

Winding Type Chip Inductor

WNLU252018RV-SERIES

1. Features

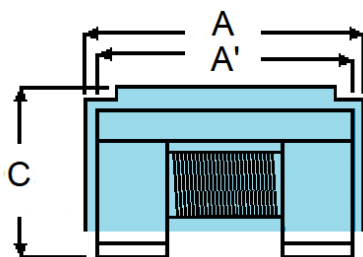
1. Ferrite core wire wound construction.
2. High Reliability due to wire wound type construction.
3. Small footprint as well as low profile.
4. 100% Lead (Pb) & Halogen-Free and RoHS compliant.
5. High reliability -Reliability tests comply with AEC-Q200
6. Operating temperature-40~+125°C (Including self - temperature rise)



2. Application

Smart meters, AV equipment, xDSL, electronic devices for communications
Infrastructure such as mobile base stations, industrial equipment, other

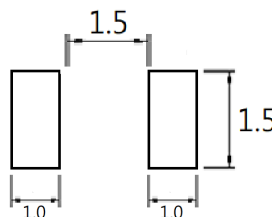
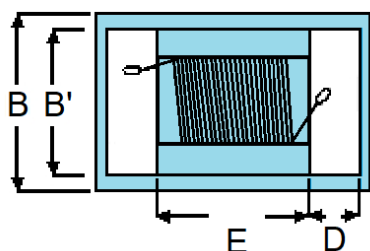
3. Dimension



Size	A	A'	B	B'
	2.60±0.30	2.45±0.20	2.00±0.20	1.45±0.20
WNLU252018	C	D	E	
	1.80±0.20	0.45±0.10	1.55Min	

Unit:mm

Recommend PC Board Pattern



4. Part Numbering



- A: Series
- B: Dimension L x W x H
- C: Application Low DCR
- D: Category Code V=Vehicle
- E: Inductance 101=100uH
- F: Inductance Tolerance M=±20%

5. Specification

TAI-TECH Part Number	Ls(uH)	Frequency	DCR (Ω) $\pm 20\%$	IDC(A)
WNLU252018RV-1R0M	1.00 $\pm 20\%$	7.96M	0.07	0.455
WNLU252018RV-1R5M	1.50 $\pm 20\%$	7.96M	0.09	0.350
WNLU252018RV-2R2M	2.20 $\pm 20\%$	7.96M	0.10	0.315
WNLU252018RV-3R3M	3.30 $\pm 20\%$	7.96M	0.20	0.280
WNLU252018RV-4R7M	4.70 $\pm 20\%$	7.96M	0.24	0.210
WNLU252018RV-6R8M	6.80 $\pm 20\%$	7.96M	0.29	0.175
WNLU252018RV-100M	10.0 $\pm 20\%$	2.52M	0.36	0.155
WNLU252018RV-150M	15.0 $\pm 20\%$	2.52M	0.75	0.130
WNLU252018RV-220M	22.0 $\pm 20\%$	2.52M	1.00	0.105
WNLU252018RV-330M	33.0 $\pm 20\%$	2.52M	1.40	0.085
WNLU252018RV-470M	47.0 $\pm 20\%$	2.52M	1.70	0.060
WNLU252018RV-680M	68.0 $\pm 20\%$	2.52M	3.30	0.050
WNLU252018RV-101M	100 $\pm 20\%$	0.796M	4.00	0.040

Winding Type Chip Inductor

WNLU322522RV-SERIES

1. Features

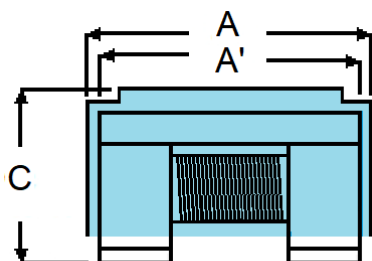
1. Ferrite core wire wound construction.
2. High Reliability due to wire wound type construction.
3. Small footprint as well as low profile.
4. 100% Lead (Pb) & Halogen-Free and RoHS compliant.
5. High reliability -Reliability tests comply with AEC-Q200
6. Operating temperature-40~+125°C (Including self - temperature rise)



