

APPROVAL SHEET

WLPN606010 Series Shielded SMD Power Inductors

*Contents in this sheet are subject to change without prior notice.

Features

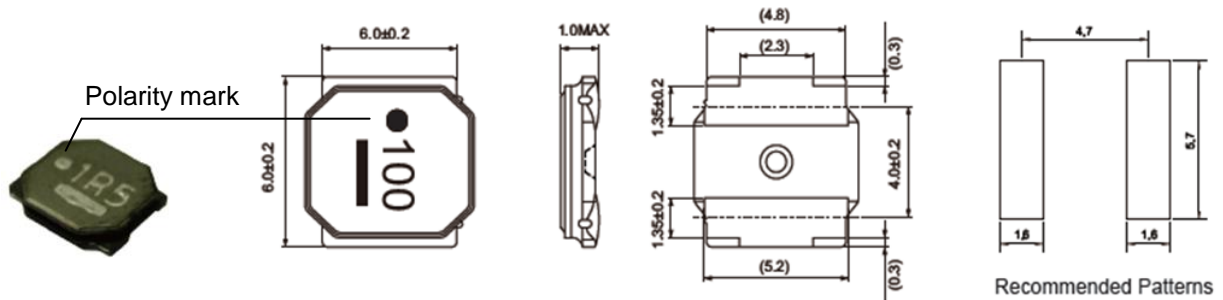
1. Close magnetic loop with magnetic resin shielded.
2. Low profile, High inductance.

Applications

1. General propose power inductor in DC power system.
2. Inductor in DC/DC converter.
3. Low profile for portable and wearable device.
4. LC filter in Audio D class Amplifier.

Shape and Dimension

Unit: mm



Ordering Information

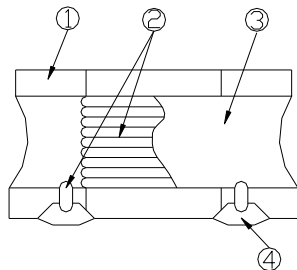
| WL | PN | 6060 | 10 | M | 1R5 | P | B |
|---------------------|---------------------------------------|-------------------|------------------|------------------|---------------------------|--------------------------------|-------|
| Product Code | Series | Dimensions | Thickness | Tolerance | Value | Packing Code | |
| WL: Inductor | Shielded SMD Power Inductors | 6.0 * 6.0 mm | 1.0 mm | M: ± 20% | 1R5 = 1.5uH 100 = 10uH | P=7" Reeled (Embossed Tape) | B:STD |

Electrical Characteristics

| WLPN606010 Series | L (μ H) | Inductance Tolerance | Test Freq (KHz) | DCR ($\Omega \pm 30\%$) | SRF (MHz)Min | Rated Current (mA) Max | |
|----------------------|-----------------|-------------------------|-----------------------|------------------------------|-----------------|-------------------------------|-------------------------------------|
| | | | | | | Saturation Current Idc1 | Temperature Rise Current Idc2 |
| WLPN606010M1R5PB | 1.5 | M | 100 | 0.090 | 77 | 2400 | 1900 |
| WLPN606010M2R2PB | 2.2 | M | 100 | 0.110 | 56 | 1900 | 1700 |
| WLPN606010M3R3PB | 3.3 | M | 100 | 0.135 | 42 | 1600 | 1500 |
| WLPN606010M4R7PB | 4.7 | M | 100 | 0.165 | 36 | 1300 | 1400 |
| WLPN606010M6R8PB | 6.8 | M | 100 | 0.220 | 30 | 1200 | 1200 |
| WLPN606010M100PB | 10 | M | 100 | 0.270 | 25 | 1000 | 1100 |
| WLPN606010M220PB | 22 | M | 100 | 0.580 | 12 | 650 | 700 |

1. Test Frequency: 100KHz.
2. Test Equipment:
Inductance: Chroma3302+1320+16502 or equivalent.
DCR: Chroma16502 or equivalent.
SRF: HP4291B or equivalent.
3. Saturation Current Idc1: The value of current causes a 30% inductance reduction from initial value.
4. Temperature rise current Idc2: The value of current causes a 40°C temperature rise.
5. Rated Current: Either Idc1 or Idc2 whichever is smaller.
6. Operating Temperature Range: -25°C to +125°C (Including self-temperature rise).
7. Storage Temp. Range : -40°C to +85°C.
8. MSL : Level 1.

