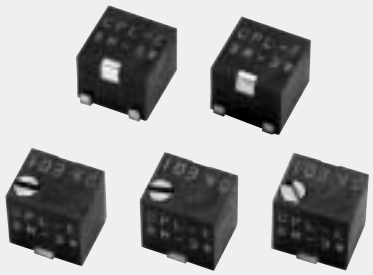
COPAL ELECTRONICS

New

SURFACE MOUNT CERMET TRIMMERS SM-3

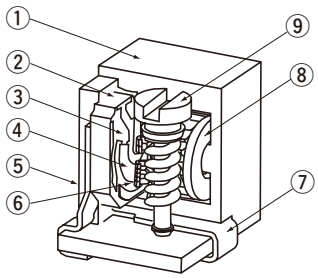
RoHS compatible



■ FEATURES

- Lead-free soldering, Cadmium-free
- Fine adjustment is possible
- Automatic mounting is possible (Taping)
- Flow/reflow soldering is possible
- Sealed construction (Washable)

INTERNAL STRUCTURE



	Part name	Material	Flammability
①	Housing	PPS (Polyphenylenesulphide)	UL-94V-0
②	Base element	Ceramic	—
③	Electrode	Ag-Pd cermet	
④	Resistive element	RuO_2 cermet	
⑤	Adhesive	Epoxy	UL-94V-0
⑥	Wiper	Multi metal alloy	—
⑦	Terminal pin	Copper alloy, Sn-Cu-plated	
⑧	Rotor gear	PA (Polyamide)	UL-94V-0
⑨	Shaft	Brass, Nickel-plated	—

CFCs, Halon, Carbon tetrachloride and designated bromic flame retardant PBBOs and PBBs are not used in our products.

■ PART NUMBER DESIGNATION

S M - 3 T W 1 k Ω (1 0 2)

- Series name
- Form of packaging
  - T : Taping (Reel)
  - Blank : Bulk in vinyl bags
- Product shape (Shape of terminal)
  - W : J-hook
- Resistance value
- Resistance code

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

Oct, 2004

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■ LIST OF PART NUMBERS

Adjustment position	Shape of terminal	Form of packaging	
		Taping (reel)	Vinyl bag
Top adjustment	W (J-hook)	SM-3TW	SM-3W
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	

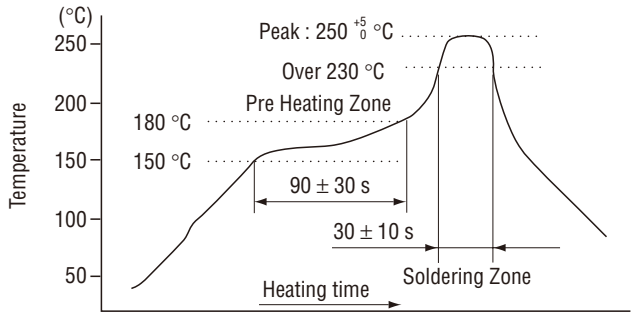
Fig. 1

❋ : 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
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^{-6}/°C maximum
Insulation resistance	100 MΩ minimum (DC500 V)
Dielectric strength	AC600 V, 60 s
Net weight	Approx. 0.10 g

<Reflow profile for soldering heat evaluation>



Reflow : two times maximum

■ 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/s², 6 ms 6 directions for 3 times each	[Δ R/R ≦ 1 %] [S.S. ≦ 1 %]
Vibration	Amplitude 1.52 mm or Acceleration 196 m/s², 10 ~ 2000 Hz, 3 directions, 12 times each	
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 ~ 4 s	[Δ R/R ≦ 1 %]

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

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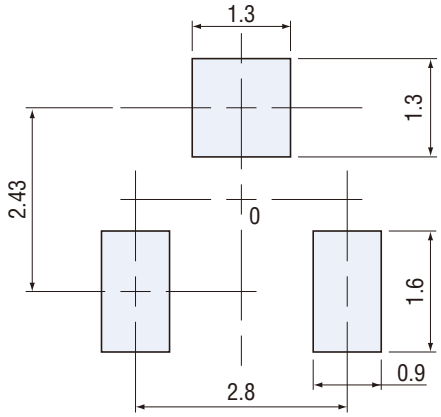
■ MAXIMUM INPUT RATINGS

Nominal resistance values (Ω)	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-3

(Unit : mm)

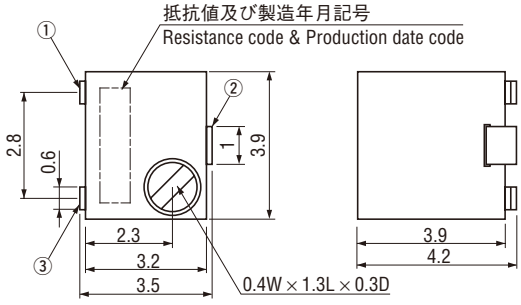


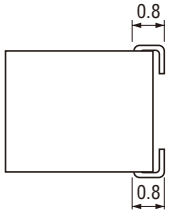
Note) The zero point is the center of mounting.

