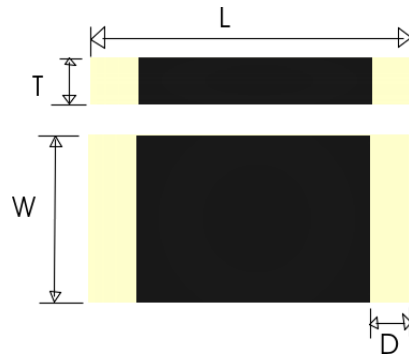


**1. SCOPE**

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

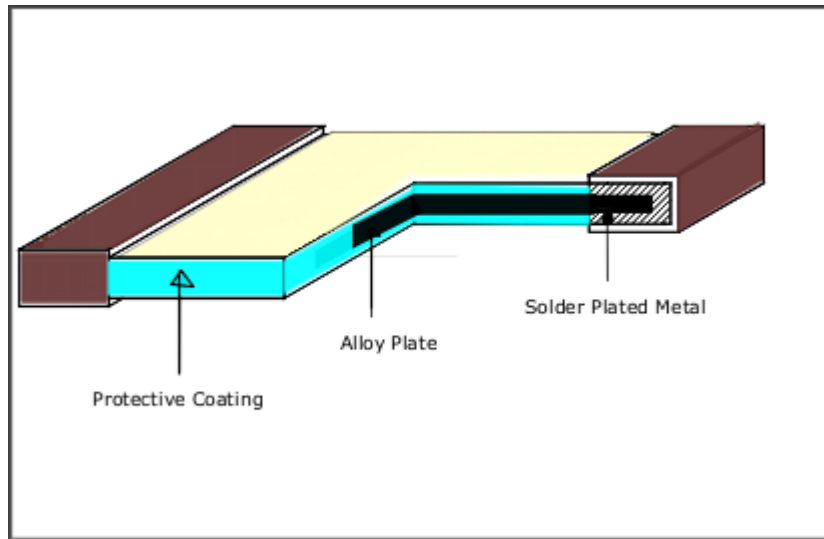
**2. PART CODING**

<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: 61% H: 63% J: 65%	Embossed Tape	R005: 0.005 $\zeta$ 1M5: 0.0015 $\zeta$ M50: 0.0005 $\zeta$

**3. DIMENSIONS**

TYPE	L (mm)	W (mm)	D (mm)	T (mm)
M50	6.3560.254	3.1860.254	1.360.3	1.460.2
M75	6.3560.254	3.1860.254	1.360.3	1.060.2
R001	6.3560.254	3.1860.254	1.360.3	0.860.2
1M5	6.3560.254	3.1860.254	1.360.3	0.6560.2
R002	6.3560.254	3.1860.254	1.360.3	0.560.2
2M5	6.3560.254	3.1860.254	1.360.3	1.060.2
R003	6.3560.254	3.1860.254	1.360.3	0.760.2
3M5	6.3560.254	3.1860.254	1.360.3	0.7160.2
R004	6.3560.254	3.1860.254	1.360.3	0.660.2
4M5	6.3560.254	3.1860.254	1.360.3	0.5860.2
R005	6.3560.254	3.1860.254	1.360.3	0.560.2
5M5	6.3560.254	3.1860.254	1.360.3	0.4760.2
R006	6.3560.254	3.1860.254	1.360.3	0.560.2
6M5	6.3560.254	3.1860.254	1.360.3	0.4760.2
R007	6.3560.254	3.1860.254	1.360.3	0.4560.2

