CHIP COIL（CHIP INDUCTORS）LQH43CN□□□□33L Reference Specification

1. Scope
This reference specification applies to LQH43CN_33L Series, Chip coil (Chip Inductors).

2. Part Numbering

<table>
<thead>
<tr>
<th>(ex)</th>
<th>L</th>
<th>Q</th>
<th>H</th>
<th>43</th>
<th>C</th>
<th>N</th>
<th>2R7</th>
<th>M</th>
<th>3</th>
<th>3</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product ID</td>
<td>Structure</td>
<td>Dimension (L × W)</td>
<td>Applications and Characteristics</td>
<td>Category</td>
<td>Inductance</td>
<td>Tolerance</td>
<td>Features</td>
<td>Electrode</td>
<td>Packaging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MURATA MFG.CO., LTD</td>
<td>Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Rating
- Operating Temperature Range: -40 to +85°C
- Storage Temperature Range: -40 to +85°C

<table>
<thead>
<tr>
<th>Customer Part Number</th>
<th>MURATA Part Number</th>
<th>Inductance (μH)</th>
<th>Tolerance (%)</th>
<th>DC Resistance (Ω max.)</th>
<th>Self Resonant Frequency (MHz min.)</th>
<th>Rated Current (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LQH43CNR56M33L</td>
<td>0.56</td>
<td>0.023±30%</td>
<td>160</td>
<td>2950</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LQH43CNR82M33L</td>
<td>0.82</td>
<td>0.027±30%</td>
<td>130</td>
<td>2800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LQH43CN1R0M33L</td>
<td>1.0</td>
<td>0.032±30%</td>
<td>110</td>
<td>2600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LQH43CN1R5M33L</td>
<td>1.5</td>
<td>0.036±30%</td>
<td>80</td>
<td>2450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LQH43CN1R8M33L</td>
<td>1.8</td>
<td>0.042±30%</td>
<td>70</td>
<td>2300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LQH43CN2R2M33L</td>
<td>2.2</td>
<td>0.047±30%</td>
<td>60</td>
<td>2100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LQH43CN2R7M33L</td>
<td>2.7</td>
<td>0.053±30%</td>
<td>50</td>
<td>1800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LQH43CN3R3M33L</td>
<td>3.3</td>
<td>0.076±30%</td>
<td>47</td>
<td>1650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LQH43CN3R9M33L</td>
<td>3.9</td>
<td>0.082±30%</td>
<td>40</td>
<td>1600</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Testing Conditions
<Unless otherwise specified>
Temperature: Ordinary Temperature (15 to 35°C)
Humidity: Ordinary Humidity (25 to 85%RH)
Atmospheric Pressure: 86 to 106 kPa

<In case of doubt>
Temperature: 20 ± 2°C
Humidity: 60 to 70% (RH)
Atmospheric Pressure: 86 to 106 kPa

5. Appearance and Dimensions

- Unit Mass (Typical value): 0.13g

(in mm)
6. Electrical Performance

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>Inductance</td>
<td>Inductance shall meet item 3.</td>
<td>Measuring Equipment: Agilent 4192A or equivalent  Measuring Frequency: 1MHz</td>
</tr>
<tr>
<td>6.2</td>
<td>DC Resistance</td>
<td>DC Resistance shall meet item 3.</td>
<td>Measuring Equipment: Digital multi meter</td>
</tr>
<tr>
<td>6.3</td>
<td>Self Resonant Frequency</td>
<td>S.R.F shall meet item 3.</td>
<td>Measuring Equipment: Agilent 4991A or equivalent</td>
</tr>
<tr>
<td>6.4</td>
<td>Rated Current</td>
<td>Self temperature rise shall be limited to 40°C max. Inductance Change: within ± 20%</td>
<td>The rated current is applied.</td>
</tr>
</tbody>
</table>

