

HoLRS2512 Bare Alloy Resistor Series Selection Specification

■ Features

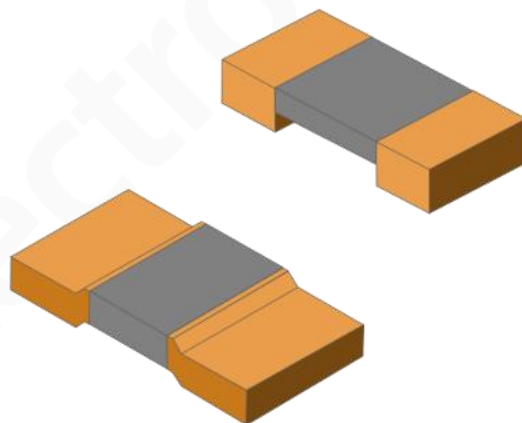
High-precision, low-temperature drift, ultra-high power, pure alloy resistors are welded using Milliohm Electronics' independently designed, professional, self-controlled electron beam welding equipment.

Based on the perfect combination of professional design capabilities, high-precision processing equipment, and strict process control system, the product can achieve a target accuracy of up to $\pm 0.1\%$.

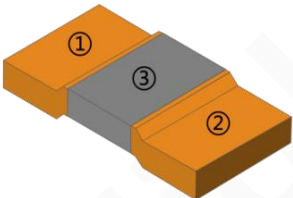
The product's TCR is $\leq \pm 25 \sim 100 \text{ppm/}^\circ\text{C}$ in the range of $-55 \sim +170^\circ\text{C}$. Non-inductive design, inductance is less than 3 nanohenry. The product complies with ROHS.

■ Application

- ① Power Supply Modules
- ② Industrial Instrumentation Equipment
- ③ Servo Drive Systems
- ④ Automation Control Systems ⑤ Variable Frequency Drives



■ Product Construction

	Serial Number	Part Name
	1	Copper electrode
	2	Copper electrode
	3	Alloy Resistive

■ Electrical Parameters

Size	Resistance	Rated Power	Maximum Rated Current	Resistance Tolerance	T.C.R.	Operating Temp.Range
2512	0.2mR~5mR	3W	24.49A~122.47A	$\pm 0.1\%$ $0.2\% \pm 0$ $.5\% \pm 1$ $0\% \pm 5.0$ $\%$	$\pm 25 \text{ppm} \sim \pm 100 \text{ppm}$	$-55^\circ\text{C} \sim +170^\circ\text{C}$



■ Product Selection

SelectionExample : HoLRS2512-3W-2mR-1%-K-25ppm						Bare Alloy Resistors: 2512	
Ho	LRSC	2512	3W	2mR	1%	K	25ppm
↓	↓	↓	↓	↓	↓	↓	↓
Manufacturer	Series	Size	Rated Power	Resistance Value	Tolerance	Material	T.C.R.
Milliohm	Bare alloy	2512	3W	0.2mR~5mR	±0.1% ±0.2% ±0.5% ±1% ±5%	M=MANGANIN (standard material will not display in P/N) K=Karma T=FeCrAl N=6J16 H=6J06	±25ppm ±50ppm ±75ppm ±100ppm ±115ppm ±175ppm

■ Product Dimensions(mm)

