

5 mm Square Surface Mount Miniature Trimmers Multi-Turn Cermet Sealed



The TSM4 trimming potentiometer has been designed for surface mount applications and offers volumetric efficiency 5 mm x 5 mm x 3.7 mm with high performance and stability.

The TSM4 design is suitable for both manual or automatic operation, and can withstand vapor phase and reflow soldering techniques.

FEATURES

- 0.25 W at 70 °C
- Professional and industrial grade
- Wide ohmic range (10 Ω to 1 MΩ)
- Low contact resistance variation (2 % or 3 Ω)
- Small size for optimum packaging density
- Tests according to CECC 41000 or IEC 60393-1
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT



| ELECTRICAL SPECIFICATIONS | |
|--|---------------------------------------|
| Resistive element | Cermet |
| Electrical travel | 11 turns \pm 2 |
| Resistance range | 10 Ω to 1 M Ω |
| Standard series | 1 - 2 - 5 |
| Tolerance standard | \pm 10 % |
| Power rating | Linear 0.25 W at 70 °C |
| Circuit diagram | |
| Temperature coefficient | See Standard Resistance Element table |
| Limiting element voltage (linear law) | 200 V |
| Contact resistance variation (typical) | 2 % or 3 Ω |
| End resistance (typical) | 1 Ω |
| Dielectric strength (RMS) | 600 V |
| Insulation resistance (500 V _{DC}) | 10 ⁶ M Ω |

| MECHANICAL SPECIFICATIONS | |
|----------------------------------|------------------------------|
| Mechanical travel | 13 turns \pm 2 |
| Operating torque (max. Ncm) | 1 |
| End stop torque (Ncm) | Clutch action (2 turns max.) |
| Unit weight (max. g) | 0.15 |
| Wiper (actual travel) | Positioned at approx. 50 % |

| ENVIRONMENTAL SPECIFICATIONS | |
|-------------------------------------|-----------------------|
| Temperature range | -55 °C to +125 °C |
| Climatic category | 55/125/56 |
| Sealing | Sealed container IP67 |
| MSL level | 1 |

| SOLDERING RECOMMENDATIONS | |
|---|--|
| Recommended reflow profile 2, see Application Note www.vishay.com/doc?52029 | |



| PERFORMANCES | | | | |
|-------------------------|---|---------------------------|--------------------------|---|
| TESTS | CONDITIONS | TYPICAL VALUES AND DRIFTS | | |
| | | $\Delta R_T/R_T$ | $\Delta R_{1-2}/R_{1-2}$ | OTHER |
| Electrical endurance | 1000 h at rated power 90'/30' - ambient temp. 70 °C | ± 2 % | ± 3 % | Contact res. variation: $\Delta < 1 \%$ Rn |
| Climatic sequence | Phase A dry heat 125 °C Phase B damp heat Phase C cold -55 °C Phase D damp heat 5 cycles | ± 2 % | ± 3 % | Dielectric strength: 600 V _{RMS} Insulation resistance: $> 10^4$ M Ω |
| Damp heat, steady state | Temperature 40 °C - RH 93 % 56 days | ± 2 % | ± 3 % | Dielectric strength: 600 V _{RMS} Insulation resistance: $> 10^4$ M Ω |
| Charge of temperature | -55 °C to +125 °C 5 cycles | ± 1 % | | $\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 2 \%$ |
| Mechanical endurance | 100 cycles - rated power | $\pm (3 \% + 3 \Omega)$ | | |
| Shock | 50 g - 11 ms 3 successive shocks in 3 directions | ± 1 % | | $\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 1 \%$ |
| Vibration | 10 Hz to 55 Hz 0.75 mm or 10 g - 6 h | ± 1 % | | $\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 1 \%$ |

Note

- Nothing stated herein shall be construed as a guarantee of quality or durability.

