# Chip Ferrite Bead BLM03H□□□□□N1□ Reference Specification

## 1.Scope

This reference specification applies to Chip Ferrite Bead BLM03H_N Series.

## 2.Part Numbering

(ex.) BL M 03 HG 601 S N 1 D
(1) (2) (3) (4) (5) (6) (7) (8) (9)

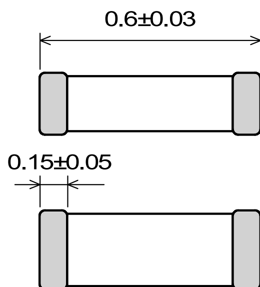
(1)Product ID (2)Type (3)Dimension(L×W) (4)Characteristics (5)Typical Impedance at 100MHz
(6)Performance(S:general/F:Low Rdc) (7)Category (8)Numbers of Circuit (9)Packaging(D:Taping / B:Bulk)

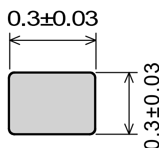
## 3.Rating

| Customer Part Number | MURATA Part Number | Impedance (Ω) (Under Standard Testing Condition) | | Rated Current (mA) | DC Resistance (Ω max.) | | Remark |
|---|---|---|---|---|---|---|---|
| | | at 100MHz | at 1GHz | | Initial Values | Values After Testing | |
| | BLM03HG601SN1D<br>BLM03HG601SN1B | 600±25% | 1000±40% | 150 | 1.6 | 1.7 | For general use |
| | BLM03HG102SN1D<br>BLM03HG102SN1B | 1000±25% | 1800±40% | 125 | 2.6 | 2.7 | For general use |
| | BLM03HG122SN1D<br>BLM03HG122SN1B | 1200±25% | 2000±40% | 100 | 3.5 | 3.6 | For general use |
| | BLM03HB191SN1D<br>BLM03HB191SN1B | 190±25% | 1150±40% | 150 | 2.0 | 2.1 | For general use |
| | BLM03HB401SN1D<br>BLM03HB401SN1B | 400±25% | 1850±40% | 125 | 2.8 | 2.9 | For general use |
| | BLM03HD331SN1D<br>BLM03HD331SN1B | 330±25% | 750±40% | 200 | 1.0 | 1.1 | For High speed Signal line |
| | BLM03HD471SN1D<br>BLM03HD471SN1B | 470±25% | 1000±40% | 175 | 1.3 | 1.4 | For High speed Signal line |
| | BLM03HD601SN1D<br>BLM03HD601SN1B | 600±25% | 1500±40% | 150 | 1.7 | 1.8 | For High speed Signal line |
| | BLM03HD102SN1D<br>BLM03HD102SN1B | 1000±25% | 2300±40% | 120 | 2.9 | 3.0 | For High speed Signal line |
| | BLM03HD102FN1D<br>BLM03HD102FN1B | 1000±25% | 2300±40% | 135 | 2.4 | 2.5 | For High speed Signal line |
| | BLM03HD152FN1D<br>BLM03HD152FN1B | 1500±25% | 2700±40% | 120 | 3.1 | 3.2 | For High speed Signal line |
| | BLM03HD182FN1D<br>BLM03HD182FN1B | 1800±25% | 3000±40% | 100 | 3.8 | 3.9 | For High speed Signal line |

■Operating Temperature : -55°C to +125°C ■Storage Temperature : -55°C to +125°C

## 4.Style and Dimensions

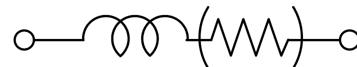



: Electrode

(in mm)

■ Equivalent Circuit



(Resistance element becomes dominant at high frequencies.)

■ Unit Mass(Typical value)
0.3mg

## 5.Marking

No marking.

## 6.Standard Testing Conditions

< Unless otherwise specified >
Temperature : Ordinary Temp. (15 °C to 35 °C )
Humidity : Ordinary Humidity (25%(RH) to 85%(RH))

