

SUNWAY R CHIP DATASHEET



Metal Current Sensor SD Series

Tolerance : $\pm 1\%$ / $\pm 2\%$ / $\pm 5\%$
Sizes : 2512

RoHS compliant & Halogen free



CATALOGUE

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1. ORDERING INFORMATION

SCOPE

This specification describes SD series current sensor - low TCR with lead-free terminations made by metal substrate.

APPLICATIONS

- Consumer goods
- Computer
- Telecom / Datacom
- Industrial / Power supply
- Alternative Energy
- Car electronics

FEATURES

- Halogen Free Epoxy
- AEC-Q200 qualified
- Halogen-free Epoxy
- RoHS compliant
- Reduce environmentally hazardous wastes
- High component and equipment reliability
- Non-forbidden materials used in products/production
- Low resistances applied to current sensing
- Anti-sulfur

ORDERING EXAMPLE

The ordering code of a SD 2512 3W Chip resistor, TCR100 , value 0.001 Ω with $\pm 1\%$ tolerance, supplied in 7-inch embossed plastic tape reel is: SD2512FR001F3WPKH

ORDERING INFORMATION-GLOBAL PART NUMBER

Global part numbers are identified by the series, sizes, tolerance ,packing type, temperature coefficient, taping reel and resistance value.

GLOBAL PART NUMBER

| | | | | | | | |
|-----------|-------------|----------|-------------|----------|-----------|----------|-----------|
| SD | XXXX | X | XXXX | X | XX | X | XH |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |

(1) SIZE

2512

(2) TOLERANCE

F= $\pm 1.0\%$
G= $\pm 2.0\%$
J= $\pm 5.0\%$

(3) RESISTANCE

Example:
U500 = 0.0005 Ω
R004 = 0.004 Ω

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

E= $\pm 50\text{ppm}$
F = $\pm 100\text{ppm}$
J = $\pm 350\text{ppm}$

(5) POWER

3W

(6) CONTROL CODE

N:Lead Free, P:Total Lead Free

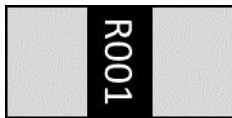
(7) PACKAGING TYPE & PRODUCT CODE

K = 07" Embossed plastic tape
H = Default code

2. MARKING AND CONSTRUCTION

MARKING

SD2512

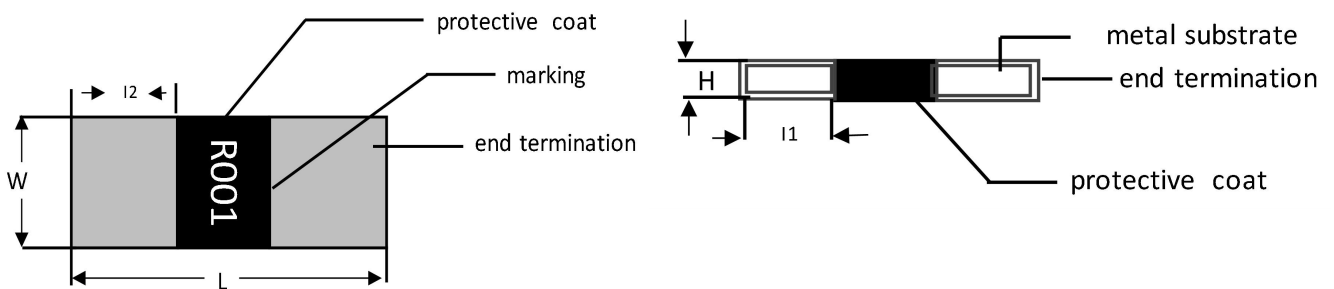


The "R" is used as a decimal point; the other 3 digits are significant
SD2512 (3W) : 0.5mΩ to 4mΩ

Value=0.001Ω

CONSTRUCTION

The resistors are constructed using outstanding TCR level material , which makes Sunway SD resistors excellent for current sensing application in battery charger circuit& DC-DC convergent. The composition of resistive material is adjusted to give the approximate required resistance and is covered with a protective coating. Marking is printed on the top side of the resistor.Finally ,the three external terminations (Cu/Ni/matte Tin) are added , as shown in Fig.



