

# APPROVAL SHEET

## **WLPN404018 Series Shielded SMD Power Inductors**

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

### Features

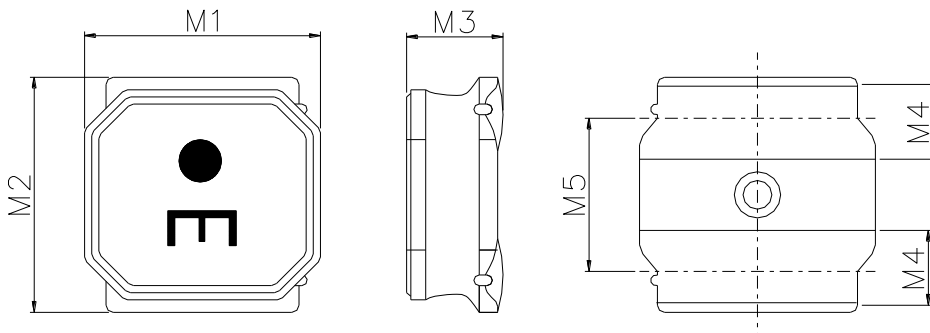
1. Close magnetic loop with magnetic resin shielded.
2. Low profile, High inductance.

### 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.

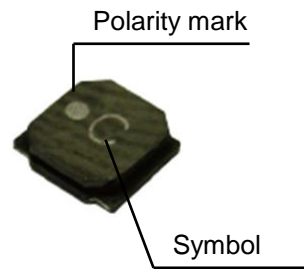
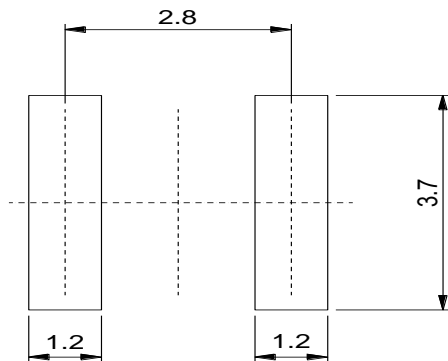
### Shape and Dimension

Unit: mm



	DIM.	TOL.
M1	4.0	±0.2
M2	4.0	±0.2
M3	1.8	MAX.
M4	1.1	±0.2
M5	2.5	±0.2

### Recommended Land-Pattern



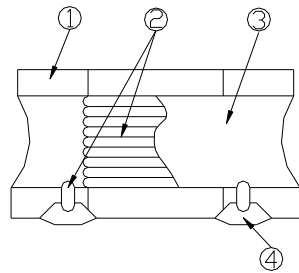
### Ordering Information

WL	PN	4040	18	N	1R0	L	B
<b>Product Code</b>	<b>Series</b>	<b>Dimensions</b>	<b>Thickness</b>	<b>Tolerance</b>	<b>Value</b>	<b>Packing Code</b>	
WL: Inductor	Shielded SMD Power Inductors	4.0 * 4.0 mm	1.8 mm	M: ± 20% N: ± 30%	1R0 = 1.0uH 100 = 10uH	L=13" Reeled (Embossed Tape)	B:STD

### Electrical Characteristics

WLPN404018 Series	L ( $\mu$ H)	Symbol	Inductance Tolerance	DCR ( $\Omega \pm 20\%$ )	SRF (MHz)Min	Rated Current (mA) Max	
						Saturation Current Idc1	Temperature Rise Current Idc2
WLPN404018N1R0LB	1.0	A	$\pm 30\%$	0.027	90	4000	3200
WLPN404018N1R5LB	1.5	B	$\pm 30\%$	0.037	75	3300	2400
WLPN404018M2R2LB	2.2	C	$\pm 20\%$	0.042	60	3000	2200
WLPN404018M3R3LB	3.3	E	$\pm 20\%$	0.055	45	2300	2000
WLPN404018M4R7LB	4.7	H	$\pm 20\%$	0.070	35	2000	1700
WLPN404018M6R8LB	6.8	I	$\pm 20\%$	0.098	30	1600	1450
WLPN404018M100LB	10	K	$\pm 20\%$	0.150	25	1300	1200
WLPN404018M150LB	15	M	$\pm 20\%$	0.210	18	1100	850
WLPN404018M220LB	22	N	$\pm 20\%$	0.290	15	900	720
WLPN404018M330LB	33	P	$\pm 20\%$	0.460	12	700	550
WLPN404018M470LB	47	S	$\pm 20\%$	0.650	10	600	440
WLPN404018M680LB	68	T	$\pm 20\%$	1.000	8.3	520	320
WLPN404018M101LB	100	V	$\pm 20\%$	1.450	6.5	420	280
WLPN404018M151LB	150	W	$\pm 20\%$	2.300	5.5	340	220
WLPN404018M221LB	220	X	$\pm 20\%$	3.800	4.0	275	170

