

# WIREWOUND TYPE COMMON MODE FILTER

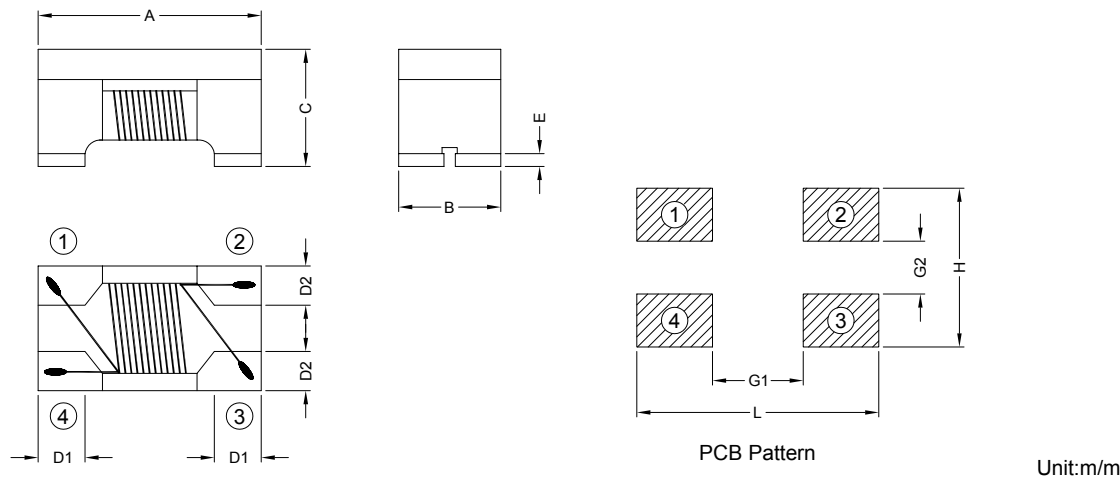
W4 SERIES

## 1. PART NO. EXPRESSION :

W 4 F 3 0 0 - R D - 1 0  
 (a)(b)(c) (d) (e)(f) (g)

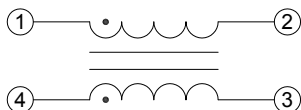
- (a) Series code
- (b) Dimension code
- (c) Material code
- (d) Impedance code : 300 = 30Ω
- (e) R : Tape & Reel
- (f) Rated Current : D = 400mA
- (g) 10 : Lead Free

## 2. CONFIGURATION & DIMENSIONS :

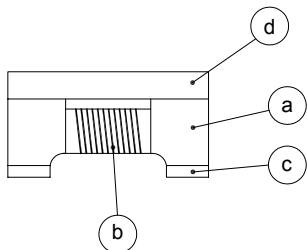


A	B	C	D1	D2	E	G1	G2	H	L
3.20±0.20	1.60±0.20	2.00±0.20	0.50±0.10	0.50±0.10	0.15±0.10	1.90 Ref.	0.40 Ref.	1.60 Ref.	3.70 Ref.

## 3. SCHEMATIC :



## 4. MATERIALS :



- (a) Core : Ferrite U Core
- (b) Wire : Enamelled Copper Wire
- (c) Terminal : Ag / Ni / Sn
- (d) Capsulate : Ferrite Cap



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### 5. GENERAL SPECIFICATION :

- a) Operating temp. : -55°C to +125°C
- b) Storage temp. : -40°C Max. 70% RH

### 6. ELECTRICAL CHARACTERISTICS :

Part No.	Common mode Impedance (Ω)	Test Frequency (MHz)	DCR (Ω) Max.	Rated Current (mA)	Rated Voltage (Vdc)	Withstand Voltage (Vdc)	IR (Ω) Min.
W4F300-RD-10	30±25%	100	0.20	400	50	125	10M
W4F670-RD-10	67±25%	100	0.30	400	50	125	10M
W4F800-RD-10	80±25%	100	0.30	400	50	125	10M
W4F900-RD-10	90±25%	100	0.30	400	50	125	10M
W4F121-RD-10	120±25%	100	0.30	400	50	125	10M
W4F161-RC-10	160±25%	100	0.35	350	50	125	10M
W4F181-RC-10	180±25%	100	0.35	350	50	125	10M
W4F221-RC-10	220±25%	100	0.45	300	50	125	10M
W4F261-RC-10	260±25%	100	0.45	300	50	125	10M
W4F281-RC-10	280±25%	100	0.45	300	50	125	10M
W4F301-RC-10	300±25%	100	0.50	300	50	125	10M
W4F361-RC-10	360±25%	100	0.60	300	50	125	10M
W4F431-RC-10	430±25%	100	0.60	300	50	125	10M
W4F471-RC-10	470±25%	100	0.70	300	50	125	10M
W4F551-RC-10	550±25%	100	0.75	300	50	125	10M
W4F601-RC-10	600±25%	100	0.80	300	50	125	10M
W4F222-RB-10	2200±25%	100	1.20	200	50	125	10M



