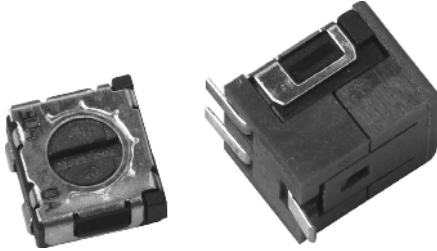


## Surface Mount Cermet Trimmers (single turn)



### FEATURES

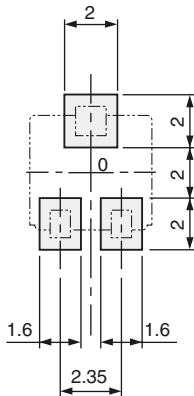
- Lead (Pb)-free soldering, Cadmium-free
- Wide variety (7 types) to choose from
- Automatic mounting is possible (Taping)
- Flow/reflow soldering is possible
- Sealed construction (Washable)
- Stopper structure prevents terminal pin from being open
- Cross slot totor suitable for automatic adjustment
- RoHS compliant



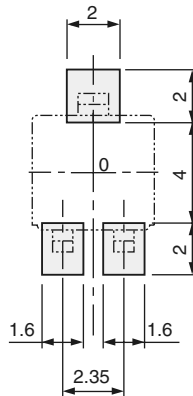
### DIMENSIONS in millimeters

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

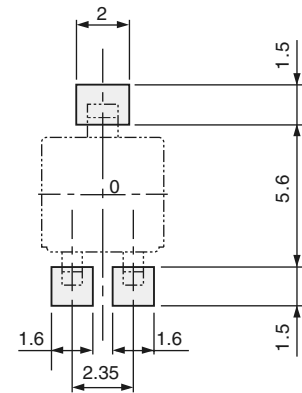
ST-4A, 4EA



ST-4B, 4EB

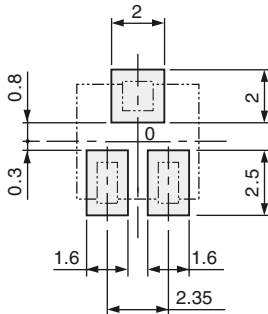


ST-4D, 4ED

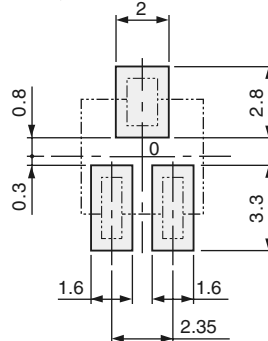


(Unit: mm)

ST-4G, 4EG



ST-4H, 4EH



Note) The zero point is the center of mounting.

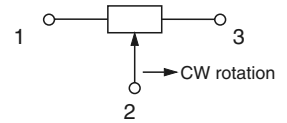
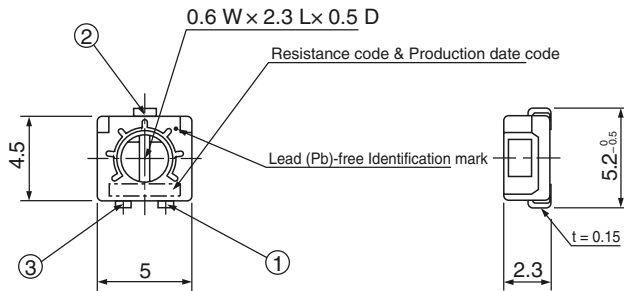
Specifications are subject to change without notice. Specifications in this catalog are for reference. The formal specification sheets will be submitted upon request.

