# HIGH CURRENT MOLDED POWER INDUCTORS

## *L816PW SERIES*

**1. PART NO. EXPRESSION :**

L 8 1 6 P W - 1 R 0 M F

(a) (b) (c) (d)(e)

(a) Series code

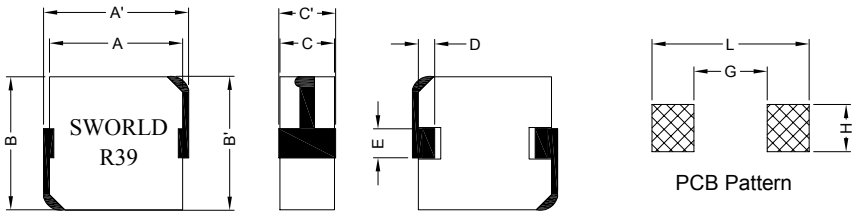
(b) Type code

(c) Inductance code : 1R0 = 1.0uH

(d) Tolerance code : M = ±20%

(e) F : Lead Free

**2. CONFIGURATION & DIMENSIONS :**

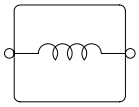



PCB Pattern

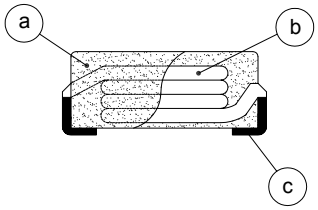
Unit:m/m

| A' | A | B' | B | C' | C | D | E | G | H | L |
|---|---|---|---|---|---|---|---|---|---|---|
| 7.8 Max. | 6.86±0.5 | 7.0 Max. | 6.47±0.5 | 5.2 Max. | 5.0 Max. | 1.6±0.5 | 2.1±0.5 | 3.7 Ref. | 3.5 Ref. | 8.7 Ref. |

**3. SCHEMATIC :**



**4. MATERIALS :**




(a) Core

(b) Wire

(c) Terminal

**5. FEATURES :**

a) Shielded Construction

b) Frequency up to 5MHz

RoHS Compliant

*NOTE : Specifications subject to change without notice. Please check our website for latest information.*

*15.01.2008*

**6. GENERAL SPECIFICATION :**

a) Test Freq. : 100KHz/0.25VDC

b) Ambient Temp. : 20°C

c) Operating Temp. : -55°C to +125°C

d) Storage Temp. : -55°C to +125°C

e) Heat Rated Current (Irms) : Will cause the coil temp. rise approximately ΔT=40°C without core loss.

f) Saturation Current (Isat) : Will cause $L_0$ to drop approximately 20% typ.

g) Part Temperature (Ambient+Temp. Rise) : Should not exceed 125°C under worst case operating conditions.

**7. ELECTRICAL CHARACTERISTICS :**

| Part No. | Inductance $L_0$ ( μH ) ±20% @ 0 Adc | Irms ( A ) Typ. | Isat ( A ) Typ. | DCR ( mΩ ) Max. |
|---|---|---|---|---|
| L816PW-R39MF | 0.39 | 21 | 30 | 2.6 |
| L816PW-R68MF | 0.68 | 18 | 28 | 3.8 |
| L816PW-1R0MF | 1.00 | 15 | 22 | 4.2 |
| L816PW-1R5MF | 1.50 | 16 | 18 | 5.4 |
| L816PW-2R2MF | 2.20 | 13 | 15 | 8.2 |
| L816PW-3R3MF | 3.30 | 10 | 13 | 15.2 |
| L816PW-4R7MF | 4.70 | 7 | 10 | 18.6 |
| L816PW-6R8MF | 6.80 | 6 | 8 | 30.0 |
| L816PW-100MF | 10.0 | 5 | 6 | 44.5 |