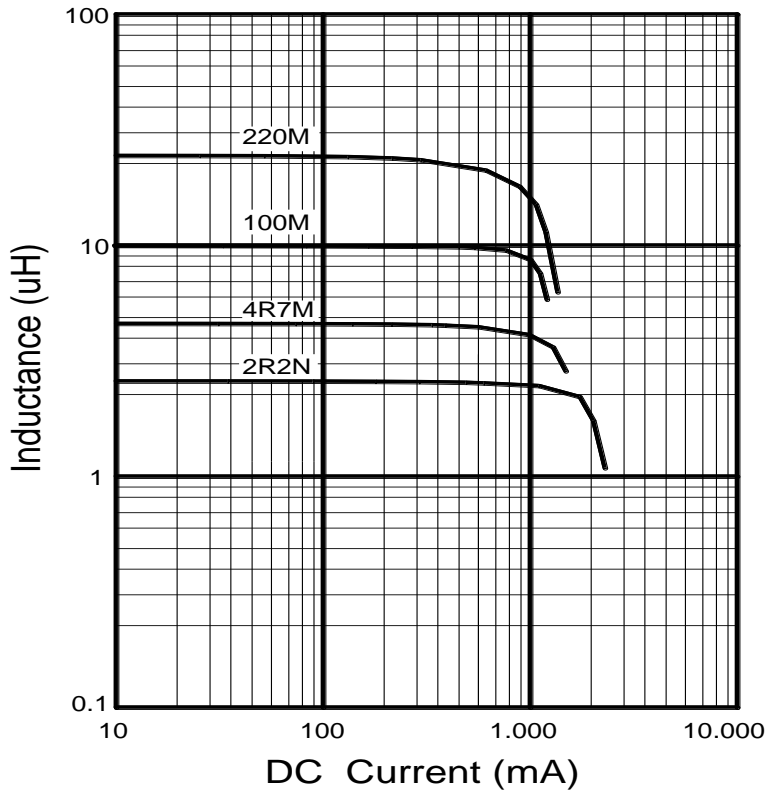
Structural Drawing



- ① Ferrite core : Ni-Zn ferrite.
- ② Winding wire : Polyurethane-copper wire.
- ③ Over-coating resin : Epoxy resin, containing ferrite powder.
- ④ Electrode : External electrode (substrate) Ag
External electrode (base plating) Ni-Sn
External electrode (top surface solder coating) Sn-Ag-Cu

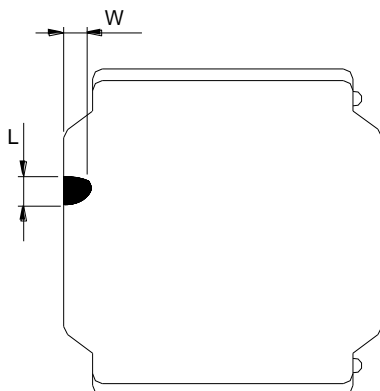
Characteristic Curve

Inductance vs. DC Current



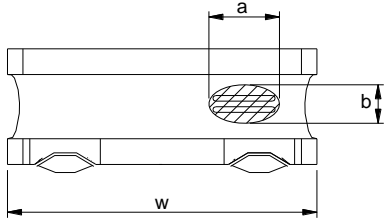
Core Chipping:

The appearance standard of the chipping size in top side, of bottom side ferrite core is following dimension.



