

COPAL ELECTRONICS

SINGLE TURN

SURFACE MOUNT TYPE TRIMMERS

ST-3

SURFACE MOUNT
TYPE TRIMMERS



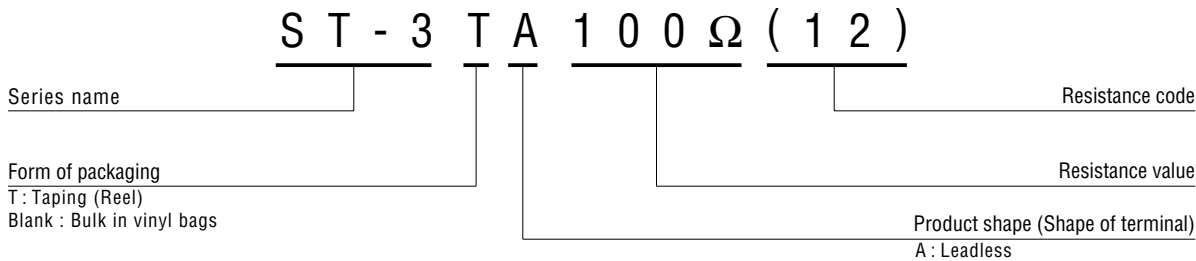
FEATURES

- Small and thin (3.2 × 2.0 × 3.5 mm)
- Sealed construction (Washable)
- Insulated rotor and case
- Flow/reflow soldering is possible
- Sure mechanical stops

INTERNAL STRUCTURE			
Part name		Material	Flammability
①	Rotor	PPS (Polyphenylenesulphide)	UL-94V-0
②	Resistive element	RuO ₂ cermet	—
③	Terminal (Leadless)	Solder-plated	
④	Base element	Ceramic	
⑤	Electrode	Ag-Pd cermet	
⑥	Wiper	Multi metal alloy	
⑦	“O” ring	Silicone rubber	UL-94HB
⑧	Housing	PPS (Polyphenylenesulphide)	UL-94V-0

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

PART NUMBER DESIGNATION



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

■ LIST OF PART NUMBERS

Adjustment position	Shape of terminal	Form of packaging	
		Taping (reel)	Bulk packaging
Top adjustment	A (Leadless)	ST-3TA	ST-3A
Pieces in package		1000 pcs./reel	100 pcs./pack

■ ELECTRICAL CHARACTERISTICS

Nominal resistance range	10 Ω ~ 1 MΩ
Total resistance tolerance	± 20 %
Power ratings	0.125 W (70 °C) 0 W (125 °C)
Resistance law	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 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 ppm/°C maximum 100 Ω ~ 1 MΩ : ± 100 ppm/°C maximum
Insulation resistance	1000 MΩ minimum (DC500 V)
Dielectric strength	AC500 V, 60 s
Net weight	Approx. 0.05 g (ST-3A)

<Nominal resistance values>

⤵ 10 Ω	⤵ 20 Ω	50 Ω	100 Ω	200 Ω	500 Ω	1 kΩ	2 kΩ	3 kΩ
5 kΩ	10 kΩ	20 kΩ	30 kΩ	50 kΩ	100 kΩ	200 kΩ	500 kΩ	1 MΩ

Fig.1

⤵ : Semi-standard

* 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 version must be purchased in reel units.

■ MECHANICAL CHARACTERISTICS

Mechanical angle	250 ° (1 turn)
Operating torque	5 mN·m {51 gf·cm} maximum
Stop strength	20 mN·m {204 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	235 °C, 2 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 %RH), 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 of 1.52 mm or Acceleration of 196 m/s ² , 10~2000 Hz, 3 directions, 12 times each	
Load life	70 °C, 0.125 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. $\leq 2 \%$]
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	260 °C, 10 s or 215 °C, 35 s	[$\Delta R/R \leq 1 \%$]

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

MAXIMUM INPUT RATINGS

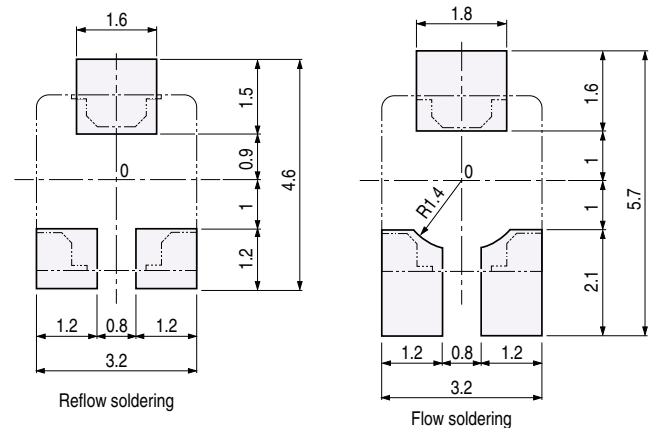
Nominal resistance values (Ω)	Resistance code	Maximum input voltage (V)	Maximum wiper current (mA)
➡ 10	11	1.00	100
➡ 20	21	1.58	79.1
50	51	2.50	50.0
100	12	3.53	35.4
200	22	5.00	25.0
500	52	7.91	15.8
1 k	13	11.2	11.2
2 k	23	15.8	7.91
3 k	33	19.4	6.45
5 k	53	25.0	5.00
10 k	14	35.4	3.54
20 k	24	50.0	2.50
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

➡ : Semi-standard

RECOMMENDED P.C.B. PAD OUTLINE DIMENSIONS

ST-3A

(Unit : mm)



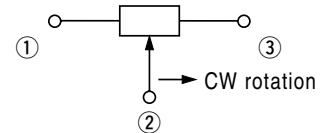
Note) The zero point is the center of mounting.

