



1 Scope

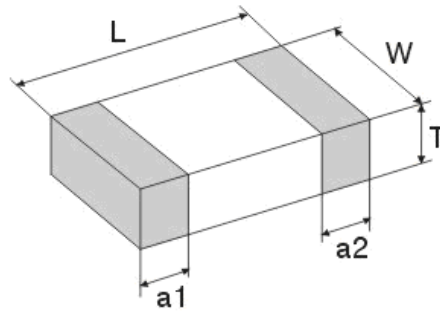
This specification applies to the HDSB series of multilayer chip sharp bead.

2 Product Identification

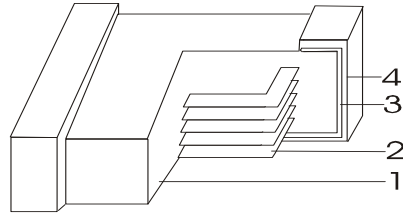
HDSB 1005 A 750 T -LF
 ① ② ③ ④ ⑤ ⑥

- ① Product Symbol (HDSB:)
- ② Dimensions(3)
- ③ Material Code
- ④ Impedance Value 750: 75Ω
- ⑤ Packaging Style (B: Bulk; T: Tape & Reel)
- ⑥ Lead Free

3 Appearance, Dimensions and Material



| Type | Dimensions (mm) [inch] | | | |
|----------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | L | W | T | a1, a2 |
| 1005 [0402] | 1.00±0.15 [0.04±0.006] | 0.50±0.15 [0.02±0.006] | 0.50±0.15 [0.02±0.006] | 0.25±0.10 [0.01±0.004] |
| 1608 [0603] | 1.60±0.15 [0.063±0.006] | 0.80±0.15 [0.031±0.006] | 0.80±0.15 [0.031±0.006] | 0.30±0.20 [0.012±0.008] |
| 2012 [0805] | 2.00±0.20 [0.079±0.008] | 1.25±0.20 [0.049±0.008] | 0.85±0.20 [0.033±0.008] | 0.50±0.30 [0.02±0.012] |
| 3216 [1206] | 3.20±0.20 [0.126±0.008] | 1.60±0.20 [0.063±0.008] | 1.10±0.30 [0.043±0.012] | 0.50±0.30 [0.02±0.012] |



| | Composition | Material | Supplier |
|---|--------------------|----------|----------|
| 1 | Base Material | Ferrite | Japan |
| 2 | Internal Conductor | Ag | Japan |
| 3 | Terminal Electrode | Ag | Japan |
| 4 | Terminal Electrode | Ni-Sn | USA |

4 Testing Conditions

<Unless otherwise specified>

Temperature : Ordinary Temperature (5 to 35°C)

Humidity : Ordinary Humidity (25 to 85% RH)

<In case of doubt>

Temperature : 20±2°C

Humidity : 60 to 75% RH

Atmospheric Pressure : 86 to 106 kPa



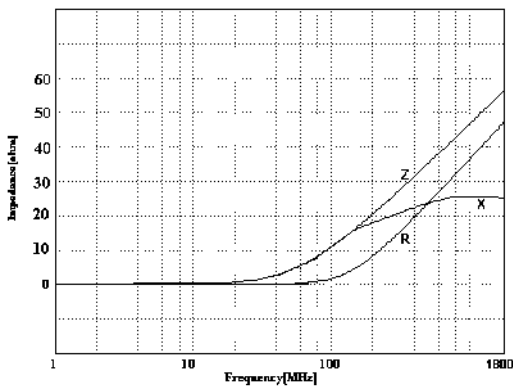
5 Rating

Operating Temperature Range : -55 to +125°C

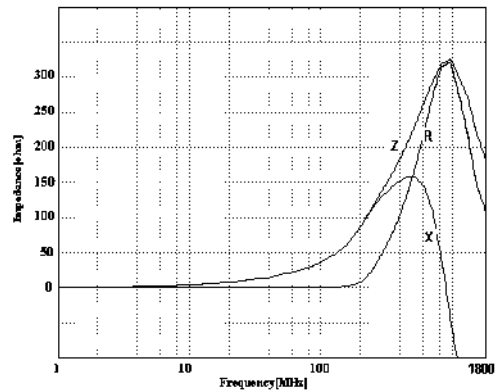
Storage Temperature Range : -55 to +125°C

