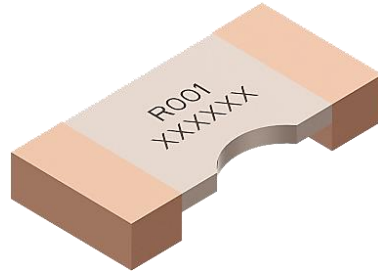


## VSIL2512S5 Series, Current Sensor Resistor (Lead / Halogen Free)

### Features / Applications :

- High power rating is up to 5W
- 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 <sup>1</sup>                     | Feature             |
|--------------------------------------------------|---------------------|
| Power Rating <sup>2</sup>                        | 5 W                 |
| Resistance Value                                 | 0.3 to 2 mΩ         |
| Temperature Coefficient of Resistance (25/125°C) | From 50 ppm/°C      |
| Operation Temperature Range                      | -65°C~ +170°C       |
| Resistance Tolerance                             | ± 1%                |
| Maximum Working Voltage (V)                      | $(P \cdot R)^{1/2}$ |

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°C, the maximum load shall be derated in accordance with the following curve.

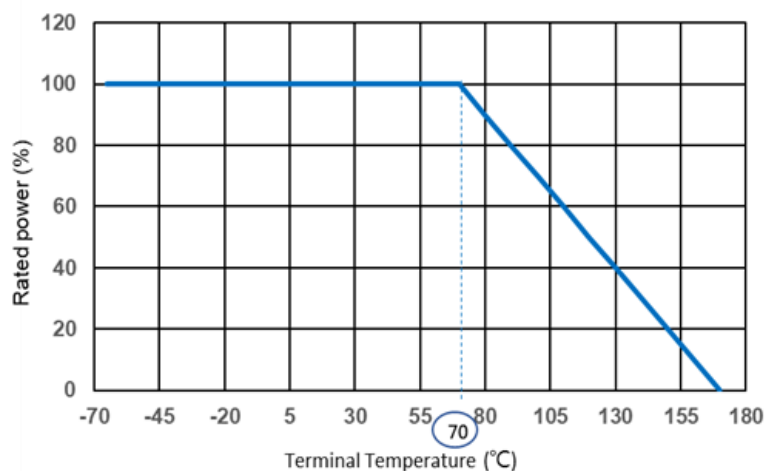
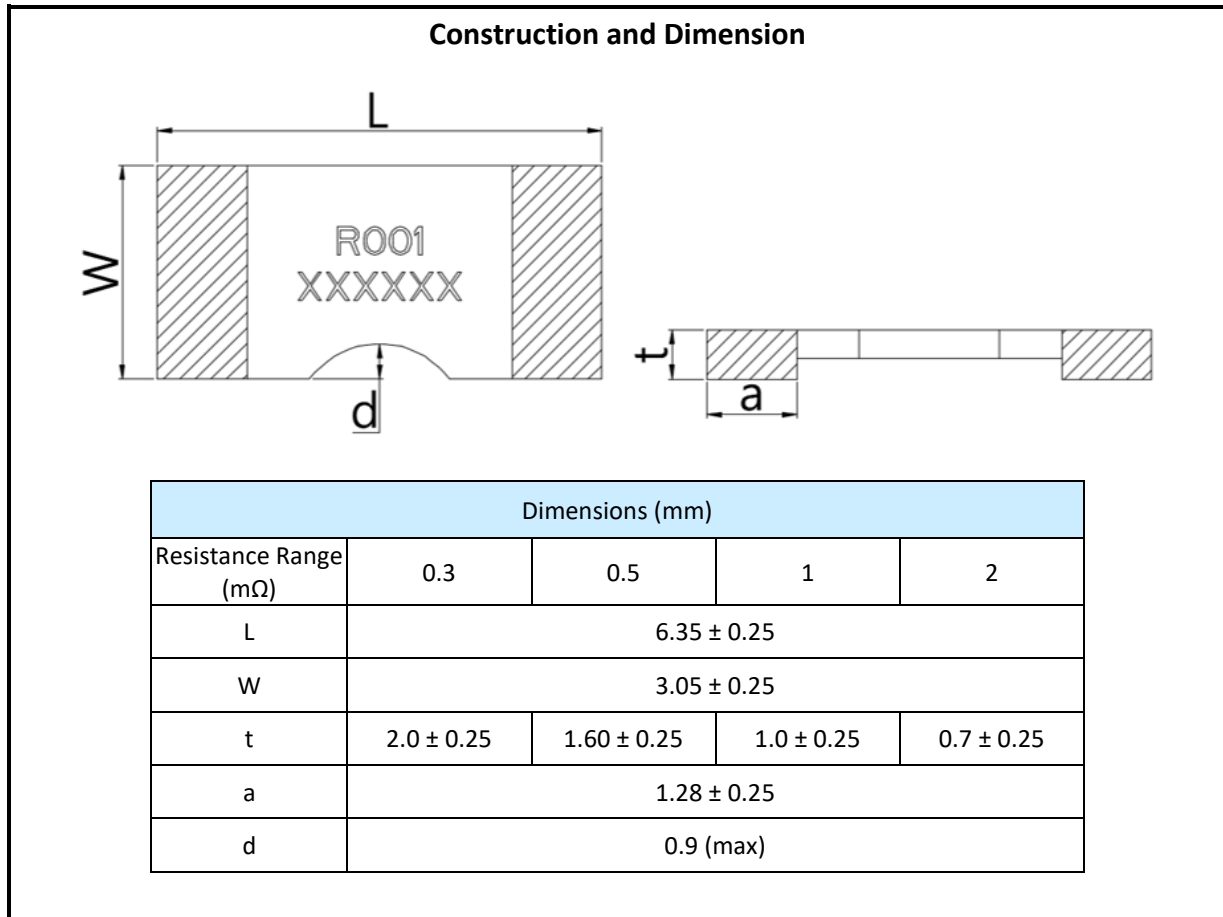
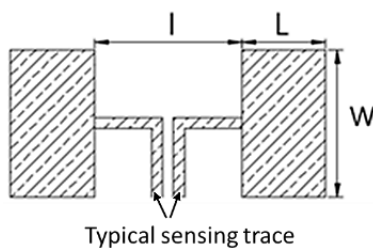


