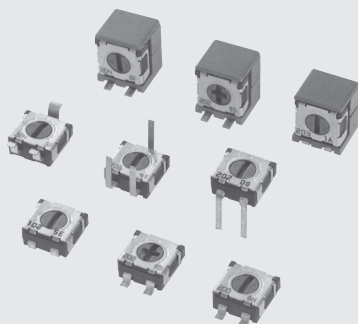


# SURFACE MOUNT CERMET TRIMMERS (SINGLE TURN)

# ST-4

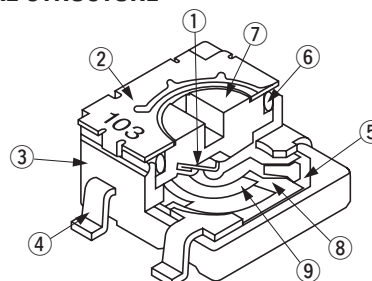
## RoHS compliant



## FEATURES

- RoHS compliant
- Wide variety (7 types) to choose from
- Automatic mounting is possible (Taping)
- Flow/reflow soldering is possible
- Sealed construction (Washable: Refer to page 698.)
- Stopper structure prevents terminal pin from being open.
- Cross slot rotor suitable for automatic adjustment

## INTERNAL STRUCTURE



|   | Part name         | Material                   | Flammability |
|---|-------------------|----------------------------|--------------|
| ① | Wiper             | Multi metal alloy          | —            |
| ② | Cover             | Stainless steel (SUS 304)  |              |
| ③ | Housing           | Epoxy                      | UL94V-0      |
| ④ | Terminal pin      | Copper alloy, Sn-Cu-plated | —            |
| ⑤ | Base element      | Ceramic                    |              |
| ⑥ | "O" ring          | Silicone rubber            | UL94HB       |
| ⑦ | Rotor             | Polyphenylenesulphide      | UL94V-0      |
| ⑧ | Electrode         | Ag-Pd cermet               | —            |
| ⑨ | Resistive element | RuO <sub>2</sub> cermet    |              |

## PART NUMBER DESIGNATION

S T - 4 E T A 2 0 0 Ω ( 2 0 1 )

Series name (minus slot)

Terminal pin

E : Sn-Cu (Lead-free)

Form of packaging

T : Taping (Reel)

Blank : Bulk in plastic bag

Resistance code

Resistance value

Product shape (Shape of terminal)

A, G : J-hook

B, D, H : Gull wing

C, F : Through hole pins

S T - 4 2 E T A 2 0 0 Ω ( 2 0 1 )

Series name (cross slot)

Terminal pin

E : Sn-Cu (Lead-free)

Form of packaging

T : Taping (Reel)

Blank : Bulk in plastic bag

Resistance code

Resistance value

Product shape (Shape of terminal)

A, G : J-hook

B, D, H : Gull wing

C, F : Through hole pins

※ Please refer to the LIST OF PART NUMBERS when placing orders.

# ST-4

## SURFACE MOUNT TRIMMERS

### LIST OF PART NUMBERS

| Adjustment position | Shape of terminal       | Form of packaging |               |
|---------------------|-------------------------|-------------------|---------------|
|                     |                         | Taping (reel)     | Plastic bag   |
| Top adjustment      | A ( J-hook )            | ST-4/42ETA        | ST-4/42EA     |
|                     | B ( Gull wing )         | ST-4/42ETB        | ST-4/42EB     |
|                     | C ( Through hole pins ) |                   | ST-4/42EC     |
| Rear adjustment     | D ( Gull wing )         | ST-4/42ETD        | ST-4/42ED     |
|                     | F ( Through hole pins ) |                   | ST-4/42EF     |
| Side adjustment     | G ( J-hook )            | ST-4/42ETG        | ST-4/42EG     |
|                     | H ( Gull wing )         | ST-4/42ETH        | ST-4/42EH     |
| Pieces in package   |                         | 500 pcs./reel     | 100 pcs./pack |

