

ACPP Precision Surface Mount Passivated Resistors



- Precision thin film technology
- Extended ohmic range 10R – 1M5
- Precision to $\pm 0.1\%$ and 15ppm/ $^{\circ}\text{C}$
- Passivated range for superior humidity performance
- RoHS Compliant



Characteristics

Tolerance (Code): $\pm 0.1\%$ (B), $\pm 0.25\%$ (C), $\pm 0.5\%$ (D)
 Operating temperature: -55°C to $+155^{\circ}\text{C}$
 Temperature coefficient: $\pm 15\text{ppm}/^{\circ}\text{C}$, $\pm 25\text{ppm}/^{\circ}\text{C}$, $\pm 50\text{ppm}/^{\circ}\text{C}$
 Overload: $\leq \pm 0.2\%$, $\leq \pm 0.1\%$ (ACPP0402), RCWV*2.5 or maximum overload voltage (whichever is lowest) for 2 seconds
 Thermal shock: $\leq \pm 0.02\%$, $\leq \pm 0.1\%$ (ACPP0402), -55°C $+150^{\circ}\text{C}$ 100 cycles
 Endurance: $\leq \pm 0.05\%$, $\leq \pm 0.25\%$ (ACPP0402), $70 \pm 2^{\circ}\text{C}$, RCWV for 1000 hours with 1.5 hours on and 0.5 hours off
 Humidity: $\leq \pm 0.05\%$, $\leq \pm 0.5\%$ (ACPP0402), 1000 hours at $40 \pm 2^{\circ}\text{C}$, 90-95% R.H with 1.5 hours on and 0.5 hours off

Electrical Specifications

Type	Wattage	Maximum operating voltage	Maximum overload voltage	TCR ppm/ $^{\circ}\text{C}$	Ohmic value range
ACPP0402	0.0625	25V	50V	± 15	49R9 - 12K
				± 25	24R9 - 24K9
ACPP0603	0.0625	50V	100V	± 15	24R9 - 332K
				± 25	
				± 50	
ACPP0805	0.1	100V	200V	± 15	10R - 1M
				± 25	
				± 50	
ACPP1206	0.125	150V	300V	± 15	10R - 1M
				± 25	
				± 50	
ACPP2010	0.25	150V	300V	± 15	24R9 - 1M
				± 25	10R - 1M5
				± 50	
ACPP2512	0.5	150V	300V	± 15	24R9 - 1M
				± 25	10R - 1M5
				± 50	

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

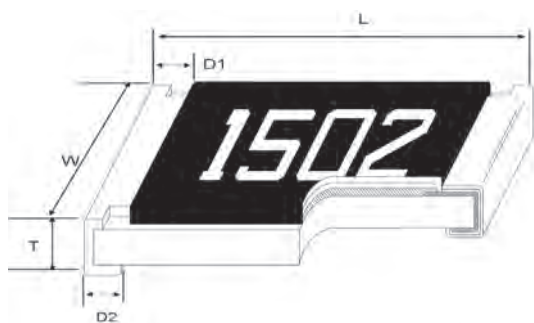
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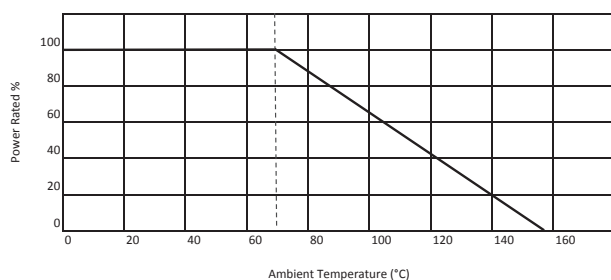
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Dimensions (mm)