2. Application

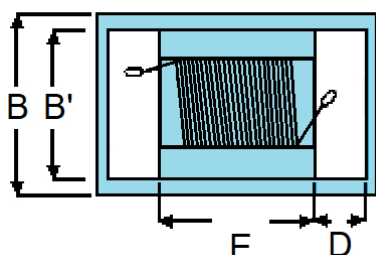
Smart meters, AV equipment, xDSL, electronic devices for communications
 Infrastructure such as mobile base stations, industrial equipment, other

3. Dimension

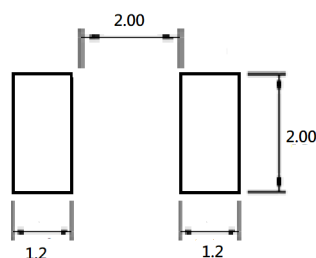


Size	A	A'	B	B'
	3.20±0.30	3.15±0.20	2.50±0.30	1.95±0.20
WNLU322522	C	D	E	
	2.20±0.20	0.55±0.10	2.00 ref	

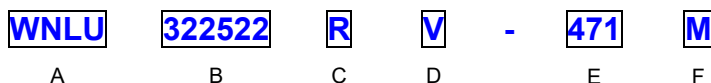
Unit:mm



Recommend PC Board Pattern



4. Part Numbering



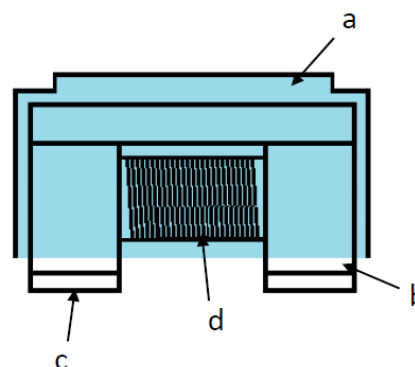
- A: Series
- B: Dimension L x W x H
- C: Application Low DCR
- D: Category Code V=Vehicle
- E: Inductance 471=470uH
- F: Inductance Tolerance M=±20%

5. Specification

TAI-TECH Part Number	Ls(uH)	Frequency	DCR±20% (Ω)	IDC (A)
WNLU322522RV-1R0M	1.00±20%	7.96M	0.06	0.750
WNLU322522RV-2R2M	2.20±20%	7.96M	0.09	0.500
WNLU322522RV-3R3M	3.30±20%	7.96M	0.11	0.420
WNLU322522RV-4R7M	4.70±20%	7.96M	0.13	0.360
WNLU322522RV-6R8M	6.80±20%	7.96M	0.17	0.260
WNLU322522RV-100M	10.0±20%	2.52M	0.20	0.250
WNLU322522RV-220M	22.0±20%	2.52M	0.40	0.140
WNLU322522RV-330M	33.0±20%	2.52M	0.65	0.095
WNLU322522RV-470M	47.0±20%	2.52M	0.85	0.090
WNLU322522RV-680M	68.0±20%	2.52M	1.30	0.070
WNLU322522RV-101M	100±20%	0.796M	2.20	0.055
WNLU322522RV-151M	150±20%	0.796M	2.90	0.050
WNLU322522RV-221M	220±20%	0.796M	5.10	0.040
WNLU322522RV-331M	330±20%	0.796M	6.80	0.035
WNLU322522RV-471M	470±20%	0.796M	14.50	0.030
WNLU322522RV-681M	680±20%	0.796M	18.50	0.025
WNLU322522RV-102M	1000±20%	0.796M	22.50	0.020

