

## Surface Mount Cermet Trimmers (single turn)



### FEATURES

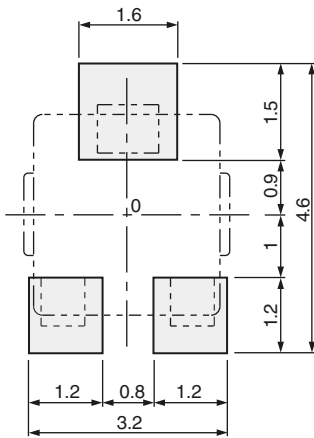
- Lead (Pb)-free soldering, Cadmium-free
- Top and side adjustment styles
- Rotor with a cross slot for ease of adjustment
- Leaded terminals provide strong adhesive strength against P.C.B. bending
- J-hook, Gull wing and leaded terminal configurations
- Sealed / Washable
- RoHS compliant



**DIMENSIONS** in millimeters

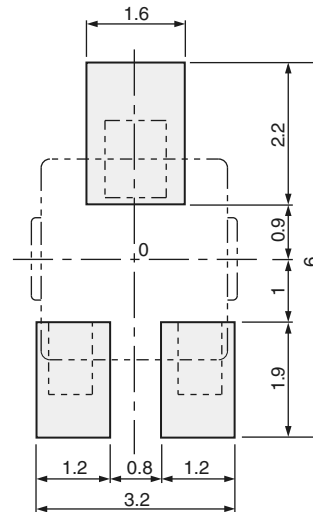
### RECOMMENDED P.C.B. PAD OUTLINE DIMENSIONS

ST-32A, G, EA, EG



For reflow soldering

ST-32B, H, EB, EH

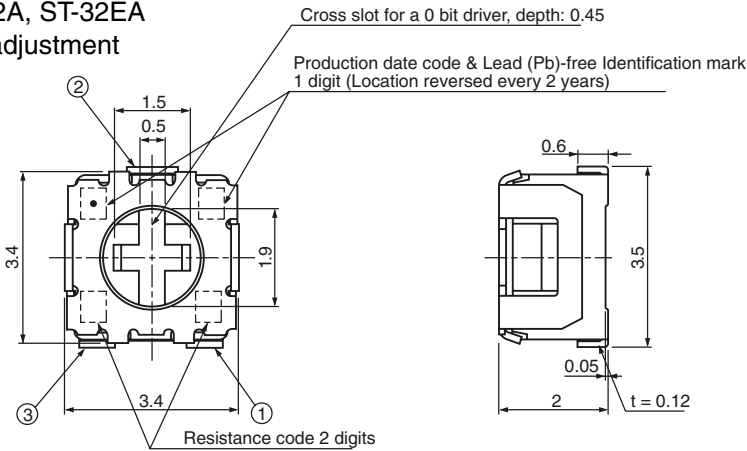


(Unit: mm)

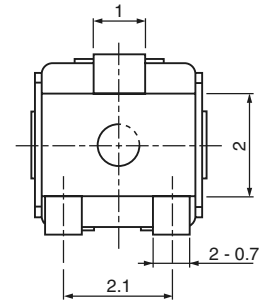
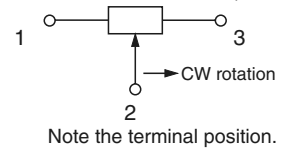
Note) The zero point is the center of mounting.