OUTLINE DIMENSIONS

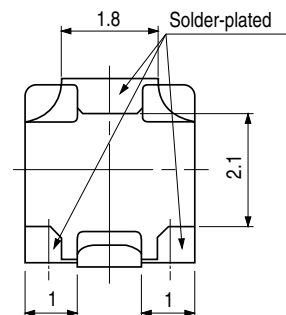
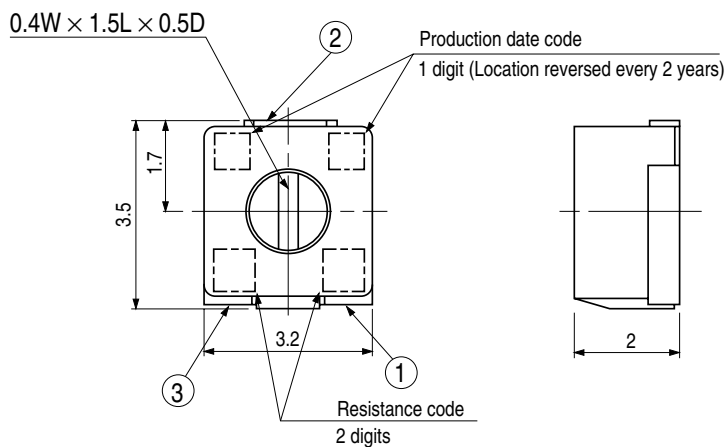
ST-3A

Top adjustment

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



* Note the terminal position.



ST-3

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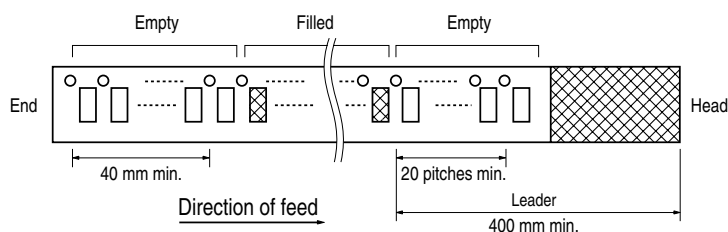
PACKAGING SPECIFICATIONS

<Taping packaging specifications>

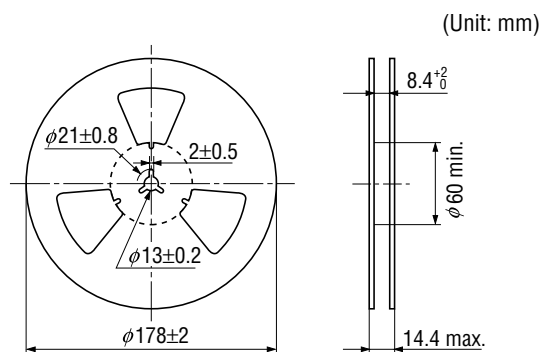
- Taping version is packaged in 1000 pcs. per reel.
Orders will be accepted for units of 1000 pcs., i.e., 1000, 2000, 3000 pcs., etc.
- Taping version is boxed with 5 reels (5000 pcs.).

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

EMBOSSED TAPE DIMENSIONS



REEL DIMENSIONS



Reel & embossed tape materials

Embossed tape: Plastic

Reel: Paper

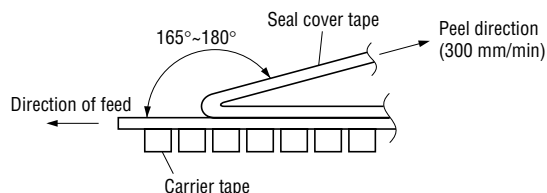
Embossed tape pull strength

9.8 N {1kgf} minimum

Peeling strength of seal tape

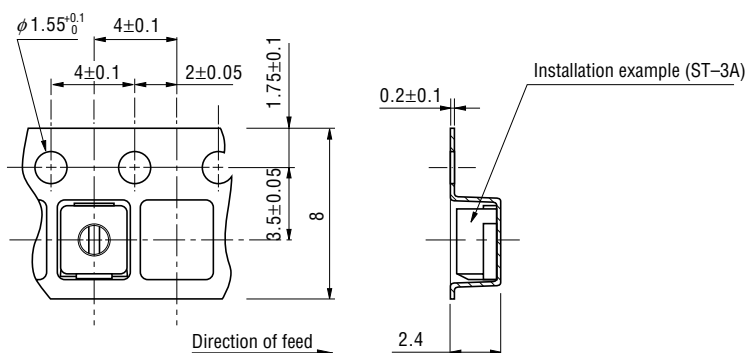
0.098~0.69 N {10~70gf}

Test method for peeling strength of seal tape



{ } : Reference only

ST-3TA



<Bulk 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.