

## Surface Mount Cermet Trimmers (14 turns)



### FEATURES

- Lead (Pb)-free soldering, Cadmium-free
- Precise adjustment is possible
- Automatic mounting is possible (Taping)
- Flow/reflow soldering is possible
- Sealed construction (Washable)
- RoHS compliant

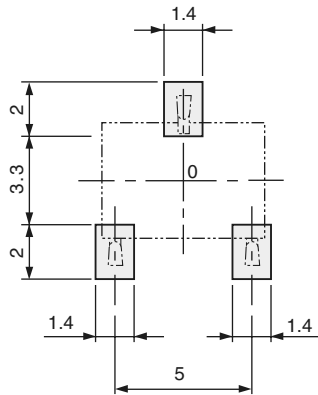


### DIMENSIONS in millimeters

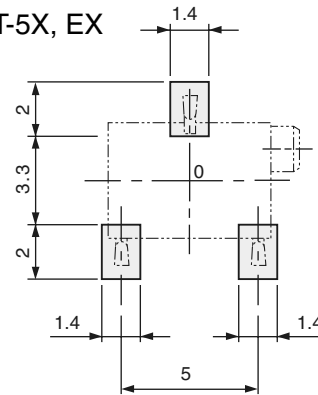
### RECOMMENDED P.C.B. PAD OUTLINE DIMENSIONS

(Unit: mm)

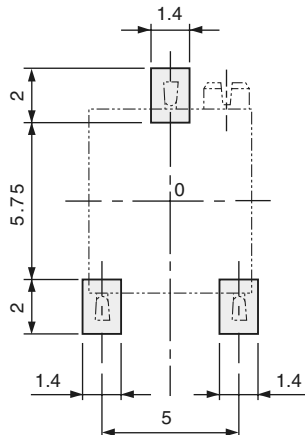
ST-5W, EW



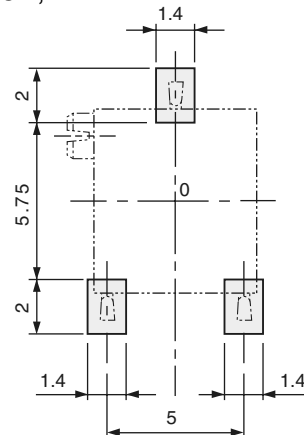
ST-5X, EX



ST-5P, EP



ST-5R, ER



Note) The zero point is the center of mounting.

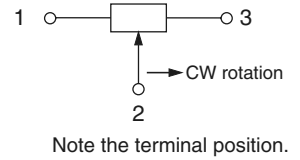
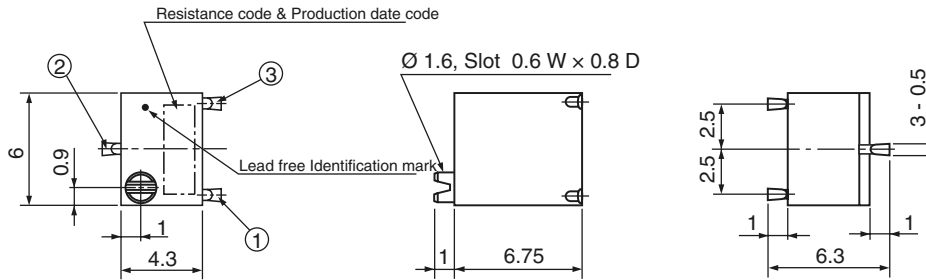
Specifications are subject to change without notice. Specifications in this catalog are for reference. The formal specification sheets will be submitted upon request.

