0W	C:0.5W, 1: 1W, A: 1.5W, B: 3.5W
(4)	**Resistance**	**R001**	R001: 1mΩ	m20: 0.20 mΩ ~ R200: 200mΩ,
(5)	**Tolerance**	**J**	J: ±5%	D: ±0.5%, F: ±1%, G:±2%,

ELECTRICAL CHARACTERISTICS

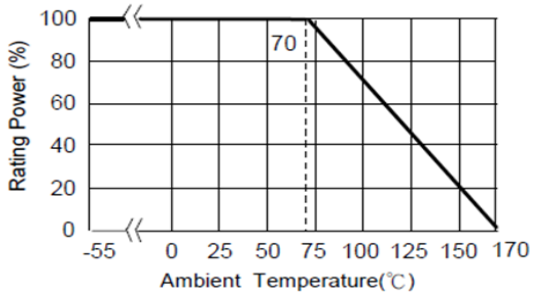
series	Power Rating at 70°C	Max. Rated Current	Max. Overload Current	Resistance (mΩ)		TCR (PPM/°C)
				±0.5%	±1%, ±2%, ±5%	
MLR1206	1/2W	40.82A	91.29A	7.0~50.0	0.3~50.0	0.3mΩ: ±450 0.5~0.9mΩ: ±175 1.0~15.0mΩ: ±75 15.1~50.0mΩ: ±50
	1W	57.74A	129.10A	7.0~50.0	0.3~50.0	
	1.5W	70.71A	158.11A	-	0.3~1.0	
MLR2010	1W	44.72A	100.00A	7.0~49	0.5~100	0.5~0.9mΩ: ±100 1.0~1.9mΩ: ± 75 2.0~6.9mΩ: ± 50 7.0~100mΩ: ± 25
	1.5W	54.77A	122.47A	7.0~40	0.5~40	
	2W	63.25A	141.42A	7.0~12	0.5~12	
MLR2512	1W	57.74A	129.10A	7.0~50	0.3~100	0.3mΩ: ±150 0.5~1.0mΩ: ± 75 1.1~3.0mΩ: ± 50 3.1~100mΩ: ± 25
	1.5W	70.71A	158.11A	7.0~50	0.3~100	
	2W	81.65A	182.57A	7.0~50	0.3~75.0	
	3W	100.00A	223.61A	7.0~10.0	0.3~10.0	0.3mΩ: ±150 0.5~1.0mΩ: ± 75 1.1~2.5mΩ: ± 50 2.6~10.0mΩ: ± 25
MLR2725	4W	126.49A	316.23A	-	0.20~3.0	0.20mΩ: ±100 0.25~3.0mΩ: ± 50
	5W	158.11A	353.55A	-	0.20~0.5	
MLR2728	3W	27.39A	61.24A	4.0~19.0	4.0~100	4.0~100mΩ: ± 25
	3.5W	29.58A	66.14A	4.0~19.0	4.0~100	
	4W	31.62A	70.71A	4.0~19.0	4.0~50.0	
MLR4527S (without heat sink)	2W	63.25A	141.42A	7.0~100	0.5~200	0.5~1.0mΩ: ± 75 1.1~200mΩ: ± 50
	3W	77.5A	173.21A	7.0 ~27	0.5~27	
	5W	100A	223.61A	7.0~7.5	0.5~7.5	
MLR4527	5W	100A	173A	7.0 ~120	0.5~200	

Metal Alloy Low-Ohmic Resistor
Current Sensing Type

MLR Series

MERITEK

POWER DERATING CURVE



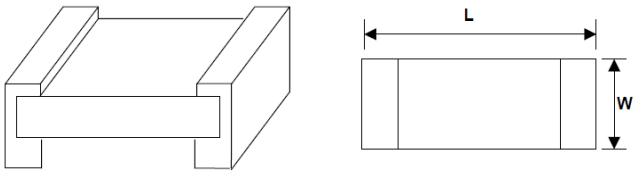
Notes: The following equation may be used to determine the DC or AC currents (RMS) of normal rated power. However, if the result value exceeds the highest current of regulated standards, the highest normal rated power is to be used.

$$I = \sqrt{\frac{P}{R}}$$

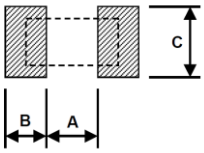
I: Rating Current (A)
P: Rating Power (W)
R: Resistance (Ω)

