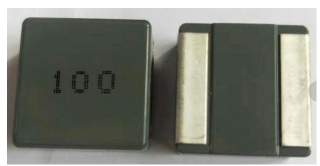
# Powder Molding Type

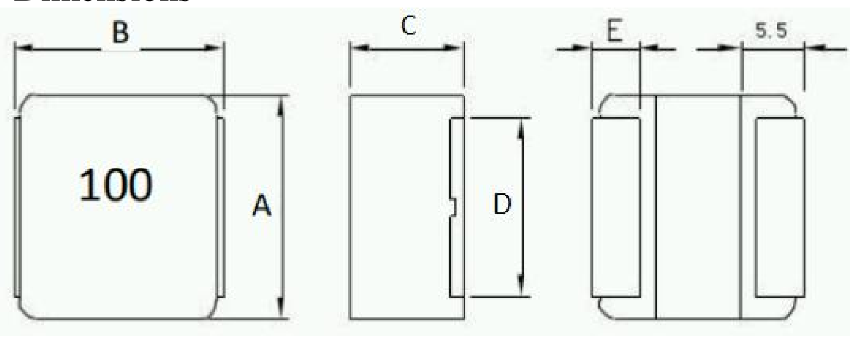
**BCIHP2213-Series**

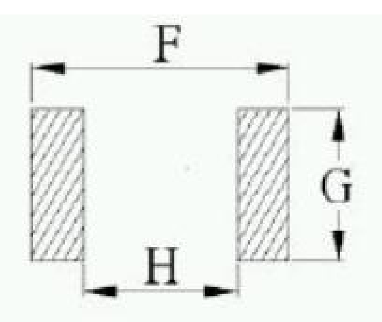
● Photograph picture




BCIHP2213-Series

● Dimensions

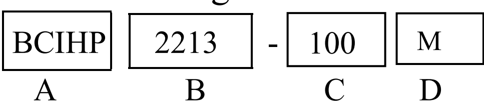



Recommend PC Board Pattern

| ITEM | A(mm) | B(mm) | C(mm) | D(mm) | E(mm) | F(mm) | G(mm) | H(mm) |
|---|---|---|---|---|---|---|---|---|
| BCIHP2213-Series | 22.0±0.5 | 22.5±0.5 | 13 MAX | 18.5±0.3 | 5.0±0.5 | 29 | 22 | 5.8 |

● Part Numbering




A:Series(系列代號)

B:Dimension(尺寸)

C:Inductance(電感值)

D:Inductance Tolerance(電感值公差)

A+B+C+D

2213

R15=0.15uH

M=±20% N=±30%

● Features

1. 100% lead (Pb)-free.
2. Lowest DCR.
3. Frequency range up to 3.0MHz.
4. Ultra low buzz noise, due to composite construction.

● 特點

1. 符合 RoHs.
2. 低電阻.
3. 頻率可達到 3.0 MHz.
4. 設計緊湊/超低噪音

● Applications

1. DC/DC converter for CPU in PC
2. Battery powered devices
3. LCD displays, HDDs, DVCs, DSCs, PDA etc.
4. Thin type on-board power supply module.

● 應用

1. 用於電腦處理器的 DC/DC 轉換設備.
2. 電源,電池設備.
3. 適用於液晶屏顯示,HDD, DVC, DSC, PDA 等.
4. 薄型車載電源模組.

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● Specification

| ITEM | INDUCTANCE uH @100KHZ,1.0V,0A(1) | DCR mΩ 25℃ TYP | DCR mΩ 25℃ MAX | HEAT RATING CURRENT DC AMPS (5) TYPICAL(Irms) | SATU RATION CURRENT DC AMPS (6) TYPICAL(Isat) |
|---|---|---|---|---|---|
| BCIHP2213-R47M | 0.47 | 0.56 | 0.67 | 80.0 | 100.0≦20% |
| BCIHP2213-1R0M | 1.0 | 0.86 | 0.89 | 69.0 | 71.0≦20% |
| BCIHP2213-2R2M | 2.2 | 1.22 | 1.25 | 58.0 | 48.0≦20% |
| BCIHP2213-3R3M | 3.3 | 1.50 | 1.80 | 49.0 | 41.0≦20% |
| BCIHP2213-4R7M | 4.7 | 1.77 | 1.84 | 47.0 | 37.0≦20% |
| BCIHP2213-6R8M | 6.8 | 2.84 | 3.09 | 36.0 | 36.0≦20% |
| BCIHP2213-100M | 10.0 | 3.80 | 4.14 | 28.0 | 28.0≦20% |
| BCIHP2213-150M | 15.0 | 5.62 | 6.11 | 23.5 | 24.0≦20% |
| BCIHP2213-220M | 22.0 | 10.60 | 10.80 | 17.5 | 16.0≦20% |
| BCIHP2213-330M | 33.0 | 15.10 | 15.40 | 15.5 | 10.5≦20% |
| BCIHP2213-470M | 47.0 | 17.30 | 17.70 | 13.5 | 10.5≦20% |
| BCIHP2213-750M | 75.0 | 29.76 | 32.35 | 12.0 | 12.0≦20% |
| BCIHP2213-820M | 82.0 | 31.46 | 34.20 | 10.2 | 9.0≦20% |
| BCIHP2213-101M | 100.0 | 36.25 | 39.40 | 9.1 | 7.0≦30% |
| BCIHP2213HC-151M | 150.0 | 68.00 | 90.00 | 6.0 | 8.0≦30% |
| BCIHP2213HC-221M | 220.0 | 98.00 | 130.00 | 4.5 | 6.0≦30% |
| BCIHP2213HC-401M | 400.0 | 208.00 | 270.00 | 4.0 | 6.0≦30% |

