

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= $v(P \cdot R)$; Overload Voltage= $2.5 \cdot v(P \cdot R)$; Operating Current= $v(P/R)$

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 | ±(0.5%+0.05Ω) | 5 X Rated Power for 5 seconds |
| Insulation Resistance | ≥10G | Max. overload voltage for 1 minute |
| Endurance | ±(1.0%+0.05Ω) | 70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Damp Heat with Load | ±(1.0%+0.05Ω) | 40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Dry Heat | ±(0.5%+0.05Ω) | 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±5°C for 3 seconds |
| Resistance to Soldering Heat | ±(0.5%+0.05Ω) | 260±5°C for 10 seconds |
| Voltage Proof | No breakdown or flashover | 1.42 times RCWV (RMS) for 1 minute |
| Leaching | Individual leaching area ≤5% Total leaching area ≤10% | 260±5°C for 30 seconds |
| Rapid Change of Temperature | ±(0.5%+0.05Ω) | -55°C to +155°C, 5 cycles |

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

Storage Temperature: 25±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 | ϕD_0 | 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) |



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