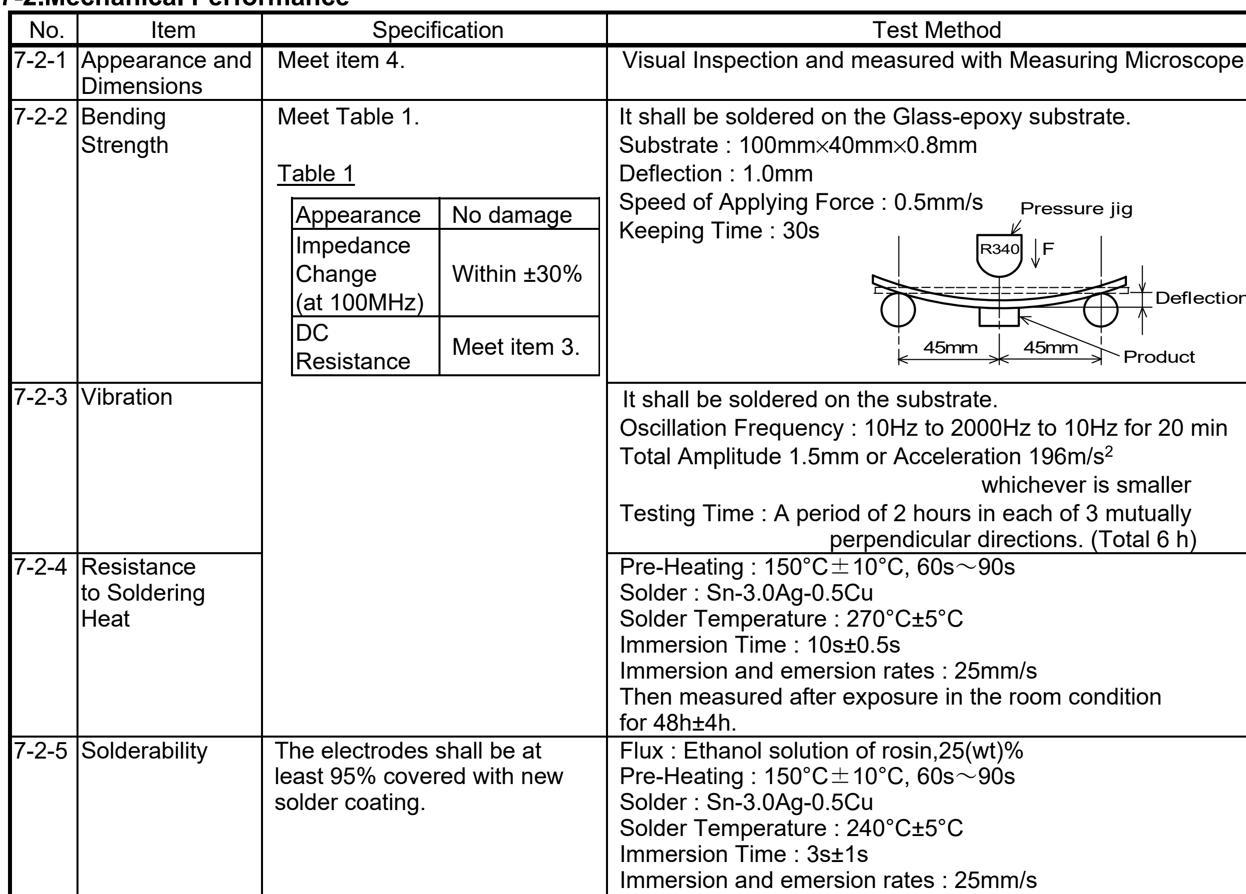
< In case of doubt >
Temperature : 20°C±2 °C
Humidity : 60%(RH) to 70%(RH)
Atmospheric pressure : 86kPa to 106kPa

## 7.Specifications

### 7-1.Electrical Performance

| No. | Item | Specification | Test Method |
|---|---|---|---|
| 7-1-1 | Impedance | Meet item 3. | Measuring Frequency : 100MHz±1MHz , 1GHz±1MHz<br>Measuring Equipment : KEYSIGHT 4991A or the equivalent<br>Test Fixture : KEYSIGHT 16197A or the equivalent |
| 7-1-2 | DC Resistance | Meet item 3. | Measuring Equipment : Digital multi meter<br>*Except resistance of the Substrate and Wire |

### 7-2.Mechanical Performance




| No. | Item | Specification | Test Method |
|---|---|---|---|
| 7-2-1 | Appearance and Dimensions | Meet item 4. | Visual Inspection and measured with Measuring Microscope. |
| 7-2-2 | Bending Strength | Meet Table 1.<br><br>Table 1<br>Appearance: No damage<br>Impedance Change (at 100MHz): Within ±30%<br>DC Resistance: Meet item 3. | It shall be soldered on the Glass-epoxy substrate.<br>Substrate : 100mm×40mm×0.8mm<br>Deflection : 1.0mm<br>Speed of Applying Force : 0.5mm/s<br>Keeping Time : 30s |
| 7-2-3 | Vibration | | It shall be soldered on the substrate.<br>Oscillation Frequency : 10Hz to 2000Hz to 10Hz for 20 min<br>Total Amplitude 1.5mm or Acceleration 196m/s$^2$ whichever is smaller<br>Testing Time : A period of 2 hours in each of 3 mutually perpendicular directions. (Total 6 h) |
| 7-2-4 | Resistance to Soldering Heat | | Pre-Heating : 150°C±10°C, 60s～90s<br>Solder : Sn-3.0Ag-0.5Cu<br>Solder Temperature : 270°C±5°C<br>Immersion Time : 10s±0.5s<br>Immersion and emersion rates : 25mm/s<br>Then measured after exposure in the room condition for 48h±4h. |
| 7-2-5 | Solderability | The electrodes shall be at least 95% covered with new solder coating. | Flux : Ethanol solution of rosin,25(wt)%<br>Pre-Heating : 150°C±10°C, 60s～90s<br>Solder : Sn-3.0Ag-0.5Cu<br>Solder Temperature : 240°C±5°C<br>Immersion Time : 3s±1s<br>Immersion and emersion rates : 25mm/s |

