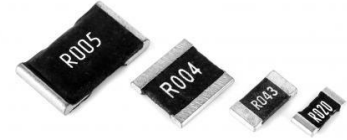


Metal Alloy Low-Resistance Resistor

- This specification is applicable to lead free, halogen free of RoHS directive for metal alloy low-resistance resistor. - The product is for general purpose.
- LR-A series : AEC-Q200 qualified available.
- Miniature size suitable for compact Print Circuit Boards of high-precision electronic products.
- Applications include : Power Supply, Battery Pack, Measurable Instrument, LED Driver and Others



GENERAL SPECIFICATIONS

Type	Rating Power	T.C.R (ppm/°C)		Resistance Range (mΩ)	
				D (±0.5%)	F (±1%) G (±2%) J (±5%)
1206	0.5W	0.5~0.6mΩ	≤+175	7~50	0.5~50
		1~1.5mΩ	≤+75		
		2~4mΩ	≤+75		
		5~15mΩ	≤+75		
		15.1~50mΩ	≤+50		
	1W	0.5~0.6mΩ	≤+175	5~50	0.5~50
		1~1.5mΩ	≤+75		
		2~4mΩ	≤+75		
		5~15mΩ	≤+75		
		15.1~50mΩ	≤+50		
1.5W	0.5~0.6mΩ	≤+175	-	0.5~1	
	1mΩ	≤+75			
2010	1W	0.5~0.9mΩ	≤+100	7~49	0.5~100
		1~1.9mΩ	≤+75		
		2~6.9mΩ	≤+50		
		7~100mΩ	≤+25		
	1.5W	0.5~0.9mΩ	≤+100	7~40	0.5~40
		1~1.9mΩ	≤+75		
		2~6.9mΩ	≤+50		
		7~40mΩ	≤+25		
	2W	0.5~0.9mΩ	≤+100	7~12	0.5~12
		1~1.9mΩ	≤+75		
		2~6.9mΩ	≤+50		
		7~12mΩ	≤+25		

- Rating Current $I_r = \sqrt{P \div R}$
- Overload Current $I_o = \sqrt{5 \times P \div R}$
- Operating Temperature Range : -55~+170°C

GENERAL SPECIFICATIONS

Type2W	Rating Power	T.C.R (ppm/°C)		Resistance Range (mΩ)	
				D (±0.5%)	F (±1%)
					G (±2%)
				J (±5%)	
2512	1W	0.3mΩ	≤+150	7~50	0.3~300
		0.5~0.7mΩ	≤+75		
		0.75mΩ	≤+75		
		0.8~1mΩ	≤+75		
		1.1~3mΩ	≤+50		
		3.1~100mΩ	≤+25		
		101~300mΩ	≤+50		
	1.5W	0.3mΩ	≤+150	7~50	0.3~220
		0.5~0.7mΩ	≤+75		
		0.75mΩ	≤+75		
		0.8~1mΩ	≤+75		
		1.1~3mΩ	≤+50		
		3.1~100mΩ	≤+25		
		101~220mΩ	≤+50		
	2W	0.3mΩ	≤+150	7~50	0.3~100
		0.5~0.7mΩ	≤+75		
		0.75mΩ	≤+75		
		0.8~1mΩ	≤+75		
		1.1~3mΩ	≤+50		
		3.1~100mΩ	≤+25		
	3W	0.3mΩ	≤+150	7~10	0.3~10
		0.5~0.7mΩ	≤+75		
		0.75mΩ	≤+75		
		0.8~1mΩ	≤+75		
1.1~2.5mΩ		≤+50			
2.6~10mΩ		≤+20			
2512H (with heat sink)	2W	80~200mΩ	≤+50	-	80~200
	3W	10~100mΩ	≤+50	10~50	10~100
2725	4W	0.2mΩ	≤+100	-	0.2~3
		0.25~3mΩ	≤+50		
	5W	0.2mΩ	≤+100	-	0.2~3
		0.25~3mΩ	≤+50		
2728	3W	4~100mΩ	≤+25	4~19	4~100
	3.5W	4~100mΩ	≤+25	4~19	4~100
	4W	4~50mΩ	≤+25	4~19	4~50