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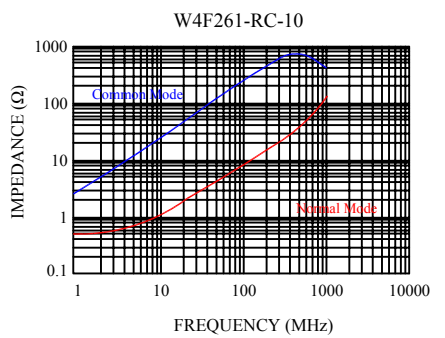
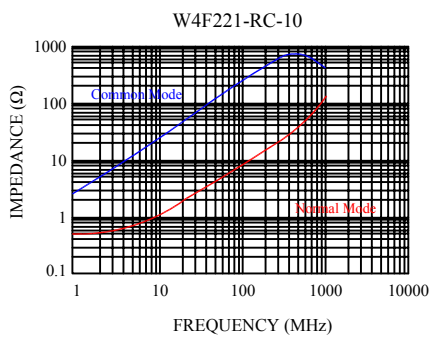
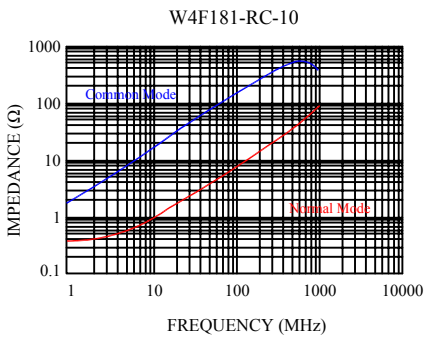
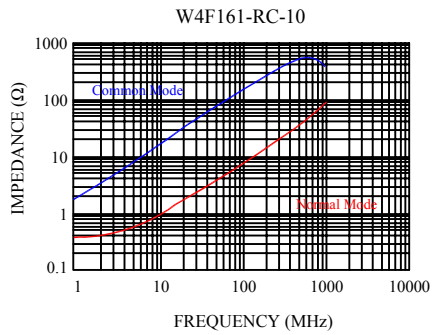
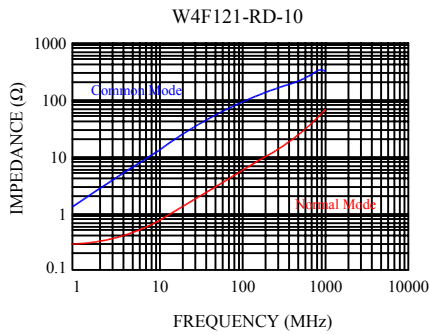
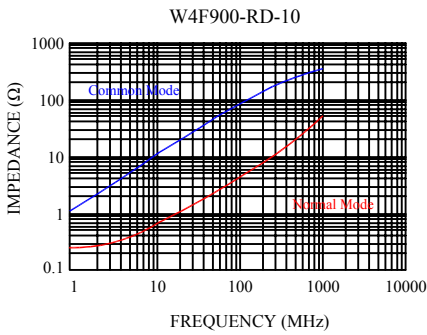
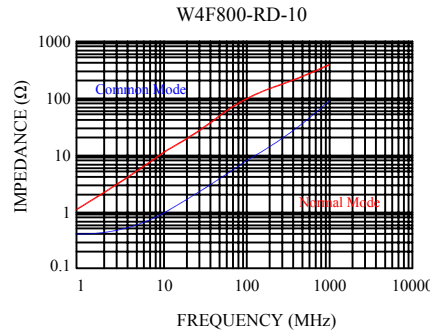
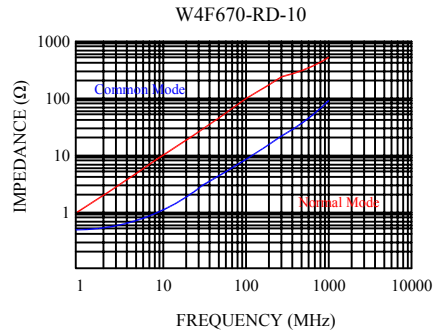
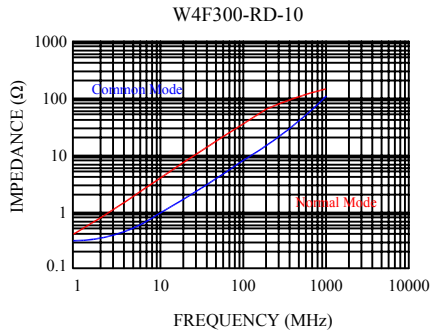
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### 7. CHARACTERISTICS CURVES :



