

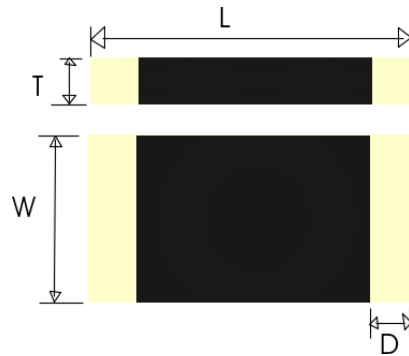
1. SCOPE

These specification covers 2512 sized low resistance current sensing metal resistors.

2. PART CODING

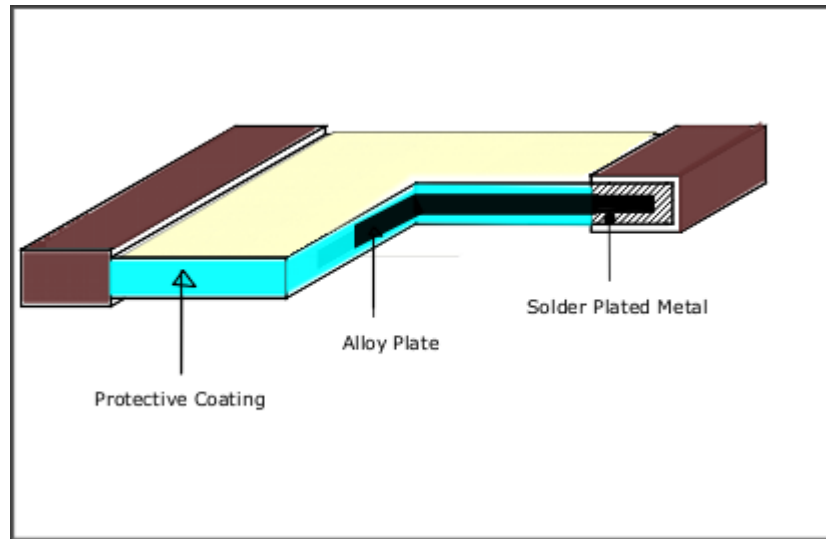
<u>LR</u>	<u>12</u>	<u>J</u>	<u>E</u>	<u>R005</u>
Type	Dimension	Tolerance	Packaging	Resistance
Current Sensing Resistor	2512	F: $\pm 1\%$ H: $\pm 3\%$ J: $\pm 5\%$	Embossed Tape	R005: 0.005Ω 1M5: 0.0015Ω M50: 0.0005Ω

3. DIMENSIONS



TYPE	L (mm)	W (mm)	D (mm)	T (mm)
M50	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	1.4 ± 0.2
M75	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	1.0 ± 0.2
R001	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.8 ± 0.2
1M5	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.65 ± 0.2
R002	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.5 ± 0.2
2M5	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	1.0 ± 0.2
R003	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.7 ± 0.2
3M5	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.71 ± 0.2
R004	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.6 ± 0.2
4M5	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.58 ± 0.2
R005	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.5 ± 0.2
5M5	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.47 ± 0.2
R006	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.5 ± 0.2
6M5	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.47 ± 0.2
R007	6.35 ± 0.254	3.18 ± 0.254	1.3 ± 0.3	0.45 ± 0.2