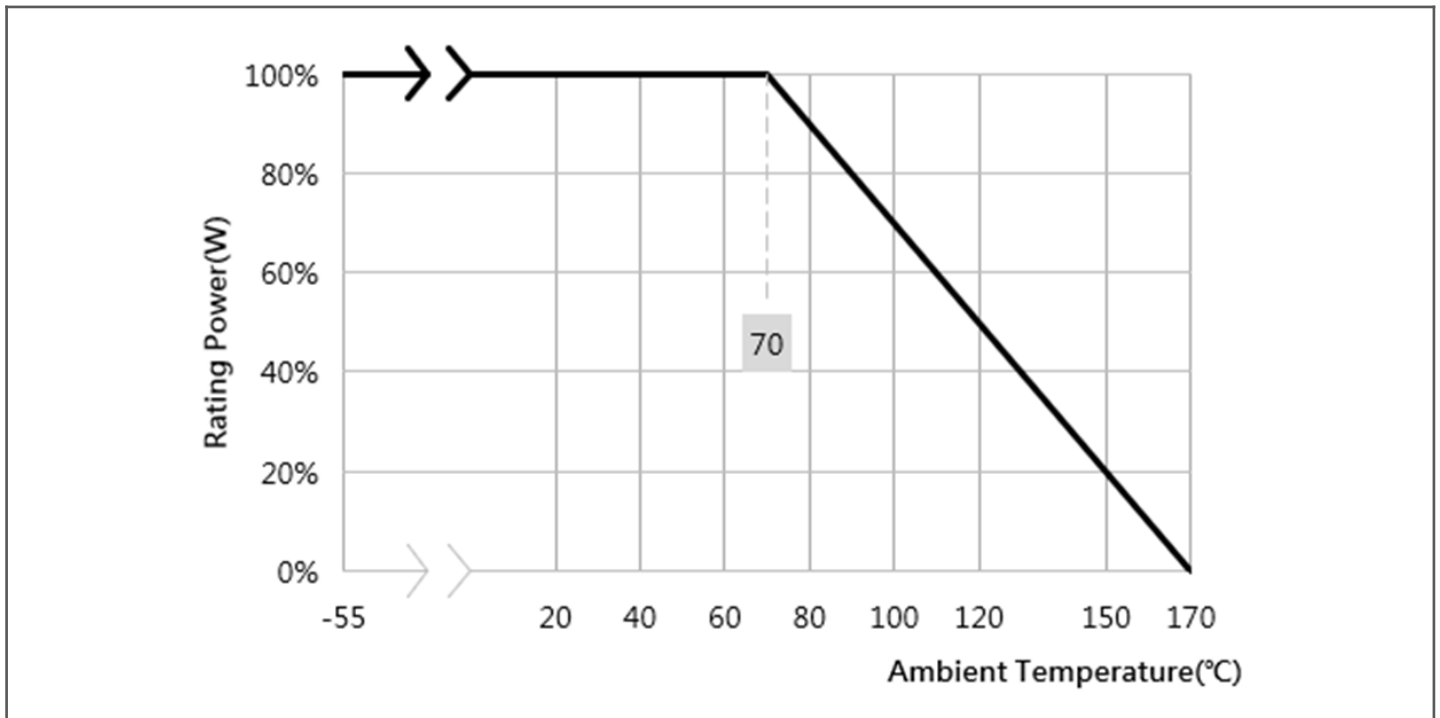
- Rating Current $I_r = \sqrt{P \div R}$
- Overload Current $I_o = \sqrt{5 \times P \div R}$
- Operating Temperature Range : -55~+170°C

GENERAL SPECIFICATIONS

Type2W	Rating Power	T.C.R (ppm/°C)		Resistance Range (mΩ)	
				D (±0.5%)	F (±1%)
					G (±2%)
				J (±5%)	
4527S (without heat sink)	2W	0.5mΩ	≤+75	7~100	0.5~200
		0.6~1mΩ	≤+75		
		1.1~3mΩ	≤+50		
		4~5mΩ	≤+50		
		5.1~200mΩ	≤+50		
	3W	0.5mΩ	≤+75	7~27	0.5~27
		0.6~1mΩ	≤+75		
		1.1~3mΩ	≤+50		
		4~5mΩ	≤+50		
		5.1~27mΩ	≤+50		
4527	5W	0.5mΩ	≤+75	7~120	0.5~200
		0.6~1mΩ	≤+75		
		1.1~3mΩ	≤+50		
		4~5mΩ	≤+50		
		5.1~200mΩ	≤+50		

