GHz Noise Suppression Chip Ferrite Bead BLM21HE□□□SN1□ Reference Specification

1. Scope

This reference specification applies to GHz Noise Suppression Chip Ferrite Bead BLM21HE□□□SN1□ series for general electronic equipment.

2. Part Numbering

(Ex.)

BL	M	21	HE	601	S	N	1	L
Product ID	Type	Dimension (L × W)	Application and characteristic	Impedance	Performance	Category	Number of line	Packaging L: taping *B: bulk

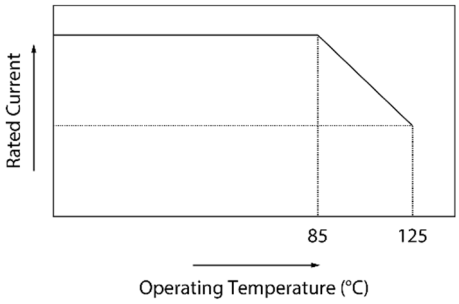
*B: Bulk packing is also available.

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	Impedance (Ω) at 100 MHz	Impedance (Ω) at 1 GHz	Rated current* (mA)		DC resistance (Ω max.)	
				Ambient temperature 85°C	Ambient temperature 125°C	Initial value	Value after testing
	BLM21HE601SN1L	600±25%	450±40%	2300	1500	0.055	0.075
	BLM21HE122SN1L	1200±25%	450±40%	1600	1100	0.11	0.14
	BLM21HE472SN1L	4700±25%	750±40%	850	600	0.40	0.50
	BLM21HE802SN1L	8000±25%	850±40%	650	500	0.70	0.90

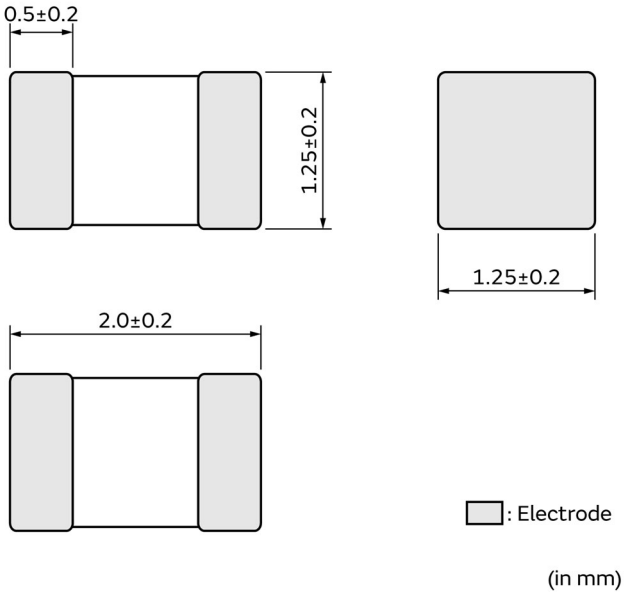
* As shown in the diagram below, derating is applied to the rated current based on the operating temperature



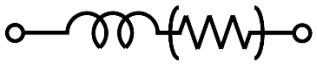
4. Testing Conditions

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 and Dimensions



■ Equivalent Circuit



(Resistance element becomes dominant at high frequencies.)

no polarity

Unit mass (typical value): 0.0098 g

6. Marking

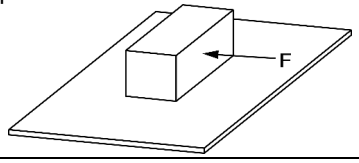
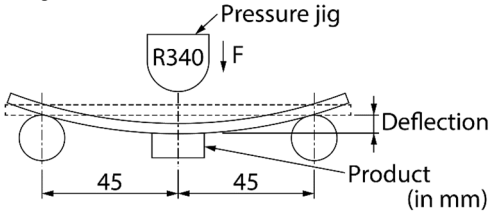
No marking.

7. Electrical Performance

No.	Item	Specification	Test method
7.1	Impedance	Meet chapter 3 ratings.	Measuring equipment: Keysight 4291A or the equivalent Measuring frequency: 100 MHz, 1 GHz Measuring fixture: Keysight 16197A or the equivalent
7.2	DC resistance	Meet chapter 3 ratings.	Measuring equipment: digital multimeter except resistance of the substrate and wire.

