4-terminal high precision current sensor specification

1. Scope
   This specification applies to the following 4-terminals high precision current sensor for use in electronic equipments.

2. Part number
   \[ \text{RL3264SW4 - } \text{***M - F - T*} \]
   
   Explanation of Resistance Value
   Eg.) 2 \( \text{m}\Omega \rightarrow 002M \)

   ① Type
   ② Nominal resistance
   ③ Resistance tolerance
   ④ Packaging form \( \text{(T1 = 1,000pcs/reel , T5 = 5,000pcs/reel)} \)

3. Structure
   Metallized Ni-alloy resistor and electrode on ceramic substrate, covered with heat resistive epoxy resin.

4. Dimensions

![Diagram of dimensions]

   (1) Substrate
   (2) Resistor
   (3) Terminals
   (4) Protection film
   (5) Marking
   
   Alumina 96%
   Ni-alloy
   Sn-Pb or Sn(on Cu)
   Sn is free from lead.
   Heat resistive epoxy resin
   Epoxy resin

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Dimensions(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>6.4±0.2</td>
</tr>
<tr>
<td>W</td>
<td>3.2±0.2</td>
</tr>
<tr>
<td>t</td>
<td>0.5±0.2</td>
</tr>
<tr>
<td>a</td>
<td>2.7±0.2</td>
</tr>
<tr>
<td>b</td>
<td>0.4±0.2</td>
</tr>
</tbody>
</table>

Marking

   Top: Resistance value \( \text{Eg.) 2 \text{m}\Omega \rightarrow 002M} \)
   Bottom: An alphabet that indicates manufacturing month, and quadrilaterals beside its both sides shall be marked.

   Manufacturing month code reference is the annexed document 1 table 5 of JIS C 5201 - 1:1998
6. Schematic diagram

There is no difference between voltage-terminal and current terminal. But it is possibly causing to deteriorate its characteristics when you connect line across. You can't connect lines across each other.

Resistance value of this product is called resistance value for current sensing and shows resistance value of sign R in the upper diagram. Resistance value between terminals shows resistance value added at terminal resistance.

7. Specification

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance value for current sensing</td>
<td>1 mΩ～10 mΩ 1mΩ step</td>
</tr>
<tr>
<td>Resistance tolerance</td>
<td>±0.5% (D)</td>
</tr>
<tr>
<td></td>
<td>±1.0% (F)</td>
</tr>
<tr>
<td>Terminal resistance</td>
<td>500 μΩ under</td>
</tr>
<tr>
<td>Temperature coefficient of resistance</td>
<td>1 mΩ ±300 ppm/°C</td>
</tr>
<tr>
<td></td>
<td>2～4 mΩ ±200 ppm/°C</td>
</tr>
<tr>
<td></td>
<td>5～10 mΩ ±100 ppm/°C</td>
</tr>
<tr>
<td>Rated load</td>
<td>2 W (Derating curve…Figure-1)</td>
</tr>
<tr>
<td>Maximum over current</td>
<td>$I = \sqrt{\frac{150}{R}}$ [A] (10m sec. max.)</td>
</tr>
<tr>
<td></td>
<td>Resistance value (Ω)</td>
</tr>
<tr>
<td></td>
<td>Maximum current 200A</td>
</tr>
<tr>
<td></td>
<td>Interval 60 sec min.</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-40～+125°C</td>
</tr>
<tr>
<td>Rated ambient temperature</td>
<td>+70°C</td>
</tr>
</tbody>
</table>

Figure - 1 Derating curve
8. Reliability testing

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short time over load</td>
<td>Voltage of 1.5 times the rated voltage shall be applied for 5sec.</td>
<td>±(0.5% +0.0005Ω)</td>
</tr>
<tr>
<td>Load life</td>
<td>Rated voltage for 90min. followed by a pause of 30min. at a temperature of 70±3°C. Cycles shall be repeated for 1000hrs.</td>
<td>±(0.5% +0.0005Ω)</td>
</tr>
<tr>
<td>Moisture load life</td>
<td>Rated voltage for 90min. followed by a pause of 30min. at a temperature of 60±2°C with relative humidity of 90%. Cycles shall be repeated for 1000hrs</td>
<td>±(0.5% +0.0005Ω)</td>
</tr>
<tr>
<td>Temperature cycle</td>
<td>[-40°C 30min → R.T. 3min → +125°C 30min → R.T. 3min.] 5 continuous cycles.</td>
<td>±(0.5% +0.0005Ω)</td>
</tr>
<tr>
<td>Soldering heating</td>
<td>Dipped into solder for 10±1sec. at 260±5°C</td>
<td>±(0.5% +0.0005Ω)</td>
</tr>
<tr>
<td>Substrate bending</td>
<td>Between fulcrums: 90mm, Bend width: 2mm, Glass-epoxy board: t=1.6mm</td>
<td>±(0.5% +0.0005Ω)</td>
</tr>
<tr>
<td>Solderability</td>
<td>Dipped into solder for 3±0.5sec. at 235±5°C or 245±5°C (lead free)</td>
<td>A new solder shall cover min of 90%</td>
</tr>
</tbody>
</table>