4. CONFIGURATION

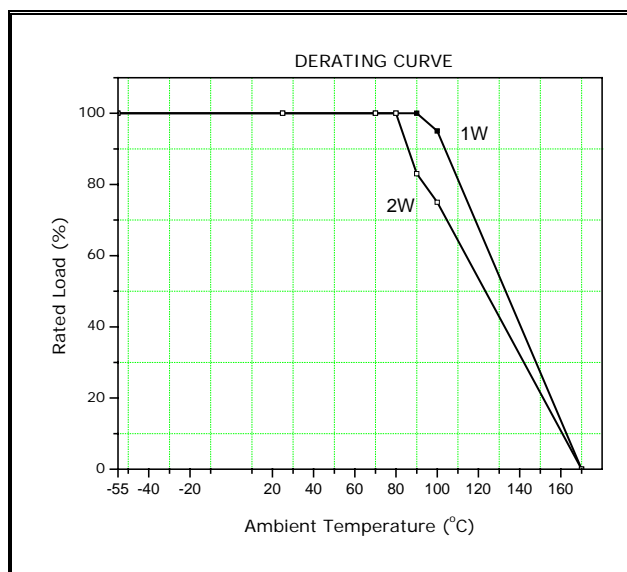


5. RATINGS

Resistance	Power Rating at 80°C	Max. Dielectric Voltage	Operating Temp. (°C)
0.5mΩ~2mΩ	2W	200V	-55 °C ~ 170 °C
2.5mΩ~7mΩ	1W	200V	-55 °C ~ 170 °C

5.1 POWER TEMPERATURE DERATING CURVE

Power ratings are based on continuous full load operation at rated ambient temperature of 80°C. For resistors operated at ambient temperature in excess of 80°C, the maximum load shall be derated in accordance with the following curve.



5.2 RATED VOLTAGE

The direct or alternating voltage for the rated power can be calculated from the following formula but must not exceed the maximum voltage.

$$V = \sqrt{P \times R}$$

Where,

V=rated voltage (V)

P=rated power (W)

R=rated resistance (Ω)

6. CHARACTERISTICS

6.1 Temperature coefficient of resistance (TCR)

6.1.1 Test Method

$$\text{TCR (ppm/}^{\circ}\text{C)} = \left[\frac{R_2 - R_1}{R_1(T_2 - T_1)} \right] \times 10^6$$

Where,

R₁=resistance at room temperature

R₂=resistance at -10°C or 125°C

T₁=room temperature

T₂=-10°C or 125°C

6.1.2 Performance

Range (mΩ)	0.5	0.75~2	2.5~3	4~5.5	6~7
TCR (ppm)	±50	±50	±150	±100	±75
Tolerance (%)	±3,5	±1,3	±1,3,5	±1,3,5	±1,3,5
Power Rating (W)	2	2	1	1	1

6.2 Short Time Overload

6.2.1 Test Method

5 times the rated power is applied to the resistor and the change in resistance is measured after 30mins.

6.2.2 Performance

$$\Delta R < \pm(0.5\% + 0.5 m\zeta)$$

6.3 Load Life

6.3.1 Test Method

The resistor is placed in a chamber for 1000hrs at $70\pm 2^{\circ}\text{C}$. The rated voltage is applied to the resistor (duty cycle: 90mins ON, 30mins OFF). The change in resistance is measured 60mins after removal from test chamber.

6.3.2 Performance

$$\Delta R < \pm(1\% + 0.5m\zeta)$$

6.4 Solderability

6.4.1 Test Method

The resistor is immersed in solder bath at $260\pm 5^{\circ}\text{C}$ for 2 ± 0.5 secs.

6.4.2 Performance

Coverage of 95% of the surface immersed.

6.5 High Temperature Storage

6.5.1 Test Method

The resistor is placed in a constant temperature-humidity chamber at $125\pm 2^{\circ}\text{C}$ for 1000hrs and the resistance is measured 60mins after the end of the cycle.

6.5.2 Performance

$$\Delta R < \pm(1\% + 0.5m\zeta)$$

6.6 Thermal Shock

6.6.1 Test Method

The resistor is kept at a temperature of -55°C for 5mins and the temperature is then raised to 125°C and the resistor is held in this state for another 5mins. The time taken for switching between temperatures does not exceed 10secs and this is repeated for 5 cycles. The change in resistance is measured 2hrs after the completion of 5 cycles.

6.6.2 Performance

$$\Delta R < \pm(0.5\% + 0.5m\Omega)$$

6.7 Solder Heat

6.7.1 Test Method

The resistor is immersed in solder bath at $260 \pm 5^{\circ}\text{C}$ for 10 ± 1 secs and the resistance is measured 1hr after the test.

