

Chip-Type Metal Plate Low-Resistance Resistor

ISO 9001:2000
CERTIFIED
TS-16949
CERTIFIED

Type TLR

1. General

- Ultra-low TCR ($\pm 75\text{ppm}/^\circ\text{C}$) available
- Metal alloy: superior corrosion & heat resistance
- Applications include current sensing, voltage division and pulse applications
- Ultra low resistance ($1\text{m}\Omega\sim 20\text{m}\Omega$) suitable for large current detecting
- Available Pb-free/RoHS compliant
- Low inductance

2. Type Designation

The type designation shall be the following form:

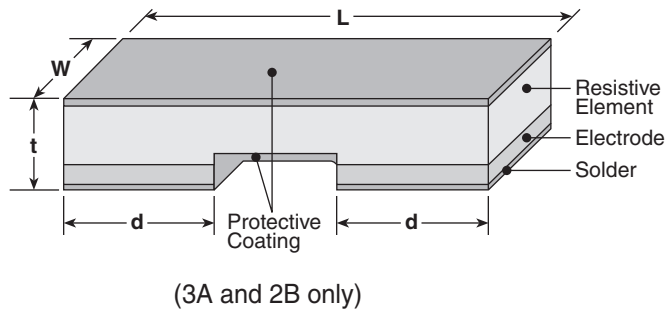
New Type

TLR	3A	D	TE	2L00	F	75
Type	Power Rating	Termination Material	Packaging	Nominal Resistance	Tolerance	T.C.R.
	2B: 0.5W 2H: 1W 3A: 1W 3AW: 2W	D: SnAgCu (2B, 2H, 3A, 3AW) L: SnPb (3A)	TE: 7" 8mm Pitch Embossed plastic 2,000 pcs/reel (3A, 3AW) TE: 7" 4mm Pitch Embossed plastic 4,000 pcs/reel (2H only) TD: 4mm Pitch Punched paper 5,000 pcs/reel paper (2B only) BK: Bulk	F: 4 digits J: 3 digits Ex: 2L00: 2m Ω	F: $\pm 1\%$ J: $\pm 5\%$	75ppm/ $^\circ\text{C}$ Nil: 150ppm/ $^\circ\text{C}$ Nil: 200ppm/ $^\circ\text{C}$

3. Standard Applications

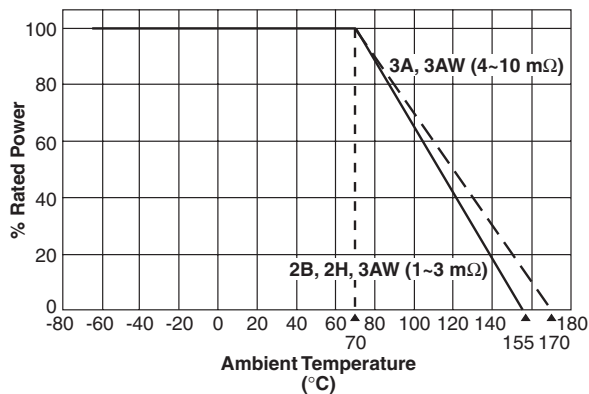
Part Designation	Power Rating @ 70 $^\circ\text{C}$	T.C.R. (ppm/ $^\circ\text{C}$) Max.	Standard Resistance (Ω)	Resistance Tolerance	Absolute Maximum Working Voltage	Rated Ambient Temperature	Operating Temperature Range
TLR2B	1/2W (.5W)	± 75	2m,3m,4m,5m,6m,8m, 10m,11m,12m,13m, 15m,16m,18m,20m	F: $\pm 1\%$	\sqrt{PxR}	+70 $^\circ\text{C}$	-65 $^\circ\text{C}$ to +155 $^\circ\text{C}$
		± 150		F: $\pm 1\%$, J: $\pm 5\%$			
TLR2H	1W	± 75	2m,3m,4m,5m, 6m,7m,8m,9m,10m	F: $\pm 1\%$	\sqrt{PxR}	+70 $^\circ\text{C}$	-65 $^\circ\text{C}$ to +155 $^\circ\text{C}$
		± 150		F: $\pm 1\%$, J: $\pm 5\%$			
TLR3A	1W	± 150	1m, 2m	F: $\pm 1\%$, J: $\pm 5\%$	\sqrt{PxR}	+70 $^\circ\text{C}$	-65 $^\circ\text{C}$ to +170 $^\circ\text{C}$
		± 200	3m, 4m				
TLR3AW	2W	± 75	3m	F: $\pm 1\%$	\sqrt{PxR}	+70 $^\circ\text{C}$	-65 $^\circ\text{C}$ to +155 $^\circ\text{C}$
			4m,5m,6m,7m,8m				-65 $^\circ\text{C}$ to +170 $^\circ\text{C}$
		± 150	1m,2m,3m,4m,5m, 6m,7m,8m,9m,10m	F: $\pm 1\%$, J: $\pm 5\%$			-65 $^\circ\text{C}$ to +155 $^\circ\text{C}$

