# High Power Current sensors

## Metal Foil Current Sensing Resistors

## Features

- Chip size 1225: Resistance value from 0.25mΩ up to 10mΩ
- Chip size 2512: Resistance value from 1mΩ up to 1000mΩ
- Lead free, RoHs compliant for global applications and halogen free
- Excellent long term stability

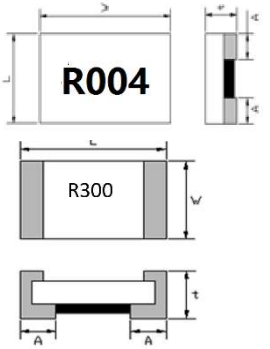
## Application

- Switching Power Supply
- Voltage Regulation Module
- DC-DC Converter, Adaptor, Battery Pack, Charger
- PDA & Cell Phone
- Power management Applications
- Current sensor for power hybrid sources
- High current handling for automotive engine

## 1. High Power Metal Foil-Current Sensing Resistors

This approval sheet applies of high-power metal foil current sensing resistor

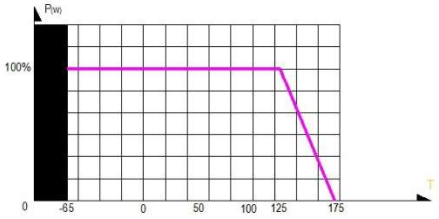
## 2. Dimensions




| Type (inch size) | Dimensions(mm) | | | |
|---|---|---|---|---|
| | L | W | t | A |
| LFS1225 | 3.1±0.15 | 6.3±0.15 | 0.80±0.15 | 0.55±0.15 |

| Type (inch size) | Dimensions(mm) | | | |
|---|---|---|---|---|
| | L | W | t | A |
| LFS 2512 | 6.45±0.20 | 3.25±0.20 | 0.80±0.15 | 0.90±0.20 |

## 3. Derating Curve




## 4. Ordering code

| LFS | 1225 | E | F | H | R004 |
|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) |

(1) Series type: LFS (High Power Metal Foil Current Sensing Resistor)

(2) Chip size: 1225; 2512

(3) Packaging Material: Emboss (E)

(4) Resistance Tolerance: ± 1% (F), ± 2% (G), ± 5% (J)

(5) Power rating: H=3W

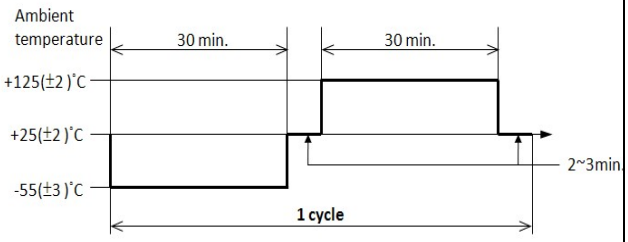
(6) Resistance Code: R004 means 4mΩ,

## 5. Electrical Specification

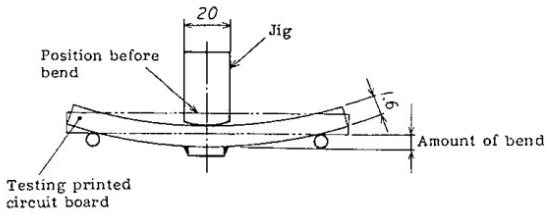
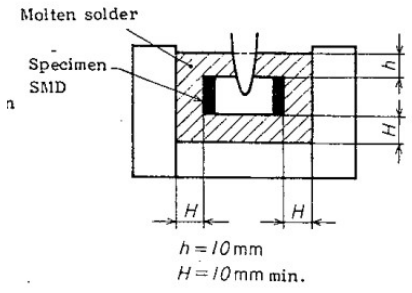
| Item | Power Rating | Resistance Range(mΩ) | Tolerance (%) | TCR (PPM/℃) |
|---|---|---|---|---|
| LFS 1225 | 3W | 0.25 ≤ R ≤ 10 | F(±1.0); J(±5.0); K(±10) | ±50; |
| LFS 2512 | 3W | 1 ≤ R ≤ 1000 | F(±1.0); J(±5.0); K(±10) | ±50; |

Unless otherwise specified, all values are tested at the following condition:
Temperature: 21℃ to 25℃ and Relative humidity: 45% to 75%

## 6. Environmental Characteristics

| No. | Item | Test Condition | Specification |
|---|---|---|---|
| 1 | Temperature Coefficient of Resistance (T.C.R.) | +25°C /+125°C. (JIS-C5202-5.2)<br>$TCR\ (\text{ppm}/℃) = \frac{\Delta R}{R \times \Delta t} \times 10^6$ | Refer to electrical specification. |
| 2 | Damp Heat with Load | The specimens shall be placed in a chamber and subjected to a relative humidity of 90~95% percent and a temperature of 40° ±2°C for the period of 1000 hr with applying rated power 1.5 hours ON and 0.5 hour OFF.<br>(MIL-STD-202, Method 103) | ΔR≤±(1%+0.0005Ω) |
| 3 | High Temperature Exposure | The chip (mounted on board) is exposed in the heat chamber 125±3℃ for 1000 hrs.<br>(JIS-C5202-7.2) | ΔR≤±(1%+0.0005Ω) |
| 4 | Load Life | Apply rated power at 70±2°C for 1000 hours with 1.5 hours ON and 0.5 hour OFF. (JIS-C5202-7.10) | ΔR≤±(1%+0.0005Ω) |
| 5 | Rapid change of temperature | The chip (mounted on board) is exposed, -55±3°C (30min.)/+155±2°C (30min.) for 5 cycles.<br>The following conditions as the following figure.<br>(JIS-C5202-7.4)<br>  | ΔR≤±(1%+0.0005Ω) |