7. Mechanical Performance

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
<th>Test Method</th>
</tr>
</thead>
</table>
| 7.1 | Shear Test  | Chip coil shall not be damaged.                                               | Substrate: Glass-epoxy substrate  
Applied Direction: Chip Coil  
Force: 20N  
Hold Duration: 5±1 s |
| 7.2 | Bending Test| Substrate: Glass-epoxy substrate  
(100 x 40 x 1.6mm)  
Speed of Applying Force: 1mm / s  
Deflection: 2mm  
Hold Duration: 30 s |
| 7.3 | Vibration   | Oscillation Frequency:  
10 to 55 to 10Hz for 1 minute  
Total Amplitude: 1.5mm  
Testing Time: A period of 2 hours in each of 3 mutually perpendicular directions.  
(Total 6 hours) |
| 7.4 | Solderability| The wetting area of the electrode shall be at least 90% covered with new solder coating. |
| 7.5 | Resistance to Soldering Heat| Appearance: No damage  
Inductance Change: within ± 5% |
|     |             | Flux: Ethanol solution of rosin, 25(wt)%  
(Immersed for 5s to 10s)  
Solder: Sn-3.0Ag-0.5Cu  
Pre-Heating: 150±10°C / 60 to 90seconds  
Solder Temperature: 240±5°C  
Immersion Time: 3±1 s |
|     |             | Flux: Ethanol solution of rosin, 25(wt)%  
(Immersed for 5s to 10s)  
Solder: Sn-3.0Ag-0.5Cu  
Pre-Heating: 150±10°C / 60 to 90seconds  
Solder Temperature: 270±5°C  
Immersion Time: 10±1 s  
Then measured after exposure in the room condition for 24±2 hours. |
8. **Environmental Performance (It shall be soldered on the substrate.)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1</td>
<td>Heat Resistance</td>
<td>Appearance: No damage</td>
<td>Temperature: 85±2°C, Time: 1000± 36 hours, then measured after exposure in the room condition for 24±2 hours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inductance Change: within ±5%</td>
<td></td>
</tr>
<tr>
<td>8.2</td>
<td>Cold Resistance</td>
<td></td>
<td>Temperature: -40±2°C, Time: 1000± 36 hours, then measured after exposure in the room condition for 24±2 hours.</td>
</tr>
<tr>
<td>8.3</td>
<td>Humidity</td>
<td></td>
<td>Temperature: 40±2°C, Humidity: 90 to 95%(RH), Time: 1000± 36 hours, then measured after exposure in the room condition for 24±2 hours.</td>
</tr>
<tr>
<td>8.4</td>
<td>Temperature Cycle</td>
<td></td>
<td>1 cycle:&lt;br&gt;step 1: -40±2°C / 30±3 min, step 2: Ordinary temp. / 10 to 15 min, step 3: +85±2°C / 30±3 min, step 4: Ordinary temp. / 10 to 15 min, total of 10 cycles, then measured after exposure in the room condition for 24±2 hours.</td>
</tr>
</tbody>
</table>

9. **Specification of Packaging**

9.1 **Appearance and Dimensions of plastic tape**

![Diagram of plastic tape dimensions](https://via.placeholder.com/150)

- Direction of feed
- (0.3)
- ※The packing directions of the chip coil in taping are unified with the in/out positions of the lead wire.

Dimension of the Cavity is measured at the bottom side.

9.2 **Specification of Taping**

1. Packing quantity (standard quantity) 500 pcs / reel
2. Packing Method Products shall be packed in each embossed cavity of plastic tape and sealed by cover tape.
3. Sprocket hole The sprocket holes are to the right as the tape is pulled toward the user.
4. Spliced point Plastic tape and cover tape has no spliced point.
5. Missing components number Missing components number within 0.1 % of the number per reel or 1 pc., whichever is greater, and are not continuous. The specified quantity per reel is kept.