4. Dimensions & Construction

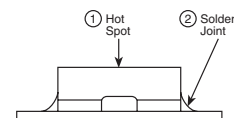
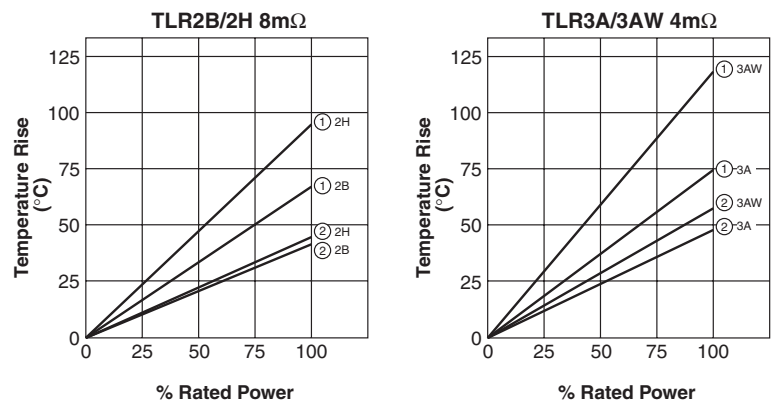


Size Code	Resistance	Dimensions inches (mm)			
		L	W	d	t
TLR2B	2m, 3m, 4m, 5m, 6m, 8m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m	.126±.008 (3.20±0.20)	.063±.008 (1.60±0.20)	.020±.008 (0.50±0.20)	.024±.008 (0.60±0.20)
TLR2H	2mΩ - 6mΩ	.200±.008 (5.00±0.20)	.100±.008 (2.50±0.20)	.060±.008 (1.50±0.20)	.024±.008 (0.60±0.20)
	7mΩ - 10mΩ			.020±.008 (0.50±0.20)	
TLR3A	1mΩ	.25±.01 (6.35±0.25)	.125±.01 (3.18±0.25)	.087±.01 (2.20±0.25)	.024±.01 (0.62±0.25)
	2mΩ			.047±.01 (1.20±0.25)	
	3mΩ			.073±.01 (1.85±0.25)	
	4mΩ			.047±.01 (1.20±0.25)	
TLR3AW	1mΩ - 4mΩ	.25±.01 (6.35±0.25)	.125±.01 (3.18±0.25)	.087±.01 (2.20±0.25)	.024±.01 (0.60±0.25)
	5mΩ - 8mΩ			.047±.01 (1.20±0.25)	
	10mΩ			.030±.01 (0.77±0.25)	

5. Derating Curve



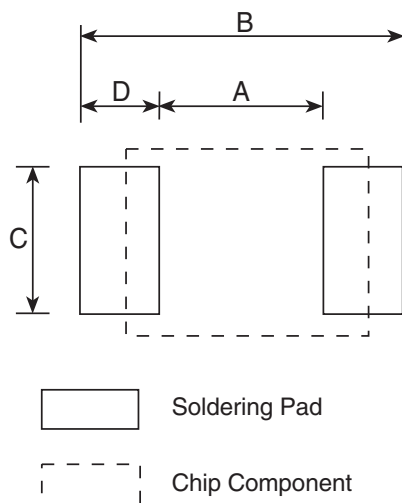
6. Temperature Rise



7. Characteristics

Item	Requirement	Conditions
Thermal Shock	$\pm 0.5\% \Delta R$	-55°C ~ +150°C, 1000 cycles, 15 minutes at each extreme
Short Time Overload	$\pm 0.5\% \Delta R$	Rated power x 5 for 5 seconds (TLR3AW (9-10 mΩ only) rated power x 2.5 for 5 seconds)
Low Temperature Storage	$\pm 0.5\% \Delta R$	-65°C for 24 hours
High Temperature Exposure	$\pm 1.0\% \Delta R$	+170°C, 1000 hours for 3A & 3AW (4-10 mΩ only) ±155°C, 1000 hours for 3AW (1-3 mΩ), 2B & 2H only)
Blased Humidity	$\pm 0.5\% \Delta R$	+85°C ± 2°C, 85% RH, 10% Bias, 1000 hours
Mechanical Shock	$\pm 0.5\% \Delta R$	100 grams for 11 milliseconds, 5 pulses
Vibration	$\pm 0.5\% \Delta R$	Frequency varied 10 to 2000 Hz in one minute, 3 directions, 12 hours
Load Life	$\pm 1.0\% \Delta R$	1000 hours @ rated power, +70°C, 1.5 hours "ON", 0.5 hours "OFF"
Resistance to Solder Heat	$\pm 0.5\% \Delta R$	+260°C ± 5°C, 10 ~ 12 seconds
Moisture Resistance	$\pm 0.5\% \Delta R$	MIL-STD-202, Method 106, 0% power, 7a and 7b not required

