

**Wire-wound Ferrite Power Inductors LBXN/LBXP series  
for Telecommunications Infrastructure and Industrial Equipment**  
**Wire-wound Ferrite Power Inductors LMXN/LMXP series  
for Medical Devices classified as GHTF Class C (Japan Class III)**

■ RELIABILITY DATA

1. Operating Temperature Range

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

Test Methods and Remarks      Including self-generated heat

2. Storage Temperature Range

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

Test Methods and Remarks       $-5$  to  $40^{\circ}\text{C}$  for the product with taping.

3. Rated current

Specified Value      Within the specified tolerance

4. Inductance

Specified Value      Within the specified tolerance

Test Methods and Remarks      Measuring equipment      : LCR Meter (HP 4285A or equivalent)  
Measuring frequency      : 100kHz, 1V

5. DC Resistance

Specified Value      Within the specified tolerance

Test Methods and Remarks      Measuring equipment      : DC ohmmeter (HIOKI 3227 or equivalent)

6. Self resonance frequency

Specified Value      Within the specified tolerance (2020 type: —)

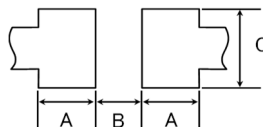
Test Methods and Remarks      Measuring equipment      : Impedance analyzer/material analyzer (HP4291A or equivalent HP4191A, 4192A or equivalent)

7. Temperature characteristic

Specified Value      Inductance change : Within  $\pm 20\%$

Test Methods and Remarks      Measurement of inductance shall be taken at temperature range within  $-40^{\circ}\text{C}\sim +85^{\circ}\text{C}$ .  
With reference to inductance value at  $+20^{\circ}\text{C}$ ., change rate shall be calculated.  
Change of maximum inductance deviation in step 1 to 5

Step	Temperature ( $^{\circ}\text{C}$ )
1	20
2	Minimum operating temperature
3	20 (Standard temperature)
4	Maximum operating temperature
5	20

8. Resistance to flexure of substrate					
Specified Value	No damage				
Test Methods and Remarks	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.				
	Test board size : 100 × 40 × 1.6 mm				
	Test board material : glass epoxy-resin				
	Solder cream thickness : 0.10mm ( 2020~3030 type)				
	: 0.15mm ( 4040~8080 type)				
	Land dimension				
					
		Type	A	B	C
		2020	0.65	0.7	2.0
		2424	0.7	0.75	2.0
		3030	0.8	1.4	2.7
		4040	1.2	1.6	3.7
		5050	1.5	2.1	4.0
		6060	1.6	3.1	5.7
		8080	1.8	3.8	7.5

14. Solderability		
Specified Value	At least 90% of surface of terminal electrode is covered by new solder.	
Test Methods and Remarks	The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table. Flux : Ethanol solution containing rosin 25%.	
	Solder Temperature	245±5℃
	Time	5±1.0 sec.
※Immersion depth : All sides of mounting terminal shall be immersed.		
15. Resistance to soldering heat		
Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	The test sample shall be exposed to reflow oven at 230±5℃ for 40 seconds, with peak temperature at 260±5℃ for 5 seconds, 2 times.	
	Test board material	: glass epoxy-resin
	Test board thickness	: 1.0mm
16. Thermal shock		
Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 1000 cycles.	
	Conditions of 1 cycle	
	Step	Temperature (℃)      Duration (min)
	1	−40±3      30±3
	2	Room temperature      Within 3
	3	+85±2      30±3
	4	Room temperature      Within 3
17. Damp heat		
Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	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.	
	Temperature	60±2℃
	Humidity	90~95%RH
	Time	1000+24/−0 hour
18. Loading under damp heat		
Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	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 and applied the rated current continuously as shown in below table.	
	Temperature	60±2℃
	Humidity	90~95%RH
	Applied current	Rated current
	Time	1000+24/−0 hour
19. Low temperature life test		
Specified Value	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table.	
	Temperature	−40±2℃
	Time	1000+24/−0 hour
20. High temperature life test		
Specified Value	—	

21. Loading at high temperature life test		
Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.	
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow soldering.	
	Temperature	$85 \pm 2^{\circ}\text{C}$
	Applied current	Rated current
	Time	$1000 + 24 / - 0$ hour
22. Standard condition		
Specified Value	Standard test condition :	
	Unless otherwise specified, temperature is $20 \pm 15^{\circ}\text{C}$ and $65 \pm 20\%$ of relative humidity.	
	When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of $20 \pm 2^{\circ}\text{C}$ of temperature, $65 \pm 5\%$ relative humidity.	
	Inductance is in accordance with our measured value.	