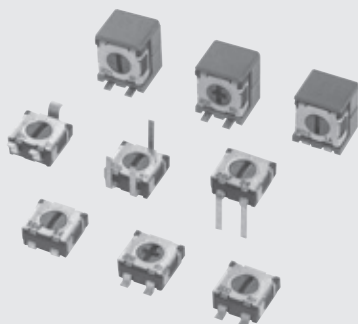


SURFACE MOUNT CERMET TRIMMERS (SINGLE TURN) ST-4

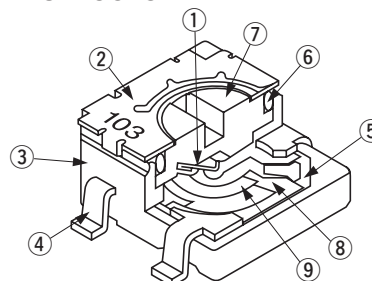
RoHS compliant



FEATURES

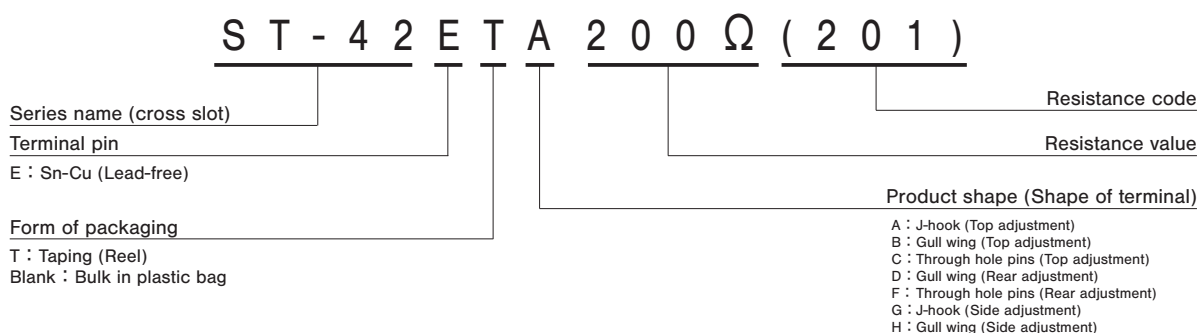
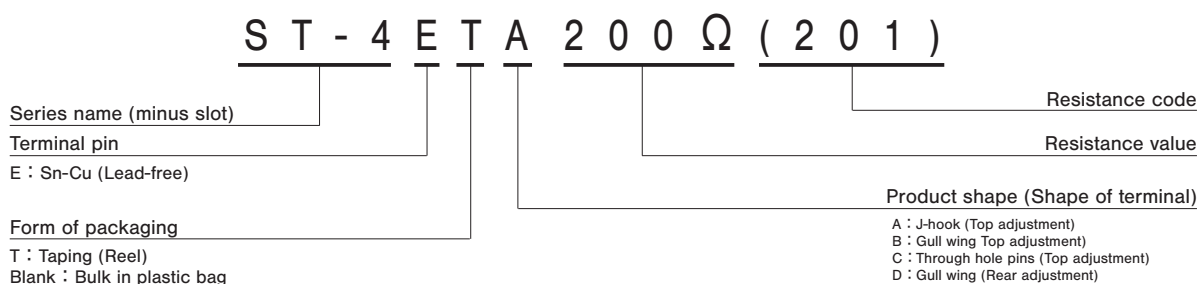
- RoHS compliant
- Wide variety (7 types) to choose from
- Automatic mounting is possible (Taping)
- Flow/reflow soldering is possible
- Sealed construction (Washable: Refer to page 698.)
- Stopper structure prevents terminal pin from being open.
- Cross slot rotor suitable for automatic adjustment
- Resin materials are UL Recognized 94V-0 or 94V-1 equivalent

