

Messrs. Digi-Key

Issue No. : PC-02-064

Date of issue : November 15, 2002

Classification :  New  Change  Renewal

## Delivery Specification

Product Description : Balun

Product Part Number : EHF2BE0920

Classification of Spec : Individual Product Specification

Applications : Cellular phone

For other applications, contact the undersigned in advance.

Term of Validity : November 14, 2007 from the date of issue.

|   |                  |
|---|------------------|
| CUSTOMER USE ONLY   | Receipt Record#: |
| This was certainly received by us.<br>1(one) copy is being returned to you. | Date of receipt: |
|   | Received by:     |
|   | Title:           |
|   | Dept.:           |

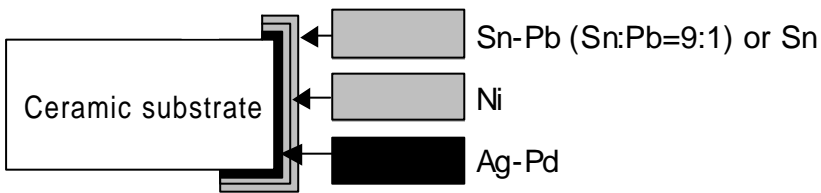
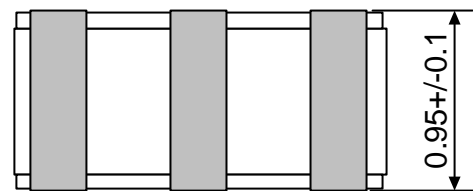
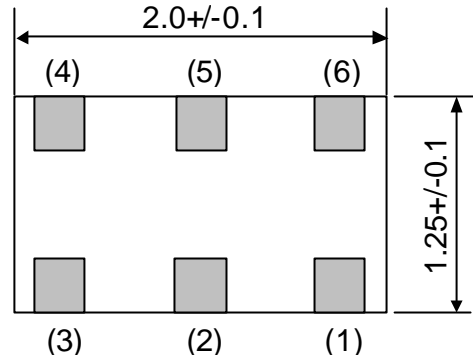
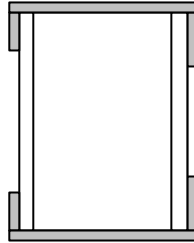
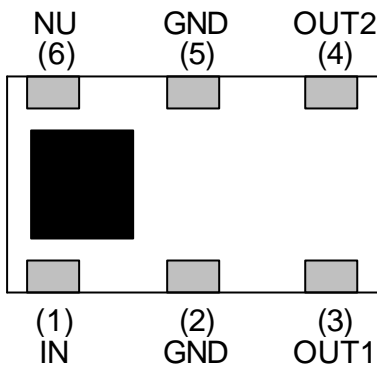
Matsushita Electronic Components Co., Ltd.  
Network Device Company  
Module Strategic Business Unit  
Engineering Group HFD Team  
992-1 Aiba Ohno-cho Ibi-gun Gifu 501-0598 JAPAN  
Tel: +81-0585-36-2322  
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|               |                          |
|---------------|--------------------------|
| Prepared by   | : H. Ito                 |
| Checked by    | : M. Mizuno              |
| Authorized by | : M. Mizuno              |
| Title         | : Manager of Engineering |

[Shape, appearance, dimension] Unit: mm

<Top view>

<Bottom and side view>



Note 1) "typ" is used where no dimensional tolerance applies.

| Item                        | Description  |
|-----------------------------|--|
| Appearance/<br>construction | Product surface shall be covered with a protective film, which does not easily separate nor present noticeable unevenness, scratches, pinholes, color changes etc. |
|                             | Terminals shall ensure practically acceptable quality.   |
|                             | Substrate shall be as shown in the drawing with no excessive chippings, scratches, burrs, or cracks.   |
| Marking                     | Shall be legible in black (with printing paste).   |
| Remarks                     | ■ marked side for pin 1.   |

|                               |       |                        |           |        |                                    |
|-------------------------------|-------|------------------------|-----------|--------|------------------------------------|
| Balun                         |       | Delivery Specification |           |        | EHF2BE0920<br>Appearance           |
| Enact. Date November 15, 2002 | P.S.M | Approval               | Check     | Plan   |                                    |
| Enfo. Date November 15, 2002  | ----- | M. Mizuno              | M. Mizuno | H. Ito | Drawing No.<br>151-EHF-2BE0920 9-1 |

