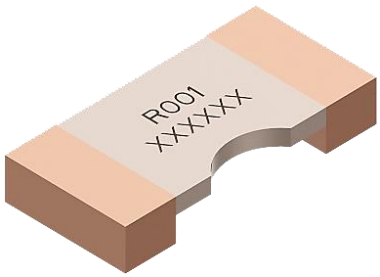
# VSIL2512S3 Series, Current Sensor Resistor (Lead / Halogen Free)

## Features / Applications :

- High power rating is up to 3W
- Welding construction; excellent long-term stability
- Automotive applications & Current Sensor Resistor
- Suited for mounting on DBC / IMS substrate
- RoHS compliant and AECQ-200 qualified




## Electrical Specifications :

| Characteristics[1] | Feature |
|---|---|
| Power Rating[2] | 3 W |
| Resistance Value | 0.3 to 3 mΩ |
| Temperature Coefficient of Resistance (25/125℃) | From 50 ppm/℃ |
| Operation Temperature Range | -65℃~ +170℃ |
| Resistance Tolerance | ± 1% |
| Maximum Working Voltage (V) | $(P*R)^{1/2}$ |

1. For detail information refer to the table on page 3 P/N list
2. For resistors are operated at terminal temperature in excess of 70℃, the maximum load shall be derated in accordance with the following curve.

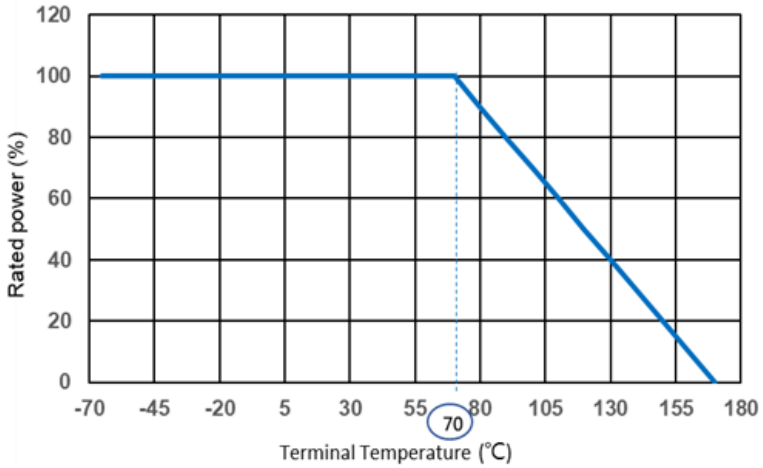
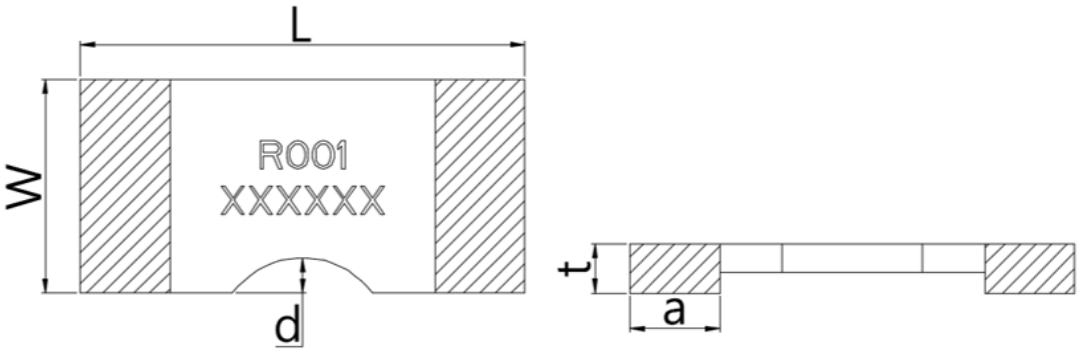



Figure 1. ：Power derating curve at terminal temperature

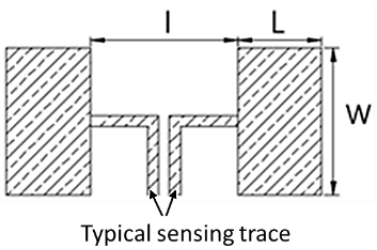
## Outline Drawing :

**Construction and Dimension**




| Dimensions (mm) | | | | |
|---|---|---|---|---|
| Resistance Range (mΩ) | 0.3 | 0.5 | 1, 3 | 2 |
| L | 6.35 ± 0.25 | | | |
| W | 3.05 ± 0.25 | | | |
| t | 2.0 ± 0.25 | 1.60 ± 0.25 | 1.0 ± 0.25 | 0.7 ± 0.25 |
| a | 1.28 ± 0.25 | | | |
| d | 0.9 (max) | | | |

Recommended Solder Pad Dimensions




| Resistance Range | Dimensions | | |
|---|---|---|---|
| mΩ | W (mm) | L (mm) | I (mm) |
| 0.3 to 3 | 3.4 | 1.8 | 3.4 |

## Type Designation :

| V S I L | 2512 | S | 3 | — | □ □ □ □ | □ |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | | (5) | (6) |

Note :

(1) Series No.