1. Test Frequency: 100KHz
2. Test Equipment:  
Inductance: Chroma3302+1320 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

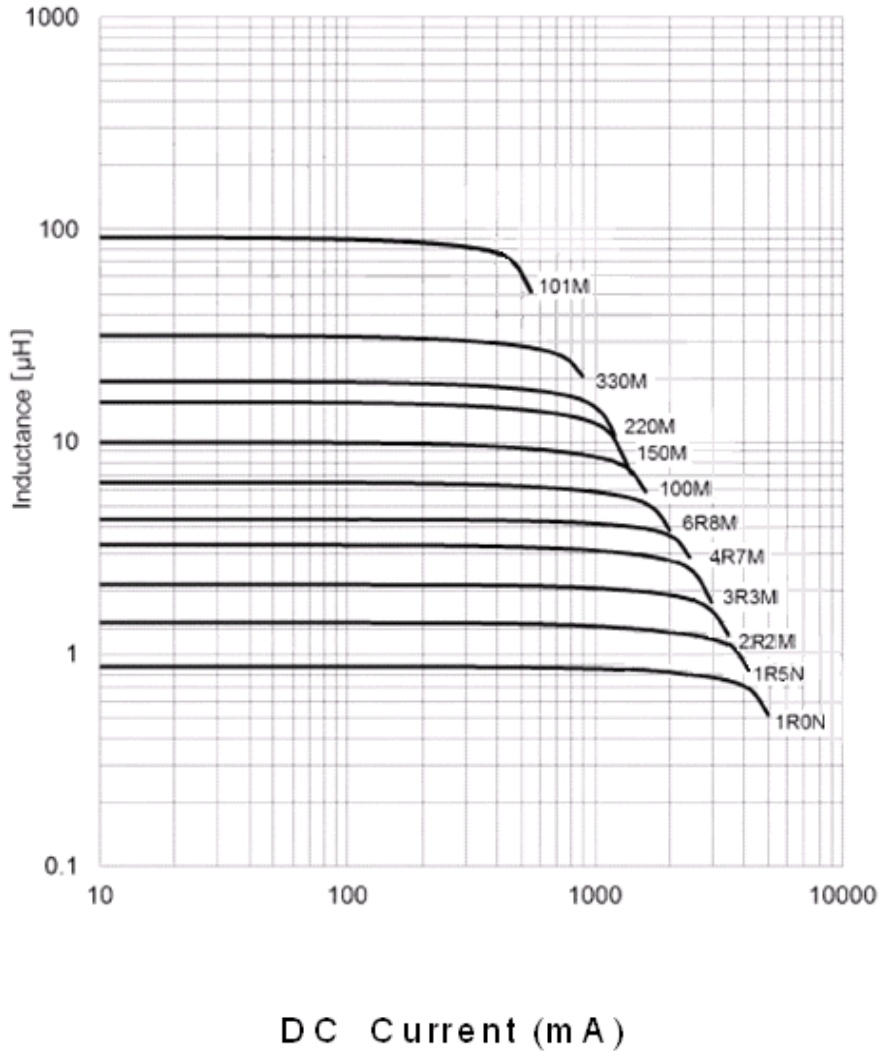
**Structural Drawing**

(Magnetic Shielded Type)

- 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

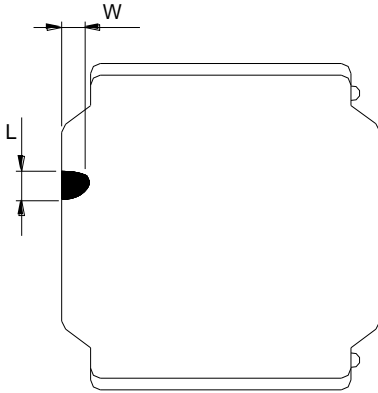
### Characteristic Curve

#### Inductance vs. DC Current



**Core Chipping:**

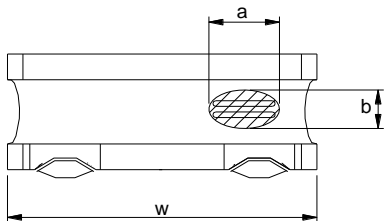
The appearance standard of the chipping size in top side, of bottom side ferrite Core is following dimension.