6.7.2 Performance

$$\Delta R < \pm(0.5\% + 0.5m\Omega)$$

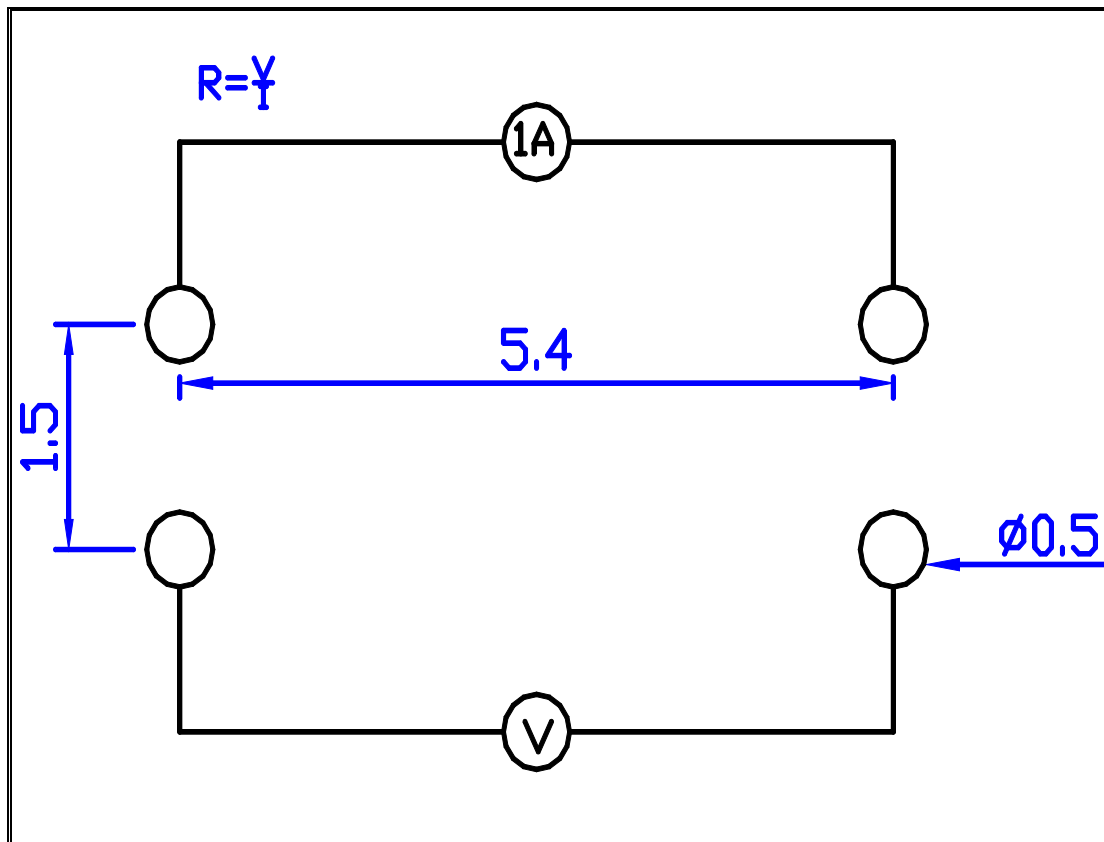
7. Measurements

7.1 4-wire precision measurement

Equipment: ADEX AX-1152D DC Low Ohm Meter

Excitation Current: 3A (0.5m ς ~1.5 m ς)