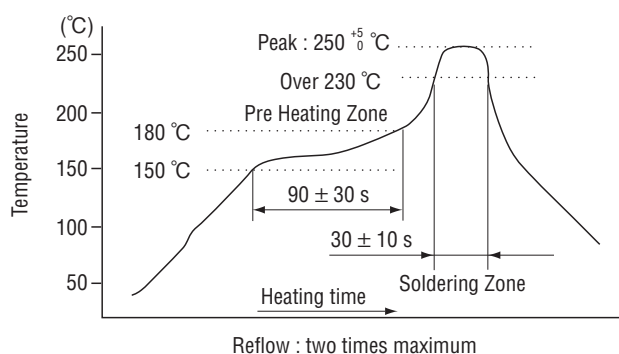
The products indicated by  mark are manufactured upon receipt of order basis.

※  slot : ST-4E  slot : ST-42E

### ELECTRICAL CHARACTERISTICS

|                            |                                                                                                        |
|----------------------------|--------------------------------------------------------------------------------------------------------|
| Nominal resistance range   | 10 Ω ~ 2 M Ω                                                                                           |
| 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 angle | 210° (1 turn)                                                                                          |
| End resistance             | 1 % or 2 Ω , whichever is greater                                                                      |
| C.R.V.                     | 1 % or 3 Ω , whichever is greater                                                                      |
| Operating temp. range      | — 55 ~ 125 °C                                                                                          |
| Temp. coefficient          | 10 Ω ~ 50 Ω : ± 250 10 <sup>-6</sup> /°C maximum<br>100 Ω ~ 2 M Ω : ± 100 10 <sup>-6</sup> /°C maximum |
| Insulation resistance      | 1000 M Ω minimum (DC500 V)                                                                             |
| Dielectric strength        | AC500 V, 60 s                                                                                          |
| Net weight                 | Approx. 0.12 g (ST-4EA, EB, EC, ED, EF)<br>Approx. 0.22 g (ST-4EG, EH)                                 |

### <Reflow profile for soldering heat evaluation>



### <Nominal resistance values>

|                                                                                        |                                                                                        |        |         |         |         |       |       |       |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------|---------|---------|---------|-------|-------|-------|
|  10 Ω |  20 Ω | 50 Ω   | 100 Ω   | 200 Ω   | 500 Ω   | 1 k Ω | 2 k Ω | 5 k Ω |
| 10 k Ω                                                                                 | 20 k Ω                                                                                 | 50 k Ω | 100 k Ω | 200 k Ω | 500 k Ω | 1 M Ω | 2 M Ω |       |

Fig. 1

 : 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.

※ Cross slot available : ST-42E 

### MECHANICAL CHARACTERISTICS

|                   |                                     |
|-------------------|-------------------------------------|
| Mechanical angle  | 240° (1 turn)                       |
| Operating torque  | 10 mN·m {102 gf·cm} maximum         |
| Stop strength     | 30 mN·m {306 gf·cm} minimum         |
| Rotational life   | 100 cycles [ Δ R/R ≤ ± (2 Ω + 3 %)] |
| Thrust to rotor   | 5 N {0.51 kgf} minimum              |
| Solderability     | 245 ± 3 °C, 2 ~ 3 s                 |
| Shear (Adhesion)  | 5 N {0.51 kgf} 10 s                 |
| Substrate bending | Width 90 mm, bend 3 mm, 5 s, 1 time |
| Pull-off strength | 5 N {0.51 kgf} 10 s                 |