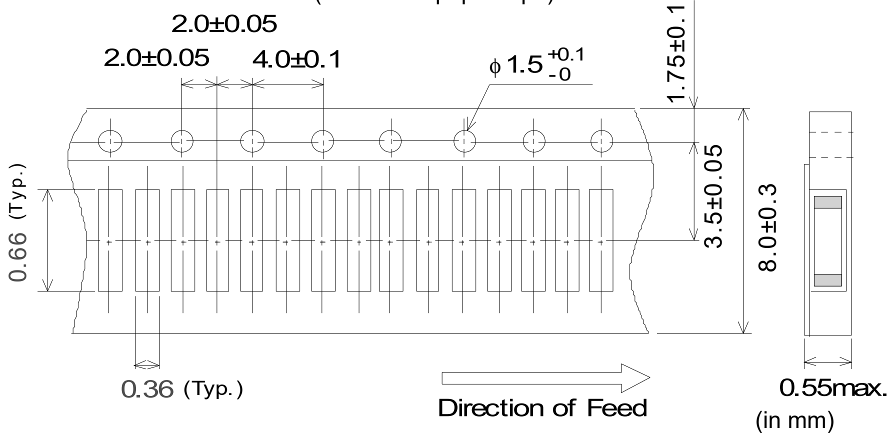
### 7-3.Environmental Performance

It shall be soldered on the substrate.

| No. | Item | Specification | Test Method |
|---|---|---|---|
| 7-3-1 | Temperature Cycle | Meet Table 1. | 1 cycle :<br>1 step : -55 °C(+0 °C,-3 °C) / 30min±3min<br>2 step : Ordinary temp. / 10min to 15min<br>3 step : +125 °C(+3 °C,-0 °C) / 30min±3min<br>4 step : Ordinary temp. / 10min to 15min<br>Total of 100 cycles<br>Then measured after exposure in the room condition for 48h±4h. |
| 7-3-2 | Humidity | | Temperature : 70°C±2°C<br>Humidity : 90%RH to 95%RH<br>Time : 1000h(+48h,-0h)<br>Then measured after exposure in the room condition for 48h±4h. |
| 7-3-3 | Heat Life | | Temperature : 125°C±3°C<br>Applying Current : Rated Current<br>Time : 1000h(+48h,-0h)<br>Then measured after exposure in the room condition for 48h±4h. |
| 7-3-4 | Cold Resistance | | Temperature : -55±2°C<br>Time : 1000h(+48h,-0h)<br>Then measured after exposure in the room condition for 48h±4h. |

## 8.Specification of Packaging

### 8-1.Appearance and Dimensions (8mm-wide paper tape)




(in mm)

(1)Taping

Products shall be packaged in the cavity of the base tape of 8mm-wide, 2mm-pitch continuously and sealed by cover tape .

(2)Sprocket hole:Sprocket hole shall be located on the right hand side toward the direction of feed.

(3)Spliced point:The base tape and cover tape have no spliced point

(4)Cavity:There shall not be burr in the cavity.

(5)Missing components number

Missing components number within 0.025% of the number per reel or 1 pc., whichever is greater, and are not continuous. The specified quantity per reel is kept.

### 8-2.Tape Strength

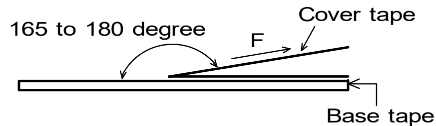
(1)Pull Strength

| Cover tape | 5N min. |
|---|---|

(2)Peeling off force of Cover tape

0.1N to 0.6N (Minimum value is typical.)

