

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



## FEATURES

- 0.25 W at 85 °C
- Professional grade
- Wide ohmic range (10  $\Omega$  to 1 M $\Omega$ )
- Low contact resistance variation (1 % or 3  $\Omega$ )
- Small size for optimum packaging density
- Top and side adjust styles
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

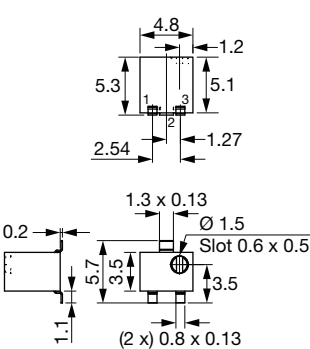
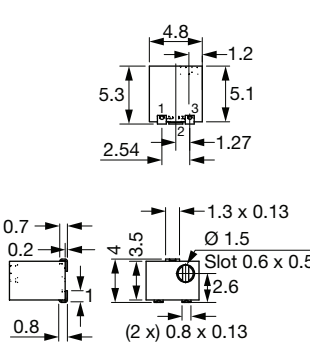
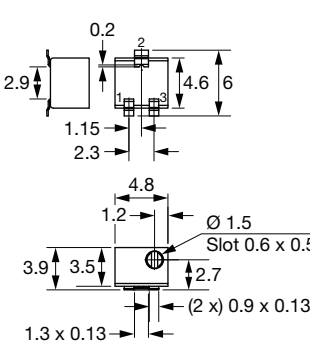
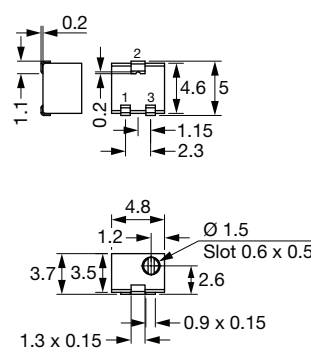
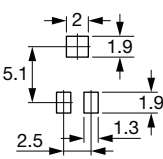
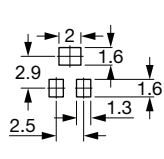
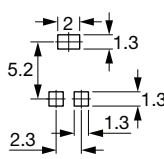
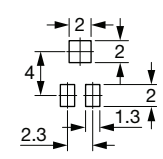

**RoHS**  
COMPLIANT

## LINKS TO ADDITIONAL RESOURCES

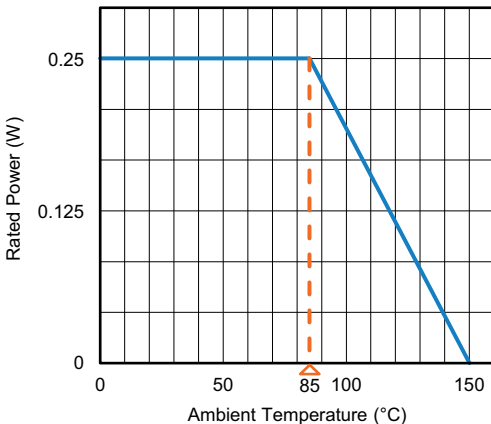
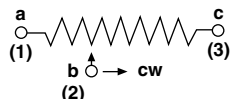


The TSM4 trimming potentiometer has been designed for surface mount applications and offers volumetric efficiency 5 mm x 5 mm x 3.7 mm with high performance and stability.