Figure 1. : Power derating curve at terminal temperature

## Outline Drawing :



## Recommended Solder Pad Dimensions



| Resistance Range | Dimensions |        |        |
|------------------|------------|--------|--------|
| mΩ               | W (mm)     | L (mm) | I (mm) |
| 0.3 to 2         | 3.4        | 1.8    | 3.4    |

## Type Designation :

VSIL      2512      S      5      —      □□□□      □  
 (1)          (2)          (3)          (4)                      (5)          (6)

Note :

- (1) Series No.
- (2) Size
- (3) Terminal Type : S = Short terminal
- (4) Power Rating : 5 = 5W
- (5) Resistance value : R001 = 0.001Ω, 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% |
| VSIL2512S5-0M30* | 0.3     | ±150    | 5            | ✓         |    |    |
| VSIL2512S5-0M50* | 0.5     | ±75     | 5            | ✓         |    |    |
| VSIL2512S5-R001* | 1       | ±50     | 5            | ✓         |    |    |
| VSIL2512S5-R002* | 2       | ±50     | 5            | ✓         | ✓  |    |

\* 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°C/ +125°C.                          |
| Short Time Overload           | $\Delta R: \pm 0.5\%$<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                           | $\Delta R: \pm 1\%$<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°C for 5±0.5 seconds.                                           |
| Resistance to Solder Heat | $\Delta R: \pm 0.5\%$<br>Without distinct damage in appearance                                | MIL-STD-202 Method 210<br>260 ± 5°C for 10 ± 1 seconds.                                               |
| Board Flex                | $\Delta R: \pm 1.0\%$<br>Without mechanical damage such as break.                             | AEC-Q200-005<br>Bending value: 2 mm for 60 ± 1 seconds.                                               |
| Vibration                 | $\Delta R: \pm 0.5\%$<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           | $\Delta R: \pm 0.5\%$<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) | $\Delta R: \pm 1.0\%$<br>Without mechanical damage such as break. | AEC-Q200-006<br>Force of 1.8Kg for 60 seconds.                                       |

