

# 承 認 書

## SPECIFICATION FOR APPROVAL

|                      |                            |
|----------------------|----------------------------|
| <i>CUSTOMER:</i>     |                            |
| <i>CUSTOMER P/N</i>  |                            |
| <i>PART NO:</i>      |                            |
| <i>DESCRIPTION:</i>  | <i>SMD POWER INDUCTORS</i> |
| <i>PRODUCTS NO:</i>  | BCRH104R-150M              |
| <i>PRODUCTS REV:</i> | 01                         |
| <i>DATE:</i>         | 2018-6-11                  |

|                             |                 |                 |
|-----------------------------|-----------------|-----------------|
| <i>PURCHASER CONFIRMED.</i> |                 |                 |
| <i>APPROVAL BY</i>          | <i>CHECK BY</i> | <i>DRAWN BY</i> |
|                             |                 |                 |
| <i>REMARK</i>               |                 |                 |

|                                |                 |                  |
|--------------------------------|-----------------|------------------|
| <i>PROVIDER ENGINEER DEPT.</i> |                 |                  |
| <i>APPROVAL BY</i>             | <i>CHECK BY</i> |                  |
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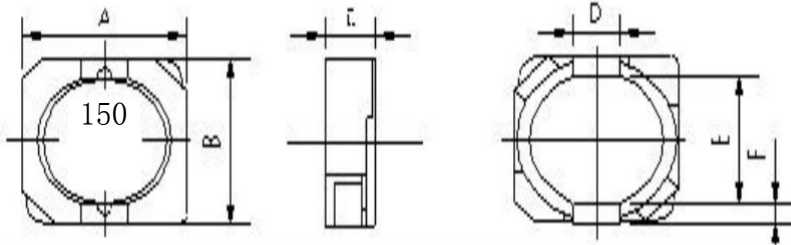
# TEST DATA

## DIMENSION&ELECTRIC CHARACTER

|              |              |            |               |
|--------------|--------------|------------|---------------|
| CUSTOMER:    |              | PART NO. : |               |
| DESCRIPTION: | SMD INDUCTOR | SERIES NO: | BCRH104R-150M |

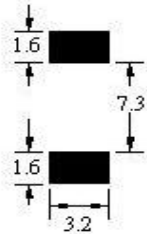
### 1.MECHANICAL DIMENSION

UNIT : mm



|   |          |
|---|----------|
| A | 10.3MAX  |
| B | 10.5MAX  |
| C | 4.0MAX   |
| D | 3.0±0.1  |
| E | 7.7±0.3  |
| F | 1.2±0.15 |
| G |          |
| H |          |
| I |          |

### 2.RECOMMEND LAND PATTERN DIMENSIONS



### 3.SPECIFICATIONS

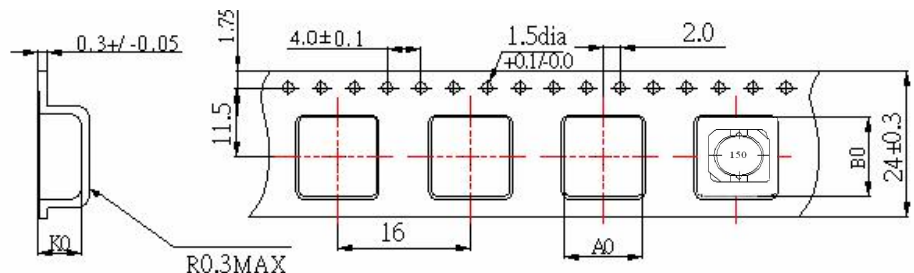
| Part Number   | L<br>Inductance<br>(uH)<br>@ (0A) | R <sub>dc</sub> (mOHM) |     | Heat Rating Current DC<br>Amps. Idc (A) | Saturation Current DC<br>Amps. Idc (A) |
|---------------|-----------------------------------|------------------------|-----|---|--|
|               |                                   | Typical                | Max | Typical                                 | Typical                                |
| BCRH104R-150M | 15.0                              | 44                     | 50  | 3.1                                     | 3.6                                    |

- (1). All test data is referenced to 25°C ambient.
- (2). Operating Temperature Rangr-30°C to +100°C.
- (3). DC current(A)that will cause an approaimateΔT of 40°C.
- (4). DC current(A)that will cause Lo to drop approximately 35%.
- (5). The part temperature (ambient+temp rise)should not exeed 100°C under worst case operating conditions. Circuit design, component placement, PWB trace size and thickness, airflow and oter aooting provisions all affsct the part temperature part temperature should be verified in the end appliation.

