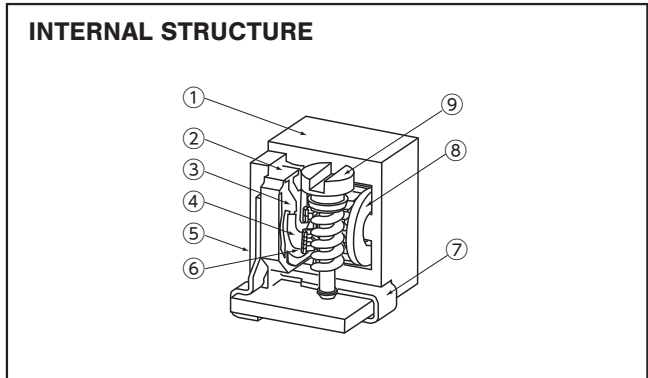
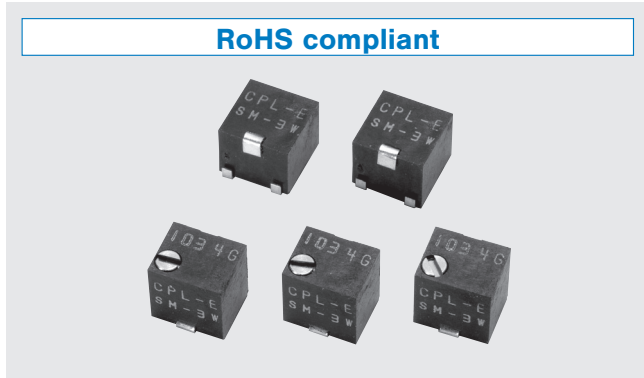




**THE DATASHEET OF  
SM-31TW103**



# SURFACE MOUNT CERMET TRIMMERS **SM-3/31**

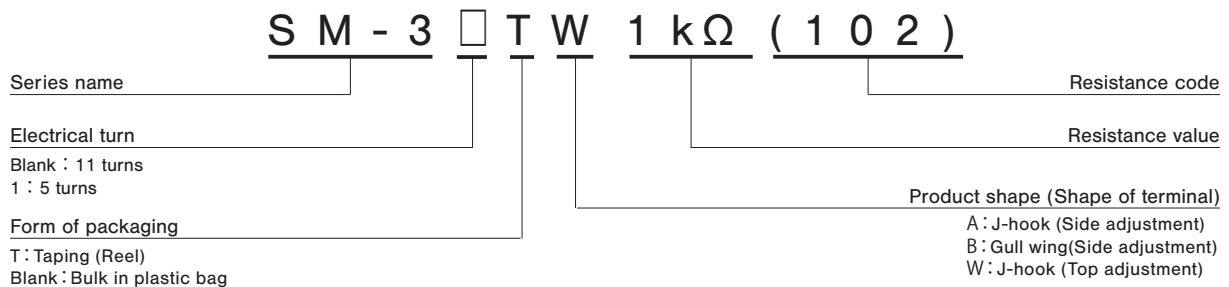


## FEATURES

- RoHS compliant
- Fine adjustment is possible
- Automatic mounting is possible (Taping)
- Reflow soldering is possible
- Sealed construction (Washable: Refer to page 628.)
- Resin material is UL Recognized 94V-0

	Part name	Material
①	Housing	PPS (Polyphenylenesulphide)
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
⑧	Rotor gear	PA (Polyamide)
⑨	Shaft	Brass, Nickel-plated

## PART NUMBER DESIGNATION



※ 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 kΩ	2 kΩ	5 kΩ	10 kΩ
20 kΩ	50 kΩ	100 kΩ	200 kΩ	500 kΩ	1 MΩ	2 MΩ	

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 MΩ
Resistance tolerance	± 20 %
Power ratings	0.125 W (70 °C) 0 W (150 °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	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 MΩ minimum (DC500 V)
Dielectric strength	AC600 V, 60 s
Net weight	Approx. 0.10 g