[Absolute maximum ratings]

| No. | Item                  | Symbol | Rating    | Unit | Remarks           |
|-----|-----------------------|--------|-----------|------|-------------------|
| 1   | Maximum input power   | Pmax   | 100       | mW   | DC voltage is 0V. |
| 2   | Operating temperature | Topr   | -30...+85 | degC |                   |
| 3   | Storage temperature   | Tstg   | -40...+85 | degC |                   |

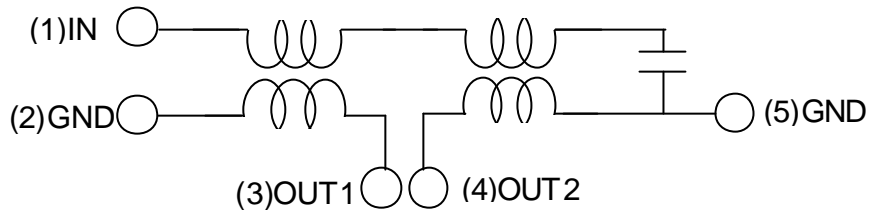
Note: This component cannot apply a DC Bias.

[Electrical characteristics]

T=-30...+85degC

| No. | Item                          | Test Circuit | Specification |      |      | Unit |
|-----|-------------------------------|--------------|---------------|------|------|------|
|     |                               |              | Min.          | Typ. | Max. |      |
| 1   | Frequency                     | -            | 880           | -    | 960  | MHz  |
| 2   | Insertion loss (Back to back) | Fig-2        | -             | -    | 1.0  | dB   |
| 3   | Unbalance impedance           | -            | -             | 50   | -    | ohm  |
| 4   | Balance impedance             | -            | -             | 100  | -    | ohm  |
| 5   | Unbalance port VSWR           | Fig-1        | -             | -    | 2.0  | -    |
| 6   | Amplitude balance             | Fig-1        | -1.5          | -    | 1.5  | dB   |
| 7   | Phase balance                 | Fig-1        | 165           | 180  | 195  | deg  |

[Internal circuitry]



[Measuring circuit]

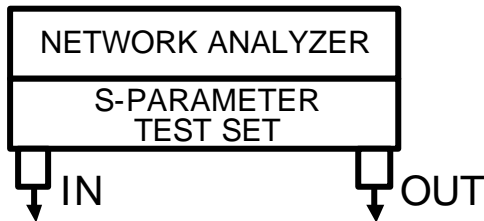
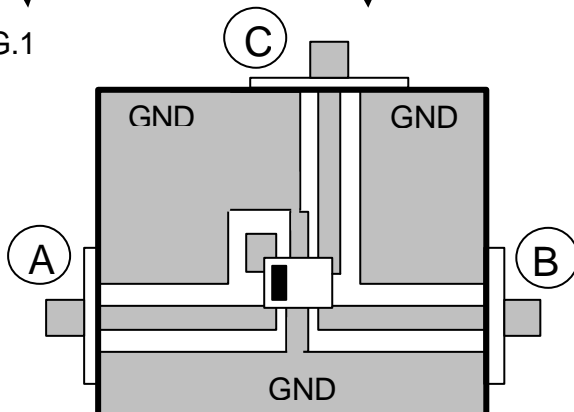


FIG.1



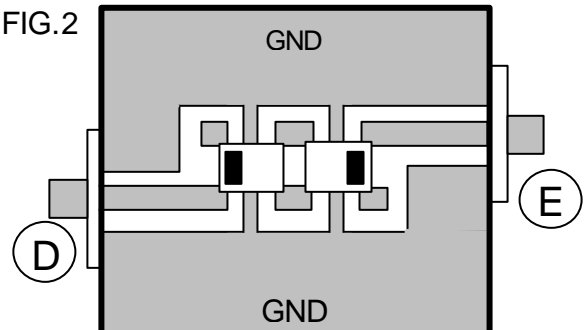
< Phase balance measurement >

- Phase1  
A=IN, B=OUT, C=Terminal resistor (50 ohm)
- Phase2  
A=IN, C=OUT, B=Terminal resistor (50 ohm)
- Phase balance  
Phase balance=Phase1-Phase2

< Insertion loss measurement >

Assuming the loss as "Loss" when D=IN, E=OUT  
Insertion loss for a device is "Loss"/2