| Customer Part No. | HONGDA Part No. | Impedance (Ω) ±25% | Z Test Frequency (MHz) | Rdc (Ω) max | Rated Current (mA) max |
|-------------------|--------------------|--------------------------|------------------------------|-------------------|------------------------------|
| 0402,10 Ohm | HDSB1005A 100T-LF | 10 | 100 | 0.10 | 600 |
| 0402,30 Ohm | HDSB1005A 300T-LF | 30 | 100 | 0.10 | 600 |
| 0402,47 Ohm | HDSB1005A 470T-LF | 47 | 100 | 0.35 | 300 |
| 0402,68 Ohm | HDSB1005A 680T-LF | 68 | 100 | 0.40 | 300 |
| 0402,75 Ohm | HDB1005A 750T -LF | 75 | 100 | 0.40 | 300 |
| 0402,120 Ohm | HDSB1005A 121T-LF | 120 | 100 | 0.55 | 300 |
| 0402,220 Ohm | HDSB1005A 221T-LF | 220 | 100 | 0.70 | 200 |
| 0402,240 Ohm | HDSB1005A 241T-LF | 240 | 100 | 0.70 | 200 |
| 0603,30 Ohm | HDSB1608A 300T-LF | 30 | 100 | 0.15 | 300 |
| 0603,60 Ohm | HDSB1 608A 600T-LF | 60 | 100 | 0.20 | 300 |
| 0603,120 Ohm | HDSB1608A 121T-LF | 120 | 100 | 0.30 | 200 |
| 0603,220 Ohm | HDSB1608A 221T-LF | 240 | 100 | 0.55 | 200 |
| 0603,300 Ohm | HDSB1608A 301T-LF | 300 | 100 | 0.70 | 200 |
| 0603,600 Ohm | HDSB1608A 601T-LF | 600 | 100 | 1.10 | 200 |
| 0603,1000 Ohm | HDSB1608A 102T-LF | 1000 | 100 | 1.50 | 200 |