Note:

(1) Tolerance of Inductance:,M=±20%.

(2) All test data is referenced to 25℃ ambient.

(3) Inductance is measured at 100KHz/1.0V. 25℃ ambient.

(4) Operating Temperature Range -40℃ to +125℃.

(5) DC current (Irms) (A) that will cause an approximate △T of 40℃.

(6) DC current (Isat) (A) that will cause Lo to drop approximately 20%.

(7) The part Temperature (ambient + temp rise) should not exceed 125℃ under worst case operating conditions. Circuit design, component placement, PWB trace size and thickness, airflow and other cooling provisions all affect the part temperature Part temperature should be verified in the end application.

(1) 電感的公差：M=±20%.

(2) 所有的測試資料應該是在 25℃的環境溫度下測試.

(3) 感值測試頻率100KHz/1.0V.

(4) 操作溫度範圍－40℃到+125℃.

(5) 加 DC(Irms)電流值(A)會導致△T 40℃左右的變化.

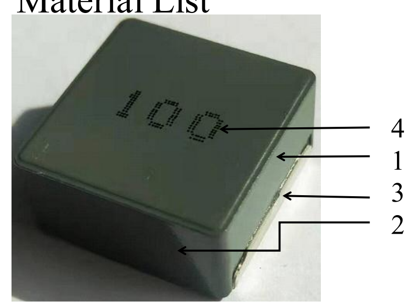
(6) 加 DC(Isat)電流值(A)會導致初始值下降20%左右.

(7) 產品的溫度不能超過 125℃，即使在最壞的操作情況下，基板設計，元件放置，PWB 尺寸和厚度，氣流和一些冷卻設備都會影響產品溫度，產品溫度要在最終應用時才被驗證.

# Powder Molding Type

**BCIHP2213-Series**

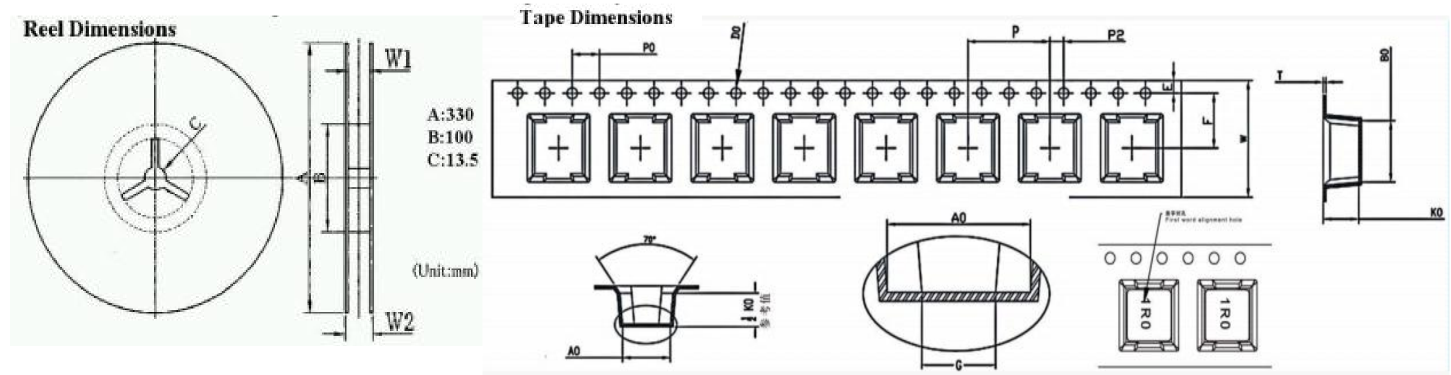
## ● Material List




| NO | ITEM | Materials |
|---|---|---|
| 1 | Core | Magnetic Metal Powder or equivalen |
| 2 | Wire | Polyester Wire or equivalen |
| 3 | External Electode | Copper |
| | Electroplating | Ni/Sn |
| 4 | Paint | Epoxy resin |