- Rating Current $I_r = \sqrt{P \div R}$
- Overload Current $I_o = \sqrt{5 \times P \div R}$
- Operating Temperature Range : -55~+170°C

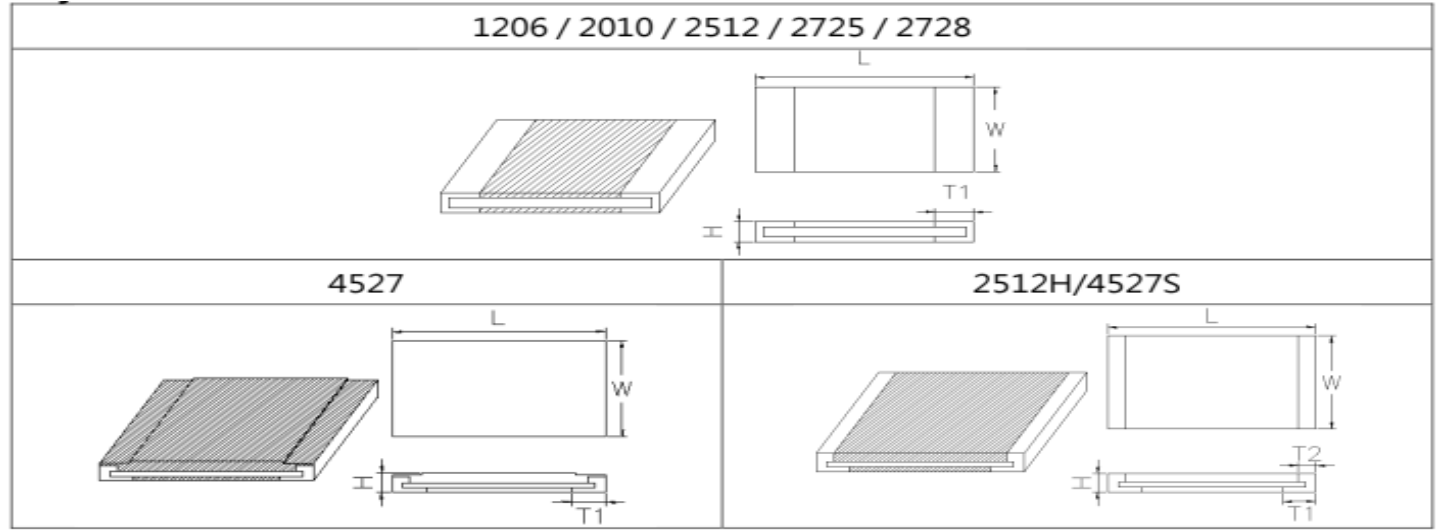
DERATING CURVE



CHARACTERISTICS

Temperature Coefficient of Resistance	Refer to general specifications	JIS C5201 4.8 Method $TCR(ppm/^{\circ}C) = \{(R2-R1)/R1(T2-T1)\} \times 10^6$ R1 : Resistance of room temp.(T1), R2 : Resistance of 150°C(T2)
Short Time Overload	LR4527(S) : $\leq \pm 2\%$ Others : $\leq \pm 0.5\%$	JIS C 5201-1 4.13 Method 5times rated power, 5seconds
Insulation Resistance	$\geq 10^9 \Omega$	JIS C5201 4.6 Method DC100V for 1minuts
Dielectric withstanding Voltage	Without break down	JIS C 5201 4.7 Method Applied AC500V for 1minute, Limit surge current Max. 50mA
Resistance to Solder Heat	$\leq \pm 0.5\%$	JIS C 5201 4.18 Method Solder temperature/immersion time : $260 \pm 5^{\circ}C$, 10 ± 1 seconds
Solderability	95% coverage	JIS C 5201 4.17 Method $245 \pm 5^{\circ}C$, 3 ± 0.5 seconds
Resistance to solvent	$\leq \pm 0.5\%$	JIS C 5201-1 4.29 Method Immersion time 60seconds, @ $20^{\circ}C \sim 25^{\circ}C$
Vibration	$\leq \pm 0.5\%$	JIS C 5201-1 4.23.4 Method 10Hz-55Hz-10Hz (1minute), 4hours each direction
Low Temperature Exposure (Storage)	$\leq \pm 0.5\%$	JIS C 5201 4.23.4 Method 1,000hours, @ $-55^{\circ}C$
High Temperature Exposure (Storage)	$\leq \pm 1.0\%$	JIS C 5201 4.23.2 Method 1,000hours, @ $+170^{\circ}C$
Temperature Cycling (Rapid Temp. Change)	$\leq \pm 0.5\%$	JESD22-A104 Method $-55^{\circ}C$ to $+150^{\circ}C$, 1,000cycles, Dwell time Max. 30minutes
Moisture Resistance (Climatic Sequence)	$\leq \pm 0.5\%$	MIL-STD-202 Method 106
Bias Humidity	$\leq \pm 0.5\%$	JIS C 5201 4.24 Method $+85^{\circ}C$, 85%RH, 10% bias, 1.5hours On, 0.5hours Off Extended life test 1,000hours
Load Life	LR4527(S) : $\leq \pm 2\%$ Others : $\leq \pm 1\%$	JIS C 5201 4.25 Method Test temperature $+70 \pm 2^{\circ}C$, Rated working voltage 1.5hours On, 0.5hours Off, Extended life test 1,000hours

