

Type TLM Series

Key Features

Low resistance resistor for current detection

Small size to power ratio

Metal foil construction ensures high reliability and performance with very low and stable TCR

Designed for current sense circuits in power electronic systems

Terminal finish matte Sn over Ni



TE Connectivity is pleased to introduce this low ohmic metal chip resistor designed for current sense circuits in power electronic systems. Supplied as standard on tape and reel for automatic insertion processes.

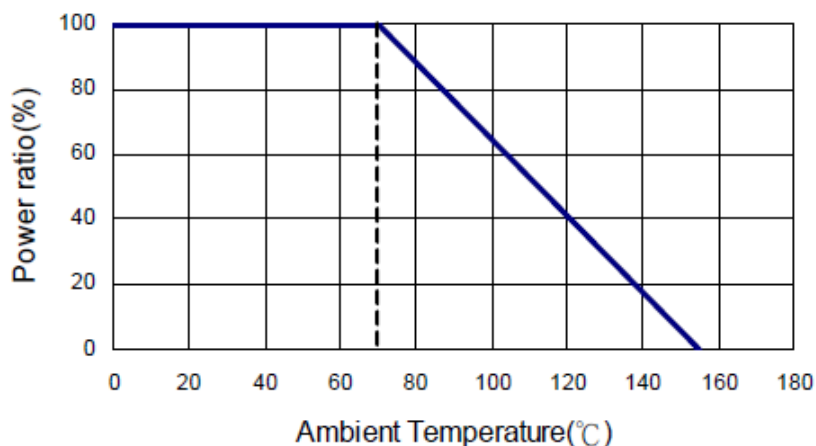
Characteristics – Electrical

Type	Power Rating @ 70°C	Operating Temp. Range	Resistance Range (mΩ)			TCR (PPM/°C)
			±1%	±2%	±5%	
TLM 1J	0.125W	-55~+55°C	10 - 19			±100
			20 - 100			±50 ±100
TLM 2A	0.25W		10 - 19			±100
			20 - 100			±50 ±100
TLM 2B	0.5W		10 – 19			±100
			20 - 100			±50 ±100
TLM 2H	0.75W		10 – 19			±100
			20 - 100			±50 ±100
TLM 3A	1W		10 – 19			±100
			20 - 100			±50 ±100

Operating Voltage= $\sqrt{P \cdot R}$; Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$; Operating Current= $\sqrt{P/R}$

Power derating curve

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with this curve.



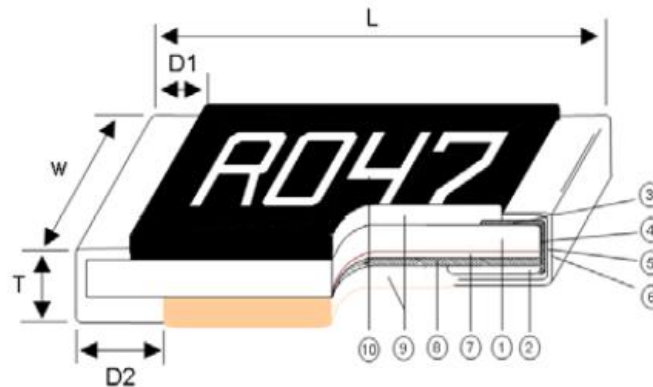
Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (TCR)	As Spec.	-55°C~+125°C, 25°C is the reference temperature
Short Term Overload	$\pm(0.5\%+0.05\Omega)$	5 X Rated Power for 5 seconds
Insulation Resistance	$\geq 10G$	Max. overload voltage for 1 minute
Endurance	$\pm(1.0\%+0.05\Omega)$	70 $\pm$ 2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	$\pm(1.0\%+0.05\Omega)$	40 $\pm$ 2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Dry Heat	$\pm(0.5\%+0.05\Omega)$	at +155°C for 1000 hrs
Bending Strength	As Spec.	Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Solderability	95% min. coverage	245 $\pm$ 5°C for 3 seconds
Resistance to Soldering Heat	$\pm(0.5\%+0.05\Omega)$	260 $\pm$ 5°C for 10 seconds
Voltage Proof	No breakdown or flashover	1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area $\leq 5\%$ Total leaching area $\leq 10\%$	260 $\pm$ 5°C for 30 seconds
Rapid Change of Temperature	$\pm(0.5\%+0.05\Omega)$	-55°C to +155°C, 5 cycles