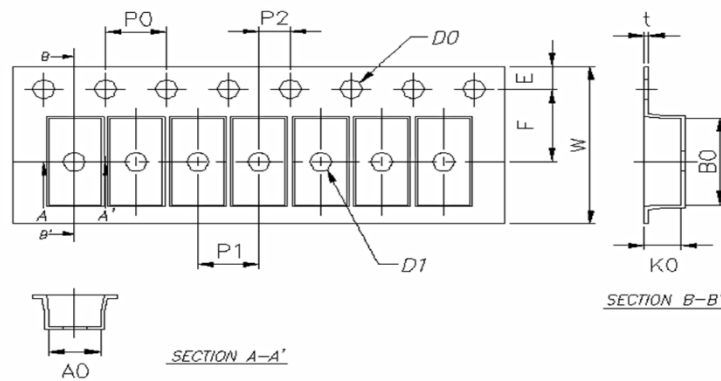
### Endurance

| Item                        | Specification and Requirement                                  | Test Method                                                                                             |
|-----------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Temperature Cycling         | $\Delta R: \pm 0.5\%$<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             | $\Delta R: \pm 0.5\%$<br>Without distinct damage in appearance | MIL-STD-202 Method 103<br>1000 hours, 85°C/85%R.H,<br>applied for 10% rated power.                      |
| Operational Life            | $\Delta R: \pm 1.0\%$<br>Without distinct damage in appearance | MIL-STD-202 Method 108<br>70°C, 100% rated power<br>1.5 hours ON, 0.5 hours Off<br>For total 1000 hours |
| High Temperature<br>Storage | $\Delta R: \pm 1.0\%$<br>Without distinct damage in appearance | MIL-STD-202 Method 108<br>170°C for 1000 hours.                                                         |
| Moisture Resistance         | $\Delta R: \pm 0.5\%$<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 :

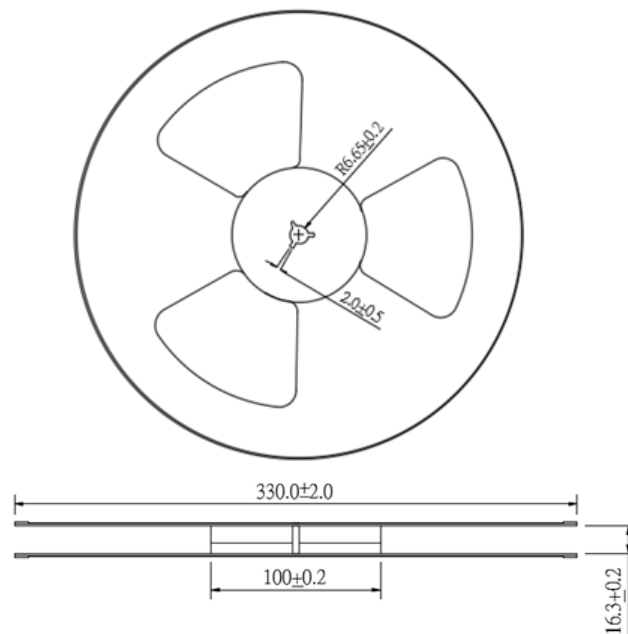
Dimensions :



| Resistance Range<br>(mΩ) | W    | P1   | E    | F    | P2   | D0   | D1   | P0   | A0    | B0   | t     | K0   |
|--------------------------|------|------|------|------|------|------|------|------|-------|------|-------|------|
|                          | ±0.3 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | +0.1 | ±0.1 | ±0.1 | ±0.15 | ±0.2 | ±0.05 | ±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                        |      |      |      |      |      |      |      |      |       | 6.8  |       | 1.35 |
| 2                        |      |      |      |      |      |      |      |      |       | 6.8  |       | 1.2  |

