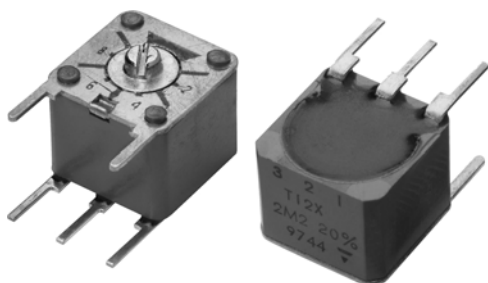


# Fully Sealed Container 12 mm Square or Round Single-Turn Cermet Trimmer



## FEATURES

- Military and professional grade
- High power rating (1 W at 70 °C)
- Tests according to CECC 41000 or IEC 60393-1
- High stability (1 % typical)
- Mechanical strength
- Hermetic sealing of the case
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

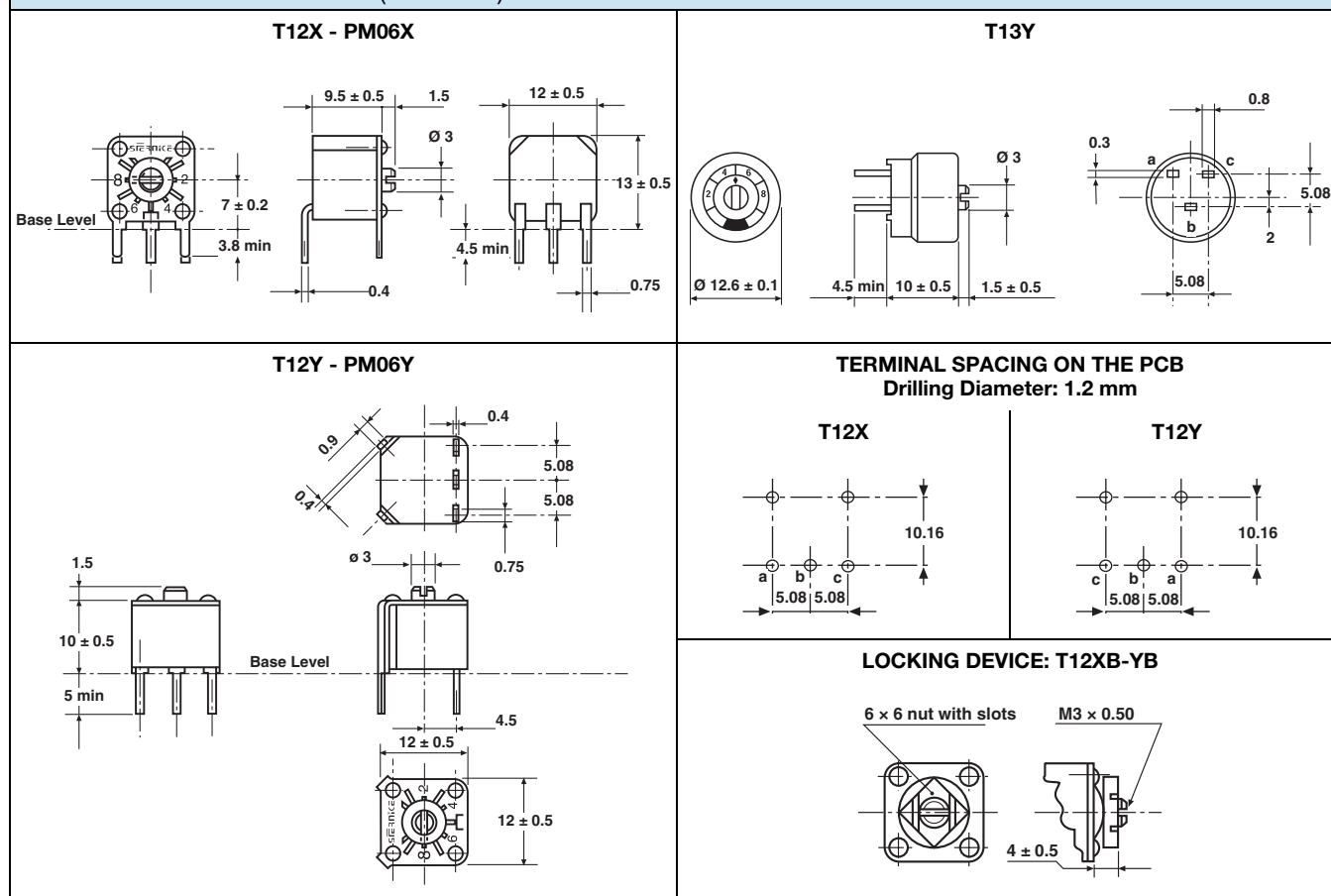

**RoHS**  
COMPLIANT

The Vishay Sfernice trimming potentiometers T12 and T13 fully meet the requirements of CECC 41 100.

The use of a cermet track combined with sealing of the case provides unique characteristics and performances.

T12 and T13 have been specially designed for mounting on printed circuit board.

