Wire-wound Metal Power Inductors MCOIL™ LSAN series for General Purpose
Wire-wound Metal Power Inductors MCOIL™ LSAP series for General Purpose
Wire-wound Metal Power Inductors MCOIL™ LLAN series for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)
Wire-wound Metal Power Inductors MCOIL™ LLAP 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℃：LSAN/LLAN −40～＋125℃：LSAP/LLAP
Test Methods and Remarks	Including self-generated heat

2. Storage Temperature Range	
Specified Value	−40～＋85℃
Test Methods and Remarks	0 to 40℃ for the product with taping.

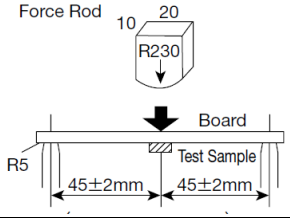
3. Rated current	
Specified Value	Within the specified tolerance

4. Inductance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 2MHz、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	−

7. Temperature characteristic	
Specified Value	Inductance change : Within ±15%
Test Methods and Remarks	Measurement of inductance shall be taken at temperature range within −40℃～＋85℃. With reference to inductance value at ＋20℃., change rate shall be calculated.

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 : 100×40×1.0 mm Test board material : Glass epoxy-resin Solder cream thickness : 0.12 mm 

9. Insulation resistance : between wires	
Specified Value	—

10. Insulation resistance : between wire and core	
Specified Value	—

11. Withstanding voltage : between wire and core	
Specified Value	—

12. Adhesion of terminal electrode	
Specified Value	No abnormality.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. Applied force : 10N to X and Y directions. Duration : 5s. Solder cream thickness : 0.12mm.

13. Resistance to vibration	
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. Then it shall be submitted to below test conditions. Frequency Range : 10～55Hz Total Amplitude : 1.5mm (May not exceed acceleration 196m/s^2) Sweeping Method : 10Hz to 55Hz to 10Hz for 1min. Time : X, Y, Z — For 2 hours on each X, Y, and Z axis. Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

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±0.5 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℃ for 40 seconds, with peak temperature at 260+0/−5℃ for 5 seconds, 3 times. Test board material : Glass epoxy-resin Test board thickness : 1.0mm Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

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 100 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

Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

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: 500+24/−0 hour Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

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: 500+24/−0 hour Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

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: 500+24/−0 hour Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

20. High 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: 85±2℃ Time: 500+24/−0 hour Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

21. Loading at high temperature life test	
Specified Value	—

22. Standard condition	
Specified Value	Standard test condition : Unless otherwise specified, temperature is 20±15℃ and 65±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±2℃ of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.