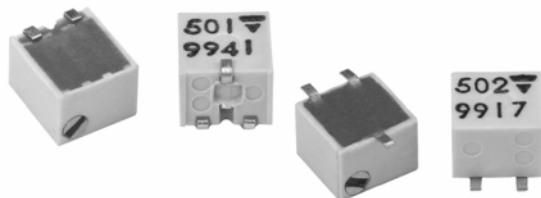


## 5 mm Square Surface Mount Miniature Trimmers Multi-Turn Cermet Sealed



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.

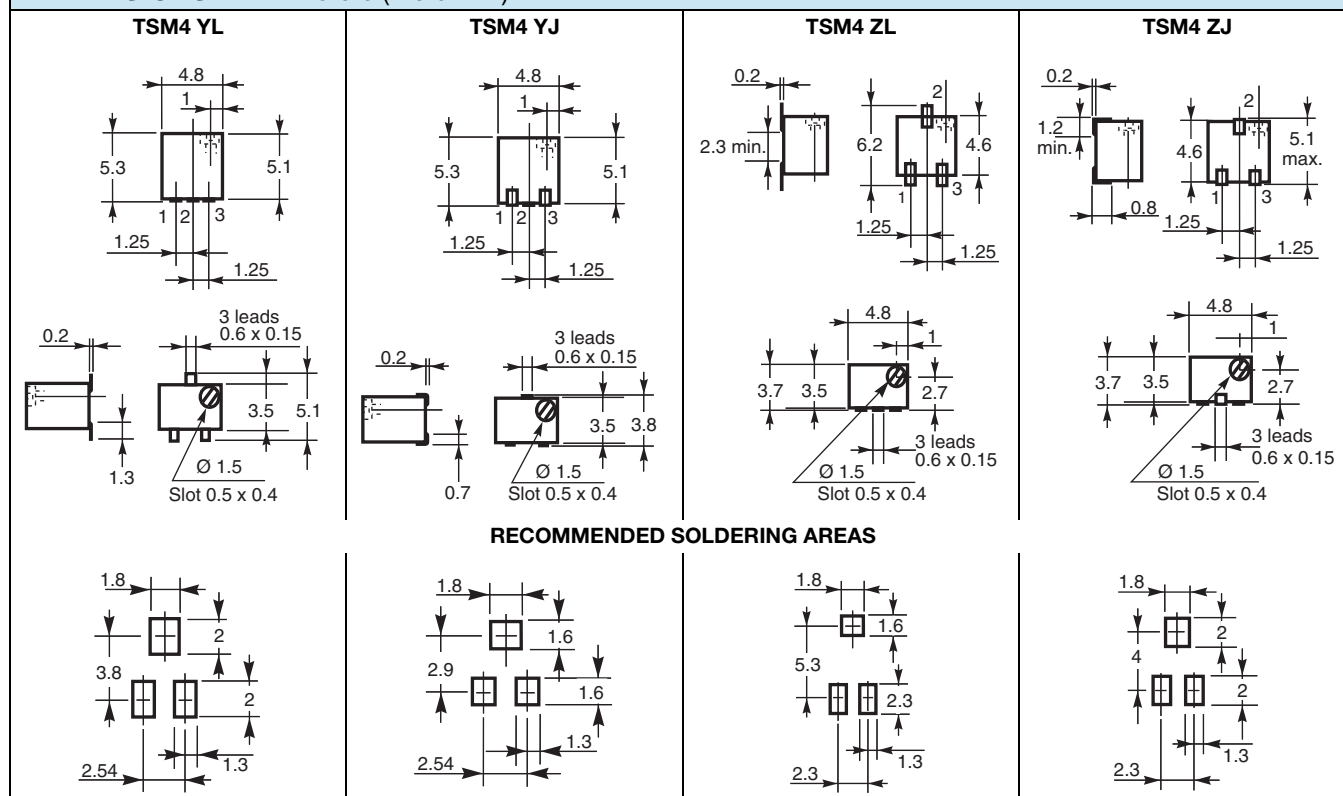
### FEATURES

- 0.25 W at 70 °C
- Professional and industrial grade
- Wide ohmic range (10  $\Omega$  to 1 M $\Omega$ )
- Low contact resistance variation (2 % or 3 %)
- Small size for optimum packaging density
- Tests according to CECC 41000 or IEC 60393-1
- Compliant to RoHS Directive 2002/95/EC

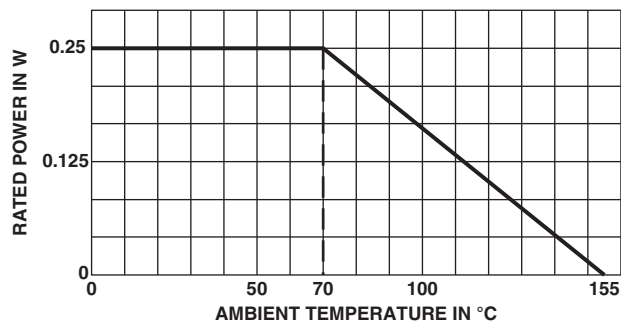
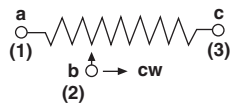