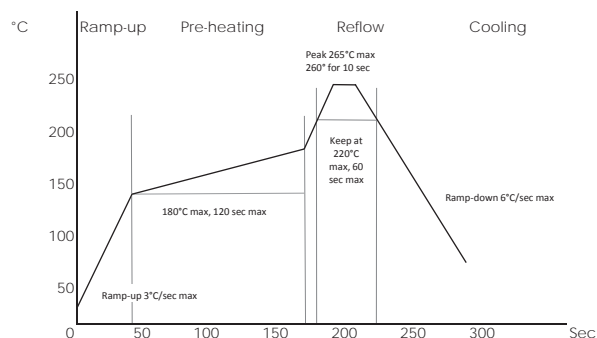
Series	L	W	T	D1	D2
ACPP0402	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.05	0.20 ± 0.10	0.20 ± 0.10
ACPP0603	1.55 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
ACPP0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.30 ± 0.20	0.40 ± 0.20
ACPP1206	3.05 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.42 ± 0.20	0.35 ± 0.20
ACPP2010	4.90 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.60 ± 0.30	0.50 ± 0.20
ACPP2512	6.30 ± 0.15	3.10 ± 0.15	0.55 ± 0.10	0.60 ± 0.30	0.50 ± 0.20



Derating Curve



Soldering Curve



Ordering Procedure

Standard Resistor: Series, Resistance Value, Tolerance, TCR
 .i.e: ACPP0603 100K B 15PPM

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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

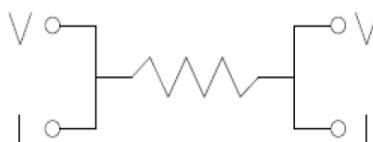
Item	Requirement	Test Method
TCR	As Spec	+25/-55/+25/+125/25°C
Short Time Overload	$\pm(0.5\%+0.0005\Omega)$	RCWV*2.5 or Max. Overload voltage whichever is lower for 5 seconds
Insulation Resistance	>1000M Ω	Apply 100Vdc for 1 minute
Endurance	$\pm(0.5\%+0.0005\Omega)$	70 \pm 2°, RCWV for 1000hrs with 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



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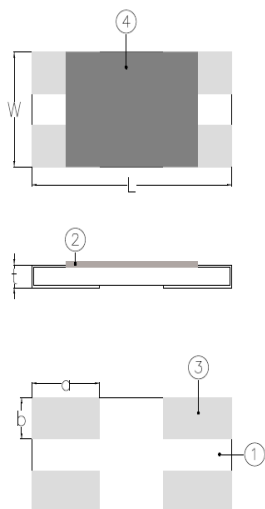
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Construction



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) (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 Type	Power Rating at 70°C	Operating Temp Range	Resistance Range (mΩ)				TCR(PPM/°C)
			±0.5%	±1%	±2%	±5%	
L4T12 (1206)	1/2W	-55 ~ + 155°C	10 - 20				±50 (E) ±75 (F)
L4T20 (2010)	3/4W	-55 ~ + 155°C	10 - 20				±50 (E) ±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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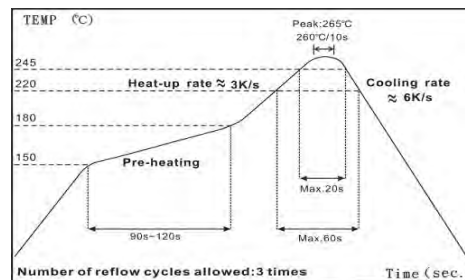
L4T Four Terminal High Precision Current Sense Resistor



Reflow Soldering Profile

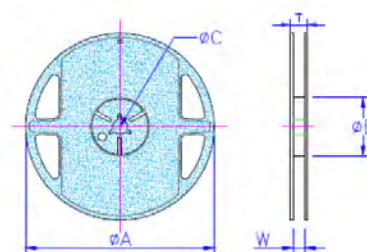
IR Reflow Soldering

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

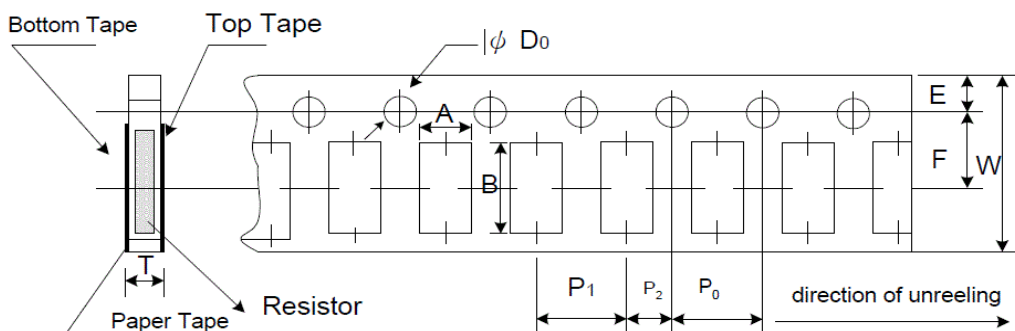


Packing Quantity & Reel Specifications(mm)