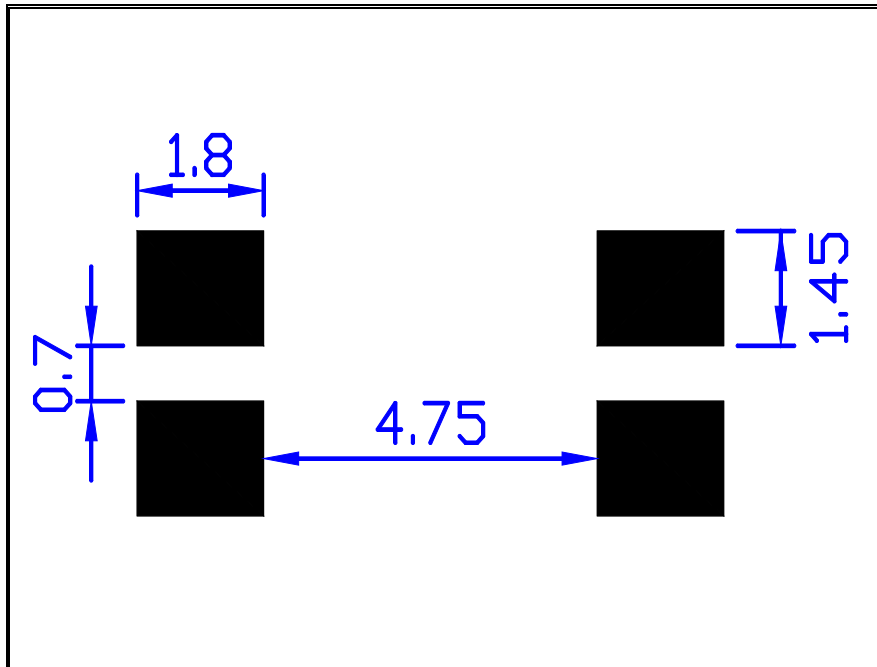
1A (2m ς ~7m ς)



unit: mm

7.2 4-wire pad layout (recommended for precision current sensing) for 1W & 2W & 3W Operation

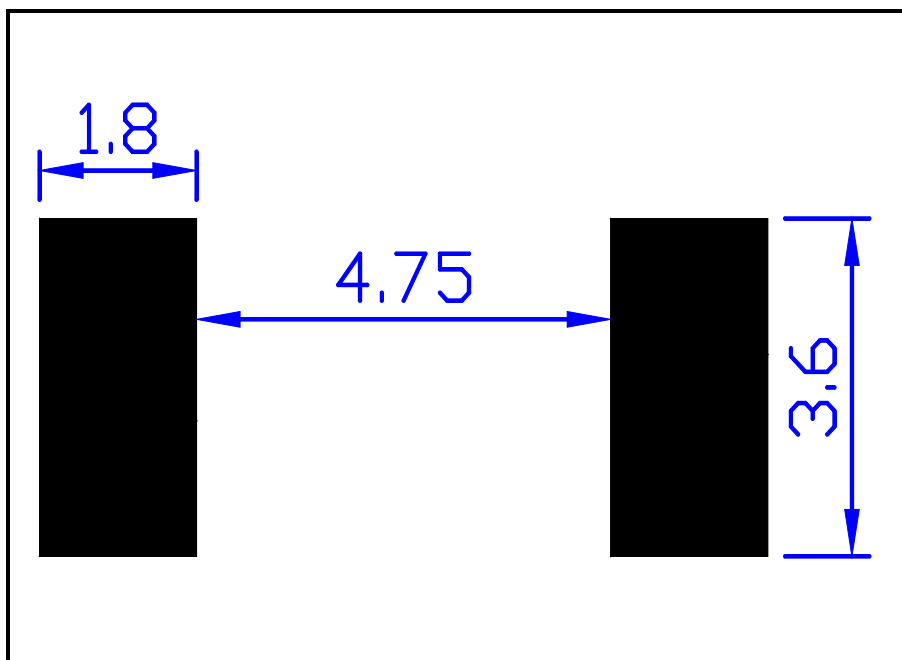
Note: No circuits between pads to avoid short circuit