**DIMENSIONS** in millimeters

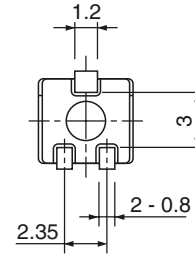
Unless otherwise specified, tolerance:  $\pm 0.3$  (Unit: mm)

**OUTLINE DIMENSIONS**

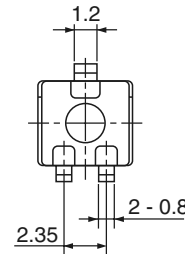
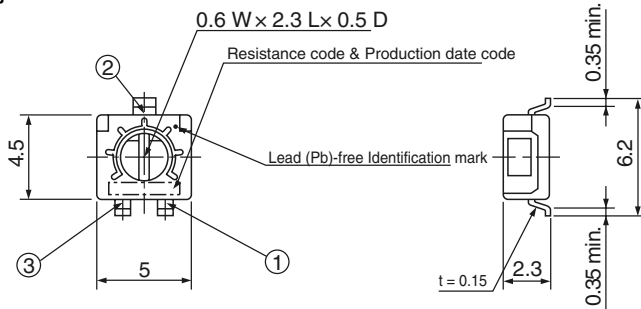
ST-4A, 4EA  
Top adjustment



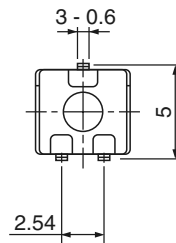
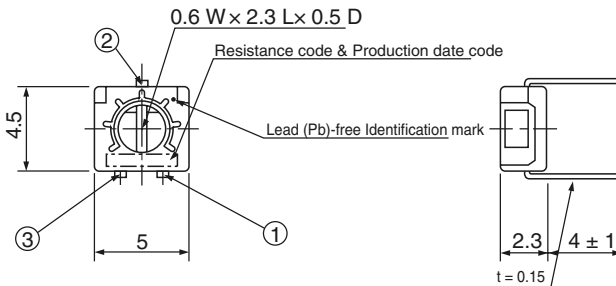
\*: Note the terminal position.



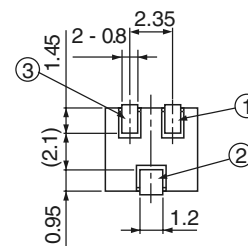
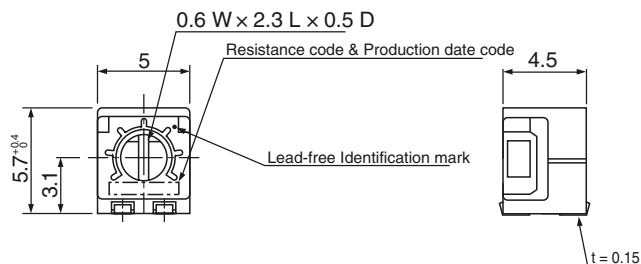
ST-4B, 4EB  
Top adjustment



ST-4C, 4EC  
Top adjustment



ST-4G, 4EG  
Side adjustment



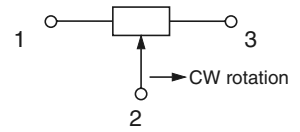
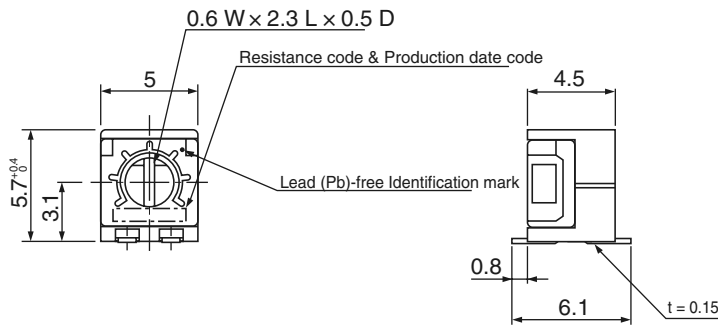
Specifications are subject to change without notice. Specifications in this catalog are for reference. The formal specification sheets will be submitted upon request.