**DIMENSIONS** in millimeters  
**OUTLINE DIMENSIONS**

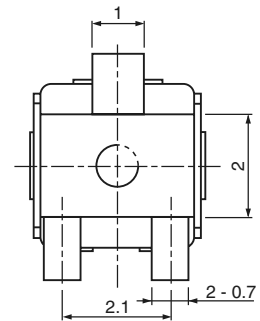
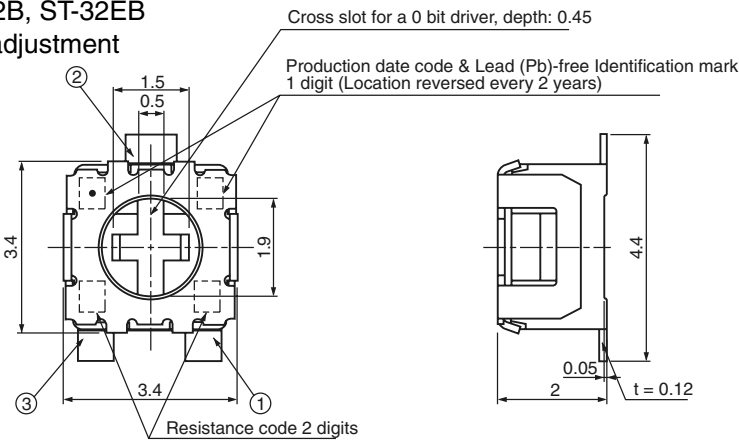
ST-32A, ST-32EA  
Top adjustment



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

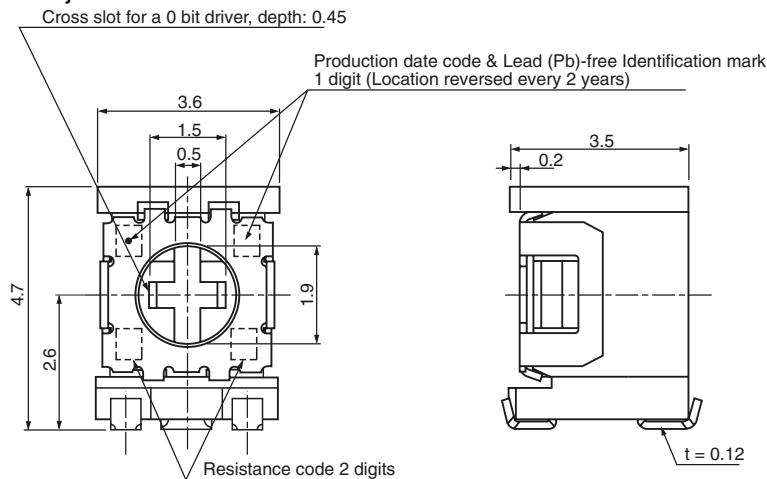


ST-32B, ST-32EB  
Top adjustment

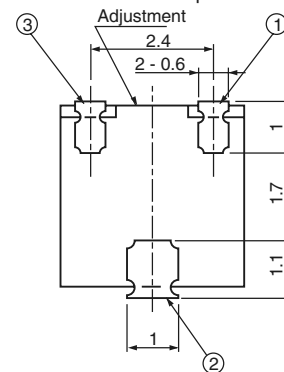
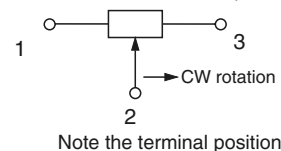


Specifications are subject to change without notice. Specifications in this catalog are for reference. The formal specification sheets will be submitted upon request.

ST-32G, ST-32EG  
Side adjustment

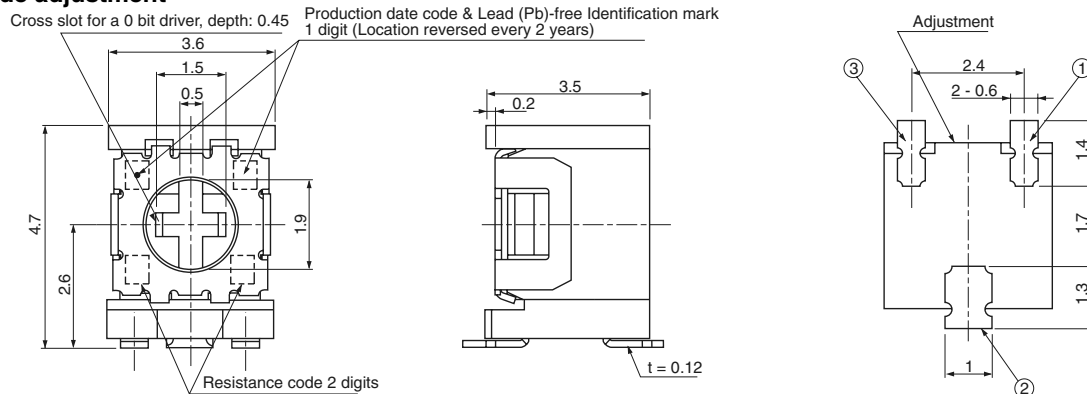


Unless otherwise specified, tolerance:  $\pm 0.3$  (Unit: mm)