(2) Size

(3) Terminal Type : S = Short terminal

(4) Power Rating : 3 = 3W

(5) Resistance value : R003 = 0.003Ω, 0M30 = 0.0003Ω

(6) Tolerance : F = ±1%, G = ±2%, J = ±5%

## P/N list :

| P/N | R value | TCR | Power Rating | Tolerance | | |
|---|---|---|---|---|---|---|
| | (mΩ) | (ppm/K) | (W) | 1% | 2% | 5% |
| VSIL2512S3-0M30* | 0.3 | ±150 | 4 | ✓ | | |
| VSIL2512S3-0M50* | 0.5 | ±75 | 4 | ✓ | | |
| VSIL2512S3-R001* | 1 | ±50 | 4 | ✓ | | |
| VSIL2512S3-R002* | 2 | ±50 | 4 | ✓ | ✓ | |
| VSIL2512S3-R003* | 3 | ±50 | 4 | ✓ | | |

* Note : Other values and tolerance would be available, please contact Cyntec.

## Characteristics :

### Electrical

| Item | Specification and Requirement | Test Method |
|---|---|---|
| Temperature Coefficient (TCR) | As follow specification | JIS-C-5201<br>+25℃/ +125℃. |
| Short Time Overload | △R: ± 0.5%<br>Without damage by flashover, spark, arcing, burning or breakdown | JIS-C-5201-1 4.13<br>2.5 x rated power for 5 seconds. |
| ESD | △R: ± 1%<br>Without damage by flashover, spark, arcing, burning or breakdown | AEC-Q200-002<br>Human body, 8KV. |

### Mechanical

| Item | Specification and Requirement | Test Method |
|---|---|---|
| Solderability | The surface of terminal immersed shall be minimum of 95% covered with a new coating of solder | J-STD-002 Method B category 3<br>245±5℃ for 5±0.5 seconds. |
| Resistance to Solder Heat | △R: ± 0.5%<br>Without distinct damage in appearance | MIL-STD-202 Method 210<br>260 ± 5℃ for 10 ± 1 seconds. |
| Board Flex | △R: ± 1.0%<br>Without mechanical damage such as break. | AEC-Q200-005<br>Bending value: 2 mm for 60 ± 1 seconds. |
| Vibration | △R: ± 0.5%<br>Without distinct damage in appearance | MIL-STD-202 Method 204<br>5G's for 20 minutes, 12 cycles each of 3 orientations. Test from 10-2000Hz. |

| | | |
|---|---|---|
| Mechanical Shock | △R: ± 0.5%<br>Without distinct damage in appearance | MIL-STD-202 Method 213<br>100G's peak value, 6ms,<br>Half-sine waveform, 12.3ft/sec. |
| Terminal Strength<br>(SMD) | △R: ± 1.0%<br>Without mechanical damage such as break. | AEC-Q200-006<br>Force of 1.8Kg for 60 seconds. |