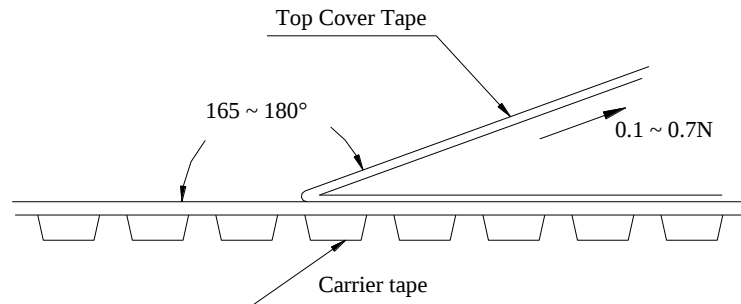
Unit: mm

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 be 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

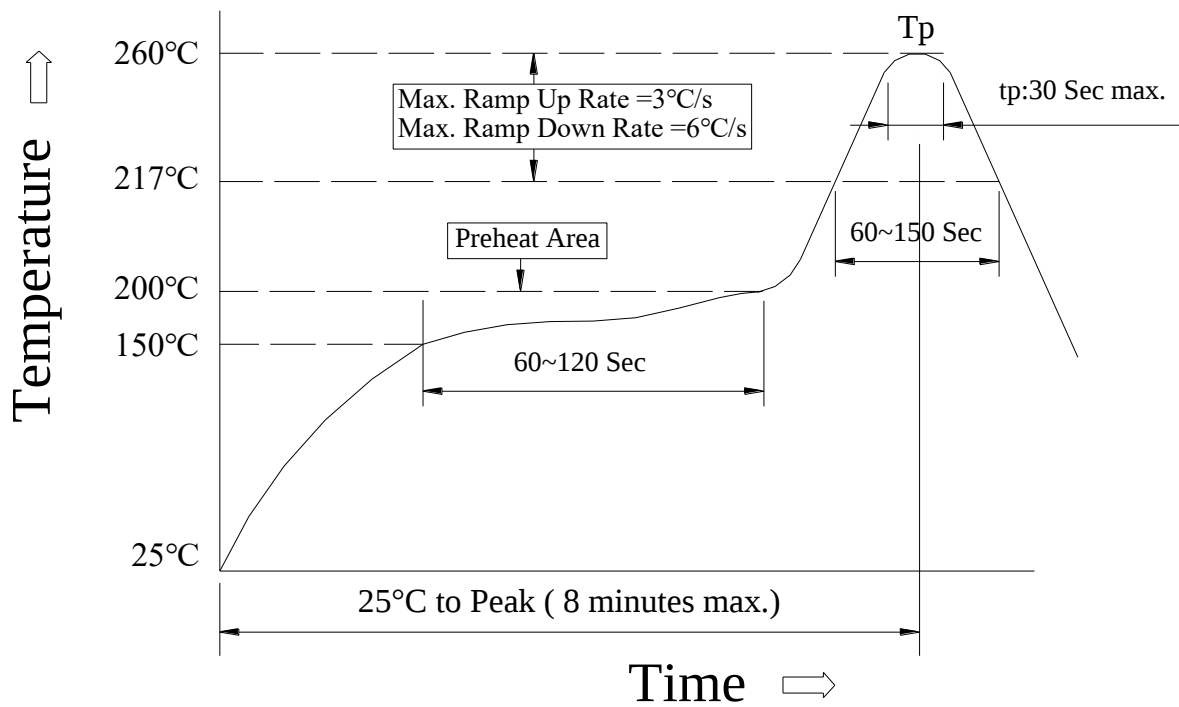
- (1) The chip is characterized to moisture sensitivity component which is defined in level 2 base on J-STD-020C, the storage and SMT condition need to be confirm operation environment.
- (2) Chip resistor shall be stored in a room where temperature and humidity must be controlled. (temperature 5 to 35°C, 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°C   | Max.30 seconds ( tp ) |
|                               | 217°C          | 60~150 seconds        |
| Pre-Heat                      | 150 ~ 200°C    | 60~120 seconds        |
| Time 25°C to peak temperature | 8 minutes max. |                       |

Reference : JEDEC J-STD-020D