### 4.PACKAGING INFORMATION

paets are packaged on 13" reels  
800 parts per reel.

|            |
|------------|
| A0= 10.3mm |
| B0=10.5mm  |
| K0=4.1mm   |



APPROVED BY:

CHECKED BY:

DRAWN BY:chenlinli

# ZHUHAI BAOCHENG ELECTRONICS CO., LTD

## TEST DATA FOR PREPRODUCTION SAMPLE

| CUSTOMER:               |       |       | CUSTOMER P/N:             |   |   |   | CUSTOMER REV: |   |   | TEST DATE:2018-6-11 |   |
|-------------------------|-------|-------|---------------------------|---|---|---|---------------|---|---|---------------------|---|
| PART NAME: SMD INDUCTOR |       |       | BC PART NO: BCRH104R-150M |   |   |   | BC REV:       |   |   | QUANTITY:10PCS      |   |
| TEST ITEM               | A     | B     | C                         | D | E | F | G             | H | I | J                   | K |
| SPEC.                   | 10.3  | 10.5  | 4.0                       |   |   |   |               |   |   |                     |   |
|                         | MAX   | MAX   | MAX                       |   |   |   |               |   |   |                     |   |
| 01                      | 10.00 | 10.25 | 3.81                      |   |   |   |               |   |   |                     |   |
| 02                      | 9.99  | 10.24 | 3.79                      |   |   |   |               |   |   |                     |   |
| 03                      | 10.00 | 10.28 | 3.83                      |   |   |   |               |   |   |                     |   |
| 04                      | 10.03 | 10.29 | 3.82                      |   |   |   |               |   |   |                     |   |
| 05                      | 10.19 | 10.31 | 3.82                      |   |   |   |               |   |   |                     |   |
| 06                      | 10.18 | 10.38 | 3.79                      |   |   |   |               |   |   |                     |   |
| 07                      | 10.05 | 10.29 | 3.83                      |   |   |   |               |   |   |                     |   |
| 08                      | 10.06 | 10.19 | 3.81                      |   |   |   |               |   |   |                     |   |
| 09                      | 10.18 | 10.32 | 3.86                      |   |   |   |               |   |   |                     |   |
| 10                      | 10.09 | 10.27 | 3.84                      |   |   |   |               |   |   |                     |   |
| 11                      |       |       |                           |   |   |   |               |   |   |                     |   |
| 12                      |       |       |                           |   |   |   |               |   |   |                     |   |
| 13                      |       |       |                           |   |   |   |               |   |   |                     |   |
| 14                      |       |       |                           |   |   |   |               |   |   |                     |   |
| 15                      |       |       |                           |   |   |   |               |   |   |                     |   |
| $\bar{X}$               | 10.08 | 10.28 | 3.82                      |   |   |   |               |   |   |                     |   |
| $\sigma$                | 0.075 | 0.048 | 0.020                     |   |   |   |               |   |   |                     |   |
| Cpk                     | 0.99  | 1.50  | 2.93                      |   |   |   |               |   |   |                     |   |
| APPROVED BY             |       |       | CHECKED BY                |   |   |   | PREPARED BY   |   |   |                     |   |
|                         |       |       |                           |   |   |   | chenlinli     |   |   |                     |   |

# ZHUHAI BAOCHENG ELECTRONICS CO., LTD

## TEST DATA FOR PREPRODUCTION SAMPLE

|                         |              |                           |           |               |                     |  |
|-------------------------|--------------|---------------------------|-----------|---------------|---------------------|--|
| CUSTOMER:               |              | CUSTOMER P/N:             |           | CUSTOMER REV: | TEST DATE:2018-6-11 |  |
| PART NAME: SMD INDUCTOR |              | BC PART NO: BCRH104R-150M |           | BC REV:       | QUANTITY:10PCS      |  |
| TEST ITEM               | L (0A)       | L (3.6A)/L (0A) 100%      | DCR (S-F) |               |                     |  |
| TEST CONDITION          | 100KHZ 0.25V |                           |           |               |                     |  |
| SPEC.                   | 15uH<br>+20% | = 65%<br>AT DC 3.6A       | 50m<br>Ω  |               |                     |  |
| 01                      | 14.36        | 73%                       | 43.66     |               |                     |  |
| 02                      | 14.22        | 78%                       | 44.52     |               |                     |  |
| 03                      | 15.84        | 80%                       | 45.78     |               |                     |  |
| 04                      | 14.67        | 78%                       | 44.23     |               |                     |  |
| 05                      | 15.06        | 75%                       | 43.43     |               |                     |  |
| 06                      | 14.05        | 89%                       | 42.89     |               |                     |  |
| 07                      | 15.85        | 80%                       | 42.56     |               |                     |  |
| 08                      | 14.82        | 78%                       | 44.83     |               |                     |  |
| 09                      | 14.75        | 79%                       | 45.18     |               |                     |  |
| 10                      | 14.32        | 73%                       | 43.81     |               |                     |  |
| 11                      |              |                           |           |               |                     |  |
| 12                      |              |                           |           |               |                     |  |
| 13                      |              |                           |           |               |                     |  |
| 14                      |              |                           |           |               |                     |  |
| 15                      |              |                           |           |               |                     |  |
| $\bar{X}$               | 14.79        |                           | 44.09     |               |                     |  |
| $\sigma$                | 0.600        |                           | 0.963     |               |                     |  |
| Cpk                     | 2.39         |                           | 2.05      |               |                     |  |