{ } : Reference only

### ENVIRONMENTAL CHARACTERISTICS

| Test item           | Test conditions                                                                                                                                                                                                                                                                  | Specifications                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Thermal shock       | — 65 ~ 125 °C (0.5 h), 5 cycles                                                                                                                                                                                                                                                  | [ Δ R/R ≤ 2 %]<br>[S.S. ≤ 1 %]      |
| Humidity            | — 10 ~ 65 °C (80 ~ 98 %),<br>10 cycles, 240 h                                                                                                                                                                                                                                    | [ Δ R/R ≤ 2 %]                      |
| Shock               | 981 m/s <sup>2</sup> , 6 ms<br>6 directions for 3 times each                                                                                                                                                                                                                     | [ Δ R/R ≤ 1 %]<br>[S.S. ≤ 1 %]      |
| Vibration           | (Amplitude) 1.52 mm or<br>(Acceleration) 196 m/s <sup>2</sup> ,<br>10 ~ 2000 Hz, 3 directions, 12 times each                                                                                                                                                                     |                                     |
| Load life           | 70 °C, 0.25 W 1000 h                                                                                                                                                                                                                                                             | [ Δ R/R ≤ 3 %]<br>[S.S. ≤ 1 %]      |
| Low temp. operation | — 55 °C, 2 h                                                                                                                                                                                                                                                                     | [ Δ R/R ≤ 2 %]<br>[S.S. ≤ 2 %]      |
| High temp. exposure | 125 °C, 250 h                                                                                                                                                                                                                                                                    | [ Δ R/R ≤ 3 %]<br>[S.S. ≤ 2 %]      |
| Immersion seal      | 85 °C, 60 s                                                                                                                                                                                                                                                                      | No leaks<br>(No continuous bubbles) |
| Soldering heat      | Flow : 260 ± 3 °C as the temperature in a<br>pot of molten solder, immersion from head of<br>terminal to backside of board, 5 ~ 6 s, two<br>times maximum<br>Reflow : Peak temperature 255 °C<br>(Please refer to the profile below.)<br>Manual soldering : 350 ± 10 °C, 3 ~ 4 s | [ Δ R/R ≤ 1 %]                      |

Δ R/R : Change in total resistance  
S.S. : Setting stability

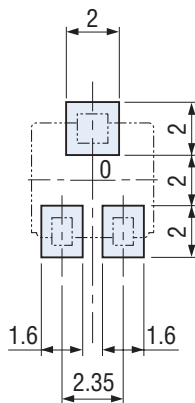
### MAXIMUM INPUT RATINGS

| Nominal resistance values ( $\Omega$ )                                                                                                                  | Resistance code                                                                           | Maximum input voltage (V)                                                                       | Maximum wiper current (mA)                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <div> <div> <div>→</div> <div>10</div> </div> <div> <div>→</div> <div>20</div> </div> <div>50</div> <div>100</div> <div>200</div> <div>500</div> </div> | <div>100</div> <div>200</div> <div>500</div> <div>101</div> <div>201</div> <div>501</div> | <div>1.00</div> <div>2.00</div> <div>3.53</div> <div>5.00</div> <div>7.07</div> <div>11.2</div> | <div>100</div> <div>100</div> <div>70.7</div> <div>50.0</div> <div>35.4</div> <div>22.4</div>   |
| <div>1 k</div> <div>2 k</div> <div>5 k</div> <div>10 k</div> <div>20 k</div> <div>50 k</div>                                                            | <div>102</div> <div>202</div> <div>502</div> <div>103</div> <div>203</div> <div>503</div> | <div>15.8</div> <div>22.4</div> <div>35.4</div> <div>50.0</div> <div>70.7</div> <div>112</div>  | <div>15.8</div> <div>11.2</div> <div>7.07</div> <div>5.00</div> <div>3.54</div> <div>2.24</div> |
| <div>100 k</div> <div>200 k</div> <div>500 k</div> <div>1 M</div> <div>2 M</div>                                                                        | <div>104</div> <div>204</div> <div>504</div> <div>105</div> <div>205</div>                | <div>158</div> <div>200</div> <div>200</div> <div>200</div> <div>200</div>                      | <div>1.58</div> <div>1.00</div> <div>0.40</div> <div>0.20</div> <div>0.10</div>                 |

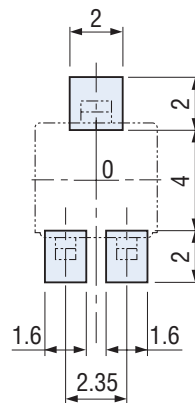
The products indicated by → mark are manufactured upon receipt of order basis.

