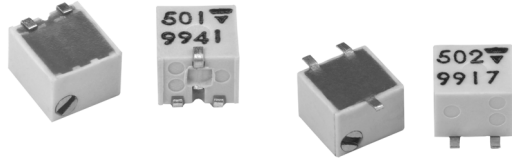


## Surface Mount Miniature Trimmers Multi-Turn Cermet Sealed



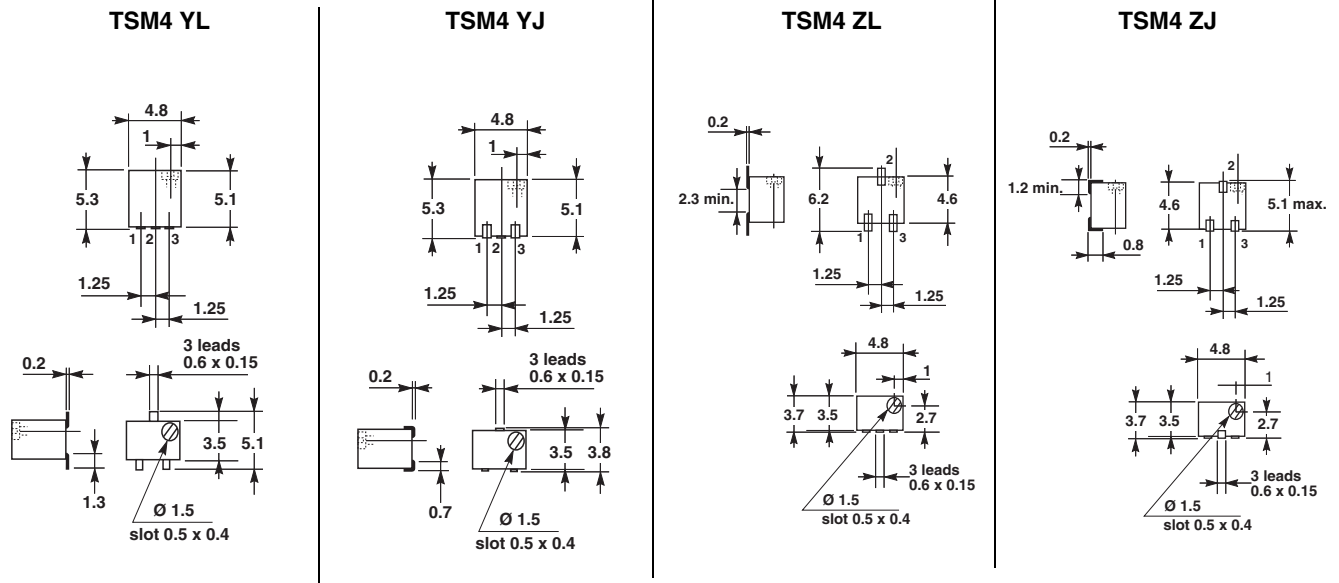
The TSM4 trimming potentiometer has been designed for surface mount applications and offers volumetric efficiency  $5 \times 5 \times 3.7 \text{ mm}^3$  with high performance and stability.

The TSM4 design is suitable for both manual or automatic operation, and can withstand vapor phase and reflow soldering techniques.

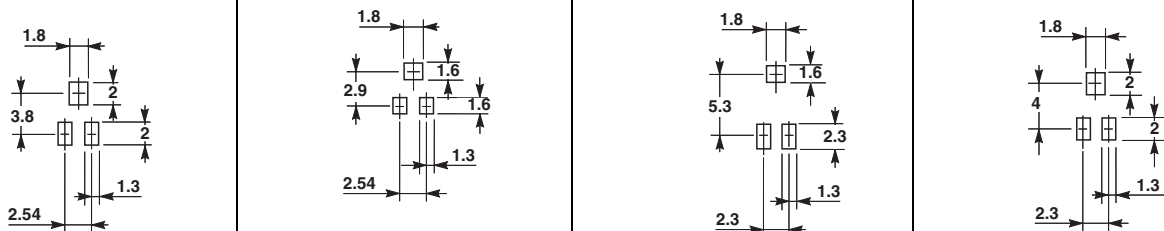
### FEATURES

- 0.25 Watt at 85 °C
- Professional grade
- Excellent stability
- Wide ohmic range
- Low contact resistance variation
- Small size for optimum packing density
- Suitable for both manual or automatic operation

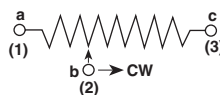
### DIMENSIONS in millimeters



### RECOMMENDED SOLDERING AREAS



### CIRCUIT DIAGRAM



Tolerances unless otherwise specified  $\pm 0.5$



ELECTRICAL SPECIFICATIONS		
Resistive Element		Cermet
Electrical Travel		11 turns ± 2
Resistance Range		10 Ω to 1 MΩ
Standard Series		1 - 2 - 5
Tolerance Standard		±10 %
Power Rating	Linear	0.25 W at + 85 °C
	Logarithmic	not applicable
Temperature Coefficient		See Standard Resistance Element Table
Limiting Element Voltage (Linear Law)		200 V
Contact Resistance Variation (Typical)		2 % or 3 Ω
End Resistance (Typical)		1 Ω
Dielectric Strength (RMS)		600 V
Insulation Resistance		10 <sup>6</sup> MΩ