9.3 **Pull Strength**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Embossed carrier tape</td>
<td>10N min.</td>
</tr>
<tr>
<td>Cover tape</td>
<td>5N min.</td>
</tr>
</tbody>
</table>
9.4 Peeling off force of cover tape

<table>
<thead>
<tr>
<th>Speed of Peeling off</th>
<th>300mm/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peeling off force</td>
<td>0.2 to 0.7N (minimum value is typical)</td>
</tr>
</tbody>
</table>

9.5 Dimensions of Leader-tape, Trailer and Reel

There shall be leader-tape (cover tape) and trailer-tape (empty tape) as follows.

9.6 Marking for reel

Customer part number, MURATA part number, Inspection number(*1), RoHS Marking(*2), Quantity etc.

*1) <Expression of Inspection No.>

(1) Factory Code
(2) Date
First digit : Year / Last digit of year
Second digit : Month / Jan. to Sep. \(\rightarrow\) 1 to 9, Oct. to Dec. \(\rightarrow\) O, N, D
Third, Fourth digit : Day

*2) « Expression of RoHS Marking » ROHS – Y (△)

(1) RoHS regulation conformity parts.
(2) MURATA classification number

9.7 Marking for Outside package (corrugated paper box)

Customer name, Purchasing order number, Customer part number, MURATA part number, RoHS Marking(*2) ,Quantity, etc.

9.8. Specification of Outer Case

<table>
<thead>
<tr>
<th>Outer Case Dimensions (mm)</th>
<th>Standard Reel Quantity in Outer Case (Reel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>D</td>
</tr>
<tr>
<td>186</td>
<td>186</td>
</tr>
</tbody>
</table>

* Above Outer Case size is typical. It depends on a quantity of an order

10. Caution

Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party’s life, body or property.

(1) Aircraft equipment
(2) Aerospace equipment
(3) Undersea equipment
(4) Power plant control equipment
(5) Medical equipment
(6) Transportation equipment (vehicles, trains, ships, etc.)
(7) Traffic signal equipment
(8) Disaster prevention / crime prevention equipment
(9) Data-processing equipment
(10) Applications of similar complexity and / or reliability requirements

MURATA MFG.CO., LTD
11. Notice
This product is designed for solder mounting.
Please consult us in advance for applying other mounting method such as conductive adhesive.

11.1 Land pattern designing
Recommended land patterns for flow and reflow soldering are as follows:
These have been designed for Electric characteristics and solderability.
Please follow the recommended patterns. Otherwise, their performance which includes electrical performance or solderability may be affected, or result to "position shift" in soldering process.

Flow Soldering

Reflow Soldering *

11.2 Flux, Solder

<table>
<thead>
<tr>
<th>Flux</th>
<th>Solder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use rosin-based flux.</td>
<td>Use Sn-3.0Ag-0.5Cu solder</td>
</tr>
<tr>
<td>Don’t use highly acidic flux with halide content exceeding 0.2(wt)% (chlorine conversion value).</td>
<td>Standard thickness of solder paste : 200 μm to 300 μm</td>
</tr>
<tr>
<td>Don’t use water-soluble flux.</td>
<td></td>
</tr>
</tbody>
</table>

Other flux (except above) Please contact us for details, then use.

11.3 Flow soldering conditions / Reflow soldering conditions

- 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.

soldering profile

(1)Flow soldering profile

<table>
<thead>
<tr>
<th></th>
<th>Standard Profile</th>
<th>Limit Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-heating</td>
<td>150°C, 60s min.</td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td>250°C 4s~6s</td>
<td>265°C±3°C 5s</td>
</tr>
<tr>
<td>Cycle of flow</td>
<td>2 times</td>
<td>1 time</td>
</tr>
</tbody>
</table>
(2) Reflow soldering profile

<table>
<thead>
<tr>
<th>Standard Profile</th>
<th>Limit Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-heating</td>
<td>150 ~ 180°C, 90s ± 30s</td>
</tr>
<tr>
<td>Heating</td>
<td>above 220°C, 30s ~ 60s max.</td>
</tr>
<tr>
<td>Peak temperature</td>
<td>245 ± 3°C, 260°C, 10s</td>
</tr>
<tr>
<td>Cycle of reflow</td>
<td>2 times, 1 time</td>
</tr>
</tbody>
</table>

