

Block Type EMIFIL for Consumer equipment & Industrial equipment BNX00□-11 REFERENCE SPECIFICATION

1. Scope

This reference specification applies to Block Type EMIFIL BNX00□-11 series.

1.1 Specific applications:

- Power equipment: Products that can be used in power equipment such as renewable energy equipment, energy storage equipment and EV charging equipment and whose functions are not directly related to the protection of human life and property.
- Industrial equipment: Products that can be used in industrial equipment such as base stations, manufacturing equipment, industrial robotics equipment, and measurement equipment, and whose functions do not directly relate to the protection of human life and property.
- Medical equipment (GHTF Class C) *Except for implant/surgery/auto injector: Products that can be used for medical equipment of Class C of the international classification class GHTF and whose malfunction is considered to pose a relatively high risk to the human body.
- Medical equipment (GHTF Class A and B): Products that can be used for medical equipment regulated by Class A and Class B of the international classification class GHTF and whose functions do not directly relate to the protection of human life and property.
- Consumer equipment: Products that can be used in consumer equipment such as home appliances, audio/visual equipment, communication equipment, information equipment, office equipment, and household robotics, and whose functions are not directly related to the protection of human life and property.

1.2 Unsuitable application:

Applications listed in "Limitation of applications" in this reference specification.

WE DISCLAIM ANY LOSS AND DAMAGES ARISING FROM OR IN CONNECTION WITH THE PRODUCTS INCLUDING BUT NOT LIMITED TO THE CASE SUCH LOSS AND DAMAGES CAUSED BY THE UNEXPECTED ACCIDENT, IN EVENT THAT THE PRODUCT IS APPLIED FOR THE PURPOSE WHICH IS SPECIFIED ABOVE AS THE UNSUITABLE APPLICATION FOR THE PRODUCT.

2. Rating

Customer Part Number	Murata Part Number	Rated Voltage V(DC)	Withstanding Voltage V(DC)	Rated Current A(DC)	Insulation Resistance MΩmin.	Voltage Drop mV max.	Insertion Loss dB min.
	BNX002-11	50	125	10	100	30	1 MHz to 1 GHz: 40
	BNX003-11	150	375	10	100	30	5 MHz to 1 GHz: 40
	BNX005-11	50	125	15	100	30	1 MHz to 1 GHz: 40

- Operating Temperature -40°C to +85°C
- Storage Temperature -40°C to +85°C

3. Standard Testing Condition

<Unless otherwise specified>

Temperature : Ordinary Temp. 15 °C to 35 °C

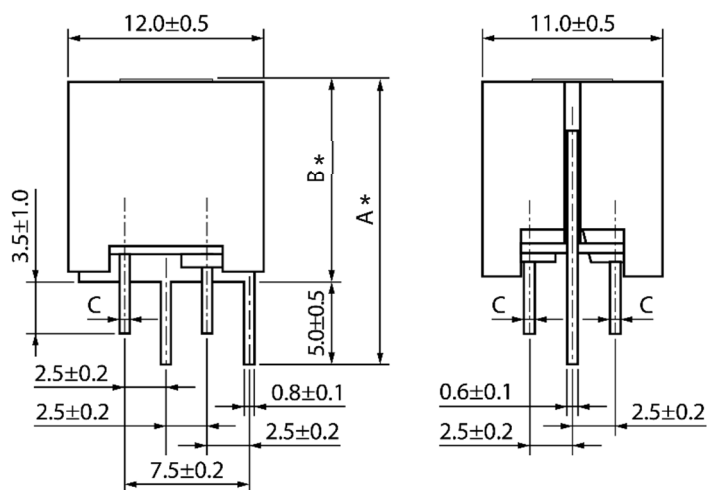
Humidity : Ordinary Humidity 25 %(RH) to 85 %(RH)

<In case of doubt>

Temperature : 20 °C ± 2 °C

Humidity : 60 %(RH) to 70 %(RH)

Atmospheric pressure : 86 kPa to 106 kPa

4. Style and Dimensions

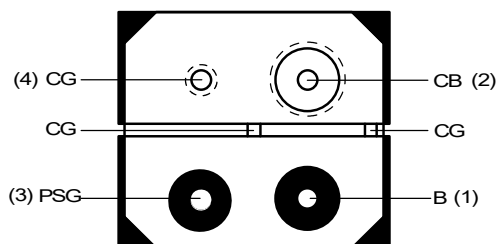
Part Number	A	B	C
BNX002-11	18.0 max.	12.5 max.	($\phi 0.8$)
BNX003-11	18.0 max.	12.5 max.	($\phi 0.8$)
BNX005-11	18.0 max.	13.0 max.	($\phi 1.0$)

(in mm)

*The upper one between the top of the case and the surface of the capacitor is adopted in the measurement of the height of the product.