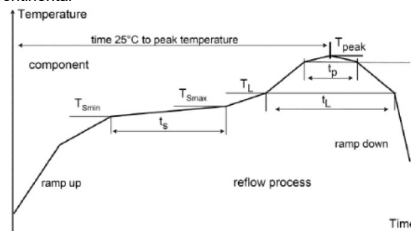
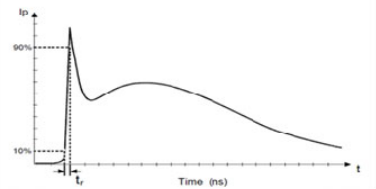
6. Materials

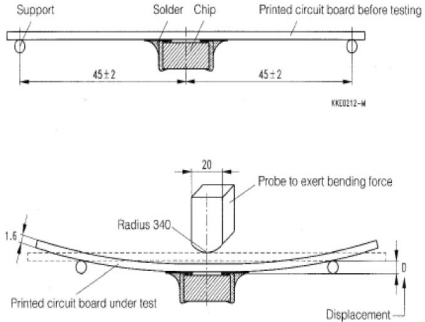
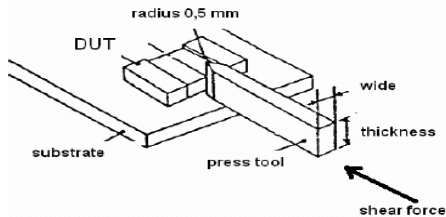
No.	Description	Specification
a.	Upper Plate	UV Glue
b.	Core	Ferrite Core
c.	Termination	Ag/Ni/Sn
d.	Wire	Enameled Copper Wire



7. Reliability and Test Condition

Item	Performance	Test Condition															
Operating temperature	-40~+125°C (Including self - temperature rise)																
Storage temperature	-40+125°C (on board)																
Electrical Performance Test																	
Inductance L	Refer to standard electrical characteristic list	Agilent E4991A , Keysight E4991B ,Keysight 4980AL															
Q		Agilent-4287, Agilent-4285															
SRF		Agilent E4991A , Keysight E4991B															
DC Resistance		Agilent-34420A Agilent-4338B															
IDC	$\Delta L \leq 30\%$	1. Applied the current to coils, the inductance change shall be less than 30% to initial value. 2. Heat Rated Current (Irms) will cause the coil temperature rise $\Delta T(^{\circ}C)$ without core loss. (1.) Applied the allowed DC current. (2.) Temperature measured by digital surface thermometer															
	$\Delta T \leq 40^{\circ}C$																
Reliability Test																	
High Temperature Exposure(Storage) AEC-Q200		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles) Temperature : 125±2°C Duration : 1000hrs Min. Measured at room temperature after placing for 24±4 hrs.															
Temperature Cycling AEC-Q200		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles) Condition for 1 cycle Step1 : -40±2°C 30min Min. Step2 : 125±2°C transition time 1min MAX. Step3 : 125±2°C 30min Min. Step4 : Low temp. transition time 1min MAX. Number of cycles : 1000 Measured at room temperature after placing for 24±4 hrs.															
Moisture Resistance (AEC-Q200)	Appearance : No damage. Inductance : within±10% of initial value Q : Shall not exceed the specification value. RDC : within ±15% of initial value and shall not exceed the specification value	t=24 hours/cycle. Note: Steps 7a & 7b not required. Unpowered. Measurement at 24±2 hours after test conclusion. 															
Biased Humidity (AEC-Q200)		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles) Humidity : 85±3% R.H, Temperature : 85°C±2°C Duration : 1000hrs Min. Measured at room temperature after placing for 24±4hrs.															
High Temperature Operational Life (AEC-Q200)		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles) Temperature : 125±2°C Duration : 1000hrs Min. with 100% rated current. Measured at room temperature after placing for 24±4hrs.															
External Visual	Appearance : No damage.	Inspect device construction, marking and workmanship. Electrical Test not required.															
Physical Dimension	According to the product specification size measurement	According to the product specification size measurement															
Resistance to Solvents		Add aqueous wash chemical - OKEM clean or equivalent.															
Mechanical Shock	Appearance : No damage. Inductance : within±10% of initial value Q : Shall not exceed the specification value. RDC : within ±15% of initial value and shall not exceed the specification value	<table border="1"> <thead> <tr> <th>Type</th> <th>Peak value (g's)</th> <th>Normal duration (D) (ms)</th> <th>Wave form</th> <th>Velocity change (Vi)ft/sec</th> </tr> </thead> <tbody> <tr> <td>SMD</td> <td>100</td> <td>6</td> <td>Half-sine</td> <td>12.3</td> </tr> <tr> <td>Lead</td> <td>100</td> <td>6</td> <td>Half-sine</td> <td>12.3</td> </tr> </tbody> </table>	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec	SMD	100	6	Half-sine	12.3	Lead	100	6	Half-sine	12.3
		Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec											
SMD	100	6	Half-sine	12.3													
Lead	100	6	Half-sine	12.3													
3 shocks in each direction along 3 perpendicular axes. (18 shocks).																	

