

# SMD POWER INDUCTORS (PRELIMINARY)

## SPI3012 SERIES

### 1. PART NO. EXPRESSION :

SPI3012-1R0NZF-□□  
 (a) (b) (c) (d)(e)(f) (g)

(a) Series code

(b) Dimension code

(c) Inductance code : 1R0 = 1.0uH

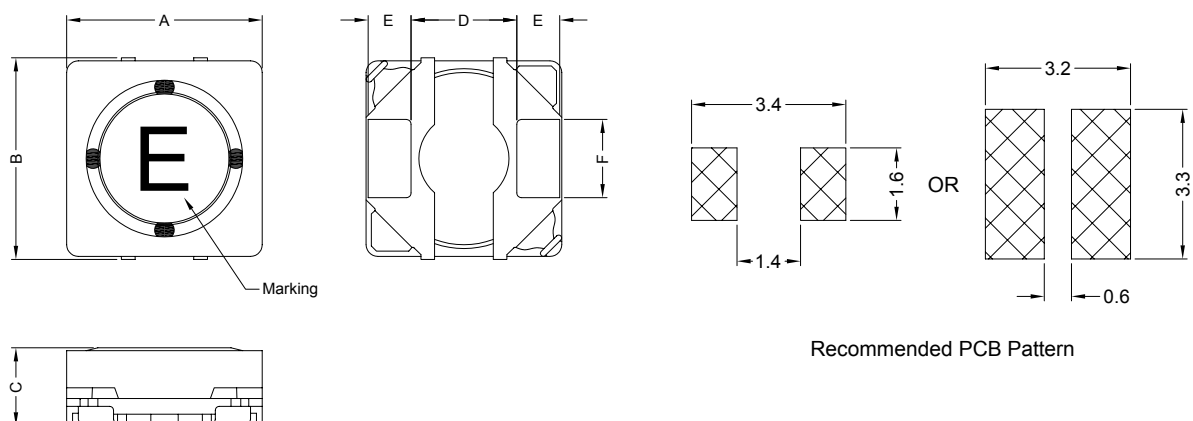
(d) Tolerance code : M =  $\pm 20\%$ , N =  $\pm 30\%$

(e) Z : Standard part

(f) F : RoHS Compliant

(g) 11 ~ 99 : Internal controlled number

### 2. CONFIGURATION & DIMENSIONS :



Recommended PCB Pattern

Unit:m/m

| A             | B             | C        | D       | E        | F       | G       |
|---------------|---------------|----------|---------|----------|---------|---------|
| 3.0 $\pm$ 0.2 | 3.0 $\pm$ 0.3 | 1.2 Max. | 1.5 Typ | 0.76 Typ | 1.2 Typ | 0.7 Typ |

### 3. MATERIALS :

(a) Core : Ferrite

(b) Wire : Polyurethane Enamelled Copper Wire

(c) Terminal Clip : C5191

(d) Adhesive : Epoxy

(e) Ink : 70000-00101



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**4. GENERAL SPECIFICATION :**

- a) IDC1 : Based on inductance change ( $\Delta L/L_0: \leq 30\%$ ) @ ambient temp. 25°C
- b) IDC2 : Based on temperature rise ( $\Delta T: 40^\circ\text{C Typ.}$ )
- c) Rated Current : IDC1 or IDC2, whichever value is lower
- d) Storage temp. : -40°C to +105°C
- e) Operating temp. : -40°C to +105°C ( include self temp. rise )
- f) Resistance to solder heat : 260°C 10secs