### 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

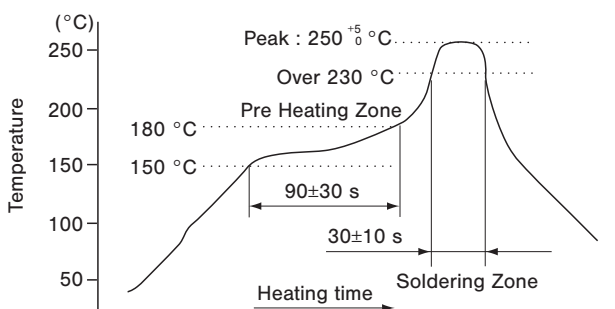
{ } : Reference only

### ENVIRONMENTAL CHARACTERISTICS

Test item	Test conditions	Specifications
Thermal shock	- 65 ~ 150 °C (0.5 h), 5 cycles	[ Δ R/R ≤ 2 %] [S.S. ≤ 2 %]
Humidity	- 10 ~ 65 °C (Relative humidity 80 ~ 98 %), 10 cycles, 240 h	[ Δ R/R ≤ 3 %]
Shock	981 m/s <sup>2</sup> , 6 ms 6 directions for 3 times each	[ Δ R/R ≤ 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	[ Δ R/R ≤ 1 %] [S.S. ≤ 1 %]
Load life	70 °C, 0.125 W, 1000 h	[ Δ R/R ≤ 3 %] [S.S. ≤ 2 %]
Low temp. operation	- 65 °C, 2 h	[ Δ R/R ≤ 2 %] [S.S. ≤ 2 %]
High temp. exposure	150 °C, 250 h	[ Δ R/R ≤ 3 %] [S.S. ≤ 2 %]
Immersion seal	85 °C, 60 s	No leaks (No continuous bubbles)
Soldering heat	Reflow : Peak temperature 255 °C (Please refer to the profile below.) Manual soldering : 350 ± 10 °C, 3 ~ 4S	[ Δ R/R ≤ 1 %]

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

### <Reflow profile for soldering heat evaluation>



Reflow : two times maximum

# SM-3/31

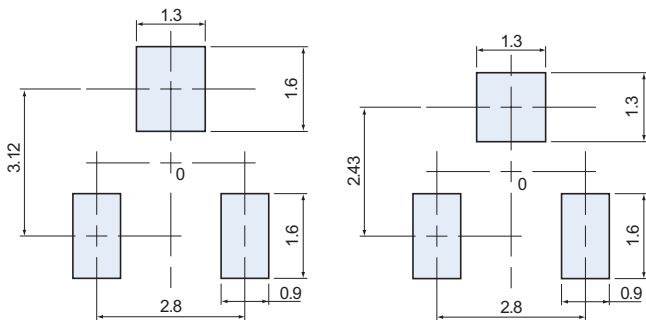
## SURFACE MOUNT TRIMMERS

### 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

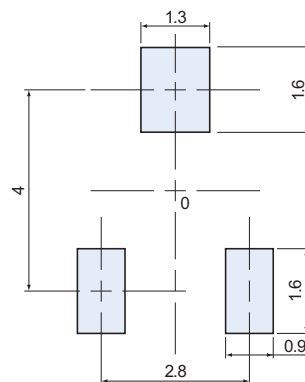
### RECOMMENDED P.C.B. PAD OUTLINE DIMENSIONS

#### SM-3W/31W



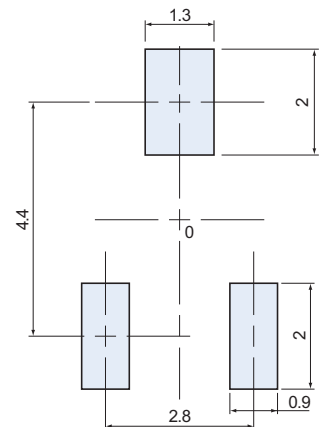
※ Also available to place as the above.