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

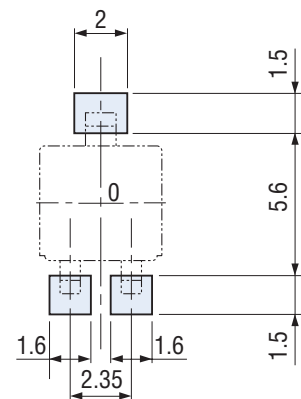
#### ST-4EA



#### ST-4EB

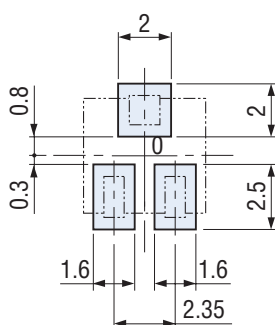


#### ST-4ED

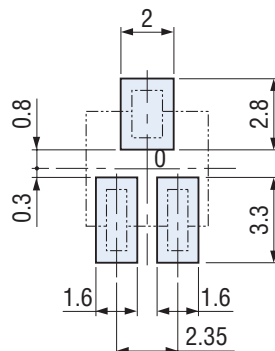


(Unit: mm)

#### ST-4EG



#### ST-4EH



Note) The zero point is the center of mounting.

# ST-4

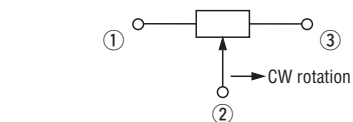
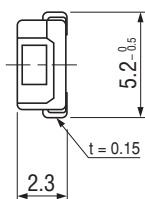
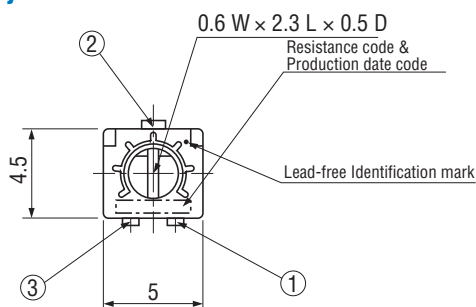
## SURFACE MOUNT TRIMMERS

### OUTLINE DIMENSIONS

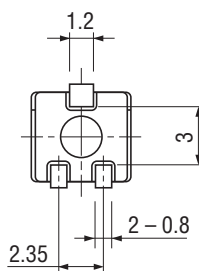
Unless otherwise specified, tolerance :  $\pm 0.3$  (Unit: mm)

#### ST-4EA

##### Top adjustment

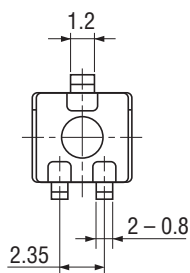
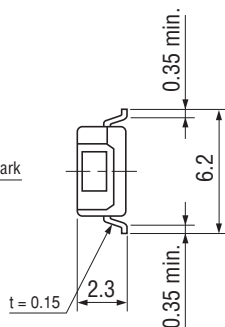
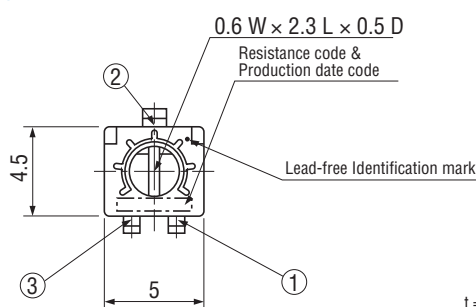


※ Note the terminal position.