**5. ELECTRICAL CHARACTERISTICS :**

| Part No.          | Inductance<br>( $\mu\text{H}$ ) | Test<br>Frequency<br>( Hz ) | RDC<br>( $\text{m}\Omega$ )<br>$\pm 20\%$ | IDC1<br>( A ) | IDC2<br>( A ) | Marking |
|-------------------|---------------------------------|-----------------------------|-------------------------------------------|---------------|---------------|---------|
| SPI3012-1R0NZF-□□ | 1.0 $\pm 30\%$                  | 0.1V/100K                   | 55                                        | 1.50          | 1.80          | A       |
| SPI3012-1R2NZF-□□ | 1.2 $\pm 30\%$                  | 0.1V/100K                   | 63                                        | 1.40          | 1.65          | B       |
| SPI3012-1R5NZF-□□ | 1.5 $\pm 30\%$                  | 0.1V/100K                   | 75                                        | 1.30          | 1.50          | C       |
| SPI3012-2R2NZF-□□ | 2.2 $\pm 30\%$                  | 0.1V/100K                   | 110                                       | 1.00          | 1.30          | E       |
| SPI3012-3R3NZF-□□ | 3.3 $\pm 30\%$                  | 0.1V/100K                   | 150                                       | 0.87          | 1.10          | G       |
| SPI3012-3R9NZF-□□ | 3.9 $\pm 30\%$                  | 0.1V/100K                   | 180                                       | 0.82          | 1.00          | H       |
| SPI3012-4R7MZF-□□ | 4.7 $\pm 20\%$                  | 0.1V/100K                   | 210                                       | 0.75          | 0.90          | I       |
| SPI3012-5R6MZF-□□ | 5.6 $\pm 20\%$                  | 0.1V/100K                   | 270                                       | 0.65          | 0.80          | J       |
| SPI3012-6R8MZF-□□ | 6.8 $\pm 20\%$                  | 0.1V/100K                   | 330                                       | 0.60          | 0.70          | K       |
| SPI3012-8R2MZF-□□ | 8.2 $\pm 30\%$                  | 0.1V/100K                   | 380                                       | 0.55          | 0.65          | L       |
| SPI3012-100MZF-□□ | 10 $\pm 20\%$                   | 0.1V/100K                   | 410                                       | 0.50          | 0.60          | M       |
| SPI3012-120MZF-□□ | 12 $\pm 20\%$                   | 0.1V/100K                   | 550                                       | 0.45          | 0.55          | N       |
| SPI3012-150MZF-□□ | 15 $\pm 20\%$                   | 0.1V/100K                   | 680                                       | 0.40          | 0.45          | O       |
| SPI3012-220MZF-□□ | 22 $\pm 20\%$                   | 0.1V/100K                   | 950                                       | 0.35          | 0.35          | Q       |



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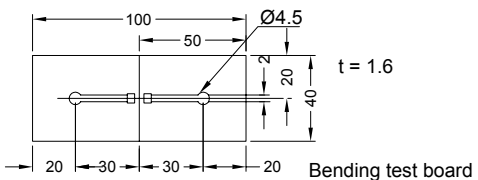
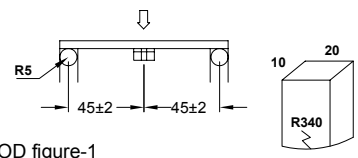
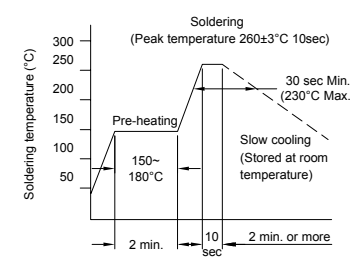
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## 6. RELIABILITY & TEST CONDITION :