INTERNAL STRUCTURE



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

PART NUMBER DESIGNATION




※ 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 |

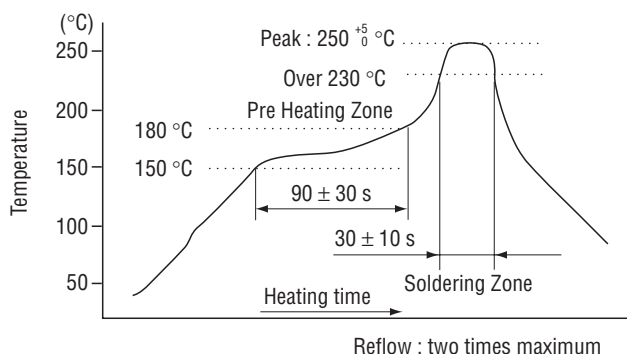
The products indicated by  mark are manufactured upon receipt of order basis.

※  slot : ST-4E  slot : ST-42E 

ELECTRICAL CHARACTERISTICS

| | |
|----------------------------|--|
| Nominal resistance range | 10 Ω ~ 2 M Ω |
| Resistance tolerance | $\pm 20\%$ |
| 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 ⁻⁶ /°C maximum 100 Ω ~ 2 M Ω : ± 100 10 ⁻⁶ /°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) 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 [$\Delta R/R \leq \pm (2 \Omega + 3 \%)$] |
| 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 | [$\Delta R/R \leq 2\%$] [S.S. $\leq 1\%$] |
| Humidity | - 10 ~ 65 °C (80 ~ 98 %), 10 cycles, 240 h | [$\Delta R/R \leq 2\%$] |
| Shock | 981 m/s ² , 6 ms 6 directions for 3 times each | [$\Delta R/R \leq 1\%$] [S.S. $\leq 1\%$] |
| Vibration | (Amplitude) 1.52 mm or (Acceleration) 196 m/s ² , 10 ~ 2000 Hz, 3 directions, 12 times each | |
| Load life | 70 °C, 0.25 W 1000 h | [$\Delta R/R \leq 3\%$] [S.S. $\leq 1\%$] |
| Low temp. operation | - 55 °C, 2 h | [$\Delta R/R \leq 2\%$] [S.S. $\leq 1\%$] |
| High temp. exposure | 125 °C, 250 h | [$\Delta R/R \leq 3\%$] [S.S. $\leq 2\%$] |
| Immersion seal | 85 °C, 60 s | No leaks (No continuous bubbles) |
| Soldering heat | Flow : 260 ± 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 | [$\Delta R/R \leq 1\%$] |

$\Delta R/R$: Change in total resistance
S.S. : Setting stability

ST-4

SURFACE MOUNT TRIMMERS

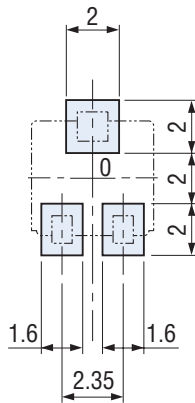
MAXIMUM INPUT RATINGS

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

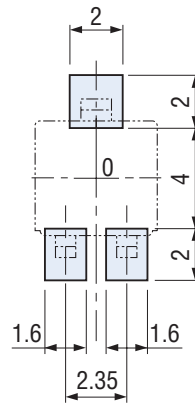
The products indicated by ↻ mark are manufactured upon receipt of order basis.