**4. CONFIGURATION**

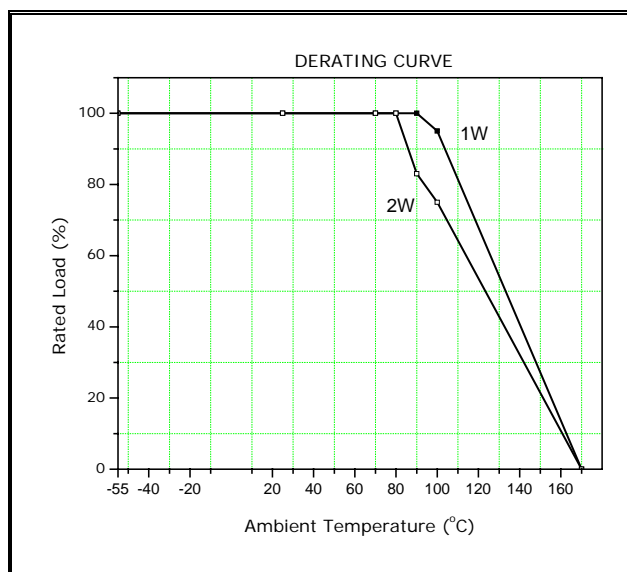


**5. RATINGS**

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,

R<sub>1</sub>=resistance at room temperature

R<sub>2</sub>=resistance at -10°C or 125°C

T<sub>1</sub>=room temperature

T<sub>2</sub>=-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  $2\pm 0.5\text{secs}$ .

### 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  $-55^{\circ}\text{C}$  for 5mins and the temperature is then raised to  $125^{\circ}\text{C}$  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

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

## **6.7 Solder Heat**

### 6.7.1 Test Method

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

### 6.7.2 Performance

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

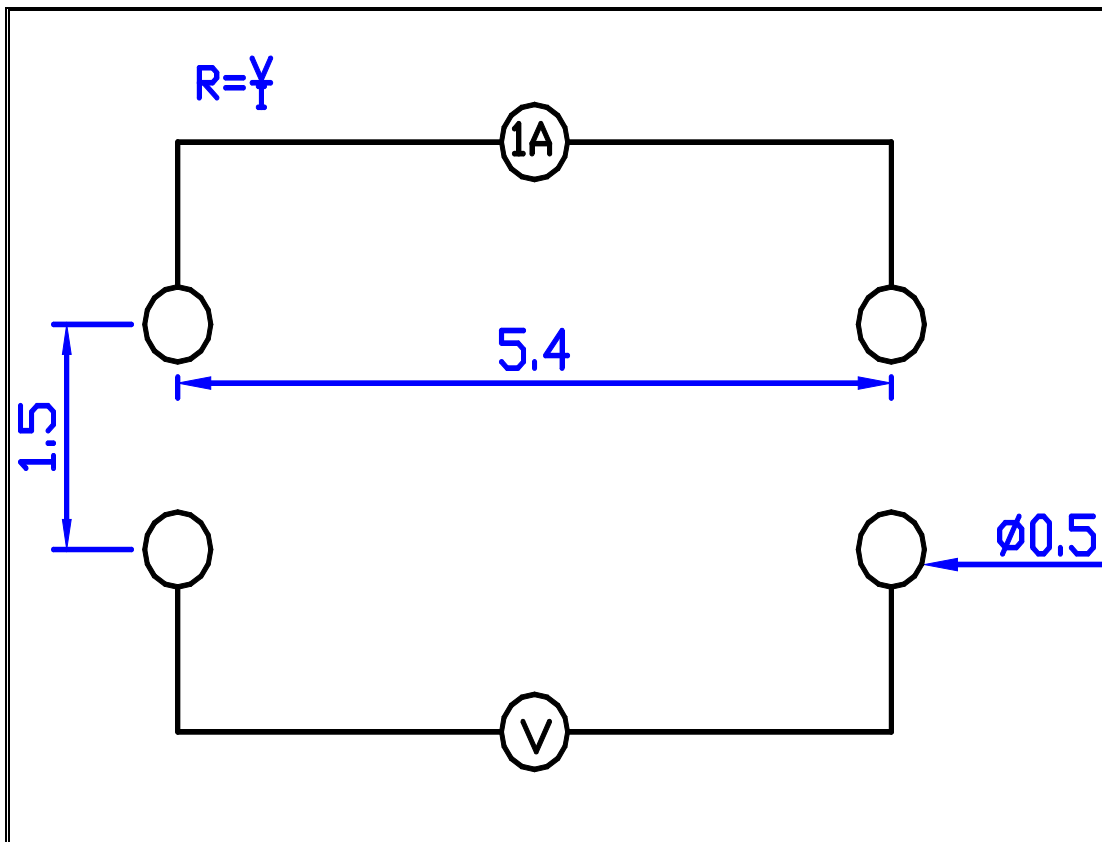
## 7. Measurements

### 7.1 4-wire precision measurement

Equipment: ADEX AX-1152D DC Low Ohm Meter

Excitation Current: 3A (0.5m $\varsigma$ ~1.5 m $\varsigma$ )