1. TEST INSTRUMENTS:

- HP-4284A METER
- HP-4285A METER
- HP-4191A METER
- VR116+VR7220 METER
- CH-3200 METER
- CH-310 METER
- CH-3305 METER
- CD1068+CD1320 METER
- VR113+VR712+R712 METER
- WK3260B+WK3265B METER
- VR562 METER
- CH-502B DCR METER

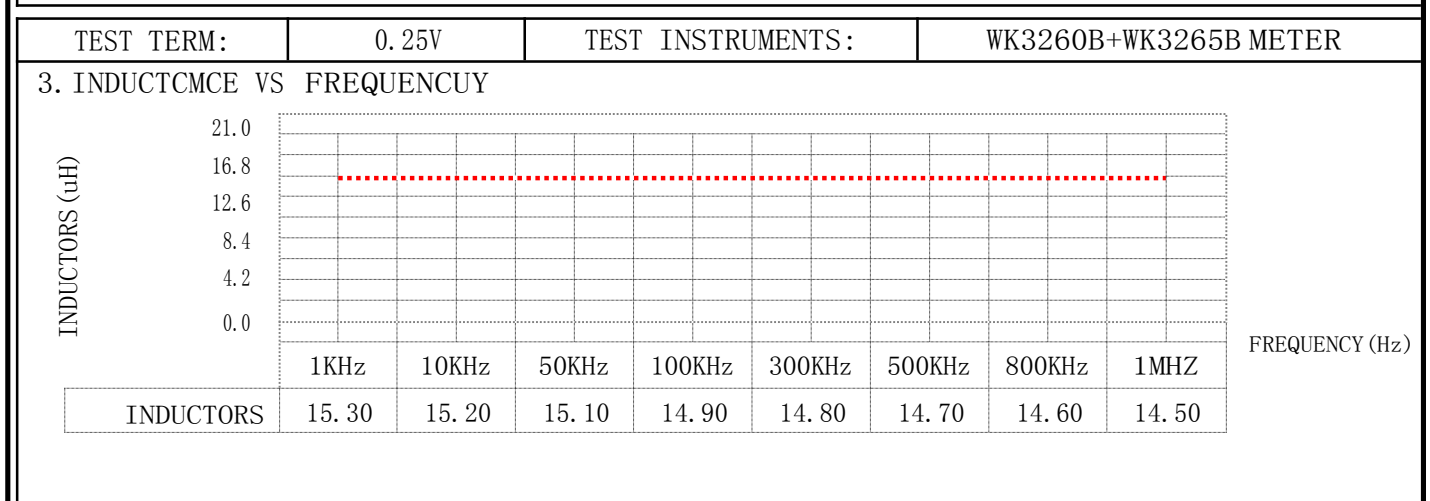
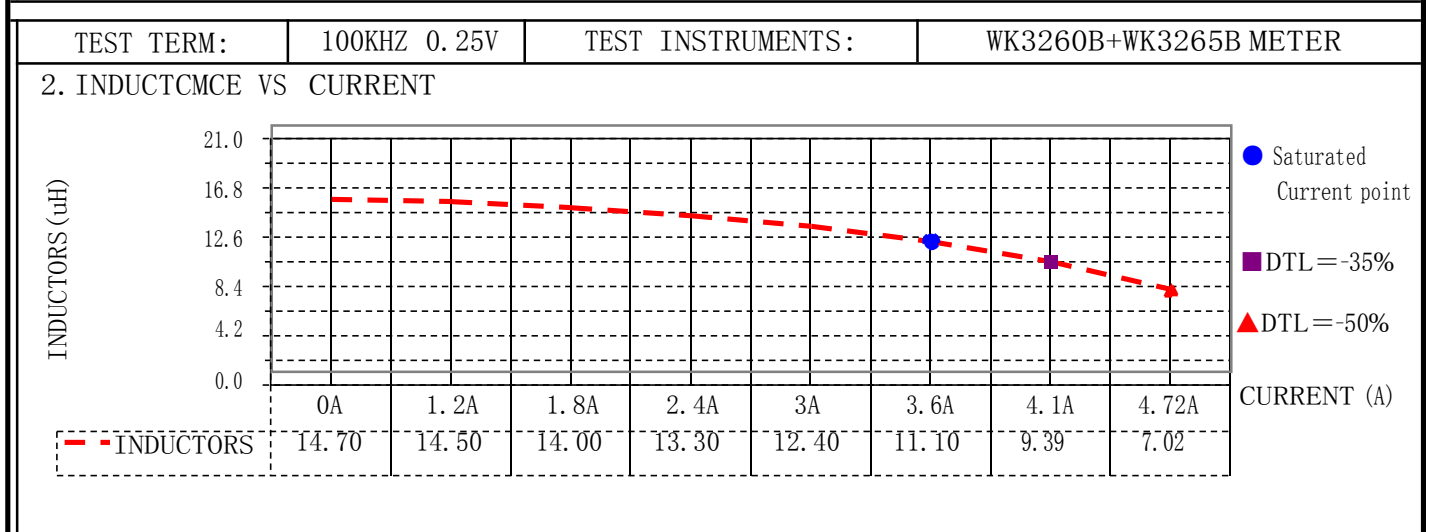
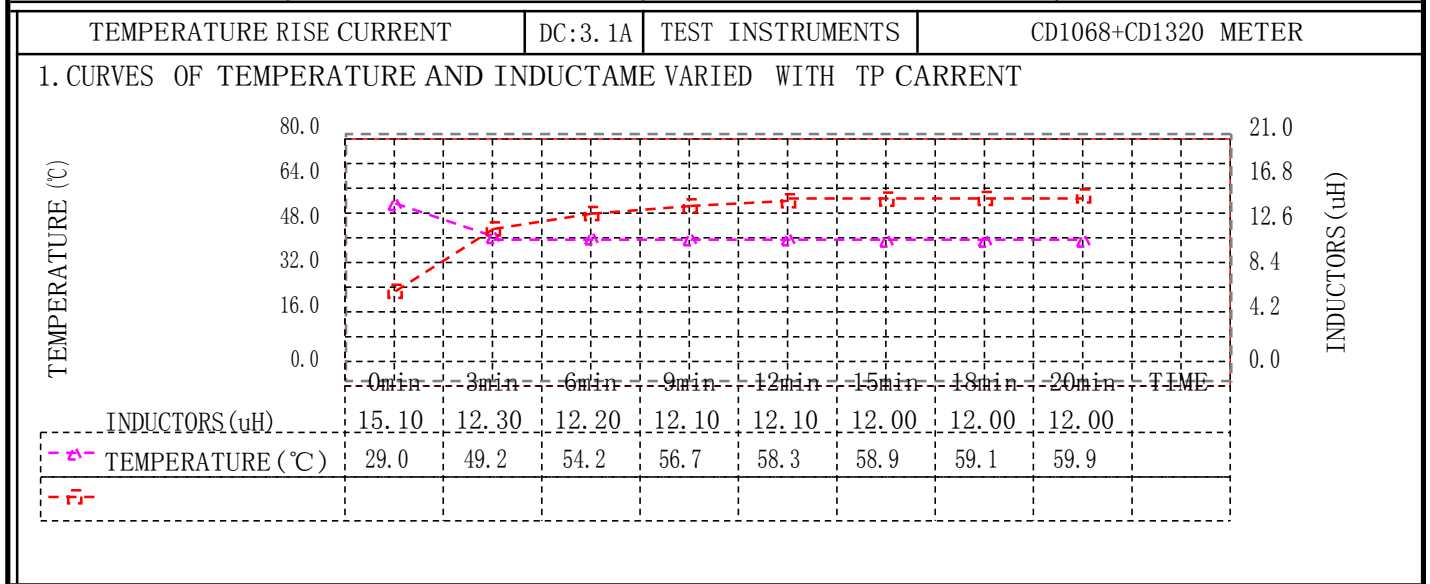
2. CONDITION

TEMPERATURE: 25°C  
HUMIDITY: 65%RH

|             |            |             |
|-------------|------------|-------------|
| APPROVED BY | CHECKED BY | PREPARED BY |
|             |            | chenlinli   |

# ELECTRONICS CHARACTER TEST CHART

|            |              |                       |                     |
|------------|--------------|-----------------------|---------------------|
| CUSTOMER:  |              | CUSTOMER P/N:         | TEST DATE:2018-6-11 |
| PART NAME: | SMD INDUCTOR | BC P/N: BCRH104R-150M | SAMPLE CO:          |