| STANDARD RESISTANCE ELEMENT DATA | | | | |
|----------------------------------|---------------------|----------------------|------------------------------|--|
| STANDARD RESISTANCE VALUES | LINEAR LAW | | | TYPICAL TCR -55 °C +125 °C ppm/°C |
| | MAX. POWER AT 70 °C | MAX. WORKING VOLTAGE | MAX. CURRENT THROUGH ELEMENT | |
| Ω | W | V | mA | |
| 10 | 0.25 | 1.58 | 158 | ± 100 |
| 20 | 0.25 | 2.23 | 112 | |
| 50 | 0.25 | 3.53 | 77 | |
| 100 | 0.25 | 5.00 | 50 | |
| 200 | 0.25 | 7.07 | 35 | |
| 500 | 0.25 | 11.2 | 22 | |
| 1K | 0.25 | 15.8 | 15.8 | |
| 2K | 0.25 | 22.3 | 11.2 | |
| 5K | 0.25 | 35.3 | 7.1 | |
| 10K | 0.25 | 50.0 | 5.0 | |
| 20K | 0.25 | 70.7 | 3.5 | |
| 50K | 0.25 | 112 | 2.2 | |
| 100K | 0.25 | 158 | 1.6 | |
| 200K | 0.25 | 200 | 1.0 | |
| 500K | 0.08 | 200 | 0.4 | |
| 1M | 0.04 | 200 | 0.2 | |

MARKING

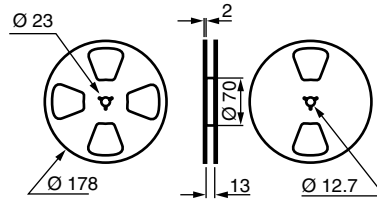
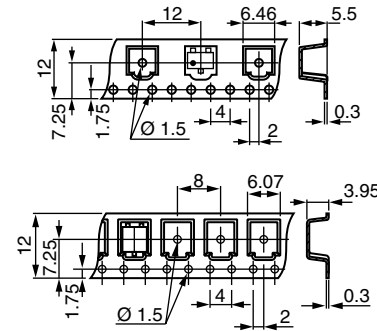
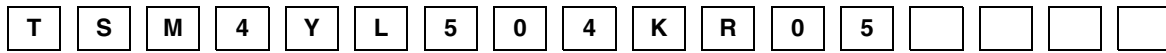
Vishay trademark, ohmic value, manufacturing date

The ohmic value is indicated by a 3 figure code, the first two are significant figures, the third one is the multiplier.

Example: 100 = 10 Ω
 101 = 100 Ω
 102 = 1000 Ω
 503 = 50 000 Ω

PACKAGING in millimeters

On tape and reel, by 500 pieces for Z version: Code TR500, or 250 pieces for Y version: Code TR250.
 In bulk on request (plastic box of 50 pieces): Code BO50.

Version Y

Version Z

ORDERING INFORMATION (part number)


| | | | | | |
|-------------|--|---|-----------------|--|---|
| MODEL | STYLE | OHMIC VALUE | TOLERANCE | PACKAGING | SPECIAL NUMBER |
| TSM4 | YJ YL ZJ ZL | From 10 Ω to 1 MΩ 504 = 500 kΩ | K = 10 % | R10 = reel 500 pieces for ZJ and ZL R05 = reel 250 pieces for YJ and YL On request B25 = box of 50 pieces | (If applicable) Given by Vishay for custom design |

DESCRIPTION (for information only)

| | | | | | | |
|-------------|-----------|-------------|-------------|---------|-----------|----------------|
| TSM4 | YL | 500K | 10 % | | TR | e3 |
| MODEL | STYLE | VALUE | TOLERANCE | SPECIAL | PACKAGING | LEAD (Pb)-FREE |

RELATED DOCUMENTS
APPLICATION NOTES

| | |
|---|--|
| Potentiometers and Trimmers | www.vishay.com/doc?51001 |
| Guidelines for Vishay Sfernice Resistive and Inductive Components | www.vishay.com/doc?52029 |



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