

**Wire-wound Ferrite Bead Inductors for Power Lines LSMC/LSMG series
for General Electronic Equipment for Consumer**
**Wire-wound Ferrite Bead Inductors for Power Lines LLMC/LLMG series
for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)**

■ RELIABILITY DATA

1. Operating Temperature Range

Specified Value : $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$ (Including self-generated heat)

2. Storage Temperature Range

Specified Value : $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

Test Methods and Remarks : *Note: -5 to $+40^{\circ}\text{C}$ in taped packaging

3. Impedance

Specified Value : Within the specified range

Test Methods and Remarks : Measuring equipment : Impedance analyzer (HP4291A) or its equivalent
Measuring frequency : 100 ± 1 MHz

4. DC Resistance

Specified Value : Within the specified range

Test Methods and Remarks : Four-terminal method
Measuring equipment : Milliohm High-Tester 3226 (Hioki Denki) or its equivalent

5. Rated Current

Specified Value : Within the specified range

6. Vibration

Specified Value : Appearance : No significant abnormality
Impedance change : Within $\pm 30\%$ of the initial value

Test Methods and Remarks : The test samples shall be soldered to the test board by the reflow.
Then it shall be submitted to below test conditions.

Frequency	10~55Hz	
Overall Amplitude	1.5mm (Shall not exceed acceleration 196m/s^2)	
Sweeping Method	1min(10→55→10Hz)	
Time	X	2hours
	Y	
	Z	

7. Solderability

Specified Value : 90% or more of immersed surface of terminal electrode shall be covered with fresh solder.

Test Methods and Remarks	Solder Temperature	$245 \pm 5^{\circ}\text{C}$
	Time	5 秒
	Preconditioning	Immersion into flux.
	Immersing Speed	25mm/s

8. Resistance to Soldering Heat

Specified Value : Appearance : No significant abnormality
Impedance change : Within $\pm 30\%$ of the initial value

Test Methods and Remarks : The test sample shall be exposed to reflow oven at 230°C for 40 seconds, with peak temperature at $260 + 0 / - 5^{\circ}\text{C}$ for 10 seconds, 2times.
Test board material : Glass epoxy-resin
Test board thickness : 1.6mm

▶ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification.
For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>).

9. Thermal Shock

Specified Value	Appearance : No significant abnormality Impedance change : Within +50/−10% of the initial value															
Test Methods and Remarks	<p>Conditions for 1 cycle</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>−40±3°C</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room Temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td>85±2°C</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room Temperature</td> <td>Within 3</td> </tr> </tbody> </table> <p>Number of cycles : 100 Mounting method : Soldering onto PC board The measurement, after the test, shall be carried out the test sample has been left for 2 to 3 hours</p>	Step	Temperature (°C)	Duration (min)	1	−40±3°C	30±3	2	Room Temperature	Within 3	3	85±2°C	30±3	4	Room Temperature	Within 3
Step	Temperature (°C)	Duration (min)														
1	−40±3°C	30±3														
2	Room Temperature	Within 3														
3	85±2°C	30±3														
4	Room Temperature	Within 3														

10. Resistance to Humidity (steady state)

Specified Value	Appearances : No significant abnormality Impedance change : Within ±30% of the initial value						
Test Methods and Remarks	<p>The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table.</p> <table border="1"> <tbody> <tr> <td>Temperature</td> <td>40±2°C</td> </tr> <tr> <td>Humidity</td> <td>90~95%RH</td> </tr> <tr> <td>Time</td> <td>500+24/−0 hour</td> </tr> </tbody> </table> <p>The measurement, after the test, shall be carried out the test sample has been left for 2 to 3 hours</p>	Temperature	40±2°C	Humidity	90~95%RH	Time	500+24/−0 hour
Temperature	40±2°C						
Humidity	90~95%RH						
Time	500+24/−0 hour						

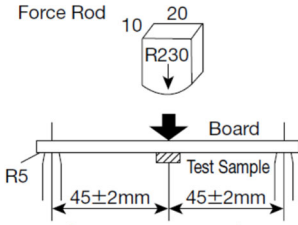
11. Loading under Damp Heat

Specified Value	Appearance : No significant abnormality Impedance change : Within ±30% of the initial value								
Test Methods and Remarks	<p>The test samples shall be soldered to the test board by the reflow soldering. The test samples shall be placed in thermostatic oven set at specified temperature, humidity, and applied the rated current continuously as shown in below table.</p> <table border="1"> <tbody> <tr> <td>Temperature</td> <td>40±2°C</td> </tr> <tr> <td>Humidity</td> <td>90~95%RH</td> </tr> <tr> <td>Applied current</td> <td>Rated current</td> </tr> <tr> <td>Time</td> <td>500+24/−0 hour</td> </tr> </tbody> </table> <p>The measurement, after the test, shall be carried out the test sample has been left for 2 to 3 hours</p>	Temperature	40±2°C	Humidity	90~95%RH	Applied current	Rated current	Time	500+24/−0 hour
Temperature	40±2°C								
Humidity	90~95%RH								
Applied current	Rated current								
Time	500+24/−0 hour								

12. High Temperature Loading Test

Specified Value	Appearance : No significant abnormality Impedance change : Within ±30% of the initial value						
Test Methods and Remarks	<p>The test samples shall be soldered to the test board by the reflow soldering. The test samples shall be placed in thermostatic oven set at specified temperature and applied the rated current continuously as shown in below table.</p> <table border="1"> <tbody> <tr> <td>Temperature</td> <td>85±2°C</td> </tr> <tr> <td>Applied current</td> <td>Rated current</td> </tr> <tr> <td>Time</td> <td>500+24/−0 hour</td> </tr> </tbody> </table> <p>The measurement, after the test, shall be carried out the test sample has been left for 2 to 3 hours</p>	Temperature	85±2°C	Applied current	Rated current	Time	500+24/−0 hour
Temperature	85±2°C						
Applied current	Rated current						
Time	500+24/−0 hour						

13. Bending Strength

Specified Value	Appearance : No mechanical damage.
Test Methods and Remarks	<p>The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm</p> <p>Warp : 2mm Testing board : Glass epoxy-resin substrate Thickness : 0.8mm</p> 

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14. Adhesion of Electrode

Specified Value	No separation or indication of separation of electrode.
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Test Methods and Remarks	Applied force : 5N Duration : 10 sec.
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Note on standard condition: "standard condition" referred to herein is defined as follows:
5 to 35°C of temperature, 45 to 85% relative humidity and 86 to 106kPa of air pressure.

When there are questions concerning measurement results:

In order to provide correlation data, the test shall be conducted under condition of $20 \pm 2^\circ\text{C}$ of temperature, 60 to 70% relative humidity and 86 to 106kPa of air pressure. Unless otherwise specified, all the tests are conducted under the "standard condition."