

# L4T Four Terminal High Precision Current Sense Resistor



Available in two sizes ARCOL's. Four Terminal High Precision Current Sense Resistor offers High Power in a small package utilising advanced thick film technology.



## Applications

- Power Management Applications
- Switching Power Supply
- Over current Protection
- Portable Devices

## Characteristics

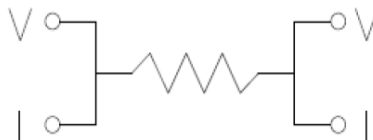
| Item                         | Requirement               | Test Method  |
|------------------------------|---------------------------|--|
| TCR                          | As Spec                   | +25/-55/+25/+125/25°C  |
| Short Time Overload          | $\pm(0.5\%+0.0005\Omega)$ | RCWV*2.5 or Max. Overload voltage whichever is lower for 5 seconds         |
| Insulation Resistance        | >1000M $\Omega$           | Apply 100Vdc for 1 minute  |
| Endurance                    | $\pm(0.5\%+0.0005\Omega)$ | 70 $\pm$ 2°, RCWV for 1000hrs with 1.5 hrs ON and 0.5hrs OFF               |
| Damp Heat with Load          | $\pm(0.5\%+0.0005\Omega)$ | 40 $\pm$ 2°, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs ON and 0.5 hrs OFF |
| Bending Strength             | $\pm(0.5\%+0.0005\Omega)$ | Bending amplitude 3mm for 10 seconds                                       |
| Solderability                |                           | 245 $\pm$ 5°C for 3 seconds  |
| Dielectric Withstand Voltage |                           | Apply Max. Overload Voltage for 1 minute                                   |
| Resistance to Soldering Heat | $\pm(0.5\%+0.0005\Omega)$ | 260 $\pm$ 5°C for 10seconds  |
| Rapid change of temperature  | $\pm(0.5\%+0.0005\Omega)$ | -55°C ~ 155°C, 5 cycles  |

RCWV(Rated continuous working voltage)=  $\sqrt{(P*R)}$  or Max. Operating voltage whichever is lower.

- Reference Standards: MIL-STD-202, JIS-C 5201
- Storage Temperature: 15 ~ 28°C; Humidity <80% RH

## Schematic Diagram

- V = Voltage Terminal
- I = Current Terminal



ARCOL UK Limited,  
Threemilestone Ind. Estate,  
Truro, Cornwall, TR4 9LG, UK.  
T +44 (0) 1872 277431  
F +44 (0) 1872 222002  
E sales@arcolresistors.com

[www.arcolresistors.com](http://www.arcolresistors.com)

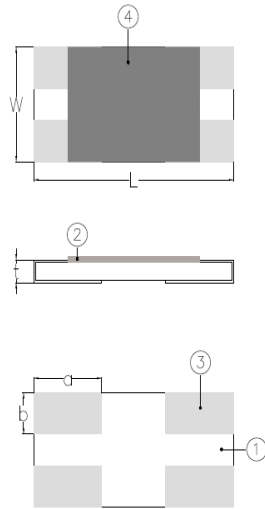
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## Construction



|   |                   |   |                 |
|---|-------------------|---|-----------------|
| 1 | Alumina Substrate | 4 | Protection Coat |
| 2 | Resistor Layer    | 5 | Barrier Layer   |
| 3 | Electrode         |   |                 |

## Dimensions(mm)

| Type  | Size (Inch) | L       | W       | T        | a       | b        | Weight (g)<br>(1000 pcs) |
|-------|-------------|---------|---------|----------|---------|----------|--------------------------|
| L4T12 | 1206        | 3.0±0.2 | 1.6±0.2 | 0.5±0.15 | 1.0±0.2 | 0.55±0.2 | 10                       |
| L4T20 | 2010        | 5.0±0.2 | 2.5±0.2 | 0.5±0.15 | 1.7±0.2 | 0.9±0.2  | 29                       |

| Item<br>Type | Power Rating<br>at 70°C | Operating<br>Temp Range | Resistance Range (mΩ) |     |     |     | TCR(PPM/°C)        |
|--------------|-------------------------|-------------------------|-----------------------|-----|-----|-----|--------------------|
|              |                         |                         | ±0.5%                 | ±1% | ±2% | ±5% |                    |
| L4T12 (1206) | 1/2W                    | -55 ~ + 155°C           | 10 - 20               |     |     |     | ±50 (E)<br>±75 (F) |
| L4T20 (2010) | 3/4W                    | -55 ~ + 155°C           | 10 - 20               |     |     |     | ±50 (E)<br>±75 (F) |