**DIMENSIONS** in millimeters

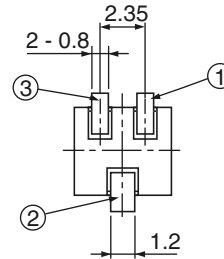
**OUTLINE DIMENSIONS**

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

ST-4H, 4EH  
Side adjustment

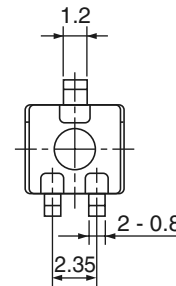
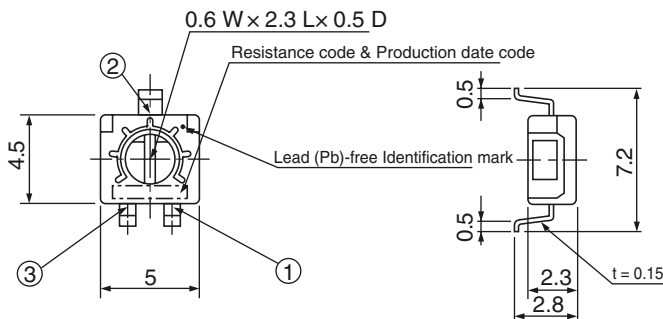


\*: Note the terminal position.



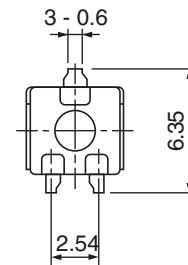
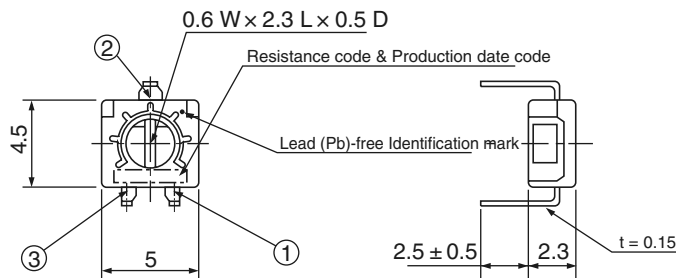
ST-4D, 4ED  
Rear adjustment

<Semi-standard products>

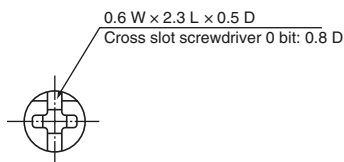


ST-4F, 4EF  
Rear adjustment

<Semi-standard products>



ST-42, 42E  
CROSS SLOT DIMENSION



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

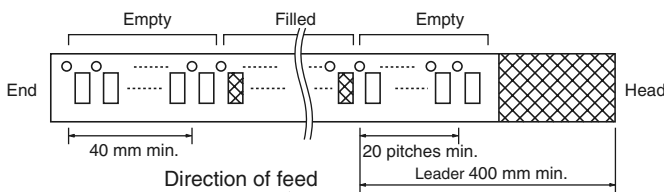
**PACKAGING SPECIFICATIONS**

**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.
- ST-4TA, TB, TD, ETA, ETB and ETD versions are boxed with 4 reels (2000 pcs.).
- ST-4TG, TH, ETG and ETH versions are 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.