DIMENSIONS



Type	Max. Power Rating [W]	Resistance Range [mΩ]	Dimensions – in inches (millimeters)				
			L	W	H	T1	T2
1206	0.5 1	0.5~0.6	0.126±0.01 (3.200±0.254)	0.063±0.01 (1.600±0.254)	0.046±0.01 (1.150±0.254)	0.029±0.01 (0.725±0.254)	-
		1			0.025±0.01 (0.645±0.254)	0.020±0.01 (0.508±0.254)	
		2~4			0.022±0.01 (0.545±0.254)	0.020±0.01 (0.508±0.254)	
		5			0.022±0.01 (0.545±0.254)	0.024±0.01 (0.600±0.254)	
		6~50			0.022±0.01 (0.545±0.254)	0.020±0.01 (0.508±0.254)	
	1.5	0.5~0.6			0.046±0.01 (1.150±0.254)	0.029±0.01 (0.725±0.254)	
		1			0.025±0.01 (0.645±0.254)	0.020±0.01 (0.508±0.254)	
2010	1	0.5~0.9	0.200±0.01 (5.080±0.254)	0.100±0.01 (2.540±0.254)	0.031±0.01 (0.787±0.254)	0.057±0.01 (1.440±0.254)	-
	1.5 2	1~3			0.031±0.01 (0.787±0.254)	0.051±0.01 (1.295±0.254)	
		3.1~4			0.025±0.01 (0.645±0.254)	0.031±0.01 (0.787±0.254)	
		4.1~100			0.025±0.01 (0.645±0.254)	0.031±0.01 (0.787±0.254)	
2512	1	0.3	0.246±0.01 (6.248±0.254)	0.126±0.01 (3.202±0.254)	0.046±0.01 (1.150±0.254)	0.079±0.01 (2.02±0.254)	-
		0.5~0.7			0.031±0.01 (0.787±0.254)	0.079±0.01 (2.02±0.254)	
		0.75~0.8			0.031±0.01 (0.787±0.254)	0.054±0.01 (1.374±0.254)	
		0.9			0.031±0.01 (0.787±0.254)	0.044±0.01 (1.118±0.254)	
		1~4			0.031±0.01 (0.787±0.254)	0.074±0.01 (1.880±0.254)	
		4.1~79			0.025±0.01 (0.645±0.254)	0.044±0.01 (1.118±0.254)	
		80~200			0.025±0.01 (0.645±0.254)	0.034±0.01 (0.868±0.254)	
		201~300			0.0236±0.01 (0.600±0.254)	0.034±0.01 (0.868±0.254)	