L	W
1.0mmMax.	1.0mmMax.

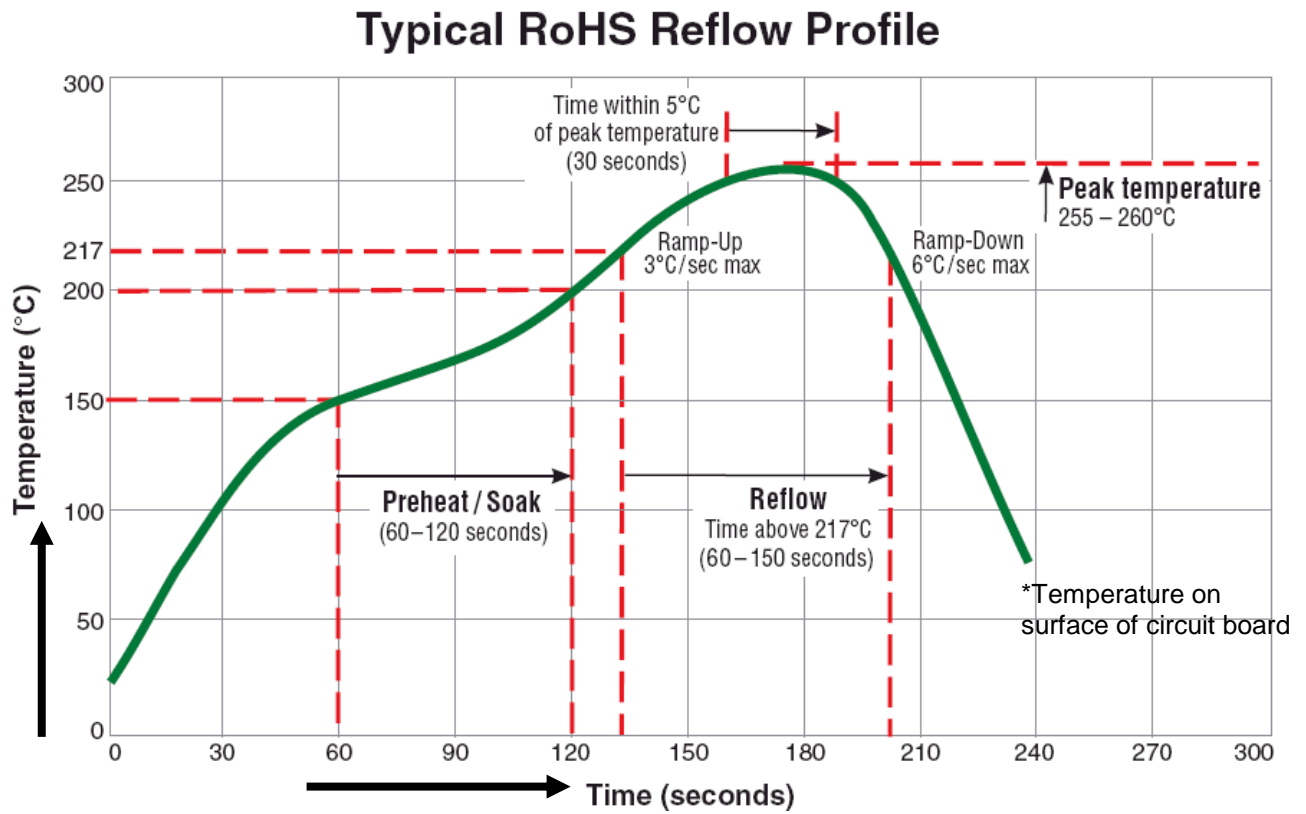
**Exposed wire tolerance limit of coating resin part on product side**