RECOMMENDED P.C.B. PAD OUTLINE DIMENSIONS

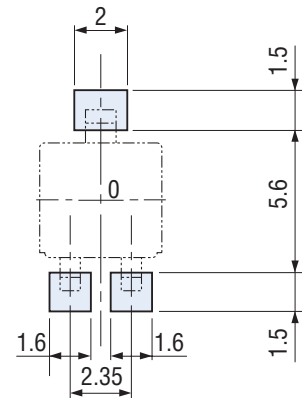
ST-4EA



ST-4EB

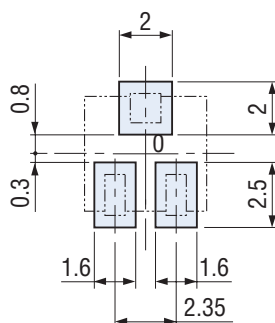


ST-4ED

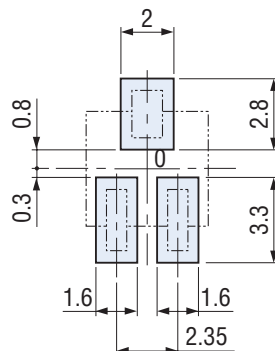


(Unit: mm)

ST-4EG



ST-4EH



Note) The zero point is the center of mounting.

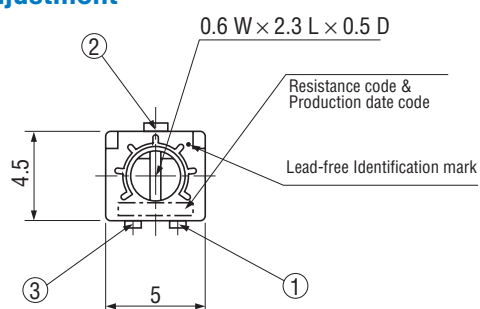
ST-4

SURFACE MOUNT TRIMMERS

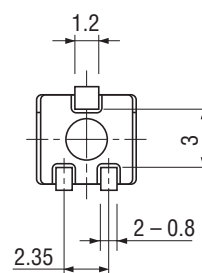
OUTLINE DIMENSIONS

Unless otherwise specified, tolerance : ± 0.3 (Unit: mm)

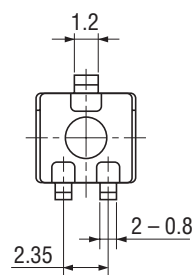
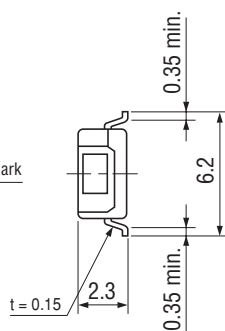
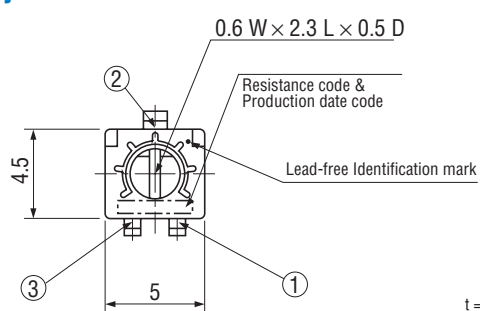
ST-4EA Top adjustment



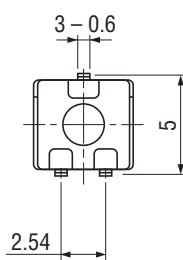
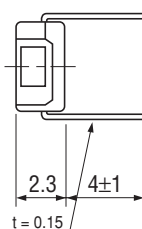
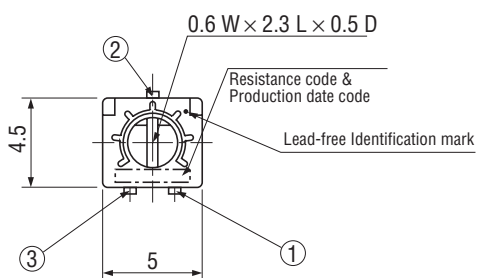
※ Note the terminal position.