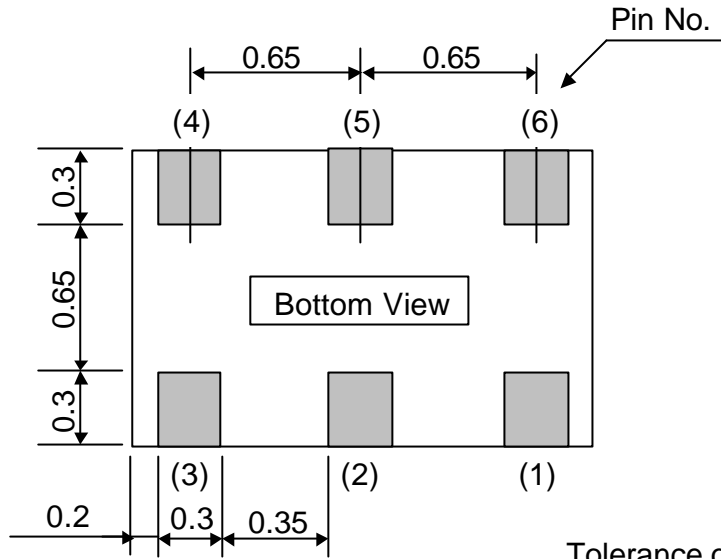
FIG.2



|                               |       |                        |           |        |   |
|-------------------------------|-------|------------------------|-----------|--------|---|
| Balun                         |       | Delivery Specification |           |        | EHF2BE0920<br>Specification and measurement |
| Enact. Date November 15, 2002 | P.S.M | Approval               | Check     | Plan   |   |
| Enfo. Date November 15, 2002  | ----- | M. Mizuno              | M. Mizuno | H. Ito | Drawing No.<br>151-EHF-2BE0920 9-2          |

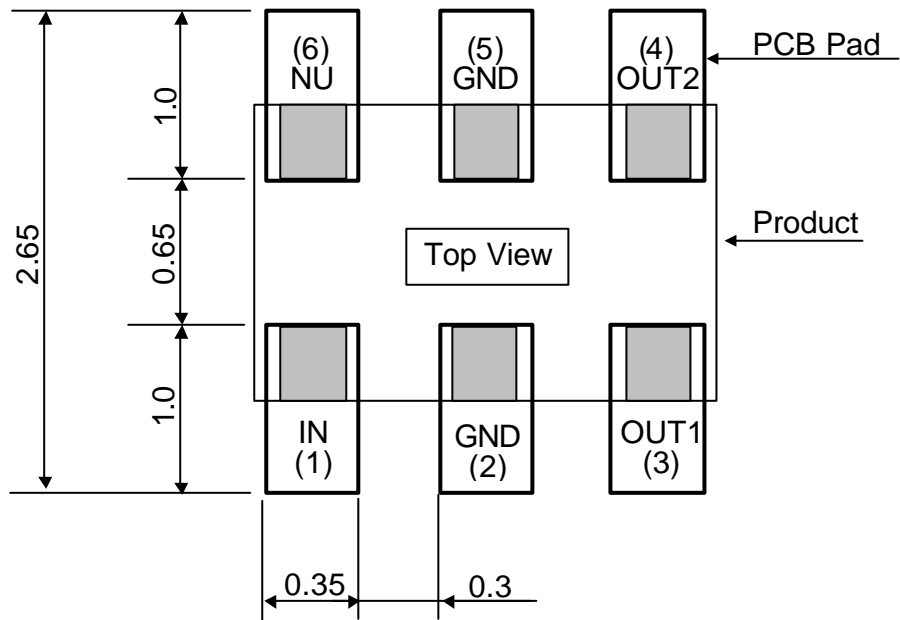
[Terminal dimensions] Unit: mm

<Bottom>



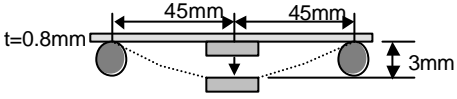
Tolerance of Terminal dimensions:  $\pm 0.15$