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):**



(Table 1)

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

**Mechanical Performance /Environmental Test Performance Specifications: (WLPN404018 series)**

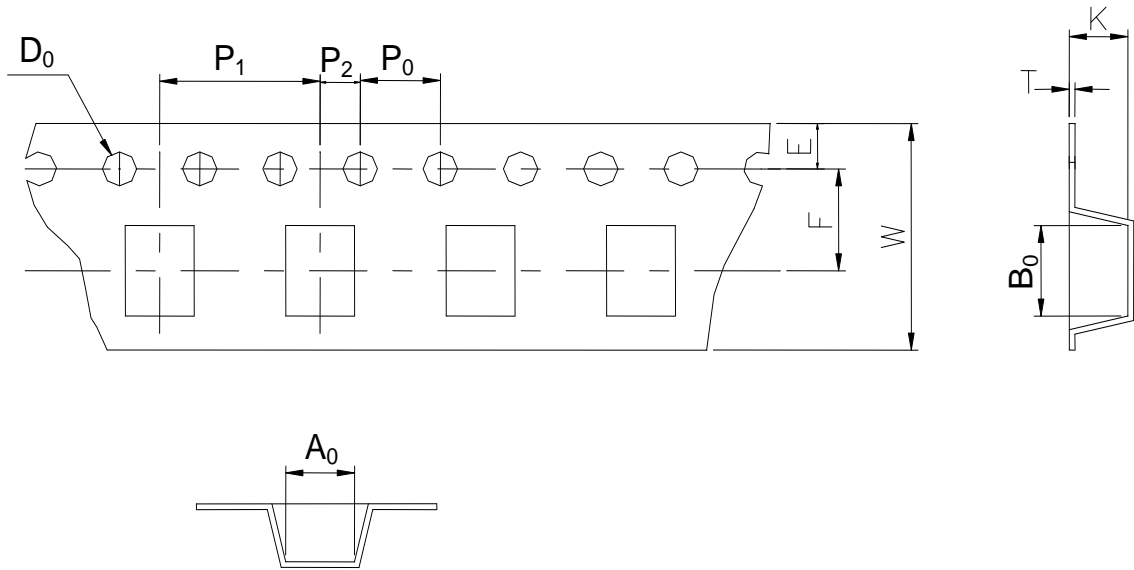
No.	Item	Test condition	Requirements								
1	Resistance to Deflection	No damage.	<p>The test samples shall be soldered to the test board by the reflow soldering conditions show in Table 1. As illustrated below, apply force in the direction of the Arrow indicating until deflection of the test board Reaches to 2 mm.</p> <p>Test board size :100×40×10 Test board material I: glass epoxy-resin Solder cream thickness:0.1 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	$\Delta L/L$ :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.Then It shall be submitted to below test conditions</p> <table border="1"> <tr> <td>Frequency range</td> <td>10Hz~55Hz</td> </tr> <tr> <td>Total Amplitude</td> <td>1.5mm(May not exceed acceleration 196 m/S<sup>2</sup>)</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/S <sup>2</sup> )	Sweeping Method	10Hz to 55Hz to 10 Hz for 1 min.	Time	For 2 hours on each X, Y, and Z axis.
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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)	$\Delta L/L$ :within±10% No abnormality observed In appearance	<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"> <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									
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Immersing Speed	25 mm/s																	
7	Temperature Characteristics	<p>△L/L:within±20%</p> <p>No abnormality observed</p> <p>In appearance</p>	<p>Measurement of inductance shall be taken at temperature Range within -25 deg C to +85 deg C.</p> <p>With reference to inductance value at +20 deg C, change Rate shall be calculated.</p>															
8	Thermal shock	<p>△L/L:within±10%</p> <p>No abnormality observed</p> <p>In appearance</p>	<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"> <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	<p>△L/L:within±10%</p> <p>No abnormality observed</p> <p>In appearance</p>	<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"> <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											
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Time	500 +24/-0 h																	
10	Loading at high temperature life test	<p>△L/L:within±10%</p> <p>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.</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"> <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									
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11	Damp heat life test	<p>△L/L:within±10%</p> <p>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.</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"> <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									
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12	Loading under Damp heat life test	<p>△L/L:within±10%</p> <p>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.</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"> <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							
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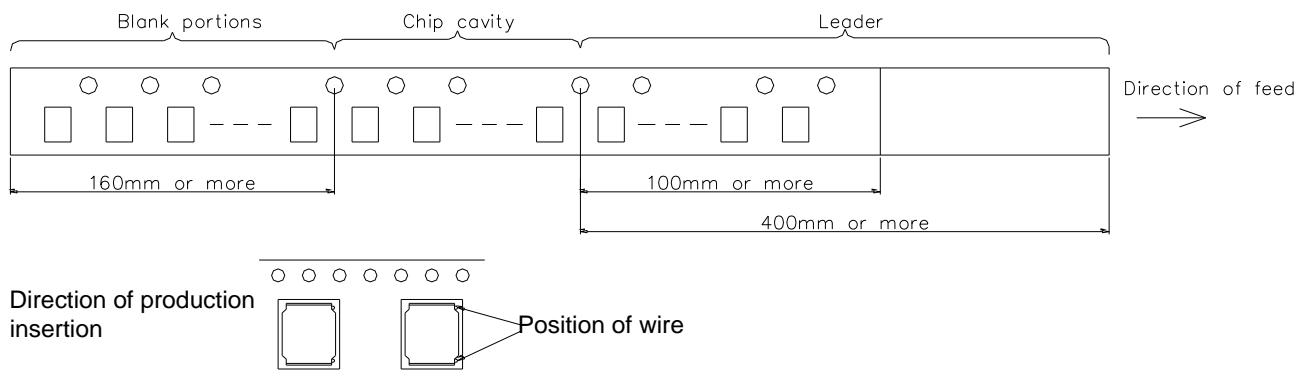
**Tape & Reel Packaging Dimensions:**