Item	Performance	Test Condition																																																
Vibration		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles) Oscillation Frequency : 10Hz~2KHz~10Hz for 20 minutes Equipment : Vibration checker Total Amplitude : 5g Testing Time : 12 hours (20 minutes, 12 cycles each of 3 orientations)																																																
Resistance to Soldering Heat	Appearance : No damage. Inductance : within±10% of initial value Q : Shall not exceed the specification value. RDC : within ±15% of initial value and shall not exceed the specification value	Test condition : <table border="1" data-bbox="938 416 1398 528"> <thead> <tr> <th>Temperature(°C)</th> <th>Time(s)</th> <th>Temperature ramp/immersion and emersion rate</th> <th>Number of heat cycles</th> </tr> </thead> <tbody> <tr> <td>260 ±5 (solder temp)</td> <td>10 ±1</td> <td>25mm/s ±6 mm/s</td> <td>1</td> </tr> </tbody> </table> Depth: completely cover the termination Continental  <table border="1" data-bbox="938 855 1423 1034"> <thead> <tr> <th>Component Size</th> <th>Ramp up to 160°C</th> <th>T_{min}</th> <th>t_r</th> <th>T_{max}</th> <th>T_L</th> <th>t_d</th> <th>T_{min}**</th> <th>t_d**</th> <th>Ramp down</th> </tr> </thead> <tbody> <tr> <td>Thickness < 1.6mm or Thickness 1.6mm-2.5mm and Volume < 350 mm³</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>≥260°C</td> <td>≥40s</td> <td></td> </tr> <tr> <td>Thickness 1.6mm-2.5mm and Volume 350-2000 mm³ or Thickness > 2.5mm and Volume < 350 mm³</td> <td></td> <td>≥190°C</td> <td>≥110s</td> <td>≥200°C</td> <td>≥217°C</td> <td>≥90s</td> <td>≥250°C</td> <td>≥30s</td> <td></td> </tr> <tr> <td>Thickness 1.6mm-2.5mm and Volume > 2000 mm³ or Thickness > 2.5mm and Volume > 350 mm³</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>≥245°C</td> <td>≥300s</td> <td></td> </tr> </tbody> </table> Table 1: Minimum requirements for lead-free soldering *peak temperature is measured on the centre top of the component package ** t _d measured @ T _{peak} -5°C	Temperature(°C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1	Component Size	Ramp up to 160°C	T _{min}	t _r	T _{max}	T _L	t _d	T _{min} **	t _d **	Ramp down	Thickness < 1.6mm or Thickness 1.6mm-2.5mm and Volume < 350 mm ³							≥260°C	≥40s		Thickness 1.6mm-2.5mm and Volume 350-2000 mm ³ or Thickness > 2.5mm and Volume < 350 mm ³		≥190°C	≥110s	≥200°C	≥217°C	≥90s	≥250°C	≥30s		Thickness 1.6mm-2.5mm and Volume > 2000 mm ³ or Thickness > 2.5mm and Volume > 350 mm ³							≥245°C	≥300s	
Temperature(°C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles																																															
260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1																																															
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Thickness 1.6mm-2.5mm and Volume > 2000 mm ³ or Thickness > 2.5mm and Volume > 350 mm ³							≥245°C	≥300s																																										
Thermal shock (AEC-Q200)		Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles) Condition for 1 cycle Step1 : -40±2°C 15±1min Step2 : 125±2°C within 20Sec. Step3 : 125±2°C 15±1min Number of cycles : 300 Measured at room temperature after placing for 24±4hrs.																																																
ESD	Appearance : No damage. Inductance : within±10% of initial value Q : Shall not exceed the specification value. RDC : within ±15% of initial value and shall not exceed the specification value	 Direct Contact and Air Discharge PASSIVE COMPONENT HBM ESD Discharge Waveform to a Coaxial Target Test method: AEC-Q200-002 Test mode : Contact Discharge Discharge level : 4 KV (Level: 2)																																																
Solderability	More than 95% of the terminal electrode should be covered with solder	a. Method B, 4hrs @155°C dry heat @235°C±5°C Testing Time :5 +0/-0.5 seconds b. Method D category 3. (8hours ± 15 min)@ 260°C±5°C Testing Time :30 +0/-0.5 seconds																																																
Electrical Characterization	Refer Specification for Approval	Summary to show Min, Max, Mean and Standard deviation .																																																
Flammability	Electrical Test not required.	V-0 or V-1 are acceptable.																																																

