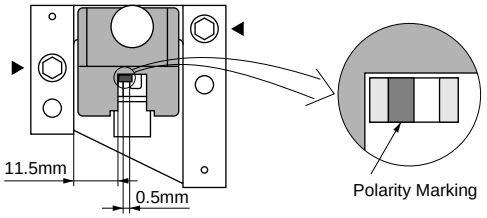
■ Test and Measurement Conditions

<Unless otherwise specified>
Temperature: Ordinary Temp. 15 to 35°C
Humidity: Ordinary Humidity 25 to 85% (RH)

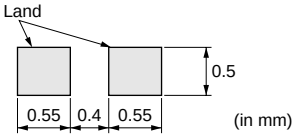
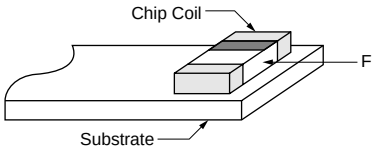
<In case of doubt>
Temperature: 20°C±2°C
Humidity: 60 to 70% (RH)
Atmospheric pressure: 86 to 106kPa

■ Specifications

1. Electrical Performance

No.	Item	Specifications	Test Methods
1	Inductance	Inductance shall meet rating above.	Measuring Equipment: YHP4291A or equivalent Measuring Frequency: 100MHz Measuring Condition: Test signal level/about 7dBm Electricallength/0.94cm Weight/about 1 to 5N Measuring Fixture: HP16193A Positions coil under test as shown in below and contact coil with each terminal by adding weight. Polarity marking should be a topside, and polarity marking should be in the direction of the fixture for position of chip coil.  Measuring Method: See last page [Electrical Performance: Measuring Method of Inductance/Q]
2	Q	Q shall meet rating above.	
3	DC Resistance	DC Resistance shall meet rating above.	Measuring Equipment: Digital multi meter
4	Self Resonant Frequency (S.R.F)	S.R.F shall meet rating above.	Measuring Equipment: HP8753C or equivalent
5	Allowable DC Current	Self-temperature rise shall be limited to 25°C max.	The allowable current is applied.

2. Mechanical Performance

No.	Item	Specifications	Test Methods
1	Solderability	The wetting area of the electrode shall be at least 90% covered with new solder coating.	Flux: Ethanol solution of rosin 25wt% (Immersed for 5 to 10s) Pre-Heating: 150±10°C/60 to 90s Solder: Sn-3.0Ag-0.5Cu Solder Temperature: 240±5°C Immersion Time: 3±1s
2	Resistance to Soldering Heat	Appearance: No damage Inductance Change: Within ±10%	Flux: Ethanol solution of rosin 25wt% (Immersed for 5 to 10s) Pre-Heating: 150±10°C/1 to 2 minutes Solder: Sn-3.0Ag-0.5Cu Solder Temperature: 270±5°C Immersion Time: 10±1s Then measured after exposure in the room condition for 24±2 hrs.
3	Bonding Strength	Chip coil shall not be damaged after tested as test methods.	Substrate: Glass-epoxy substrate  Force: 5N Hold Duration: 5±1s Applied Direction: Parallel to Substrate 

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Specifications and Test Methods

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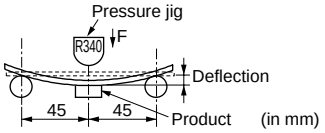
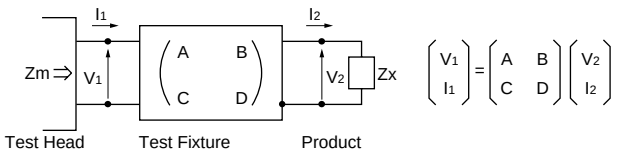
No.	Item	Specifications	Test Methods
4	Bending Strength	Chip coil shall not be damaged after tested as test methods.	Substrate: Glass-epoxy substrate (100x40x0.8mm) Speed of Applying Force: 1mm/s Deflection: 2mm Hold Duration: 30s 
5	Vibration	Appearance: No damage Inductance Change: Within ±10%	It should be soldered on the substrate. Oscillation Frequency: 10 to 2000 to 10Hz for 1min. Total Amplitude: 1.5mm or Acceleration amplitude 49m/s^2 whichever is smaller. Testing Time: A period of 2 hours in each of 3 mutually perpendicular directions. (Total 6 hrs.)

3. Environmental Performance (It should be soldered on the substrate.)

No.	Item	Specifications	Test Methods
1	Humidity	Appearance: No damage Inductance Change: Within ±10%	Temperature: 40±2°C Humidity: 90 to 95% (RH) Time: 1000$\pm^{48}_{0}$hrs. Then measure values after exposure in the room condition for 24±2 hrs.
2	Biased Humidity		Temperature: 40±2°C Humidity: 90 to 95% (RH) Test Current: Rated Current Time: 1000$\pm^{48}_{0}$hrs. Then measure values after exposure in the room condition for 24±2 hrs.
3	Heat Life		Temperature: 125±2°C Test Current: Rated Current Time: 1000$\pm^{48}_{0}$hrs. Then measure values after exposure in the room condition for 24±2 hrs.
4	Temperature Cycle		1 Cycle: 1 step: -55$\pm^{0}_{3}$°C/30±3 minutes 2 step: Room Temperature/2 to 3 minutes 3 step: +125$\pm^{3}_{0}$°C/30±3 minutes 4 step: Room Temperature/2 to 3 minutes Total of 1000 cycles Then measure values after exposure in the room condition for 24±2 hrs.

■ Electrical Performance: Measuring Method of Inductance/Q

1. Residual elements and stray elements of test fixture can be described by F-parameter shown in following.



$$\begin{pmatrix} V_1 \\ I_1 \end{pmatrix} = \begin{pmatrix} A & B \\ C & D \end{pmatrix} \begin{pmatrix} V_2 \\ I_2 \end{pmatrix}$$

2. The impedance of chip coil Zx and measured value Zm can be described by input/output current/voltage.

$$Zm = \frac{V_1}{I_1} \quad , \quad Zx = \frac{V_2}{I_2}$$

3. Thus, the relation between Zx and Zm is following;

$$Zx = \alpha \frac{Zm - \beta}{1 - Zm\Gamma}$$

where, $\alpha = D / A = 1$
$\beta = B / D = Zsm - (1 - Yom\ Zsm)\ Zss$
$\Gamma = C / A = Yom$

(Zsm: measured impedance of short chip
Zss: residual impedance of short chip (0nH)
Yom: measured admittance when opening the fixture)

4. Lx and Qx shall be calculated with the following equation.

$$Lx = \frac{Im\,(Zx)}{2\pi f} \quad , \quad Qx = \frac{Im\,(Zx)}{Re\,(Zx)}$$

Lx: Inductance of chip coil
Qx: Q of chip coil
f: Measuring frequency