**DIMENSIONS** in millimeters

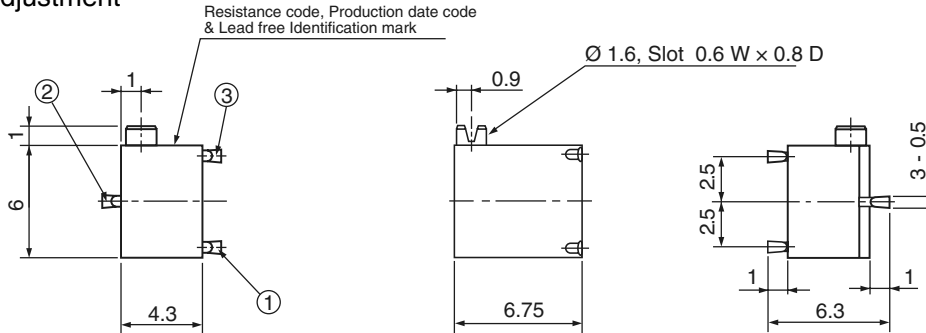
**OUTLINE DIMENSIONS**

ST-5W, ST-5EW  
Top adjustment

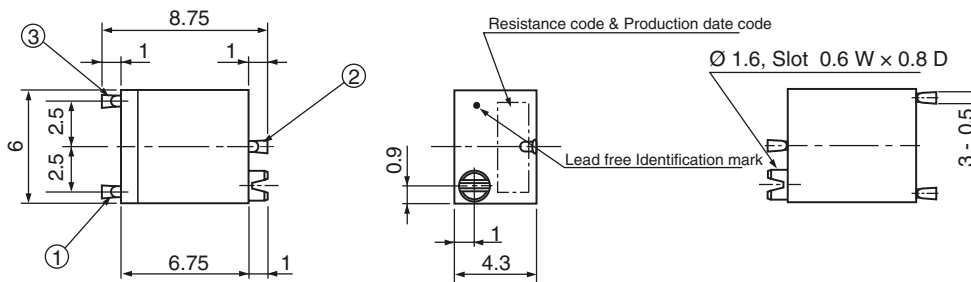
Unless otherwise specified, tolerance:  $\pm 0.3$  (Unit: mm)



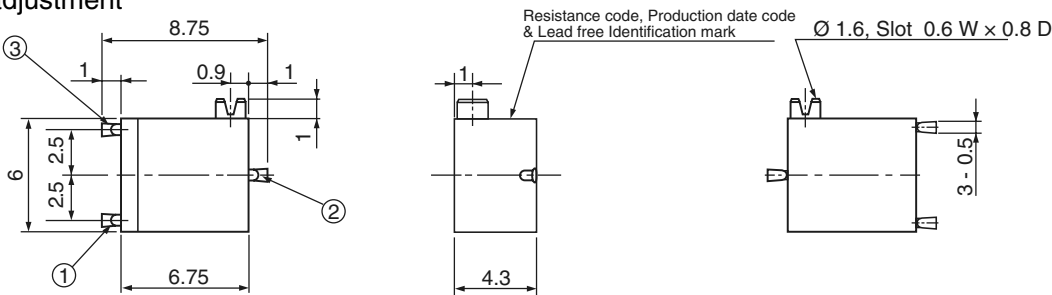
ST-5X, ST-5EX  
Side adjustment



ST-5P, ST-5EP  
Side adjustment



ST-5R, ST-5ER  
Side adjustment



Specifications are subject to change without notice. Specifications in this catalog are for reference. The formal specification sheets will be submitted upon request.

**DIMENSIONS** in millimeters

**PACKAGING SPECIFICATIONS**

Taping packaging specifications

Taping version is packaged in 500 pcs. per reel.

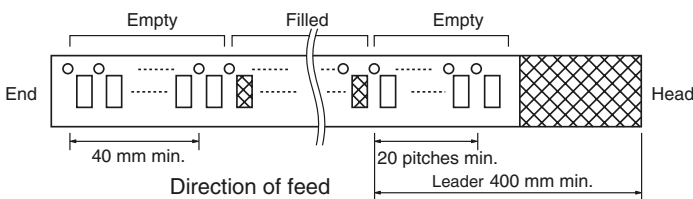
Orders will be accepted for units of 500 pcs., i.e., 500, 1000, 1500 pcs., etc.

Taping version is boxed with one reel (500 pcs.).