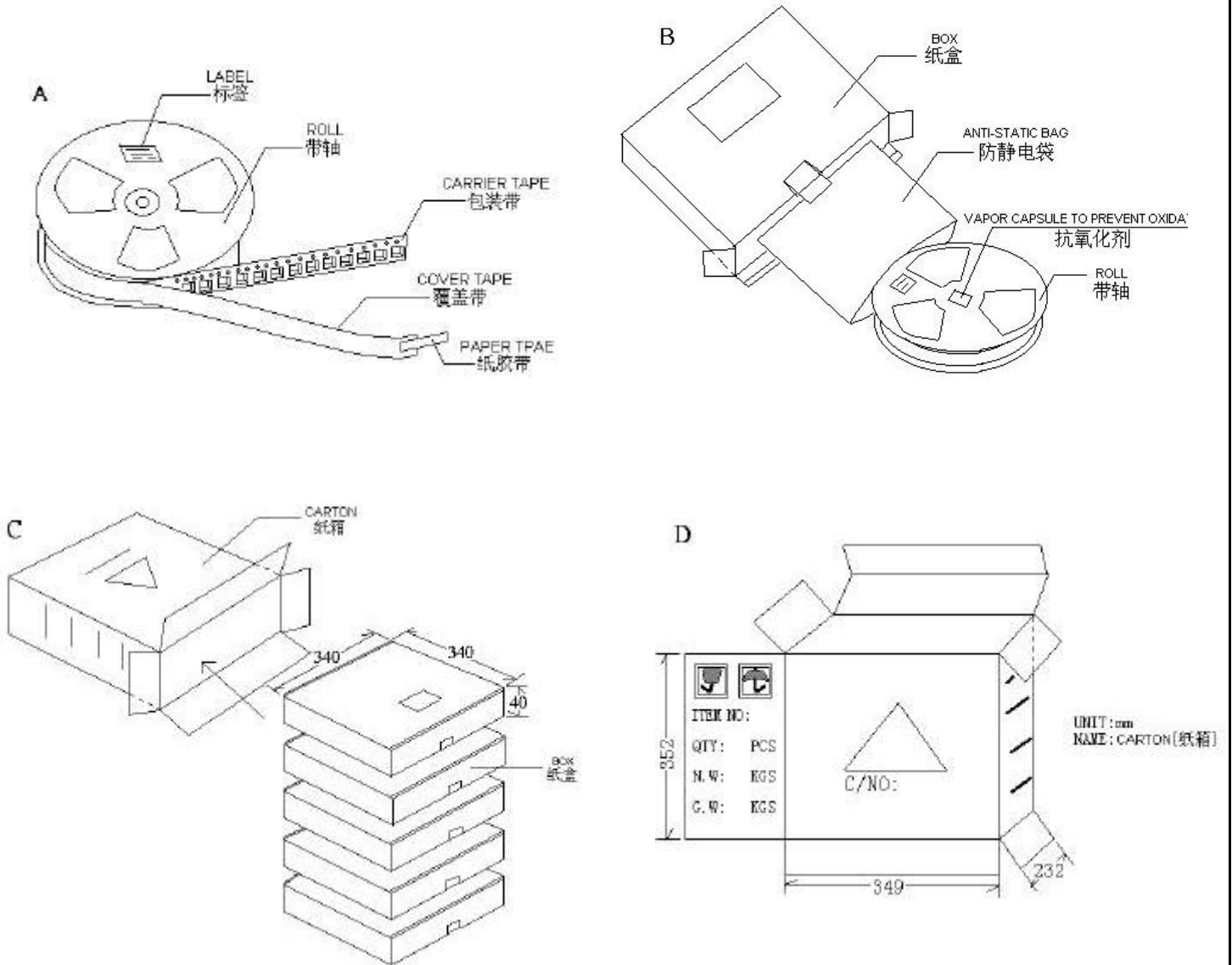


1. TEST CONDITION  
 TEMPERATURE: 25°C  
 HUMIDITY: ≤ 65% RH

|             |            |             |
|-------------|------------|-------------|
| APPROVED BY | CHECKED BY | PREPARED BY |
|             |            | chenlinli   |