3.DIMENSION AND ELECTRICAL CHARACTERISTICS

DIMENSION

| TYPE | RESISTANCE RANGE | L(mm) | W(mm) | H(mm) | l1(mm) | l2(mm) |
|--------|---|-----------------|-----------------|-----------------|-----------------|-----------------|
| SD2512 | $0.5\text{m}\Omega \leq R \leq 4\text{m}\Omega$ | 6.40 ± 0.20 | 3.20 ± 0.20 | 0.80 ± 0.20 | 2.20 ± 0.20 | 2.20 ± 0.20 |

Note:

1. For relevant physical dimensions ,please refer to construction outlines.
2. Please contact with sales offices , distributors and representatives in your region before ordering.

ELECTRICAL CHARACTERISTICS

| TYPE | POWER RATING | TOLERANCE | RESISTANCE RANGE | TCR |
|--------|--------------|-----------|---|------------------------------------|
| SD2512 | 3W | 1%/2%/5% | $0.5\text{m}\Omega \leq R < 1\text{m}\Omega$ | $\pm 350\text{ppm}/^\circ\text{C}$ |
| SD2512 | 3W | 1%/2%/5% | $1\text{m}\Omega \leq R < 2\text{m}\Omega$ | $\pm 100\text{ppm}/^\circ\text{C}$ |
| SD2512 | 3W | 1%/2%/5% | $2\text{m}\Omega \leq R \leq 4\text{m}\Omega$ | $\pm 50\text{ppm}/^\circ\text{C}$ |

4. FUNCTIONAL DESCRIPTION

FUNCTIONAL DESCRIPTION

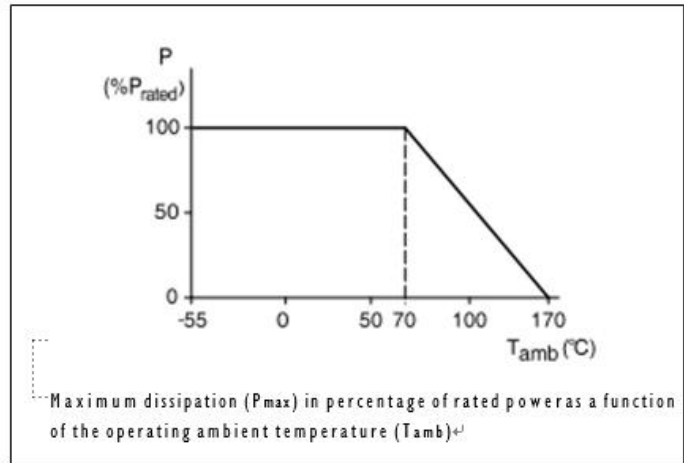
OPERATING TEMPERATURE RANGE

SD Range: - 55°C to +170°C

POWER RATING

Standard rated power at 70°C:

For detail power value, please refer to Table .