unit: mm

7.3 2-wire pad layout for 1W & 2W & 3W Operation

Note: No circuits between pads to avoid short circuit

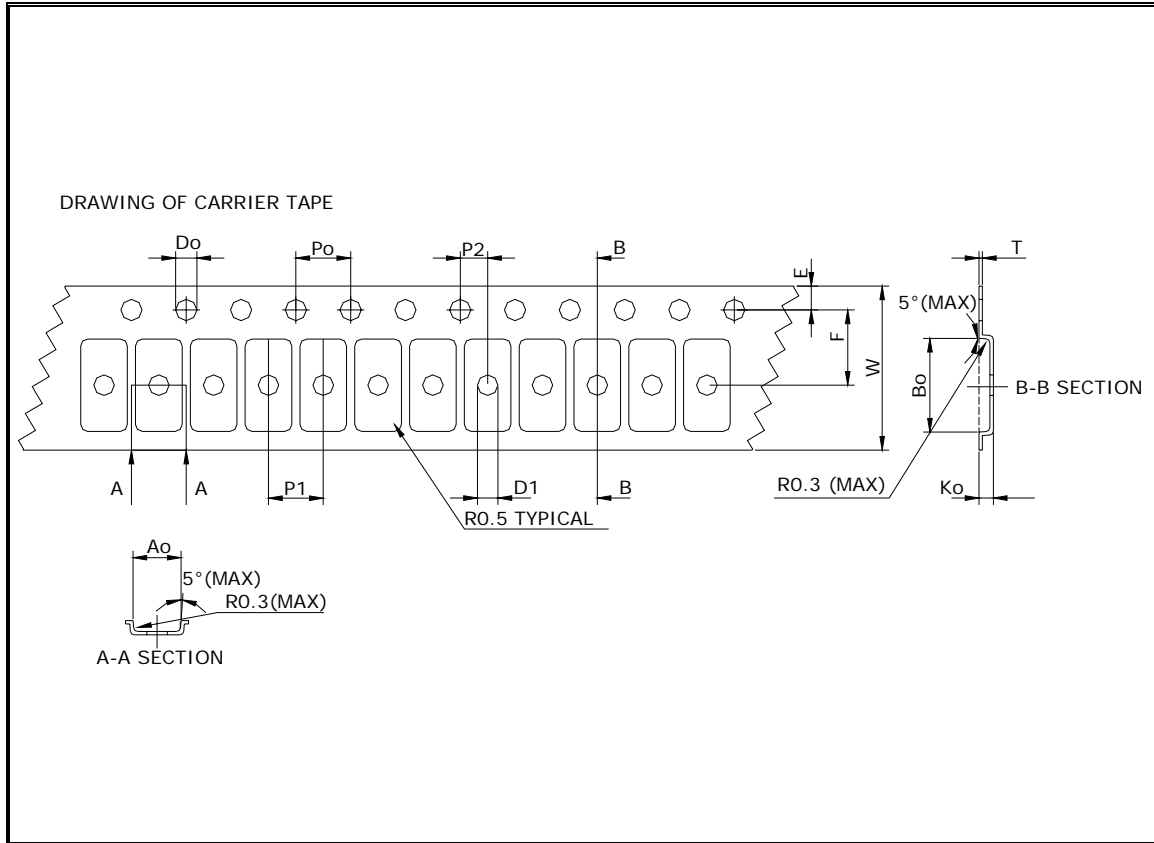


unit: mm

2W for 0.5mΩ~2 mΩ. 3W for 0.5mΩ~2 mΩ (Special Version)

8. Packaging

Emboss Plastic Tape Specifications



UNIT : mm

Symbol	A_o	B_o	K_o	P_o	P_1	P_2	T
Spec.	3.40 ± 0.1	6.75 ± 0.1	0.80 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	0.25 ± 0.1
Symbol	E	F	D_o	D_1	W	$10P_o$	
Spec.	1.75 ± 0.1	5.5 ± 0.05	1.55 ± 0.05	1.5 (MIN)	12.0 ± 0.3	40.0 ± 0.2	

Notice:

1. The cumulative tolerance of 10 sprocket hole pitch is ± 0.2 mm.
2. Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.
3. A_o & B_o measured 0.3mm from the bottom of the packet
4. K_o measured at a point on the inside bottom of the packet to the top surface of the carrier.
5. Pocket position relative to sprocket hole is measured as the true position of the pocket and not the pocket hole