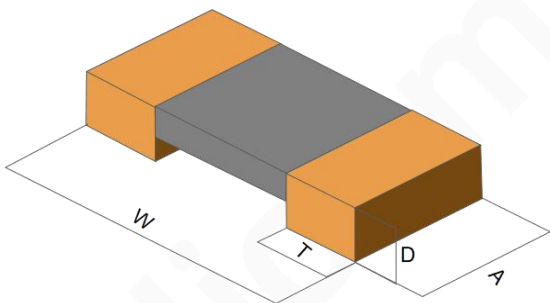


Figure 1

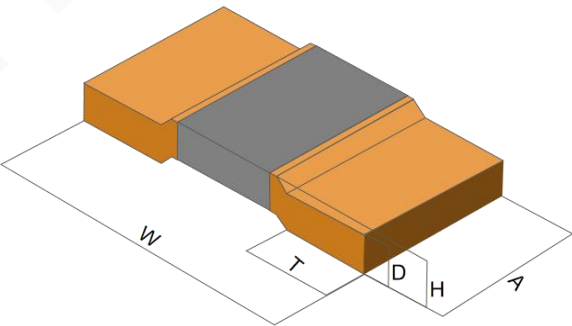


Figure 2

Size	Resistance	W±0.3	A±0.3	H±0.3	D±0.1	T±0.5	Material	icon
2512	0.20mR	6.4	3.2	/	1.7	2.1	H	Figure 1
	0.25mR	6.4	3.2	/	1.6	2.1	H	

Resistance adjustment notch:

1.Used to adjust the accuracy of the product, has no effect on other performance of the product.

2.The accuracy of some original products meets the original factory requirements and does not require notch adjustment process

■ Product Dimensions(mm)

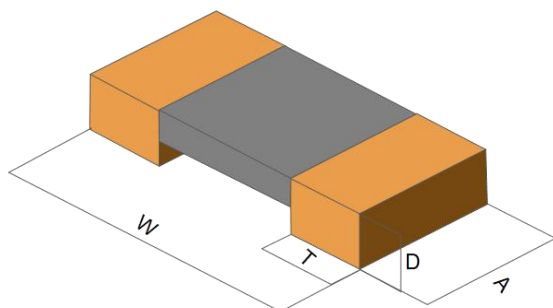


Figure 1

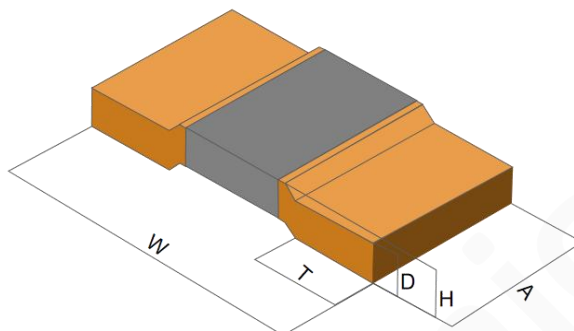
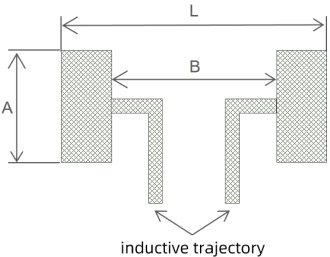