# PACKAGE STANDARD

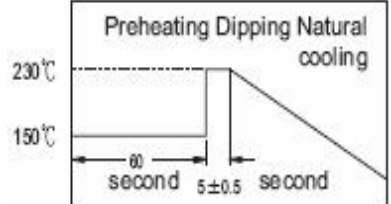
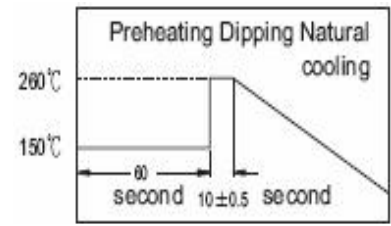
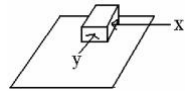
PART NO. BCRH104R SERIES



| NO       | A        | B      | C       |
|----------|----------|--------|---------|
| MODEL    | φ 330*24 | SMD-BC | BC-10   |
| QUANTITY | 800PCS   | 800PCS | 4000PCS |

# ■ GENERAL CHARACTERISTICS

P.1

|                        |  |
|------------------------|--|
| Operation Temperature  | -30°C to +100°C (Includes temperature when the coil is heated)   |
| External Appearance    | On visual inspection, the coil has no external defects.  |
| Solder Ability Test    | <p>1. More than 90% of terminal electrode should be covered with solder.</p> <ul style="list-style-type: none"> <li>● After fluxing, component shall be dipped in a melted.</li> <li>● Solder: bath at 230°C±5°C for 5±0.5 seconds.</li> </ul>    |
| Solder Heat Resistance | <p>1. Components should have not evidence of electrical and mechanical damage.<br/>2. Inductance: within±10% of initial value.<br/>3. Impedance: within±30% of initial value.</p> <ul style="list-style-type: none"> <li>● Preheat: 150±5°C 60seconds.</li> <li>● Solder temperature: 260±5°C.</li> <li>● Flux: rosin.</li> <li>● Dip time: 10±0.5seconds.</li> </ul>   |
| Terminal Strength      | <p>After soldering of X,Y withstanding at below conditions .The terminal should not Peel off. (Refer to figure at below)</p> <ul style="list-style-type: none"> <li>● 5N:60sec.<br/>BC Series, BCB Series, BCDB Series, BCEI Series BCEP Series, BCH Series, BCMD Series, BCMS Series, BCPF Series, BCPS Series BCR Series, BCRH Series, BCRHB Series, BCX Series, BCIHP Series, BCLQ72, BCRM135, BCPH73, BCC5D23, BCHP1210.</li> <li>● 10N:10sec.<br/>BC73, BC75, BC4020FH, BC74B.</li> <li>● 15N:10sec.<br/>BC104, BC105, BC105B, BC108, BC5022FH.</li> <li>● 20N:10sec.<br/>BCR125B.</li> </ul>  |
| Insulating Resistance  | Over 100MO at 100V D.C. between coil and core.   |
| Dielectric Strength    | No dielectric breakdown at 100V D.C. for 1 minute between coil and core.   |
| Vibration Resistance   | Inductance deviation within ±3% after vibration for 1 hour. In each of three orientations at Sweep vibration (10~55~10HZ) with 1.5mmP-P amplitudes.  |
| Shock Resistance       | Inductance deviation within ±3% after being dropped once with 981m/s <sup>2</sup> (100G) shock Attitude upon a rubber block method shock testing machine, in three different orientations  |

## ■ Application Notice/Handling

### 1. Storage Conditions

To maintain the solder ability of terminal electrodes:

- (1) Temperature and humidity conditions: less than 40°C and 70% RH.
- (2) Products should be used within 6 months.
- (3) The packaging material should be kept where no chlorine or sulfur exists in the air.

### 2. Handling

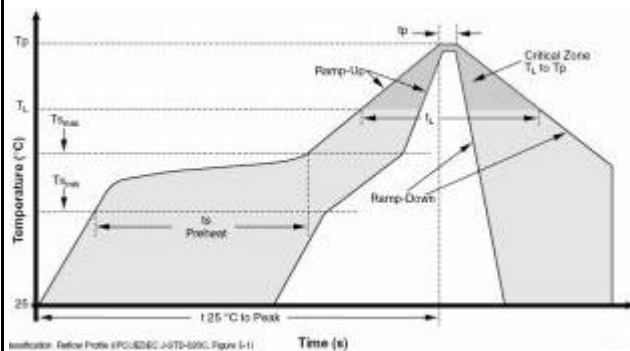
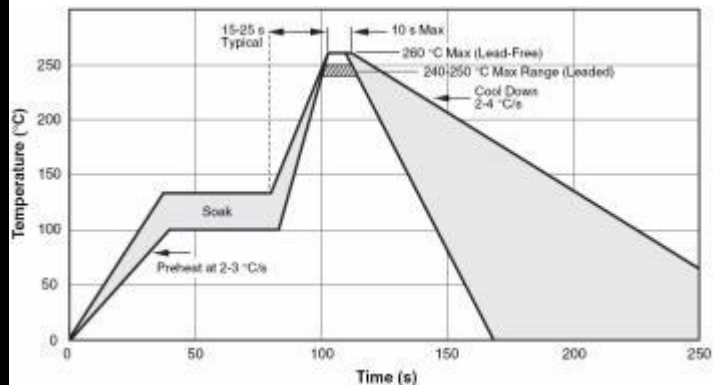
- (1) Do not touch the electrodes (soldering terminals) with fingers as this may lead to deterioration of solderability.
- (2) The use of tweezers or vacuum pick-ups is strongly recommended for individual components.
- (3) Bulk handling should ensure that abrasion and mechanical shock are minimized.