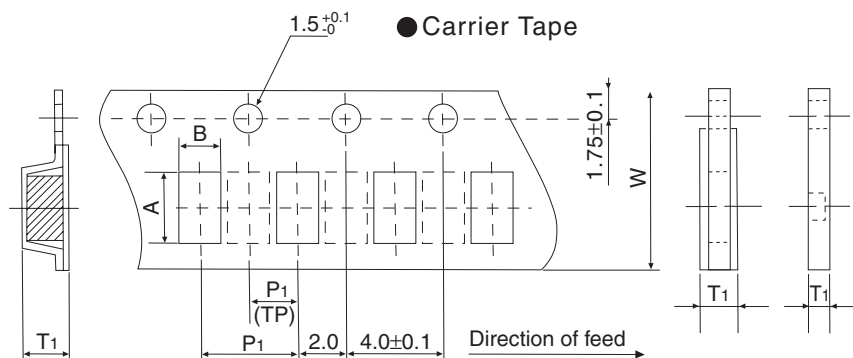
8. Solder Pad Dimensions



Type	Style	Dimensions millimeters				
		Component Size	A	B	C	D
TLR	3A (1mΩ)	6.35 X 3.18	1.95	7.55	3.83	3.05
	3A (2mΩ)		3.45	7.55	3.83	2.05
	3A (3mΩ)		2.15	7.55	3.83	2.70
	3A (4mΩ)		3.45	7.55	3.83	2.05
	2B	3.2 X 1.6	1.4	4.0	1.8	1.3
	2H (2mW~6mW)	5.0 X 2.5	1.3	6.1	3.0	2.4
	2H (7mW~10mW)	5.0 X 2.5	3.3	6.1	3.0	1.4
	3AW (2mW~4mW)	6.35 X 3.18	1.45	7.55	3.83	3.05
	3AW (5mW~8mW)	6.35 X 3.18	3.45	7.55	3.83	2.05
	3AW (10mΩ)	6.35 X 3.18	4.40	7.55	3.83	1.575

10. Packaging

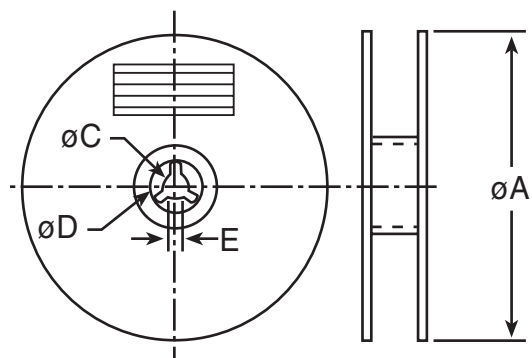
10.1 Dimensions of Carrier Tape



(Notes) Dotted lines are applicable to only "TP" and "TB."

Type		Component Size (mm)			Carrier Tape	Quantity/ Reel (Pieces)	Taping (mm)					Reel Size
		L	W	T			A	B	W	P1	T1	
TLR	3A, 3AW	6.4	3.2	0.6	TE	2000	6.75 ^{±0.2}	3.55 ^{±0.1}	12.0 ^{±0.1}	8.0 ^{±0.2}	1.0 ^{±0.1}	180
	2B	3.2	1.6	0.6	TD	5000	3.5 ^{±0.2}	2.0 ^{±0.2}	8.0 ^{±0.2}	4.0 ^{±0.1}	0.75 ^{+0.2/-0}	180
	2H	5.0	2.5	0.6	TE	4000	5.35 ^{±0.2}	2.9 ^{±0.1}	12.0 ^{±0.1}	4.0 ^{±0.1}	1.0 ^{±0.15}	180

10.2 Reel Dimensions (2,000 pieces/Reel)



Dimensions in inches (mm)

	øA	øC	øD	E	Qty/ Reel
3A 3AW	7.08	.511	.826	.079	2,000
2B	(180 ^{±0.0} _{3.0})	(13.0 ^{±0.2})	(21.0 ^{±0.8})	(2.0 ^{±0.2})	5,000
2H					4,000