

**Chip Power Bead for Automotive powertrain/safety equipment****BLE32PN□□SH1L****Murata Standard Reference Specification [AEC-Q200]****1.Scope**

This reference specification applies to Chip Power Bead BLE32PN\_SH series based on AEC-Q200.

**1.1 Specific applications:**

- Automotive powertrain/safety equipment: Products that can be used for automotive equipment related to running, turning, stopping, safety devices, etc., or equipment whose structure, equipment, and performance are legally required to meet technical standards for safety assurance or environmental protection.
- Automotive infotainment/comfort equipment: Products that can be used for automotive equipment such as car navigation systems and car audio systems that do not directly relate to human life and whose structure, equipment, and performance are not specifically required by law to meet technical standards for safety assurance or environmental protection.
- 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.

**1.2 Unsuitable application:**

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

**2. Part Numbering**

(ex.)  $\frac{BL}{(1)} \frac{E}{(2)} \frac{32}{(3)} \frac{PN}{(4)} \frac{300}{(5)} \frac{S}{(6)} \frac{H}{(7)} \frac{1}{(8)} \frac{L}{(9)}$

(1)Product ID

(2)Type

(3)Dimension (L×W)

(4)Characteristics

(5)Typical Impedance at 100MHz

(6)Performance

(7)Category(for Automotive Electronics)

(8)Numbers of Circuit

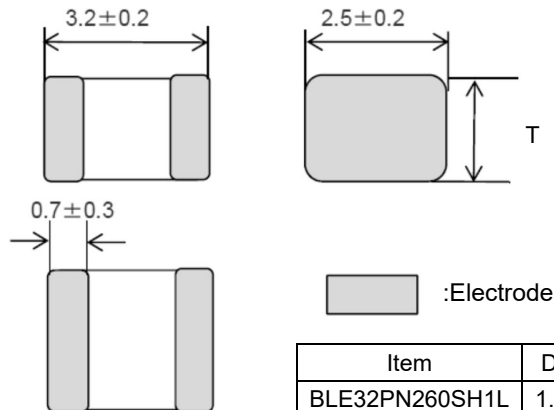
(9)Packaging (L:Taping )

**3. Rating**

Customer Part Number	MURATA Part Number	Impedance (Ω) (at 100MHz, Under Standard Testing Condition)		Rated Current (A)	DC Resistance (mΩ max. )		ESD Rank 4:<8kV
			Typical		Initial Values	Values After Testing	
	BLE32PN260SH1L	26±10	26	10	1.6	2.1	4
	BLE32PN300SH1L	30±10	30	10	1.6	2.1	

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

#### 4. Style and Dimensions



Item	Dimension "T"
BLE32PN260SH1L	1.5+0.1/-0.2
BLE32PN300SH1L	2.0±0.2

(in mm)

#### ■ Equivalent Circuit



( Resistance element becomes dominant at high frequencies. )

#### ■ Unit Mass (Typical value)

BLE32PN260SH1L : 0.060 g

BLE32PN300SH1L : 0.080 g

#### 5. Marking

No marking.

#### 6. Standard Testing Conditions

&lt; Unless otherwise specified &gt;

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

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

&lt; In case of doubt &gt;

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 Measuring Equipment :KEYSIGHT 4291A or the equivalent Test Fixture : KEYSIGHT 16192A or the equivalent
7-1-2	DC Resistance	Meet item 3.	Measuring Equipment : Digital multi meter * Except resistance of the Substrate and Wire

##### 7-2. Mechanical Performance

(based on Table 13 for FILTER EMI SUPPRESSORS/FILTERS)

