

Metal Alloy Chip Resistor SMT Shunt 4 Terminal Type

MLSF Series

MERITEK

FEATURE

- Operation Temperature: -65°C to +170°C
- High Precision Current Sensing and Voltage Division
- Low-Resistance and TCR
- Excellent Anti-Surge Capability
- Applications: Power Modules, High Current Power Supply, Measuring Instrument, Battery Management System, Automotive
- AEC-Q200 Qualified



PART NUMBERING SYSTEM

MLSF 1216 R R001 F
(1) (2) (3) (4) (5)



No	Item	Code	Description	
(1)	Meritek Series	MLSF	Metal Alloy Chip Resistor, SMT Shunt 4 Terminal Type	
(2)	Size Code	1216	1216: 3.0x3.81mm	2726: 6.9x6.6mm, 4026: 10.1x6.6mm
(3)	Rated Power	R	R: 3W	H: 4W, D: 5W, I: 6W, E: 7W
(4)	Resistance	R001	R001: 1.0mΩ	0M50:0.5mΩ, R002: 2.0mΩ
(5)	Tolerance	F	F:±1%	G: ±2%, J: ±5%

ELECTRICAL CHARACTERISTICS

Size	Power Rating at 70°C	T.C.R.	Max Rating Current	Max Overload Current	Resistance 1%(F), 2%(G), 5%(J)	Material
	(W)	(ppm/°C)	(A)	(A)	(mΩ)	
1216	5.0	≤±50	100.00	223.60	0.5	MnCuSn
	3.0	≤±50	54.77	122.47	1.0	MnCu
2726	7.0	≤±50	118.31	264.58	0.5	MnCuSn
	6.0	≤±50	77.46	173.21	1.0	MnCu
	6.0	≤±50	54.77	122.47	2.0	FeCrAl
	4.0	≤±50	36.51	81.64	3.0	FeCrAl
	3.0	≤±50	27.39	61.24	4.0	FeCrAl
	3.0	≤±50	24.49	54.77	5.0	FeCrAl
4026	7.0	≤±50	187.08	418.33	0.2	MnCuSn
	7.0	≤±50	118.32	264.58	0.5	MnCuSn
	6.0	≤±50	77.46	173.21	1.0	MnCu
	4.0	≤±50	36.51	81.64	3.0	FeCrAl

Notes:

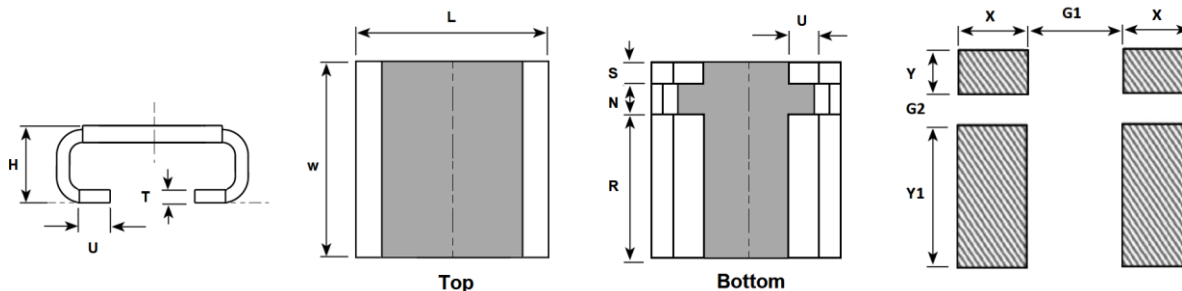
1. Power rating is guaranteed when terminal temperature of resistor is below 70°C
2. Operating Temperature Range: -65~+170°C, Storage Temperature: 25±°C, Humidity: 60±20%