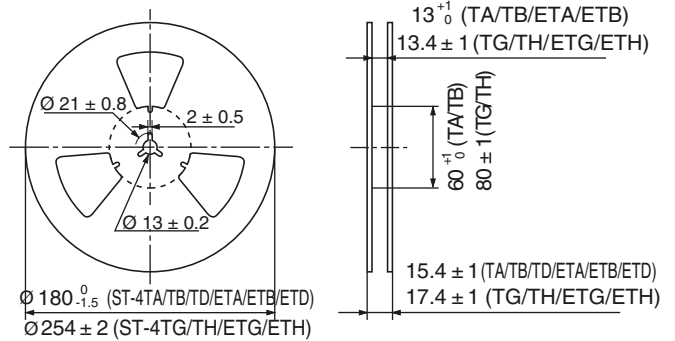
**EMBOSSED TAPE DIMENSIONS**



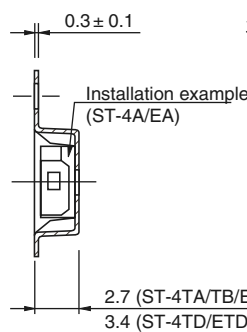
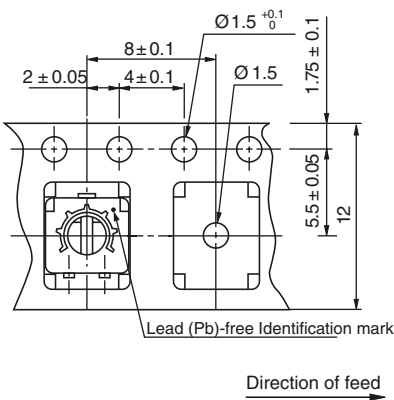
**REEL DIMENSIONS**

(Conforms to JIS C 0806-3)  
 (In accordance with EIAJ ET-7200A)

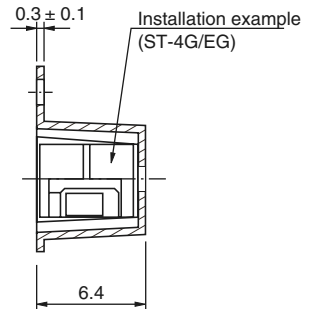
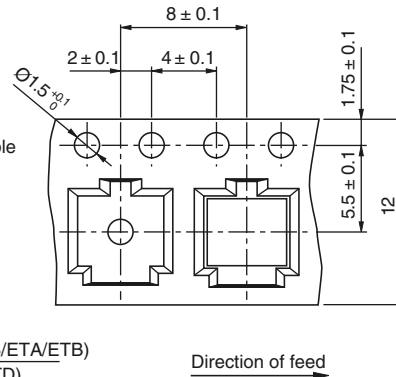
(Unit: mm)



**ST-4TA/TB/TD/ETA/ETB/ETD**



**ST-4TG/TH/ETG/ETH**



**Vinyl bag packaging specifications**

- Unit of bulk in vinyl bag packaging is 100 pcs. per pack.
- Boxing of bulk in vinyl bags is performed with 500 pcs. per box.

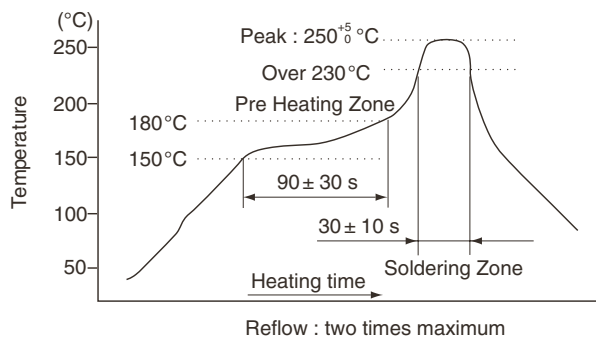
**MECHANICAL SPECIFICATIONS**

<b>Mechanical angle</b>	240° (1 turn)
<b>Operating torque</b>	10 mN m {102 gf cm} maximum
<b>Stop strength</b>	30 mN m {306 gf cm} minimum
<b>Rotational life</b>	100 cycles [ $\Delta R/R \leq \pm (2 \Omega + 3 \%)$ ]
<b>Thrust to rotor</b>	5 N {0.51 kgf} minimum
<b>Solderability</b>	Sn-Pb: 235 °C, 2 s Sn-Cu (Lead (Pb)-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 SPECIFICATIONS**