RATED VOLTAGE

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$$V = (P \cdot R)^{1/2}$$

Where

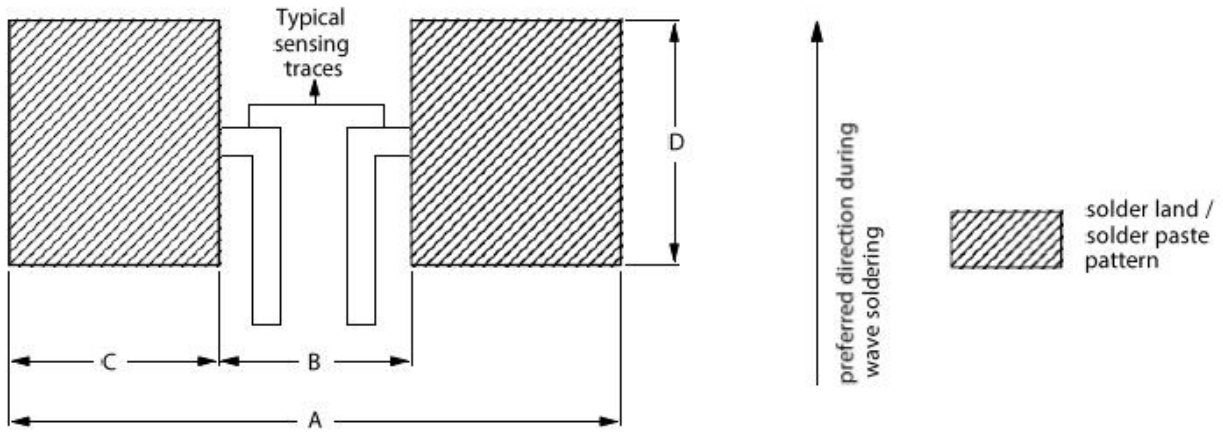
V= Continuous rated DC or AC (rms) working voltage (V)

P = Rated power (W)

R = Resistance value (Ω)

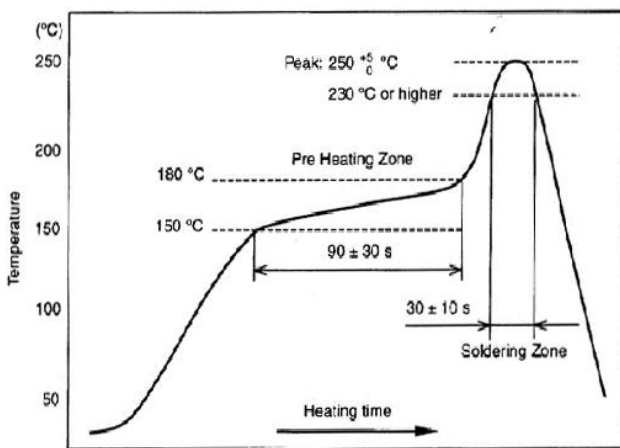
5. FOOTPRINT AND SOLDERING PROFILES

FUNCTIONAL DESCRIPTION



Single resistor chips recommended dimensions of footprints

| TYPE | A | B | C | D |
|--------|-----|-----|-----|-----|
| SD2512 | 7.5 | 1.3 | 3.1 | 4.0 |

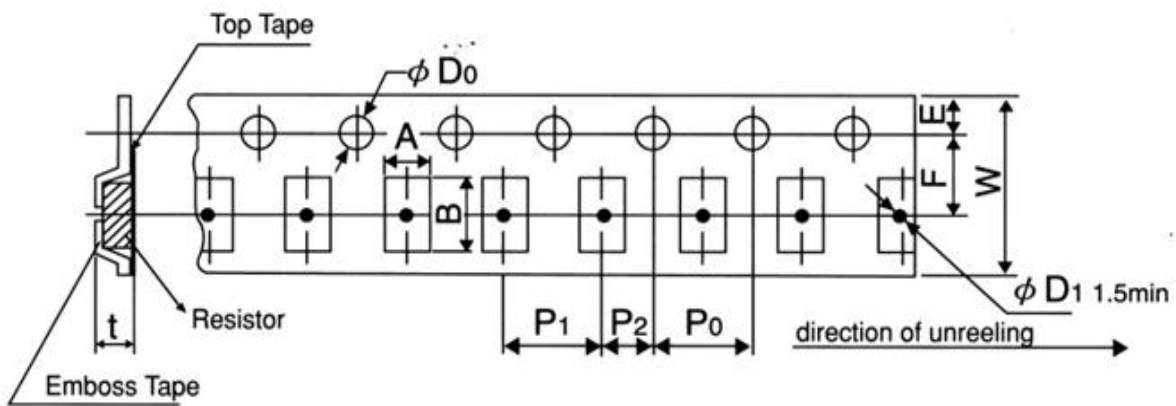


Peak value: $250 \pm 5 / -0 \text{ } ^\circ\text{C}$, 5 s,
 Preheating zone: 150~180°C, 90±30 s,
 Welding zone: 230°C or higher, 30±10 s