[Recommended PCB pad dimensions] Unit: mm



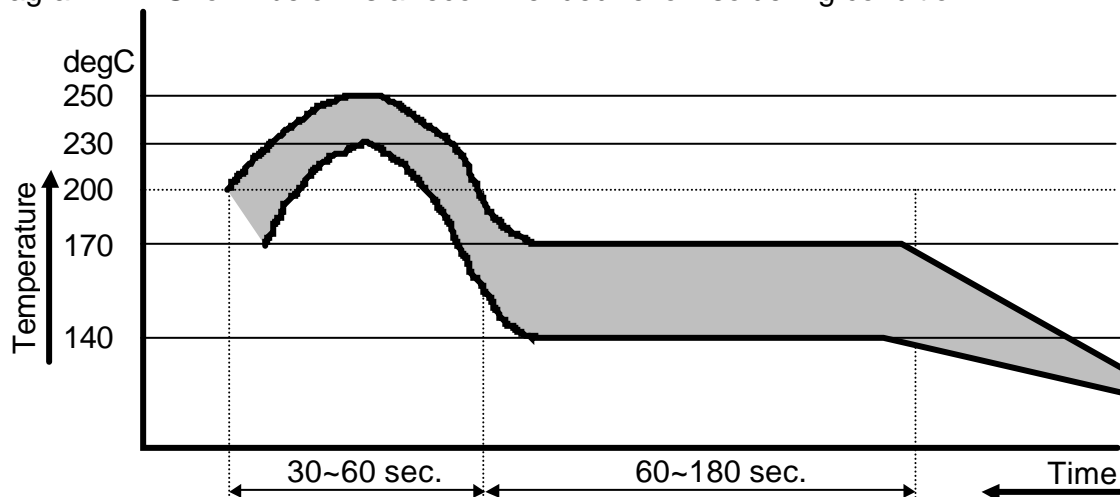
|                               |  |                        |           |           |            |                                    |
|-------------------------------|--|------------------------|-----------|-----------|------------|------------------------------------|
| Balun                         |  | Delivery Specification |           |           | EHF2BE0920 |                                    |
| Enact. Date November 15, 2002 |  | P.S.M                  | Approval  | Check     | Plan       | Terminals/Recommended lands        |
| Enfo. Date November 15, 2002  |  | -----                  | M. Mizuno | M. Mizuno | H. Ito     | Drawing No.<br>151-EHF-2BE0920 9-3 |

[Quality characteristics]

| Test item                              | Test condition   | Judgment criteria   |
|--|--|---|
| High temperature                       | +85degC, 1000h   | No abnormality shall be observed in appearance or electrical characteristics.                                   |
| Low temperature                        | -40degC, 1000h   |   |
| High-temperature high-humidity storage | +60degC, 90%RH, 1000h  |   |
| Pressure Pot                           | +121degC, 99%RH, 2.026x10 <sup>5</sup> Pa, 100h  |   |
| Temperature cycling                    | -40...+85degC, Each 30 min., 200cy   |   |
| Vibration                              | 10...500Hz, 10G, in each direction of XYZ, 2h30min.  |   |
| Impact                                 | 100G, 6mS, Half sinusoidal wave, in each direction of XYZ, 3 times   |   |
| Shock (Drop)                           | 1.8m, 6 facesx6cy(36 times with 100g Dummy Load)   |   |
| Electro static discharge               | 200pF, 0 ohm, +/-200V, Each 5 times  |   |
| Soldering heat resistance              | Manual hot gas: 260+/-10degC, 30 sec., 2 times   | Over 90% of the terminal surface shall be covered with solder.  |
|  | Soldering iron: 260+/-10degC, 3 sec., 2 times  |   |
|  | Reflow: 260degC peak, 2 times  |   |
| Solder ability                         | Solder bath: 235+/-5degC, 2 sec.   | Over 95% of the terminal surface shall be covered with solder.  |
|  | Reflow: 230degC  |   |
| Board warping                          | Assemble this component on a PC board with 0.8mm thickness using the recommended soldering condition shown below, and apply a bending force of 3mm warping at a rate of 1mm/sec. 5 seconds and 5 times.<br> | There should not be any cracks in the component or solder joints, no abnormality in electrical characteristics. |
| Terminal removal                       | Solder a component on a PC board using the recommended condition shown below and then press the component sideways at 1mm/sec. Destruction limit 9.8N or greater.  |   |
| Seating plane co-planarity             | Within 0.1mm   |   |

< Recommended soldering condition >

Diagram1 Shown below is a recommended reflow soldering condition.



|                               |       |                        |           |        |                                       |
|-------------------------------|-------|------------------------|-----------|--------|---------------------------------------|
| Balun                         |       | Delivery Specification |           |        | EHF2BE0920<br>Quality Characteristics |
| Enact. Date November 15, 2002 | P.S.M | Approval               | Check     | Plan   |                                       |
| Enfo. Date November 15, 2002  | ----- | M. Mizuno              | M. Mizuno | H. Ito | Drawing No.<br>151-EHF-2BE0920 9-4    |

[Cautions for use]