Maximum number of consecutive missing pieces = 2

Leader length and reel dimension are shown in the dia-grams below.

**EMBOSSED TAPE DIMENSIONS**

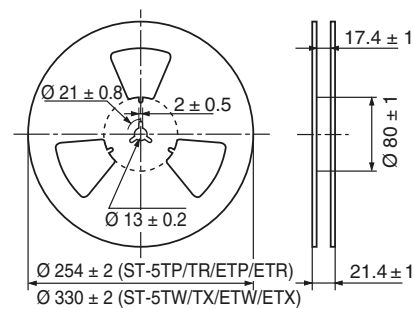


**REEL DIMENSIONS**

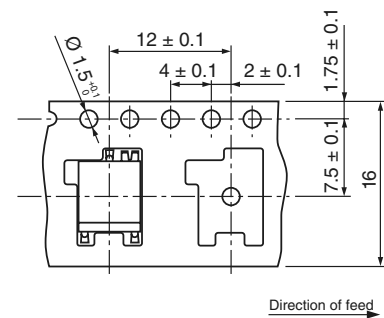
(Conforms to JIS C 0806-3)

(In accordance with EIAJ ET-7200A)

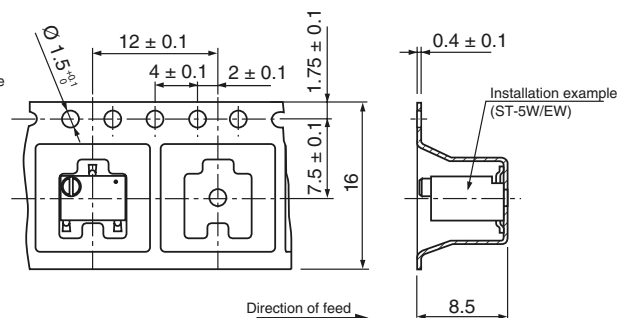
(Unit: mm)



**ST-5TP/TR/ETP/ETR**



**ST-5TW/TX/ETW/ETX**



Specifications are subject to change without notice. Specifications in this catalog are for reference. The formal specification sheets will be submitted upon request.

**Magazine packaging specifications**

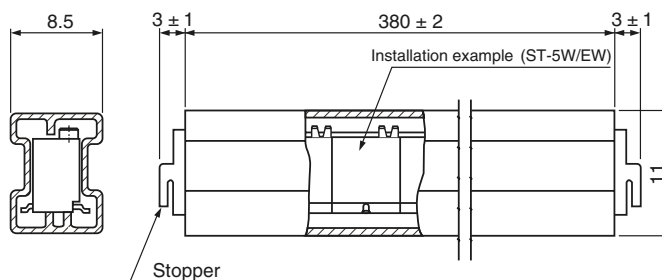
Magazine is packed 50 pcs. per stick.

Orders will be accepted for units of 50 pcs., i.e., 50, 100, 150 pcs., etc.

Magazines are packed 2000 pcs. per box.

(Unit: mm)

**Magazine dimensions**



**Vinyl bag packaging specifications**

Unit of bulk in vinyl bag packaging is 50 pcs. per pack.

Boxing of bulk in vinyl bags is performed with 200 pcs. per box.

Specifications are subject to change without notice. Specifications in this catalog are for reference. The formal specification sheets will be submitted upon request.

**MECHANICAL SPECIFICATIONS**

<b>Mechanical turn</b>	14 turns
<b>Operating torque</b>	20 mN m {204 gf cm} maximum
<b>Mechanical stop</b>	Clutch action
	200 cycles
<b>Rotational life</b>	10 Ω ~ 200 Ω [ $\Delta R/R \leq \pm (0.5 \Omega + 3 \%)$ ] 500 Ω ~ 2 MΩ [ $\Delta R/R \leq \pm (0.5 \Omega + 2 \%)$ ]
<b>Thrust to shaft</b>	5 N {0.51 kgf} minimum
<b>Solderability</b>	Sn-Pb: 235 °C, 2 s Sn (Lead-free): 245 ± 3 °C, 2 ~ 3 s
<b>Shear (Adhesion)</b>	5 N {0.51 kgf} 10 s
<b>Substrate bending</b>	Width 90 mm, bend 3 mm, 5 s, 1 time
<b>Pull-off strength</b>	5 N {0.51 kgf} 10 s