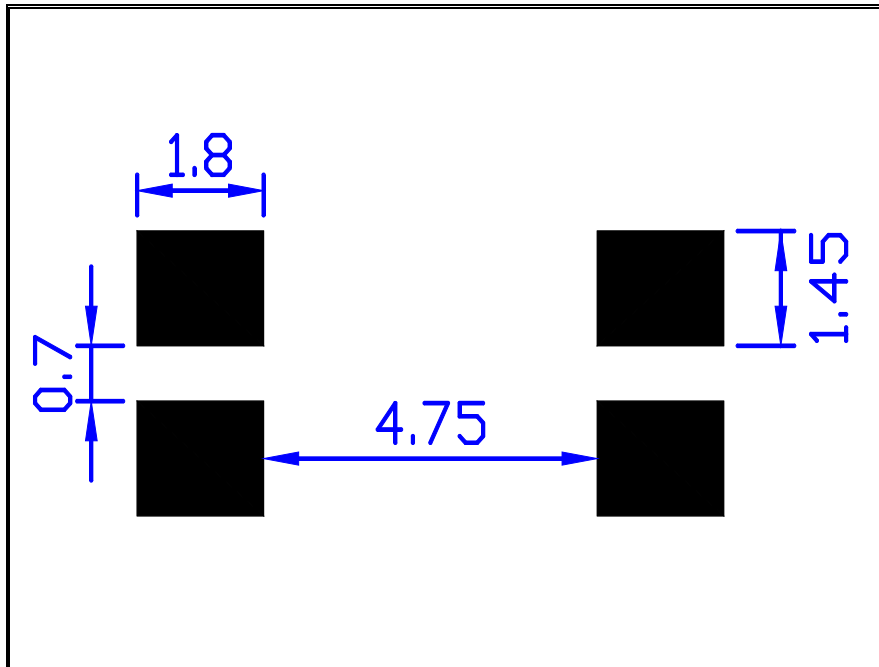
1A (2m $\varsigma$ ~7m $\varsigma$ )



unit: mm

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

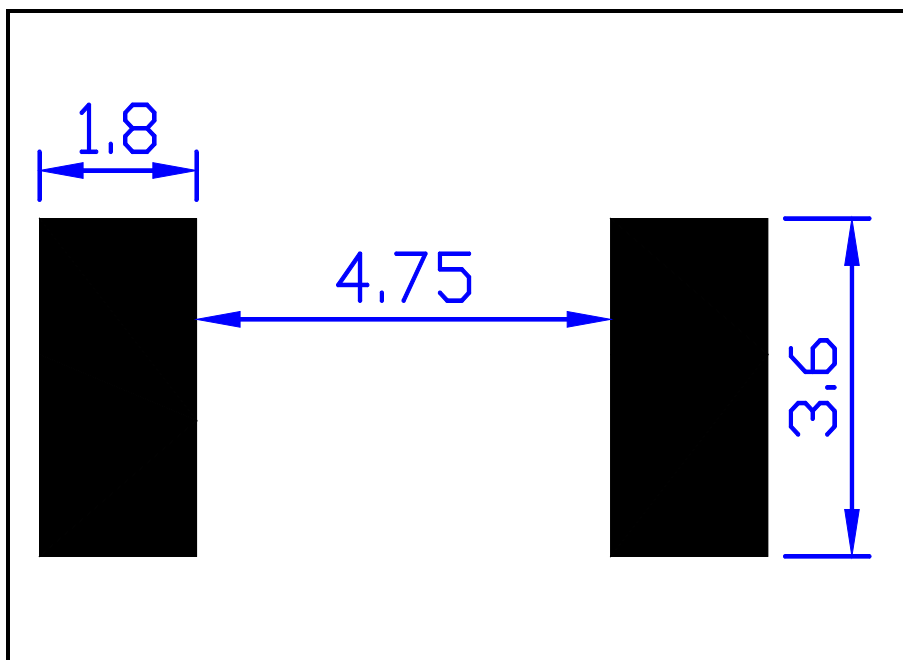
*Note: No circuits between pads to avoid short circuit*