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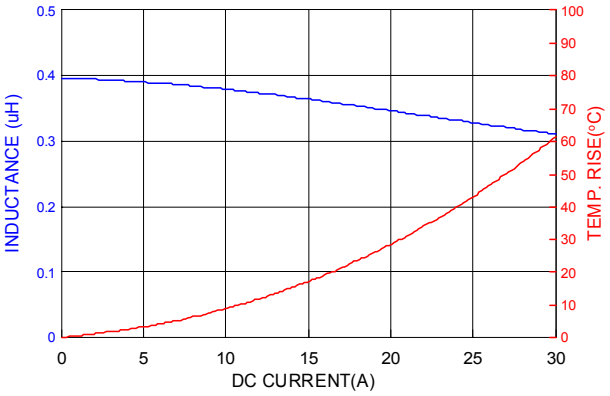
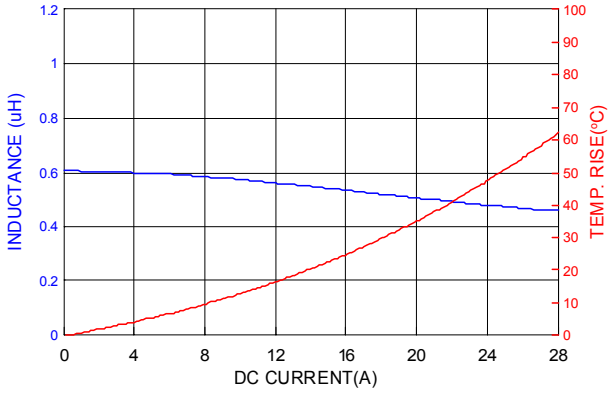
**8. CHARACTERISTICS CURVES :**