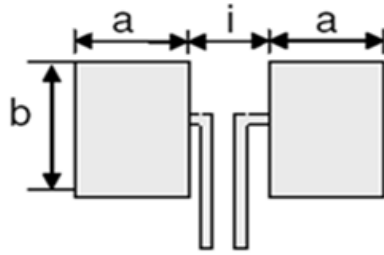
DIMENSIONS

Type	Max. Power Rating [W]	Resistance Range [mΩ]	Dimensions – in inches (millimeters)								
			L	W	H	T1	T2				
2512	1.5	0.3	0.246±0.01 (6.248±0.254)	0.126±0.01 (3.202±0.254)	0.046±0.01 (1.150±0.254)	0.079±0.01 (2.02±0.254)	-				
		0.5~0.7			0.031±0.01 (0.787±0.254)	0.079±0.01 (2.02±0.254)					
		0.75~0.8			0.031±0.01 (0.787±0.254)	0.054±0.01 (1.374±0.254)					
		0.9			0.031±0.01 (0.787±0.254)	0.044±0.01 (1.118±0.254)					
		1~4			0.031±0.01 (0.787±0.254)	0.074±0.01 (1.880±0.254)					
		4.1~79			0.025±0.01 (0.645±0.254)	0.044±0.01 (1.118±0.254)					
		80~200			0.025±0.01 (0.645±0.254)	0.034±0.01 (0.868±0.254)					
		201~220			0.0236±0.01 (0.600±0.254)	0.034±0.01 (0.868±0.254)					
	2	0.3			0.046±0.01 (1.150±0.254)	0.079±0.01 (2.02±0.254)					
		0.5~0.7			0.031±0.01 (0.787±0.254)	0.079±0.01 (2.02±0.254)					
		0.75~0.8			0.031±0.01 (0.787±0.254)	0.054±0.01 (1.374±0.254)					
		0.9			0.031±0.01 (0.787±0.254)	0.044±0.01 (1.118±0.254)					
		1~4			0.031±0.01 (0.787±0.254)	0.074±0.01 (1.880±0.254)					
		4.1~75			0.0254±0.01 (0.645±0.254)	0.044±0.01 (1.118±0.254)					
		80~100			0.0254±0.01 (0.645±0.254)	0.024±0.01 (0.624±0.254)					
	3	0.3			0.046±0.01 (1.150±0.254)	0.079±0.01 (2.02±0.254)					
		0.5~0.7			0.031±0.01 (0.787±0.254)	0.079±0.01 (2.02±0.254)					
		0.75~0.8			0.031±0.01 (0.787±0.254)	0.054±0.01 (1.374±0.254)					
		0.9~2.9			0.031±0.01 (0.787±0.254)	0.044±0.01 (1.118±0.254)					
		3~3.5			0.031±0.01 (0.787±0.254)	0.074±0.01 (1.880±0.254)					
		3.6~4			0.031±0.01 (0.787±0.254)	0.066±0.01 (1.676±0.254)					
		4.1~10			0.025±0.01 (0.645±0.254)	0.044±0.01 (1.118±0.254)					
	2512H (with heat sink)	2			80~200	0.246±0.01 (6.248±0.254)		0.126±0.01 (3.202±0.254)	0.039±0.01 (1.00±0.254)	0.034±0.01 (0.868±0.254)	0.0039 ~0.0394 (0.1~1)
		3			10~79				0.039±0.01 (1.00±0.254)	0.044±0.01 (1.118±0.254)	
80~100			0.039±0.01 (1.00±0.254)	0.034±0.01 (0.868±0.254)							
0.5			0.039±0.01 (1.00±0.254)	0.085±0.01 (2.159±0.254)							
0.6			0.039±0.01 (1.00±0.254)	0.071±0.01 (1.803±0.254)							
0.75			0.039±0.01 (1.00±0.254)	0.059±0.01 (1.504±0.254)							