Operating Voltage =  $\sqrt{P \cdot R}$  or Max operating voltage listed above, whichever is lower.  
 Overload Voltage =  $2.5\sqrt{P \cdot R}$  or Max overload voltage listed above, whichever is lower.

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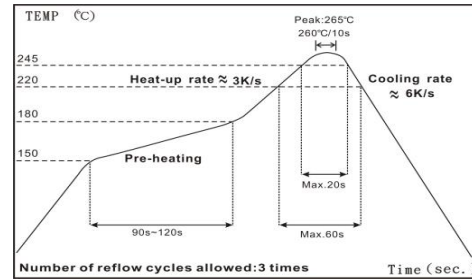
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## Reflow Soldering Profile

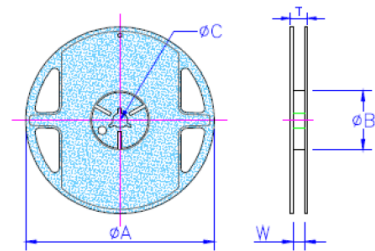
IR Reflow Soldering

Time of IR reflow soldering at maximum temperature point 260°C:10s

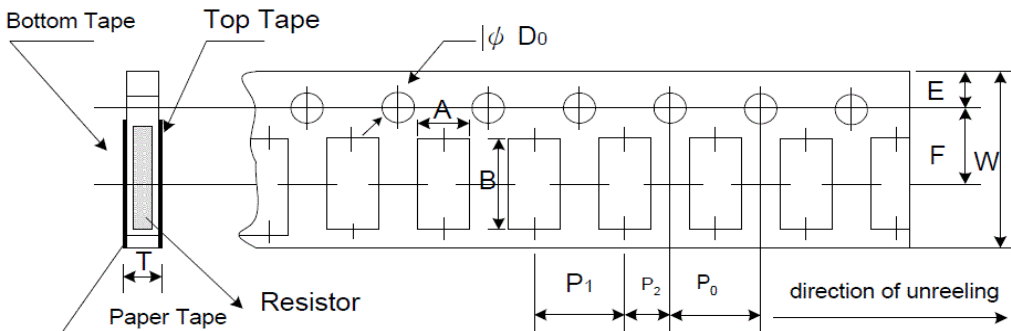


## Packing Quantity & Reel Specifications(mm)

| Type  | øA        | øB       | øC       | W        | T        | Paper Tape (EA) | Emboss Plastic Tape (EA) |
|-------|-----------|----------|----------|----------|----------|-----------------|--------------------------|
| L4T12 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0  | 11.5±1.0 | 5,000           |                          |
| L4T20 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 13.5±1.0 | 15.5±1.0 |                 | 4,000                    |

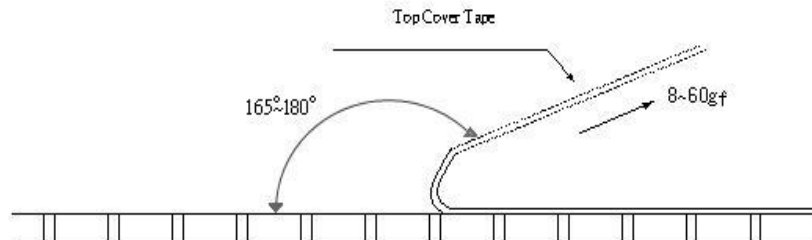


Paper Tape Specifications(mm)



| Type  | A         | B         | W         | E         | F        | P0        | P1        | P2        | øD0       | T         |
|-------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|
| L4T12 | 2.00±0.05 | 3.55±0.05 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.55±0.05 | 0.75±0.05 |