**DIMENSIONS** in millimeters

**ST-32H, ST-32EH**  
Side adjustment



**PACKAGING SPECIFICATIONS**

Taping packaging specifications

Taping version is packaged in 500 pcs. per reel.

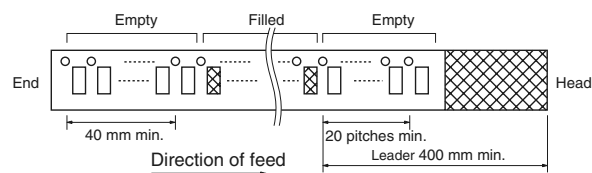
Orders will be accepted for units of 500 pcs., i.e., 500, 1000, 1500 pcs., etc.

ST-32TA, ETA, TB and ETB versions are boxed with 4 reels (2000 pcs.). ST-32TG, ETG, TH 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.

**EMBOSSED TAPE DIMENSIONS**

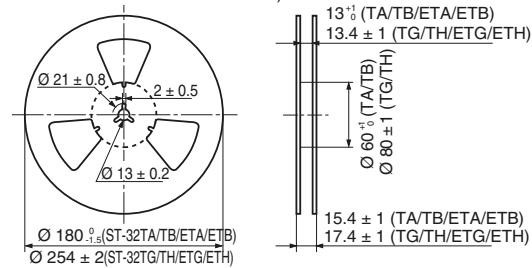


**REEL DIMENSIONS**

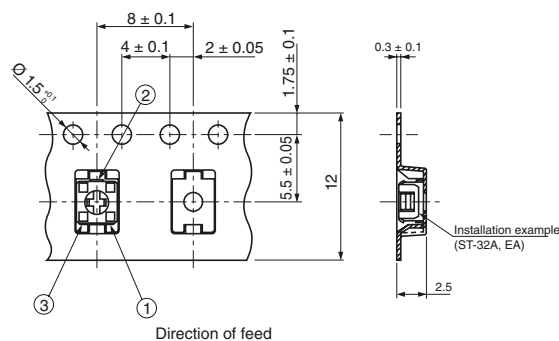
(Conforms to JIS C 0806-3)

(Unit: mm)

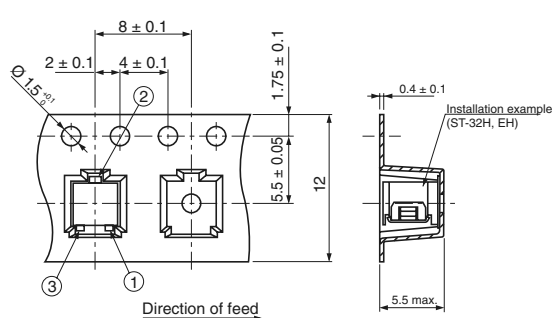
(In accordance with EIAJ ET-7200A)



**ST-32TA, TB, ETA, ETB**



**ST-32TG, 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.

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**MECHANICAL SPECIFICATIONS**

|                          |   |
|--------------------------|---|
| <b>Mechanical turn</b>   | 250 ° (1 turn)  |
| <b>Operating torque</b>  | 5 mN m {51 gf cm} maximum   |
| <b>Stop Strength</b>     | 20 mN m {204 gf cm} minimum                                       |
| <b>Rotational life</b>   | 100 cycles<br>[ $\Delta R/R \leq \pm (2 \Omega + 3 \%)$ ]         |
| <b>Thrust to rotor</b>   | 5 N {0.51 kgf} minimum  |
| <b>Solderability</b>     | Sn-Pb: 235 °C, 2 s<br>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   |

