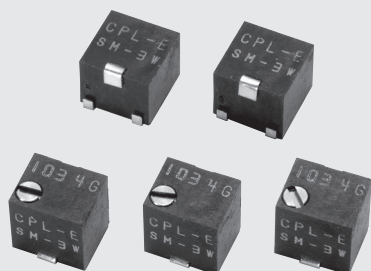
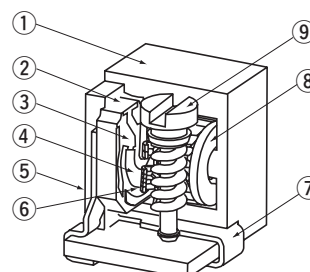


**RoHS compliant****FEATURES**

- RoHS compliant
- Fine adjustment is possible
- Automatic mounting is possible (Taping)
- Reflow soldering is possible
- Sealed construction (Washable: Refer to page 698.)

**INTERNAL STRUCTURE**

|   | Part name         | Material                   | Flammability |
|---|-------------------|----------------------------|--------------|
| ① | Housing           | Polyphenylenesulphide      | UL94V-0      |
| ② | Base element      | Ceramic                    | —            |
| ③ | Electrode         | Ag-Pd cermet               |              |
| ④ | Resistive element | RuO <sub>2</sub> cermet    |              |
| ⑤ | Adhesive          | Epoxy                      |              |
| ⑥ | Wiper             | Multi metal alloy          |              |
| ⑦ | Terminal pin      | Copper alloy, Sn-Cu-plated | UL94V-0      |
| ⑧ | Rotor gear        | Polyamide                  |              |
| ⑨ | Shaft             | Brass, Nickel-plated       |              |

**PART NUMBER DESIGNATION**

|                             |   |   |   |  |   |   |                  |   |   |                                   |   |   |   |   |
|-----------------------------|---|---|---|--|---|---|------------------|---|---|-----------------------------------|---|---|---|---|
| S                           | M | - | 3 |  | T | W | 1                | k | Ω | (                                 | 1 | 0 | 2 | ) |
| Series name                 |   |   |   |  |   |   | Resistance code  |   |   |                                   |   |   |   |   |
| Electrical turn             |   |   |   |  |   |   | Resistance value |   |   |                                   |   |   |   |   |
| Blank : 11 turns            |   |   |   |  |   |   |                  |   |   |                                   |   |   |   |   |
| 1 : 5 turns                 |   |   |   |  |   |   |                  |   |   |                                   |   |   |   |   |
| Form of packaging           |   |   |   |  |   |   |                  |   |   | Product shape (Shape of terminal) |   |   |   |   |
| T : Taping (Reel)           |   |   |   |  |   |   |                  |   |   | A, W : J-hook                     |   |   |   |   |
| Blank : Bulk in plastic bag |   |   |   |  |   |   |                  |   |   | B : Gull wing                     |   |   |   |   |

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

# SM-3/31

## SURFACE MOUNT TRIMMERS

### LIST OF PART NUMBERS

| Electrical turns  | Adjustment position | Shape of terminal | Form of packaging |              |
|-------------------|---------------------|-------------------|-------------------|--------------|
|                   |                     |                   | Taping (reel)     | Plastic bag  |
| 11                | Top adjustment      | W (J-hook)        | SM-3TW            | SM-3W        |
|                   | Side adjustment     | A (J-hook)        | SM-3TA            | SM-3A        |
|                   |                     | B (Gull wing)     | SM-3TB            | SM-3B        |
| 5                 | Top adjustment      | W (J-hook)        | SM-31TW           | SM-31W       |
|                   | Side adjustment     | A (J-hook)        | SM-31TA           | SM-31A       |
|                   |                     | B (Gull wing)     | SM-31TB           | SM-31B       |
| Pieces in package |                     |                   | 500 pcs./reel     | 50 pcs./pack |

### <Nominal resistance values>

|        |        |         |         |         |       |       |        |
|--------|--------|---------|---------|---------|-------|-------|--------|
| 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 |        |

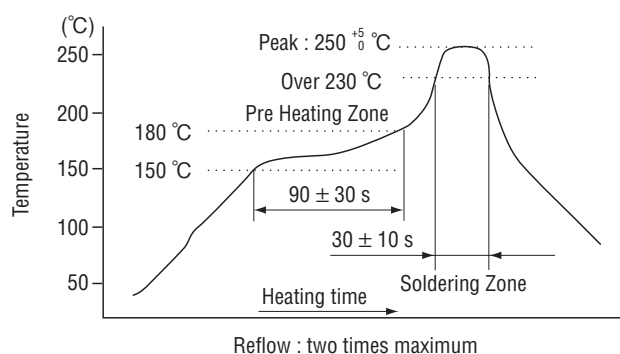
Fig. 1

- ※ 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.