8. Mechanical Performance

The product is soldered on a substrate for test.(Except Resistance to soldering heat, Solderability)
(Test shall be done using Flux, Solder and Soldering condition which are specified in chapter 12 except the case of being specified special condition.)

No.	Item	Specification	Test method
8.1	Shear test	No significant mechanical damage or no sign of electrode peeling off shall be observed.	Applying force: 9.8 N Holding time: 5 s Force application direction: 
8.2	Bending test	No significant mechanical damage or no sign of electrode peeling off shall be observed.	Test substrate: glass-epoxy substrate (100 mm × 40 mm ×1.6 mm) Pressurizing speed: 1.0 mm/s Pressure jig: R340 Amount of bending: 2 mm Holding time: 20 s 

No.	Item	Specification	Test method
8.3	Vibration	Appearance shall have no significant mechanical damage.	Oscillation frequency: 10 Hz to 2000 Hz to 10 Hz/20 min Total amplitude: 3.0 mm or acceleration amplitude of 196 m/s^2, whichever is smaller Test time: 3 directions perpendicular to each other, 2 h for each direction (6 h in total)
8.4	Resistance to soldering heat	Appearance: No significant mechanical damage shall be observed. Impedance change rate: within ±50% DC resistance: Meet chapter 3 ratings.	Flux: Ethanol solution of rosin, 25(wt)% Pre-heating: 150°C/60 s Solder: Sn-3.0Ag-0.5Cu solder Solder temperature: 260°C±5°C Immersion time: 10 s Post-treatment: left for 4 hours to 48 hours at room temperature.
8.5	Solderability	95% or more of the outer electrode shall be covered with new solder seamlessly.	Flux: Ethanol solution of rosin, 25(wt)% Pre-heating: 150°C/60 s Solder: Sn-3.0Ag-0.5Cu solder Solder temperature: 245°C±3°C Immersion time: 3 s

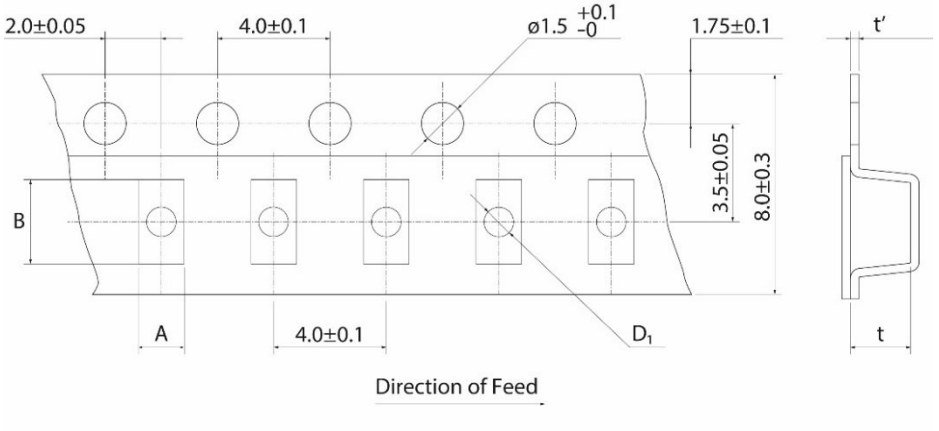
9. Environmental Performance

The product is soldered on a substrate for test.
(Test shall be done using Flux, Solder and Soldering condition which are specified in chapter 12 except the case of being specified special condition.)

No.	Item	Specification	Test method
9.1	Heat life	Appearance: No significant mechanical damage shall be observed. Impedance change rate: within ±50% DC resistance: Meet chapter 3 ratings.	Temperature: 125°C±2°C Applying current: Rated current at test temperature Test time: 1000 h (+48 h, -0 h) Post-treatment: left for 4 hours to 48 hours at room temperature.
9.2	Cold resistance	Appearance: No significant mechanical damage shall be observed. Impedance change rate: within ±50% DC resistance: Meet chapter 3 ratings.	Temperature: -55°C±2°C Test time: 1000 h (+48 h, -0 h) Post-treatment: left for 4 hours to 48 hours at room temperature.
9.3	Humidity	Appearance: No significant mechanical damage shall be observed. Impedance change rate: within ±50% DC resistance: Meet chapter 3 ratings.	Temperature: 40°C±2°C Humidity: 90% to 95% (RH) Test time: 1000 h (+48 h, -0 h) Post-treatment: left for 4 hours to 48 hours at room temperature.
9.4	Temperature cycle	Appearance: No significant mechanical damage shall be observed. Impedance change rate: within ±50% DC resistance: Meet chapter 3 ratings.	Single cycle conditions: Step 1: -55°C (+0°C, -3°C), 30 min (+3 min, -0 min) Step 2: ordinary temperature, 3 min max. Step 3: +125°C (+3°C, -0°C), 30 min (+3 min, -0 min) Step 4: ordinary temperature, 3 min max. Number of testing: 100 cycles Post-treatment: left for 4 hours to 48 hours at room temperature.