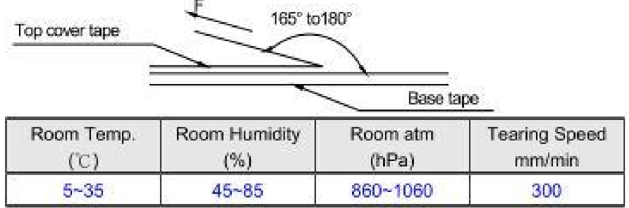
## ● Packaging Information

(1) Reel Dimension & Tape Dimension / Packaging Quantity




| ITEN | DIMENSIONS (m/m) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q'TY (PCS) | W | A0 | B0 | K0 | P | F | T | D0 | P0 | P2 | E |
| BCIHP2213-Series | 100 | 44±0.3 | 22.5±0.1 | 23±0.1 | 13.6±0.1 | 32±0.1 | 20.2±0.15 | 0.5±0.05 | 1.5+0.1-0 | 4.0±0.1 | 2.0±0.1 | 1.75±0.1 |

(2) Tearing Off Force




| Room Temp. (℃) | Room Humidity (%) | Room atm (hPa) | Tearing Speed mm/min |
|---|---|---|---|
| 5~35 | 45~85 | 860~1060 | 300 |

The force tearing off cover 10 to 130 grams (0.1N to 1.3N) in the arrow direction under the following conditions.

## ● Storage conditions/Note things

(1) Storage temperature and humidity conditions :
1. Product packing with Carrier tape: +5℃~+40℃ and less than 60% RH.
2. Product alone: -20℃~+60℃ and less than 60% 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.

(4) Do not touch the electrodes (soldering terminals) with fingers as this may lead to deterioration of solder ability.

(5) The use of tweezers or vacuum pick-ups is strongly recommended for individual components.

(6) Bulk handling should ensure that abrasion and mechanical shock are minimized.

# Powder Molding Type

**BCIHP2213-Series**

● Package for standard

| ITEM | | | |
|---|---|---|---|
| Packing method & Dimensions | | | |
| ITEM | A | B | C |
| BCIHP2213-Series | 100 Pcs | 100 Pcs | Pcs |

# Powder Molding Type

**BCIHP2213-Series**

## ● General Characteristics

| | |
|---|---|
| Operation Temperature | -40℃ to +125℃ (Includes temperature when the coil is heated) |
| External Appearance | On visual inspection, the coil has no external defects. |

## ● Electrical Performance Test

<table>
<tr><td>Inductance</td><td rowspan="2">Refer to standard electrical characteristics list.</td></tr>
<tr><td>DCR</td></tr>
<tr><td>Saturation Current(Isat)</td><td>BCIHP2213-Series △L≦20% typical.<br>BCIHP2213HC-Series △L≦30% typical.</td></tr>
<tr><td>Heat Rated Current(Irms)</td><td>Approximately △T≦40℃.</td></tr>
</table>

## ● Reliability Test

<table>
<tr><td>Solder Ability Test</td><td colspan="2">1. More than 90% of terminal electrode should be covered with solder.<br>● After fluxing, component shall be dipped in a melted.<br>● Solder: bath at 245℃±5℃ for 5±0.5 seconds.</td></tr>
<tr><td>Heat resistance of Reflow Soldering Test</td><td colspan="2">1. Components should have not evidence of electrical and mechanical damage.<br>2. Inductance: within±10% of initial value.<br>● Preheat:150±5℃ 60seconds.<br>● Solder temperature: 255+5℃/-0℃.<br>● Flux: rosin.<br>● Dip time:10±0.5seconds.</td></tr>
<tr><td>Adhesion strength Test</td><td colspan="2">1. No apparent damage<br>● Product is mounted on PCB. Thereafter R340 pressure fixture is used to apply pressure to product from backside of the board at a rate of approx. 1mm/sec. until bending width becomes 1mm and keep it for 5sec.</td></tr>
<tr><td>Welding strength Test</td><td colspan="2">1. No separation or indication of electrode.<br>● A static load using a R5.0 pressing tool shall be applied to the body of the specimen in the direction of the arrow and shall be hold for 3±1 sec.</td></tr>
<tr><td>Insulating Resistance</td><td colspan="2">Over 100MΩ at 100V D.C. between coil and core.</td></tr>
<tr><td>Dielectric Strength</td><td colspan="2">No dielectric breakdown at 30V D.C. for 1 minute between coil and core.</td></tr>
<tr><td>Vibration Test</td><td>Inductance deviation within +10% after vibration for 1 hour. In each of three orientations at Sweep vibration (10~55~10HZ) with 1.5mmP-P amplitudes.</td><td rowspan="2">1. No separation or indication of electrode.<br>2. △L/L≦15%</td></tr>
<tr><td>Drop Test</td><td>Inductance deviation within +10% after being dropped once with 981m/s2 (100G) shock Attitude upon a rubber block method shock testing machine, in three different orientations.</td></tr>
</table>