Reference Standards: IEC 60115-1, 60068-2-58; JIS-C 5201-1

Storage Temperature: 25 $\pm$ 3°C; Humidity < 80%RH

Construction:

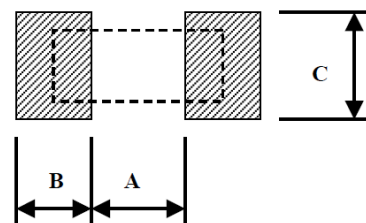


1	Alumina Substrate	5	Barrier Layer (Ni)	9	Primary Overcoat (Epoxy)
2	Bottom Electrode (Cu)	6	External Electrode (Sn)	10	Marking (Epoxy)
3	Top Electrode (NiCr)	7	Adhesive (Acrylic)		
4	Edge Electrode (NiCr)	8	Resistor Layer (Alloy)		

Dimensions

Type	Resistance Range (mΩ)	L	W	T	D1	D2
TLM 1J	10 – 29	1.55±0.10	0.85±0.10	0.40±0.10	0.30±0.15	0.45±0.15
	30 - 100	1.55±0.10	0.85±0.10	0.40±0.10	0.30±0.15	0.35±0.15
TLM 2A	10 – 29	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.50±0.20
	30 - 100	2.00±0.15	1.25±0.15	0.52±0.10	0.30±0.20	0.35±0.20
TLM 2B	10 - 29	3.05±0.15	1.55±0.15	0.58±0.15	0.50±0.25	0.90±0.25
	30 - 100	3.05±0.15	1.55±0.15	0.55±0.15	0.50±0.25	0.60±0.25
TLM 2H	10 - 29	5.00±0.20	2.50±0.20	0.58±0.15	0.60±0.30	1.50±0.30
	30 - 100	5.00±0.20	2.50±0.20	0.55±0.15	0.60±0.30	0.90±0.30
TLM 3A	10 – 29	6.30±0.20	3.15±0.20	0.58±0.15	0.60±0.30	1.80±0.30
	30 - 100	6.30±0.20	3.15±0.20	0.55±0.15	0.60±0.30	1.20±0.30

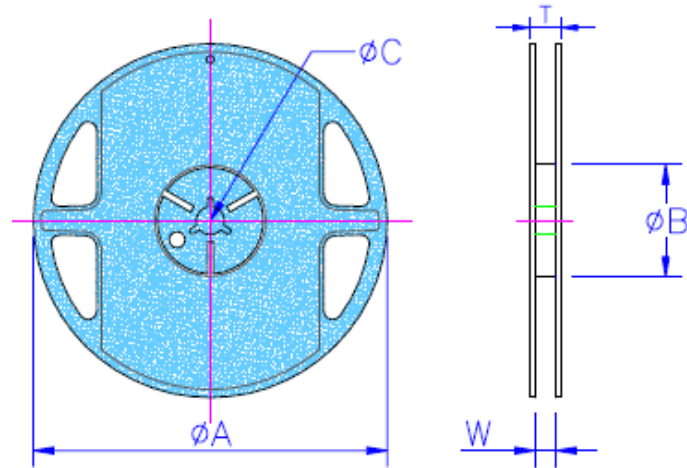
Recommended Land Pattern:



Type	Resistance Range (mΩ)	A	B	C
TLM1J	10 – 29	0.40	1.20	0.50
	30 - 100	0.70	1.05	0.90
TLM2A	10 – 29	0.80	1.10	1.35
	30 - 100	1.00	1.00	1.35
TLM2B	10 - 29	0.9	1.70	1.70
	30 - 100	1.50	1.40	1.70
TLM2H	10 - 29	1.70	2.35	2.50
	30 - 100	2.80	1.80	2.50
TLM3A	10 – 29	2.30	2.90	3.10
	30 - 100	3.60	2.25	3.10