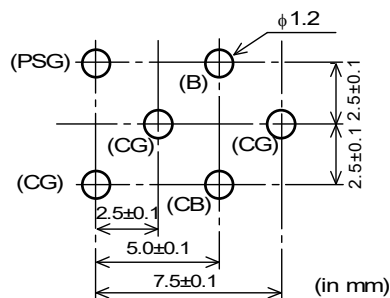
Note) Although some part of the product surface seems to be white in some cases, do not care because it is the result of waxing process for humidity resistance improvement. This wax does not make bad affection to mechanical or electrical performance, reliability of the product.

• TERMINAL LAYOUT (BOTTOM FIGURE)



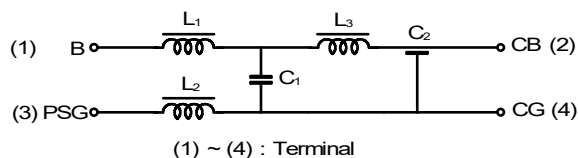
• DIMENSIONS OF INSTALLATION HOLES

(front view)



(in mm)

• EQUIVALENT CIRCUIT



• Unit Mass (Typical value)

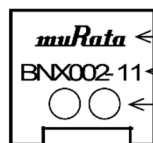
BNX002-11 3.0g

BNX003-11 3.2g

BNX005-11 3.3g

5. Marking

Filter shall be marked as follows.



Murata mark

Part Number

Manufacturing Date

(Ex.) 59

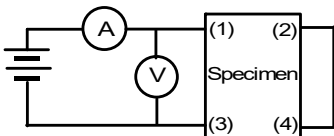
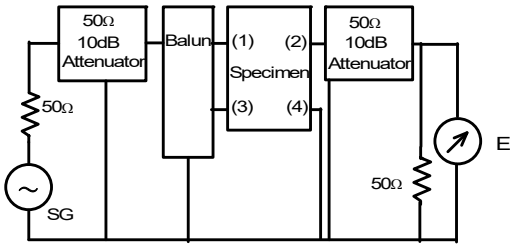
5 ... 1995 (Last digit of the year)

9 ... September

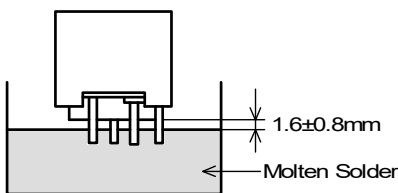
(Jan. to Sept. 1 ~ 9

(Oct. : O, Nov. : N, Dec. : D)

6. Electrical Performance

No.	Item	Specification	Test Method
6.1	Insulation Resistance	Meet item 2.	Measured at DC rated voltage between terminal (1)(2) and (3)(4). Time: 1 minute Suitable resistor: 1MΩ.
6.2	Withstanding Voltage	Filter shall be no failure.	Voltage shall be applied between terminal (1)(2) and terminal (3)(4). Time : 1 to 5 seconds. Charging current : 50 mA max.
6.3	Voltage Drop	Meet item 2.	Rated Current: 10 A (BNX002-11, BNX003-11) 15 A (BNX005-11) 
6.4	Insertion Loss	Meet item 2.	 * Method of measurement based on MIL-STD-220 Insertion Loss = $20\log (E_0 / E_1)$ E_0 : Level without FILTER (short) E_1 : Level with FILTER