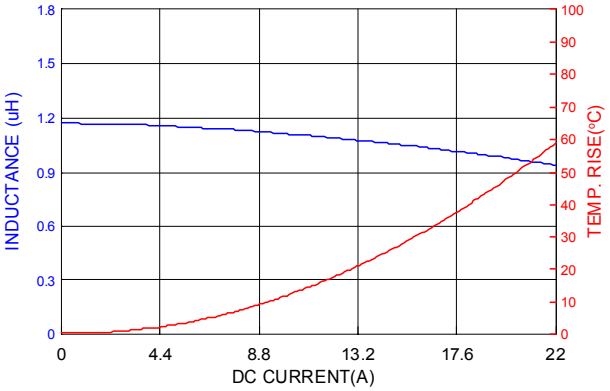
L816PW-R39MF



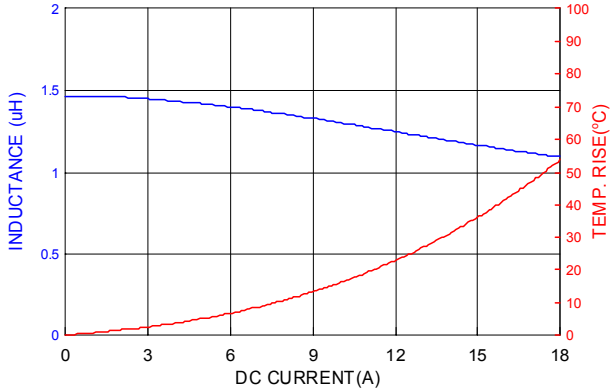

L816PW-R68MF



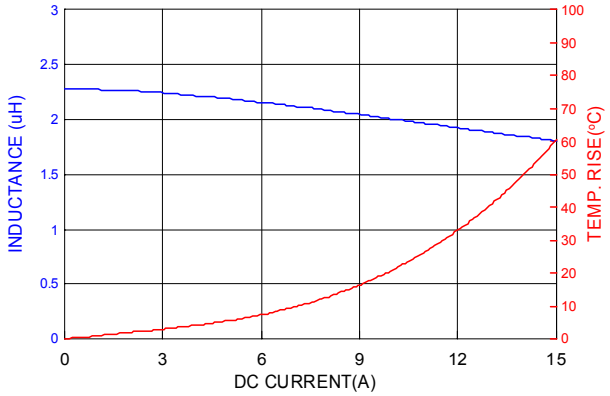

L816PW-1R0MF



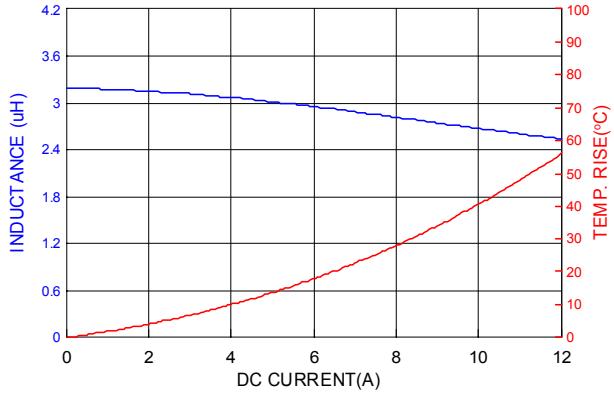

L816PW-1R5MF




L816PW-2R2MF




L816PW-3R3MF

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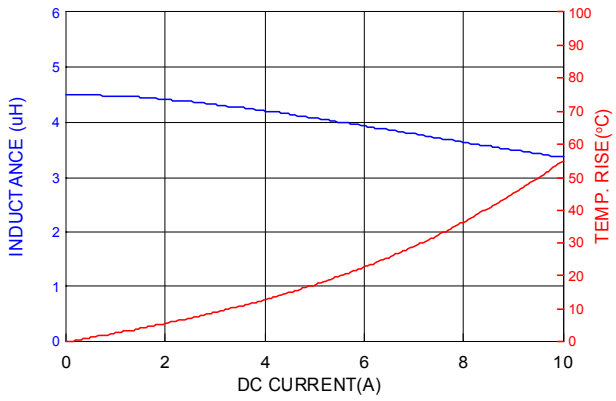
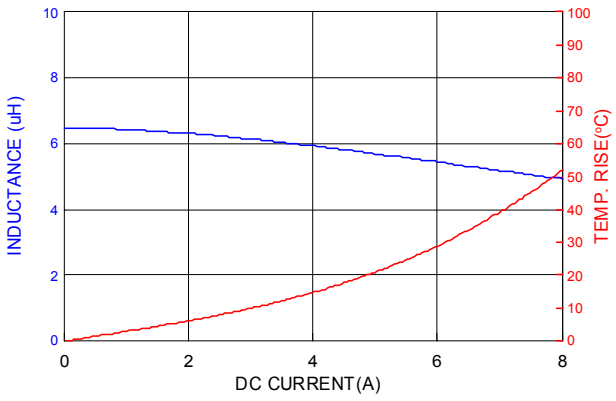
**8. CHARACTERISTICS CURVES :**

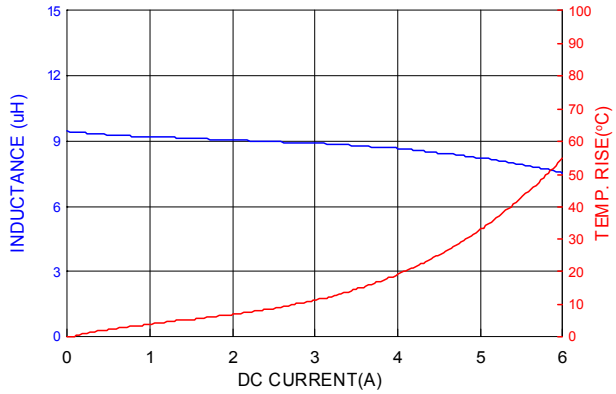
L816PW-4R7MF




L816PW-6R8MF




L816PW-100MF

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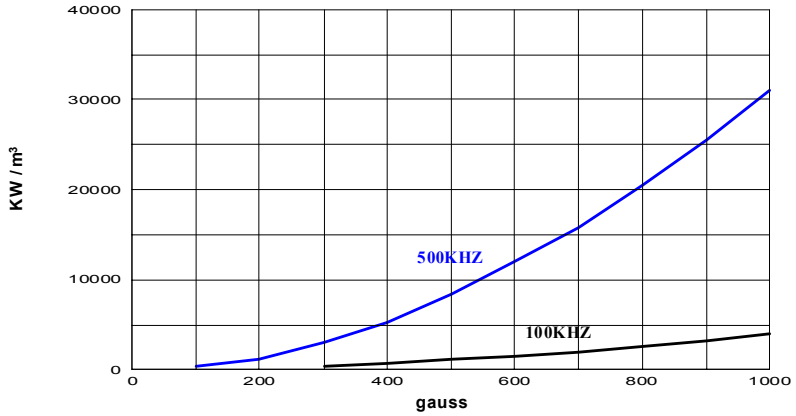
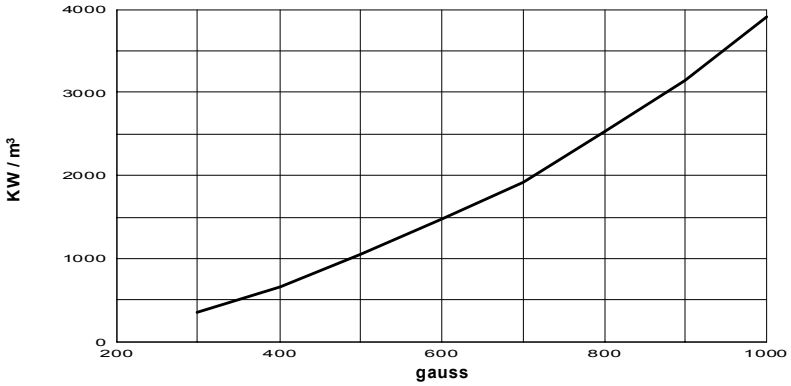
## 9. CORE LOSS :

