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



## FEATURES

- 0.25 W at 70 °C
- For through hole version see T53Y series
- Wide ohmic range (10 Ω to 1 MΩ)
- Small size for optimum packaging density
- Tests according to CECC 41000 or IEC 60393-1
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

## LINKS TO ADDITIONAL RESOURCES

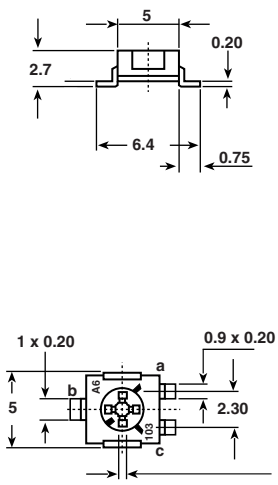
3D Models

The TS53 trimming potentiometer has been designed for surface mount applications and offers volumetric efficiency (5 mm x 5 mm x 2.7 mm) with high performance and stability.

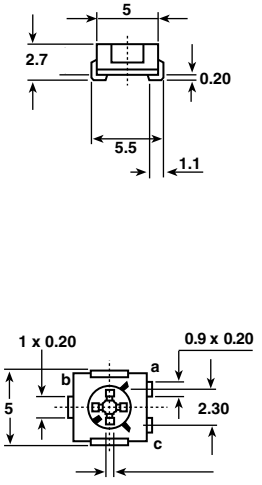
The TS53 design is suitable for both manual or automatic operation, and can withstand wave, and reflow soldering techniques.

## DIMENSIONS in millimeters (± 0.25 mm)

**TS53YL**



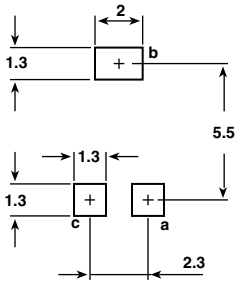

**TS53YJ**



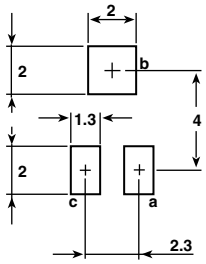

**Cruciform screwdriver slot**
**Ø 2.5, width 0.5**
**Deep: 0.55**
**Max. deep (center): 0.7**

**RECOMMENDED SOLDERING AREAS**

**TS53YL**



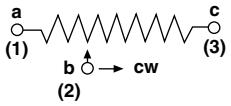
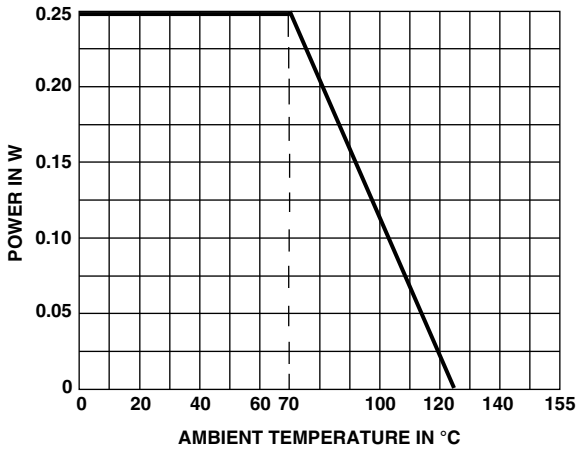

**TS53YJ**






For technical questions, contact: sferpottrimmers@vishay.com

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| ELECTRICAL SPECIFICATIONS | |
|---|---|
| Resistive element | Cermet |
| Electrical travel | 220° ± 15° |
| Resistance range | 10 Ω to 1 MΩ |
| Standard series | 1 - 2 - 5 |
| Tolerance standard | ± 20 % |
| Circuit diagram |   |
| Power rating<br>linear | 0.25 W at + 70 °C   |
| Temperature coefficient | See Standard Resistance Element Data table |
| Limiting element voltage (linear law) | 200 V |
| Contact resistance variation (typical) | 1 % or 3 Ω |
| End resistance (typical) | 0.1 % or 3 Ω |
| Dielectric strength (RMS) | 1000 V |
| Insulation resistance | 1 GΩ |

| MECHANICAL SPECIFICATIONS | |
|---|---|
| Mechanical travel | 270 ° ± 10° |
| Operating torque (max. Ncm) | 1.5 |
| End stop torque (max. Ncm) | 3.5 |
| Unit weight (max. g) | 0.15 |
| Terminals | Pure Sn (e3) |

| ENVIRONMENTAL SPECIFICATIONS | |
|---|---|
| Temperature range | -55 °C to +125 °C |
| Climatic category | 55 / 125 / 56 |
| Sealing | Sealed container IP67 |
| MSL level | 4 |

## SOLDERING RECOMMENDATIONS

Recommended reflow profile 2, see Application Note www.vishay.com/doc?52029

**Caution**
Reflow soldering must be done within 72 h while stored under a max. temperature of 30 °C, 60 % RH after opening the dry pack envelope.