10. Specification of Packaging

10.1 Appearance and dimensions of tape (8 mm width/plastic tape)



A	1.45±0.1
B	2.25±0.1
t	1.3±0.1
t'	0.2±0.1
D1	φ1.0+0.1/-0

(in mm)

* The dimensions of the cavity are measured at its bottom.

10.2 Taping specifications

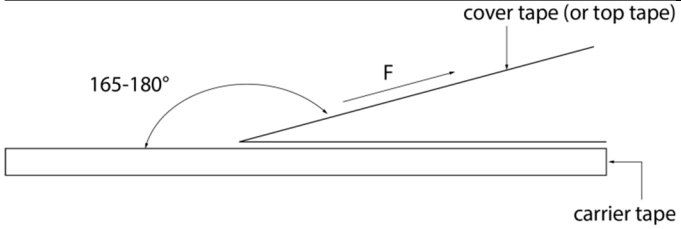
Packing quantity (Standard quantity)	3000 pcs/reel
Packing method	The products are placed in cavities of a carrier tape and sealed by a cover tape (top tape and bottom tape when the cavities of the carrier tape are punched type).
Feed hole position	The feed holes on the carrier tape are on the right side when the cover tape (top tape when the cavities of the carrier tape are punched type) is pulled toward the user.
Joint	The carrier tape and cover tape (top tape when the cavities of the carrier tape are punched type) are seamless.
Number of missing products	Number of missing products 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.

10.3 Break down force of tape

Cover tape (or top tape)	5 N min.
Bottom tape (only when the cavities of the carrier tape are punched type)	5 N min.

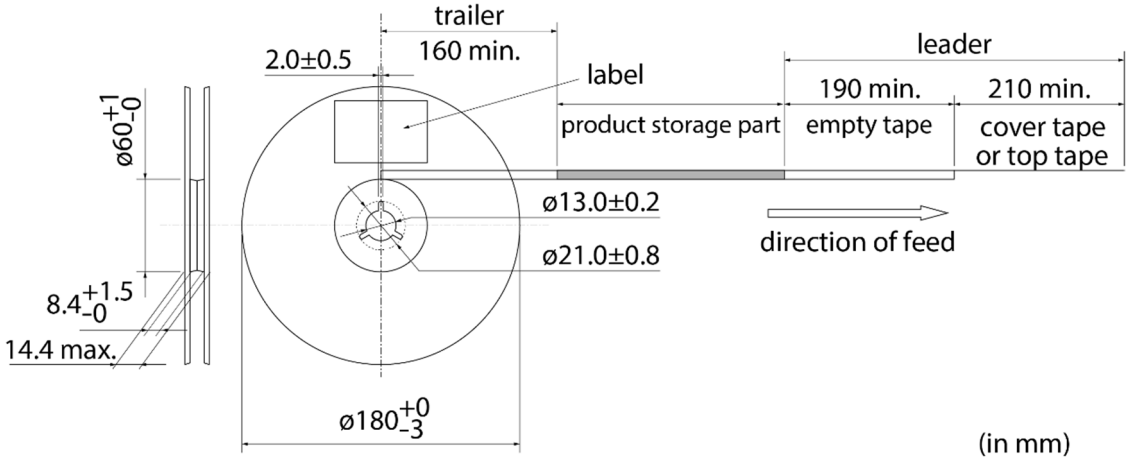
10.4 Peeling off force of tape

Speed of peeling off	300 mm/min
Peeling off force	0.1 N to 0.7 N (The lower limit is for typical value.)



10.5 Dimensions of leader section, trailer section and reel

A vacant section is provided in the leader (start) section and trailer (end) section of the tape for the product. The leader section is further provided with an area consisting only of the cover tape (or top tape). (See the diagram below.)