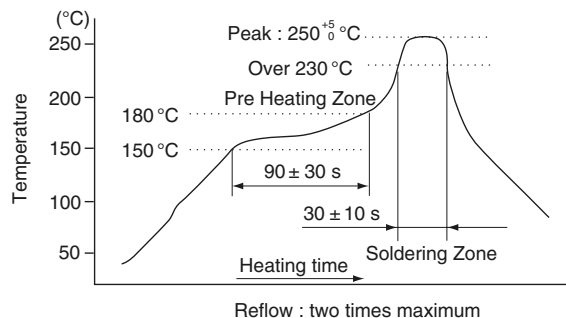
**ELECTRICAL CHARACTERISTICS**

Nominal resistance range	10 Ω ~ 2 MΩ
Resistance tolerance	± 10 %
Power ratings	0.25 W (85 °C) 0 W (120 °C)
Resistance law	Linear law (B)
Maximum input voltage	DC200 V or power rating, whichever is smaller
Maximum wiper current	100 mA or power rating, whichever is smaller
Effective electrical turn	11 turns
End resistance	1 % or 2 Ω, whichever is greater
C.R.V.	1 % or 3 Ω, whichever is greater
Operating temp. range	- 55 ~ 120°C
Temp. coefficient	10 Ω ~ 50 Ω: ± 250 10 <sup>-6</sup> /°C maximum 100 Ω ~ 2 MΩ: ± 100 10 <sup>-6</sup> /°C maximum
Insulation resistance	1000 MΩ minimum (DC500 V)
Dielectric strength	AC600 V, 60 s
Net weight	Approx. 0.35 g

**ENVIRONMENTAL SPECIFICATIONS**

Test item	Test conditions	Specifications
Thermal shock	- 65 ~ 125 °C (0.5 h), 5 cycles	[ $\Delta R/R \leq 2 \%$ ] [S.S. ≤ 1 %]
Humidity	- 10 ~ 65 °C (Relative humidity 80 ~ 98 %), 10 cycles, 240 h	[ $\Delta R/R \leq 2 \%$ ]
Shock	981 m/s <sup>2</sup> , 6 ms 6 directions for 3 times each	[ $\Delta R/R \leq 1 \%$ ] [S.S. ≤ 1 %]
Vibration	Amplitude 1.52 mm or Acceleration 196 m/s <sup>2</sup> . 10 ~ 2000 Hz, 3 directions, 12 times each	
Load Life	85 °C, 0.25 W, 1000 h	[ $\Delta R/R \leq 3 \%$ ] [S.S. ≤ 1 %]
Low temperature operation	- 55 °C, 2 h	[ $\Delta R/R \leq 2 \%$ ] [S.S. ≤ 2 %]
High temperature exposure	120 °C, 250 h	[ $\Delta R/R \leq 3 \%$ ] [S.S. ≤ 2 %]
Immersion seal	85 °C, 60 s	No leaks (No continuous bubbles)
Soldering heat	Sn-Pb 260 °C, 10 s or 215 °C, 35 s	[ $\Delta R/R \leq 1 \%$ ]
	Sn Flow: 260 °C ± 3 °C as the temperature in a pot of molten solder, immersion from head of terminal to backside of board, 5 ~ 6 s, two times maximum Reflow: Peak temperature 255 °C (Please refer to the profile below.) Manual soldering: 350 ± 10 °C, 3 ~ 4 s	