| ITEM                                            | PERFORMANCE                                                                                   | TEST CONDITION                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mechanical                                      |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Substrate bending                               | $\Delta L/L_0 \leq \pm 10\%$<br><br>There shall be no mechanical damage or electrical damage. | <p>The sample shall be soldered onto the printed circuit board in figure 1 and a load applied until the figure in the arrow direction is made approximately 3mm.(keep time 30 secs)</p>  <p>Bending test board</p>  <p>PRESSURE ROD figure-1</p>                                                          |
| Vibration                                       | $\Delta L/L_0 \leq \pm 10\%$<br><br>There shall be no mechanical damage.                      | <p>The sample shall be soldered onto the printed circuit board and when a vibration having an amplitude of 1.52mm and a frequency of from 10 to 55Hz/1 minute repeated should be applied to the 3 directions (X,Y,Z) for 2 hours each. (A total of 6 hours)</p>                                                                                                                                                                                                                |
| Solderability                                   | New solder<br>More than 90%                                                                   | <p>Flux (rosin, isopropyl alcohol{JIS-K-1522}) shall be coated over the whole of the sample before hard, the sample shall then be preheated for about 2 minutes in a temperature of 130~150°C and after it has been immersed to a depth 0.5mm below for 3±0.2 seconds fully in molten solder M705 with a temperature of 245±5°C.</p> <p>More than 90% of the electrode sections shall be covered with new solder smoothly when the sample is taken out of the solder bath.</p> |
| Resistance to Soldering heat (reflow soldering) | There shall be no damage or problems.                                                         |  <p>The specimen shall be passed through the reflow oven with the condition shown in the above profile for 1 time.<br/>The specimen shall be stored at standard atmospheric conditions for 1 hour, after which the measurement shall be made.</p>                                                                                                                                          |



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## 6. RELIABILITY &amp; TEST CONDITION :

| ITEM                            | PERFORMANCE                                                                   | TEST CONDITION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
|---------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------|----------|---|---------------------------------------------------|---------|---|-------------------------|-------------------------------------------|---|--------------------------------------------------|---------|---|-------------------------|-------------------------------------------|
| Electrical Characteristics Test |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| Dielectric withstand voltage    | There shall be no damage or problems.                                         | AC 100V voltage shall be applied for 1 minute across the top surface and the terminal of this sample                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| Temperature characteristics     | $\Delta L/L_{20^\circ\text{C}} \leq \pm 10\%$<br>0~2000 ppm/ $^\circ\text{C}$ | The test shall be performed after the sample has stabilized in an ambient temperature of -20 to +85 $^\circ\text{C}$ , and the value calculated based on the value applicable in a normal temperature and normal humidity shall be $\Delta L/L_{20^\circ\text{C}} \leq \pm 10\%$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| High temperature storage        | $\Delta L/L_0 \leq \pm 10\%$<br>There shall be no mechanical damage.          | The sample shall be left for 96 $\pm$ 4 hours in an atmosphere with a temperature of 85 $\pm$ 2 $^\circ\text{C}$ and a normal humidity. Upon completion of the measurement shall be made after the sample has been left in a normal temperature and normal humidity for 1 hour.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| Low temperature storage         | $\Delta L/L_0 \leq \pm 10\%$<br>There shall be no mechanical damage.          | The sample shall be left for 96 $\pm$ 4 hours in an atmosphere with a temperature of -25 $\pm$ 3 $^\circ\text{C}$ . Upon completion of the test, the measurement shall be made after the sample has been left in a normal temperature and normal humidity for 1 hour.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| Change of temperature           | $\Delta L/L_0 \leq \pm 10\%$<br>There shall be no other damage of problems    | The sample shall be subject to 5 continuous cycles, such as shown in the table 2 below and then it shall be subjected to standard atmospheric conditions for 1 hour, after which measurement shall be made. <table border="1"> <thead> <tr> <th></th><th>Temperature</th><th>Duration</th></tr> </thead> <tbody> <tr> <td>1</td><td>-25<math>\pm</math>3<math>^\circ\text{C}</math><br/>(Thermostat No.1)</td><td>30 min.</td></tr> <tr> <td>2</td><td>Standard<br/>atmospheric</td><td>5 sec. or less<br/>No.1<math>\rightarrow</math>No.2</td></tr> <tr> <td>3</td><td>85<math>\pm</math>2<math>^\circ\text{C}</math><br/>(Thermostat No.2)</td><td>30 min.</td></tr> <tr> <td>4</td><td>Standard<br/>atmospheric</td><td>5 sec. or less<br/>No.2<math>\rightarrow</math>No.1</td></tr> </tbody> </table> |  | Temperature | Duration | 1 | -25 $\pm$ 3 $^\circ\text{C}$<br>(Thermostat No.1) | 30 min. | 2 | Standard<br>atmospheric | 5 sec. or less<br>No.1 $\rightarrow$ No.2 | 3 | 85 $\pm$ 2 $^\circ\text{C}$<br>(Thermostat No.2) | 30 min. | 4 | Standard<br>atmospheric | 5 sec. or less<br>No.2 $\rightarrow$ No.1 |
|                                 | Temperature                                                                   | Duration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| 1                               | -25 $\pm$ 3 $^\circ\text{C}$<br>(Thermostat No.1)                             | 30 min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| 2                               | Standard<br>atmospheric                                                       | 5 sec. or less<br>No.1 $\rightarrow$ No.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| 3                               | 85 $\pm$ 2 $^\circ\text{C}$<br>(Thermostat No.2)                              | 30 min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| 4                               | Standard<br>atmospheric                                                       | 5 sec. or less<br>No.2 $\rightarrow$ No.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |
| Moisture storage                | $\Delta L/L_0 \leq \pm 10\%$<br>There shall be no mechanical damage.          | The sample shall be left for 96 $\pm$ 4 hours in a temperature of 40 $\pm$ 2 $^\circ\text{C}$ and a humidity(RH) of 90~95%. Upon completion of the test, the measurement shall be made after the sample has been left in a normal temperature and normal humidity more than 1 hour.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |             |          |   |                                                   |         |   |                         |                                           |   |                                                  |         |   |                         |                                           |