# ■ THE CONDITION OF REFLOW(RECOMMENDATION)

## TYPICAL WAVE SOLDER PROFILE FOR LEADED AND LEAD-FREE THROUGH-HOLE PACKAGES

## TYPICAL IR REFLOW PROFILE FOR LEADED AND LEAD-FREE SURFACE MOUNT PACKAGES



IPC/JEDEC J-STD-020C, Figure 5-1

| Profile Feature                                  | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|--|-------------------------|------------------|
| Average Ramp-Up Rate (Ts <sub>max</sub> to Tp)   | 3 °C/second max.        | 3 °C/second max. |
| Preheat  |                         |                  |
| ± Temperature Min (Ts <sub>min</sub> )           | 100 °C                  | 150 °C           |
| ± Temperature Max (Ts <sub>max</sub> )           | 150 °C                  | 200 °C           |
| ± Time (ts <sub>min</sub> to ts <sub>max</sub> ) | 60-120 seconds          | 60-180 seconds   |
| Time maintained above:                           |                         |                  |
| ± Temperature (T <sub>l</sub> )                  | 183 °C                  | 217 °C           |
| ± Time (t <sub>l</sub> )                         | 60-150 seconds          | 60-150 seconds   |
| Peak/Classification Temperature (Tp)             | See Table 4.1           | See Table 4.2    |
| Time within 5 °C of actual Peak Temperature (tp) | 10-30 seconds           | 20-40 seconds    |
| Ramp-Down Rate                                   | 6 °C/second max.        | 6 °C/second max. |
| Time 25 °C to Peak Temperature                   | 6 minutes max.          | 8 minutes max.   |

Table 4. Classification Reflow Profiles (per IPC/JEDEC J-STD-020C, Table 5.2)

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

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm           | 240 +0/-5 °C                | 225 +0/-5 °C                |
| ≥2.5 mm           | 225 +0/-5 °C                | 225 +0/-5 °C                |

Table 5. SnPb Eutectic Process – Package Peak Reflow Temperatures (per IPC/JEDEC J-STD-020C, Table 4.1)

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350-2000 | Volume mm <sup>3</sup> >2000 |
|-------------------|-----------------------------|---------------------------------|------------------------------|
| <1.6 mm           | 260 + 0 °C *                | 260 + 0 °C *                    | 260 + 0 °C *                 |
| 1.6 mm - 2.5 mm   | 260 + 0 °C *                | 250 + 0 °C *                    | 245 + 0 °C *                 |
| ≥2.5 mm           | 250 + 0 °C *                | 245 + 0 °C *                    | 245 + 0 °C *                 |

\* Tolerance: Process compatibility is up to and including the stated classification temperature (this means Peak reflow temperature + 0 °C. For example 260 °C + 0 °C) at the rated MSL level.

Table 6. Pb-free Process – Package Classification Reflow Temperatures (per IPC/JEDEC J-STD-020C, Table 4.2)

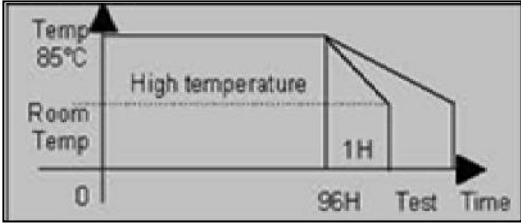
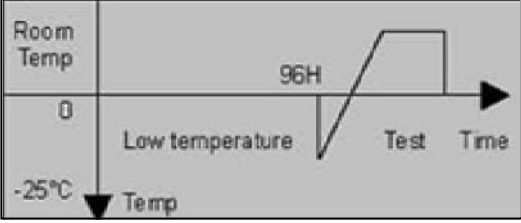
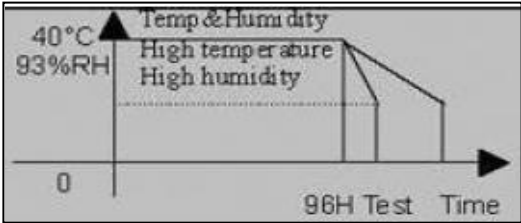
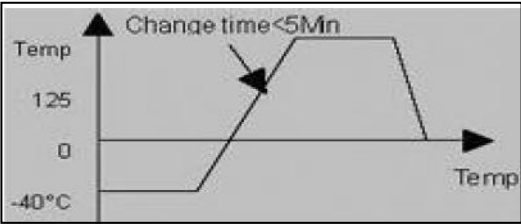
Note 1: The profiling tolerance is + 0 °C, -X °C (based on machine variation capability) whatever is required to control the profile process but at no time will it exceed -5 °C. Process compatibility at the peak reflow profile temperatures as defined in Table 4.2.