DIMENSIONS

1206 / 2010 / 2512 / 2725 / 2728



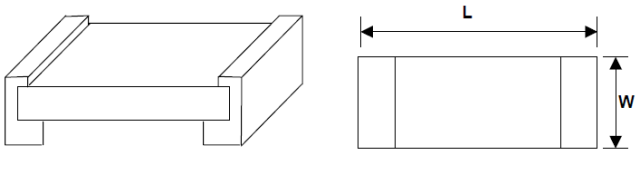
Land Pattern



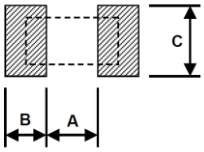
Size	Resistance (mΩ)	L ±0.254	W ±0.254	H ±0.254	T1 ±0.254	A	B	C
1206	0.3	3.200	1.600	1.000	0.550	0.90	1.65	2.18
	0.5 ~ 0.6	3.200	1.600	1.000	0.725	0.90	1.65	2.18
	1.0	3.200	1.600	0.645	0.508	1.00	1.60	2.18
	2.0 ~ 4.0	3.200	1.600	0.545	0.508	1.00	1.60	2.18
	5.0	3.200	1.600	0.545	0.600	1.00	1.60	2.18
	6.0 ~ 50.0	3.200	1.600	0.545	0.508	1.00	1.60	2.18
2010	0.5 ~ 0.9	5.080	2.540	0.787	1.440	1.22	2.89	2.92
	1.0 ~ 3.0	5.080	2.540	0.787	1.295	1.22	2.89	2.92
	3.1 ~ 4.0	5.080	2.540	0.645	0.787	2.41	2.29	2.92
	4.1 ~ 100.0	5.080	2.540	0.645	0.787	2.41	2.29	2.92
2512 (1W~ 2W)	0.3	6.248	3.302	1.000	2.020	1.27	3.05	3.68
	0.5 ~ 3.0	6.248	3.302	0.787	1.880	1.27	3.05	3.68
	3.1 ~ 4.0	6.248	3.302	0.787	1.880	1.27	3.05	3.68
	4.1 ~ 75.0	6.248	3.302	0.645	1.118	3.18	2.11	3.68
	75.1 ~ 100.0	6.248	3.302	0.645	0.868	3.18	2.11	3.68
2512 (3W)	0.3	6.248	3.302	1.000	2.020	1.27	3.05	3.68
	0.5	6.248	3.302	0.787	1.880	1.27	3.05	3.68
	0.6~0.7	6.248	3.302	0.787	1.118	3.00	2.19	3.68
	0.75	6.248	3.302	0.787	1.374	3.00	2.19	3.68
	0.8~2.9	6.248	3.302	0.787	1.118	3.00	2.19	3.68
	3.0	6.248	3.302	0.787	1.874	1.80	2.79	3.68
	3.1 ~ 4.0	6.248	3.302	0.787	1.676	1.80	2.79	3.68
	4.1 ~ 10.0	6.248	3.302	0.645	1.118	3.00	2.19	3.68
2725	0.20 ~ 0.50	6.807	6.452	0.991	2.159	1.32	3.18	6.86
	0.60	6.807	6.452	0.991	1.803	1.32	3.18	6.86
	1.0	6.807	6.452	1.092	2.159	1.32	3.18	6.86
	1.5	6.807	6.452	0.991	2.159	1.32	3.18	6.86
	2.0	6.807	6.452	0.889	1.803	1.32	3.18	6.86
	2.25 ~ 2.5	6.807	6.452	0.889	1.651	1.32	3.18	6.86
	3.0	6.807	6.452	0.889	1.295	1.32	3.18	6.86
2728	40.0 ~ 100.0	6.706	7.188	0.991	1.143	3.51	2.75	7.82

DIMENSIONS (CONTINUED)

4527/4527S



Land Pattern



Size	Resistance (mΩ)	L ±0.254	W ±0.254	H ±0.254	T1 ±0.254	T2 ±0.254	A	B	C
4527S (without heat sink)	0.5	11.430	6.850	1.400	3.465	0.965	5.51	4.80	8.74
	0.6 ~ 3.0	11.430	6.850	1.400	3.215	0.965	5.51	4.80	8.74
	4.0 ~ 5.0	11.430	6.850	1.400	3.215	0.965	5.51	4.80	8.74
	5.1 ~ 200	11.430	6.850	1.400	1.815	0.965	8.31	3.40	8.74
4527	0.5	11.430	6.850	1.500	3.215	0.965	5.51	4.80	8.74
	0.6 ~ 3.0	11.430	6.850	1.500	3.215	0.965	5.51	4.80	8.74
	4.0 ~ 5.0	11.430	6.850	1.500	3.215	0.965	5.51	4.80	8.74
	5.1 ~ 200	11.430	6.850	1.500	1.815	0.965	8.31	3.40	8.74