### ELECTRICAL CHARACTERISTICS

|                           |   |
|---------------------------|---|
| Nominal resistance range  | 50 Ω ~ 2 M Ω                                  |
| Resistance tolerance      | ± 20 %  |
| Power ratings             | 0.125 W (70 °C) 0 W (150 °C)                  |
| Resistance law            | (B)<br>Linear law                             |
| 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 (SM-3) / 5 turns (SM-31)             |
| End resistance            | 1 % or 3 Ω , whichever is greater             |
| C.R.V.                    | 3 % or 3 Ω , whichever is greater             |
| Operating temp. range     | − 65 ~ 150 °C                                 |
| Temp. coefficient         | ± 100 10 <sup>-6</sup> /°C maximum            |
| Insulation resistance     | 100 M Ω minimum (DC500 V)                     |
| Dielectric strength       | AC600 V, 60 s                                 |
| Net weight                | Approx. 0.10 g                                |

### <Reflow profile for soldering heat evaluation>



### MECHANICAL CHARACTERISTICS

|                   |                                     |
|-------------------|-------------------------------------|
| Operating torque  | 5 mN·m {51 gf·cm} maximum           |
| Mechanical stop   | Clutch action                       |
| Rotational life   | 200 cycles [ Δ R/R ≤ ± (2 Ω + 3 %)] |
| Thrust to shaft   | 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 ~ 150 °C (0.5 h), 5 cycles   | [ Δ R/R ≤ 2 %]<br>[S.S. ≤ 2 %]      |
| Humidity            | − 10 ~ 65 °C (80 ~ 98 %),<br>10 cycles, 240 h   | [ Δ R/R ≤ 3 %]                      |
| 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, 0.125 W, 1000 h  | [ Δ R/R ≤ 3 %]<br>[S.S. ≤ 2 %]      |
| Low temp. operation | − 65 °C, 2 h  | [ Δ R/R ≤ 2 %]<br>[S.S. ≤ 2 %]      |
| High temp. exposure | 150 °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      | 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 %]                      |

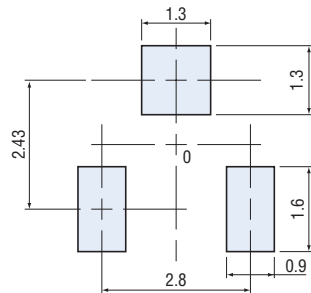
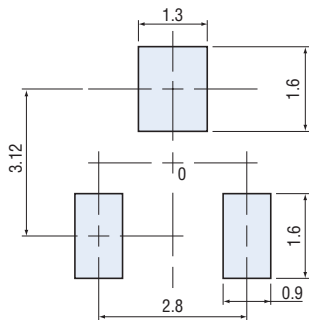
Δ R/R : Change in total resistance  
S.S. : Setting stability

### MAXIMUM INPUT RATINGS

| Nominal resistance values ( $\Omega$ ) | Resistance code | Maximum input voltage (V) | Maximum wiper current (mA) |
|--|-----------------|---------------------------|----------------------------|
| 50                                     | 500             | 2.50                      | 50.0                       |
| 100                                    | 101             | 3.53                      | 35.4                       |
| 200                                    | 201             | 5.00                      | 25.0                       |
| 500                                    | 501             | 7.91                      | 15.8                       |
| 1 k                                    | 102             | 11.2                      | 11.2                       |
| 2 k                                    | 202             | 15.8                      | 7.91                       |
| 5 k                                    | 502             | 25.0                      | 5.00                       |
| 10 k                                   | 103             | 35.4                      | 3.54                       |
| 20 k                                   | 203             | 50.0                      | 2.50                       |
| 50 k                                   | 503             | 79.1                      | 1.58                       |
| 100 k                                  | 104             | 112                       | 1.12                       |
| 200 k                                  | 204             | 158                       | 0.79                       |
| 500 k                                  | 504             | 200                       | 0.40                       |
| 1 M                                    | 105             | 200                       | 0.20                       |
| 2 M                                    | 205             | 200                       | 0.10                       |

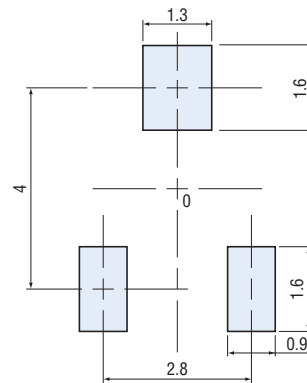
### RECOMMENDED P.C.B. PAD OUTLINE DIMENSIONS

#### SM-3W/31W



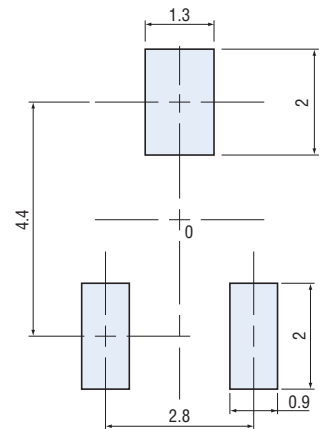
※ Also available to place as the above.