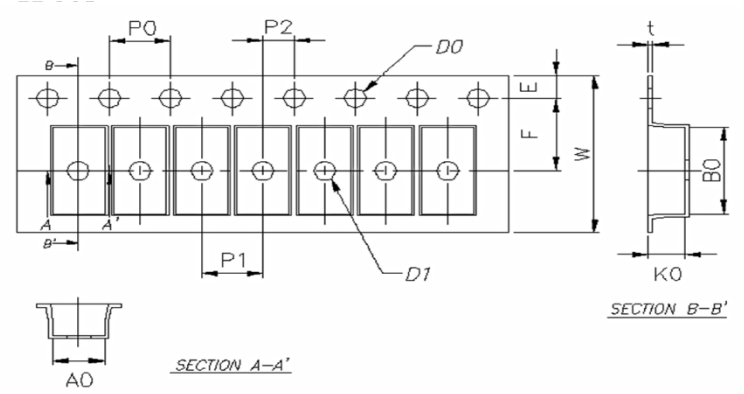
Endurance

| Item | Specification and Requirement | Test Method |
|---|---|---|
| Temperature Cycling | △R: ± 0.5%<br>Without distinct damage in appearance | JESD22 Method JA-104<br>-55°C to 150°C /1000cycle<br>30 min maximum dwell time at<br>each temperature. |
| Biased Humidity | △R: ± 0.5%<br>Without distinct damage in appearance | MIL-STD-202 Method 103<br>1000 hours, 85℃/85%R.H,<br>applied for 10% rated power. |
| Operational Life | △R: ± 1.0%<br>Without distinct damage in appearance | MIL-STD-202 Method 108<br>70℃, 100% rated power<br>1.5 hours ON, 0.5 hours Off<br>For total 1000 hours |
| High Temperature<br>Storage | △R: ± 1.0%<br>Without distinct damage in appearance | MIL-STD-202 Method 108<br>170°C for 1000 hours. |
| Moisture Resistance | △R: ± 0.5%<br>Without distinct damage in appearance | MIL-STD-202 Method 106<br>65°C /90-100%RH, unpowered, 7b<br>not required |

Note : Measurement at 24±4 hours after test conclusion for all reliability tests-parts.

## PACKAGING DESCRIPTIONS :

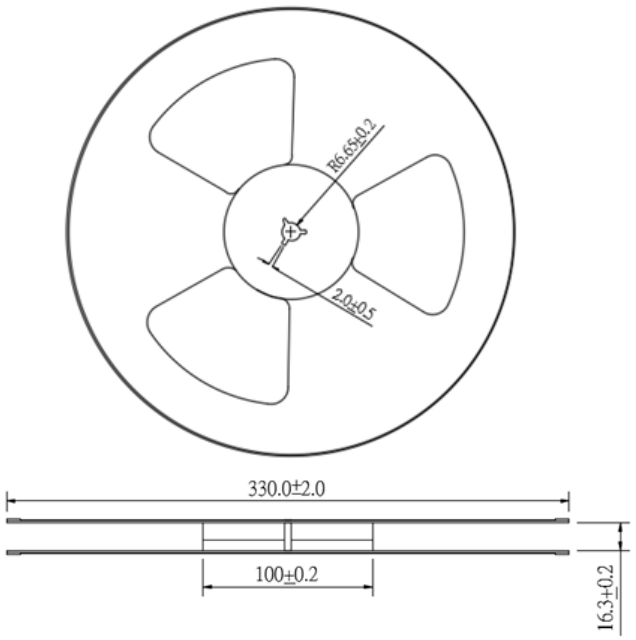
Dimensions :




| Resistance Range (mΩ) | W ±0.3 | P1 ±0.1 | E ±0.1 | F ±0.1 | P2 ±0.1 | D0 +0.1 | D1 ±0.1 | P0 ±0.1 | A0 ±0.15 | B0 ±0.2 | t ±0.05 | K0 ±0.1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.3 | 12 | 4.0 | 1.75 | 5.5 | 2.0 | 1.5 | 1.5 | 4.0 | 3.45 | 6.6 | 0.25 | 2.4 |
| 0.5 | | | | | | | | | | 6.8 | | 2.0 |
| 1, 3 | | | | | | | | | | 6.8 | | 1.35 |
| 2 | | | | | | | | | | 6.8 | | 1.2 |

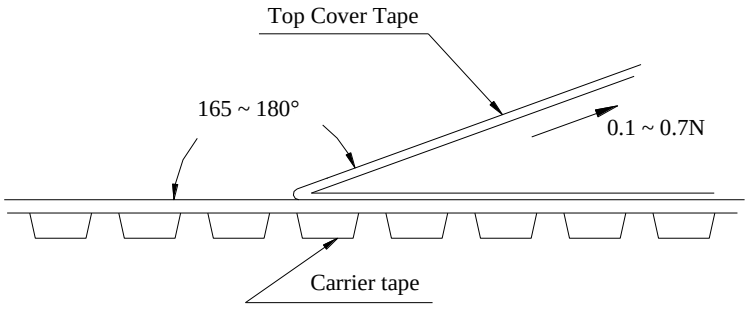
Unit: mm

Reel Dimensions :



## Peel Strength of Top Cover Tape :

The peel speed shall be about 300mm/min and the peel force of top cover tape shall between 0.1 to 0.7N




## Number of Taping :

3,000 pieces / reel

## Label Marking :

The following items shall be marked on tray

(1) Description

(2) Quantity

(3) Part No.

(4) Tapping No.

