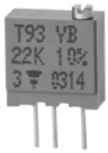
# 3/8” Square Multi-Turn Cermet Trimmers



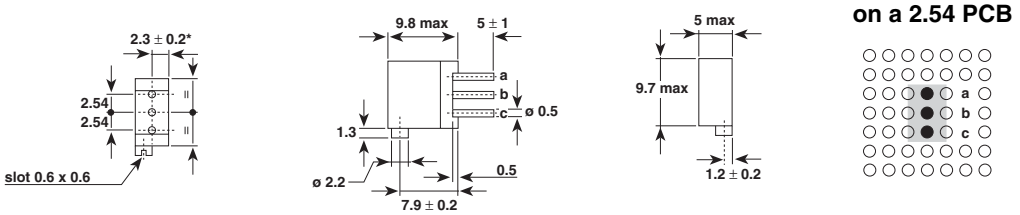

The T93 is a small size trimmer - 3/8” x 3/8” x 3/16” - answering PC board mounting requirements.
Five versions are available which differ by the position of the control screw in relation to the PC board plane and by the spacing of the terminals.
Excellent operational stability is provided by the use of a cermet element.

## FEATURES

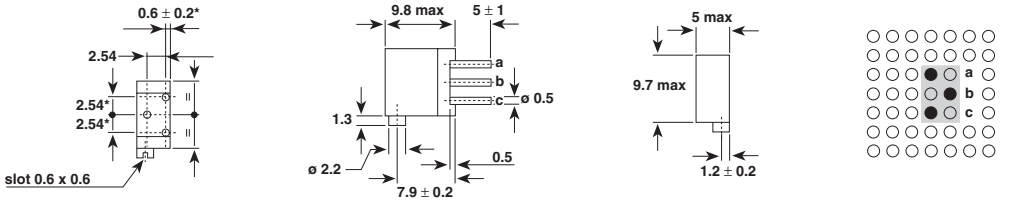
- Industrial Grade
- 0.5 Watt at 70°C
- Tests according to CECC 41 000
- Good stability
- Contact resistance variation < 1% typical
- Meet MIL-R-22097 specifications

## DIMENSIONS in millimeters

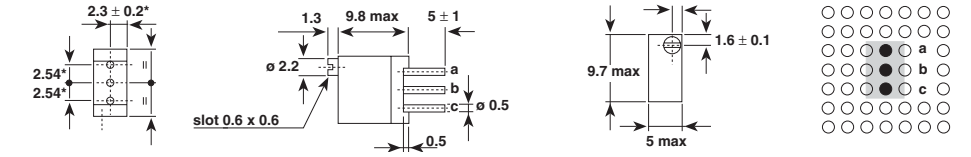
**T93XA**



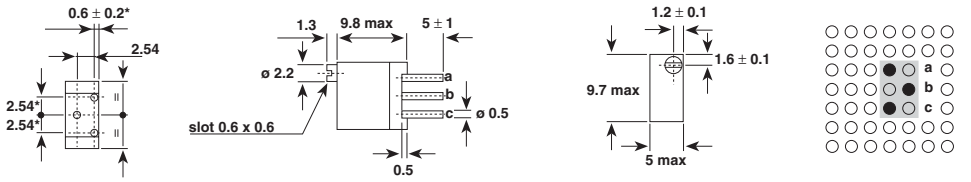

**T93XB**



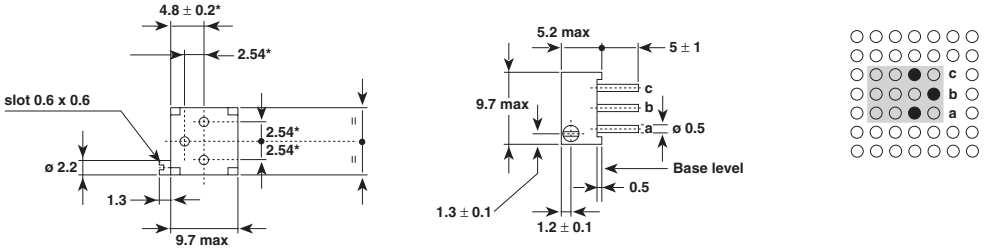

**T93YA**




**T93YB**




**T93Z**




**Terminal Spacing on a 2.54 PCB**







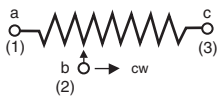









**CIRCUIT DIAGRAM**




* to be measured at base level

Tolerance unless otherwise specified ±0.5

| ELECTRICAL SPECIFICATIONS | | |
|---|---|---|
| **Resistive Element** | | cermet |
| **Electrical Travel** | | 21 turns ± 2 |
| **Resistance Range** | | 10Ω to 2.2MΩ |
| **Standard series E3** | | 1 - 2.2 - 4.7 and on request 1 - 2 - 5 |
| **Tolerance** | **Standard** | ± 10% |
| | **On Request** | ± 5% |
| **Power Rating** | **Linear** | 0.5W at + 70°C |
| | **Logarithmic** | not applicable |
| **Temperature Coefficient** | | See Standard Resistance Element Table |
| **Limiting Element Voltage (Linear Law)** | | 250V |
| **Contact Resistance Variation** | | 2% Rn or 2Ω |
| **End Resistance (Typical)** | | 1Ω |
| **Dielectric Strength (RMS)** | | 1000V |
| **Insulation Resistance (500VDC)** | | $10^6$MΩ |