#### SM-3A/31A



#### SM-3B/31B

(Unit : mm)

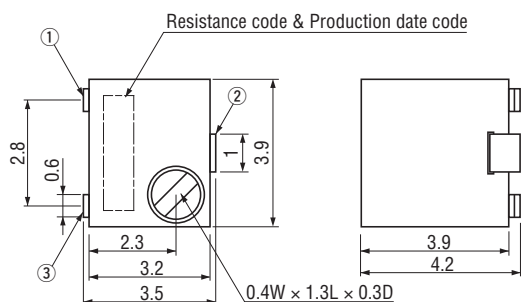


Note) The zero point is the center of mounting.

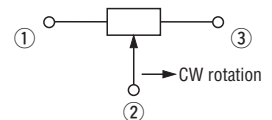
### OUTLINE DIMENSIONS

#### SM-3W/31W

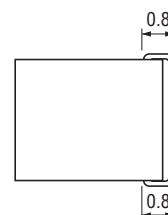
##### Top adjustment



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



※ Note the terminal position.

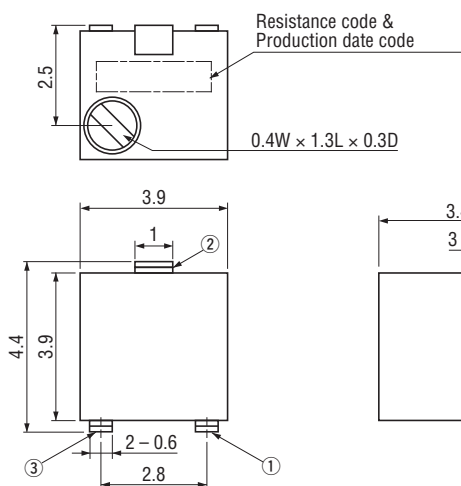


# SM-3/31

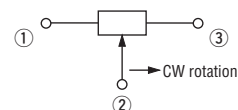
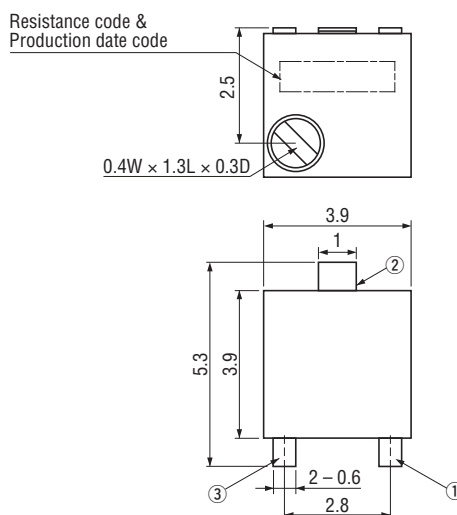
## SURFACE MOUNT TRIMMERS

### OUTLINE DIMENSIONS

#### ● SM-3A/31A Side adjustment



#### ● SM-3B/31B Side adjustment



※ Note the terminal position.

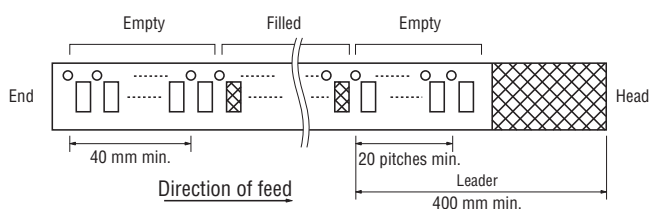
### PACKAGING SPECIFICATIONS

#### <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.

Maximum number of consecutive missing pieces = 2  
Leader length and reel dimension are shown in the diagrams below.

#### ● EMBOSSED TAPE DIMENSIONS

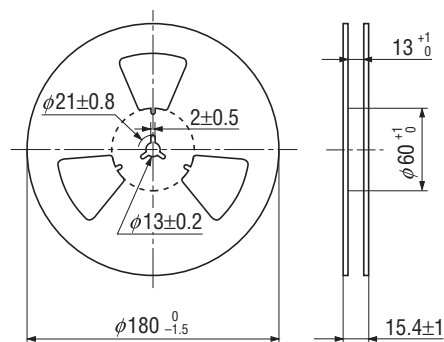


#### ● REEL DIMENSIONS

(Conforms to JIS C 0806-3)

(In accordance with EIAJ ET-7200A)