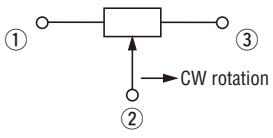
■ OUTLINE DIMENSIONS

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

● SM-3W
Side adjustment







❋ : Note the terminal position.

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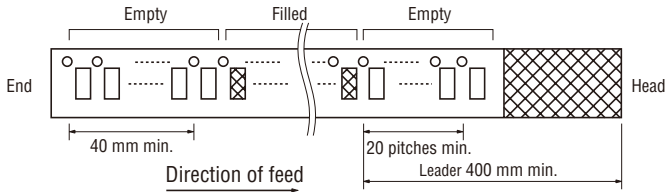
■ PACKAGING SPECIFICATIONS

<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 dia-grams below.

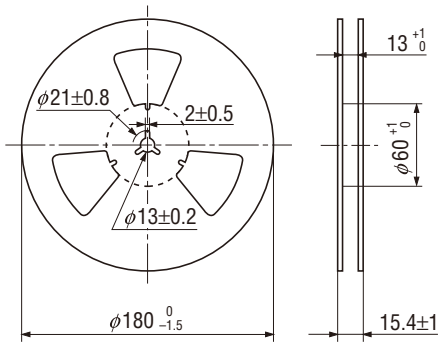
● EMBOSSED TAPE DIMENSIONS



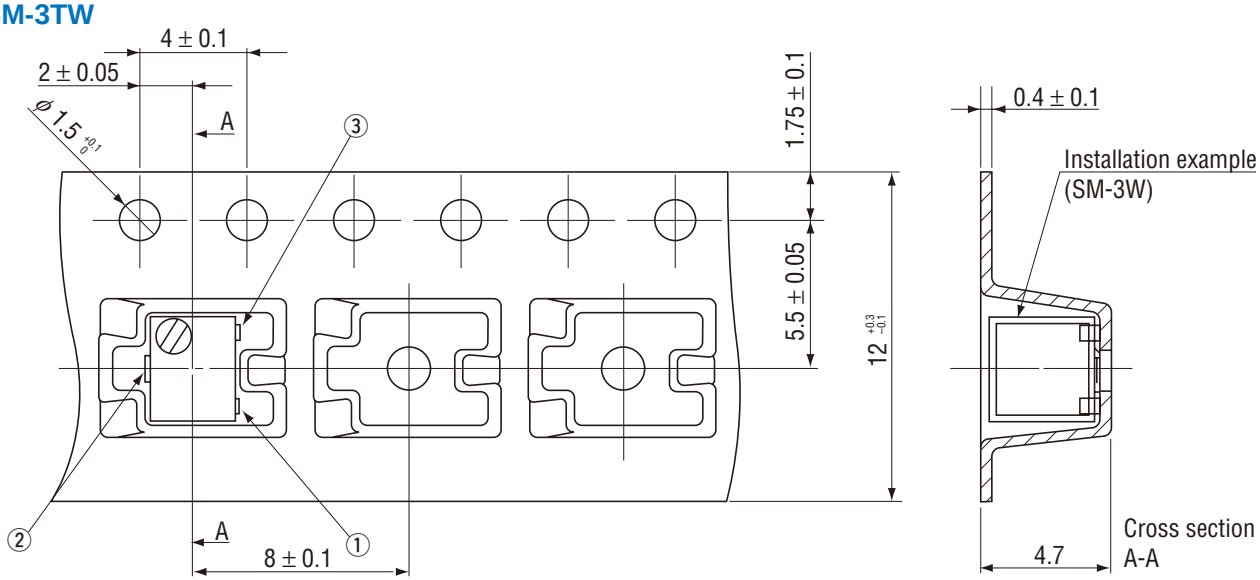
● REEL DIMENSIONS

(Conforms to JIS C 0806-3)
(In accordance with EIAJ ET-7200A)

(Unit: mm)



● SM-3TW



<Vinyl bag packaging specifications>

- Unit of bulk in vinyl bag packaging is 50 pcs. per pack.
- Boxing of bulk in vinyl bags is performed with 200 pcs. per box.