

**Wire-wound Ferrite Inductors LSQB/LSQC/LSQE series**

**for General Electronic Equipment for Consumer**

**Wire-wound Ferrite Power Inductors LSQN/LSQPA series**

**for General Electronic Equipment for Consumer**

**Wire-wound Ferrite Inductors for Signal Lines LSQM series**

**for General Electronic Equipment for Consumer**

**Wire-wound Ferrite Inductors LLQB/LLQC/LLQE series**

**for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)**

**Wire-wound Ferrite Power Inductors LLQN/LLQPA series**

**for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)**

**Wire-wound Ferrite Inductors for Signal Lines LLQM 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~+105°C (Including self-generated heat)
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2. Storage Temperature Range (after soldering)

Specified Value	-40~+85°C
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Test Methods and Remarks	Wire-wound Ferrite Inductors, Wire-wound Ferrite Power Inductors Please refer the term of "7. storage conditions" in precautions.
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3. Rated Current

Specified Value	Within the specified tolerance
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4. Inductance

Specified Value	Within the specified tolerance
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Test Methods and Remarks	Measuring equipment : LCR Meter (HP4285A or its equivalent) Measuring frequency : Specified frequency
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5. Q

Specified Value	Wire-wound Ferrite Inductors for Signal Lines: Within the specified tolerance
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Test Methods and Remarks	Wire-wound Ferrite Inductors for Signal Lines: Measuring equipment : LCR Meter (HP4285A or its equivalent) Measuring frequency : Specified frequency
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6. DC Resisittance

Specified Value	Within the specified tolerance
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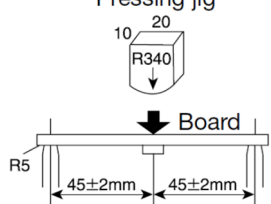
Test Methods and Remarks	Measuring equipment : DC Ohmmeter (HIOKI 3227 or its equivalent)
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7. Self-Resonant Frequency

Specified Value	Within the specified tolerance
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Test Methods and Remarks	Measuring equipment : Impedance analyzer (HP4291A or its equivalent)
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8. Temperature Characteristic					
Specified Value	LSQMB2016		Inductance change : Within $\pm 5\%$		
	LLQMB2016				
	LSQBA1608	LSQBA2012	LSQEA2012	LSQNA2012	Inductance change : Within $\pm 20\%$
	LSQNA2012	LSQBA2016	LSQNA2016	LSQBA2518	
	LSQEA2518	LSQNA2518	LSQCA3225	LSQPA3225	
	LLQBA2016	LLQBA2012	LLQEA2012	LLQNA2012	
	LLQNA2012	LLQBA2016	LLQNA2016	LLQBA2518	Inductance change : Within $\pm 25\%$
	LLQEA2518	LLQNA2518	LLQCA3225	LLQPA3225	
	LSQBB1608	LSQNB1608	LSQCA2016	LSQPA2016	
	LSQCA2518	LSQPA2518	LSQBA3218		
LLQBB1608	LLQNB1608	LLQCA2016	LLQPA2016	Inductance change : Within $\pm 35\%$	
LLQCA2518	LLQPA2518	LLQBA3218			
LSQCA2012	LSQPA2012				
LLQCA2012	LLQPA2012				
Test Methods and Remarks	Based on the inductance at 20°C and Measured at the ambient of $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ .				

9. Resistance to Flexure of Substrate	
Specified Value	No damage.
Test Methods and Remarks	<p>Warp : 2mm            Test substrate : Glass epoxy-resin substrate            Thickness : 1.0mm (1608 type:0.8mm)</p> <p>Pressing jig</p> 

10. Body Strength	
Specified Value	No damage.
Test Methods and Remarks	<p>Applied force : 10N (1608 type:5N)            Duration : 10sec.</p>

11. Adhesion of terminal electrode		
Specified Value	LB, LBC, LBR, LBMF Series	No abnormality.
	CB, CBC, CBL, CBMF Series	
	LBM Series	
Test Methods and Remarks	<p>Applied force : 10N to X and Y directions (1608 type:5N to X and Y directions)            Duration : 5 sec.            Test substrate : Printed board</p>	