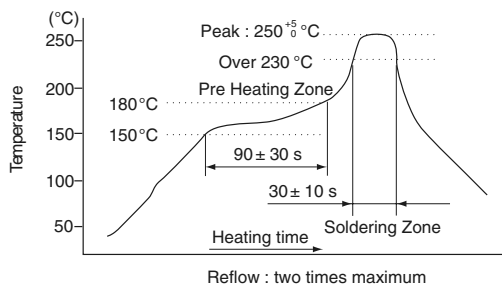
**ELECTRICAL CHARACTERISTICS**

|                            |   |
|----------------------------|---|
| Nominal resistance range   | 10 Ω ~ 2 MΩ   |
| Resistance tolerance       | ± 20 %  |
| Power ratings              | 0.125 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 MΩ: ± 100 10 <sup>-6</sup> /°C maximum |
| Insulation resistance      | 1000 MΩ minimum (DC500 V)   |
| Dielectric strength        | AC500 V, 60 s   |
| Net weight                 | Approx. 0.05 g (ST-32A, B, EA, EB)<br>Approx. 0.11 g (ST-32G, H, EG, EH)                            |

**ENVIRONMENTAL SPECIFICATIONS**

| Test item                 | Test conditions  | Specifications                             |
|---------------------------|--|--|
| Thermal shock             | - 65 ~ 125 °C (0.5 h),<br>5 cycles   | [ $\Delta R/R \leq 2 \%$ ]<br>[S.S. ≤ 1 %] |
| Humidity                  | - 10 ~ 65 °C (Relative humidity 80 ~ 98 %),<br>10 cycles, 240 h  | [ $\Delta R/R \leq 2 \%$ ]                 |
| Shock                     | 981 m/s <sup>2</sup> , 6 ms<br>6 directions for 3 times each   | [ $\Delta R/R \leq 1 \%$ ]<br>[S.S. ≤ 1 %] |
| Vibration                 | Amplitude 1.52 mm or<br>Acceleration 196 m/s <sup>2</sup> ,<br>10 ~ 2000 Hz,<br>3 directions, 12 times each  |  |
| Load Life                 | 70 °C, 0.125 W, 1000 h   | [ $\Delta R/R \leq 3 \%$ ]<br>[S.S. ≤ 1 %] |
| Low temperature operation | - 55 °C, 2 h   | [ $\Delta R/R \leq 2 \%$ ]<br>[S.S. ≤ 2 %] |
| High temperature exposure | 125 °C, 250 h  | [ $\Delta R/R \leq 3 \%$ ]<br>[S.S. ≤ 2 %] |
| Immersion seal            | 85 °C, 60 s  | No leaks (No continuous bubbles)           |
| Soldering heat            | Sn-Pb<br>260 °C, 10 s or 215 °C,<br>35 s<br><br>S-Cu<br>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<br>Reflow: Peak temperature 255 °C (Please refer to the profile below.)<br>Manual soldering: 350 ± 10 °C, 3 ~ 4 s | [ $\Delta R/R \leq 1 \%$ ]                 |

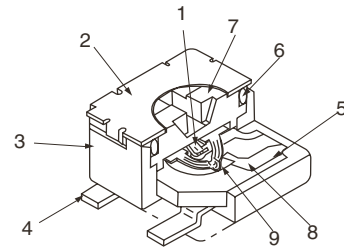
Reflow profile for soldering heat evaluation