- (1) Operating a product over the maximum rating for even a moment may result in a product failure or breakage. Never use a product in such a condition that it may cause a safety problem.
- (2) Opening or short-circuiting the product terminals or inserting a product in the reverse orientation while power is being supplied may cause a breakage. Always avoid such circumstances.
- (3) Operations in a corrosive gas atmosphere or improper environments such as high-temperature, high-humidity or dewy conditions may lead to product performance deterioration, a breakage, a change in appearance etc. Please avoid such conditions, as they are unsafe.
- (4) Always ground the soldering iron or soldering bath used for assembly operation to avoid any excessive voltage applied to a product.
- (5) After soldering with solder bridges, incomplete soldering or in the reverse orientation, supplying power may result in a product breakage. Please confirm the soldered condition before supplying power to the product.
- (6) Excessive stress on the terminals may cause a contact failure or performance deterioration. Please use caution.
- (7) Please provide a fail-safe provision in the product you design by taking any failure of our product into consideration.
- (8) This product does not include a DC-cutting device. Application of a DC voltage between the Balance port and the Unbalance port may cause product deterioration or breakage.

\* If any question arises about the safety of this product, please contact us immediately with a request for an engineering examination.

[Remarks]

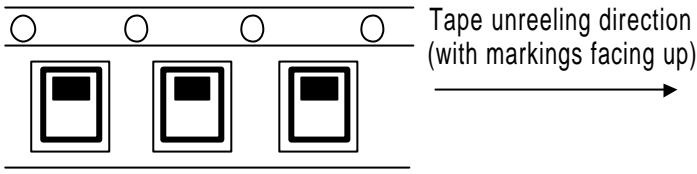
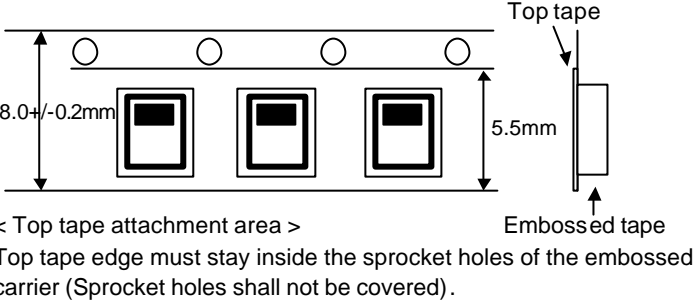

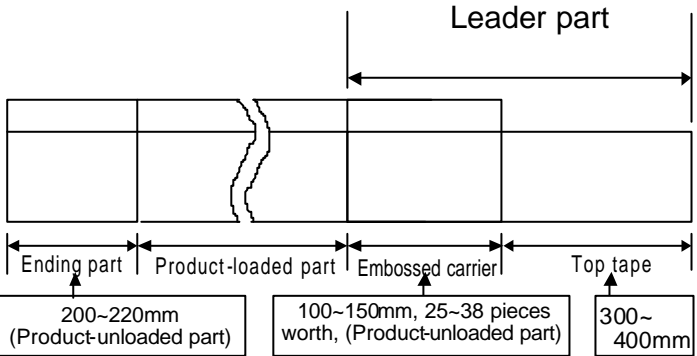
- \*1: All of the materials used in this product are those listed as the existing chemical substances based on the "Law for examination and regulation of manufacture of chemical substances".
- \*2: The production process of this product does not use any ozone-depleting chemicals (OZC) regulated by the Montreal Protocol.
- \*3: Validity of this specification is 5 years from the date of issue, but the validity is considered on going unless any changes are made.

|                               |       |                        |           |        |                                    |
|-------------------------------|-------|------------------------|-----------|--------|------------------------------------|
| Balun                         |       | Delivery Specification |           |        | EHF2BE0920<br>Cautions             |
| Enact. Date November 15, 2002 | P.S.M | Approval               | Check     | Plan   |                                    |
| Enfo. Date November 15, 2002  | ----- | M. Mizuno              | M. Mizuno | H. Ito | Drawing No.<br>151-EHF-2BE0920 9-5 |

[Packaging materials]

1. Materials            1) Embossed carrier tape (Refer to the attachment)  
                               2) Top tape: Anti-static  
                               3) Packaging box (Refer to the attachment)  
                               4) Packaging tape, carrier-securing adhesive tape