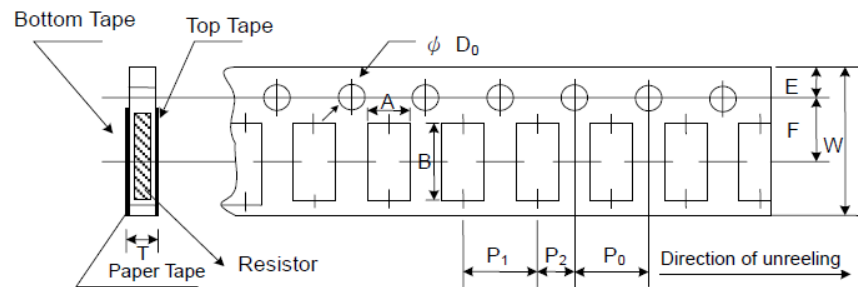
Packaging

Packaging Quantity and Reel Specification:



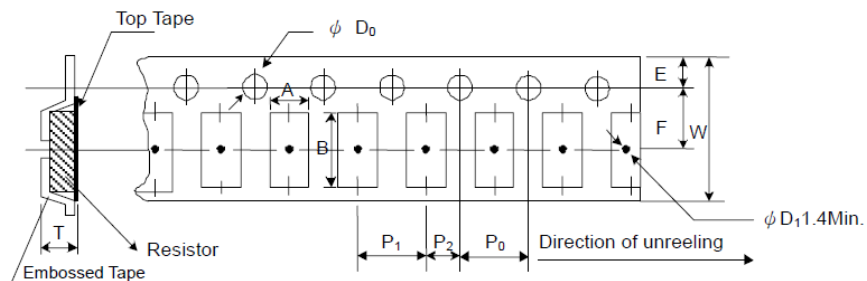
Type	ΦA	ΦB	ΦC	W	T	Paper Tape (EA)	Embossed Plastic Tape (EA)
TLM1J	178.0±1.0	60.0±1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
TLM2A	178.0±1.0	60.0±1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
TLM2B	178.0±1.0	60.0±1.0	13.5±0.7	9.5±0.1	11.5±1.0	5,000	-
TLM2H	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
TLM3A	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



Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
TLM1J	1.10 ±0.10	1.90 ±0.10	8.0 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	4.00 ±0.05	2.00 ±0.05	1.50 +0.1 -0	0.70 ±0.10
TLM2A	1.60 ±0.10	2.40 ±0.20	8.0 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	4.00 ±0.05	2.00 ±0.05	1.50 +0.1 -0	0.85 ±0.10
TLM2B	1.90 ±0.10	3.50 ±0.20	8.0 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	4.00 ±0.05	2.00 ±0.05	1.50 +0.1 -0	0.85 ±0.10

Embossed Plastic Tape Specifications



Type	A	B	W	E	F	P0	P1	P2	ΦD0	T
TLM2H	2.80 ±0.10	5.50 ±0.10	12.0 ±0.10	1.75 ±0.10	5.50 ±0.05	4.00 ±0.05	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10	1.00 ±0.20
TLM3A	3.50 ±0.10	6.700 ±0.20	12.0 ±0.20	1.75 ±0.10	5.50 ±0.05	4.00 ±0.05	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10	1.00 ±0.20

How To Order

TLM	2A	E	R01	J	TD
Common Part	Size	TCR	Resistance Value	Tolerance	Pack Style
TLM	1J - 0603 2A - 0805 2B - 1206 2H - 2010 3A - 2512	D - 50PPM E - 100PPM	10mΩ - R01 100mΩ - R10	F - 1% J - 5%	TD - Reel 5K (0603, 0805, 1206) TE - Reel 4K (2010, 2512)