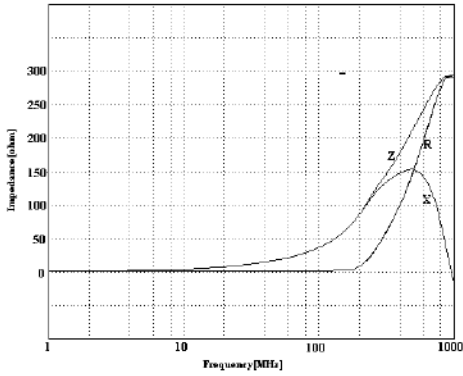
HDSB1005A 100T



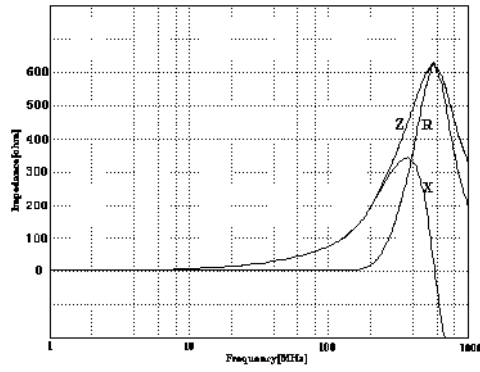
HDSB1005A 300T



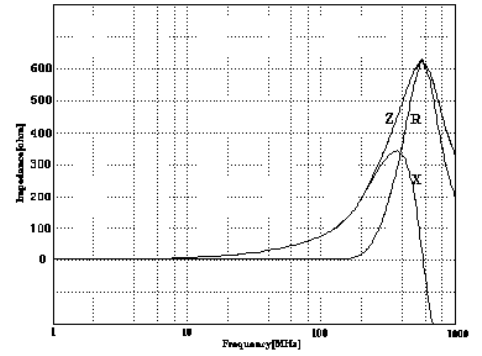
HDSB1005A 470T LF



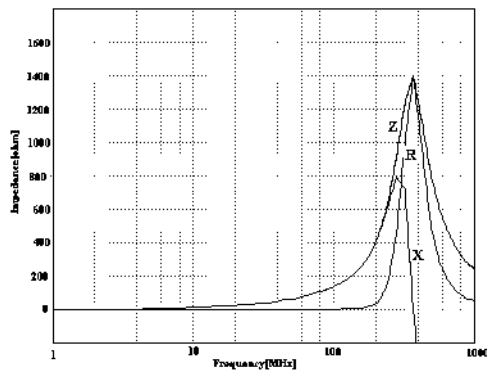
HDSB1005A 680T



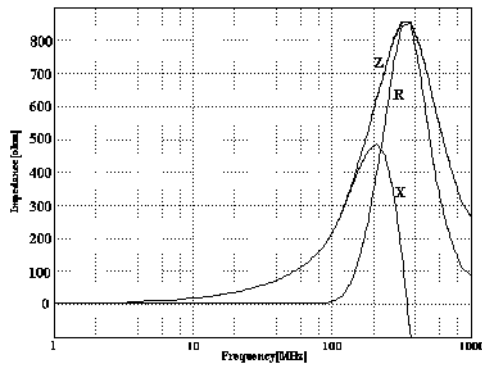
HDB1005A750T



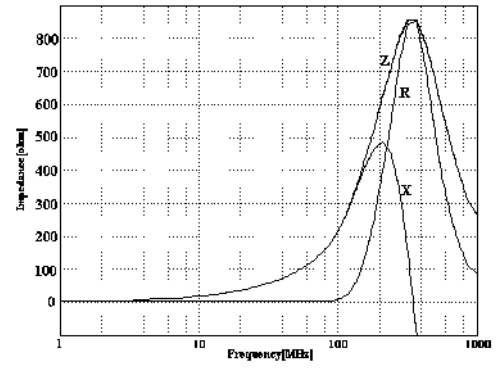
HDSB1005A 121T



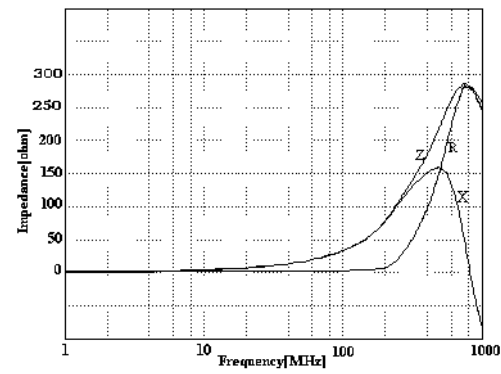
HDSB1005A 221T



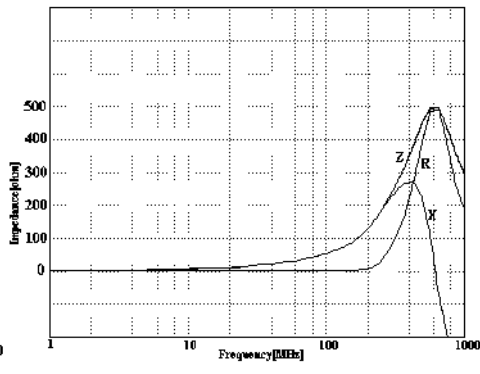
HDSB1005A 241T



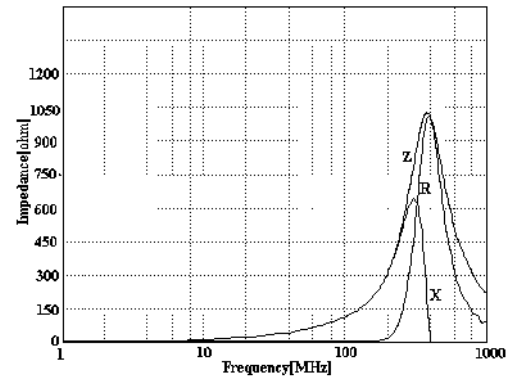
HDSB1608A300T



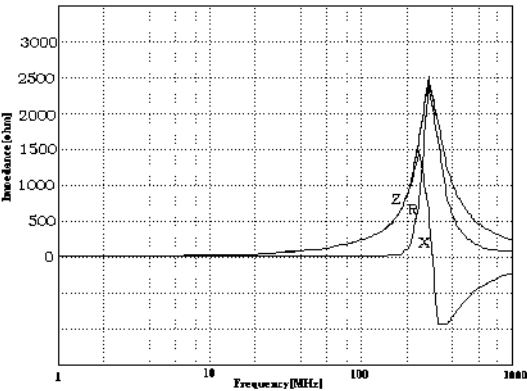
HDSB1 608A600T



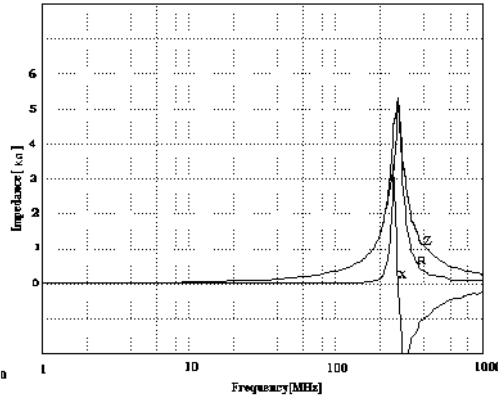
HDSB1608A121T



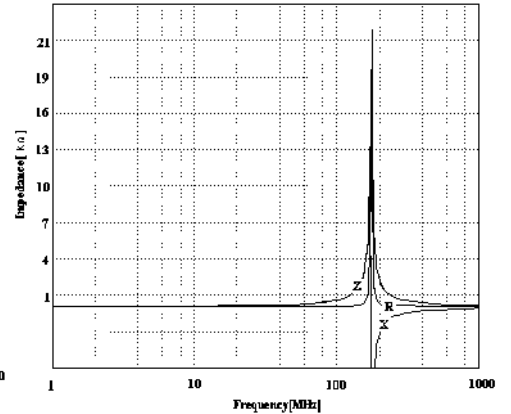
HDSB1608A221T



HDSB1608A301T



HDSB1608A601T





6 Electrical Performance

6.1 Impedance

Impedance shall meet item 5 when measured on the condition of Table 1.

Table 1

| | |
|------------------------|---|
| Measuring Equipment | Impedance analyzer HP4291 or equivalent |
| Measuring Frequency | (see item 5) |
| Measuring signal level | 50mV |

6.2 DC Resistance

D.C Resistance shall meet item 5 when measured on the condition of Table 2.

Table 2

| | |
|---------------------|---------------------------------|
| Measuring Equipment | LCR Meter HP4263A or equivalent |
|---------------------|---------------------------------|

6.3 Rated current

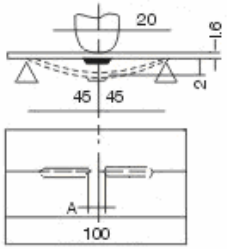
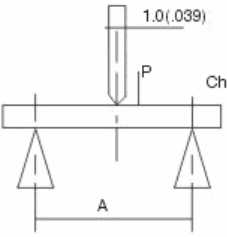
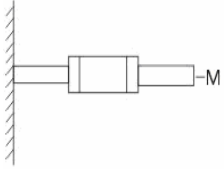
Chip surface temperature rise just 20°C against chip surface temperature when the allowable current (which is mentioned in item 5) is applied.

Table 3

| | |
|---------------------|--|
| Measuring Equipment | Electric Power Supplier, Electric Current Meter, Thermometer |
|---------------------|--|



7 Reliable Performance

| NO. | Item | Specifications | Test Methods | | | | | | | | | | | | | | | |
|------|---------------------|---|--|------|---------------|----------|------|------|-----|------|-----|------|------|-----|-----|------|------|-----|
| 1 | Solder-Ability | More than 90% of termination should be covered with new solder. | Solder : Sn Temperature : 255°C+5°C/-0°C Flux : rosin Duration : 3.5±0.5s | | | | | | | | | | | | | | | |
| 2 | Leaching Resistance | More than 75% of termination Should be covered with new solder. | Solder : Sn Temperature : 270°C+2°C/-0°C Flux : rosin Duration : 10±0.5s | | | | | | | | | | | | | | | |