### 100KHz and 500KHz



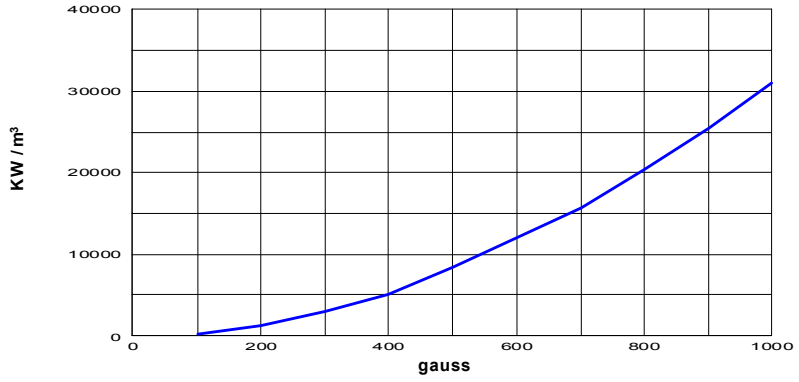

| material / gauss \ loss | 100KHz | 500KHz |
|---|---|---|
| 100 | - | 266 |
| 200 | - | 1,234 |
| 300 | 351.7 | 2,932 |
| 400 | 665.9 | 5,195 |
| 500 | 1,039 | 8,336 |
| 600 | 1,471 | 12,025 |
| 700 | 1,923 | 15,715 |
| 800 | 2,537 | 20,444 |
| 900 | 3,148 | 25,429 |
| 1000 | 3,902 | 31,002 |

### 100KHz




| material / gauss \ loss | 100KHz |
|---|---|
| 300 | 351.7 |
| 400 | 665.9 |
| 500 | 1,039 |
| 600 | 1,471 |
| 700 | 1,923 |
| 800 | 2,537 |
| 900 | 3,148 |
| 1000 | 3,902 |

### 500KHz




| material / gauss \ loss | 500KHz |
|---|---|
| 100 | 266 |
| 200 | 1,234 |
| 300 | 2,932 |
| 400 | 5,195 |
| 500 | 8,336 |
| 600 | 12,025 |
| 700 | 15,715 |
| 800 | 20,444 |
| 900 | 25,429 |
| 1000 | 31,002 |

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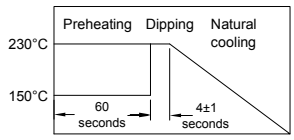
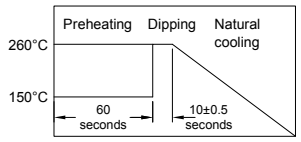
**10. RELIABILITY AND TEST CONDITION :**