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





| <b>ELECTRICAL SPECIFICATIONS</b>             |                                       |                                        |
|----------------------------------------------|---------------------------------------|----------------------------------------|
| Resistive element                            |                                       | Cermet                                 |
| Electrical travel                            |                                       | 270° ± 10°                             |
| Resistance range                             |                                       | 22 Ω to 10 MΩ                          |
| Standard series E3                           |                                       | 1 - 2.2 - 4.7 and on request 1 - 2 - 5 |
| Tolerance                                    | standard                              | ± 20 %                                 |
|                                              | on request                            | ± 10 %, ± 5 %                          |
| Power rating                                 | linear                                | 1 W at 70 °C                           |
|                                              | logarithmic                           | 0.5 W at 70 °C                         |
| Power rating chart                           |                                       |                                        |
| Circuit diagram                              |                                       |                                        |
| Resistance laws                              |                                       |                                        |
| Temperature coefficient                      | See Standard Resistance Element Table |                                        |
| Limiting element voltage (linear law)        | 350 V                                 |                                        |
| Contact resistance variation                 | 3 % R <sub>n</sub> or 3 Ω             |                                        |
| End resistance (typical)                     | 1 Ω                                   |                                        |
| Dielectric strength (RMS)                    | 1000 V                                |                                        |
| Insulation resistance (500 V <sub>DC</sub> ) | 10 <sup>6</sup> MΩ                    |                                        |

**MECHANICAL SPECIFICATIONS**

|                             |                   |
|-----------------------------|-------------------|
| Mechanical travel           | 300° ± 5°         |
| Operating torque (max. Ncm) | 3                 |
| End stop torque (max. Ncm)  | 15                |
| Unit weight (max. g)        | 4.7               |
| Terminals                   | Pure Sn (code e3) |

**ENVIRONMENTAL SPECIFICATIONS**

|                   |                      |
|-------------------|----------------------|
| Temperature range | -55 °C to +125 °C    |
| Climatic category | 55/100/56            |
| Sealing           | IP67<br>Fully sealed |

**PERFORMANCES**

| TESTS                    | CONDITIONS                                                                                        | TYPICAL VALUES AND DRIFTS                                                                            |                                              |
|--------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------|
|                          |                                                                                                   | $\Delta R_T/R_T$ (%)                                                                                 | $\Delta R_{1-2}/R_{1-2}$ (%)                 |
| Load life                | 1000 h at rated power<br>90°/30° - ambient temperature 70 °C                                      | ± 1 %<br>Contact res. variation: < 2 % Rn                                                            | ± 2 %                                        |
| Climatic sequence        | Phase A dry heat 100 °C<br>Phase B damp heat<br>Phase C cold -55 °C<br>Phase D damp heat 5 cycles | ± 0.5 %                                                                                              | ± 1 %                                        |
| Long term damp heat      | 56 days<br>40 °C, 93 % RH                                                                         | ± 0.5 %<br>Dielectric strength: 1000 V <sub>RMS</sub><br>Insulation resistance: > 10 <sup>4</sup> MΩ | ± 1 %                                        |
| Rapid temperature change | 5 cycles<br>-55 °C to +125 °C                                                                     | ± 0.5 %                                                                                              | $\Delta V_{1-2}/\Delta V_{1-3}$<br>≤ ± 1 %   |
| Shock                    | 50 g at 11 ms<br>3 successive shocks<br>in 3 directions                                           | ± 0.1 %                                                                                              | ± 0.5 %                                      |
| Vibration                | 10 Hz to 55 Hz<br>0.75 mm or 10 g during 6 h                                                      | ± 0.1 %                                                                                              | $\Delta V_{1-2}/\Delta V_{1-3}$<br>≤ ± 0.5 % |
| Rotational life          | 200 cycles                                                                                        | ± 1 %<br>Contact res. variation: < 2 % Rn                                                            |                                              |