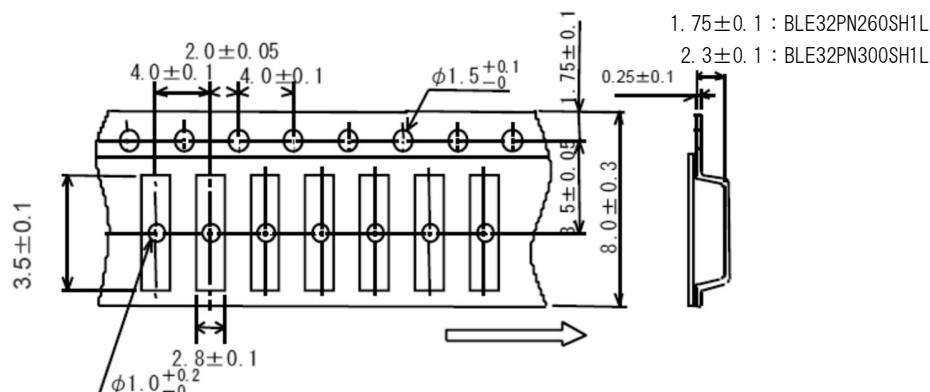
AEC-Q200 Rev.D issued June. 1 2010

No.	AEC-Q200		Murata Specification / Deviation	
	Stress	Test Method		
3	High Temperature Exposure	1000hours at 125 deg C Set for 24hours at room temperature, then measured.	Meet Table A after testing. <u>Table A</u>	
			Appearance	No damage
			Impedance Change (at 100MHz)	Within ±30%
			DC Resistance	Meet item 3.
4	Temperature Cycling	500 cycles -55 deg C to +125 deg C Set for 24hours at room temperature, then measured.	Meet Table A after testing.	

No.	AEC-Q200		Murata Specification / Deviation
	Stress	Test Method	
5	Destructive Physical Analysis	Per EIA469 No electrical tests	No defects
7	Biased Humidity	1000hours at 85 deg C, 85%RH Apply max rated current.	Meet Table A after testing.
8	Operational Life	Apply 125 deg C 1000hours Set for 24hours at room temperature, then measured	Meet Table A after testing.
9	External Visual	Visual inspection	No abnormalities
10	Physical Dimension	Meet item 4 (Style and Dimensions)	No defects
12	Resistance to Solvents	Per MIL-STD-202 Method 215	Not Applicable
13	Mechanical Shock	Per MIL-STD-202 Method 213 Condition F 1500g(14.7N)/0.5ms/Half sine	Meet Table A after testing.
14	Vibration	5g's(0.049N) for 20 min, 12cycles each of 3 orientations Test from 10-2000Hz.	Meet Table A after testing.
15	Resistance to Soldering Heat	Solder temperature 260C+/-5 deg C Immersion time 10s	Pre-heating:150C +/-10 deg,60s to 90s Meet Table A after testing.
17	ESD	Per AEC-Q200-002	Meet Table A after testing. ESD Rank : Meet Item 3. (Rating)
18	Solderability	Per J-STD-002	Method b : Not Applicable 95% of the terminations is to be soldered.
19	Electrical Characterization	Measured : Impedance	No defects
20	Flammability	Per UL-94	Not Applicable
21	Board Flex	Epoxy-PCB(1.6mm) Deflection 2mm(min) 60s minimum holding time	Meet Table A after testing.
22	Terminal Strength	Per AEC-Q200-006	No defects
30	Electrical Transient Conduction	Per ISO-7637-2	Not Applicable

## 8. Specification of Packaging

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



(in mm)

\*Dimension of the Cavity is measured at the bottom side.

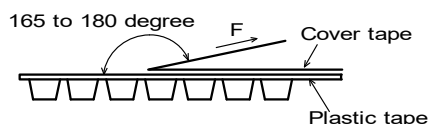
- (1) Taping  
Products shall be packaged in the cavity of the base tape of 8mm-wide, 4mm-pitch continuously and sealed by top tape and bottom tape.
- (2) Sprocket hole  
The sprocket holes are to the right as the tape is pulled toward the user.
- (3) Spliced point  
The base tape and top tape have no 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

Plastic tape	5N min.
Cover tape	10N min.

- (2)Peeling off force of Top tape  
0.2N to 0.7N (Minimum value is typical.)  
\*Speed of Peeling off:300mm/min



### 8-3. Taping Condition

- (1)Standard quantity per reel  
Quantity per 180mm reel: 1500 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. »

$$\begin{array}{ccc} \square\square & \text{O O O O} & \times\times\times \\ \hline (1) & (2) & (3) \end{array}$$

- (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 »