2. Specification

| No. | Item                                  | Condition  | Remarks  |
|-----|---------------------------------------|--|--|
| 1   | Reel outer diameter                   | Refer to the attachment.   |  |
| 2   | Reel inner diameter                   | Refer to the attachment.   |  |
| 3   | Reel inner width                      | Refer to the attachment.   |  |
| 4   | Quantity in a reel                    | 4000 pieces/reel   |  |
| 5   | Taping direction                      |    |  |
| 6   | Top tape attachment position          |   | Tape breaks force.<br>Min. 10N<br>Top cover tape strength.<br>Min. 10N<br>Tape peel force.<br>0.1...1.0N<br>Tape peel angle.<br>165...180degree<br>Reel weight.<br>Max 1500g |
| 7   | Label attachment position             |  | Indicated Item<br>Pat No., Lot No.<br>Quantity, Maker<br>Country of Origin   |
| 8   | Tape leader part and tape ending part |  |  |
| 9   | Missing products                      | No missing products shall be allowed.  |  |
| 10  | Packaged quantity in a box            | 21 reels/box (Max)   | 84000 pieces/box(Max)  |

|                               |       |                        |           |        |   |
|-------------------------------|-------|------------------------|-----------|--------|---|
| Balun                         |       | Delivery Specification |           |        | EHF2BE0920<br>Packaging specification 1 |
| Enact. Date November 15, 2002 | P.S.M | Approval               | Check     | Plan   |   |
| Enfo. Date November 15, 2002  | ----- | M. Mizuno              | M. Mizuno | H. Ito | Drawing No.<br>151-EHF-2BE0920 9-6      |

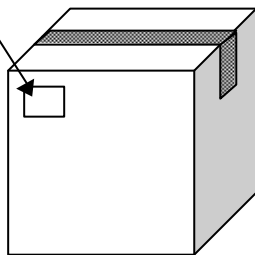
1. Method

- 1) Load products in each cavity of an embossed carrier tape, in the correct orientation, by leaving the product-unloaded part shown in Item No. 8(P9-6) of the packaging specification.
- 2) Heat-seal a top tape in good alignment on the carrier tape.
- 3) After 4000 pieces are loaded and reeled, provide a product-unloaded part at the tape-leader portion. Secure the tip of the carrier tape with a piece of adhesive tape.
- 4) Stack the reels (21 reels max.) and enclose them in a packaging box. Close the flaps with a piece of adhesive tape.
- 5) Provide markings on the packaging box.

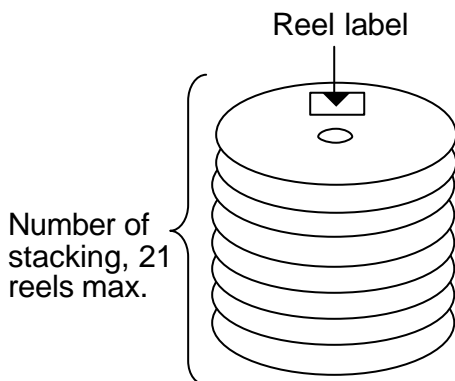
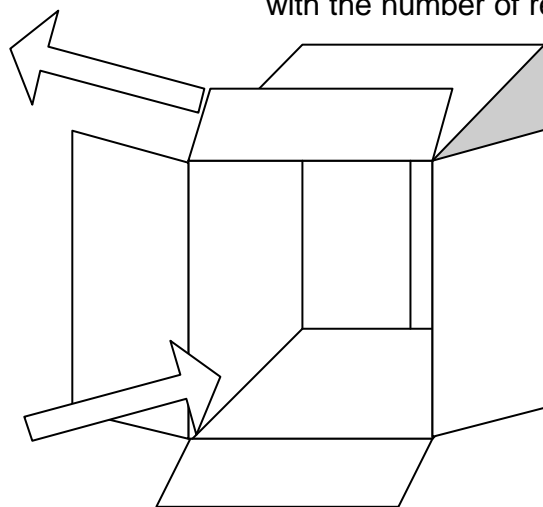
< Items to be indicated >

1. Part No.
2. Quantity
3. Lot No.
4. Manufacturer name
5. Country of origin

Marking on the packaging box



Packaging box shape varies with the number of reels enclosed.