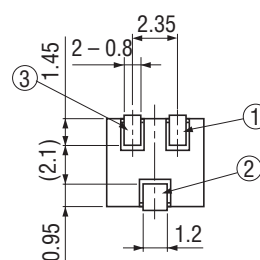
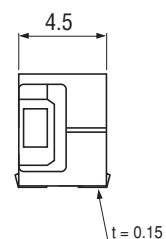
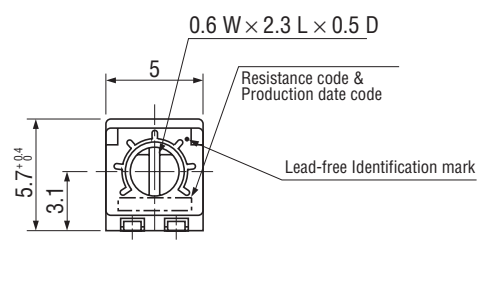
ST-4EB Top adjustment



ST-4EC Top adjustment



ST-4EG Side adjustment



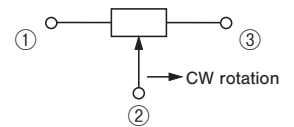
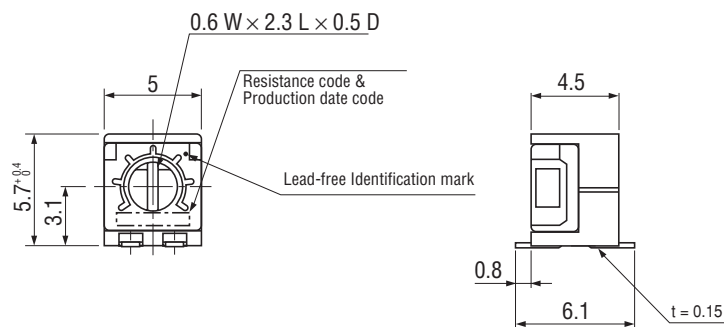
ST-4

SURFACE MOUNT TRIMMERS

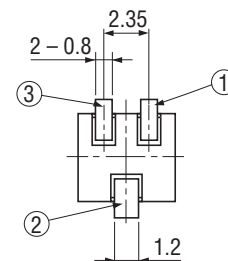
OUTLINE DIMENSIONS

Unless otherwise specified, tolerance : ± 0.3 (Unit: mm)

ST-4EH Side adjustment

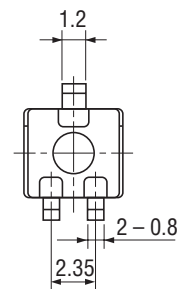
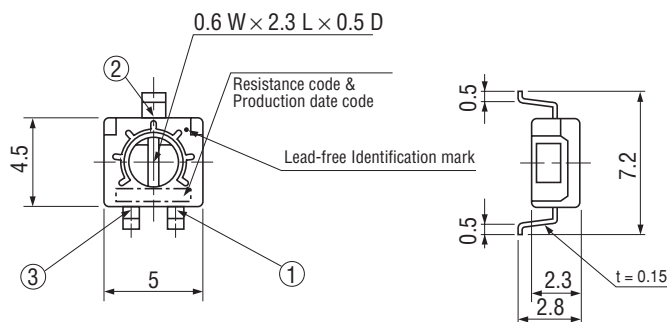


※ Note the terminal position.



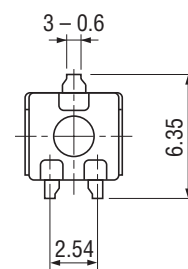
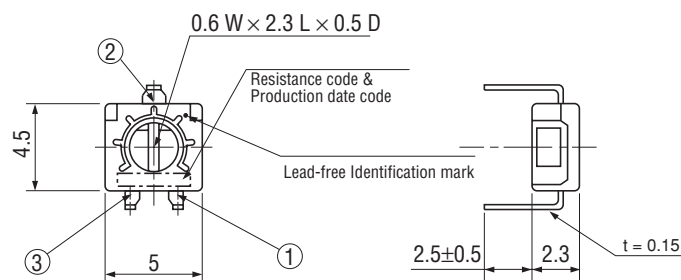
ST-4ED Rear adjustment