| L | W |
|-----------|-----------|
| 1.5mmMax. | 1.5mmMax. |

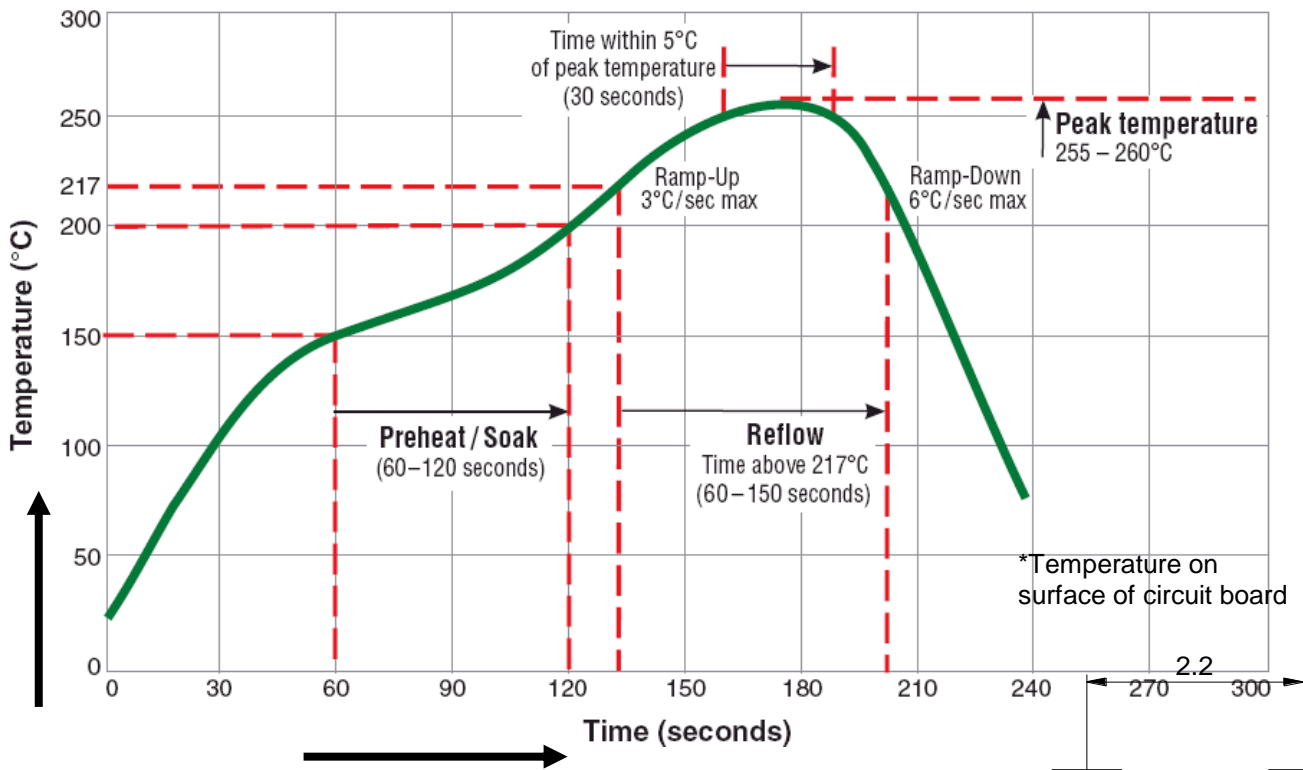
Exposed wire tolerance limit of coating resin part on product side
Size of exposed wire occurring to coating resin is specified below.



- ① Width direction (dimension a): Acceptable when $a \leq w/2$
 Nonconforming when $a > w/2$
- ② Length direction (dimension b): Dimension b is not specified.
- ③ When total area of exposed wire occurring to each sides is not greater than 50% of coating resin area, that is acceptable.

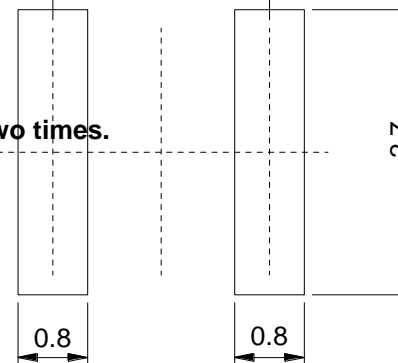
Reflow Profile Chart (Reference):

Typical RoHS Reflow Profile

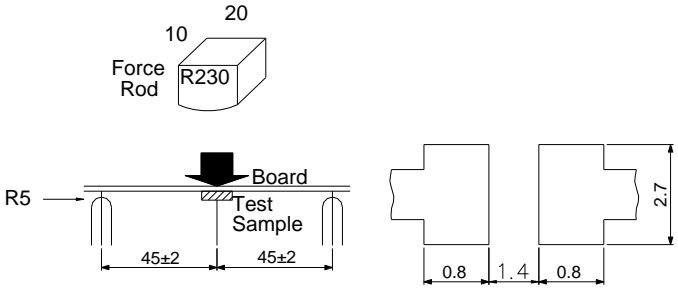
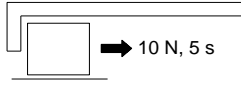
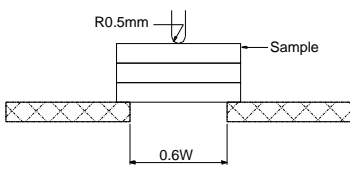


(Table 1)

The products may be exposed to reflow soldering process of above profile up to two times.