| 3 | Bending Strength | No mechanical damage should be noticed | When the board curve to 2mm (0.079 inch) <table border="1"> <thead> <tr> <th>Size</th> <th>A(mm)</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>0.3</td> </tr> <tr> <td>1005</td> <td>0.5</td> </tr> <tr> <td>1608</td> <td>0.7</td> </tr> <tr> <td>2012</td> <td>1.0</td> </tr> </tbody> </table>  | Size | A(mm) | 0603 | 0.3 | 1005 | 0.5 | 1608 | 0.7 | 2012 | 1.0 | | | | | |
| Size | A(mm) | | | | | | | | | | | | | | | | | |
| 0603 | 0.3 | | | | | | | | | | | | | | | | | |
| 1005 | 0.5 | | | | | | | | | | | | | | | | | |
| 1608 | 0.7 | | | | | | | | | | | | | | | | | |
| 2012 | 1.0 | | | | | | | | | | | | | | | | | |
| 4 | Body Strength | No mechanical damage should be noticed | Applied specified pull strength in axial direction <table border="1"> <thead> <tr> <th>Size</th> <th>A/mm</th> <th>P/N</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>0.3</td> <td>4.9</td> </tr> <tr> <td>1005</td> <td>0.7</td> <td>4.9</td> </tr> <tr> <td>1608</td> <td>1.0</td> <td>4.9</td> </tr> <tr> <td>2012</td> <td>1.4</td> <td>9.8</td> </tr> </tbody> </table>  | Size | A/mm | P/N | 0603 | 0.3 | 4.9 | 1005 | 0.7 | 4.9 | 1608 | 1.0 | 4.9 | 2012 | 1.4 | 9.8 |
| Size | A/mm | P/N | | | | | | | | | | | | | | | | |
| 0603 | 0.3 | 4.9 | | | | | | | | | | | | | | | | |
| 1005 | 0.7 | 4.9 | | | | | | | | | | | | | | | | |
| 1608 | 1.0 | 4.9 | | | | | | | | | | | | | | | | |
| 2012 | 1.4 | 9.8 | | | | | | | | | | | | | | | | |
| 5 | Terminal Strength | The terminal and body should be no damage | Applied specified pull strength in axial <table border="1"> <thead> <tr> <th>Size</th> <th>Pull Strength</th> <th>Time (s)</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>2 N</td> <td>5±1</td> </tr> <tr> <td>1005</td> <td>3 N</td> <td>5±1</td> </tr> <tr> <td>1608</td> <td>5 N</td> <td>5±1</td> </tr> <tr> <td>2012</td> <td>10 N</td> <td>5±1</td> </tr> </tbody> </table>  | Size | Pull Strength | Time (s) | 0603 | 2 N | 5±1 | 1005 | 3 N | 5±1 | 1608 | 5 N | 5±1 | 2012 | 10 N | 5±1 |
| Size | Pull Strength | Time (s) | | | | | | | | | | | | | | | | |
| 0603 | 2 N | 5±1 | | | | | | | | | | | | | | | | |
| 1005 | 3 N | 5±1 | | | | | | | | | | | | | | | | |
| 1608 | 5 N | 5±1 | | | | | | | | | | | | | | | | |
| 2012 | 10 N | 5±1 | | | | | | | | | | | | | | | | |