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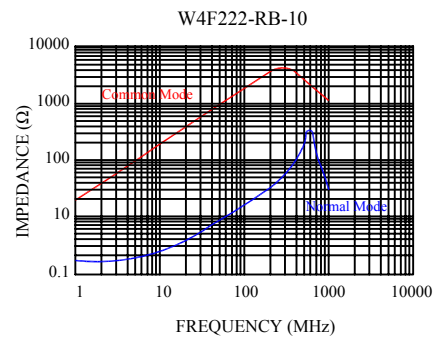
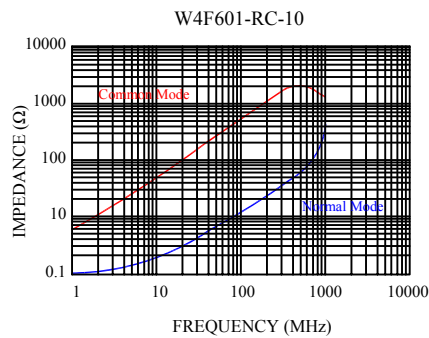
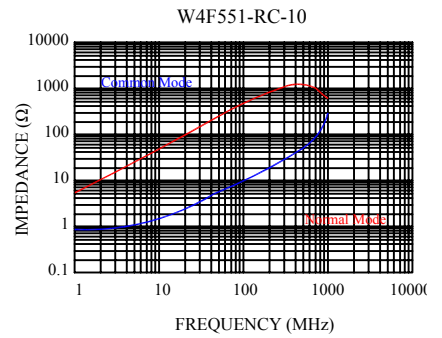
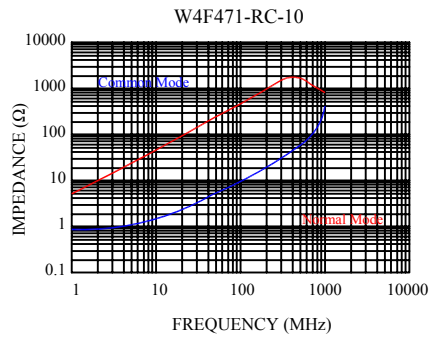
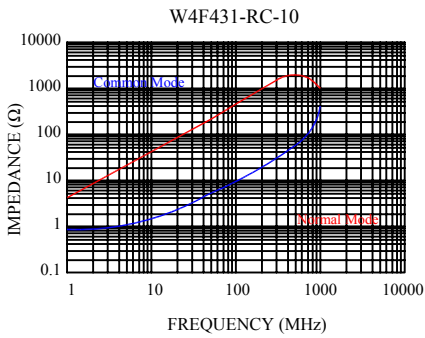
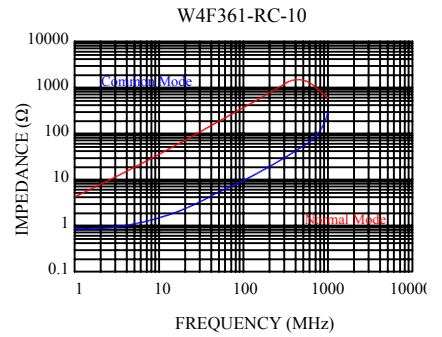
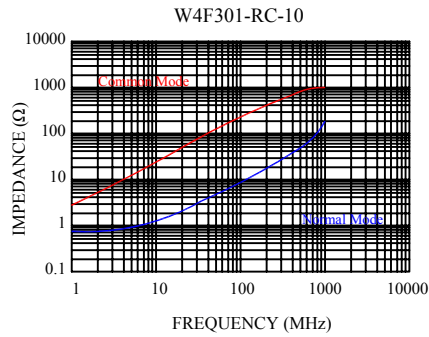
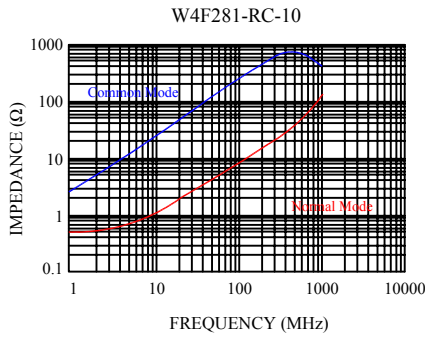
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### 7. CHARACTERISTICS CURVES :