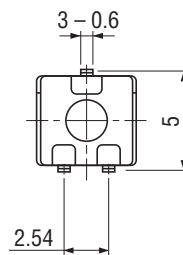
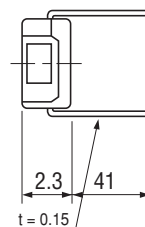
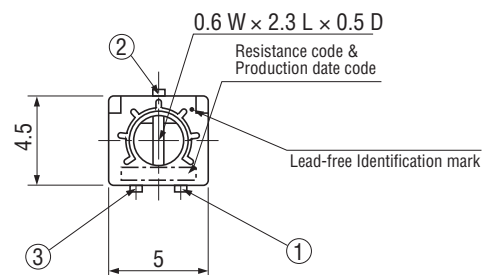
#### ST-4EB

##### Top adjustment



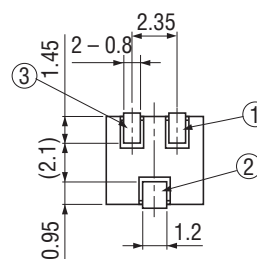
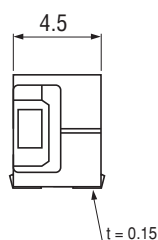
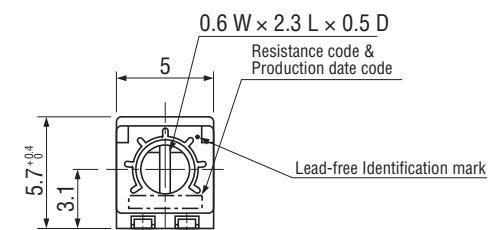
#### ST-4EC

##### Top adjustment



#### ST-4EG

##### Side adjustment

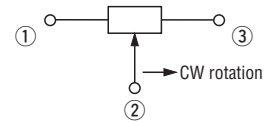
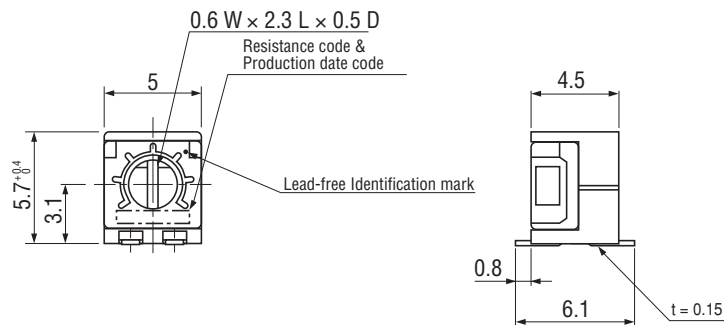


### OUTLINE DIMENSIONS

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

#### ST-4EH

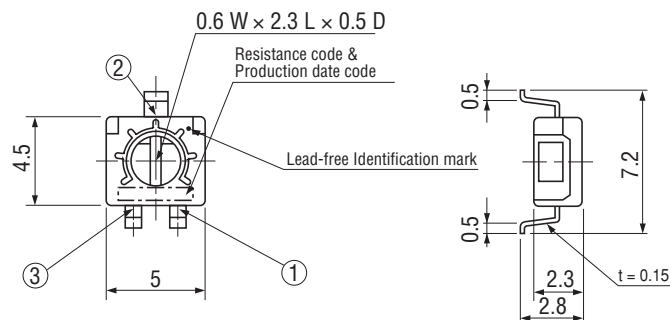
##### Side adjustment



※ Note the terminal position.