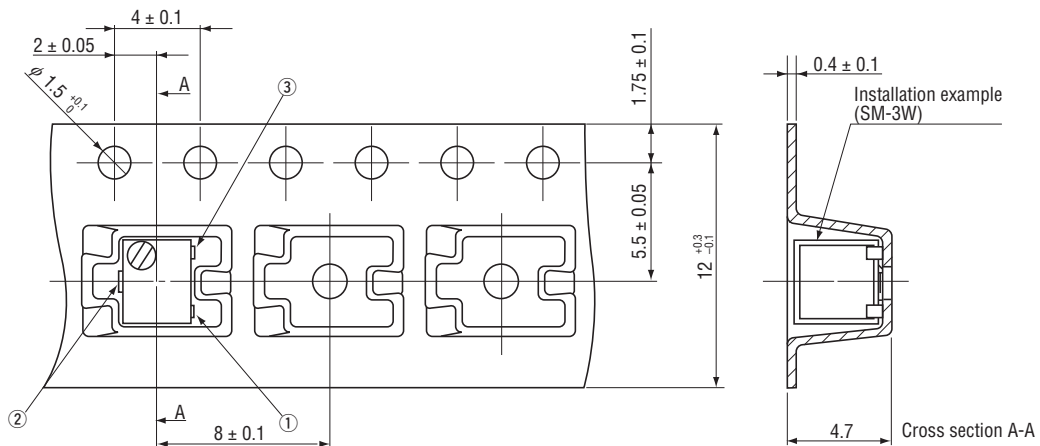
(Unit: mm)



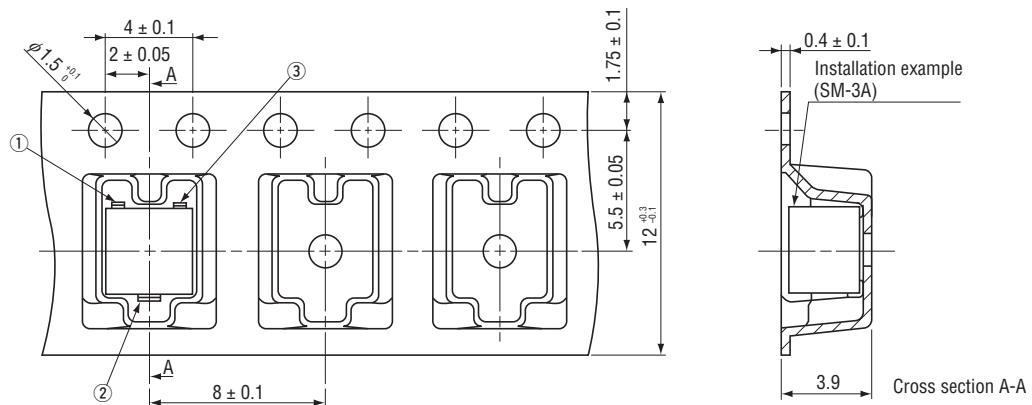
# SM-3/31

## SURFACE MOUNT TRIMMERS

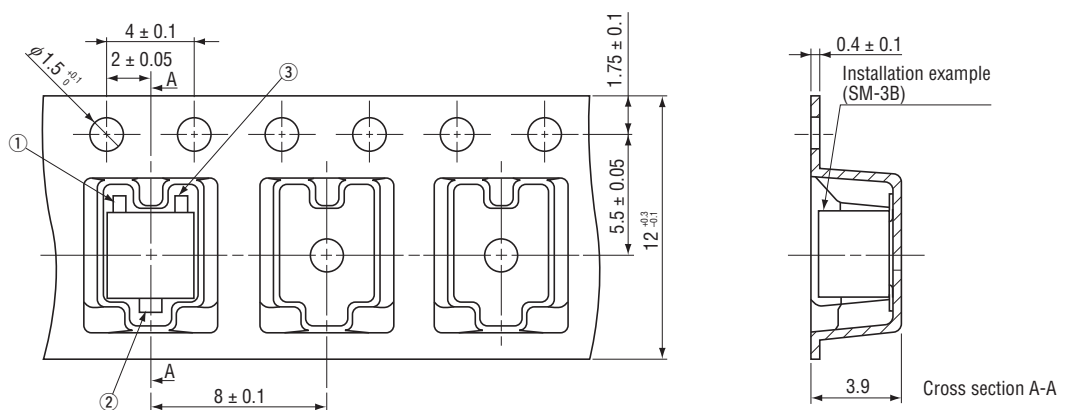
### ● SM-3TW/31TW



### ● SM-3TA/31TA



### ● SM-3TB/31TB



### <Bulk pack specifications>

- Unit of bulk in a plastic bag is 50 pcs. per pack.
- Boxing of bulk in a plastic bag is performed with 200 pcs. per box.

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