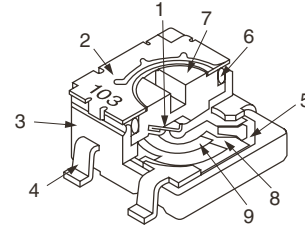
Nominal resistance range	10 $\Omega$ ~ 2 M $\Omega$
Resistance tolerance	± 20 %
Power ratings	0.25 W (70 °C) 0 W (125 °C)
Resistance law	Linear law (B)
Maximum input voltage	DC200 V or power rating, whichever is smaller
Maximum wiper current	100 mA or power rating, whichever is smaller
Effective electrical turn	210° (1 turn)
End resistance	1 % or 2 $\Omega$ , whichever is greater
C.R.V.	1 % or 3 $\Omega$ , whichever is greater
Operating temp. range	- 55 ~ 125 °C
Temp. coefficient	10 $\Omega$ ~ 50 $\Omega$ : ± 250 10 <sup>-6</sup> /°C maximum 100 $\Omega$ ~ 2M $\Omega$ : ± 100 10 <sup>-6</sup> /°C maximum
Insulation resistance	1000 M $\Omega$ minimum (DC500 V)
Dielectric strength	AC500 V, 60 s
Net weight	Approx. 0.12 g (ST-4A, B, C, D, F, EA, EB, EC, ED, EF) Approx. 0.22 g (ST-4G, H, EG, EH)

Reflow profile for soldering heat evolution

**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	70 °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	125 °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  Sn-Cu 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	[ $\Delta R/R \leq 1 \%$ ]

<b>MAXIMUM INPUT RATINGS</b>			
Nominal resistance values ( $\Omega$ )	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
<hr/>			
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
<hr/>			
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



<b>CONSTRUCTION</b>				
Part Name		Material	Flammability	
1	Wiper	Multi metal alloy	-	
2	Cover	Stainless steel (SUS 304)		
3	Housing	Epoxy	UL-94V-O	
4	Terminal pin	Sn-Pb	Copper alloy, Solder-plated	-
		Sn-Cu	Copper alloy, Sn-Cu-plated	
5	Base element	Ceramic		
6	"O" ring	Silicone rubber	UL-94HB	
7	Rotor	Polyphenylenesulphide	UL-94V-O	
8	Electrode	Ag-Pd cermet	-	
9	Resistive element	RuO2 cermet		

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

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

<b>LIST OF PART NUMBERS</b>					
Adjustment position	Shape of terminal	Form of packing			
		Taping (reel)		Magazine (stick)	
		Sn-Pb	Sn (Lead (Pb)-free)	Sn-Pb	Sn (Lead (Pb)-free)
Top adjustment	A (J-hook)	ST-4/42TA	ST-4/42ETA	ST-4/42A	ST-4/42EA
	B (Gull wing)	ST-4/42TB	ST-4/42ETB	ST-4/42B	ST-4/42EB
	C (Through hole pins)	-	-	ST-4/42C	ST-4/42EC
Rear adjustment	D (Gull-wing)	ST-4/42TD*	ST-4/42ETD*	ST-4/42D*	ST-4/42ED*
	F (Through hole pins)	-	-	ST-4/42F*	ST-4/42EF*
Side adjustment	G (J-hook)	ST-54/42TG	ST-4/42ETG	ST-4/42G	ST-4/42EG
	H (Gull-wing)	ST-4/42TH	ST-4/42ETH	ST-4/42H	ST-4/42EH
Pieces in package		500 pcs./reel		100 pcs./reel	

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

\* Slot: ST-4 □ □ Slot: -42 □ □



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	-

Not manufactured

\* 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				
<b>ST-4</b>		<b>T</b>	<b>A</b>	<b>204</b>
SERIES NAME (MINUS SLOT)	TERMINAL PIN	FORM OF PACKAGING	PRODUCT SHAPE (SHAPE OF TERMINAL)	RESISTANCE CODE
	Blank: Sn-Pb E: Sn (Lead(Pb)-free)	T: Taping (Reel) Blank: Bulk in vinyl bags	A, G: J-hook B, D, H: Gull wing  C; F: Through hole pins	

ORDERING INFORMATION				
<b>ST-4 2</b>		<b>T</b>	<b>A</b>	<b>204</b>
SERIES NAME (CROSS SLOT)	TERMINAL PIN	FORM OF PACKAGING	PRODUCT SHAPE (SHAPE OF TERMINAL)	RESISTANCE CODE
	Blank: Sn-Pb E: Sn (Lead-free)	T: Taping (Reel) Blank: Bulk in vinyl bags	A, G: J-hook B, D, H: Gull wing  C; F: Through hole pins	

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