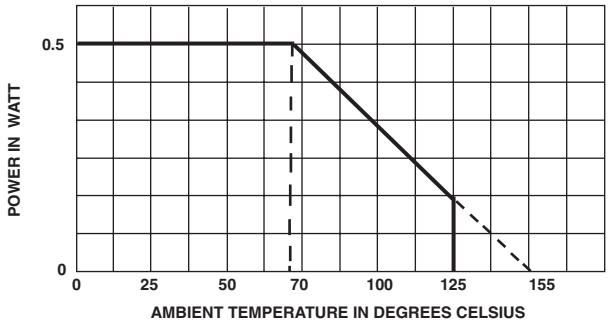
## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Mechanical Travel** | 23 turns ± 5 |
| **Operating Torque (max. Ncm)** | 1.5 |
| **End Stop Torque** | clutch action |
| **Net Weight** | Approx. 0.82 g |
| **Wiper (actual travel)** | Positioned at approx. 50% |

## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| **Temperature Range** | – 55°C to + 155°C |
| **Climatic Category** | 55 / 125 / 56 |
| **Sealing** | fully sealed container IP67 |

## POWER RATING CHART




| PERFORMANCE | | | |
|---|---|---|---|
| **TESTS** | **CONDITIONS** | **TYPICAL VALUES AND DRIFTS** | |
| | | $\frac{\Delta RT}{RT}$ (%) | $\frac{\Delta R_{1-2}}{R_{1-2}}$ (%) |
| **Load Life** | 1000 hours at rated power<br>90'/30' - ambient temp. 70°C | ± 1%<br>Contact res. variation: < 1% Rn | ± 2% |
| **Climatic Sequence** | Phase A dry heat 125°C - 30% Pr<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: 1000V RMS<br>Insulation resistance: > $10^4$ MΩ | ± 1% |
| **Rapid Temperature Change** | 5 cycles<br>– 55°C at + 125°C | ± 0.5% | $\frac{\Delta V_{1-2}}{V_{1-3}}$ ≤ ± 1% |
| **Shock** | 50 g at 11m secs<br>3 successive shocks<br>in 3 directions | ± 0.1% | ± 0.2% |
| **Vibration** | 10-55 Hz<br>0.75mm or 10 g<br>during 6 hours | ± 0.1% | $\frac{\Delta V_{1-2}}{V_{1-3}}$ ≤ ± 0.2% |
| **Rotational Life** | 200 cycles | ± 4%<br>Contact res. variation: < 1% Rn | |

## STANDARD RESISTANCE ELEMENT DATA

| STANDARD RESISTANCE VALUES | LINEAR LAW | | | T.C. –55°C +125°C |
|---|---|---|---|---|
| | MAX. POWER AT 70°C | MAX. WORKING VOLTAGE | MAX. CUR. THROUGH WIPER | |
| Ω | W | V | mA | ppm/°C |
| 10 | 0.5 | 2.2 | 224 | |
| 22 | | 3.3 | 150 | 0 |
| 47 | | 4.8 | 103 | +200 |
| 100 | | 7 | 70 | |
| 220 | | 10.5 | 47 | |
| 470 | | 15.3 | 32 | |
| 1k | | 22.4 | 22 | |
| 2.2k | | 33.2 | 15 | |
| 4.7k | | 48.5 | 10 | |
| 10k | | 70.7 | 7 | |
| 22k | | 105 | 4.8 | ± 100 |
| 47k | | 153 | 3.2 | |
| 100k | 0.5 | 224 | 2.2 | |
| 220k | 0.28 | 250 | 1.1 | |
| 470k | 0.13 | 250 | 0.53 | |
| 1M | 0.06 | 250 | 0.25 | |
| 2.2M | 0.028 | 250 | 0.11 | |

## MARKING

Printed:
– VISHAY trademark
– model
– style
– ohmic value (in Ω, kΩ, MΩ)
– tolerance (in %)
– manufacturing date
– marking of terminal 3

## PACKAGING

– In magazine pack by 50 pieces (tube) code “TU50”.

## ORDERING INFORMATION

| T93 | XA | 220kΩ | ± 10% | TU50 | e3 |
|---|---|---|---|---|---|
| MODEL | VERSION | OHMIC VALUE | TOLERANCE | PACKAGING | LEAD FINISH |
| | | | | TU50 : Tube | e3: pure Sn |

## SAP PART NUMBERING GUIDELINES

| T | 9 | 3 | X | A | 2 | 2 | 4 | K | T | 2 | 0 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | | | STYLE | | OHMIC VALUE | | | TOL | PACKAGING CODE | | | SPECIAL (IF APPLICABLE) | | |

See the end of this data book for conversion tables