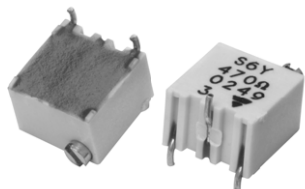


# Multi-Turn Surface Mount 1/4" Square Cermet Trimmers, Fully Sealed



Three variations are available according to the positioning of the control screw and contact positions.

The TS6 multi-turn trimmer has been designed for use in PCB surface mounting applications.

The cermet track gives a high stability performance with an extended ohmic capacity of 10  $\Omega$  to 2 M $\Omega$ .

## FEATURES

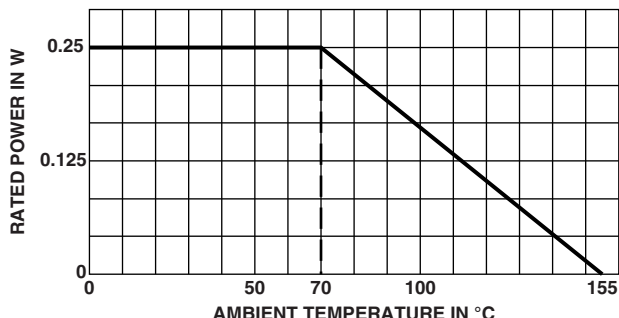
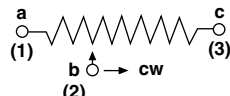
- 0.25 W at 70 °C
- Military and professional grade
- Multi-turn operation
- A low contact resistance variation (down to 2 % R<sub>n</sub>)
- Low end contact resistance (1  $\Omega$  typical)
- Full sealing
- Tests according to CECC 41000 or IEC 60393-1
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

| DIMENSIONS in millimeters ( $\pm 0.5$ mm) |  |  |  |
|---|--|--|--|
| <b>TS6X</b><br>                           |  | <b>RECOMMENDED SOLDERING AREAS</b><br> |  |
| <b>TS6Z</b><br>                           |  |  |  |
| <b>TS6Y</b><br>                           |  |  |  |

## ELECTRICAL SPECIFICATIONS

|                                       |  |                 |
|---------------------------------------|--|-----------------|
| Resistive element                     | Cermet   |                 |
| Electrical travel                     | 14 turns $\pm$ 2   |                 |
| Resistance range                      | 10 $\Omega$ to 2 M $\Omega$  |                 |
| Standard series E3                    | 1 - 2.2 - 4.7 and on request 1 - 2 - 5   |                 |
| Tolerance                             | Standard   | $\pm$ 10 %      |
|                                       | On request   | $\pm$ 5 %       |
| Power rating                          | Linear   | 0.25 W at 70 °C |
|                                       |  |                 |
| Circuit diagram                       |  |                 |
| Temperature coefficient               | See Standard Resistance Element table  |                 |
| Limiting element voltage (linear law) | 250 V  |                 |
| Contact resistance variation          | 2 % R <sub>n</sub> or 2 $\Omega$   |                 |
| End resistance (typical)              | 1 $\Omega$   |                 |
| Dielectric strength (RMS)             | 1000 V   |                 |
| Insulation resistance                 | 10 <sup>6</sup> M $\Omega$   |                 |

## MECHANICAL SPECIFICATIONS

|                             |                            |
|-----------------------------|----------------------------|
| Mechanical travel           | 15 turns $\pm$ 5           |
| Operating torque (max. Ncm) | 1.5                        |
| End stop torque             | Clutch action              |
| Net weight (max. g)         | 0.5                        |
| Wiper (actual travel)       | Positioned at approx. 50 % |

## ENVIRONMENTAL SPECIFICATIONS

|                   |                   |
|-------------------|-------------------|
| Temperature range | -55 °C to +155 °C |
| Climatic category | 55/125/56         |
| Sealing           | Fully sealed 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  | REQUIREMENTS            |                                 | OTHER  | TYPICAL VALUES AND DRIFTS |                                 |   |
|                        |   | $\Delta R_T/R_T$<br>(%) | $\Delta R_{1-2}/R_{1-2}$<br>(%) |  | $\Delta R_T/R_T$<br>(%)   | $\Delta R_{1-2}/R_{1-2}$<br>(%) | OTHER   |
| Electrical endurance   | 1000 h at rated power<br>90°/30° - ambient temp. 70 °C  | ± 2 %                   | ± 4 %                           | Contact res.<br>variation:<br>< 3 % R <sub>n</sub>                                 | ± 1 %                     | ± 2 %                           | Contact res.<br>variation:<br>< 1 % R <sub>n</sub>  |
| 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 %                           |  | ± 0.5 %                   | ± 1 %                           |   |
| Damp heat steady state | 40 °C 93 % RH<br>56 days  | ± 2 %                   | ± 3 %                           | Dielectric strength:<br>250 V <sub>RMS</sub><br>Insulation resistance:<br>> 100 MΩ | ± 0.5 %                   | ± 1 %                           | Dielectric strength:<br>1000 V <sub>RMS</sub><br>Insulation resistance:<br>> 10 <sup>4</sup> MΩ |
| Charge of temperature  | -55 °C to +125 °C<br>5 cycles   | ± 1.5 %                 |                                 | $\Delta V_{1-2}/\Delta V_{1-3}$<br>≤ ± 2 %   | ± 0.5 %                   |                                 | $\Delta V_{1-2}/\Delta V_{1-3}$<br>≤ ± 1 %  |
| Mechanical endurance   | 200 cycles at rated power   | ± 2 %                   |                                 | Contact res.<br>variation:<br>< 3 % R <sub>n</sub>                                 | ± (2 % + 3 Ω)             |                                 | Contact res.<br>variation:<br>< 1 % R <sub>n</sub>  |
| Shock                  | 50 g at 11 ms<br>3 successive shocks<br>in 3 directions   | ± 1 %                   |                                 | $\Delta V_{1-2}/\Delta V_{1-3}$<br>≤ ± 2 %   | ± 0.1 %                   |                                 | $\Delta V_{1-2}/\Delta V_{1-3}$<br>≤ 0.2 %  |
| Vibration              | 10 Hz to 55 Hz<br>0.75 mm or 10 g for 6 h   | ± 1 %                   |                                 | $\Delta V_{1-2}/\Delta V_{1-3}$<br>≤ ± 2 %   | ± 0.1 %                   |                                 | $\Delta V_{1-2}/\Delta V_{1-3}$<br>≤ ± 0.2 %  |