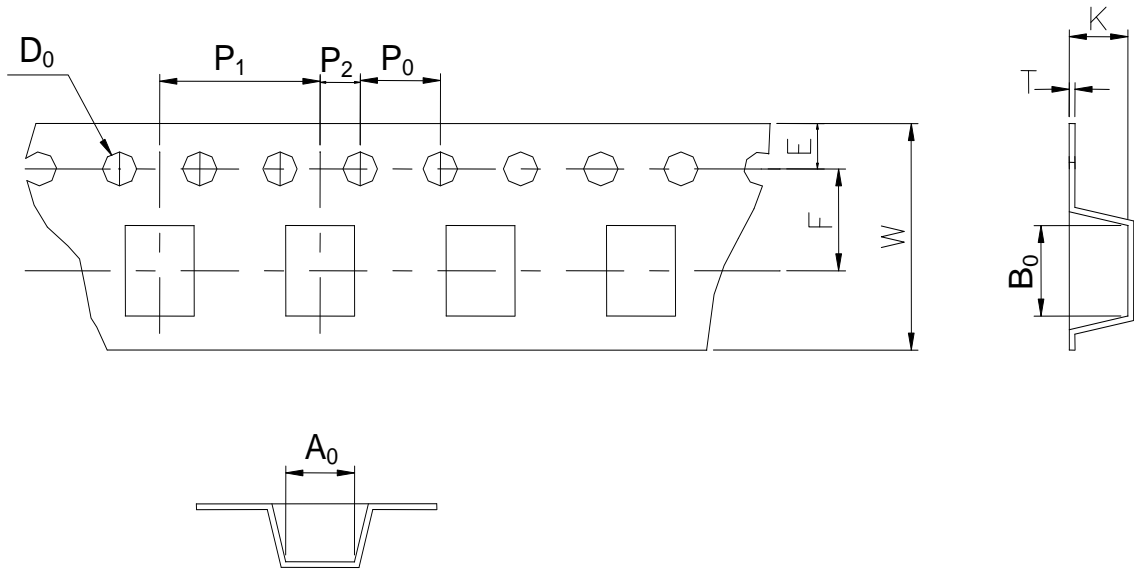
Mechanical Performance /Environmental Test Performance Specifications: (WLPN606010 series)

| No. | Item | Test condition | Requirements | | | | | | | | |
|-----------------|---|--|--|-----------------|-----------|-----------------|---|-----------------|----------------------------------|------|---------------------------------------|
| 1 | Resistance to Deflection. | No damage. | <p>The test samples shall be soldered to the test board by the reflow soldering conditions show in Table 1. As illustrated below, apply force in the direction of the Arrow indicating until deflection of the test board Reaches to 2 mm.</p>  <p>Test board size :100×40×10 Test board material I: glass epoxy-resin Solder cream thickness:0.1</p> <p>Land dimensions Unit: mm</p> | | | | | | | | |
| 2 | Adhesion of Terminal Electrode. | Shall not come off PC board | <p>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 1.</p>  <p>Applied force: 10 N to X and Y directions Duration: 5 s. Solder cream thickness:0.1 mm. (Refer to recommended Land Pattern Dimensions Defined in "Precaution")</p> | | | | | | | | |
| 3 | Body strength. | No damage | <p>Applied force :20 N. Duration :10 s.</p>  | | | | | | | | |
| 4 | Resistance to Vibration. | <p>△L/L:within±10% No abnormality observed In appearance</p> | <p>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 1. Then it shall be submitted to below test conditions.</p> <table border="1" data-bbox="673 1594 1412 1751"> <tr> <td>Frequency range</td> <td>10Hz~55Hz</td> </tr> <tr> <td>Total Amplitude</td> <td>1.5mm(May not exceed acceleration 196 m/S2)</td> </tr> <tr> <td>Sweeping Method</td> <td>10Hz to 55Hz to 10 Hz for 1 min.</td> </tr> <tr> <td>Time</td> <td>For 2 hours on each X, Y, and Z axis.</td> </tr> </table> | Frequency range | 10Hz~55Hz | Total Amplitude | 1.5mm(May not exceed acceleration 196 m/S2) | Sweeping Method | 10Hz to 55Hz to 10 Hz for 1 min. | Time | For 2 hours on each X, Y, and Z axis. |
| Frequency range | 10Hz~55Hz | | | | | | | | | | |
| Total Amplitude | 1.5mm(May not exceed acceleration 196 m/S2) | | | | | | | | | | |
| Sweeping Method | 10Hz to 55Hz to 10 Hz for 1 min. | | | | | | | | | | |
| Time | For 2 hours on each X, Y, and Z axis. | | | | | | | | | | |
| 5 | Resistance to Soldering heat (Reflow). | <p>△L/L:within±10% No abnormality observed In appearance</p> | <p>The test sample shall be exposed to reflow oven at 230±5 deg C for 40 seconds, with peak temperature at 260±5 deg C for 5 seconds, 2 times.</p> <p>Test board thickness:1.0 mm Test board material :glass epoxy-resin</p> | | | | | | | | |