7. Mechanical Performance

No.	Item	Specification	Test Method										
7.1	Appearance and Dimensions	Meet item 4.	Visual Inspection and measured with Slide Calipers.										
7.2	Marking	Marking is able to be read easily.	It is inspected Visually.										
7.3	Vibration	Meet Table 1. <table><tr><td colspan="2">Table 1</td></tr><tr><td>Appearance</td><td>No damaged</td></tr><tr><td>Insulation Resistance</td><td>30 MΩ min.</td></tr><tr><td>Dielectric Strength</td><td>No failure</td></tr><tr><td>Insertion Loss</td><td>Meet item 2.</td></tr></table>	Table 1		Appearance	No damaged	Insulation Resistance	30 MΩ min.	Dielectric Strength	No failure	Insertion Loss	Meet item 2.	It shall be soldered on the substrate. Range of Vibration Frequency : 10 to 2000 to 10Hz for 20 minutes Testing Time: A period of 2 hours in each of 3 Mutually perpendicular directions (Total 6 hours) Double Amplitude: 1.5mm or acceleration 196m / s ² Then measured after exposure in the room condition for 4 to 24 hours.
Table 1													
Appearance	No damaged												
Insulation Resistance	30 MΩ min.												
Dielectric Strength	No failure												
Insertion Loss	Meet item 2.												
7.4	Solderability	Then the lead is covered with a continuous new solder coating at least 75% along the circumference of the immersed part.	Flux: Ethanol solution of rosin, 25(wt)% Pre-heat: 150 ± 10 °C, 60 ~ 90 s Solder: Sn-3.0Ag-0.5Cu Solder Temperature: 245 ± 5 °C Immersion Time: 2 ± 0.5 seconds 										

No.	Item	Specification	Test Method
7.5	Resistance to soldering heat	Meet Table 1.	Flux : Ethanol solution of rosin, 25(wt)% Pre-heat: 150 ± 10 °C, 60 ~ 90 s Solder: Sn-3.0Ag-0.5Cu Solder Temperature: 270 ± 10 °C Immersion Time: 10s (+ 2s , - 0s) Then measure values after exposure in the room condition for 24 to 48 hours.
7.6	Resistance to soldering iron		Solder: Sn-3.0Ag-0.5Cu Tip Temperature: 350 ± 10 °C Time: 4 ± 1 s Then measure values after exposure in the room condition for 24 to 48 hours.

8. Environmental Performance

No.	Item	Specification	Test Method
8.1	Temperature Cycle	Meet Table 1.	1 Cycle 1 step: - 40 °C (+ 0°C , - 3°C) / 30 minutes 2 step: Room Temperature / within 5 minutes. 3 step: + 85 °C (+ 3°C , - 0°C) / 30 minutes 4 step: Room Temperature / within 5 minutes. Total of 10 cycle Then measured after exposure in the room condition for 24 to 48 hours.
8.2	Humidity Life		Temperature: 40 ± 2 °C Humidity: 95 %(RH) Applying Voltage: Rated Voltage Time: 500 h (+ 24h , - 0h) Then measured after exposure in the room condition for 4 to 24 hours.
8.3	Heat Life		Temperature: 85 ± 2 °C Applying Voltage: Rated Voltage × 2 Time: 1000 h (+ 48h , - 0h) Then measured after exposure in the room condition for 24 to 48 hours.

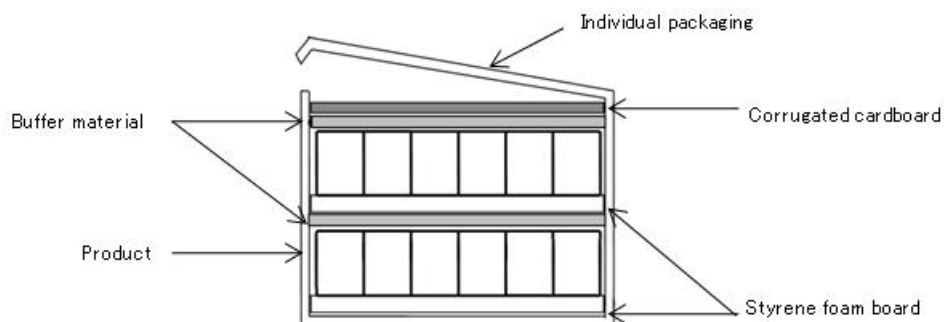
9. Specification of Packaging

9.1.Packing Quantity

Individual packaging
100pcs

9.2. Packing Method

Styrene foam which have 50 pcs of the stuck products on are placed in an Individual packaging as 2 steps.
A quantity in an Outer packaging is depending on a quantity of an order.



In some cases , omit the Buffer material and/or Corrugated cardboard.

9.3. Marking of packaging

(1) Individual packing

The following items shall be marked on a label and the label is stuck on the Individual packaing.

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

[illegible]

(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 discrimination » $\text{ROHS} - \frac{Y}{(1) (2)}$

(1) RoHS regulation conformity parts.