#### SM-3A/31A



#### SM-3B/31B

(Unit : mm)

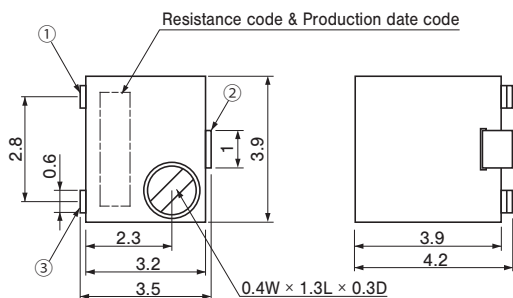


Note) The zero point is the center of mounting.

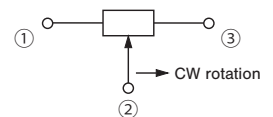
### OUTLINE DIMENSIONS

#### SM-3W/31W

##### Top adjustment



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



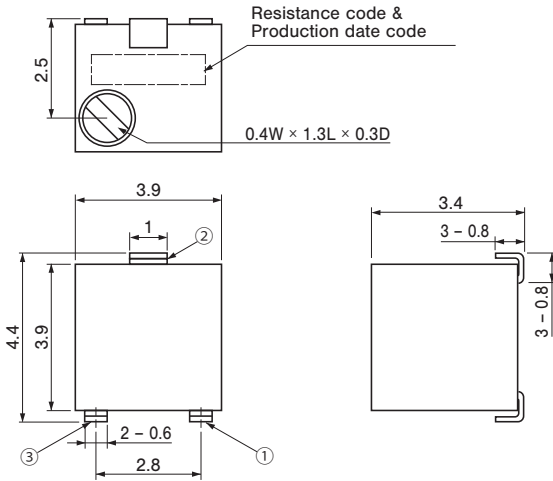
※ Note the terminal position.

# SM-3/31

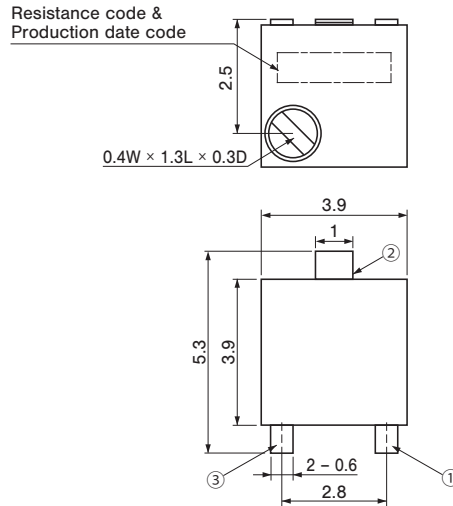
## SURFACE MOUNT TRIMMERS

### OUTLINE DIMENSIONS

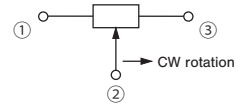
#### SM-3A/31A Side adjustment



#### SM-3B/31B Side adjustment



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



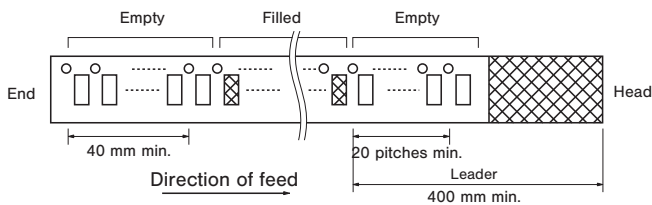
※ Note the terminal position.

### PACKAGING SPECIFICATIONS

#### <Bulk pack 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.

#### EMBOSED TAPE DIMENSIONS

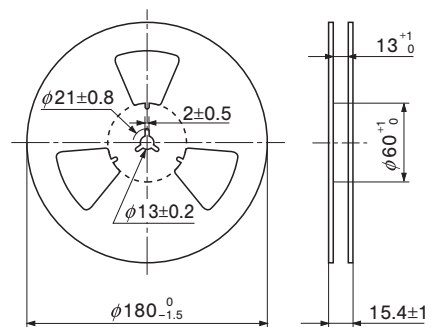


#### REEL DIMENSIONS

(Conforms to JIS C 0806-3)

(In accordance with EIAJ ET-7200A)