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

| DIMENSIONS in millimeters ( $\pm 0.5$ mm)                                           |                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| TSM4 YL<br>(TOP ADJUST)                                                             | TSM4 YJ<br>(TOP ADJUST)                                                             | TSM4 ZL<br>(SIDE ADJUST)                                                             | TSM4 ZJ<br>(SIDE ADJUST)                                                              |
|  |  |  |  |
| RECOMMENDED SOLDERING AREAS                                                         |                                                                                     |                                                                                      |                                                                                       |
|  |  |  |  |

**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 85 °C</div>  |
| Circuit diagram                              |                                              |
| Temperature coefficient                      | See Standard Resistance Element table                                                                                           |
| Limiting element voltage (linear law)        | 300 V                                                                                                                           |
| Contact resistance variation (typical)       | 1 % or 3 $\Omega$                                                                                                               |
| End resistance (typical)                     | 1 $\Omega$                                                                                                                      |
| Dielectric strength (RMS)                    | 600 V (1 minute)                                                                                                                |
| Insulation resistance (500 V <sub>DC</sub> ) | 100 M $\Omega$                                                                                                                  |

**MECHANICAL SPECIFICATIONS**

|                             |                              |
|-----------------------------|------------------------------|
| Mechanical travel           | 12 turns $\pm$ 2             |
| Operating torque (max. Ncm) | 1.8                          |
| End stop torque (Ncm)       | Clutch action (2 turns max.) |
| Unit weight (max. g)        | 0.28                         |
| Wiper (actual travel)       | Positioned at approx. 50 %   |

**ENVIRONMENTAL SPECIFICATIONS**

|                   |                       |
|-------------------|-----------------------|
| Temperature range | -65 °C to +150 °C     |
| 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)

**PERFORMANCES**

| TESTS                        | CONDITIONS                                                                                         | TYPICAL VALUES AND DRIFTS                                                     |
|------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Load life                    | 1000 h at rated power<br>90°/30° - ambient temp. +85 °C                                            | Total resistance shift = $\pm 3 \Omega$ or $\pm 3 \%$<br>whichever is greater |
| Humidity moisture resistance | MIL-STD-202 method 106<br>10 cycles of 24 hours constituted<br>with damp heat - cold - vibrations  | Total resistance shift = $\pm 2 \%$<br>Insulation resistance = 10 M $\Omega$  |
| Thermal shock                | 5 cycles                                                                                           | Total resistance shift = $\pm 2 \%$<br>Voltage resistance shift = $\pm 1 \%$  |
| Rotational cycling           | 200 cycles                                                                                         | Total resistance shift = $\pm 3 \Omega$ or $\pm 3 \%$<br>whichever is greater |
| Shock                        | MIL-STD-202 method 213 test condition C,<br>100 g - 6 ms,<br>3 successive shocks in each direction | Total resistance shift = $\pm 1 \%$<br>Voltage resistance shift = $\pm 1 \%$  |
| Vibration                    | MIL-STD-202 method 204,<br>20 g - 3 hours (1 hour per axis)                                        | Total resistance shift = $\pm 1 \%$<br>Voltage resistance shift = $\pm 1 \%$  |

**Note**

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

**STANDARD RESISTANCE ELEMENT DATA**

| STANDARD<br>RESISTANCE<br>VALUES | LINEAR LAW             |                         |                                 | TYPICAL<br>TCR<br>-55 °C<br>+125 °C |
|----------------------------------|------------------------|-------------------------|---------------------------------|-------------------------------------|
|                                  | MAX. POWER<br>AT 85 °C | MAX. WORKING<br>VOLTAGE | MAX. CURRENT<br>THROUGH ELEMENT |                                     |
| $\Omega$                         | W                      | V                       | mA                              | ppm/°C                              |
| 10                               | 0.25                   | 1.58                    | 158                             | $\pm 100$                           |
| 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                   | 223                     | 1.12                            |                                     |
| 500K                             | 0.08                   | 300                     | 0.83                            |                                     |
| 1M                               | 0.04                   | 300                     | 0.83                            |                                     |

