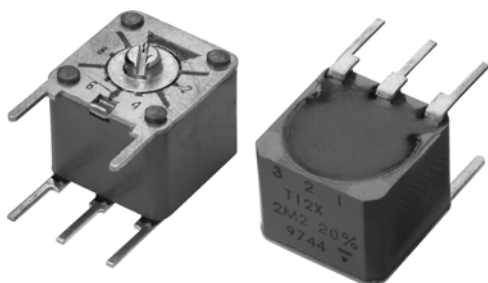


# Fully Sealed Container 12 mm Square or Round Single-Turn Cermet Trimmer



## 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)

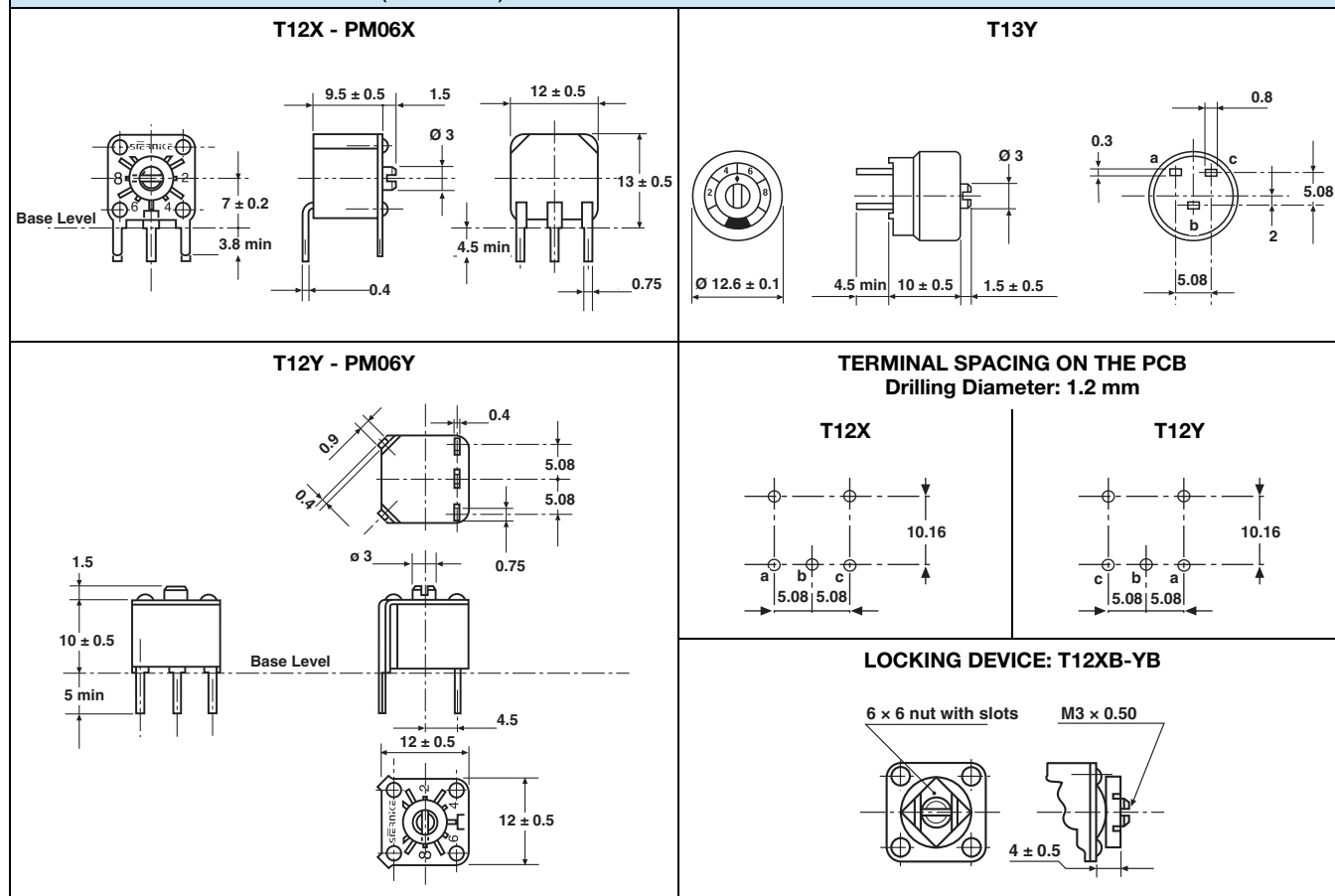

**RoHS**  
COMPLIANT

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)





| ELECTRICAL SPECIFICATIONS                    |                                       |                                        |
|----------------------------------------------|---------------------------------------|----------------------------------------|
| 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> |



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