6. PACKING STYLE & PACKAGING QUANTITY

PACKING STYLE AND PACKAGING QUANTITY

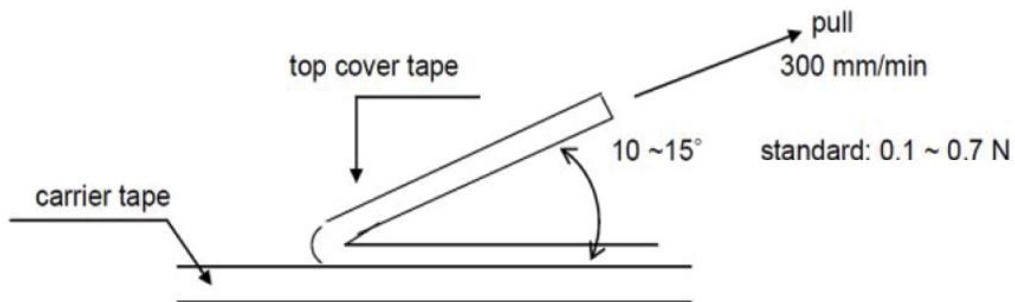
| TYPE | PACKING STYLE | REEL DIMENSION | QUANTITY |
|--------|--------------------------|----------------|----------|
| SD2512 | Embossed taping reel (K) | 7" | 4000 |



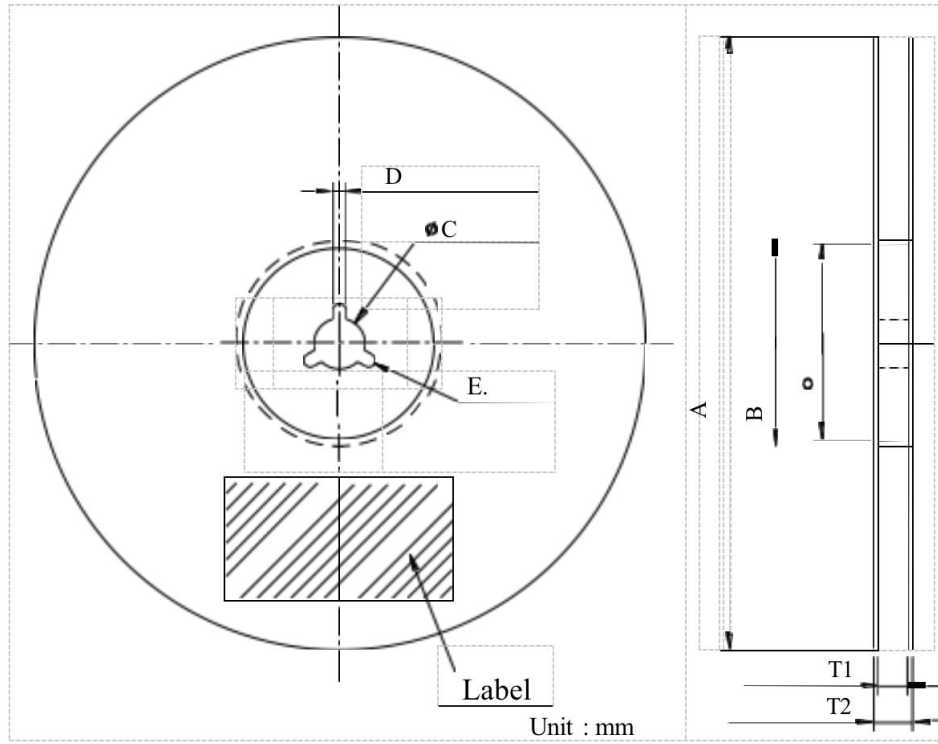
| TYPE | A | B | W | F | E | P1 | P2 | P0 | D0 | t |
|--------|----------|---------|----------|----------|----------|---------|----------|----------|-----------|----------|
| SD2512 | 3.5±0.15 | 6.8±0.2 | 12.0±0.2 | 5.5±0.05 | 1.75±0.1 | 4.0±0.1 | 2.0±0.05 | 4.0±0.05 | 1.5+0.1/0 | 1.23±0.1 |