DIMENSIONS

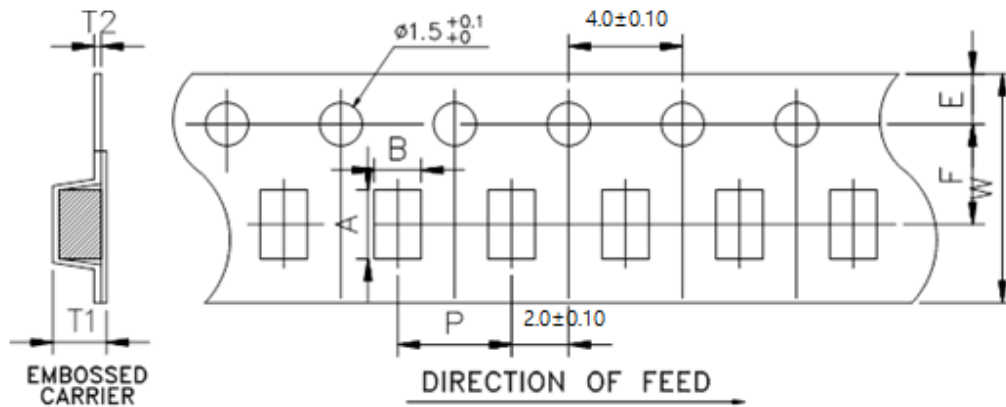
Type	Max. Power Rating [W]	Resistance Range [mΩ]	Dimensions – in inches (millimeters)				
			L	W	H	T1	T2
2725	4 5	0.2~0.3	0.268±0.01 (6.807±0.254)	0.254±0.01 (6.452±0.254)	0.039±0.01 (0.991±0.254)	0.085±0.01 (2.159±0.254)	-
		0.35			0.039±0.01 (0.991±0.254)	0.075±0.01 (1.904±0.254)	
		0.4~0.45			0.039±0.01 (0.991±0.254)	0.051±0.01 (1.30±0.254)	
		0.5			0.039±0.01 (0.991±0.254)	0.085±0.01 (2.159±0.254)	
		0.6			0.039±0.01 (0.991±0.254)	0.071±0.01 (1.803±0.254)	
		0.75			0.039±0.01 (0.991±0.254)	0.059±0.01 (2.159±0.254)	
		1			0.043±0.01 (1.092±0.254)	0.085±0.01 (2.159±0.254)	
		1.5			0.039±0.01 (0.991±0.254)	0.085±0.01 (2.159±0.254)	
		2			0.035±0.01 (0.889±0.254)	0.071±0.01 (1.803±0.254)	
		2.25~2.5			0.035±0.01 (0.889±0.254)	0.065±0.01 (1.651±0.254)	
		3			0.035±0.01 (0.889±0.254)	0.051±0.01 (1.295±0.254)	
		2728			3 3.5	4~100	
4	4~50		0.039±0.01 (0.991±0.254)	0.045±0.01 (1.143±0.254)			
4527S	2	0.5	0.450±0.01 (11.43±0.254)	0.270±0.01 (6.85±0.254)	0.055±0.01 (1.400±0.254)	0.136±0.01 (3.465±0.254)	0.038±0.01 (0.965±0.254)
		0.6~3			0.055±0.01 (1.400±0.254)	0.127±0.01 (3.215±0.254)	
		4~5			0.055±0.01 (1.400±0.254)	0.127±0.01 (3.215±0.254)	
		5.1~100			0.055±0.01 (1.400±0.254)	0.071±0.01 (1.815±0.254)	
	3	0.5			0.055±0.01 (1.400±0.254)	0.136±0.01 (3.465±0.254)	
		0.6~3			0.055±0.01 (1.400±0.254)	0.127±0.01 (3.215±0.254)	
		4~5			0.055±0.01 (1.400±0.254)	0.127±0.01 (3.215±0.254)	
		5.1~27			0.055±0.01 (1.400±0.254)	0.071±0.01 (1.815±0.254)	
	5	0.5			0.055±0.01 (1.400±0.254)	0.136±0.01 (3.465±0.254)	
		0.6~3			0.055±0.01 (1.400±0.254)	0.127±0.01 (3.215±0.254)	
		4~5			0.055±0.01 (1.400±0.254)	0.127±0.01 (3.215±0.254)	
		5.1~7.5			0.055±0.01 (1.400±0.254)	0.071±0.01 (1.815±0.254)	
4527	5	0.5	0.450±0.01 (11.43±0.254)	0.270±0.01 (6.85±0.254)	0.059±0.01 (1.500±0.254)	0.143±0.01 (3.645±0.254)	-
		0.6~3			0.059±0.01 (1.500±0.254)	0.127±0.01 (3.215±0.254)	
		4~5			0.059±0.01 (1.500±0.254)	0.127±0.01 (3.215±0.254)	
		5.1~200			0.059±0.01 (1.500±0.254)	0.071±0.01 (1.815±0.254)	