**Note**

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

**STANDARD RESISTANCE ELEMENT DATA**

| STANDARD<br>RESISTANCE VALUES | LINEAR LAW                |                            |                                  | LOG LAWS                  |                            |                                  | TYPICAL TCR<br>-55 °C to +125 °C |
|-------------------------------|---------------------------|----------------------------|----------------------------------|---------------------------|----------------------------|----------------------------------|----------------------------------|
|                               | MAX.<br>POWER<br>AT 70 °C | MAX.<br>WORKING<br>VOLTAGE | MAX. CURRENT<br>THROUGH<br>WIPER | MAX.<br>POWER<br>AT 70 °C | MAX.<br>WORKING<br>VOLTAGE | MAX. CURRENT<br>THROUGH<br>WIPER |                                  |
| $\Omega$                      | W                         | V                          | mA                               | W                         | V                          | mA                               | ppm/°C                           |
| 22                            | 1                         | 4.69                       | 213.2                            |                           |                            |                                  | ± 100                            |
| 47                            | 1                         | 6.85                       | 145.8                            |                           |                            |                                  |                                  |
| 100                           | 1                         | 10                         | 100                              |                           |                            |                                  |                                  |
| 220                           | 1                         | 14.8                       | 67.4                             |                           |                            |                                  |                                  |
| 470                           | 1                         | 21.6                       | 46.1                             |                           |                            |                                  |                                  |
| 1K                            | 1                         | 31.6                       | 31.6                             | 0.5                       | 22.4                       | 22.4                             |                                  |
| 2.2K                          | 1                         | 46.9                       | 21.3                             | 0.5                       | 33.2                       | 15.1                             |                                  |
| 4.7K                          | 1                         | 68.5                       | 14.5                             | 0.5                       | 48.5                       | 10.3                             |                                  |
| 10K                           | 1                         | 100                        | 10                               | 0.5                       | 79.7                       | 7.07                             |                                  |
| 22K                           | 1                         | 148.3                      | 6.7                              | 0.5                       | 105                        | 4.77                             |                                  |
| 47K                           | 1                         | 216.7                      | 4.6                              | 0.5                       | 153                        | 3.26                             |                                  |
| 100K                          | 1                         | 316.2                      | 3.16                             | 0.5                       | 224                        | 2.24                             |                                  |
| 220K                          | 0.56                      | 350                        | 1.59                             | 0.5                       | 332                        | 1.51                             |                                  |
| 470K                          | 0.26                      | 350                        | 0.75                             | 0.26                      | 350                        | 0.74                             |                                  |
| 1M                            | 0.12                      | 350                        | 0.35                             | 0.12                      | 350                        | 0.35                             |                                  |
| 2.2M                          | 0.05                      | 350                        | 0.16                             |                           |                            |                                  |                                  |
| 4.7M                          | 0.02                      | 350                        | 0.07                             |                           |                            |                                  |                                  |
| 10M                           | 0.01                      | 350                        | 0.03                             |                           |                            |                                  |                                  |

**MARKING**

- Vishay trademark
- Model
- Ohmic value (in  $\Omega$ , k $\Omega$ , M $\Omega$ )
- Tolerance (in %)
- Manufacturing date
- Marking of terminal: 1, 2, 3

**PACKAGING**

- For T13Y: In plastic box of 50 pieces, code B25 (BL50)
- For T12Y, T12X: In carton box of 50 pieces, code B25 (BO50)

**ORDERING INFORMATION FOR T12** (part number)

|       |        |                                  |   |                                                          |   |   |                                                |   |             |                     |   |   |                                                         |  |  |  |
|-------|--------|----------------------------------|---|----------------------------------------------------------|---|---|------------------------------------------------|---|-------------|---------------------|---|---|---------------------------------------------------------|--|--|--|
| T     | 1      | 2                                | X | B                                                        | 2 | 2 | 3                                              | M | A           | B                   | 2 | 5 |                                                         |  |  |  |
| MODEL | STYLE  | OPTION                           |   | OHMIC VALUE                                              |   |   | TOLERANCE                                      |   | TAPER       | PACKAGING CODE      |   |   | SPECIAL NUMBER                                          |  |  |  |
| T12   | X<br>Y | B = locking shaft<br>0 = without |   | From 22 $\Omega$ to 10 M $\Omega$<br>103 = 10 k $\Omega$ |   |   | M = 20 %<br>On request:<br>K = 10 %<br>J = 5 % |   | A<br>L<br>F | B25 = box 50 pieces |   |   | (If applicable)<br>Given by Vishay for<br>custom design |  |  |  |

**DESCRIPTION** (for information only)

|       |       |         |       |           |       |         |           |         |       |             |    |
|-------|-------|---------|-------|-----------|-------|---------|-----------|---------|-------|-------------|----|
| T12   | X     | B       | 22K   | 20 %      | A     |         | BO        |         |       |             | e3 |
| MODEL | STYLE | SPECIAL | VALUE | TOLERANCE | TAPER | SPECIAL | PACKAGING | SPECIAL | SHAFT | LEAD FINISH |    |

**ORDERING INFORMATION FOR T13** (part number)

|       |       |                                                             |   |   |                                     |   |             |                     |   |   |                                                         |  |  |  |  |
|-------|-------|-------------------------------------------------------------|---|---|-------------------------------------|---|-------------|---------------------|---|---|---------------------------------------------------------|--|--|--|--|
| T     | 1     | 3                                                           | Y | 1 | 0                                   | 5 | M           | A                   | B | 2 | 5                                                       |  |  |  |  |
| MODEL | STYLE | OHMIC VALUE                                                 |   |   | TOLERANCE                           |   | TAPER       | PACKAGING CODE      |   |   | SPECIAL NUMBER                                          |  |  |  |  |
| T13   | Y     | From 22 $\Omega$<br>to 10 M $\Omega$<br>103 = 10 k $\Omega$ |   |   | M = 20 %<br>On request:<br>K = 10 % |   | A<br>L<br>F | B25 = box 50 pieces |   |   | (If applicable)<br>Given by Vishay for<br>custom design |  |  |  |  |

**DESCRIPTION** (for information only)

|       |       |       |           |       |         |           |             |
|-------|-------|-------|-----------|-------|---------|-----------|-------------|
| T13   | Y     | 1M    | 20 %      | A     |         | BL50      | e3          |
| MODEL | STYLE | VALUE | TOLERANCE | TAPER | 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> |



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.