| NO. | Item | Specifications | Test Methods |
|-----|-----------------------------|--|---|
| 6 | Drop | <p>1.No mechanical damage shall be noticed</p> <p>2.Impedance shall be within $\pm 20\%$ of the initial value</p> | Drop 10 times on a concrete floor from a height of 1m. |
| 7 | Vibration | | Frequency : 10 to 55Hz Amplitude : 1.52mm Direction and time : X, Y and Z directions for 2 hours each. |
| 8 | Humidity resistance | | a. Test condition Temp. : $60\pm 2^{\circ}\text{C}$ Humidity : 90%~95% Test time : 1000 h b. Measurement method : The component should be stabilized at normal condition for 24 hours before test. |
| 9 | High temperature resistance | | a. Test condition Applied rated current Temp. : $125\pm 2^{\circ}\text{C}$ Test time : 1000 h b. Measurement method : The component should be stabilized at normal condition for 24 hours before test. |
| 10 | Low temperature resistance | | a. Test condition Temp. : $-55\pm 2^{\circ}\text{C}$ Test time : 1000 h b. Measurement method : The component should be stabilized at normal condition for 24 hours before test. |
| 11 | Thermal shock | | a. Test condition 1) Temp.: -55°C , time : $30\pm 3\text{min}$ 2) Temp.: $+125^{\circ}\text{C}$, time : $30\pm 3\text{min}$ 100 cycles b. Measurement method : The component should be stabilized at normal condition for 24 hours before test. |



8 Recommended Soldering Conditions

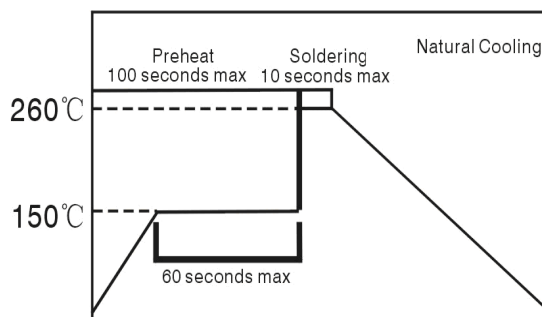
Product can be applied to flow and reflow soldering.

(1) Flux, Solder

- ① Use rosin-based flux. Don't use highly acidic flux with halide content exceeding 0.2wt% (chlorine conversion value).
- ② Use Sn solder.