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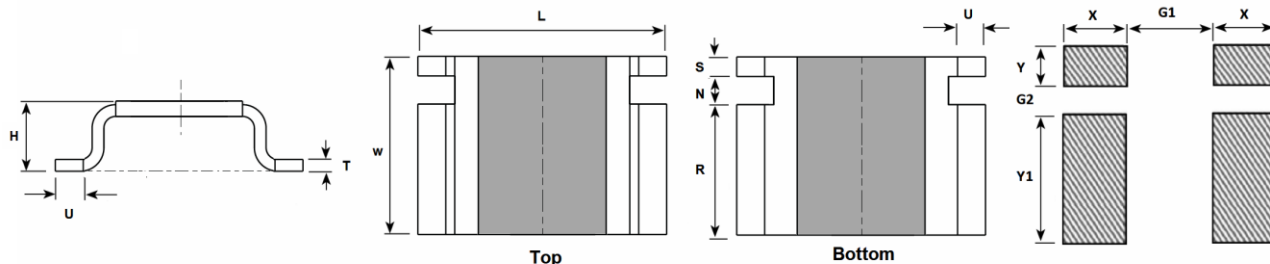
DIMENSIONS – Size 1216, 2726



Unit: mm

Size	Resistance (mR)	L ± 0.30	W ± 0.30	H Ref	T ± 0.20	U ± 0.30	S Ref	N Ref	R Ref	X	Y1	Y,G2	G1
1216	0.5	3.0	3.81	1.80	0.30	1.3	0.50	0.60	2.7	1.5	2.95	0.6	0.6
	1.0			1.80	0.30								
2726	0.5	6.9	6.60	2.85	0.45	1.9	0.70	1.0	5.0	2.9	5.6	1.0	2.0
	1.0			2.85	0.37								
	2.0			2.85	0.55								
	3.0			2.85	0.37								
	4.0			2.85	0.37								
	5.0			2.85	0.37								

DIMENSIONS – Size 4026



Unit: mm

Size	Resistance (mR)	L ± 0.30	W ± 0.30	H Ref	T ± 0.20	U ± 0.30	S Ref	N Ref	R Ref	X	Y1	Y,G2	G1
4026	0.2	10.1	6.60	2.85	0.40	1.9	0.70	1.0	5.0	2.44	5.6	0.9	5.8
	0.5			2.85	0.45								
	1.0			2.85	0.37								
	3.0			2.85	0.37								

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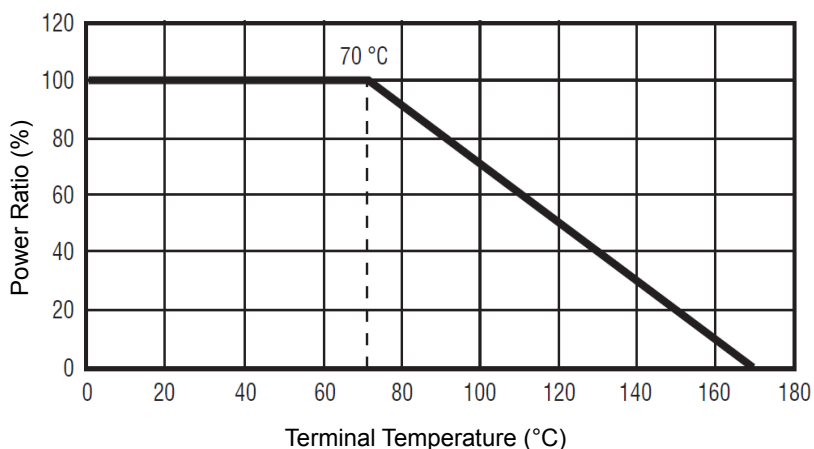
RELIABILITY TEST CONDITION AND REQUIREMENT

Item	Test Method	Condition	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25°C /+125°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	Apply 5 times of rated power for 5 seconds for following size: 1216, 2726, 4026	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	170°C / 1000 Hours. Unpowered. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Temperature Cycling	JESD22 Method JA-104	-55°C to +155°C / 1000 Cycles Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
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.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Operation Life	MIL-STD-202 Method 108	Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Moisture Resistance	MIL-STD-202, Method 106	Humidity of 90~98% Temperature of 25°C / 65°C ,10 cycles	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Mechanical Shock	MIL-STD-202 Method 213	Test ½ Sine Pulse, Peak value: 100g, normal duration: 6ms, Velocity change:12.3ft/sec.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10-2000Hz	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Board Flex	AEC Q200-005	Beading once for 60 seconds ,2mm	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Solderability	J-STD-002	(1) 4 hrs 155°C dry heat (2) 245±5°C 3 sec.	>95% coverage (electrode area)

Notes:

1. All reliability test should follow Derating curve, terminal temperature of component should be below 70°C.
2. Footprint size, solder insufficient, excessive solder, solder void and component shifted will affect the resistance accuracy after IR reflow.
3. Circuit calibration is a must to be done by functional test.