< Semi-standard products >

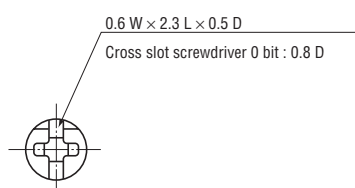


ST-4EF Rear adjustment

< Semi-standard products >



ST-42E CROSS SLOT DIMENSION



ST-4

SURFACE MOUNT TRIMMERS

PACKAGING SPECIFICATIONS

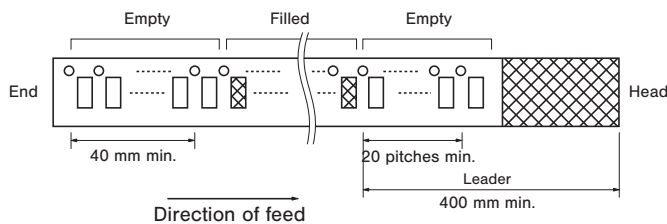
<Taping packaging specifications>

- 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 dia-grams below.

EMBOSSED TAPE DIMENSIONS

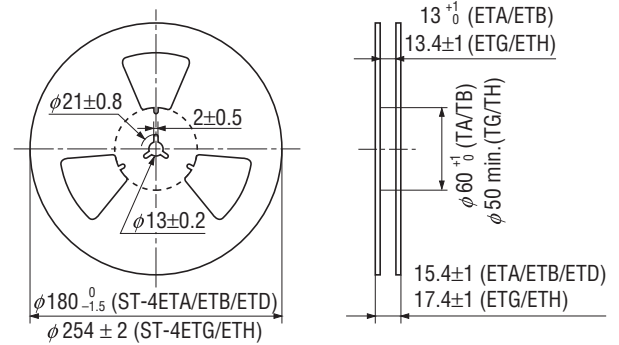


REEL DIMENSIONS

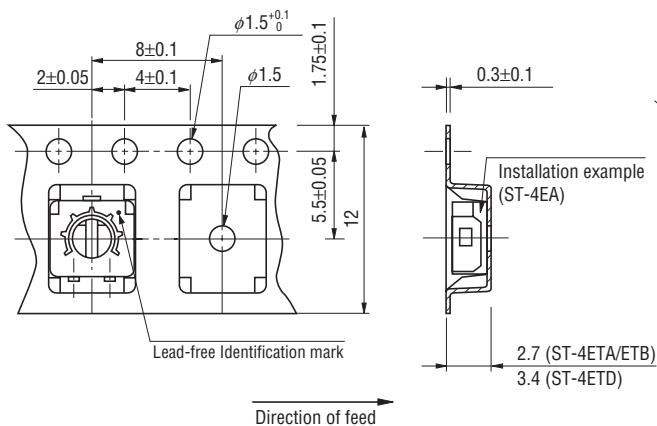
(Conforms to JIS C 0806-3)

(In accordance with EIAJ ET-7200A)

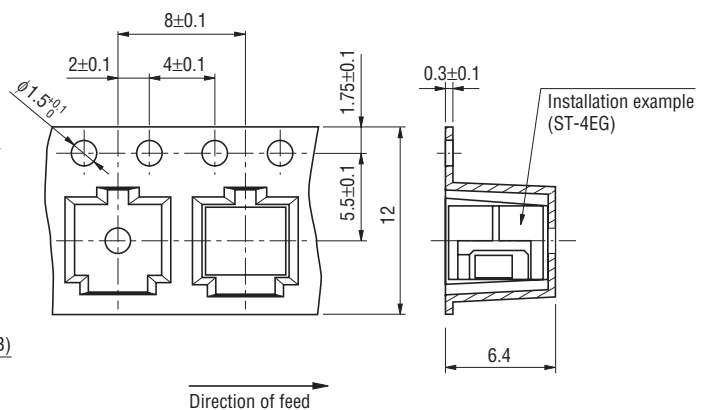
(Unit: mm)



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.