RELIABILITY TEST CONDITION AND REQUIREMENT

Test	Standard	Condition	Requirement
Insulation Resistance	JIS-C-5201-1 4.6	Apply 100VDC for 1 minute	I.R. ≥ 10GΩ
Dielectric Withstanding	JIS-C-5201-1 4.7	Apply 500VDC for 1 minute	No breakdown or flashover
Temperature Coefficient of Resistance (T.C.R.)	JIS-C-5201-1 4.8	-55°C ~ +150°C, 25°C is the reference temperature	As Specified
Short Time Overload	JIS-C-5201-1 4.13	5X rated power for 5 seconds	|ΔR/R| ≤ 0.5% |ΔR/R| ≤ 2.0% (4527 & 4527S)
Core Body Strength	JIS-C5201-1 4.15	Apply 5N for 10 seconds	|ΔR/R| ≤ 0.5% No visible damage
Vibration	JIS-C5201-1 4.22	Apply 10Hz ~ 55Hz ~ 10Hz Amplitude: 1.5mm, for 4 hours in each x/y/z direction	|ΔR/R| ≤ 0.5% No visible damage
Bending Strength	JIS-C-5201-1 4.33	Bending 2 mm once, for 5 seconds	|ΔR/R| ≤ 0.5% No visible damage or peeling off
Solderability	JIS-C-5201-1 4.17	245±5°C for 3 seconds	95% min. coverage
Resistance to Soldering Heat	JIS-C-5201-1 4.18	260±5°C for 10 seconds	|ΔR/R| ≤ 0.5%
Resistance to solvent	JIS-C5201-1 4.29	Immersed into isopropyl alcohol for 60s	|ΔR/R| ≤ 0.5% No visible damage
Low Temperature Exposure (Storage)	JIS-C5201-1 4.23.4	-55±2°C for 1,000 hours	|ΔR/R| ≤ 0.5% No visible damage
High Temperature Exposure (Storage)	JIS-C5201-1 4.23.2	170±5°C for 1,000 hours	|ΔR/R| ≤ 0.5% No visible damage
Temperature Cycling	JIS-C5201-1 4.19	-55 +0/-10^{0}C ~ +150+10/-0^{0}C as one cycle for 1000 times	|ΔR/R| ≤ 0.5% No visible damage
Bias Humidity	JIS-C-5201-1 4.24	85±5°C, 85±5% R.H. with 10% bias. Apply rated current with 1.5 hrs “ON” and 0.5 hrs “OFF”, for 1000 hrs	|ΔR/R| ≤ 0.5% No visible damage
Load Life	JIS-C-5201-1 4.25	70±2°C, Apply rated current with 1.5 hrs “ON” and 0.5 hrs “OFF”, for 1000 hrs	|ΔR/R| ≤ 0.5% |ΔR/R| ≤ 2.0% (4527 & 4527S) No visible damage