*Speed of Peeling off:300mm/min



**8-3.Taping Condition**

(1)Standard quantity per reel

| Quantity per 180mm reel | 15000 pcs. / reel |
|---|---|

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

(3)On paper tape, the top tape and the base tape shall not be adhered at the tip of the empty leader tape for more than 5 pitch.

(4) Marking for reel

The following items shall be marked on a label and the label is stuck on the reel.
(Customer part number, MURATA part number, Inspection number(∗1), RoHS marking(∗2), Quantity, etc)

∗1) « Expression of Inspection No. » □□ OOOO ××× (1) (2) (3)

(1) Factory Code
(2) Date First digit : Year / Last digit of year
Second digit : Month / Jan. to Sep. → 1 to 9, Oct. to Dec. → O,N,D
Third, Fourth digit : Day
(3) Serial No.

∗2) « Expression of RoHS marking » ROHS – Y (△) (1) (2)

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

(5) Outside package

These reels shall be packed in the corrugated cardboard package and the following items shall be marked on a label and the label is stuck on the box.
(Customer name, Purchasing Order Number, Customer Part Number, MURATA part number, RoHS marking(∗2) , Quantity , etc)

(6)Dimensions of reel and taping(leader-tape, trailer-tape)

trailer
160 min.
2.0±0.5
label
leader
190 min.
210 min.
product storage part
empty tape
cover tape or top tape
ø60+1/-0
ø13.0±0.2
ø21.0±0.8
direction of feed
8.4+1.5/-0
14.4 max.
ø180+0/-3
(in mm)

**8-4. Specification of Outer Case**

Label
H
W
D

| Outer Case Dimensions (mm) | | | Standard Reel Quantity in Outer Case (Reel) |
|---|---|---|---|
| W | D | H | |
| 186 | 186 | 93 | 5 |

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

## 9. ⚠ Caution

### 9-1.Surge current

Excessive surge current (pulse current or rush current) than specified rated current applied to the product may cause a critical failure, such as an open circuit, burnout caused by excessive temperature rise.
Please contact us in advance in case of applying the surge current.

### 9-2.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) Disaster prevention / crime prevention equipment
(7) Traffic signal equipment
(8) Transportation equipment (vehicles, trains, ships, etc.)
(9) Data-processing equipment
(10) Applications of similar complexity and / or reliability requirements to the applications listed in the above.

### 9-3. Corrosive gas

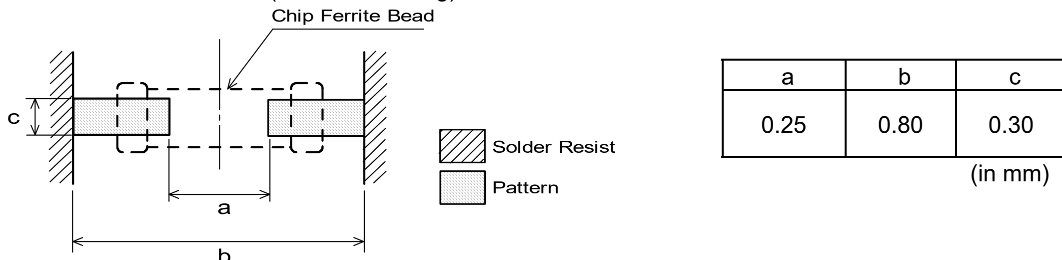
Please refrain from use since contact with environments with corrosive gases (sulfur gas [hydrogen sulfide, sulfur dioxide, etc.], chlorine, ammonia, etc.) or oils (cutting oil, silicone oil, etc.) that have come into contact with the previously stated corrosive gas environment will result in deterioration of product quality or an open from deterioration due to corrosion of product electrode, etc. We will not bear any responsibility for use under these environments.

## 10. Notice

Products can only be soldered with reflow.
This product is designed for solder mounting.
Please consult us in advance for applying other mounting method such as conductive adhesive.

### 10-1.Land pattern designing

• Standard land dimensions (Reflow soldering)




| a | b | c |
|---|---|---|
| 0.25 | 0.80 | 0.30 |

(in mm)