- Peel force of top cover tape
- The peel speed shall be about 300mm/min±5%
- The peel force of top cover tape shall be between 8gf to 80gf



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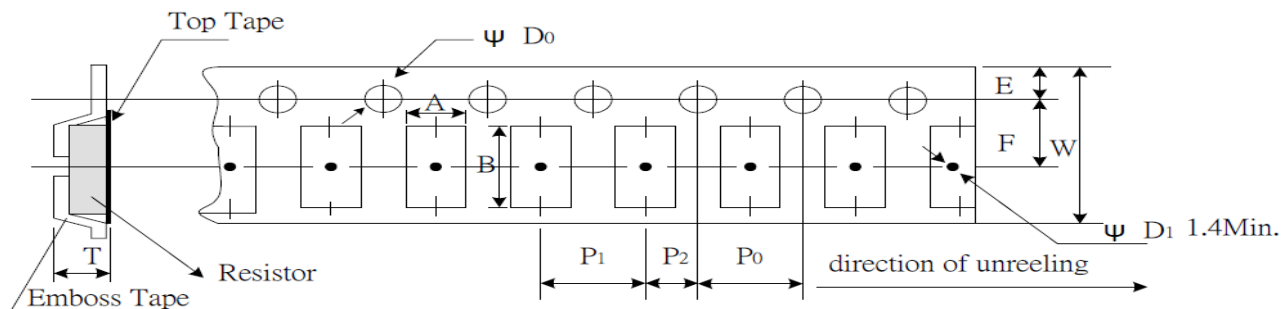
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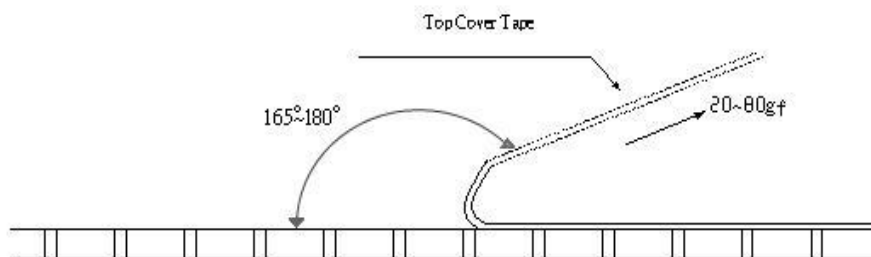


Emboss Plastic Tape Specifications(mm)



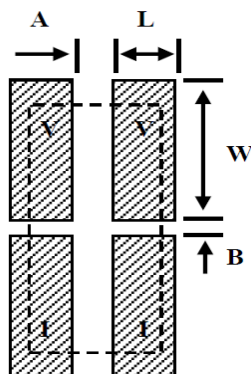
| Type  | A         | B         | W         | E         | F        | P0        | P1        | P2        | øD0       | T         |
|-------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|
| L4T20 | 2.85±0.10 | 5.45±0.10 | 12.0±0.10 | 1.75±0.05 | 5.5±0.05 | 4.00±0.05 | 4.00±0.10 | 2.00±0.05 | 1.50±0.10 | 1.00±0.20 |

- Peel force of top cover tape
- The peel speed shall be about 300mm/min±5%
- The peel force of top cover tape shall be between 20gf to 80gf



## Recommended Pad layout(mm)

| Type  | L    | W    | A    | B    |
|-------|------|------|------|------|
| L4T12 | 1.75 | 1.10 | 1.00 | 0.30 |
| L4T20 | 2.55 | 1.55 | 1.40 | 0.50 |



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## Ordering Procedure

Standard Resistor: Series(L4T12/L4T20), TCR (50PPM (E), 75PPM (F)), Resistance Value(10mΩ - 20mΩ), Tolerance,RoHs (E),Tape(R)

Standard Part Numbers

| 1%            | 0.5%          |
|---------------|---------------|
| L4T12FR010FER | L4T12FR010DER |
| L4T12FR015FER | L4T12FR015DER |
| L4T12FR020FER | L4T12FR020DER |
| L4T20FR010FER | L4T20FR010DER |
| L4T20FR015FER | L4T20FR015DER |
| L4T20FR020FER | L4T20FR020DER |

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