Figure 2

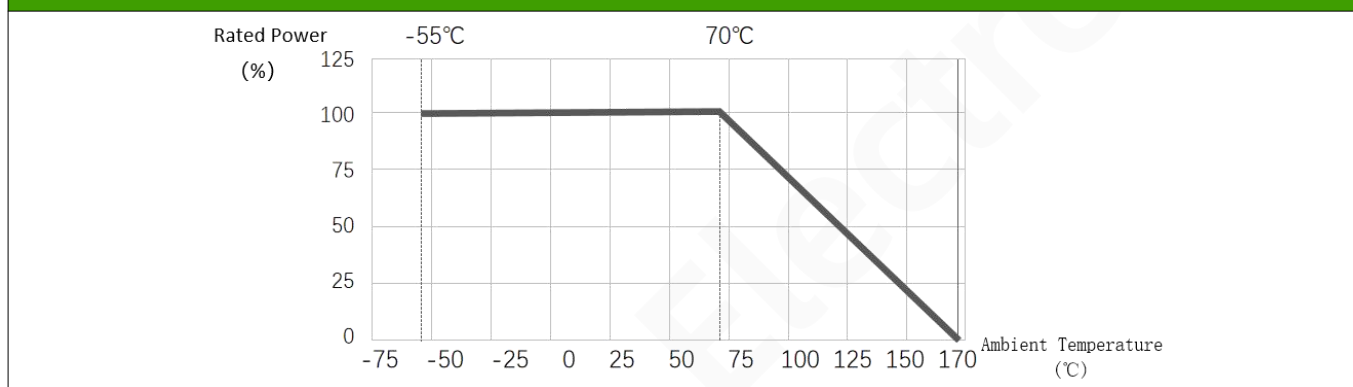
Size	Resistance	W±0.3	A±0.3	H±0.3	D±0.1	T±0.5	Material	icon
2512	0.20mR	6.4	3.2	1.9	1.40	1.2	H	Figure 2
	0.25mR	6.4	3.2	1.7	1.20	1.2	H	
	0.30mR	6.4	3.2	1.9	1.40	1.2	M	
	0.30mR	6.4	3.2	1.4	0.90	1.2	H	
	0.40mR	6.4	3.2	1.5	1.00	1.2	H	
	0.50mR	6.4	3.2	1.3	0.80	1.2	M	
	0.60mR	6.4	3.2	1.2	0.70	1.2	M	
	0.75mR	6.4	3.2	1.1	0.55	1.2	M	
	1.00mR	6.4	3.2	0.9	0.36	1.2	M	
	1.50mR	6.4	3.2	1.3	0.80	1.2	K	
	2.00mR	6.4	3.2	1.2	0.65	1.2	T	
	2.00mR	6.4	3.2	1.2	0.65	1.2	K	
	2.50mR	6.4	3.2	1.1	0.50	1.2	K	
	3.00mR	6.4	3.2	0.9	0.43	1.2	K	
	3.00mR	6.4	3.2	0.9	0.45	1.2	T	
	4.00mR	6.4	3.2	0.8	0.32	1.2	K	
	4.00mR	6.4	3.2	0.8	0.34	1.2	T	
	5.00mR	6.4	3.2	0.8	0.30	1.2	K	
	5.00mR	6.4	3.2	0.7	0.25	1.2	T	

■ Recommended Land Pattern(mm)

	Resistance	A	L	B
	0.2mΩ~5mΩ	3.4	7	3.4

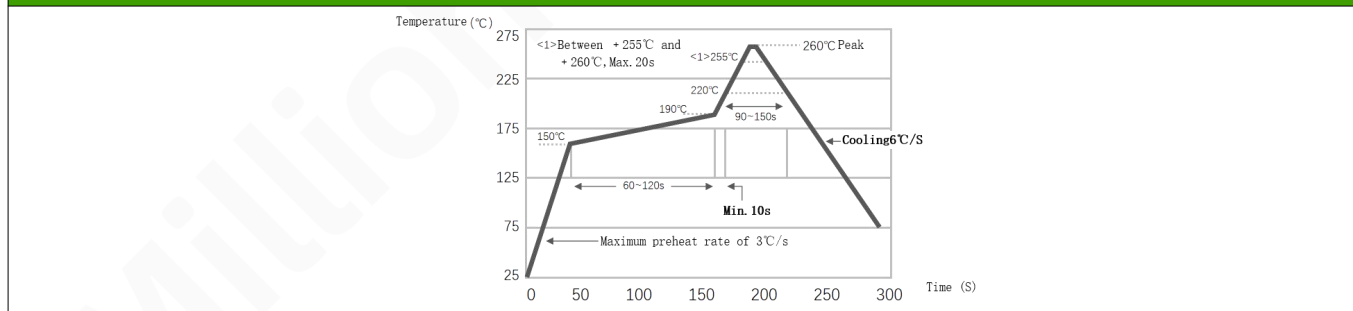
■ Derating Curve

When the resistor is operated at temperatures above 70°C, the rated power must be derated according to the Following curve