(2) MURATA classification number

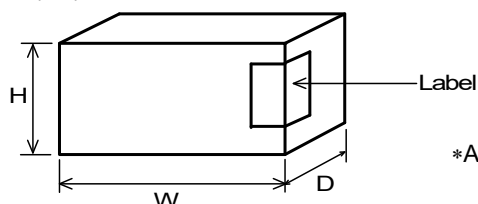
(2) Marking for Outside package

The following items shall be marked on a label and the label is stuck on the outside package.

Customer name, Purchasing Order Number, Customer Part Number, MURATA part number, RoHS discrimination(*2) , Quantity , etc

9.4 Specification of Outer Case

(ex.)



Outer Case Dimensions (mm)			Standard Individual package Quantity in Outer Case
W	D	H	
265	89	118	5

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

10. ⚠ Caution

10.1 Limitation of applications

The products listed in the reference specification (hereinafter the product(s) is called as the “Product(s)”) are designed and manufactured for applications specified in the reference specification (hereinafter called as the “Specific Application”).

We shall not warrant anything in connection with the Products including fitness, performance, adequateness, safety, or quality, in the case of applications listed in from (1) to (11) written at the end of this precautions, which may generally require high performance, function, quality, management of production or safety. Therefore, the Product shall be applied in compliance with the specific application.

WE DISCLAIM ANY LOSS AND DAMAGES ARISING FROM OR IN CONNECTION WITH THE PRODUCTS INCLUDING BUT NOT LIMITED TO THE CASE SUCH LOSS AND DAMAGES CAUSED BY THE UNEXPECTED ACCIDENT, IN EVENT THAT (i) THE PRODUCT IS APPLIED FOR THE PURPOSE WHICH IS NOT SPECIFIED AS THE SPECIFIC APPLICATION FOR THE PRODUCT, AND/OR (ii) THE PRODUCT IS APPLIED FOR ANY FOLLOWING APPLICATION PURPOSES FROM (1) TO (11) (EXCEPT THAT SUCH APPLICATION PURPOSE IS UNAMBIGUOUSLY SPECIFIED AS SPECIFIC APPLICATION FOR THE PRODUCT IN OUR CATALOG SPECIFICATION FORMS, DATASHEETS, OR OTHER DOCUMENTS OFFICIALLY ISSUED BY US*).

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Power plant control equipment
- (5) Medical equipment
- (6) Transportation equipment
- (7) Traffic control equipment
- (8) Disaster prevention/security equipment
- (9) Industrial data-processing equipment
- (10) Combustion/explosion control equipment
- (11) Equipment with complexity and/or required reliability equivalent to the applications listed in the above.

For exploring information of the Products which will be compatible with the particular purpose other than those specified in the reference specification, please contact our sales offices, distribution agents, or trading companies with which you make a deal, or via our web contact form.

Contact form: <https://www.murata.com/contactform>

* We may design and manufacture particular Products for applications listed in (1) to (11). Provided that, in such case we shall unambiguously specify such Specific Application in the reference specification without any exception. Therefore, any other documents and/or performances, whether exist or non-exist, shall not be deemed as the evidence to imply that we accept the applications listed in (1) to (11).

10.2 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.

11. Notice

11.1. Using the block type EMIFIL® (BNX) effectively

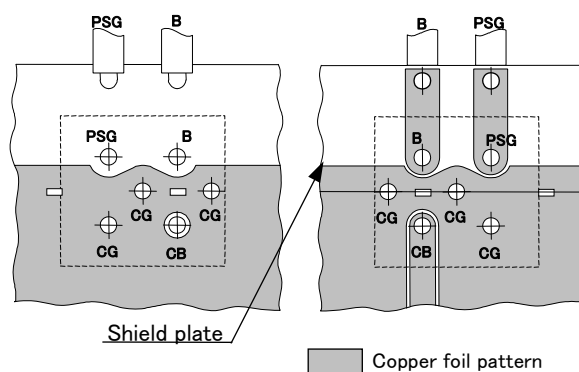
This product effectively prevents undesired radiation and external noise from going out / entering the circuit by grounding the high frequency components which cause noise problem. Therefore, grounding condition may affect on the performance of the filter and following attentions should be paid for effective use.