Item	Performance	Test Condition
<p>Board Flex</p>	<p>Appearance : No damage. Inductance : within±10% of initial value Q : Shall not exceed the specification value. RDC : within ±15% of initial value and shall not exceed the specification value</p>	<p>Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles) Place the 100mm X 40mm board into a fixture similar to the one shown in below Figure with the component facing down. The apparatus shall consist of mechanical means to apply a force which will bend the board (D) x = 2 mm minimum. The duration of the applied forces shall be 60 (+ 5) sec. The force is to be applied only once to the board.</p> 
<p>Terminal Strength(SMD)</p>	<p>Appearance : No damage. Inductance : within±10% of initial value Q : Shall not exceed the specification value. RDC : within ±15% of initial value and shall not exceed the specification value</p>	<p>Preconditioning: Run through reflow for 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles) With the component mounted on a PCB with the device to be tested, apply a 17.7 N (1.8 Kg) force to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to apply a shock to the component being tested.</p> 

8. Soldering and Mounting

8-1. Soldering

Mildly activated rosin fluxes are preferred. TAI-TECH terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

8-2.1 Soldering Reflow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020E)

8-2.2 Soldering Iron:

Products attachment with a 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. (Figure 2.)

- Preheat circuit and products to 150°C
- Never contact the ceramic with the iron tip
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- 350°C tip temperature (max)
- 1.0mm tip diameter (max)
- Limit soldering time to 4-5sec.