10.6 Marking for reel

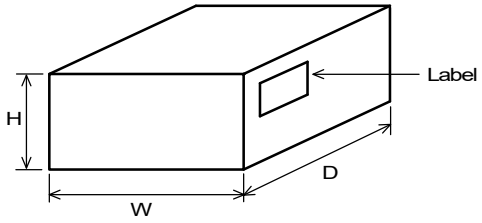
Customer part number, Murata part number, inspection number (*1), RoHS marking (*2), quantity, etc.

*1 Expression of inspection No.: □□ (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 (2) Murata classification number

10.7 Marking on outer box (corrugated box)

Customer name, purchasing order number, customer part number, Murata part number, RoHS marking (*2), quantity, etc.

10.8 Specification of outer box



Dimensions of outer box (mm)			Standard reel quantity in outer box (reel)
W	D	H	
186	186	93	5
* Above outer box size is typical. It depends on a quantity of an order.			

11. ⚠Caution

11.1 Restricted 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/crime prevention equipment
(9) Data-processing equipment
(10) Applications of similar complexity and/or reliability requirements to the applications listed in the above

11.2 Precautions on rating

Avoid using in exceeded the rated temperature range, rated voltage, or rated current.
Usage when the ratings are exceeded could lead to wire breakage, burning, or other serious fault.

11.3 Inrush current

If an inrush current (or pulse current or rush current) that significantly exceeds the rated current is applied to the product, overheating could occur, resulting in wire breakage, burning, or other serious fault.

11.4 Corrosive gas

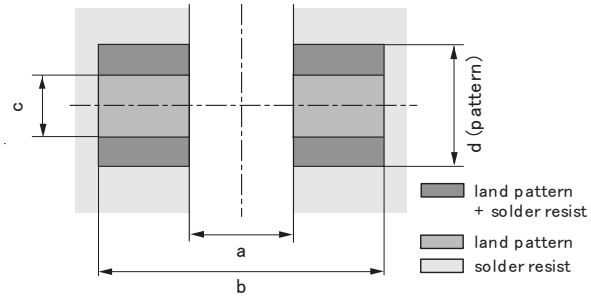
Please refrain from use since contact with environments with corrosive gases (sulfur gas [hydrogen sulfide, sulfur dioxide, etc.], chlorine, ammonia, etc.) or oils (cutting oil, silicone oil, etc.) that have come into contact with the previously stated corrosive gas environment will result in deterioration 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.

12. Precautions for Use

This product is designed to be mounted by soldering. If you want to use other mounting method, for example, using a conductive adhesive, please consult us beforehand.
Also, if repeatedly subjected to temperature cycles or other thermal stress, due to the difference in the coefficient of thermal expansion with the mounting substrate, the solder (solder fillet part) in the mounting part may crack.
The occurrence of cracks due to thermal stress is affected by the size of the land where mounted, the solder volume, and the heat dissipation of the mounting substrate. Carefully design it when a large change in ambient temperature is assumed.

12.1 Land dimensions

The following diagram shows the recommended land dimensions for flow and reflow soldering:



	a	b	c	Pattern thickness and dimension d	
				35 µm	70 µm
Flow	1.1	3.5	0.95	12.0	6.0
Reflow	1.2	2.4	1.25	12.0	6.0
If heat generation from patterns is large, please pay attention since the joint of products with substrates may deteriorate.					

(in mm)