Metal Alloy Low-Ohmic Resistor
Current Sensing Type

MLR Series

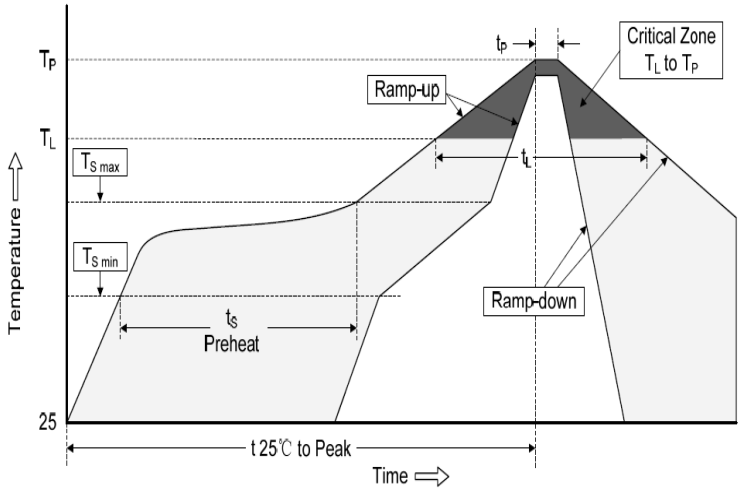
MERITEK

MATERIAL OF ALLOY

Series	Copper-Manganese Alloy	Iron-Chromium Aluminum Alloy
MLR1206	R≤4.0mΩ: Copper-Manganese Alloy	R>4.0mΩ: Iron-Chromium Aluminum Alloy
MLR2010	R≤4.0mΩ: Copper-Manganese Alloy	R>4.0mΩ: Iron-Chromium Aluminum Alloy
MLR2512	R≤3.5mΩ: Copper-Manganese Alloy	R>3.5mΩ: Iron-Chromium Aluminum Alloy
MLR2512(3W)	R≤2.5mΩ: Copper-Manganese Alloy	R>2.5mΩ: Iron-Chromium Aluminum Alloy
MLR2725	R≤0.5mΩ: Copper-Manganese Alloy	R>0.5mΩ: Iron-Chromium Aluminum Alloy
MLR2728	-	All : Iron-Chromium Aluminum Alloy
MLR4527(S)	R≤3.0mΩ: Copper-Manganese Alloy	R>3.0mΩ: Iron-Chromium Aluminum Alloy

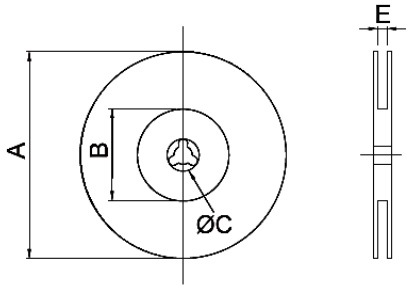
RECOMMENDED SOLDERING PROFILES

Reflow Condition		
Pre Heat	**Temp. Min $T_{s(min)}$**	150°C
	Temp. Max $T_{s(max)}$	180°C
	Time (min. to max.) (t_s)	60~120 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)		255°C ~265°C
Time within 5°C of actual peak Temperature (t_p)		10 seconds max.
Ramp-down Rate		6°C/second

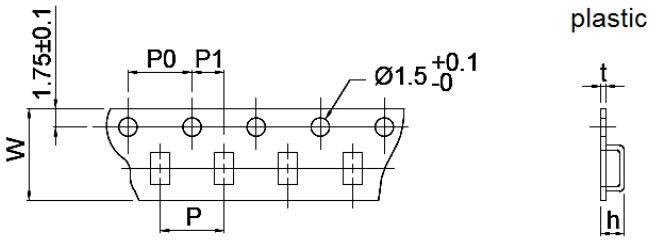


PACKAGING DIMENSION

CARRIER TAPE REELS



TAPE DIMENSIONS (mm)



Series	Reel Dimension (mm)				Tape Dimensions (mm)						Parts Per Reel
	A ±2.0	B ±1.0	C ±0.5	E ±1.0	W ±0.20	P ±0.10	P0 ±0.05	P1 ±0.05	h ±0.10	t ±0.10	Plastic 7”
MLR1206 (0.3~0.6mΩ)	178.0	60.0	13.5	9.0	8.00	4.00	4.00	2.00	1.27	0.23	2,000
MLR1206 (≥1.0mΩ)	178.0	60.0	13.5	9.0	8.00	4.00	4.00	2.00	1.10	0.20	4,000
MLR2010	178.0	80.0	13.5	13.8	12.00	4.00	4.00	2.00	1.33	0.23	2,000/4,000
MLR2512 (0.3mΩ)	178.0	80.0	13.5	13.8	12.00	8.00	4.00	2.00	1.60	0.24	1,000
MLR2512	178.0	80.0	13.5	13.8	12.00	4.00	4.00	2.00	1.30	0.20	4,000
MLR2725	178.0	80.0	13.5	13.8	12.00	8.00	4.00	2.00	1.95	0.25	1,000
MLR2728	178.0	80.0	13.5	13.8	12.00	12.00	4.00	2.00	1.45	0.25	1,000
MLR4527 MLR4527S	178.0	60.0	13.2	25.0	24.00	12.00	4.00	2.00	2.00	0.30	500

*Specifications subject to change without notice.