■ Soldering Recommendations

Reflow Temperature Profile



■ Rated current calculation formula

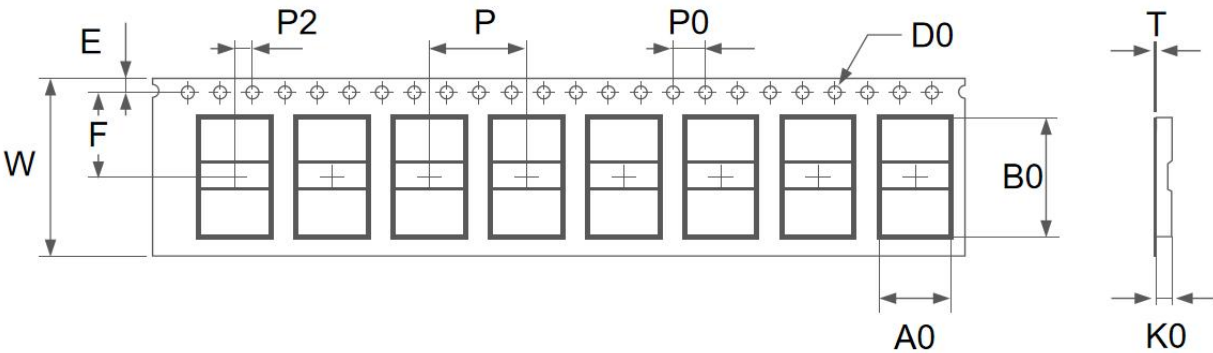
Rated current calculation formula

$I = \sqrt{P/R}$	I	P	R
	Rated Current(A)	Rated Power(W)	Resistance(Ω)

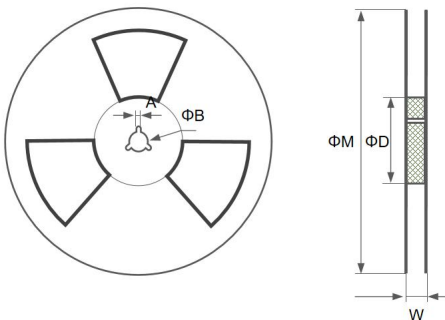
■ Performance Test

Item	Conditions of Tests	Standards	Test Limits
Short time overload	5 Times Rated Power for 5 Second Duration	JIS-C-5201	$\Delta R \leq \pm 0.5\%$
Temperature Coefficient of resistance	TCR (ppm/°C) = $(R_2 - R_1 / R_1 * (T_2 - T_1)) \times 10^6$ R1: Resistance measured at room temperature(Ω) R2: Resistance value measured at 125°C(Ω) T1: Room temperature(°C) T2: 125°C	JIS-C-5201	Refer to the measured curve
Bending strength	2mm judgment specification, at least 60 seconds of support time	AEC Q200-005	$\Delta R \leq \pm 0.5\%$
Solderability	Soldering temperature 245±5°C be immersed: 3±0.5 seconds	AEC-Q200 TEST18 J-STD-002	Solder coverage over than 95%
Solvent resistance	After soaking in 20~25°C isopropyl alcohol solvent for 60+5 seconds, take it out and let it stand for more than 24 hours, and measure the resistance change rate	AEC-Q200 TEST 12 MIL-STD-202 Method 215	$\Delta R \leq \pm 0.5\%$
Solder heat resistance test	Immerse the resistor in a 260±5°C tin furnace for 10±1 seconds, take it out and let it stand for more than 60 minutes, then measure the resistance change rate.	AEC-Q200 TEST 15 MIL-STD-202 Method 210	$\Delta R \leq \pm 0.5\%$
Temperature Cycle	1000 cycles (-55~155°C) The dwell time at each temperature is 30min, and the switching time (15°C/min). Electrical test is performed within 24±4 hours after the test.	AEC-Q200 TEST 4 JESD22 Method JA-104	$\Delta R \leq \pm 0.5\%$, No damage to appearance
High Temperature Exposure	155°C for 1000h, no power, test the resistance change rate within 24±4h	AEC-Q200 TEST 3 MIL-STD-202 Method 108	$\Delta R \leq \pm 0.5\%$
Biased Humidity Test	1000 hours, 85°C, 85% relative humidity, load 10% rated power	AEC-Q200 TEST 7 MIL-STD-202 Method 103	$\Delta R \leq \pm 0.5\%$
Load Life	Rated current, Ta=125°C, load 100% power, 0.5 hours off, 1.5 hours on, test time: 1000H	AEC-Q200 TEST 8 MIL-STD-202 Method 108	$\Delta R \leq \pm 0.5\%$
Low Temperature Storage	-55°C, storage: 1000H	EC60115-1-4.23.4 JIS-C5201-4.23.4	$\Delta R \leq \pm 0.5\%$
Mechanical shock	Impact in three directions: X, Y, and Z, half-sine pulse, duration 0.5ms, peak acceleration 100g's	AEC-Q200 TEST 13 MIL-STD-202 Method 213	$\Delta R \leq \pm 0.5\%$
Vibration	Traverse the entire frequency range from 10 to 2000 Hz within 20 minutes and return to 10 Hz; this cycle should be performed 12 times in each of the three mutually perpendicular directions (36 times in total)	AEC-Q200 TEST 14 MIL-STD-202 Method 204	$\Delta R \leq \pm 0.5\%$