12.2 Flux and solder used

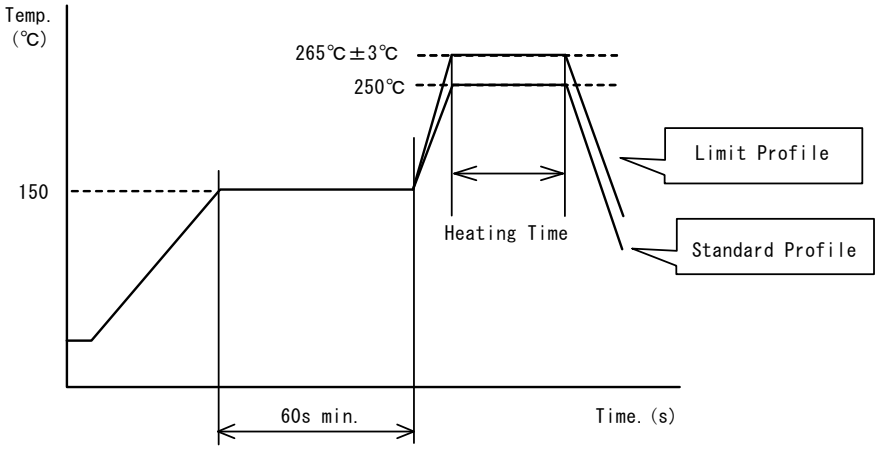
Flux	• Use a rosin-based flux. • Do not use a highly acidic flux with a halide content exceeding 0.2(wt)% (chlorine conversion value). • Do not use a water-soluble flux.
Solder	• Use Sn-3.0Ag-0.5Cu solder. • Standard thickness of solder paste: 100 µm to 200 µm

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

12.3 Soldering conditions (flow, reflow)

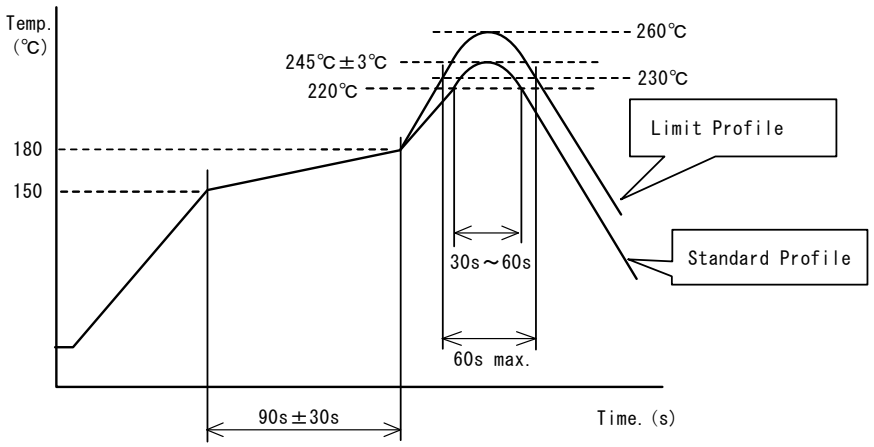
- Pre-heating should be in such a way that the temperature difference between solder and product surface is limited to 100°C max.
  Cooling into solvent after soldering also should be in such a way that the temperature difference is limited to 100°C max.
  Insufficient pre-heating may cause cracks on 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.

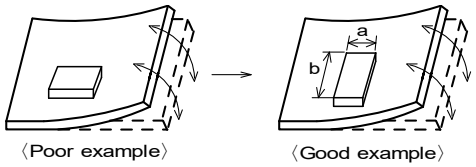
Item	Requirement
Pre-heating	150°C/approx. 1 min
Tip temperature of soldering iron	350°C max.
Power consumption of soldering iron	60 W max.
Tip diameter of soldering iron	ø3 mm max.
Soldering time	3 s (+1 s, -0 s)
Number of reworking operations	2 times max.
* Avoid a direct contact of the tip of the 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 increase the volume too much.
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.

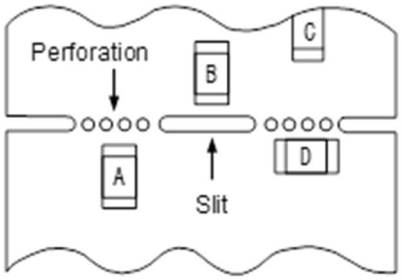


(2) Components location on PCB separation

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.

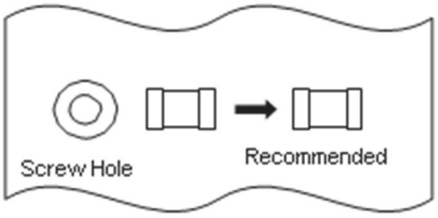
Contents of measures	Stress level
(1) Turn the mounting direction of the component parallel to the board separation surface.	A > D*1
(2) Add slits in the board separation part.	A > B
(3) Keep the mounting position of the component away from the board separation surface.	A > C
*1 A > D is valid when stress 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

Excessive ultrasonic oscillation during cleaning can cause the PCBs to resonate, resulting in cracked chips or broken solder joints. Before starting your production process, test your cleaning equipment / process to insure it does not degrade this product.