Note 2: Package volume excludes external terminals (balls, bumps, lands, leads) and/or nonintegral heat sinks.

Note 3: The maximum component temperature reached during reflow depends on package thickness and volume. The use of convection reflow processes reduces the thermal gradients between packages. However, thermal gradients due to differences in thermal mass of SMD packages may still exist.

Note 4: Components intended for use in a "lead-free" assembly process shall be evaluated using the "lead-free" classification temperatures and profiles defined in Tables 4.1, 4.2 and 5.2 whether or not lead free.



| TEST  | Required Characteristics  | Test Method/Condition   |
|---|---|---|
| <p>High Temperature Storage Test</p> <p>Reference documents:<br/>MIL-STD-202G Method 108A</p> | <p>1.No case deformation or change in appearance<br/>2. <math>\Delta L/L \leq 10\%</math><br/>3. <math>\Delta Q/Q \leq 30\%</math><br/>4. <math>\Delta DCR/DCR \leq 10\%</math></p>   |  <p>Temperature: <math>85^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> Time: <math>96 \pm 2</math> hours.<br/>Tested not less than 1 hour, nor more than 2 hours at room.</p>   |
| <p>Low Temperature Storage Test</p> <p>Reference documents:<br/>IEC 68-2-1A 6.1 6.2</p>       | <p>1.No case deformation or change in appearance.<br/>2. <math>\Delta L/L \leq 10\%</math><br/>3. <math>\Delta Q/Q \leq 30\%</math><br/>4. <math>\Delta DCR/DCR \leq 10\%</math></p>  |  <p>Temperature: <math>-25^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> Time: <math>96 \pm 2</math> hours.<br/>Tested not less than 1 hour, nor more than 2 hours at room.</p>  |
| <p>Humidity Test</p> <p>Reference documents:<br/>MIL-STD-202G Method 103B</p>                 | <p>1.No case deformation or change in appearance.<br/>2. <math>\Delta L/L \leq 10\%</math><br/>3. <math>\Delta Q/Q \leq 30\%</math><br/>4. <math>\Delta DCR/DCR \leq 10\%</math></p>  |  <ol style="list-style-type: none"> <li>1. Dry oven at a temperature of <math>40^{\circ}\text{C} \pm 5^{\circ}\text{C}</math> for 24 hours.</li> <li>2. Measurements At the end of this period</li> <li>3. Exposure: Temperature: <math>40^{\circ}\text{C} \pm 5^{\circ}\text{C}</math>. Humidity: <math>93 \pm 2</math> hours.</li> <li>4. Tested while the the chamber.</li> <li>5. Tested not less than 1 hour. Nor more than 2 hours at room temperature.</li> </ol> |
| <p>Thermal Shock Test</p> <p>Reference documents:<br/>MIL-STD-202G Method 107G</p>            | <p>1. No case deformation or change in appearance.<br/>2. <math>\Delta L/L \leq 10\%</math><br/>3. <math>\Delta Q/Q \leq 30\%</math><br/>4. <math>\Delta DCR/DCR \leq 10\%</math><br/>For T: weight <math>\leq 28\text{g}</math> : 15Min<br/><math>28\text{g} \leq \text{weight} \leq 136\text{g}</math>: 30Min</p> |  <p>First – <math>40^{\circ}\text{C}</math> for T time, last <math>125^{\circ}\text{C}</math> T time as 1 cycle. Go through 20 cycles.</p>  |

### Application Notice/Handling

- (4) Temperature and humidity conditions : less than  $40^{\circ}\text{C}$  and 70% RH.
- (5) Products should be used within 6 months.
- (6) The packaging material should be kept where no chlorine or sulfur exists in the air.
- (7) Do not touch the electrodes (soldering terminals) with fingers as this may lead to deterioration of solder ability
- (8) The use of tweezers or vacuum pick-ups is strongly recommended for individual components.
- (9) Bulk handling should ensure that abrasion and mechanical shock are minimized.