**MARKING**

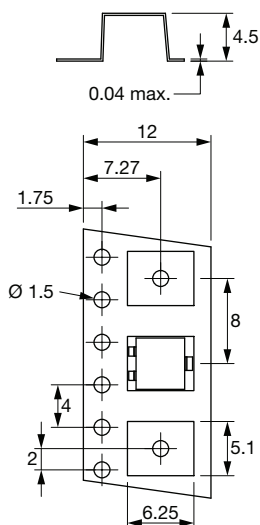
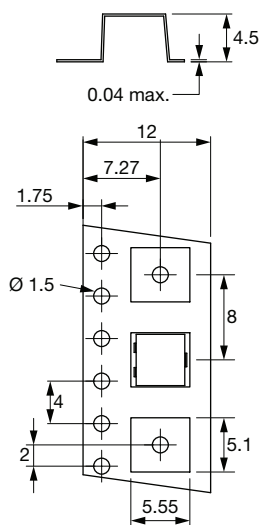
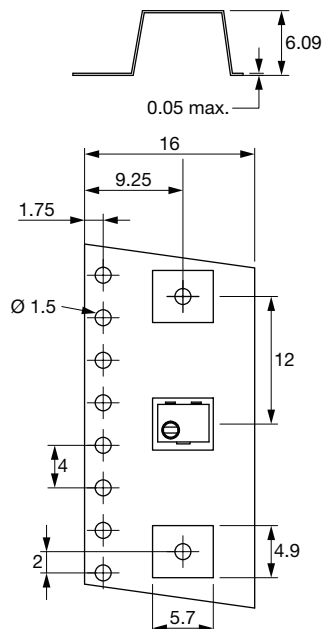
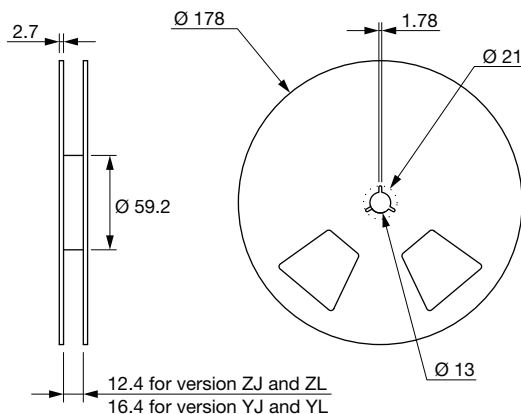
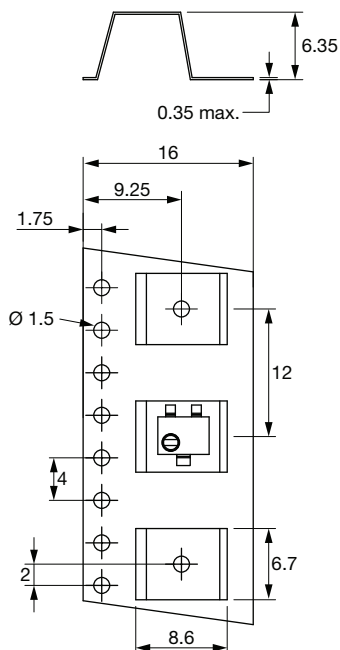
Vishay trademark, ohmic value, manufacturing date

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  $\Omega$   
 101 = 100  $\Omega$   
 102 = 1000  $\Omega$   
 503 = 50 000  $\Omega$

**PACKAGING** in millimeters

On tape and reel, by 500 pieces for Z version, 250 pieces for YJ version: code TR250, or 200 pieces for YL version.  
In bulk on request (plastic box of 50 pieces): code BO50.

**TSM4 ZL**

**TSM4 ZJ**

**TSM4 YJ**

**TSM4 YL**




**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 10 Ω to 1 MΩ<br>504 = 500 kΩ |   | K = 10 %  |   | R10 = reel 500 pieces<br>for ZJ and ZL<br>R05 = reel 250 pieces for YJ<br>and 200 pieces for YL<br>On request<br>B25 = box of 50 pieces |   |   |   | (If applicable)<br>Given by Vishay<br>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                                       | <a href="http://www.vishay.com/doc?51001">www.vishay.com/doc?51001</a> |
| Guidelines for Vishay Sfernice Resistive and Inductive Components | <a href="http://www.vishay.com/doc?52029">www.vishay.com/doc?52029</a> |



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