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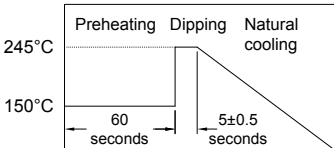
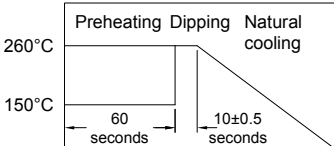
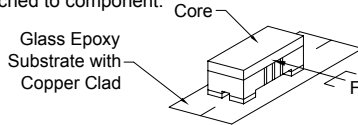
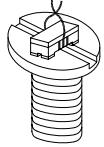
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### 8. RELIABILITY & TEST CONDITION :

ITEM	PERFORMANCE	TEST CONDITION										
Electrical Characteristics Test												
Z (common mode)	Refer to standard electrical characteristics list	HP-4291A + HP-16092A										
DCR		HP-4338B										
I.R.		Zentech 702A (Ultra High Resistance Meter)										
Rated Current		Applied the current to coils the impedance change should be less than $\pm 25\%$ to initial value and temperature rise should not be more than 30°C.										
Operating Temperature	-40°C ~ +85°C											
Storage Temperature	-40°C ~ +85°C											
Temperature Rise Test	30°C max. ( $\Delta t$ )	1. Applied the allowed DC current. 2. Temperature measured by digital surface thermometer.										
Mechanical Performance Test												
Solderability Test	More than 90% of terminal electrode should be covered with solder.	 <p>After fluxing component shall be dipped in a melted solder bath at <math>245 \pm 5^\circ\text{C}</math> for 5 seconds.</p>										
Solder Heat Resistance	1. Components should have not evidence of electrical and mechanical damage. 2. Impedance : within $\pm 25\%$ of initial value.	 <p>Preheat : 150°C 60secs Solder : Sn-Ag3-Cu0.5 Solder temperature : <math>260 \pm 5^\circ\text{C}</math> Flux : rosin Dip time : <math>10 \pm 5</math> secs.</p>										
Component Adhesion (Push Test)	<table border="1"> <thead> <tr> <th>Size</th> <th>F (Kg)</th> </tr> </thead> <tbody> <tr> <td>W4 (S)</td> <td>0.8 (min.)</td> </tr> <tr> <td>W3 (S)</td> <td>0.5 (min.)</td> </tr> <tr> <td>W4 (N)</td> <td>0.8 (min.)</td> </tr> <tr> <td>W3 (N)</td> <td>0.5 (min.)</td> </tr> </tbody> </table>	Size	F (Kg)	W4 (S)	0.8 (min.)	W3 (S)	0.5 (min.)	W4 (N)	0.8 (min.)	W3 (N)	0.5 (min.)	<p>The device should be reflow solder (<math>230 \pm 5^\circ\text{C}</math> for 10 secs.) to a tinned copper substrate. A dynamometer force gauge should be applied the side of the component. The device must withstand F(Kg) without failure of the termination attached to component.</p> 
Size	F (Kg)											
W4 (S)	0.8 (min.)											
W3 (S)	0.5 (min.)											
W4 (N)	0.8 (min.)											
W3 (N)	0.5 (min.)											
Component Adhesion (Pull Test)	<table border="1"> <thead> <tr> <th>Size</th> <th>F (Kg)</th> </tr> </thead> <tbody> <tr> <td>W4 (S)</td> <td>0.8 (min.)</td> </tr> <tr> <td>W3 (S)</td> <td>0.5 (min.)</td> </tr> <tr> <td>W4 (N)</td> <td>0.8 (min.)</td> </tr> <tr> <td>W3 (N)</td> <td>0.5 (min.)</td> </tr> </tbody> </table>	Size	F (Kg)	W4 (S)	0.8 (min.)	W3 (S)	0.5 (min.)	W4 (N)	0.8 (min.)	W3 (N)	0.5 (min.)	<p>1. Insert 10cm wire into the remaining open eye bend, the ends of even wire lengths upward and wind together. 2. Terminal shall not be remarkably damaged.</p> 
Size	F (Kg)											
W4 (S)	0.8 (min.)											
W3 (S)	0.5 (min.)											
W4 (N)	0.8 (min.)											
W3 (N)	0.5 (min.)											