## 7. Function Performance

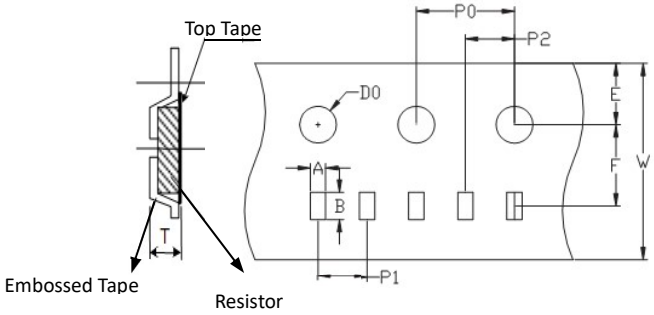
| No. | Item | Test Condition | Specification |
|---|---|---|---|
| 1 | Bending Strength | Mount the chip to test substrate. Apply pressure in direction of arrow unit band width reaches 2mm(+0.2/-0mm) illustrated in the figure below and hold for 10±1 sec. (JIS-C5202-6.1)<br>Unit: mm<br>  | ΔR≤±(1%+0.0005Ω) |
| 2 | Solvent Resistance | The chip is completed immersion of the specimens in the isopropyl alcohol for 3 (+5, -0) min. at 25°C ±5°C.<br>((MIL-STD-202, Method 215) | Verify marking permanency. (Nor required for laser etched parts or parts with no marking) |
| 3 | Resistance to solder Heat | The specimen chip shall be immersed into the flux specified in the solder bath 260±5℃ for 10±1 sec.<br>(MIL-STD-202, Method 210) | ΔR≤±(1%+0.0005Ω) |
| 4 | Solderability | The specimen chip shall be immersed into the flux specified in the solder bath 235±5℃ for 2±0.5 sec. It shall be immersed to a point 10mm from its root. (Sn96.5/Ag3.0/Cu0.5) (JIS-C5 202-6.11)<br>  | Solder shall be covered 95% or more of the electrode area. |

**Remark:**

a. 3.0 W with total solder pad trace size of 300 mm². The surface temperature of component should below 100°C.

## 8. Tape Packaging Specifications

◆Embossed Plastic Tape Specifications



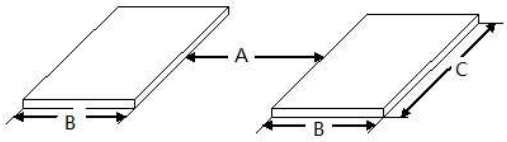

| Type | Carrier Dimensions (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | E | F | W | P0 | P1 | P2 | D0 | T |
| 1225 | 3.5±0.1 | 6.8±0.1 | 1.75±0.1 | 5.5±0.05 | 12.0±0.2 | 4.0±0.05 | 4.0±0.1 | 2.0±0.05 | 1.5±0.1 | 1.0±0.2 |
| Type | Carrier Dimensions (mm) | | | | | | | | | |
| | A | B | E | F | W | P0 | P1 | P2 | D0 | T |
| 2512 | 3.5±0.1 | 6.8±0.1 | 1.75±0.1 | 5.5±0.05 | 12.0±0.2 | 4.0±0.05 | 4.0±0.1 | 2.0±0.05 | 1.5±0.1 | 1.0±0.2 |

## 9. Minimum packaging quantity

| Size EIA (EIAJ) | 1225,2512 |
|---|---|
| Standard Packing Quantity (pcs /reel) | 4,000 |

## 10. Storage Conditions

Temperature：5~35℃, Humidity：40~75%




## 11. Recommended Soldering Pad Layout

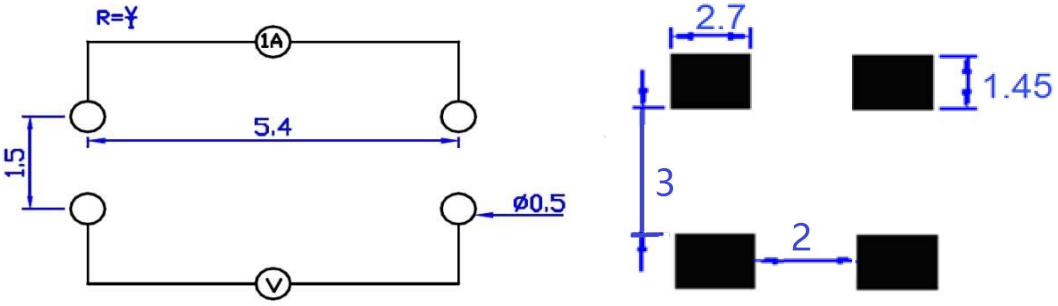
| Type | Pad Layout Dimension (mm) | | |
|---|---|---|---|
| | A | B | C |
| 1225 | 1.20 | 2.00 | 7.00 |
| 2512 | 3.80 | 2.10 | 3.40 |

## 12. Measurements:

### 12.1 Excitation current should be 3A for resistance lower than 5mΩ

### 12.2 Excitation current should be 1A for resistance higher than 5mΩ

### 12.3 4-wire precision measurement layout and 4 wire pads layout




## 13. Soldering Recommendations

- Peak reflow temperatures and durations：
  - IR Reflow Peak = 260℃ max for 10 sec
  - Wave Solder = 260℃ max for 10 sec
- Compatible with lead and lead-free solder reflow processes
- Recommended IR Reflow Profile：