(2) Flow soldering conditions

- ① Pre-heating should be in such a way that the temperature difference between solder and product surface is limited to 150°C max. Cooling into solvent after soldering also should be in such a way that temperature difference is limited to 100°C max. Unwrought pre-heating may cause cracks on the product, resulting in the deterioration of products quality.
- ② Standard soldering profile.



| | |
|--------------------|-----------------------|
| Pre-heating | 150°C, 1 minute min |
| Peak | 260°C, 10 seconds max |

(3) Reflow soldering conditions

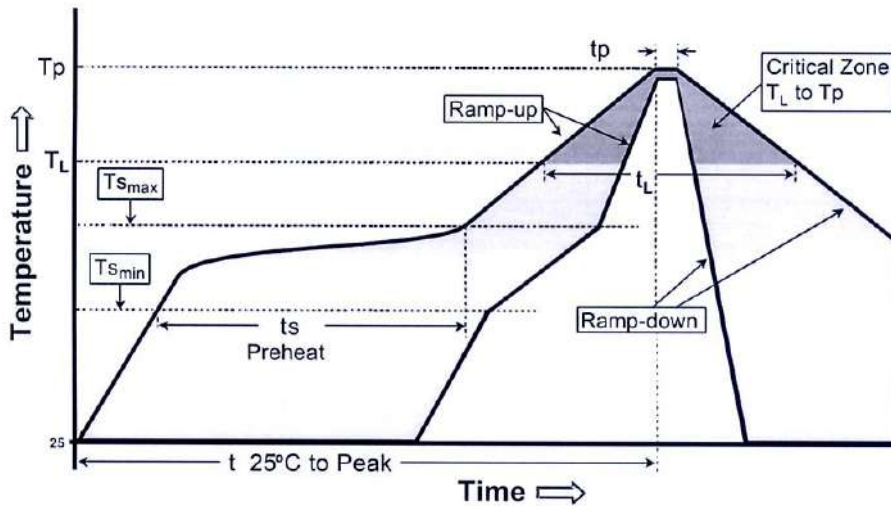
| Profile Feature | Lead-Free Assembly |
|--|------------------------------------|
| Average Ramp-Up Rate (T _{max} to T _p) | 3°C C/second max. |
| Preheat <ul style="list-style-type: none"> - Temperature Min (T_{min}) - Temperature Max (T_{max}) - Time (t_{min} to t_{max}) min to t_{max}) | 150 °C 200 °C 60-180 seconds |



| Profile Feature | Lead-Free Assembly |
|---|--------------------------|
| Time maintained above: - Temperature (TL) - Time (tL) | 217 °C 60-150 seconds |
| Peak/Classification Temperature (Tp) Peak/Classification Time (Tp) | 260 °C 3-4 seconds |
| Time within 5 °C of actual Peak Temperature (tp) | 20-40 seconds |
| Ramp-Down Rate | 6°C/second max. |
| Time 25 °C to Peak Temperature | 8 minutes max. |

Note 1: All temperatures refer to topside of the package, measured on the package body surface.

Standard soldering profile



(4) Reworking with soldering iron

The following conditions must be strictly followed when using a soldering iron.

| | |
|------------------------------|-----------------|
| Pre-heating | 150°C, 1 minute |
| Tip temperature | 350°C max |
| Soldering iron output | 80w max |
| End of soldering iron | φ 1mm max |
| Soldering time | 3 seconds max |



9 Cleaning Conditions

Products shall be cleaned on the following conditions.

(1) Cleaning temperature shall be limited to 60°C max. (40°C max for fluoride and alcohol type cleaner.)

(2) Ultrasonic cleaning shall comply with the following conditions with avoiding the resonance phenomenon at the mounted products and P.C.B.

Power: 20W/t max

Frequency: 40 kHz

Time : 5 minutes max

(3) Cleaner

a) Alternative cleaner

Isopropyl alcohol (IPA) HCFC-225

b) Aqueous agent

Surface Active Agent Type (CLEANTHROUGH 750H)

Hydrocarbon Type (TECHNOCLEANER 335)

Higher Alcohol Type (PINE ALPHA ST -100S)

Alkali Saponification Type (*AQUACLEANER 240)

(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.

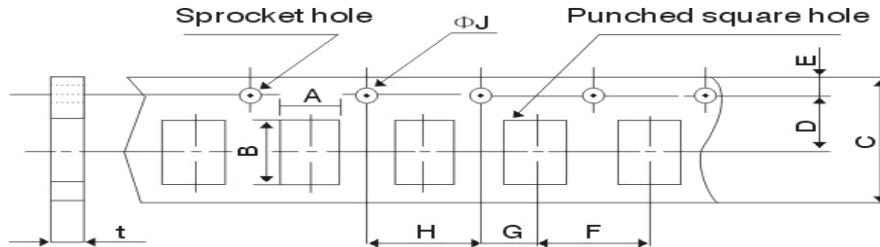
(5) Other cleaning Please contact us.