<table>
<tr><th>ITEM</th><th>PERFORMANCE</th><th>TEST CONDITION</th></tr>
<tr><td colspan="3">Electrical Characteristics Test</td></tr>
<tr><td>Inductance</td><td rowspan="2">Refer to standard electrical characteristics list</td><td>HP4284A, CH11025, CH3302, CH1320, CH1320S<br>LCR meter.</td></tr>
<tr><td>DCR</td><td>CH16502, Agilent33420A Micro-Ohm Meter.</td></tr>
<tr><td>Heat Rated Current (Irms)</td><td></td><td>Irms(A) will cause the coil temperature rise<br>approximately ΔT=40°C without core loss<br>1. Applied the allowed DC current<br>2. Temperature measured by digital surface thermometer</td></tr>
<tr><td>Saturation Current (Isat)</td><td></td><td>Isat(A) will cause Lo to drop approximately 20%</td></tr>
<tr><td colspan="3">Mechanical Performance Test</td></tr>
<tr><td>Solderability Test</td><td>More than 90% of the terminal electrode<br>should be covered with solder.</td><td>Preheat : 150°C, 60sec.<br>Solder : Sn99.95-Cu0.05<br>Solder Temperature : 230±5°C<br>Flux for lead free : rosin<br>Dip Time : 4±1sec.<br> 
</td></tr>
<tr><td>Solder Heat Resistance</td><td>1. Appearance : No significant abnormality<br>2. Inductance change : Within ±20%</td><td>Preheat : 150°C, 60sec.<br>Solder : Sn99.95-Cu0.05<br>Solder Temperature : 260±5°C<br>Flux for lead free : rosin<br>Dip Time : 10±0.5sec.<br> 
</td></tr>
<tr><td>Reliability Test</td><td></td><td></td></tr>
<tr><td>High Temperature<br>Life Test</td><td rowspan="3">1. Appearance : No damage<br>2. Inductance : Within ±20% of initial value.<br>No disconnection or short circuit.</td><td>Temperature : 125±5°C<br>Time : 500±12 hours<br>Measure at room temperature after placing for 2 to 3 hrs.</td></tr>
<tr><td>Low Temperature<br>Life Test</td><td>Temperature : -55±5°C<br>Time : 500±12 hours<br>Measure at room temperature after placing for 2 to 3 hrs.</td></tr>
<tr><td>Thermal Shock</td><td>Conditions of 1 cycle.
<table>
<tr><th>Step</th><th>Temperature (°C)</th><th>Times (min.)</th></tr>
<tr><td>1</td><td>-55±3</td><td>30±3</td></tr>
<tr><td>2</td><td>Room Temperature</td><td>Within 3</td></tr>
<tr><td>3</td><td>+125±3</td><td>30±3</td></tr>
<tr><td>4</td><td>Room Temperature</td><td>Within 3</td></tr>
</table>
Total : 5 cycles<br>Measure at room temperature after placing for 2 to 3 hrs.</td></tr>
<tr><td>Humidity Resistance</td><td>1. Appearance : No damage<br>2. Inductance : Within ±20% of initial value.<br>No disconnection or short circuit.</td><td>Temperature : 40±5°C<br>Humidity : 90% to 95%<br>Applied Current : Rated Curent<br>Time : 500±12 hours<br>Measure at room temperature after placing for 2 to 3 hrs.</td></tr>
</table>

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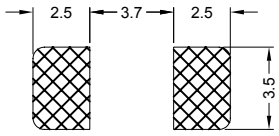
**11. SOLDERIND AND MOUNTING :**

**11-1. Recommended PC Board Pattern**




**11-2. Soldering**

Mildly activated rosin fluxes are preferred. The minimum amount of solder can lead to damage from the stresses caused by the difference in coefficients of expansion between solder, chip and substrate. Our terminations are suitable for all wave and re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

**11-2.1 Solder Re-flow :**

Recommended temperature profiles for re-flow soldering in Figure 1.

**11-2.2 Soldering Iron (Figure 2) :**

Products attachment with soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended.

Note :

a) Preheat circuit and products to 150°C.
b) 280°C tip temperature (max)
c) Never contact the ceramic with the iron tip
d) 1.0mm tip diameter (max)
e) Use a 20 watt soldering iron with tip diameter of 1.0mm
f) Limit soldering time to 3 secs.

