CHIP COILS (CHIP INDUCTORS) LQM2HPN□□□□G0□ REFERENCE SPECIFICATION

1. Scope

This reference specification applies to chip coils (chip inductors) LQM2HPN_G0 series for general electronic equipment.

2. Part Numbering

(Ex.)

LQ	M	2H	P	N	R47	M	G	0	L
Product ID	Structure	Dimension (L × W)	Application and characteristic	Category	Inductance	Tolerance	Dimension (T)	Other	Packaging L: taping *B: bulk

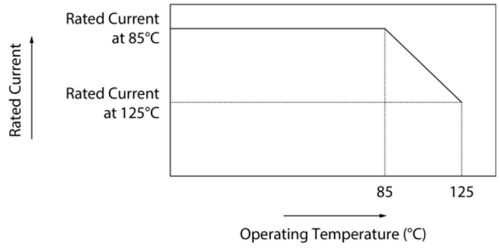
*B: Bulk packing is also available.

3. Part Number and Rating

Operating temperature range	-55°C to +125°C
Storage temperature range	-55°C to +125°C

Customer Part number	Murata Part number	Inductance		DC resistance (Ω)		Self-resonant frequency (MHz min.)	Rated current (A)*1	
		Nominal value (μH)	Tolerance (%)	Typ.	Max.		Ambient temperature 85°C*2	Ambient temperature 125°C*2
	LQM2HPNR47MG0L	0.47	±20	0.040	0.050	100	1.8	1.3
	LQM2HPN1R0MG0L	1.0	±20	0.055	0.069	60	1.6	1.2
	LQM2HPN1R5MG0L	1.5	±20	0.070	0.088	50	1.5	1.1
	LQM2HPN2R2MG0L	2.2	±20	0.080	0.10	40	1.3	0.97
	LQM2HPN3R3MG0L	3.3	±20	0.10	0.125	30	1.2	0.9
	LQM2HPN4R7MG0L	4.7	±20	0.11	0.138	25	1.1	0.82

*1 When rated current is applied to the products, temperature rise caused by self-generated heat shall be limited to 40°C max.
*2 As shown in the diagram below, derating is applied to the rated current based on the operating temperature.



4. Testing Conditions

Unless otherwise specified	Temperature: ordinary temperature (15°C to 35°C) Humidity: ordinary humidity [25% to 85% (RH)]
In case of doubt	Temperature: 20°C±2°C Humidity: 60% to 70% (RH) Atmospheric pressure: 86 kPa to 106 kPa

5. Appearance a nd Dimensions

Unit mass (typical value): 0.022 g

6. Marking

No marking.

7. Electrical Performance

No.	Item	Specification	Test method
7.1	Inductance	Meet chapter 3 ratings.	Measuring equipment: Keysight 4294A or the equivalent (1 mA) Measuring frequency: 1 MHz
7.2	DC resistance	Meet chapter 3 ratings.	Measuring equipment: digital multimeter Measuring circuit: Measure with the product set to terminal 2 and the switch pressed (open between a and b). When setting or removing the product, press the switch to short between a and b.
7.3	Self-resonant frequency	Meet chapter 3 ratings.	Measuring equipment: Keysight 4294A or the equivalent

8. Mechanical Performance

No.	Item	Specification	Test method
8.1	Shear test	No significant mechanical damage or no sign of electrode peeling off shall be observed.	Force application direction: Applying force: 10 N Holding time: 5 s±1 s

12.2 Flux and solder used

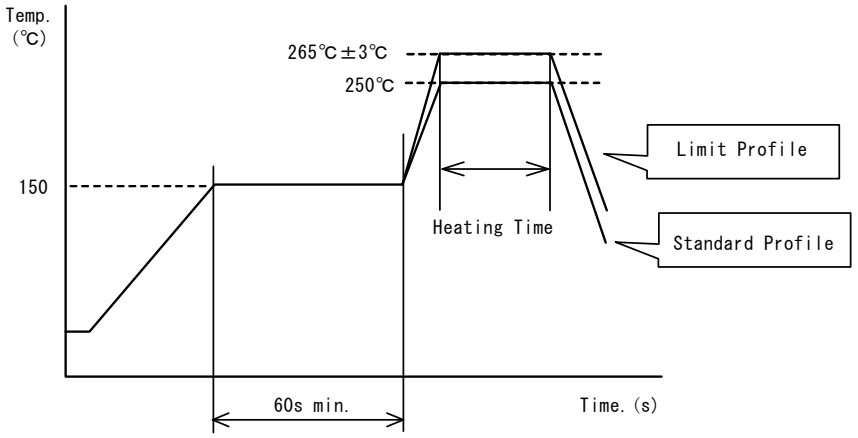
Flux	• Use a rosin-based flux. • Do not use a highly acidic flux with a halide content exceeding 0.2(wt)% (chlorine conversion value). • Do not use a water-soluble flux.
Solder	• Use Sn-3.0Ag-0.5Cu solder. • Standard thickness of solder paste: 100 μm to 150 μm

If you want to use a flux other than the above, please consult our technical department.