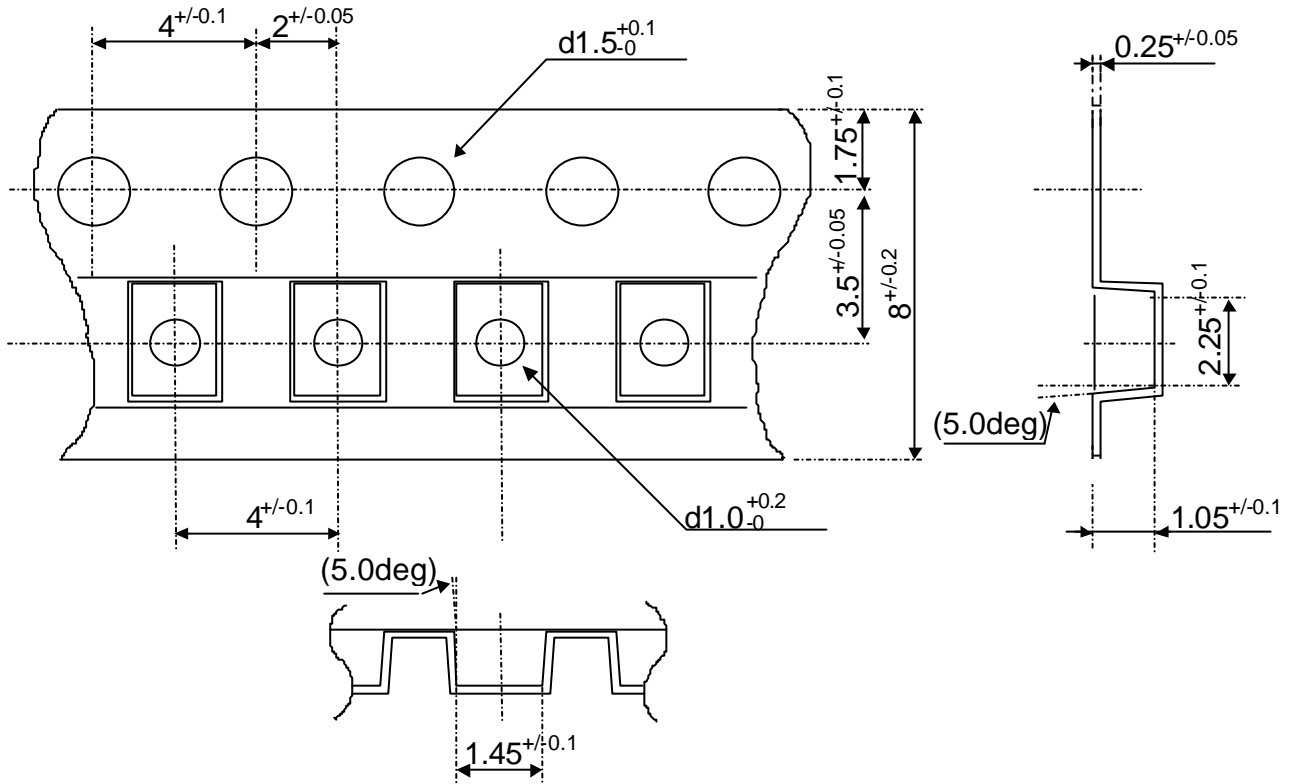


\* Insert cushion material in the empty spaces to secure reels.

|                               |       |                        |           |        |   |
|-------------------------------|-------|------------------------|-----------|--------|---|
| Balun                         |       | Delivery Specification |           |        | EHF2BE0920<br>Packaging specification 2 |
| Enact. Date November 15, 2002 | P.S.M | Approval               | Check     | Plan   |   |
| Enfo. Date November 15, 2002  | ----- | M. Mizuno              | M. Mizuno | H. Ito | Drawing No.<br>151-EHF-2BE0920 9-7      |