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### 8. RELIABILITY & TEST CONDITION :

ITEM	PERFORMANCE	TEST CONDITION															
Reliability Test																	
High Temperature Life Test	1. Appearance : No damage. 2. Impedance : within $\pm 25\%$ of initial value. No disconnection or short circuit.	Temperature : $85\pm 5^{\circ}\text{C}$ Time : $500\pm 12\text{hr}$ . Recovery : 4 to 24hrs of recovery under the standard condition after the removal from test chamber.															
Low Temperature Life Test		Temperature : $-40\pm 5^{\circ}\text{C}$ Time : $500\pm 12\text{hr}$ . Recovery : 4 to 24hrs of recovery under the standard condition after the removal from test chamber.															
Thermal Shock		Conditions of 1 cycle <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Step</th> <th>Temperature (<math>^{\circ}\text{C}</math>)</th> <th>Times (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-40\pm 3</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>2</td> <td>Room Temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td><math>85\pm 3</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>4</td> <td>Room Temperature</td> <td>Within 3</td> </tr> </tbody> </table> Conditions of 1 cycle Total : 10 cycle Recovery : 4 to 24hrs of recovery under the standard condition after the removal from test chamber.	Step	Temperature ( $^{\circ}\text{C}$ )	Times (min.)	1	$-40\pm 3$	$30\pm 3$	2	Room Temperature	Within 3	3	$85\pm 3$	$30\pm 3$	4	Room Temperature	Within 3
Step		Temperature ( $^{\circ}\text{C}$ )	Times (min.)														
1	$-40\pm 3$	$30\pm 3$															
2	Room Temperature	Within 3															
3	$85\pm 3$	$30\pm 3$															
4	Room Temperature	Within 3															
Humidity Resistance	Temperature : $40\pm 5^{\circ}\text{C}$ Humidity : 90 to 95% Applied current : Rated current Time : $500\pm 12\text{hr}$ Recovery : 4 to 24hrs of recovery under the standard condition after the removal from test chamber.																
Random Vibration Test	Appearance : Cracking, shipping and any other defects harmful to the characteristics should not be allowed. Impedance: within $\pm 30\%$	Frequency : 10-55-10Hz for 1 min. Amplitude : 1.52mm Directions & times : X, Y, Z directions for 2 hours. A period of 2 hours in each of 3 mutually perpendicular directions (Total 6 hours).															



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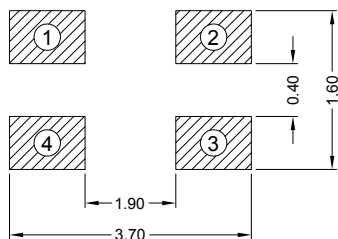
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### 9. SOLDERING AND MOUNTING :

#### 9-1. Recommended PC Board Pattern



PC board should be designed so that products are not sufficient under mechanical stress as warping the board. Products shall be positioned in the sideways direction against the mechanical stress to prevent failure.

#### 9-2. 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.

##### 9-2.1 Solder Re-flow :

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

##### 9-2.2 Solder Wave :

Wave soldering is perhaps the most rigorous of surface mount soldering processes due to the steep rise in temperature seen by the circuit when immersed in the molten solder wave, typical at 240°C. Due to the risk of thermal damage to products, wave soldering of large size products is discouraged. Recommended temperature profile for wave soldering is shown in Figure 2.

##### 9-2.3 Soldering Iron (Figure 3) :

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.