SOLDER PAD DIMENSIONS

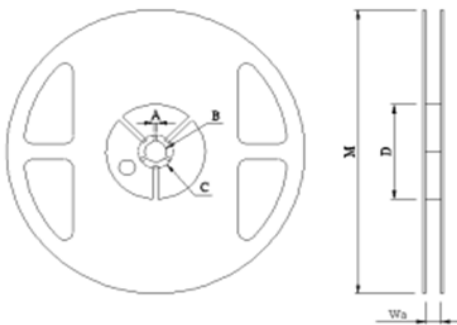


Type	Max. Power Rating [W]	Resistance Range [mΩ]	Dimensions – in millimeters			
			a	b	i	
1206	0.5, 1, 1.5	0.5~0.6	1.65	2.18	0.90	
		1~50	1.60	2.18	1.00	
2010	1	0.5~3	2.89	2.92	1.22	
		3.1~100	2.29	2.92	2.41	
2512	1	0.3~0.7	3.05	3.68	1.27	
		1~4	3.05	3.68	1.27	
		0.75~0.8	2.19	3.68	3.00	
		0.9	2.11	3.68	3.18	
		4.1~300	2.11	3.68	3.18	
		1.5	0.3~0.7	3.05	3.68	1.27
	1.5	1~4	3.05	3.68	1.27	
		0.75~0.8	2.19	3.68	3.00	
		0.9	2.11	3.68	3.18	
		4.1~220	2.11	3.68	3.18	
		2	0.3~0.7	3.05	3.68	1.27
		2	1~4	3.05	3.68	1.27
	0.75~0.8		2.19	3.68	3.00	
	0.9		2.11	3.68	3.18	
	4.1~100		2.11	3.68	3.18	
	3		0.3~0.7	3.05	3.68	1.27
	3		3~4	3.05	3.68	1.27
		0.75~0.8	2.19	3.68	3.00	
0.9~2.9		2.11	3.68	3.18		
4.1~10		2.11	3.68	3.18		
2512H		2	80~200	2.11	3.68	3.18
		3	10~100	2.11	3.68	3.18
2725	4, 5	0.2~3	3.18	6.86	1.32	
2728	3, 3.5	4~00	2.75	7.82	3.51	
	4	4~50	2.75	7.82	3.51	
4527S	2	0.5~5	5.80	8.74	3.51	
		5.1~100	4.15	8.74	6.81	
	3	0.5~5	5.80	8.74	3.51	
		5.1~27	4.15	8.74	6.81	
	5	0.5~5	5.80	8.74	3.51	
		5.1~7.5	4.15	8.74	6.81	
4527	5	0.5~5	5.80	8.74	3.51	
		5.1~200	4.15	8.74	6.81	

PACKAGING



Type	A	B	W	E	F	T1	T2	P
1206(0.5~0.6mΩ)	3.50±0.1	1.90±0.1	8.0±0.15	1.75±0.1	3.5±0.1	1.27±0.1	0.23±0.10	4.0±0.1
1206(≥1.0mΩ)	3.48±0.1	1.83±0.1	8.0±0.15	1.75±0.1	3.5±0.1	1.10±0.1	0.20±0.05	4.0±0.1
1210	3.50±0.1	3.00±0.1	8.0±0.20	1.75±0.1	3.5±0.1	1.10±0.1	0.22±0.05	4.0±0.1
2010	5.45±0.1	2.90±0.1	12.0±0.15	1.75±0.1	5.5±0.1	1.33±0.1	0.23±0.05	4.0±0.1
2512(0.3mΩ)	6.74±0.1	3.50±0.1	12.0±0.15	1.75±0.1	5.5±0.1	1.90±0.1	0.24±0.05	8.0±0.1
2512	6.75±0.1	3.50±0.1	12.0±0.15	1.75±0.1	5.5±0.1	1.30±0.1	0.20±0.05	4.0±0.1
2512H	6.75±0.1	3.55±0.1	12.0±0.30	1.75±0.1	5.5±0.1	1.60±0.1	0.20±0.10	4.0±0.1
2725	7.15±0.1	6.75±0.1	12.0±0.15	1.75±0.1	5.5±0.1	1.95±0.1	0.25±0.05	8.0±0.1
2728	7.15±0.1	7.70±0.1	12.0±0.15	1.75±0.1	5.5±0.1	1.45±0.1	0.25±0.05	12.0±0.1
4527	11.8±0.1	7.20±0.1	24.0±0.15	1.75±0.1	11.5±0.1	2.00±0.1	0.30±0.10	12.0±0.1
4527S	11.8±0.1	7.20±0.1	24.0±0.15	1.75±0.1	11.5±0.1	2.00±0.1	0.30±0.10	12.0±0.1