#### ST-4ED

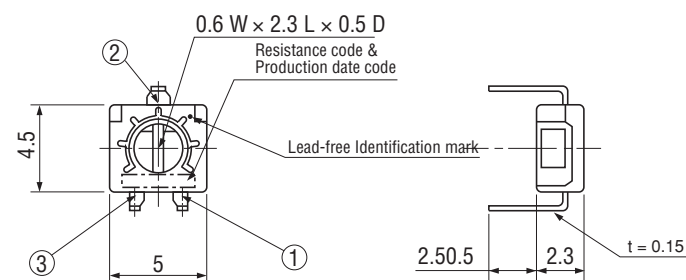
##### Rear adjustment



< Semi-standard products >

#### ST-4EF

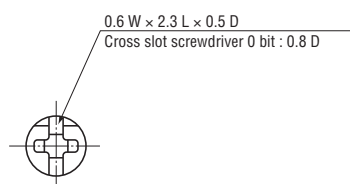
##### Rear adjustment



< Semi-standard products >

#### ST-42E

##### + CROSS SLOT DIMENSION



# ST-4

## SURFACE MOUNT TRIMMERS

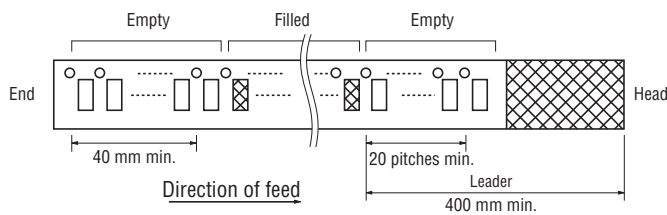
### PACKAGING SPECIFICATIONS

#### <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-4ETA, ETB and ETD versions are boxed with 4 reels (2000 pcs.).  
ST-4ETG 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 diagrams below.

### EMBOSED TAPE DIMENSIONS

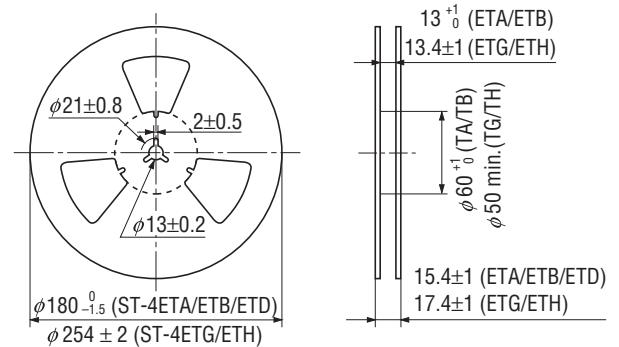


### REEL DIMENSIONS

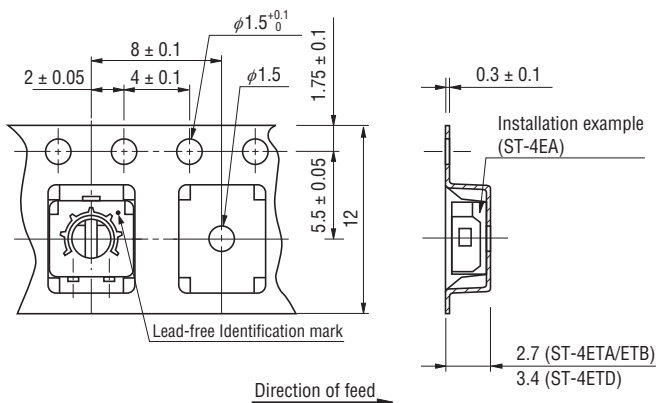
(Conforms to JIS C 0806-3)

(In accordance with EIAJ ET-7200A)

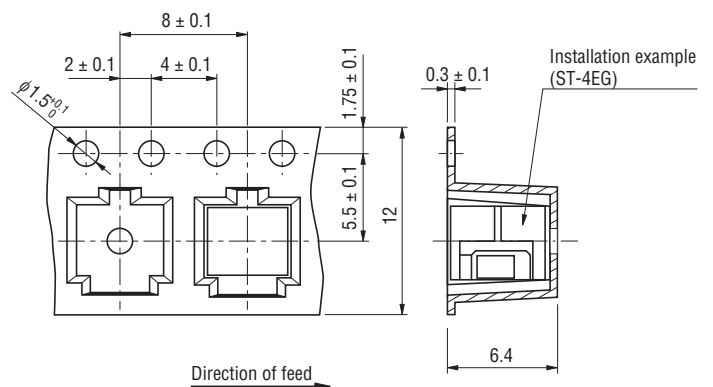
(Unit: mm)



### ST-4ETA/ETB/ETD



### ST-4ETG/ETH



#### <Bulk pack specifications>

- Unit of bulk in a plastic bag is 100 pcs. per pack.
- Boxing of bulk in a plastic bag is performed with 500 pcs. per box.

# Mouser Electronics

Authorized Distributor

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