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

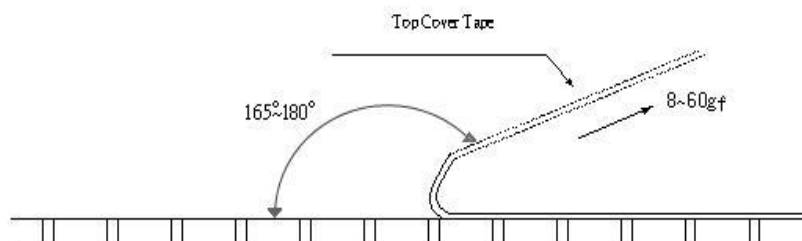


Paper Tape Specifications(mm)



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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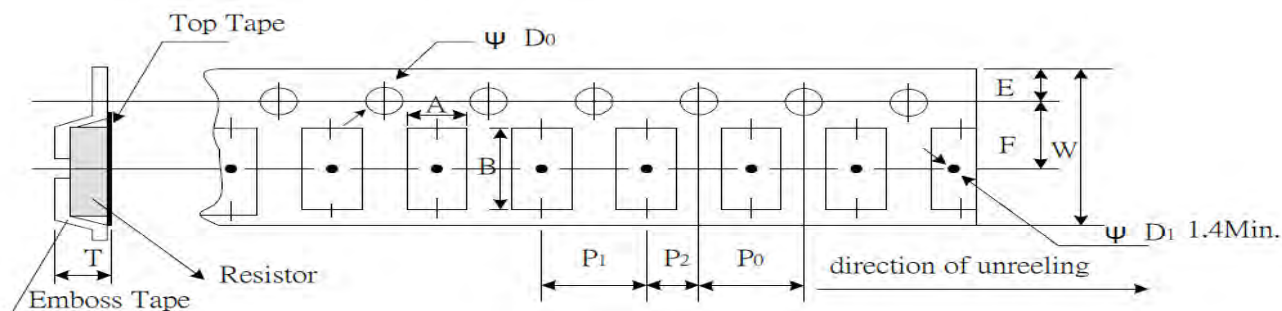
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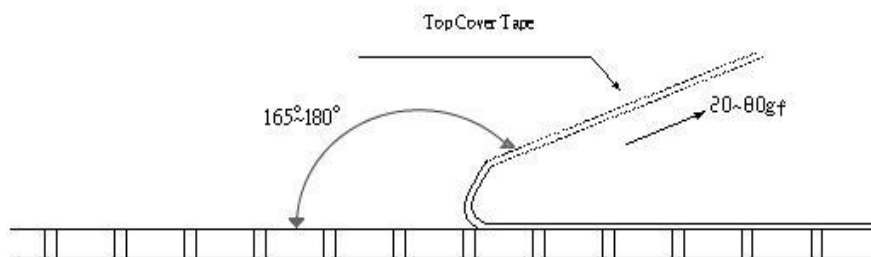


Emboss Plastic Tape Specifications(mm)



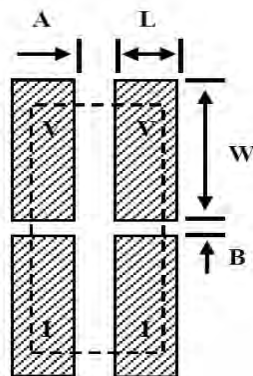
Type	A	B	W	E	F	P0	P1	P2	øD0	T
L4T20	2.85±0.10	5.45±0.10	12.0±0.10	1.75±0.05	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50±0.10	1.00±0.20

- 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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