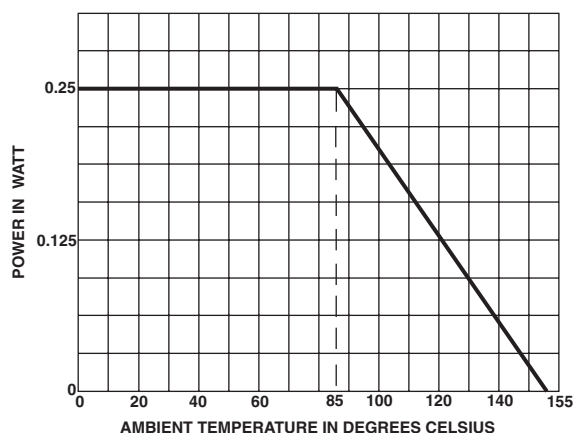
## MECHANICAL SPECIFICATIONS

Mechanical Travel	13 turns ± 2
Operating Torque (max. Ncm)	1
End Stop Torque (Ncm)	clutch action (2 turns max)
Unit Weight (max. g)	0.15
Wiper (actual travel)	positioned at approx. 50 %

## ENVIRONMENTAL SPECIFICATIONS

Temperature Range	- 55 °C to + 125 °C
Climatic Category	55/125/56
Sealing	sealed container solder immersion IP67

## POWER RATING CHART



PERFORMANCE			
TESTS	CONDITIONS	TYPICAL VALUES AND DRIFTS	
		$\frac{\Delta R_{T}}{R_{T}}$ (%)	$\frac{\Delta R_{1-2}}{R_{1-2}}$ (%)
Load Life	1000 hours at rated power 90°/30' - ambient temperature + 85 °C	± 2 % Contact resistance variation: $\Delta > 1 \% R_n$	± 3 %
Moisture Resistance	MIL STD 202 Method 106 10 cycles of 24 hours constituted with damp heat - cold - vibrations	± 2 % Dielectric strength: 1000 V RMS Insulation resistance: $> 10^4 M\Omega$	± 3 %
Long Term Damp Heat	Temperature 40 °C - RH 93 % 56 days	± 2 % Dielectric strength: 1000 V RMS Insulation resistance: $> 10^4 M\Omega$	± 3 %
Thermal Shock	- 55 °C to + 125 °C - 5 cycles	± 1 %	$\frac{\Delta V_{1-2}}{V_{1-3}} \leq \pm 2 \%$
Rotational Life (Electrical and Mechanical)	100 cycles - rated power	± 3 %	
Shock	MIL STD 202 Method 213/1 100 g - 6 ms 3 successive shocks in 3 directions	± 1 %	$\frac{\Delta V_{1-2}}{V_{1-3}} \leq \pm 1 \%$
Vibration	MIL STD 202 Method 204/D 20 g - 12 hours	± 1 %	$\frac{\Delta V_{1-2}}{V_{1-3}} \leq \pm 1 \%$



STANDARD RESISTANCE ELEMENT DATA					
STANDARD RESISTANCE VALUES	LINEAR LAW			T.C. - 55 °C + 125 °C	
	MAX. POWER AT 85 °C	MAX. WORKING VOLTAGE	MAX. CUR. THROUGH ELEMENT		
Ω	W	V	mA	ppm/°C	
10 20 50	0.25	1.58 2.23 3.53	158 112 77	0 + 200	
100 200 500 1k 2k 5k 10k 20k 50k 100k 200k 500k 1M		↓	5 7.07 11.2 15.8 22.3 35.3 50 70.7 112 158 200 200 200	50 35 22 15.8 11.2 7.1 5 3.5 2.2 1.6 1 0.4 0.2	± 100
	0.2		200	1	
	0.08		200	0.4	
	0.04		200	0.2	

**MARKING**

VISHAY trademark, ohmic value, manufacturing date.

The ohmic value is indicated by a 3 figure code, the first two digits are significant figures, the third one is the multiplier.

Example: 100 = 10 Ω  
101 = 100 Ω  
102 = 1000 Ω  
503 = 50000 Ω

**SOLDERING RECOMMENDATIONS**

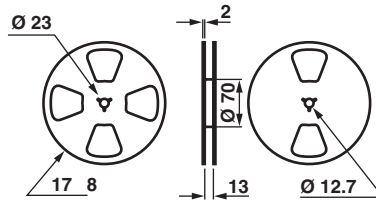
Vapor phase: 215 °C/20 to 40 seconds

Reflow: 230 °C/20 seconds

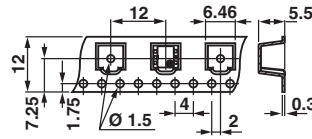
Do not exceed peak 260 °C

**PACKAGING**

In bulk (plastic box of 50 pieces).  
On tape and reel on request, by 500 pieces for Z version, or 250 pieces for Y version.



Version Y

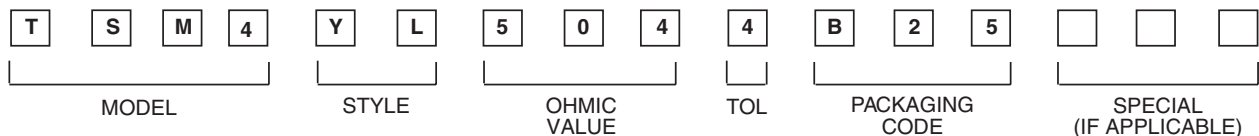


Version Z

**ORDERING INFORMATION**

TSM4 SERIES	YL STYLE	500 kΩ OHMIC VALUE	± 10 % TOLERANCE	BO50 PACKAGING	e3 LEAD FINISH
				BO50	e3: pure Sn
			On request	Version Z: code TR500 Version Y: code TR250	

**SAP PART NUMBERING GUIDELINES**



See the end of this data book for conversion tables



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