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## RECOMMENDED METHOD OF STORAGE

Dry box storage is recommended as soon as the hermetic bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 72 h under these conditions, moisture content will be too high for reflow soldering.
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 h at 40 °C + 5 °C/- 0 °C and < 5 % RH (dry air/nitrogen) or
96 h at 60 °C + 5 °C and < 5 % RH for all device containers (not suitable for reel) or
24 h at 125 °C + 5 °C (not suitable for reel)

## PERFORMANCES

| TESTS | CONDITIONS | TYPICAL VALUES AND DRIFTS | | |
|---|---|---|---|---|
| | | $\Delta R_T/R_T$ (%) | $\Delta R_{1\text{-}2}/R_{1\text{-}2}$ (%) | OTHER |
| Electrical endurance | 1000 h at rated power<br>90'/30' - ambient temp. 70 °C | ± 2 % | ± 3 % | Contact resistance variation:<br>ΔR < 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 % | |
| Damp heat steady state | Temperature 40 °C - RH 93 %<br>56 days | ± 2 % | ± 3 % | Dielectric strength: 1000 $V_{RMS}$<br>Insulation resistance: > $10^4$ MΩ |
| Charge of temperature | -55 °C to +125 °C - 5 cycles | ± 1 % | | $\Delta V_{1\text{-}2}/V_{1\text{-}3} \leq \pm 2$ % |
| Mechanical endurance | 100 cycles - rated power | ± (3 % + 5 Ω) | | |
| Shock | 50 *g* - 11 ms<br>3 successive shocks in 3 directions | ± 1 % | | $\Delta V_{1\text{-}2}/V_{1\text{-}3} \leq \pm 1$ % |
| Vibration | 10 Hz to 55 Hz<br>0.75 mm or 10 *g* - 6 h | ± 1 % | | $\Delta V_{1\text{-}2}/V_{1\text{-}3} \leq \pm 1$ % |

**Note**

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

## STANDARD RESISTANCE ELEMENT DATA

| STANDARD RESISTANCE VALUES | LINEAR LAW | | | TYPICAL TCR -55 °C +125 °C |
|---|---|---|---|---|
| | MAX. POWER AT 70 °C | MAX. WORKING VOLTAGE | MAX. CURRENT THROUGH ELEMENT | |
| Ω | W | V | mA | ppm/°C |
| 10 | 0.25 | 1.58 | 158 | ± 100 |
| 20 | 0.25 | 2.24 | 112 | |
| 50 | 0.25 | 3.54 | 71 | |
| 100 | 0.25 | 5.00 | 50 | |
| 200 | 0.25 | 7.07 | 35 | |
| 500 | 0.25 | 11.2 | 22 | |
| 1K | 0.25 | 15.8 | 16 | |
| 2K | 0.25 | 22.4 | 11 | |
| 5K | 0.25 | 35.4 | 7 | |
| 10K | 0.25 | 50.0 | 5 | |
| 20K | 0.25 | 70.7 | 3.5 | |
| 50K | 0.25 | 112 | 2.2 | |
| 100K | 0.25 | 158 | 1.6 | |
| 200K | 0.20 | 200 | 1.0 | |
| 500K | 0.08 | 200 | 0.4 | |
| 1M | 0.04 | 200 | 0.2 | |


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## MARKING

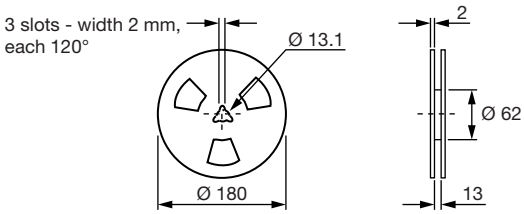
Vishay trademark, ohmic value, manufacturing date

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

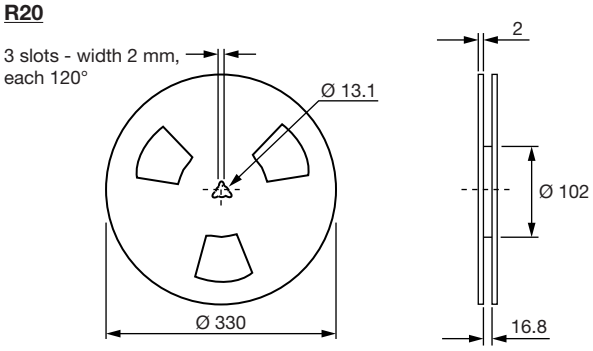
## PACKAGING

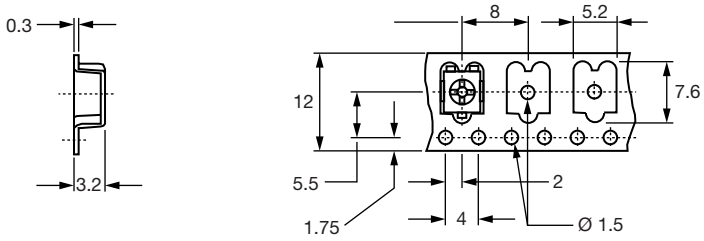
On tape and reel of 500 pieces, code R10 (TR500) and 2000 pieces, code R20 (TR2000)

**R10**




**R20**




Cover tape panel strength specifications EIA 481 A and CEI 60286-3.

**DRYPACK**
Devices are packed in moisture barrier bags to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

## ORDERING INFORMATION (part number)

| T | S | 5 | 3 | Y | L | 5 | 0 | 4 | M | R | 1 | 0 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| MODEL | STYLE | OHMIC VALUE | TOLERANCE | PACKAGING | SPECIAL NUMBER |
|---|---|---|---|---|---|
| **TS53** | **YL**<br>**YJ** | From 10 Ω to 1 MΩ<br>**504** = 500 kΩ | **M** = 20 % | **R10** =<br>reel 500 pieces<br>On request<br>**R20** =<br>reel 2000 pieces | (If applicable)<br>Given by Vishay<br>for custom design |



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## DESCRIPTION (for information only)

| TS53 | YL | 500K | 20 % | | TR | e3 |
|---|---|---|---|---|---|---|
| MODEL | STYLE | VALUE | TOLERANCE | SPECIAL | PACKAGING | LEAD (Pb)-FREE |

## RELATED DOCUMENTS

| APPLICATION NOTES | |
|---|---|
| Potentiometers and Trimmers | www.vishay.com/doc?51001 |
| Guidelines for Vishay Sfernice Resistive and Inductive Components | www.vishay.com/doc?52029 |



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