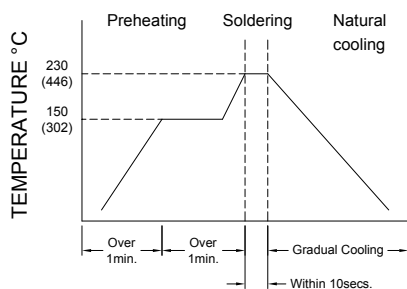


Figure 1. Re-flow Soldering

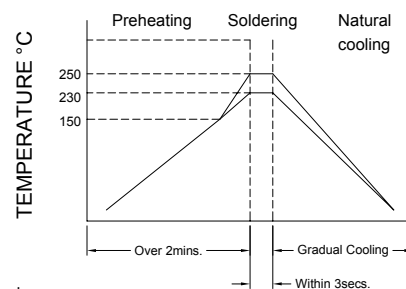


Figure 2. Wave Soldering

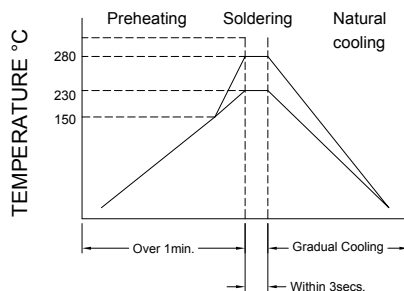


Figure 3. Hand Soldering



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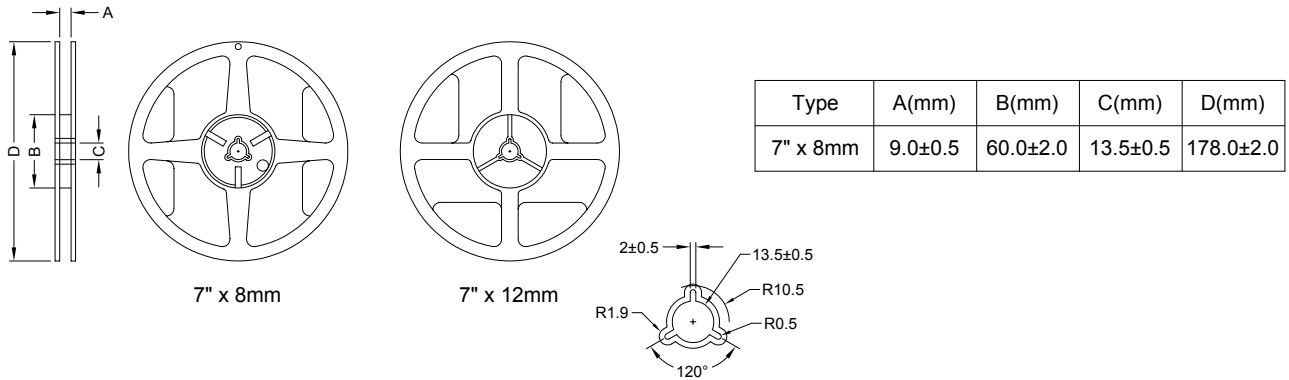


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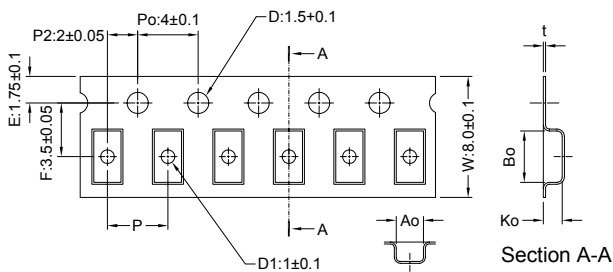
PG. 7

### 10. PACKAGING INFORMATION :

#### 10-1. Reel Dimension



#### 10-2 Tape Dimension / 8mm



Series	Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)
W3 (S)	201212	2.35±0.10	1.50±0.10	1.45±0.10	4.0±0.1	0.22±0.05
W4 (S)	321620	3.50±0.10	1.88±0.10	2.10±0.10	4.0±0.1	0.22±0.05
W3 (N)	201209	2.50±0.10	1.60±0.10	1.25±0.10	4.0±0.1	0.22±0.05
W4 (N)	321615	3.50±0.10	1.88±0.10	1.80±0.10	4.0±0.1	0.22±0.05

#### 10-3. Packing Quantity

Chip Size	W3	W4
Chip / Reel	2000 / 3000	2000
Inner Box	10000 / 15000	10000
Middle Box	50000 / 75000	50000
Carton	100000 / 150000	100000



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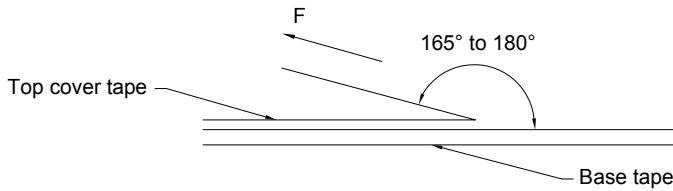
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### 10-4. Tearing Off Force



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 solderability of terminal electrodes :

- Temperature and humidity conditions : Less than 40°C and 70% RH.
- Recommended products should be used within 6 months from the time of delivery.
- The packaging material should be kept where no chlorine or sulfur exists in the air.

#### 2. Transportation :

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



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