11.4 Reworking with soldering iron.
The following conditions must be strictly followed when using a soldering iron.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-heating</td>
<td>150°C, 1 min</td>
</tr>
<tr>
<td>Tip temperature</td>
<td>350°C max.</td>
</tr>
<tr>
<td>Soldering iron output</td>
<td>80W max.</td>
</tr>
<tr>
<td>Tip diameter</td>
<td>φ 3mm max.</td>
</tr>
<tr>
<td>Soldering time</td>
<td>3(+1,-0)s</td>
</tr>
<tr>
<td>Times</td>
<td>2 times</td>
</tr>
</tbody>
</table>

Note: Do not directly touch the products with the tip of the soldering iron in order to prevent the crack on the products due to thermal shock.

11.5 Solder Volume
- Solder shall be used not to exceed the upper limits as shown below.
- Accordingly increasing the solder volume, the mechanical stress to Chip is also increased.
  Exceeding solder volume may cause the failure of mechanical or electrical performance.

\[
\frac{1}{3}T \leq t \leq T \\
(T: \text{Lower flange thickness})
\]

11.6 Product's location
The following shall be considered when designing and laying out P.C.B.'s.
(1) P.C.B. shall be designed so that products are not subject to the 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) Products location on P.C.B. separation

Products (A,B,C,D) shall be located carefully so that products are not subject to the mechanical stress due to warping the board. Because they may be subjected the mechanical stress in order of A>C>B ≡ D.

11.7 Cleaning Conditions

Products shall be cleaned on the following conditions.

(1) Cleaning temperature shall be limited to 60°C max. (40°C max for IPA.)

(2) Ultrasonic cleaning shall comply with the following conditions with avoiding the resonance phenomenon at the mounted products and P.C.B.

Power : 20 W /l max. Frequency : 28kHz to 40kHz Time : 5 minutes max.

(3) Cleaner

1. Alternative cleaner
   - Isopropyl alcohol (IPA)

2. Aqueous agent
   - PINE ALPHA ST-100S

(4) There shall be no residual flux and residual cleaner after cleaning.

In the case of using aqueous agent, products shall be dried completely after rinse with de-ionized water in order to remove the cleaner.

(5) Other cleaning

Please contact us.

11.8 Resin coating

The inductance value may change due to high cure-stress of resin to be used for coating/molding products. An open circuit issue may occur by mechanical stress caused by the resin, amount/cured shape of resin, or operating condition etc. Some resin contains some impurities or chloride possible to generate chlorine by hydrolysis under some operating condition may cause corrosion of wire of coil, leading to open circuit. So, please pay your careful attention when you select resin in case of coating/molding the products with the resin. Prior to use the coating resin, please make sure no reliability issue is observed by evaluating products mounted on your board.

11.9 Caution for use

- Sharp material such as a pair of tweezers or other material such as bristles of cleaning brush, shall not be touched to the winding portion to prevent the breaking of wire.

- Mechanical shock should not be applied to the products mounted on the board to prevent the breaking of the core.

11.10 Handling of a 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.
11.11 Storage and Handling Requirements

(1) Storage period
Use the products within 12 months after delivered.
Solderability should be checked if this period is exceeded.

(2) Storage conditions
- Products should be stored in the warehouse on the following conditions.
  - Temperature : -10 ~ 40°C
  - Humidity : 15 to 85% relative humidity
  - No rapid change on temperature and humidity
  - The electrode of the products is coated with solder. Don’t keep products in corrosive gases such as
    sulfur, chlorine gas or acid, or it may cause oxidization of electrode, resulting in poor solderability.
- Products should not be stored on bulk packaging condition to prevent the chipping of the core and the
  breaking of winding wire caused by the collision between the products.
- Products should be stored on the palette for the prevention of the influence from humidity, dust and so on.
- Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.

(3) Handling Condition
Care should be taken when transporting or handling product to avoid excessive vibration or mechanical
shock.

12. 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 reference 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.