## Care Note :

Care note for storage

(1) The chip is characterized to moisture sensitivity component which is defined in level 2 base on J-STD-020C, the storage and SMT condition need to be confirm operation environment.

(2) Chip resistor shall be stored in a room where temperature and humidity must be controlled. (temperature 5 to 35℃, humidity < 60% RH) However, a humidity keep it low, as it is possible.

(3) Chip resistor shall be stored as direct sunshine doesn't hit on it.

(4) Chip resistor shall be stored with no moisture, dust, a material that will make solderability inferior, and a harmful gas (Chloridation hydrogen, sulfurous acid gas, and sulfuration hydrogen)

(5) According to the above three points, the components can be stored for at least one year. After opening the packaging, the components must be processed within seven days.

Care note for operating and handling

(1) Protect the edge and coating of the sensors from mechanical stress.

(2) Avoid bending of printing circuit board (PCB) when cutting and fixing it on support body to reduce mechanical stress on sensors.

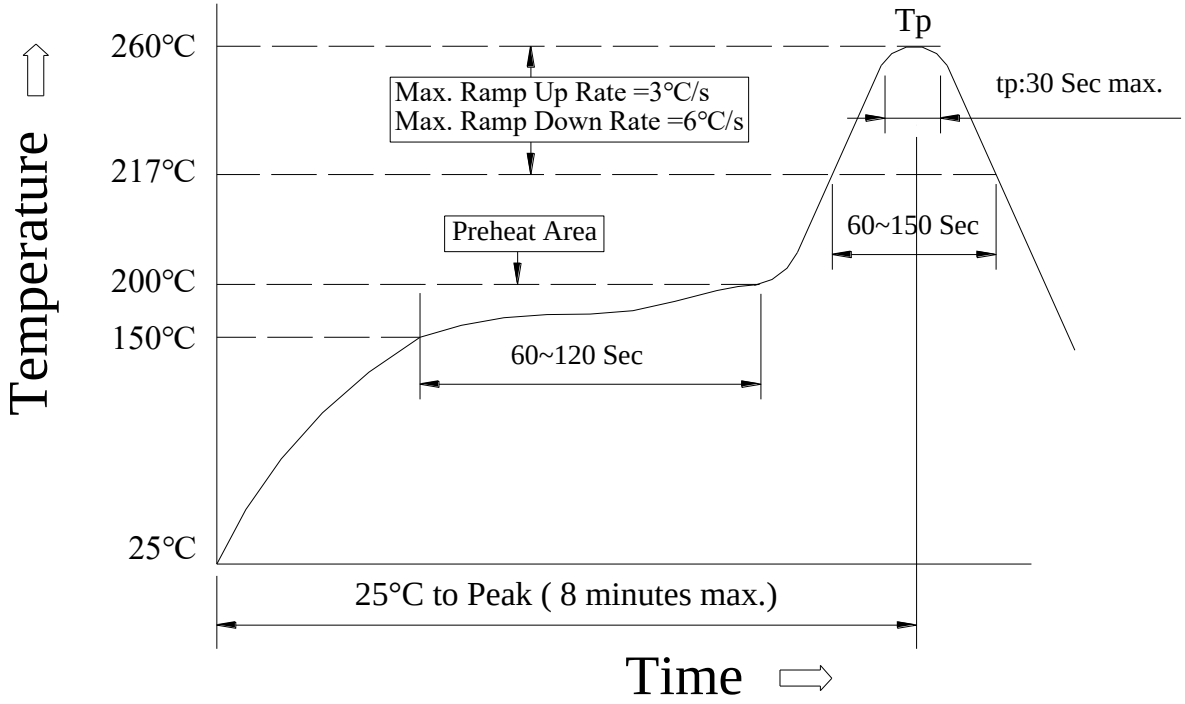
(3) Sensor should be used within the condition of specification.
Note: When a voltage higher than specified value is loaded to the sensor, this may damage the sensor material due to temperature rise.

(4) The loaded voltage should consult terminal temperature of the sensor according to the derating curve.

(5) When applying a high current exceeding suggested specification (pulse current, shock current) to the sensor, it is necessary to re-evaluate the operating condition before using it in the system.

## Reflow profile :

Recommended Reflow Profile




(1) Reflow Soldering Method :

| | | |
|---|---|---|
| Reflow Soldering | Tp:255~260℃ | Max.30 seconds ( tp ) |
| | 217℃ | 60~150 seconds |
| Pre-Heat | 150 ~ 200℃ | 60~120 seconds |
| Time 25℃ to peak temperature | 8 minutes max. | |

Reference : JEDEC J-STD-020D