Reel / Tape	W	M	A	B	C	D
7" reel for 8mm Tape	9.00±0.5	178±2	2.0±0.5	13.5±0.5	21±0.5	60.0±1
7" reel for 12mm Tape	13.8±0.5	178±2	2.0±0.5	13.5±0.5	21±0.5	80.0±1
7" reel for 24mm Tape	25.0±1.0	178±2	2.0±0.5	13.2±0.5	17.7±0.5	60.0±1

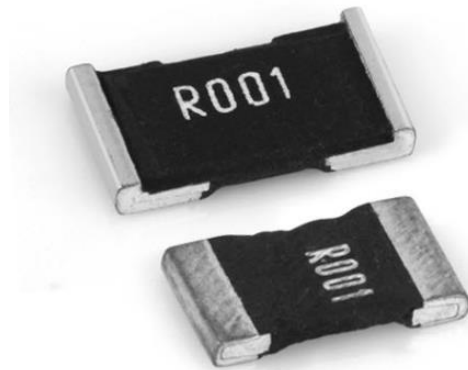
*** Packaging Quantity**

Type	Tape width	Max. Packaging Quantity (pcs/reel)		
		Embossed Plastic Type		
		4mm pitch	8mm pitch	12mm pitch
1206 (0.5~0.6mΩ)	8mm	2,000pcs	-	-
1206 (≥1.0mΩ)	8mm	4,000pcs	-	-
1210	8mm	4,000pcs	-	-
2010	12mm	2,000pcs / 4,000pcs	-	-
2512 (0.3mΩ)	12mm	-	1,000pcs	-
2512	12mm	4,000pcs	-	-
2512H	12mm	2,000pcs	-	-
2725	12mm	-	1,000pcs	-
2728	12mm	-	-	1,000pcs
4527(S)	24mm	-	-	500pcs

MARKING FORMAT

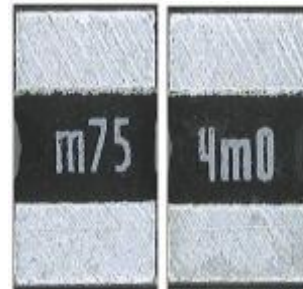
- All the products marking are 4 digits (LR2512 0.3mΩ~4.0mΩ are not included)

- a. "R" designated the decimal location in ohms.
Ex) For 1mΩ the product marking is R001;
For 25mΩ the product marking is R025;
For 100mΩ the product marking is R100.
- b. "m" designated the decimal location in milliohms.
Ex) For 0.25mΩ the product marking is 0m25;
For 0.5mΩ the product marking is 0m50;
For 5.5mΩ the product marking is 5m50;
For 25.5mΩ the product marking is 25m5.
- c. Marking image (Please refer to right)
- d. LR1206 0.5mΩ~0.6mΩ Square marking



- LR2512 0.3mΩ~4.0mΩ marking format (3 digits)

- a. Under 1mΩ (1mΩ is not included) "m" is the first digit and means the decimal point position of mΩ.
Ex) For 0.3mΩ the product marking is m30;
For 90mΩ the product marking is m90.
- b. Under 4mΩ (4mΩ is included) The first digit is the unit digit. "m" means the decimal point position of mΩ.
Ex) For 1mΩ the product marking is 1m0;
For 4mΩ the product marking is 4m0.



ORDERING PROCEDURE EXAMPLE

LRA	2512	2	1	R001	F	4
Model	Size (inch) 1206 2010 2512 2512H 2725 2728 4527 4527S	Number Of terminals	Rated Power C= 0.5W 1= 1W A= 1.5W 2= 2W 3= 3W B= 3.5W 4= 4W 5= 5W	Resistance (Ex) R001=1mΩ	Tolerance D=±0.5% F=±1% G=±2% J=±5%	Packing A=500pcs 1=1,000pcs 2=2,000pcs 4=4,000pcs