5 mm Square Surface Mount Miniature Trimmers Multi-Turn Cermet Sealed

The TSM4 trimming potentiometer has been designed for surface mount applications and offers volumetric efficiency 5 mm x 5 mm x 3.7 mm 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.

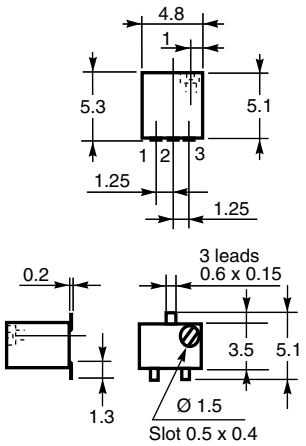
FEATURES

- 0.25 W at 70 °C
- Professional and industrial grade
- Wide ohmic range (10 Ω to 1 MΩ)
- Low contact resistance variation (2 % or 3 Ω)
- 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

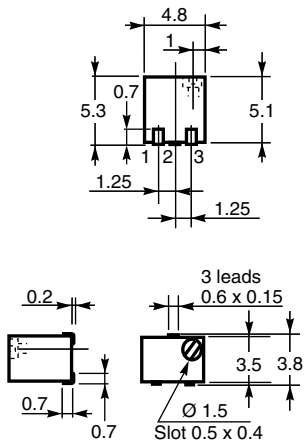
RoHS COMPLIANT

DIMENSIONS in millimeters (± 0.5 mm)

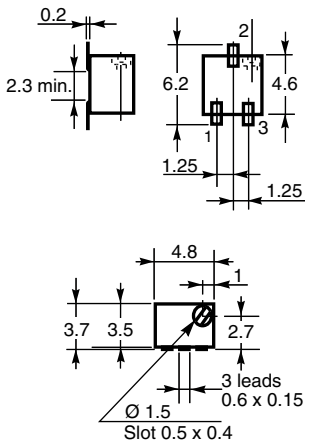
TSM4 YL



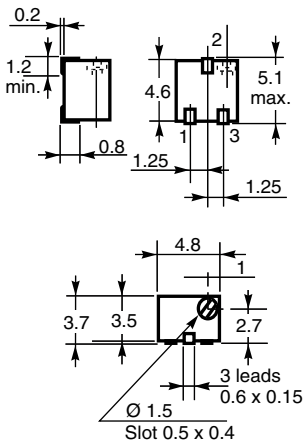
TSM4 YJ



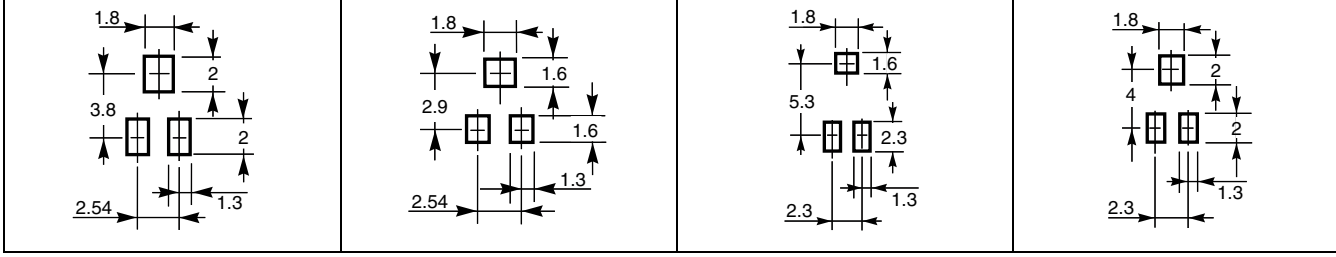
TSM4 ZL

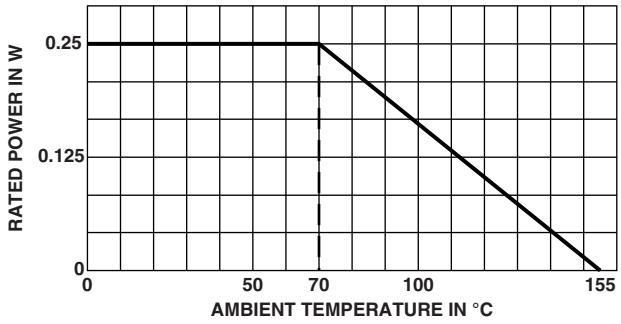
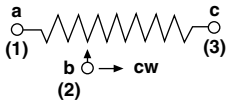


TSM4 ZJ



RECOMMENDED SOLDERING AREAS



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 70 °C 
Circuit diagram	
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 (500 V_{DC})	10^6 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 IP67
MSL level	1

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

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 90'/30' - ambient temp. 70 °C	± 2 %	± 3 %	Contact res. variation: Δ < 1 % Rn
Climatic sequence	Phase A dry heat 125 °C Phase B damp heat Phase C cold -55 °C Phase D damp heat 5 cycles	± 2 %	± 3 %	Dielectric strength: 600 V_{RMS} Insulation resistance: > 10^4 MΩ
Damp heat, steady state	Temperature 40 °C - RH 93 % 56 days	± 2 %	± 3 %	Dielectric strength: 600 V_{RMS} Insulation resistance: > 10^4 MΩ
Change 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 % + 3 Ω)		
Shock	50 *g* - 11 ms 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 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	2.23	112	
50	0.25	3.53	77	
100	0.25	5.00	50	
200	0.25	7.07	35	
500	0.25	11.2	22	
1K	0.25	15.8	15.8	
2K	0.25	22.3	11.2	
5K	0.25	35.3	7.1	
10K	0.25	50.0	5.0	
20K	0.25	70.7	3.5	
50K	0.25	112	2.2	
100K	0.25	158	1.6	
200K	0.25	200	1.0	
500K	0.08	200	0.4	
1M	0.04	200	0.2	

MARKING

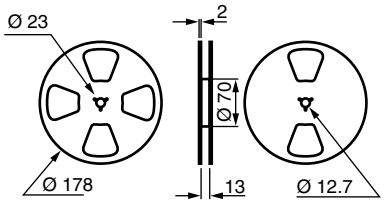
Vishay trademark, ohmic value, manufacturing date

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

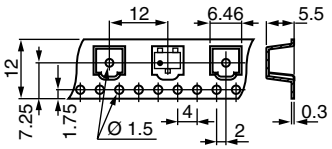
Example: 100 = 10 Ω
101 = 100 Ω
102 = 1000 Ω
503 = 50 000 Ω

PACKAGING in millimeters

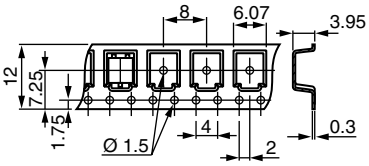
On tape and reel, by 500 pieces for Z version: Code TR500, or 250 pieces for Y version: Code TR250.
In bulk on request (plastic box of 50 pieces): Code BO50.



Version Y



Version Z



ORDERING INFORMATION (part number)

T	S	M	4	Y	L	5	0	4	K	R	0	5				

MODEL	STYLE	OHMIC VALUE	TOLERANCE	PACKAGING	SPECIAL NUMBER
TSM4	**YJ** **YL** **ZJ** **ZL**	From 10 Ω to 1 MΩ **504** = 500 kΩ	**K** = 10 %	**R10** = reel 500 pieces for ZJ and ZL **R05** = reel 250 pieces for YJ and YL On request **B25** = box of 50 pieces	(If applicable) Given by Vishay for custom design

DESCRIPTION (for information only)

TSM4	YL	500K	10 %		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

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.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. 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.