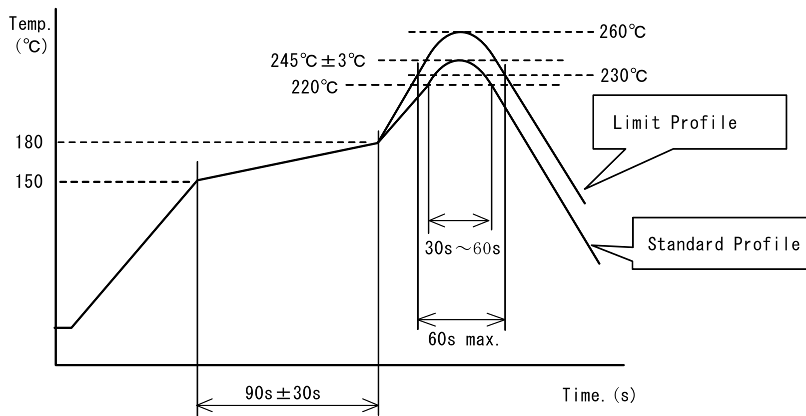
### 10-2.Soldering Conditions

(1) Flux,Solder

| | |
|---|---|
| Flux | Use rosin-based flux, but not highly acidic flux (with chlorine content exceeding 0.2(wt)%. )<br>Do not use water-soluble flux. |
| Solder | Use Sn-3.0Ag-0.5Cu solder<br>Standard thickness of solder paste : 100 μm to 150 μm |

(2) Soldering conditions

- Pre-heating should be in such a way that the temperature difference between solder and ferrite surface is limited to 150℃ max. Also cooling into solvent after soldering should be in such a way that the temperature difference is limited to 100℃ max.
  Insufficient pre-heating may cause cracks on the ferrite, 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.




| | Standard Profile | Limit Profile |
|---|---|---|
| Pre-heating | 150～180°C 、90s±30s | |
| Heating | above 220°C、30s～60s | above 230°C、60s max. |
| Peak temperature | 245±3°C | 260°C,10s |
| Cycle of reflow | 2 times | 2 times |

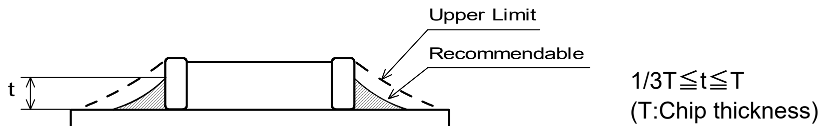
**10-3. Reworking with soldering iron**

- Pre-heating: 150°C, 1 min
- Soldering iron output: 80W max.
- Tip temperature: 350°C max.
- Tip diameter: ϕ 3mm max.
- Soldering time : 3(+1,-0) seconds.
- Times : 2times max.

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

**10-4.Solder Volume**

Solder shall be used not to be exceeded as shown below.



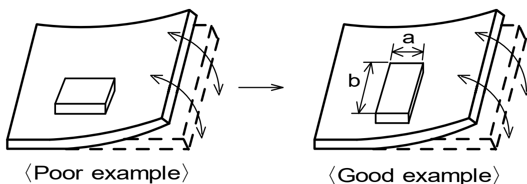

1/3T≦t≦T
(T:Chip thickness)

Accordingly increasing the solder volume, the mechanical stress to product is also increased.
Exceeding solder volume may cause the failure of mechanical or electrical performance.

**10-5.Attention regarding P.C.B. bending**

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 for board warpage.
<Products direction>

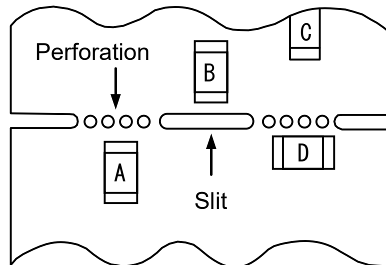



Products shall be located in the sideways direction (Length:a<b) to the mechanical stress.

(2)Components location on P.C.B. 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.

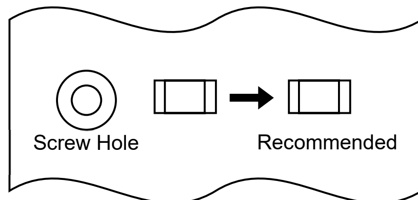
| Contents of Measures | Stress Level |
|---|---|
| (1) Turn the mounting direction of the component parallel to the board separation surface. | A > D *1 |
| (2) Add slits in the board separation part. | A > B |
| (3) Keep the mounting position of the component away from the board separation surface. | 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.




**10-6.Mounting density**

Add special attention to radiating heat of products when mounting the inductor near the products with heating.
The excessive heat by other products may cause deterioration at joint of this product with substrate.

**10-7. Cleaning**

When cleaning this product, observe the following conditions.
Any cleaning may cause deterioration in the quality of the product, so please check the quality of this product before use.

(1) The cleaning temperature shall be 60°C max. If isopropyl alcohol (IPA) is used, the cleaning temperature shall be 40°C max.

(2) When ultrasonic cleaning is used, under some cleaning conditions, the substrate could resonate and the substrate vibrations could result in chip cracks, solder breakage, and other problems. Be sure to always perform a test cleaning beforehand using an actual cleaning device, and then check the quality of the products.

(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, please consult our technical department.