- (1) Design maximized grounding area in the P.C. board, and grounding pattern for all the grounding terminals of the product to be connected. (Recommended to use our recommendation in this spec.)
- (2) Minimize the distance between ground of the P.C. board and the ground plate of the product. (Recommended to use through-hole connection between grounding area both of component side and bottom side.)
- (3) Insert the terminals into the holes on P.C. board completely.
- (4) Don't connect PSG terminal with CG terminal directly. (See the item 4. TERMINAL LAYOUT)

【 P.C. BOARD PATTERNS 】

Use a bilateral P.C.board. Insert the BNX into the P.C.board until the root of the terminal is secured. then solder.

(1) COMPONENT SIDE VIEW (2) BOTTOM VIEW

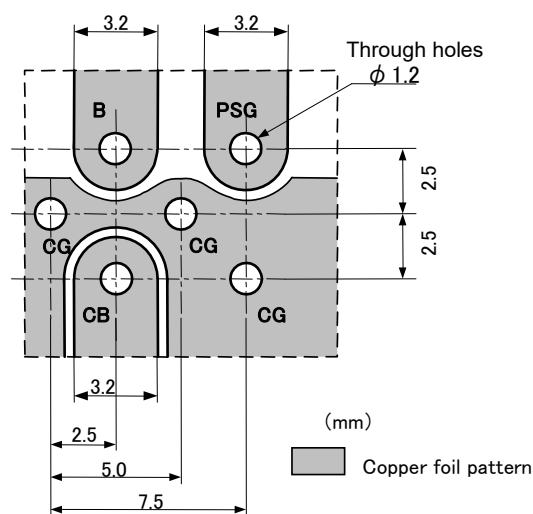


11.2. Self-heating

Though this product has a large rated current, the localized self-heating may be caused depending on soldering conditions. To avoid this, following attention should be paid.

- (1) Use P.C. board with our recommendation on hole diameter / land pattern dimensions, mentioned in the right hand drawing, especially for 4 terminals which pass current.
- (2) Solder the terminals to the P.C. board with solder-cover area at least 90%. Otherwise, excess self-heating at connection between terminals and P.C. board may lead to smoke and / or fire of the product even when operating at rated current.
- (3) After installing this product in your product, please make sure of the self-heating with the rated current.

【Recommendation land pattern】

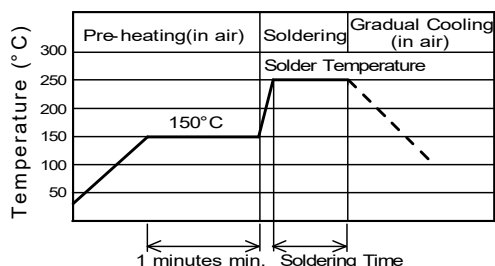


11.3. Soldering

(1) Flux, Solder

- Rosin-based flux should be used.
Do not use strong acidic flux with halide content exceeding 0.2(wt)% (chlorine conversion value.)
- Use Sn-3.0Ag-0.5Cu solder.

(2) Standard flow soldering profile.



Solder Temperature	Soldering Time
250 ~ 260 °C	4 ~ 6 s

- (3) Resistance to soldering iron goes in the following condition that tip temperature is 350 °C max. and soldering time is 5 s max.
- (4) Products and the leads should not be subjected to any mechanical stress during soldering process. (and also while subjected to the equivalent high temperature.)

11.4. 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 : 20W / l max. Frequency : 28kHz to 40kHz Time : 5 minutes max.
- (3) Cleaner
- 1.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) The surface of products may become dirty whitely after cleaning.
But there is no deterioration on mechanical, electrical characteristics and reliability.
- (6) Other cleaning
Please contact us.

11.5. Operating Environment

- (1) Do not use products in the corrodible atmosphere such as acidic gases, alkaline gases, chlorine, sulfur gases, organic gases and etc.(the sea breeze, Cl₂, H₂S, NH₃, SO₂, NO₂,etc)
- (2) Do not use products in the environment where water, oil or organic solvents may adhere to product.
- (3) Do not use products in the atmosphere where the temperature / humidity changes rapidly and it is easy to dew.

11.6. Storage condition

(1) Storage period

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

(2) Storage environment condition

- Products should be stored in the warehouse on the following conditions.
Temperature : - 10 °C to + 40 °C
Humidity : 15 % to 85% relative humidity No rapid change on temperature and humidity
- 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 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) Delivery

Care should be taken when transporting or handling product to avoid excessive vibration or mechanical shock.

12. Notes

- (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.