POWER DERATING CURVE



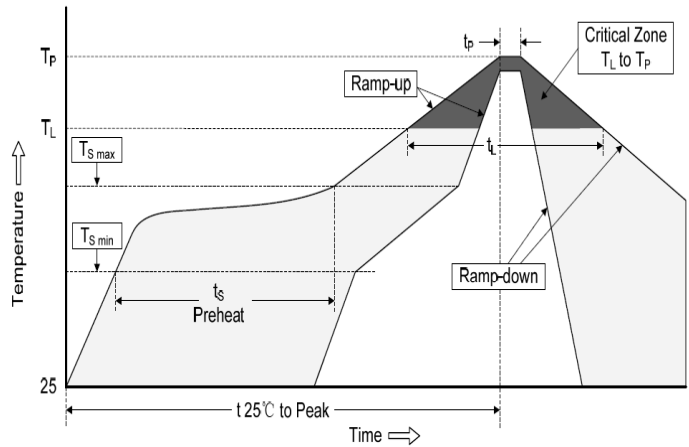
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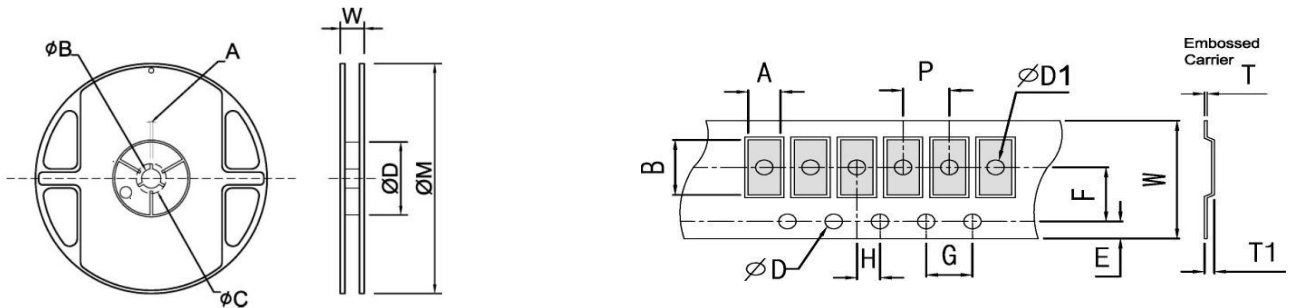
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SOLDERING RECOMMENDATION

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)		260°C
Time within 5°C of T_P (t_p)		10s
Ramp-down Rate		6°C/s



PACKAGING SPECIFICATIONS



Size	Reel Dimension (mm)								
	Quantity / Type		Reel Diameter	A ±0.5	φB ±0.5	φC ±0.5	φD ±0.5	W ±0.5	φM ±1.0
1216	3,000 / Reel	Plastic	13"	2.3	13.5	17.7	99.0	16.7	330
2726	1,400 / Reel	Plastic	13"	2.3	13.5	17.7	99.0	20.7	330
4026	1,400 / Reel	Plastic	13"	2.5	13.5	17.7	99.0	29.4	330

Size	Plastic Tape Dimension (mm)										
	Resistance (mΩ)	W ±0.30	P ±0.10	E ±0.10	F ±0.10	φD ±0.05	G ±0.10	H ±0.10	A ±0.10	B ±0.10	T1 ±0.10
1216	0.5~1	12.0	8.0	1.75	5.5	1.55	4.0	2.0	3.3	4.3	2.3
2726	0.5~5	16.0	12.0	1.75	7.5	1.55	4.0	2.0	7.0	7.0	3.1
4026	0.2~3	24.0	12.0	1.75	11.5	1.55	4.0	2.0	6.9	10.4	3.2

*Specifications subject to change without notice.