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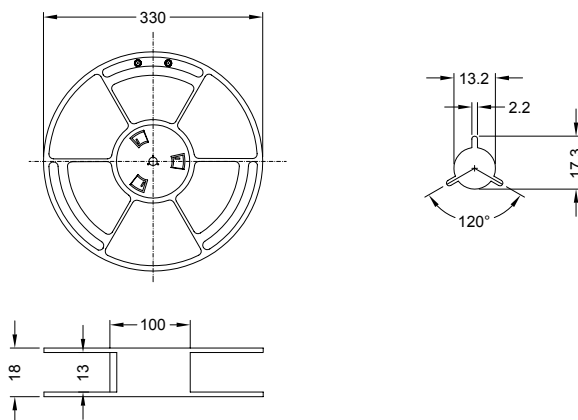
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# SPI3012 SERIES

### 7-1. Reel Dimension (mm)



Technical drawing of a plate with 10 holes and 5 stiffeners. The drawing shows a side view of the plate with dimensions: total length 4.00, hole spacing 2.00 ± 0.05, hole diameter  $\varnothing 1.5 + 0.1/-0.0$ , stiffener spacing A, stiffener width 1.5, stiffener height 5.60, and total stiffener height 1.75. A detail view of a stiffener is shown on the left with dimensions T and K0.

| Ao    | Bo    | Ko     | W    | P     | T     |
|-------|-------|--------|------|-------|-------|
| 3.5mm | 3.2mm | 1.55mm | 12mm | 8.0mm | 0.3mm |

The diagram illustrates a conveyor belt layout with the following details:

- Direction of Feed:** Indicated by an arrow pointing from right to left, labeled "user direction of feed".
- Layout Sections:**
  - Leader:** The section on the left, labeled "Leader no component 200mm min.", containing three empty rectangular boxes.
  - Components:** The central section, labeled "Components", containing four square boxes. Each box contains a circular symbol with a stylized 'M' inside. The distance between the centers of these boxes is marked as 8mm.
  - Trailer:** The section on the right, labeled "Trailer no component 400mm min.", containing three empty rectangular boxes.
- Dimensions and Markings:**
  - A dimension of 4 mm is shown between the center of a component box and the center of a hole in the top row of the trailer section.
  - Wavy lines indicate transitions or breaks in the conveyor belt layout.
  - The top edge of the layout is marked with a series of small circles, likely representing holes or sensors.

The products are packaged so that no damage will be sustained.



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