unit: mm

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

*Note: No circuits between pads to avoid short circuit*

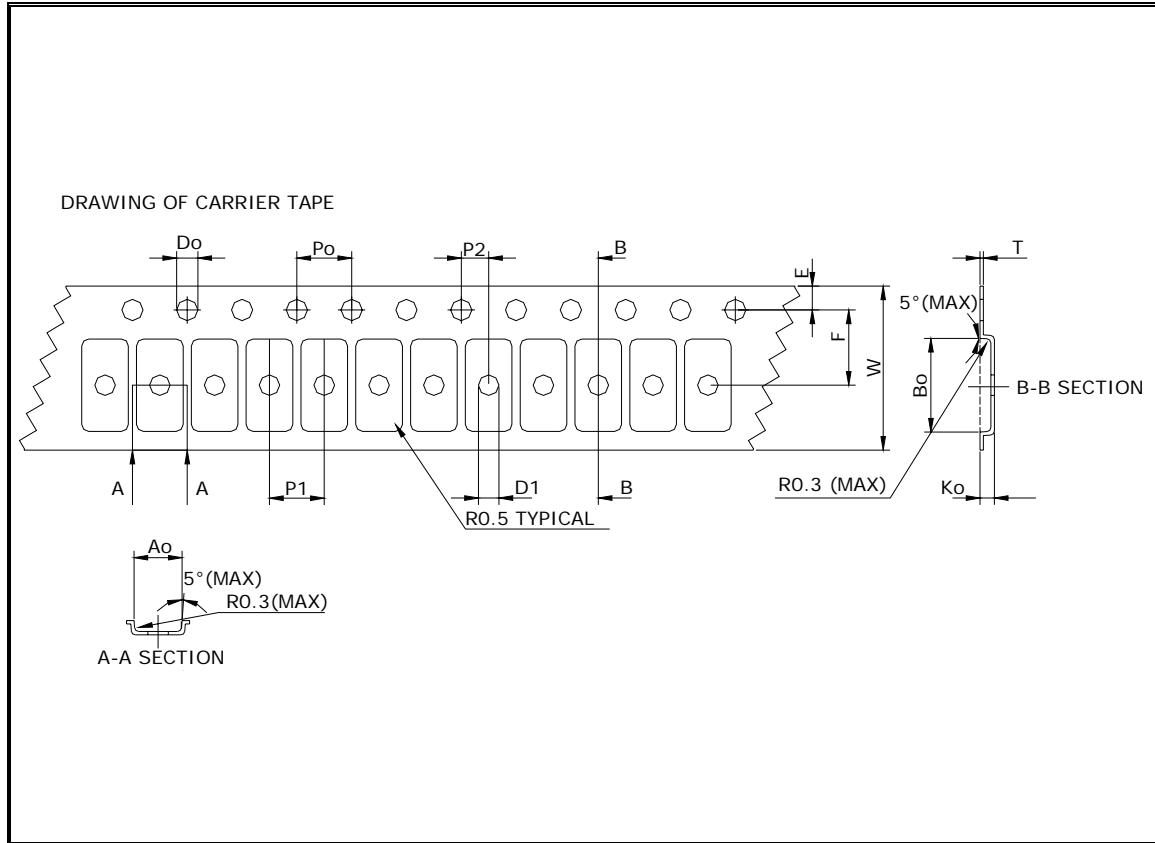


unit: mm

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

**8. Packaging**

Emboss Plastic Tape Specifications



UNIT : mm

Symbol	Ao	Bo	Ko	Po	P1	P2	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	Do	D1	W	10Po	
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 ±0.2mm.
2. Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.
3. Ao & Bo measured 0.3mm from the bottom of the packet
4. Ko 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