Reflow profile for soldering heat evaluation

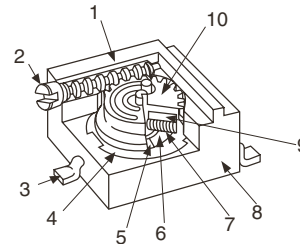


MAXIMUM INPUT RATINGS			
Nominal resistance values (Ω)	Resistance code	Maximum input voltage (V)	Maximum wiper current (mA)
10*	100	1.00	100
20*	200	2.00	100
50	500	3.53	70.7
100	101	5.00	50.0
200	201	7.07	35.4
500	501	11.2	22.4
1 k	102	15.8	15.8
2 k	202	22.4	11.2
5 k	502	35.4	7.07
10 k	103	50.0	5.00
20 k	203	70.7	3.54
50 k	503	112	2.24
100 k	104	158	1.58
200 k	204	200	1.00
500 k	504	200	0.40
1 M	105	200	0.20
2 M	205	200	0.10

The products indicated by \* mark are manufactured upon receipt of order basis

CONSTRUCTION			
Part Name	Material	Flammability	
1 Housing	Polyphenylenesulphide	UL-94V-O	
2 Shaft	Brass, Nickel-plated		
3 Terminal pin	Sn-Pb	Copper, Solder-plated	-
	Sn	Copper, Tin-plated	-
4 Base element	Ceramic	-	
5 Electrode	Ag-Pd cermet	-	
6 Resistive element	RuO <sub>2</sub> cermet	-	
7 Wiper	Multi metal alloy	-	
8 Adhesive	Epoxy	-	
9 Rubber cushion	Silicone rubber		
10 Rotor gear	PA (Polyamide)	UL-94HB	

CFC's, Halon, Carbon tetrachloride and designated bromic flame retardant PBBOs and PBBs are not used in our products.



LIST OF PART NUMBERS							
Adjustment position	Shape of terminal	Form of packing					
		Taping (reel)		Magazine (stick)		Vinyl bag	
		Sn-Pb	Sn (Lead (Pb)-free)	Sn-Pb	Sn (Lead (Pb)-free)	Sn-Pb	Sn (Lead (Pb)-free)
Top adjustment	W (Gull-wing)	ST-5TW	ST-5ETW	ST-5MW	ST-5EMW	ST-5W	ST-5EW
Side adjustment	X (Gull-wing)	ST-5TX	ST-5ETX	ST-5MX	ST-5EMX	ST-5X	ST-5EX
	P (Gull-wing)	ST-5TP	ST-5ETP	ST-5MP	ST-5EMP	ST-5P	ST-5EP
	R (Gull-wing)	ST-5TR	ST-5ETR	ST-5MR	ST-5EMR	ST-5R	ST-5ER
Pieces in package		500 pcs./reel		50 pcs./reel		50 pcs./reel	

FIG. 1: NOMINAL RESISTANCE VALUES								
10 Ω*	20 Ω*	50 Ω	100 Ω	200 Ω	500 Ω	1 kΩ	2 kΩ	5 kΩ
10 kΩ	20 kΩ	50 kΩ	100 kΩ	200 kΩ	500 kΩ	1 MΩ	2 MΩ	-

The products indicated by \* mark are manufactured upon receipt of order basis.

\* The above part numbers are all available with the respective combination of <Nominal resistance values> (Fig.1)

\* Verify the above part numbers when placing orders.

\* Taping specification is not sold separately and must be purchased in reel units.



**ORDERING INFORMATION**

ST-5		T	W	204
SERIES NAME	TERMINAL PIN	FORM OF PACKAGING	PRODUCT SHAPE (SHAPE OF TERMINAL)	RESISTANCE CODE
	Blank: Sn-Pb E: Sn (Lead(Pb)-free)	T: Taping (Reel) M: Magazine (Stick) Blank: Bulk in vinyl bags	W: Gull wing (Top adjustment) X: Gull wing (Side adjustment) P: Gull wing (Side adjustment) R: Gull wing (Side adjustment)	

**This product is manufactured by Copal Electronic Co. Ltd. of Tokyo, Japan and distributed by Vishay in North and South America only. This product is not available from Vishay outside of North or South America.**



## Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.