9. Packaging

Packing quantity, 1,000 or 5,000 pieces/reel

- Taping form: Figure-2
- Peeling strength of seal tape: Figure-3
- Reel form: Figure-4
- Taping direction: Figure-5

Marking: The following items shall be printed on the reel label. (Figure-6)

- Part number
- Quantity for each reel
- Manufacturing month code
- Manufacturer
- Inspection number (Lot number)
- The country of origin
- Double dashed line.
- No mark when finish of terminals is solder.
Figure-2 Plastic tape·Taping form

Figure-3 Peeling strength of seal tape
\[ F = \text{Peeling strength: } 0.1 - 0.7 \text{N (10 - 71gf)} \]

Figure-4 Reel form

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0</td>
<td>3.43 ± 0.2</td>
</tr>
<tr>
<td>B0</td>
<td>6.63 ± 0.2</td>
</tr>
<tr>
<td>W</td>
<td>12.0 ± 0.3</td>
</tr>
<tr>
<td>F</td>
<td>5.5 ± 0.05</td>
</tr>
<tr>
<td>E</td>
<td>1.75 ± 0.1</td>
</tr>
<tr>
<td>P0</td>
<td>4.0 ± 0.1</td>
</tr>
<tr>
<td>P1</td>
<td>4.0 ± 0.1</td>
</tr>
<tr>
<td>P2</td>
<td>2.0 ± 0.05</td>
</tr>
<tr>
<td>D0</td>
<td>1.5 ± 0.1/-0</td>
</tr>
<tr>
<td>D1</td>
<td>1.5 ± 0.2/-0</td>
</tr>
<tr>
<td>T</td>
<td>0.3 max</td>
</tr>
<tr>
<td>T2</td>
<td>1.5 max</td>
</tr>
</tbody>
</table>

End portion more than 200mm  Portion filled with parts  Lead portion more than 500mm

Pulling direction

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \phi_A )</td>
<td>180±0/-3</td>
</tr>
<tr>
<td>( \phi_H )</td>
<td>13.0±0.2</td>
</tr>
<tr>
<td>E</td>
<td>2.0±0.5</td>
</tr>
<tr>
<td>( \phi_N )</td>
<td>60±0/-0</td>
</tr>
<tr>
<td>W1</td>
<td>13.0±0.3</td>
</tr>
<tr>
<td>W2</td>
<td>17.0±1.4</td>
</tr>
</tbody>
</table>

(unit:mm)
Material: Plastic

Title: RL3264SW4
Description: 4-terminal high precision current sensor
Document #: RL00-1126
Page: 4/6
Figure-5  Taping direction

Figure-6  Reel label

<table>
<thead>
<tr>
<th>Part number</th>
<th>Quantity for each reel</th>
</tr>
</thead>
<tbody>
<tr>
<td>RL3264SW4</td>
<td><strong>M - F</strong></td>
</tr>
<tr>
<td>Q.T.Y.</td>
<td>5,000 [P.C.S.]</td>
</tr>
<tr>
<td>INSPECTED</td>
<td>Q</td>
</tr>
<tr>
<td>Y.D.S.Co., LTD.</td>
<td></td>
</tr>
<tr>
<td>430101</td>
<td></td>
</tr>
<tr>
<td>MADE IN JAPAN</td>
<td></td>
</tr>
</tbody>
</table>

- Manufacturer
- Inspection number (Lot number)
- The country of origin
- Double dashed line shows lead free
- No mark when finish of terminals is solder
<table>
<thead>
<tr>
<th>Rev.</th>
<th>Date of enactment</th>
<th>Author</th>
<th>Check</th>
<th>Approval</th>
<th>Revision content</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Apr. 7.2006</td>
<td>K.Inomata</td>
<td>K.Nagano</td>
<td>A.Nakajima</td>
<td>First edition</td>
</tr>
</tbody>
</table>