Dimensions Unit: mm

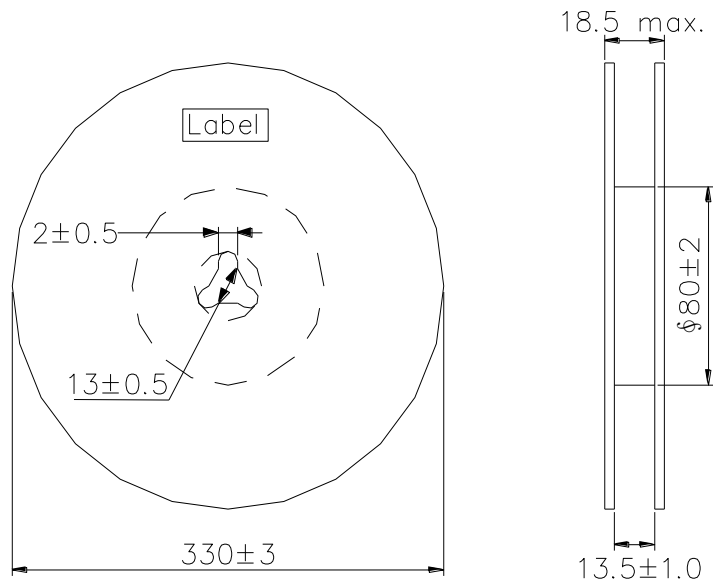


$A_0$	$B_0$	$W$	$F$	$E$	$P_1$	$P_2$	$P_0$	$D_0$	$T$	$K$
4.3 $\pm 0.1$	4.3 $\pm 0.1$	12.0 $\pm 0.3$	5.5 $\pm 0.1$	1.75 $\pm 0.1$	8.0 $\pm 0.1$	2.0 $\pm 0.1$	4.0 $\pm 0.1$	$\Phi 1.5$ $+0.1$ $-0$	0.3 $\pm 0.05$	2.1 $\pm 0.1$

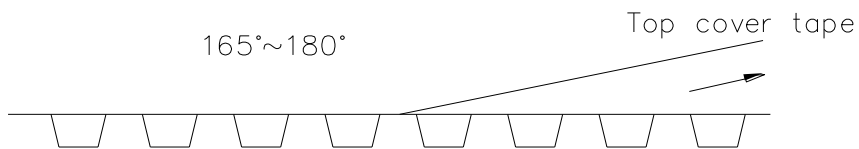
**Direction of rolling**



**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 : 3.5K pcs (3500 pcs)**