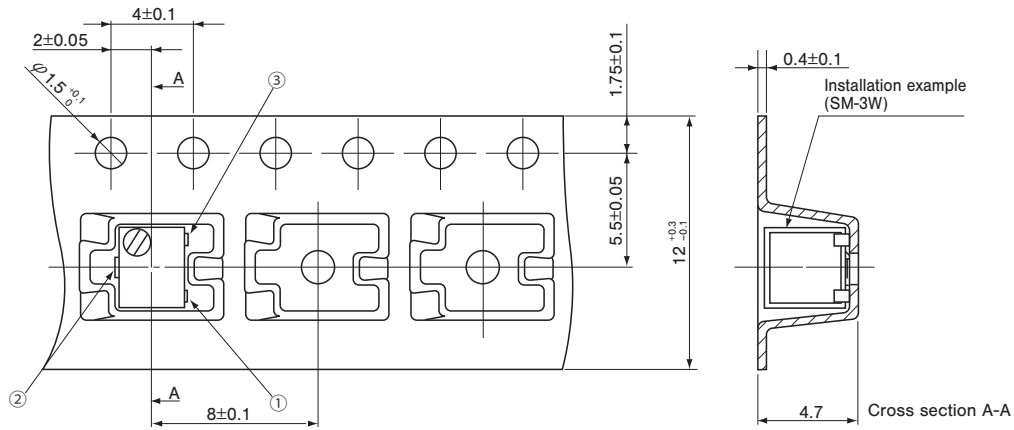
(Unit: mm)



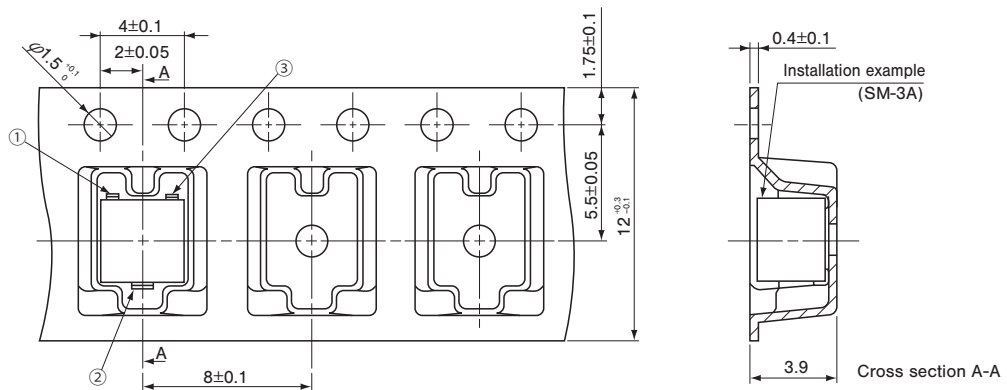
# SM-3/31

## SURFACE MOUNT TRIMMERS

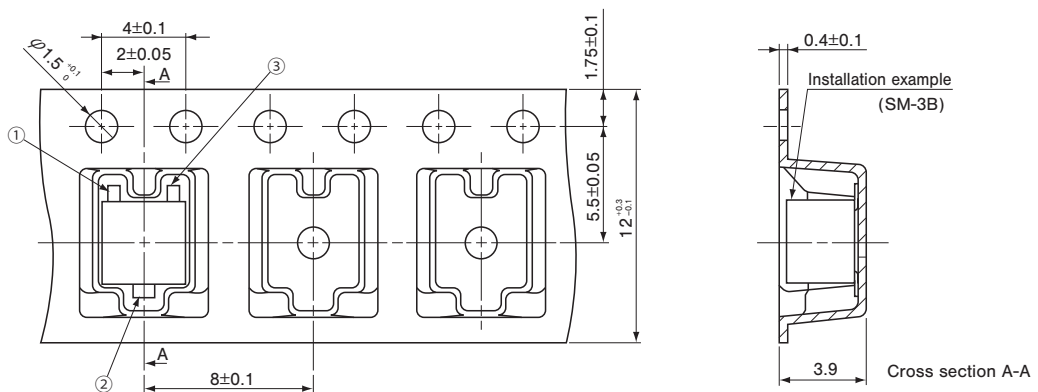
### ● SM-3TW/31TW



### ● 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.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

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- ⊖ [Copal Electronics Inc. Information](#)

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