# Powder Molding Type

**BCIHP2213-Series**

● Reliability Test

| Item | Required Characteristics | Test Method/Condition |
| --- | --- | --- |
| High Temperature Storage Test | 1. No case deformation or change in appearance<br>2. △L/L≦15%<br>3. △Q/Q≦30%<br>4. △DCR/DCR≦15%<br>● Temperature:125℃±3℃ Time:96±2 hours.<br>● Tested not less than 1 hour, nor more than 2 hours at room. | Temp 125℃ High temperature 25℃ 0℃ 1H 1H 96H Test Time |
| Low Temperature Storage Test | 1. No case deformation or change in appearance<br>2. △L/L≦15%<br>3. △Q/Q≦30%<br>4. △DCR/DCR≦15%<br>● Temperature:-40℃±3℃ Time:96±2 hours.<br>● Tested not less than 1 hour, nor more than 2 hours at room. | 25℃ 96H Test 1H 1H Time 0℃ Low Temperature -40℃ Temp |
| High Temperature Humidity Test | 1. No case deformation or change in appearance<br>2. △L/L≦15%<br>3. △Q/Q≦30%<br>4. △DCR/DCR≦15%<br>● Temperature:85℃±3℃.<br>● Humidity:85±5%RH<br>● Test Time:96±2 hours<br>● Tested not less than 1 hour. Nor more than 2 hours at room temperature. | Temp&Humidity 85℃ 85%RH High Temperature Humidity Test 25℃ 1H 1H 96H Test Time |
| Thermal Shock Test Storage Test | 1. No case deformation or change in appearance<br>2. △L/L≦15%<br>3. △Q/Q≦30%<br>4. △DCR/DCR≦15%<br>● First–40℃ for 30 Minutes, last 125℃ for 30 Minutes as 1 cycle. Go through 20 cycles. | Temp 125℃ Change time<5Min 25℃ 0℃ Time -40℃ |

# Powder Molding Type

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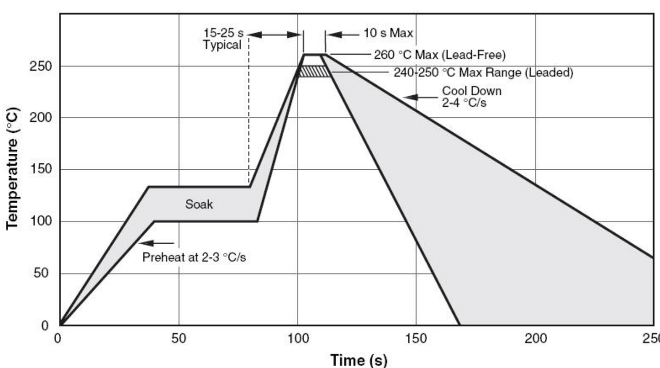
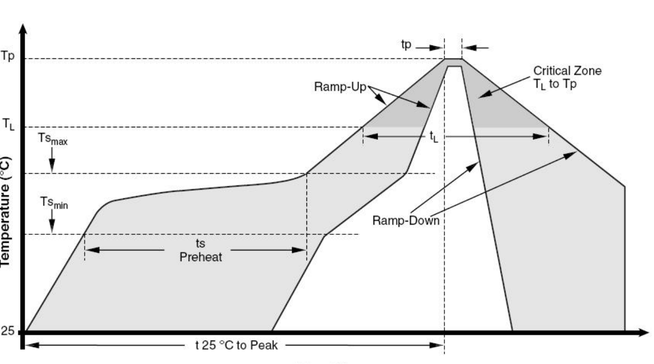
● Soldering re-flow




| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|---|---|
| Average Ramp-Up Rate ($Ts_{max}$ to Tp) | 3 °C/second max. | 3 °C/second max. |
| Preheat<br>± Temperature Min ($Ts_{min}$)<br>± Temperature Max ($Ts_{max}$)<br>± Time ($ts_{min}$ to $ts_{max}$) | 100 °C<br>150 °C<br>60-120 seconds | 150 °C<br>200 °C<br>60-180 seconds |
| Time maintained above:<br>± Temperature ($T_L$)<br>± Time ($t_L$) | 183 °C<br>60-150 seconds | 217 °C<br>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 mm³ <350 | Volume mm³ ≥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 mm³ <350 | Volume mm³ 350-2000 | Volume mm³ >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.