12.3 Soldering conditions (flow, reflow)

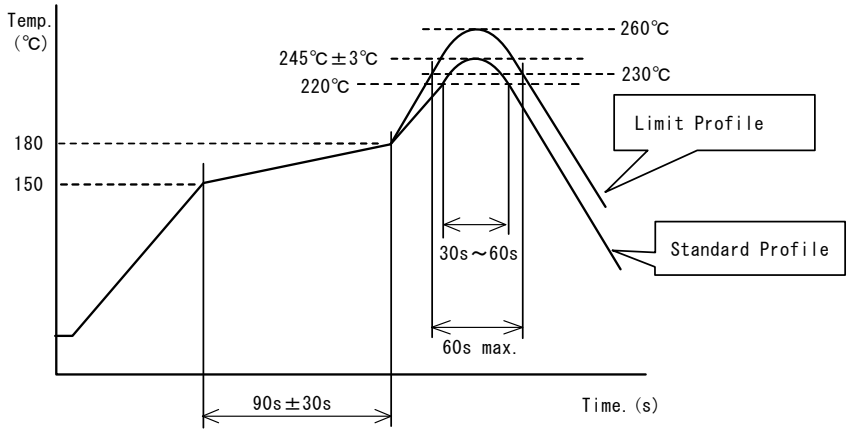
- Pre-heating should be in such a way that the temperature difference between solder and product surface is limited to 150°C max.
  Cooling into solvent after soldering also should be in such a way that the temperature difference is limited to 100°C max.
  Insufficient pre-heating may cause cracks on the product, resulting in the deterioration of product quality.
- Standard soldering profile and the limit soldering profile is as follows.
  The excessive limit soldering conditions may cause leaching of the electrode and/or resulting in the deterioration of product quality.

(1) Flow



	Standard profile	Limit profile
Pre-heating	150°C/60 s min.	150°C/60 s min.
Heating	250°C/4 s to 6 s	265°C±3°C/5 s
Number of flow cycles	2 times	2 times

(2) Reflow



	Standard profile	Limit profile
Pre-heating	150°C to 180°C/90 s±30 s	150°C to 180°C/90 s±30 s
Heating	Above 220°C/30 s to 60 s	Above 230°C/60 s max.
Peak temperature	245°C±3°C	260°C/10 s
Number of reflow cycles	2 times	2 times

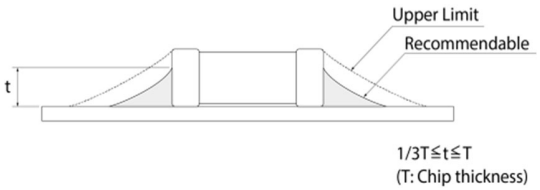
12.4 Reworking with soldering iron

The following requirements must be met to rework a soldered product using a soldering iron.

Item	Requirement
Pre-heating	150°C/approx. 1 min
Tip temperature of soldering iron	350°C max.
Power consumption of soldering iron	80 W max.
Tip diameter of soldering iron	ø3 mm max.
Soldering time	3 s (+1 s, -0 s)
Number of reworking operations	2 times max.
* Avoid a direct contact of the tip of the soldering iron with the product. Such a direction contact may cause cracks in the ceramic body due to thermal shock.	

12.5 Solder volume

Solder shall be used not to be exceeded the upper limits as shown below.

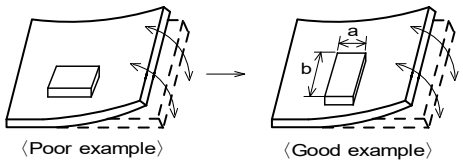


An increased solder volume increases mechanical stress on the product. Exceeding solder volume may cause the failure of mechanical or electrical performance.