[Embossed tape dimensions] Unit: mm



<Remarks>

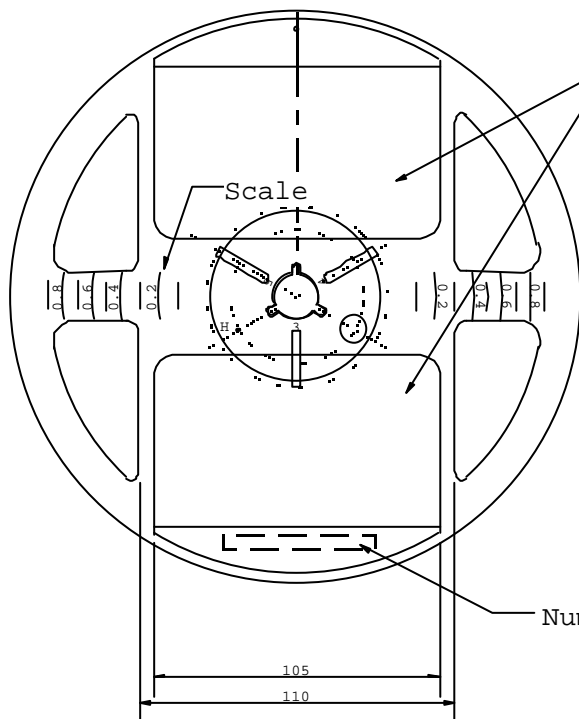
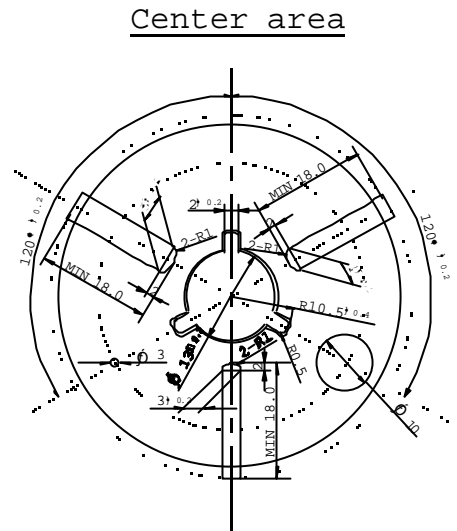
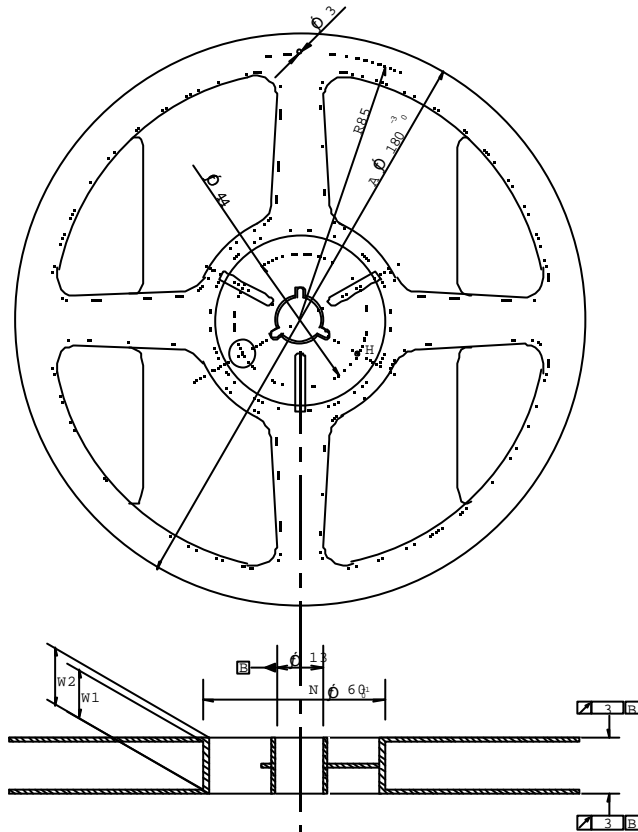
- (1) Unspecified corner radius shall be 0.3mm max.
- (2) Cumulative pitch error of sprocket holes shall be  $+/-0.2$ mm for 10 pitches.

|                               |       |                        |           |        |   |
|-------------------------------|-------|------------------------|-----------|--------|---|
| Balun                         |       | Delivery Specification |           |        | EHF2BE0920<br>Packaging specification 3 |
| Enact. Date November 15, 2002 | P.S.M | Approval               | Check     | Plan   |   |
| Enfo. Date November 15, 2002  | ----  | M. Mizuno              | M. Mizuno | H. Ito | Drawing No.<br>151-EHF-2BE0920 9-8      |

[Reel dimensions] Unit: mm

(1) This reel conforms to EIAJ-RRM-08B based on EIAJ standard.

(2) Material: PS (Polystyrene)



Label  
105...50

Scale

Rim , Hub

| Rim A                          | Hub N                         |
|--------------------------------|-------------------------------|
| 180 <sup>0</sup> <sub>-3</sub> | 60 <sup>+1</sup> <sub>0</sub> |

Inner width , Outer width

| Tape width | Inner width W1 | Outer width W2 |
|------------|----------------|----------------|
| 8          | 9+/-0.3        | 11+/-1.0       |

Number

Balun

Delivery Specification

EHF2BE0920

Enact. Date November 15, 2002

P.S.M

Approval

Check

Plan

Packaging specification 4

Enfo. Date November 15, 2002

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M. Mizuno

M. Mizuno

H. Ito

Drawing No.

151-EHF-2BE0920

9-9