PEEL-OFF FORCE

Peel-off forces of both paper/PE and embossed/blister tapes are in accordance with "IEC 60286-3" ; that is, at a peel-off speed of 300 ±10 mm/minute, 0.1 N to 1.0 N for 8 mm tape and 0.1 N to 1.3 N for tape larger than 8 mm. The peel-off angle should be between 165° and 180°.



REEL SPECIFICATION



Unit: mm

| TYPE | A | B | C | D | E | T1 |
|--------|---------|--------|--------|---------|-----|--------|
| SD2512 | 178±2.0 | 60±1.0 | 13±1.0 | 2.0±0.5 | >22 | 13±0.3 |

7. TESTS AND REQUIREMENTS

TESTS AND REQUIREMENTS

| Project | Test Method | Specifications and Requirements |
|--------------------------------------|--|--|
| Temperature coefficient (TCR) | Resistance values were measured at 25 °C (T1, R1) and 125 °C (T2, R2), and TCR was calculated as $(R2-R1)/(R1 (T2-T1)) * 10^6$ | Refer to TCR specifications for physical features |
| Short Time Overload | 5 times rated power, maintain 5s | $\Delta R \leq \pm (1.0\%+0.05m\Omega)$ |
| Insulation resistance | Apply 100V±15V DC voltage between electrode and substrate, hold for 60 seconds, then measure insulation resistance | > 100MΩ |
| Withstand voltage | An alternating current with an effective value of the maximum overload voltage is applied between the electrode and the substrate at a rate of approximately 100V/S, maintaining 60±5s | No breakdown or arc |
| Solder ability | 245°C±5°C tin tank, hold 2s±0.5s | At least 95% of surface area of electrode shall be covered with new solder |
| Resistance to Soldering Heat | 260°C±5°C tin tank, hold for 10s±1s | $\Delta R \leq \pm (0.5\%+0.05m\Omega)$, no visible damage |
| Bending test | Bending distance 2mm, hold time 60s±5s | $\Delta R \leq \pm (1.0\%+0.05m\Omega)$, no mechanical damage |
| Solvent resistance | Isopropanol (IPA) at 23°C±5°C for 10 hours | No obvious damage to appearance |
| High Temperature Exposure | 150°C±2°C, 1000H, stand for 1H, test the resistance value | $\Delta R \leq \pm (1.0\%+0.05m\Omega)$ |
| Low Temperature Exposure | -55°C±2°C, 1000H, stand for 1H, test the resistance value | $\Delta R \leq \pm (1.0\%+0.05m\Omega)$ |
| Rapid change of Temperature | -55°C 30 minutes ~ normal temperature 5 minutes ~155°C 30 minutes, 1000 cycles | $\Delta R \leq \pm (1.0\%+0.05m\Omega)$ |
| Load Life | 70°C±2°C, 1000 hours, rated power, 1.5 hours on / 0.5 hours off | $\Delta R \leq \pm (1.0\%+0.05m\Omega)$ |
| Moisture with Load | 85°C±2°C, 85%±3%RH, 1000 hours, rated power, 1.5 hours on / 0.5 hours off | $\Delta R \leq \pm (1.0\%+0.05m\Omega)$ |

8. REVISION HISTORY

REVISION HISTORY

| REVISION | DATE | CHANGE NOTIFICATION | DESCRIPTIONN |
|-----------|------------|---------------------|------------------------------------|
| Version 1 | 24-03-2022 | - | -First issue of this specification |

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