12.6 Product's location

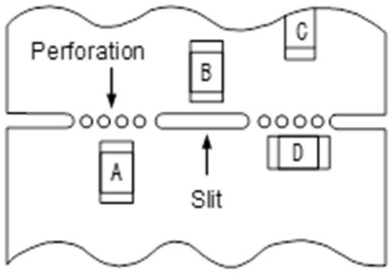
The following shall be considered when designing and laying out PCBs.

(1) PCB shall be designed so that products are not subject to mechanical stress due to warping the board.
[Products direction]
Products shall be located in the sideways direction (length: a < b) to the mechanical stress.

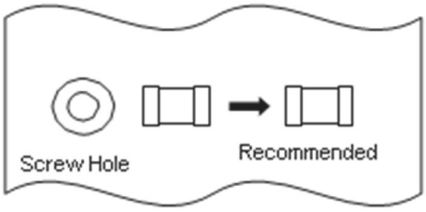


(2) Components location on PCB separation
It is effective to implement the following measures, to reduce stress in separating the board.
It is best to implement all of the following three measures; however, implement as many measures as possible to reduce stress.

Contents of measures	Stress level
(1) Turn the mounting direction of the component parallel to the board separation surface.	A > D*1
(2) Add slits in the board separation part.	A > B
(3) Keep the mounting position of the component away from the board separation surface.	A > C
*1 A > D is valid when stress is added vertically to the perforation as with hand separation. If a cutting disc is used, stress will be diagonal to the PCB, therefore A > D is invalid.	

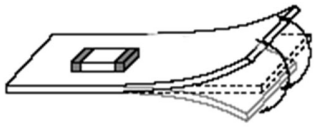


(3) Mounting components near screw holes
When a component is mounted near a screw hole, it may be affected by the board deflection that occurs during the tightening of the screw.
Mount the component in a position as far away from the screw holes as possible.

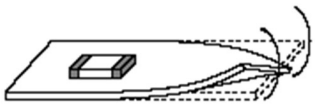


12.7 Handling of substrate

After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting to the substrate when cropping the substrate, inserting and removing a connector from the substrate or tightening screw to the substrate. Excessive mechanical stress may cause cracking in the product.



Bending



Twisting

12.8 Cleaning

The product shall be cleaned under the following conditions.
(1) The cleaning temperature shall be 60°C max. If isopropyl alcohol (IPA) is used, the cleaning temperature shall be 40°C max.
(2) Perform ultrasonic cleaning under the following conditions. Exercise caution to prevent resonance phenomenon in mounted products and the PCB.

Item	Requirement
Power	20 W/L max.
Time	5 min max.
Frequency	28 kHz to 40 kHz

(3) Cleaner
Alcohol-based cleaner: IPA
Aqueous agent: PINE ALPHA ST-100S
(4) There shall be no residual flux or residual cleaner. When using aqueous agent, rinse the product with deionized water adequately and completely dry it so that no cleaner is left.
* For other cleaning, consult our technical department.

12.9 Storage and transportation

Storage period	Use the product within 6 months after delivery. If you do not use the product for more than 6 months, check solderability before using it.
Storage conditions	• The products shall be stored in a room not subject to rapid changes in temperature and humidity. The recommended temperature range is -10°C to +40°C. The recommended relative humidity range is 15% to 85%. Keeping the product in corrosive gases, such as sulfur, chlorine gas or acid may cause the poor solderability. • Do not place the products directly on the floor; they should be placed on a palette so that they are not affected by humidity or dust. • Avoid keeping the products in a place exposed to direct sunlight, heat or vibration. • Avoid storing the product by itself bare (i.e. exposed directly to air).
Transportation	Excessive vibration and impact reduces the reliability of the products. Exercise caution when handling the products.

12.10 Resin coating

The inductance value may change and/or it may affect on the product's performance due to high cure-stress of resin to be used for coating/molding products. So please pay your careful attention when you select resin. In prior to use, please make the reliability evaluation with the product mounted in your application set.

12.11 Handling of product

Inductance could change due to the effect of magnetism. Do not use magnetized tweezers, magnets, or other similar tools when handling the product (instead, use tweezers with resin or ceramic tips).

12.12 Magnetic saturation

A current exceeding the rated current could cause the inductance value to drop due to magnetic saturation.

13. ⚠Note

(1) Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
(2) You are requested not to use our product deviating from the agreed specifications.
(3) The contents of this reference specification are subject to change without advance notice. Please approve our product specifications or transact the approval sheet for product specifications before ordering.