10 Packaging

(1) Dimensions of Tape:

Paper / Embossed carrier tape:



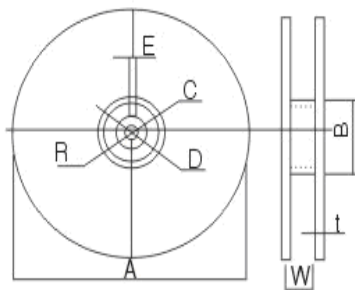
Unit: mm

| Type | 3216 | | 2012 | | 1608 | 1005 | 0603 |
|--------|--------------------|-----------------------|--------------------|-----------------------|--------------------|--------------------|--------------------|
| T* | 1.1±0.3 | | 0.85±0.2 | 1.25±0.2 | 0.8±0.15 | 0.5±0.15 | 0.3±0.05 |
| | Paper carrier tape | Embossed carrier tape | Paper carrier tape | Embossed carrier tape | Paper carrier tape | Paper carrier tape | Paper carrier tape |
| A | 2.0±0.2 | 2.0±0.2 | 1.5±0.15 | 1.5±0.15 | 1.05±0.15 | 0.65±0.10 | 0.4±0.05 |
| B | 3.6±0.2 | 3.6±0.2 | 2.5±0.2 | 2.5±0.2 | 1.9±0.15 | 1.15±0.10 | 0.7±0.05 |
| C | 8.0±0.3 | 8.0±0.3 | 8.0±0.3 | 8.0±0.3 | 8.0±0.3 | 8.0±0.3 | 8.0±0.3 |
| D | 3.5±0.05 | 3.5±0.05 | 3.5±0.05 | 3.5±0.05 | 3.5±0.05 | 3.5±0.05 | 3.5±0.05 |
| E | 1.75±0.1 | 1.75±0.1 | 1.75±0.1 | 1.75±0.1 | 1.75±0.1 | 1.75±0.1 | 1.75±0.1 |
| F | 4.0±0.1 | 4.0±0.1 | 4.0±0.1 | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 | 2.0±0.05 |
| G | 2.0±0.05 | 2.0±0.05 | 2.0±0.05 | 2.0±0.05 | 2.0±0.05 | 2.0±0.05 | 2.0±0.05 |
| H | 4.0±0.1 | 4.0±0.1 | 4.0±0.1 | 4.0±0.1 | 4.0±0.1 | 4.0±0.1 | 4.0±0.1 |
| ΦJ | 1.5+0.1/-0 | 1.5+0.1/-0 | 1.5+0.1/-0 | 1.5+0.1/-0 | 1.5+0.1/-0 | 1.5+0.1/-0 | 1.5+0.1/-0 |
| t(max) | 1.1±0.05 | 2.0±0.05 | 1.1±0.05 | 1.0±0.05 | 1.0±0.05 | 0.8±0.05 | 0.55±0.05 |

T*: Product thickness

(2) Dimensions of Reel

Unit: mm



Reel material: PS (Polystyrene)

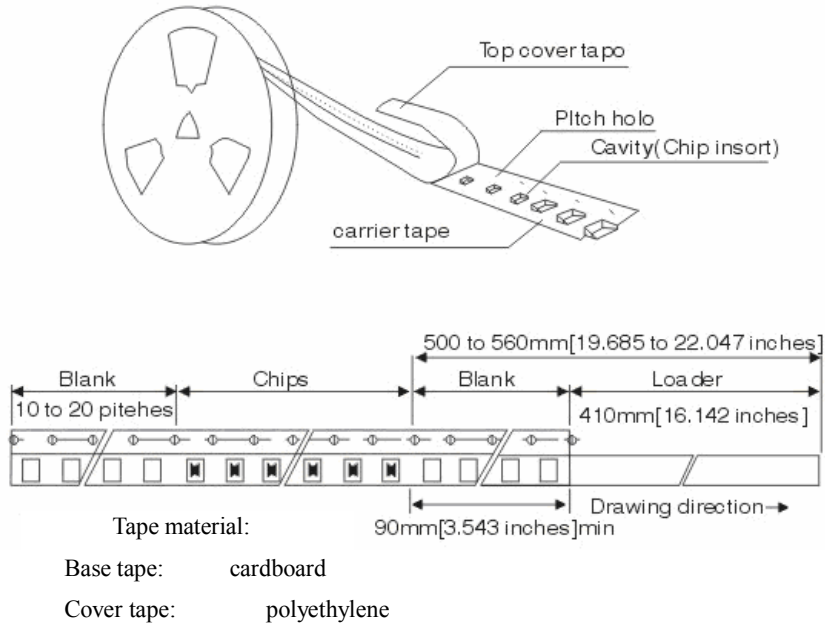
| | |
|---|-----------|
| A | 178±2 |
| B | 60±2 |
| C | 13.0±0.5 |
| D | 21.0±0.8 |
| E | 2.0±0.5 |
| W | 10.0±1.15 |
| t | 1.2±0.2 |
| R | 1.0±0.25 |