## 12. Resistance to vibration

Specified Value	Wire-wound Ferrite Inductors, Wire-wound Ferrite Power Inductors Inductance change : Within $\pm 10\%$ No significant abnormality in appearance. Wire-wound Ferrite Inductors for Signal Lines Inductance change : Within $\pm 5\%$ No significant abnormality in appearance.														
Test Methods and Remarks	The given sample is soldered to the board and then it is tested depending on the conditions of the following table. <table border="1"> <tr> <td>Vibration Frequency</td> <td colspan="2">10~55Hz</td> </tr> <tr> <td>Total Amplitude</td> <td colspan="2">1.5mm (May not exceed acceleration 196m/s<sup>2</sup>)</td> </tr> <tr> <td>Sweeping Method</td> <td colspan="2">10Hz to 55Hz to 10Hz for 1min.</td> </tr> <tr> <td rowspan="3">Time</td> <td>X</td> <td rowspan="3">For 2 hours on each X, Y, and Z axis.</td> </tr> <tr> <td>Y</td> </tr> <tr> <td>Z</td> </tr> </table> Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.	Vibration Frequency	10~55Hz		Total Amplitude	1.5mm (May not exceed acceleration 196m/s <sup>2</sup> )		Sweeping Method	10Hz to 55Hz to 10Hz for 1min.		Time	X	For 2 hours on each X, Y, and Z axis.	Y	Z
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Time	X	For 2 hours on each X, Y, and Z axis.													
	Y														
	Z														

## 13. Drop test

Specified Value	—
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## 14. Solderability

Specified Value	At least 90% of surface of terminal electrode is covered by new
Test Methods and Remarks	Solder temperature : $245 \pm 5^\circ\text{C}$ Duration : $5 \pm 0.5\text{sec}$ Flux : Ethanol solution with 25% of colophony

## 15. Resistance to soldering

Specified Value	Wire-wound Ferrite Inductors, Wire-wound Ferrite Power Inductors Inductance change : Within $\pm 10\%$ Wire-wound Ferrite Inductors for Signal Lines Inductance change : Within $\pm 5\%$
Test Methods and Remarks	3 times of reflow oven at $230^\circ\text{C}$ MIN for 40sec. with peak temperature at $260^\circ\text{C}$ for 5sec. Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

## 16. Resistance to solvent

Specified Value	—
Test Methods and Remarks	Solvent temperature : Room temperature Type of solvent : Isopropyl alcohol Cleaning conditions : 90s. Immersion and cleaning.

## 17. Thermal shock

Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.																		
Test Methods and Remarks	The given sample is soldered to the board and then its Inductance is measured after 100cycles of the following conditions. <table border="1"> <thead> <tr> <th colspan="3">Conditions of 1 cycle</th> </tr> <tr> <th>Step</th> <th>Temperature (<math>^\circ\text{C}</math>)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-40 \pm 3</math></td> <td><math>30 \pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td><math>+85 \pm 2</math></td> <td><math>30 \pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table> Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.	Conditions of 1 cycle			Step	Temperature ( $^\circ\text{C}$ )	Duration (min)	1	$-40 \pm 3$	$30 \pm 3$	2	Room temperature	Within 3	3	$+85 \pm 2$	$30 \pm 3$	4	Room temperature	Within 3
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2	Room temperature	Within 3																	
3	$+85 \pm 2$	$30 \pm 3$																	
4	Room temperature	Within 3																	

## 18. Damp heat life test

Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
Test Methods and Remarks	Temperature : $60 \pm 2^\circ\text{C}$ Humidity : 90~95%RH Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

19.Loading under damp heat life test	
Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
Test Methods and Remarks	Temperature : $60 \pm 2^\circ\text{C}$ Humidity : $90 \sim 95\% \text{RH}$ Duration : 1000 hrs Applied current : Rated current Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
20.High temperature life test	
Specified Value	Wire-wound Ferrite Power Inductors, Wire-wound Ferrite Inductors for Signal Lines : Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
Test Methods and Remarks	Temperature : $85 \pm 2^\circ\text{C}$ Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
21.Loading at high temperature life test	
Specified Value	Wire-wound Ferrite Inductors : Inductance change : Within $\pm 10\%$ (3225 type : Within $\pm 20\%$ ) No significant abnormality in appearance.
Test Methods and Remarks	Temperature : $85 \pm 2^\circ\text{C}$ Duration : 1000 hrs Applied current : Rated current Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
22.Low temperature life test	
Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
Test Methods and Remarks	Temperature : $-40 \pm 2^\circ\text{C}$ Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
23.Standard condition	
Specified Value	Standard test conditions Unless specified, Ambient temperature is $20 \pm 15^\circ\text{C}$ and the Relative humidity is $65 \pm 20\%$ . If there is any doubt about the test results, further measurement shall be had within the following limits: Ambient Temperature: $20 \pm 2^\circ\text{C}$ Relative humidity: $65 \pm 5\%$ Inductance value is based on our standard measurement systems.