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

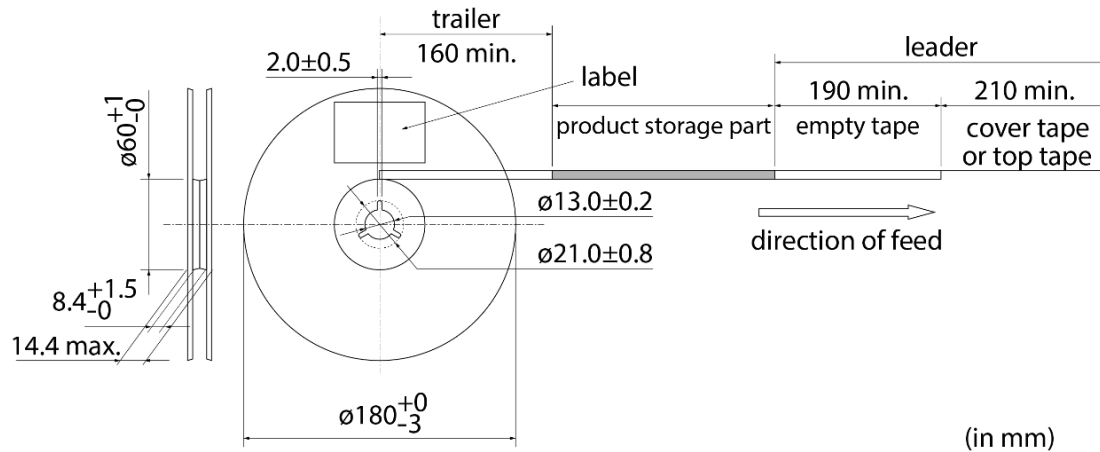
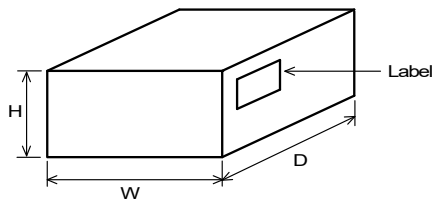
- (1) RoHS regulation conformity parts.  
(2) MURATA classification number

## (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)

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

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.Rating**

Do not use products beyond the Operating Temperature Range and Rated Current.

**9-2.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.

**9-3. Fail Safe**

Be sure to provide an appropriate fail-safe function on your product to prevent from a second damage that may be caused by the abnormal function or the failure of our products.

**9-4. 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).

**9-5. 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**

This product is designed for solder mounting.

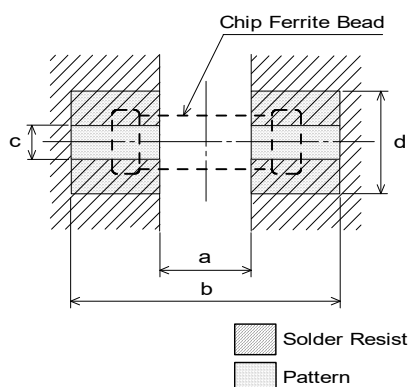
Please consult us in advance for applying other mounting method such as conductive adhesive.

Cracks may occur at the connection of solder (solder fillet portion) due to the difference of the coefficient of thermal expansion from a mounting board when heat stress like heat cycle, etc. are repeatedly given to them.

The occurrence of the crack by heat stress may be influenced by the size of a pad, solder volume, heat radiation of mounting board etc., so please pay careful attention to designing when a big change in ambient temperature can be assumed.

**10-1. Land pattern designing**

- Standard land dimensions (Flow and Reflow soldering)



Rated Current (A)	a	b	c	Land pad thickness and dimension d
				35μm
10	2.2	4.4	2.05	4.0(85°C max) 8.0(125°C max)

(in mm)

\*The excessive heat by land pads may cause deterioration at joint of products with substrate.

**10-2. Soldering conditions**

Products can be applied to reflow and flow soldering.

**(1) Flux, Solder**

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

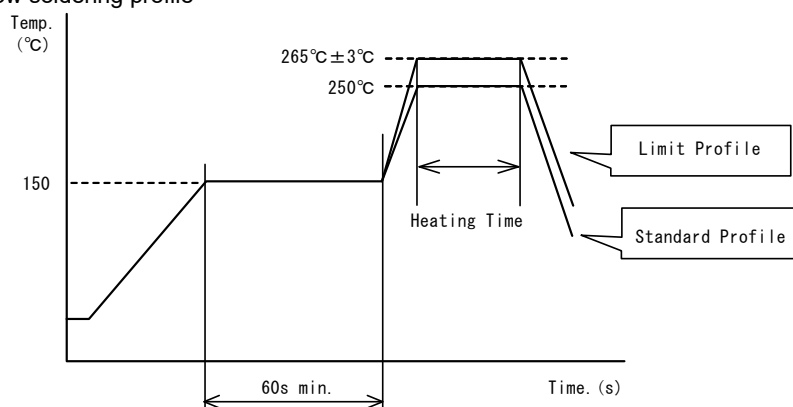
**(2) Soldering conditions**

- Pre-heating should be in such a way that the temperature difference between solder and ferrite surface is limited to 150°C max. Also cooling into solvent after soldering should be in such a way that the temperature difference is limited to 100°C max.