(3) Pulling strength of tapes

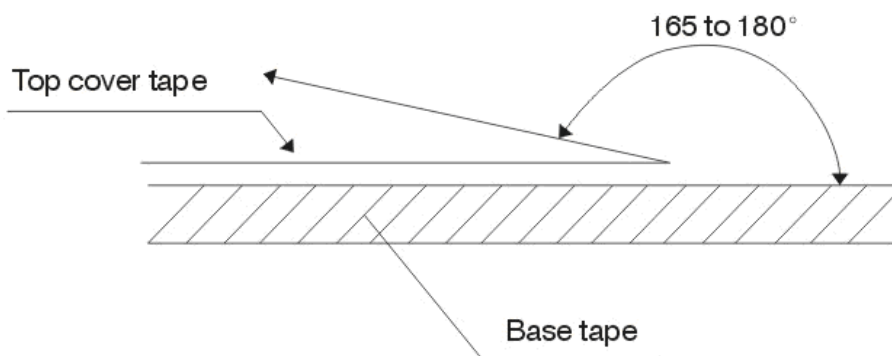
| | |
|---------------------|-----------------------------|
| Carrier tape | 10N or more (1kgf or more) |
| Cover tape | 5N or more (0.5kgf or more) |

(4) Taping figure and drawing direction



(5) Peeling strength of cover tape

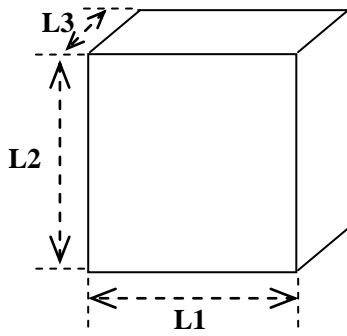
| | |
|-------------------|----------------------|
| Cover tape | 0.3~0.7N (30gf~70gf) |
|-------------------|----------------------|



Test condition:

- 1) peel angle: 165°~180° vs. carrier tape.
- 2) peel speed: 300 mm/min±10%.

(6) Box and case dimensions



Unit: mm

| Type | L1 | L2 | L3 |
|------|-------|-------|-------|
| Box | 180±2 | 180±2 | 75±1 |
| Box | 180±2 | 180±2 | 120±2 |
| Case | 400±2 | 400±2 | 200±2 |

- A 6 reels in a box.
- B 10 boxes in a case.

(7) Packaging quantities

| Type | Thickness(mm) | Bulk | Tape and reel |
|------|---------------|------|---------------|
| 3216 | 1.10±0.30 | ---- | 3000pcs |
| 2012 | 1.25±0.20 | ---- | 3000pcs |
| | 0.85±0.20 | ---- | 4000pcs |
| 1608 | 0.8±0.15 | ---- | 4000pcs |
| 1005 | 0.5±0.15 | ---- | 10000pcs |
| 0603 | 0.3±0.05 | ---- | 15000pcs |

11 Storage

(1) Storage period

Products which inspected in over 6 months ago should be examined and used, which can be confirmed with inspection No. marked on the container. Solder ability should be checked if this period is exceeded.

(2) Storage conditions

- ① Products should be storage in the warehouse on the following conditions

Temperature: $\leq 40^{\circ}\text{C}$

Humidity : $\leq 70\%$ relative humidity

No rapid change on temperature and humidity

- ② Don't keep products in corrosive gases such as sulfur, chlorine gas or acid, or it may cause oxidization of electrode, resulting in poor solder ability



- ③ Products should be storage on the palette for the prevention of the influence from humidity, dust and so on.
- ④ Products should be storage in the warehouse without heat shock, vibration, direct sunlight and so on.
- ⑤ Products should be storage under the airtight packaged condition.

12 Usage of Nonflammable Material

For these materials listed below, we don't use in process. Cd, Hg, As and its compound, PCB, etc. PBBS, PBBOs, PBDO, PBDE, PBB.

13 Usage of ODS

For ODS listed below, we don't use in process. ODS: CCL₄, HCFC, etc. ODS。

14 Flammability Class

UL 94V-1

15 Note

This product specification guarantees the quality of our product as a single unit. Please make sure that your product is evaluated and confirmed against your specifications when our product is mounted to your product.

We cannot warrant against failure caused by any use of our product that deviates from the intended use as described in this product specification.

Please return our copy of this product specification in two month after issued date with your signature of receipt. If the copy is not returned by the date, this product specification will be deemed to have been received.