**RoHS**  
COMPLIANT

### DIMENSIONS in millimeters ( $\pm 0.5$ mm)



**ELECTRICAL SPECIFICATIONS**

|                                              |                                                                                                                                   |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Resistive Element                            | Cermet                                                                                                                            |
| Electrical Travel                            | 11 turns $\pm$ 2                                                                                                                  |
| Resistance Range                             | 10 $\Omega$ to 1 M $\Omega$                                                                                                       |
| Standard Series                              | 1 - 2 - 5                                                                                                                         |
| Tolerance Standard                           | $\pm$ 10 %                                                                                                                        |
| Power Rating                                 | <div>Linear</div> <div>0.25 W at + 70 °C</div>  |
| Circuit Diagram                              |                                                |
| Temperature Coefficient                      | See Standard Resistance Element table                                                                                             |
| Limiting Element Voltage (Linear Law)        | 200 V                                                                                                                             |
| Contact resistance Variation (Typical)       | 2 % or 3 $\Omega$                                                                                                                 |
| End Resistance (Typical)                     | 1 $\Omega$                                                                                                                        |
| Dielectric Strength (RMS)                    | 600 V                                                                                                                             |
| Insulation Resistance (500 V <sub>DC</sub> ) | 10 <sup>6</sup> M $\Omega$                                                                                                        |

**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](http://www.vishay.com/doc?52029)



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

Vishay Sfernice

**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<br>90°/30° - ambient temp. + 70 °C                                           | ± 2 %                     | ± 3 %                        | Contact res. variation: $\Delta < 1$ % Rn                                       |
| Climatic Sequence      | Phase A dry heat 125 °C<br>Phase B damp heat<br>Phase C cold - 55 °C<br>Phase D damp heat 5 cycles | ± 2 %                     | ± 3 %                        | Dielectric strength: 600 V <sub>RMS</sub><br>Insulation resistance: $> 10^4$ MΩ |
| Damp Heat Steady State | Temperature 40 °C - RH 93 %<br>56 days                                                             | ± 2 %                     | ± 3 %                        | Dielectric strength: 600 V <sub>RMS</sub><br>Insulation resistance: $> 10^4$ MΩ |
| Charge of Temperature  | - 55 °C to + 125 °C<br>5 cycles                                                                    | ± 1 %                     |                              | $\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 2$ %                                    |
| Mechanical Endurance   | 100 cycles - rated power                                                                           | ± (3 % + 3 Ω)             |                              |                                                                                 |
| Shock                  | 50 g - 11 ms<br>3 successive shocks in 3 directions                                                | ± 1 %                     |                              | $\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 1$ %                                    |
| Vibration              | 10 Hz to 55 Hz<br>0.75 mm or 10 g - 6 h                                                            | ± 1 %                     |                              | $\Delta V_{1-2}/\Delta V_{1-3} \leq \pm 1$ %                                    |

**STANDARD RESISTANCE ELEMENT DATA**

| STANDARD<br>RESISTANCE<br>VALUES | LINEAR LAW             |                         |                                 | TYPICAL<br>TCR<br>- 55 °C<br>+ 125 °C<br><br>ppm/°C |
|----------------------------------|------------------------|-------------------------|---------------------------------|-----------------------------------------------------|
|                                  | MAX. POWER<br>AT 70 °C | MAX. WORKING<br>VOLTAGE | MAX. CURRENT<br>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.

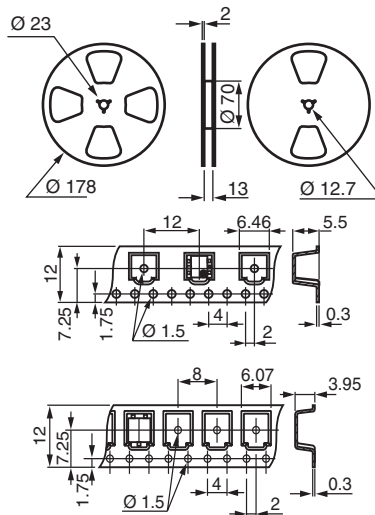
Example: 100 = 10 Ω  
 101 = 100 Ω  
 102 = 1000 Ω  
 503 = 50 000 Ω

## 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)

|       |   |                      |   |                                                             |   |           |   |                                                                                                                                   |   |                                                               |   |   |  |  |  |  |
|-------|---|----------------------|---|-------------------------------------------------------------|---|-----------|---|-----------------------------------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------|---|---|--|--|--|--|
| T     | S | M                    | 4 | Y                                                           | L | 5         | 0 | 4                                                                                                                                 | K | R                                                             | 0 | 5 |  |  |  |  |
| MODEL |   | STYLE                |   | OHMIC VALUE                                                 |   | TOLERANCE |   | PACKAGING                                                                                                                         |   | SPECIAL NUMBER                                                |   |   |  |  |  |  |
| TSM4  |   | YJ<br>YL<br>ZJ<br>ZL |   | From<br>10 $\Omega$ to 1 M $\Omega$<br>504 = 500 k $\Omega$ |   | K = 10 %  |   | R10 =<br>Reel 500 pieces<br>for ZJ and ZL<br>R05 =<br>Reel 250 pieces<br>for YJ and YL<br>On request<br>B25 =<br>Box of 50 pieces |   | (If applicable)<br>Given by<br>Vishay<br>for custom<br>design |   |   |  |  |  |  |

## DESCRIPTION (for information only)

|       |       |       |           |         |           |             |
|-------|-------|-------|-----------|---------|-----------|-------------|
| TSM4  | YL    | 500K  | 10 %      |         | TR        | e3          |
| MODEL | STYLE | VALUE | TOLERANCE | SPECIAL | PACKAGING | LEAD FINISH |



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