Insufficient pre-heating may cause cracks on the ferrite, resulting in the deterioration of product quality.

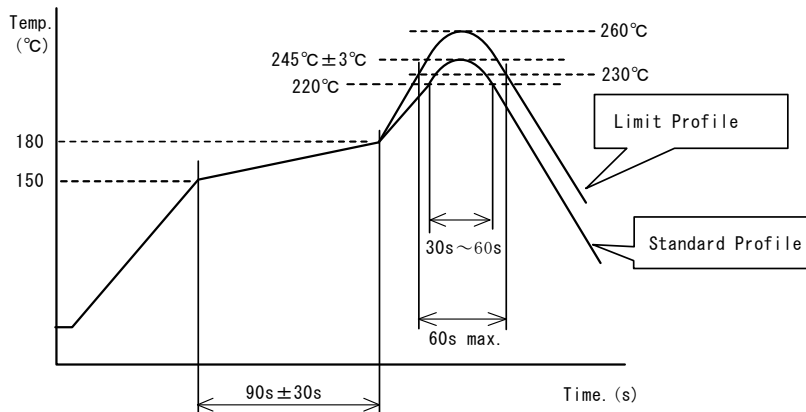
- Standard soldering profile and the limit soldering profile is as follows.

The excessive limit soldering conditions may cause leaching of the electrode and / or resulting in the deterioration of product quality.

**□ Flow soldering profile**

	Standard Profile	Limit Profile
Pre-heating	150°C, 60s min.	
Heating	250°C, 4s~6s	265°C±3°C, 5s max.
Cycle of flow	2 times	2 times

## □ Reflow soldering profile



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

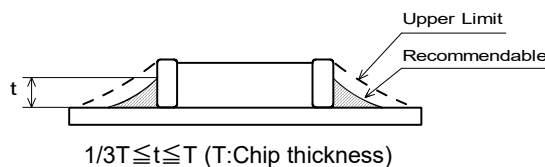
**10-3. Reworking with soldering iron**

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

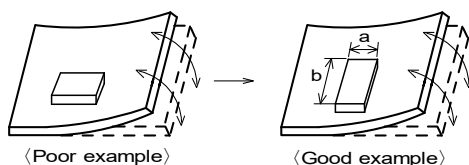


Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance.

**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.

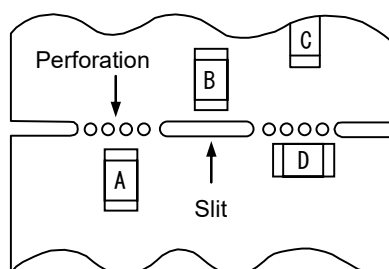


## (2) Components location on P.C.B. separation.

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.

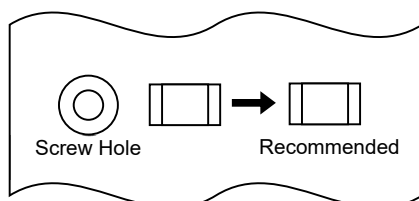
Contents of Measures	Stress Level
(1) Turn the mounting direction of the component parallel to the board separation surface.	$A > D^{*1}$
(2) Add slits in the board separation part.	$A > B$
(3) Keep the mounting position of the component away from the board separation surface.	$A > C$



\*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. Operating Environment**

Do not use this product under the following environmental conditions, on deterioration of the Insulation Resistance of the Ferrite material and/or corrosion of Inner Electrode may result from the use.

- (1) in the corrodible atmosphere such as acidic gases, alkaline gases, chlorine, sulfur gases, organic gases and etc. (the sea breeze,  $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{NO}_2$ , etc)
- (2) in the atmosphere where liquid such as organic solvent, may splash on the products.
- (3) in the atmosphere where the temperature / humidity changes rapidly and it is easy to dew.

**10-8. Resin coating**

The impedance 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.

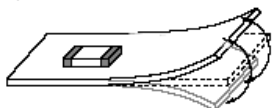
**10-9. Cleaning**

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.

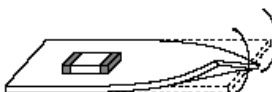
**10-10. Handling of a substrate**

After mounting products on a substrate, do not apply any stress such as 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

**10-11. Storage Conditions****(1)Storage period**

Use the products within 6 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°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.
- Avoid storing the product by itself bare (i.e.exposed directly to air).

**(3)Delivery**

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

**11. ⚠ 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.