| 6 | Solder ability. | At least 90% of surface of terminal electrode is covered by new solder. | <p>The test samples shall be dipped in flux, and then Immersed in molten solder as shown in below table.</p> <p>Flux: Methanol solution containing rosin 25%</p> <table border="1" data-bbox="675 309 1193 427"> <tr> <td>Solder Temperature</td> <td>245±deg C</td> </tr> <tr> <td>Time</td> <td>5±1.0 S.</td> </tr> <tr> <td>Immersing Speed</td> <td>25 mm/s</td> </tr> </table> | Solder Temperature | 245±deg C | Time | 5±1.0 S. | Immersing Speed | 25 mm/s | | | | | | | | | |
|--------------------|--|---|---|--------------------|-------------|-----------------|---------------------------------|-----------------|---------------------------------|------|-------------|-----------|---|------------|------|---|-----------|-----------|
| Solder Temperature | 245±deg C | | | | | | | | | | | | | | | | | |
| Time | 5±1.0 S. | | | | | | | | | | | | | | | | | |
| Immersing Speed | 25 mm/s | | | | | | | | | | | | | | | | | |
| 7 | Temperature Characteristics. | △L/L:within±20% No abnormality observed In appearance | Measurement of inductance shall be taken at temperature range within -25 deg C to +85 deg C. With reference to inductance value at +20 deg C, change rate shall be calculated. | | | | | | | | | | | | | | | |
| 8 | Thermal shock. | △L/L:within±10% No abnormality observed in appearance. | <p>The test samples shall be soldered to test board by the reflow soldering conditions shown in Table 1.</p> <p>The test samples shall be placed at specified shown in below table in sequence.</p> <p>The temperature cycle shall be repeated 100 cycles.</p> <p>Conditions of steps for 1 cycle.</p> <table border="1" data-bbox="675 786 1286 981"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3 deg C</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room Temp</td> <td>3 maximum</td> </tr> <tr> <td>3</td> <td>85±2 deg C</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room Temp</td> <td>3 maximum</td> </tr> </tbody> </table> | Step | Temperature | Time(min) | 1 | -40±3 deg C | 30±3 | 2 | Room Temp | 3 maximum | 3 | 85±2 deg C | 30±3 | 4 | Room Temp | 3 maximum |
| Step | Temperature | Time(min) | | | | | | | | | | | | | | | | |
| 1 | -40±3 deg C | 30±3 | | | | | | | | | | | | | | | | |
| 2 | Room Temp | 3 maximum | | | | | | | | | | | | | | | | |
| 3 | 85±2 deg C | 30±3 | | | | | | | | | | | | | | | | |
| 4 | Room Temp | 3 maximum | | | | | | | | | | | | | | | | |
| 9 | Low Temperature life Test. | △L/L:within±10% No abnormality observed in appearance. | <p>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 1.</p> <p>After that, the test samples shall be placed at test conditions as shown in below table.</p> <table border="1" data-bbox="675 1106 1171 1184"> <tr> <td>Temperature</td> <td>-40±2 deg C</td> </tr> <tr> <td>Time</td> <td>500 +24/-0 h</td> </tr> </table> | Temperature | -40±2 deg C | Time | 500 +24/-0 h | | | | | | | | | | | |
| Temperature | -40±2 deg C | | | | | | | | | | | | | | | | | |
| Time | 500 +24/-0 h | | | | | | | | | | | | | | | | | |
| 10 | Loading at high temperature life test. | △L/L:within±10% No abnormality observed in appearance. | <p>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 1.</p> <p>The test samples shall be placed in thermostatic oven set at specified temperature and applied the rated current continuously as shown in below table.</p> <table border="1" data-bbox="675 1357 1171 1496"> <tr> <td>Temperature</td> <td>85±2 deg C</td> </tr> <tr> <td>Applied current</td> <td>Rated current (Refer to Page 3)</td> </tr> <tr> <td>Time</td> <td>500+24/-0 h</td> </tr> </table> | Temperature | 85±2 deg C | Applied current | Rated current (Refer to Page 3) | Time | 500+24/-0 h | | | | | | | | | |
| Temperature | 85±2 deg C | | | | | | | | | | | | | | | | | |
| Applied current | Rated current (Refer to Page 3) | | | | | | | | | | | | | | | | | |
| Time | 500+24/-0 h | | | | | | | | | | | | | | | | | |
| 11 | Damp heat life test. | △L/L:within±10% No abnormality observed in appearance. | <p>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 1.</p> <p>The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table.</p> <table border="1" data-bbox="675 1608 1171 1720"> <tr> <td>Temperature</td> <td>60±2 deg C</td> </tr> <tr> <td>Humidity</td> <td>90~95%RH</td> </tr> <tr> <td>Time</td> <td>500+24/-0 h</td> </tr> </table> | Temperature | 60±2 deg C | Humidity | 90~95%RH | Time | 500+24/-0 h | | | | | | | | | |
| Temperature | 60±2 deg C | | | | | | | | | | | | | | | | | |
| Humidity | 90~95%RH | | | | | | | | | | | | | | | | | |
| Time | 500+24/-0 h | | | | | | | | | | | | | | | | | |
| 12 | Loading under Damp heat life test. | △L/L:within±10% No abnormality observed in appearance. | <p>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 1.</p> <p>The test samples shall be placed in thermostatic oven set at specified temperature and humidity and applied the rated current continuously as shown in below table.</p> <table border="1" data-bbox="675 1861 1302 2018"> <tr> <td>Temperature</td> <td>60±2 deg C</td> </tr> <tr> <td>Humidity</td> <td>90~95%RH</td> </tr> <tr> <td>Applied current</td> <td>Rated current (Refer to Page 3)</td> </tr> <tr> <td>Time</td> <td>500+24/-0 h</td> </tr> </table> | Temperature | 60±2 deg C | Humidity | 90~95%RH | Applied current | Rated current (Refer to Page 3) | Time | 500+24/-0 h | | | | | | | |
| Temperature | 60±2 deg C | | | | | | | | | | | | | | | | | |
| Humidity | 90~95%RH | | | | | | | | | | | | | | | | | |
| Applied current | Rated current (Refer to Page 3) | | | | | | | | | | | | | | | | | |
| Time | 500+24/-0 h | | | | | | | | | | | | | | | | | |