**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 70 °C | MAX. WORKING<br>VOLTAGE | MAX. WIPER<br>CURRENT |                                     |
| Ω                                | W                      | V                       | mA                    | ppm/°C                              |
| 10                               | 0.25                   | 1.58                    | 158                   | ± 100                               |
| 22                               | 0.25                   | 2.34                    | 107                   |                                     |
| 47                               | 0.25                   | 3.43                    | 73                    |                                     |
| 100                              | 0.25                   | 5.00                    | 50                    |                                     |
| 220                              | 0.25                   | 7.42                    | 34                    |                                     |
| 470                              | 0.25                   | 10.8                    | 23                    |                                     |
| 1K                               | 0.25                   | 15.8                    | 15.8                  |                                     |
| 2.2K                             | 0.25                   | 23.4                    | 10.7                  |                                     |
| 4.7K                             | 0.25                   | 34.3                    | 7.3                   |                                     |
| 10K                              | 0.25                   | 50                      | 5                     |                                     |
| 22K                              | 0.25                   | 74.2                    | 3.37                  |                                     |
| 47K                              | 0.25                   | 108.4                   | 2.31                  |                                     |
| 100K                             | 0.25                   | 158                     | 1.58                  |                                     |
| 220K                             | 0.25                   | 234                     | 1.97                  |                                     |
| 470K                             | 0.13                   | 250                     | 0.53                  |                                     |
| 1M                               | 0.06                   | 250                     | 0.25                  |                                     |
| 2M                               | 0.03                   | 250                     | 0.125                 |                                     |



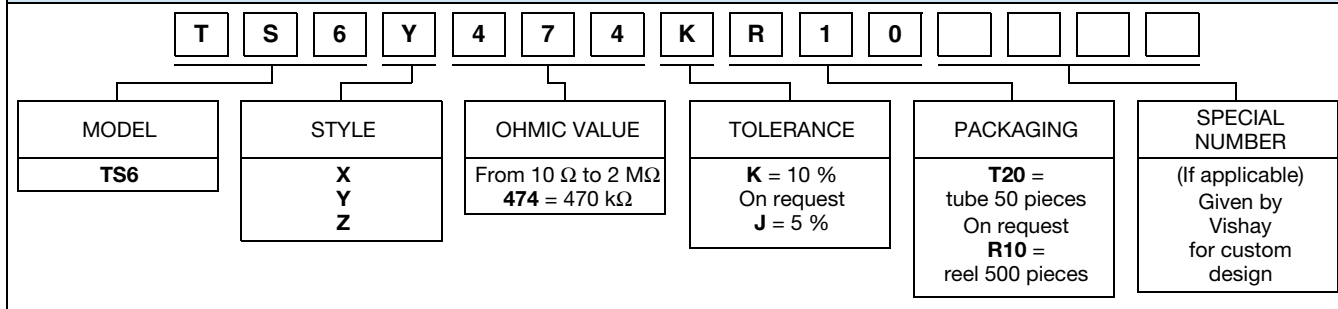
## MARKING

Printed: Vishay trademark, model, style, ohmic value (in  $\Omega$ , k $\Omega$ , M $\Omega$ ), tolerance (in %) only if non standard, manufacturing date, marking of terminal 3.

## PACKAGING

- In tube of 50 pieces code T20 (TU50)
- In reel of 500 pieces code R10 (TR500)

## ORDERING INFORMATION (part number)



## DESCRIPTION (for information only)

|       |       |       |           |         |           |             |
|-------|-------|-------|-----------|---------|-----------|-------------|
| TS6   | Y     | 470K  | 10 %      |         | TU        | e3          |
| MODEL | STYLE | VALUE | TOLERANCE | SPECIAL | PACKAGING | LEAD FINISH |

## 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> |

## ACCESSORIES

|                                    |  |
|------------------------------------|--|
| Screwdrivers (to order separately) | <a href="http://www.vishay.com/doc?57015">www.vishay.com/doc?57015</a> |
|------------------------------------|--|



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