| MAXIMUM INPUT RATINGS                  |                 |                           |                            |
|--|-----------------|---------------------------|----------------------------|
| Nominal resistance values ( $\Omega$ ) | Resistance code | Maximum input voltage (V) | Maximum wiper current (mA) |
| 10*                                    | 11              | 1.00                      | 100                        |
| 20*                                    | 21              | 1.58                      | 79.1                       |
| 50                                     | 51              | 2.50                      | 50.0                       |
| 100                                    | 12              | 3.53                      | 35.4                       |
| 200                                    | 22              | 5.00                      | 25.0                       |
| 300                                    | 32              | 6.12                      | 20.4                       |
| 500                                    | 52              | 7.91                      | 15.8                       |
| 1 k                                    | 13              | 11.2                      | 11.2                       |
| 2 k                                    | 23              | 15.8                      | 7.91                       |
| 3 k                                    | 33              | 19.4                      | 6.45                       |
| 5 k                                    | 53              | 25.0                      | 5.00                       |
| 10 k                                   | 14              | 35.4                      | 3.54                       |
| 20 k                                   | 24              | 50.0                      | 2.50                       |
| 30 k                                   | 34              | 61.2                      | 2.04                       |
| 50 k                                   | 54              | 79.1                      | 1.58                       |
| 100 k                                  | 15              | 112                       | 1.12                       |
| 200 k                                  | 25              | 158                       | 0.79                       |
| 500 k                                  | 55              | 200                       | 0.40                       |
| 1 M                                    | 16              | 200                       | 0.20                       |
| 2 M                                    | 26              | 200                       | 0.10                       |

| CONSTRUCTION |              |                           |                             |          |
|--------------|--------------|---------------------------|-----------------------------|----------|
| Part Name    |              | Material                  | Flammability                |          |
| 1            | Wiper        | Multi metal alloy         | -                           |          |
| 2            | Cover        | Stainless steel (SUS 304) |                             |          |
| 3            |              | Housing                   | Epoxy                       | UL-94V-0 |
| 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                     | PPS (Polyphenylenesulphide) | UL-94V-0 |
| 8            |              | Electrode                 | Ag-Pd cermet                | -        |
| 9            |              | Resistive element         | RuO <sub>2</sub> cermet     |          |

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



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

| LIST OF PART NUMBERS |                   |                 |                        |               |                        |
|----------------------|-------------------|-----------------|------------------------|---------------|------------------------|
| Adjustment position  | Shape of terminal | Form of packing |                        |               |                        |
|                      |                   | Taping (reel)   |                        | Vinyl bag     |                        |
|                      |                   | Sn-Pb           | Sn-Cu (Lead (Pb)-free) | Sn-Pb         | Sn-Cu (Lead (Pb)-free) |
| Top adjustment       | A (J-hook)        | ST-32TA         | ST-32ETA               | ST-532A       | ST-32EA                |
|                      | B (Gull-wing)     | ST-32TB         | ST-32ETB               | ST-32B        | ST-32EB                |
| Side adjustment      | G (J-hook)        | ST-32TG         | ST-32ETG               | ST-32G        | ST-32EG                |
|                      | H (Gull-wing)     | ST-32TH         | ST-32ETH               | ST-32H        | ST-32EH                |
| Pieces in package    |                   | 500 pcs./reel   |                        | 100 pcs./reel |                        |

| FIG. 1: NOMINAL RESISTANCE VALUES |                |                |                |               |               |               |
|-----------------------------------|----------------|----------------|----------------|---------------|---------------|---------------|
| 10 $\Omega$ *                     | 20 $\Omega$ *  | 50 $\Omega$    | 100 $\Omega$   | 200 $\Omega$  | 300 $\Omega$  | 500 $\Omega$  |
| 1 k $\Omega$                      | 2 k $\Omega$   | 3 k $\Omega$   | 5 k $\Omega$   | 10 k $\Omega$ | 20 k $\Omega$ | 30 k $\Omega$ |
| 50 k $\Omega$                     | 100 k $\Omega$ | 200 k $\Omega$ | 500 k $\Omega$ | 1 M $\Omega$  | 2 M $\Omega$  | -             |

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-32       |   | T   | A                                 | 204             |
|-------------|---|---|-----------------------------------|-----------------|
| SERIES NAME | TERMINAL PIN                              | FORM OF PACKAGING                             | PRODUCT SHAPE (SHAPE OF TERMINAL) | RESISTANCE CODE |
|             | Blank: Sn-Pb<br>E: Sn-Cu (Lead (Pb)-free) | T: Taping (Reel)<br>Blank: Bulk in vinyl bags | A, G: J-hook<br>B, H: Gull wing   |                 |

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