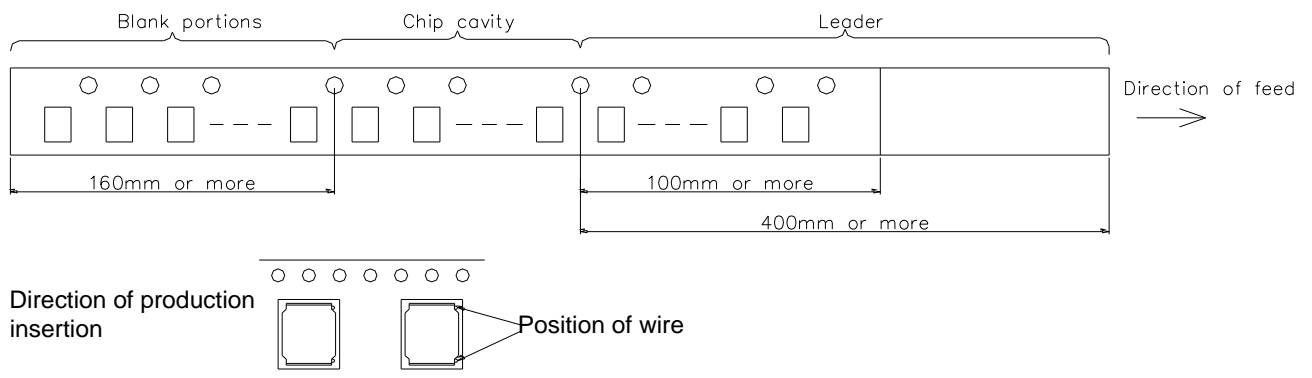
Tape & Reel Packaging Dimensions:

Dimensions Unit: mm

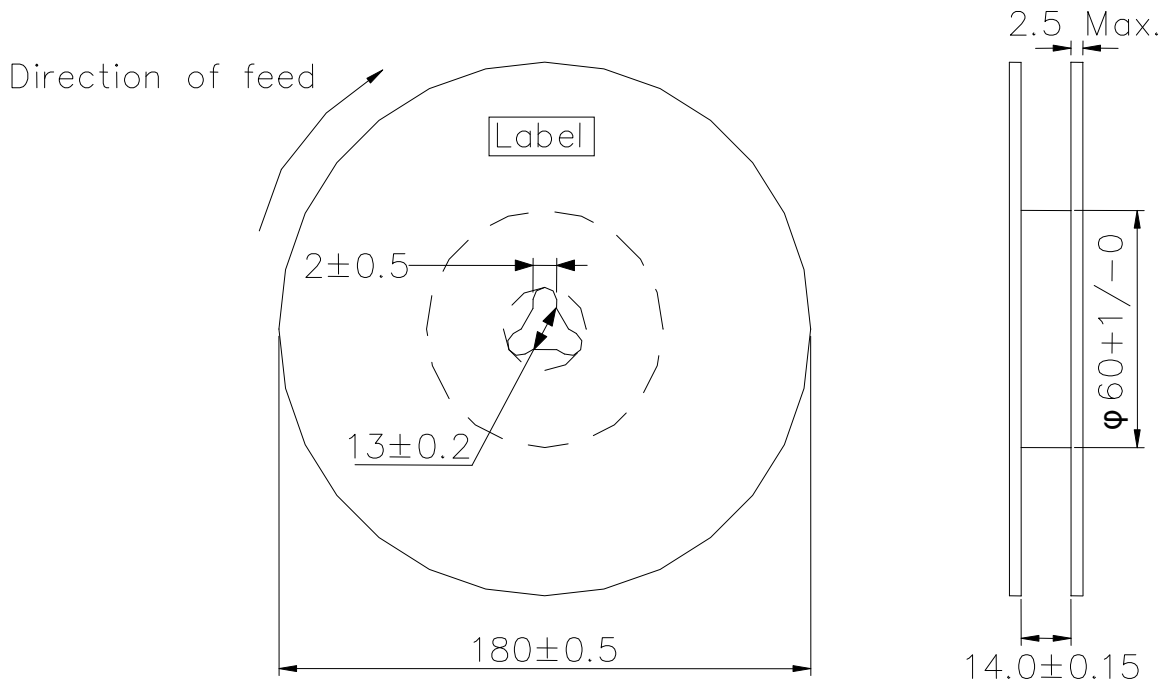


| A_0 | B_0 | W | F | E | P_1 | P_2 | P_0 | D_0 | T | K |
|-------------------|-------------------|-------------------|------------------|-------------------|------------------|------------------|------------------|------------------------------|--------------------|-------------------|
| 6.30 ± 0.1 | 6.30 ± 0.1 | 12.0 ± 0.3 | 5.5 ± 0.1 | 1.75 ± 0.1 | 8.0 ± 0.1 | 2.0 ± 0.1 | 4.0 ± 0.1 | $\Phi 1.5$ $+0.1$ -0 | 0.40 ± 0.05 | 1.40 ± 0.1 |

Direction of rolling

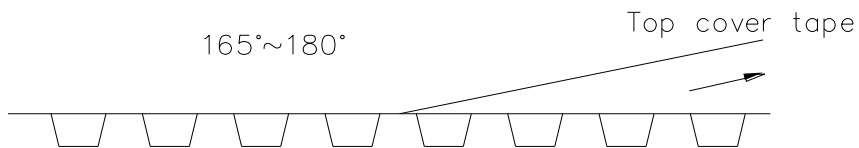


Reel



Label position: on the opposite side of sprocket holes side of reel

Top tape strength



Peel-off strength: 0.1N~1.3N

Peel-off angle: $165^\circ \sim 180^\circ$

Peel-off speed: 300mm/mm

Quantity per reel : 1K pcs