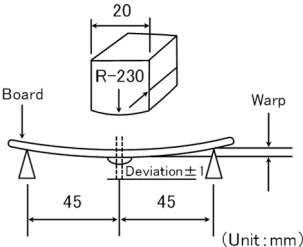


**Multilayer Metal Power Inductors MCOIL™ LBCN series
for Telecommunications Infrastructure and Industrial Equipment**
**Multilayer Metal Power Inductors MCOIL™ LMCN series
for Medical Devices classified as GHTF Class C (Japan Class III)**

■ RELIABILITY DATA

1. Operating Temperature Range	
Specified Value	-40~+125°C (Including self-generated heat) , End of part number "D" ⇒ -55~+150°C (Including self-generated heat)
2. Storage Temperature Range	
Specified Value	-40~+85°C , End of part number "D" ⇒ -55~+110°C
3. Rated Current	
Specified Value	Idc1: The decreasing-rate of inductance value is within 30 % Idc2: The temperature of the element is increased within 40°C
4. Inductance	
Specified Value	Refer to each specification.
Test Methods and Remarks	Measuring frequency : 1MHz Measuring equipment : E4991 (or its equivalent)
5. DC Resistance	
Specified Value	Refer to each specification.
Test Methods and Remarks	Measuring equipment : HIOKI RM3545 (or its equivalent)
6. Resistance to Flexure of Substrate	
Specified Value	No mechanical damage. Warp : 2mm Testing board : glass epoxy-resin substrate Thickness : 0.8mm
Test Methods and Remarks	 <p>(Unit: mm)</p>
7. Solderability	
Specified Value	At least 90% of terminal electrode is covered by new solder.
Test Methods and Remarks	Solder temperature : 245±3°C (Sn/3.0Ag/0.5Cu) Duration : 4±1 sec.
8. Resistance to Soldering	
Specified Value	Appearance: No significant abnormality Inductance change: Within ±10%
Test Methods and Remarks	Solder temperature : 260±5°C Duration : 10±0.5 sec. Preheating temperature : 150 to 180°C Preheating time : 3 min. Flux : Immersion into ethanol solution with colophony for 3 to 5 sec. Recovery : 2 to 3 hrs of recovery under the standard condition after the test. (See Note 1)

9. Thermal Shock		
Specified Value	Appearance : No significant abnormality Inductance change: Within $\pm 10\%$	
Test Methods and Remarks	Conditions for 1 cycle	
	Step	temperature (°C)
	1	(Minimum Operating Temperature) $+0/-3$
	2	Room temperature
	3	(Maximum Operating Temperature) $+3/-0$
4	Room temperature	
	time (min.)	
		30 ± 3
		$2 \sim 3$
		30 ± 3
		$2 \sim 3$
	Number of cycles: 1000	
	Recovery: 2 to 3 hrs of recovery under the standard condition after the test. (See Note 1)	

10. Damp Heat (Steady state)	
Specified Value	Appearance : No significant abnormality Inductance change: Within $\pm 10\%$
Test Methods and Remarks	Temperature : $60 \pm 2^\circ\text{C}$ Humidity : 90 to 95%RH Duration : $1000 + 24 / - 0$ hrs Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1)

11. Loading under Damp Heat	
Specified Value	Appearance : No significant abnormality Inductance change: Within $\pm 10\%$
Test Methods and Remarks	Temperature : $60 \pm 2^\circ\text{C}$ Humidity : 90 to 95%RH Applied current : I_{dc2max} Duration : $1000 + 24 / - 0$ hrs Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1)

12. Loading at High Temperature	
Specified Value	Appearance : No significant abnormality Inductance change: Within $\pm 10\%$
Test Methods and Remarks	Temperature : $85 \pm 2^\circ\text{C}$ (End of part number "D" $\Rightarrow 110 \pm 2^\circ\text{C}$) Applied current : I_{dc2max} Duration : $1000 + 24 / - 0$ hrs. Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1)

(Note 1) Measurement shall be made after 48 ± 2 hrs of recovery under the standard condition.

Note on standard condition: "standard condition" referred to herein is defined as follows:

5 to 35°C of temperature, 25 to 85% relative humidity.

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."

Derating of Rated Current

LBCN/LMCN series

Derating of current is necessary for LBCN/LMCN series depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.