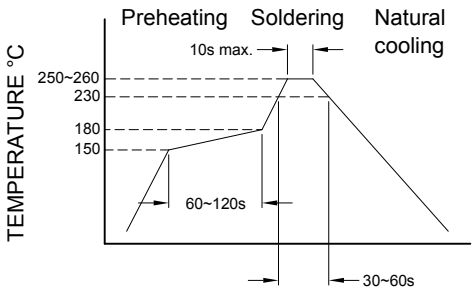



Figure 1. Re-flow Soldering

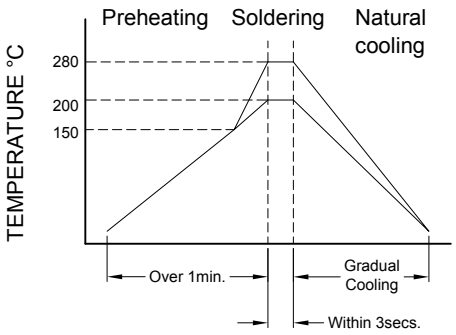



Figure 2. Iron Soldering

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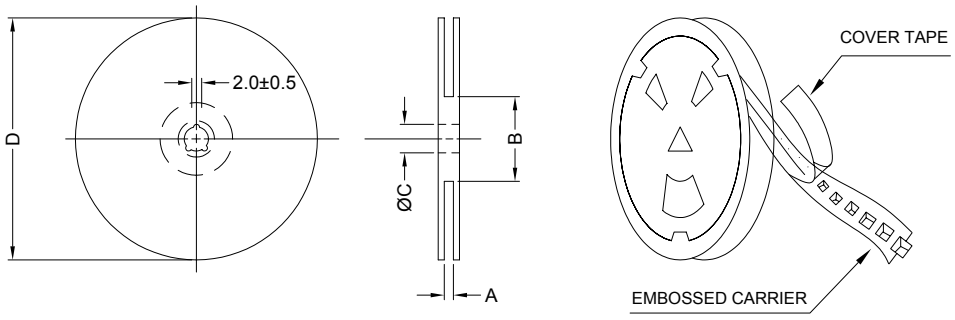
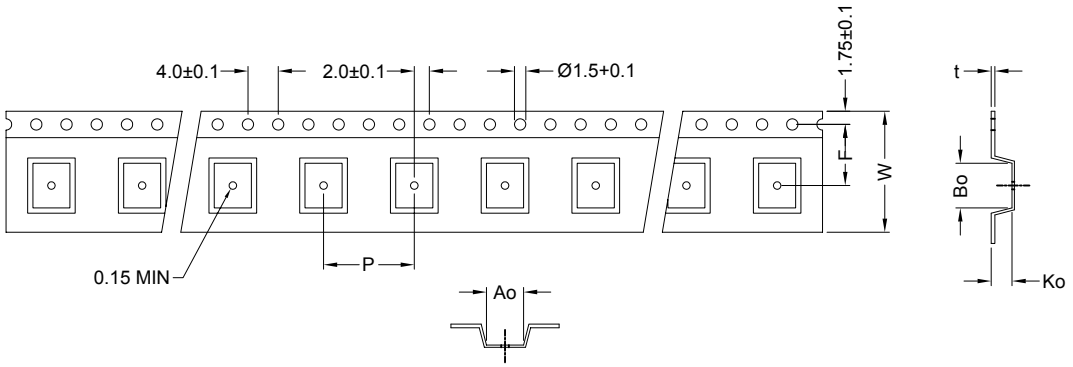
## 12. PACKAGING INFORMATION :

### 12-1. Reel Dimension




| Type | A(mm) | B(mm) | C(mm) | D(mm) |
|---|---|---|---|---|
| 13" x 16mm | 16.0±0.5 | 100±2.0 | 13.5±0.5 | 330 |

### 12-2 Tape Dimension




| Series | Ao(mm) | Bo(mm) | Ko(mm) | P(mm) | W(mm) | F(mm) | t(mm) |
|---|---|---|---|---|---|---|---|
| L816PW | 7.0±0.1 | 7.8±0.1 | 5.3±0.1 | 12.0±0.1 | 16.0±0.3 | 7.5±0.1 | 0.35±0.05 |

### 12-3. Packaging Quantity

| Size | L816PW |
|---|---|
| Chip / Reel | 800 |
| Inner Box | 1600 |
| Carton | 6400 |

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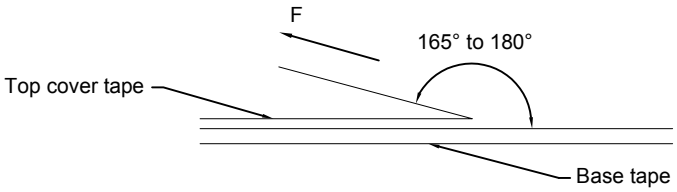
**12-4. Tearing Off Force**




The force for tearing off cover tape is 15 to 60 grams in the arrow direction under the following conditions.

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

## Application Notice

1. Storage Conditions :
   To maintain the solderabililty of terminal electrodes :
   a) Temperature and humidity conditions : Less than 30°C and 70% RH.
   b) Recommended products should be used within 6 months from the time of delivery.
   c) The packaging material should be kept where no chlorine or sulfur exists in the air.

2. Transportation :
   a) Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
   b) The use of tweezers or vacuum pick up is strongly recommended for individual components.
   c) Bulk handling should ensure that abrasion and mechanical shock are minimized.

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