■ Tape Specifications (mm)

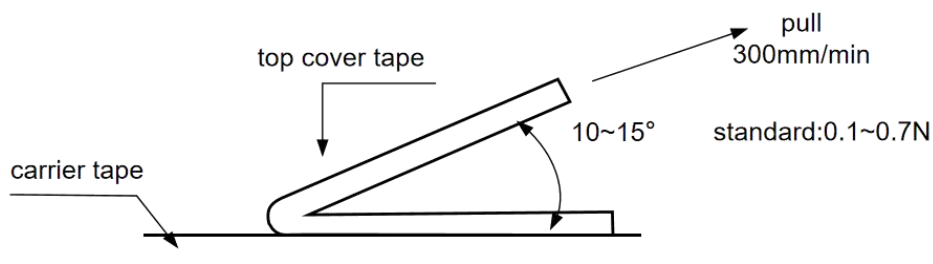
										
Size	A0±0.1	B0±0.1	W±0.3	F±0.1	E±0.1	T±0.05	K0±0.1	P±0.1	P0±0.1	P2±0.1
2512	3.75	6.9	12	5.5	1.75	0.3	2.2	8	4	2
	3.75	6.9	12	5.5	1.75	0.3	1.9	8	4	2

■ Reel Specifications (mm)

						
Size	ΦD	ΦM	Φ B	W	A	Quantity
2512	60±2	178±2.0	13.5±0.5	24±0.5	2.3±0.5	1000PCS

■ Peeling Strength of Top Cover Tape:

Peel test: peel speed 300 mm/min; peel force 0.1N-0.7N



■ Product Usage Suggestions

- ◆ During the use of the product, pay attention to surface protection to prevent bumps, scratches, and other defects on the product surface.
- ◆ When taking or placing the product, do not use sharp tools to avoid scratching the product surface and causing resistance value deviation and failure.
- ◆ When installing and using the product, avoid the product being affected by mechanical stress.
- ◆ The long-term power of the product should be less than or equal to the rated power to avoid resistance drift caused by long-term overload.
- ◆ When using the product under high temperature or poor heat dissipation conditions, refer to the power consumption reduction curve for ordering.
- ◆ If the product is not taken out of the tape packaging, it should be stored in a vacuum to avoid the risk of poor welding caused by product oxidation.

■ Storage instructions

- ◆ The product storage environment temperature is 5~35°C, humidity is < 65%RH, and the humidity should be kept as low as possible.
- ◆ The product should be stored in a clean, dry environment without harmful gases.
- ◆ Avoid removing the product from the taping package before use.
- ◆ Under the above storage conditions, the product can be kept for 1 year.
- ◆ For product over 1 year old, check whether the surface is oxidized and perform soldering test.

■ Revision of curriculum vitae:

version number	revision date	Content of the modification	Reason for change	change agent	auditor
Ho-A1	2021-12-17	Replacement of size specifications cancels H values of 0.2mR, 0.25mR	process improvement	Huang YongKang	Huang ZhongLiang
Ho-B0	2022-06-10	Add pad size recommendation and package size chart	Internal additions	Huang ZhongLiang	Huang ZhongLiang
Ho-B1	2024-07-29	Detailed update of resistance value, temperature drift range, and update of specification layout.	Optimised products c standardised format	Huang YongKang	LengYiWeng
Ho-B2	2024-11-14	Updated specification content layout	standardised format	Huang YongKang	LengYiWeng

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