Fig.1 Soldering Reflow

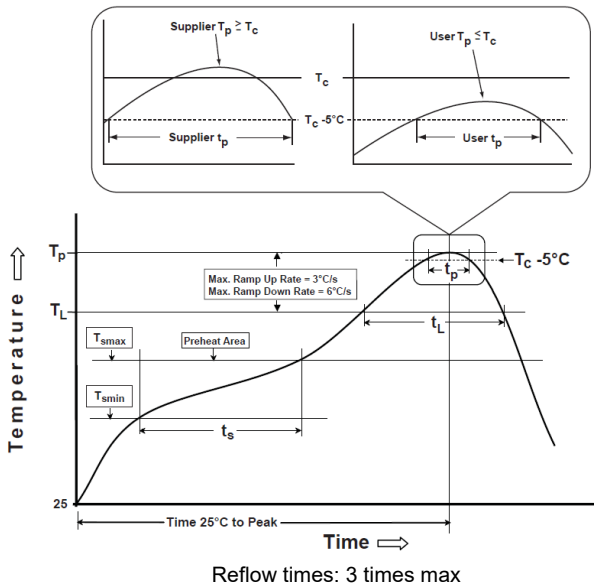


Fig.2 Iron soldering temperature profiles

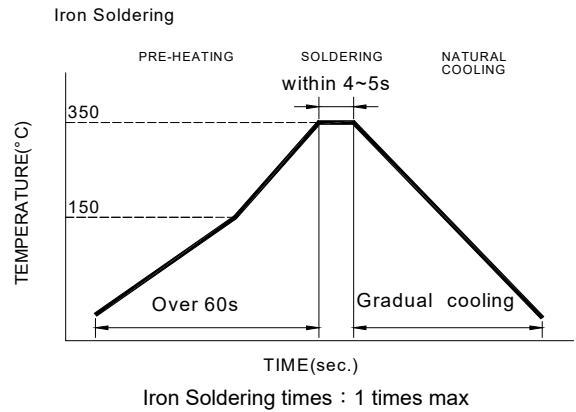


Table (1.1): Reflow Profiles

Profile Type:	Pb-Free Assembly
Preheat	
-Temperature Min(T_{smin})	150°C
-Temperature Max(T_{smax})	200°C
-Time(t_s)from(T_{smin} to T_{smax})	60-120seconds
Ramp-up rate(T_L to T_p)	3°C/second max.
Liquidus temperature(T_L)	217°C
Time(t_L)maintained above T_L	60-150 seconds
Classification temperature(T_c)	See Table (1.2)
Time(t_p) at $T_c - 5^\circ C$ (T_p should be equal to or less than T_c .)	< 30 seconds
Ramp-down rate(T_p to T_L)	6°C /second max.
Time 25°C to peak temperature	8 minutes max.

T_p : maximum peak package body temperature, T_c : the classification temperature.

For user (customer) T_p should be equal to or less than T_c .

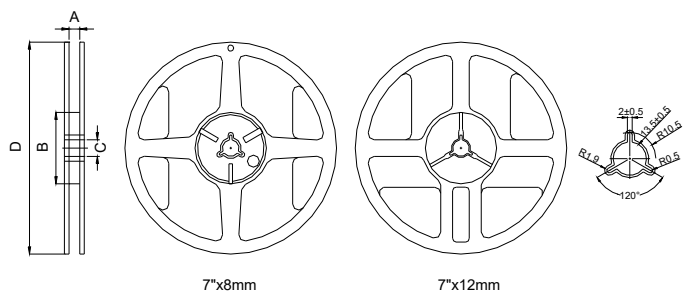
Table (1.2) Package Thickness/Volume and Classification Temperature (T_c)

	Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
PB-Free Assembly	<1.6mm	260°C	260°C	260°C
	1.6-2.5mm	260°C	250°C	245°C
	≥2.5mm	250°C	245°C	245°C

Reflow is referred to standard IPC/JEDEC J-STD-020E ◦

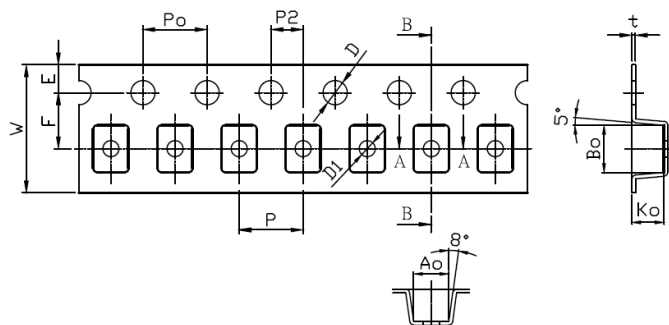
9. Packaging Information

9-1. Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x8mm	9.0±0.5	60.0±2.0	13.5±0.5	178.0±2.0

9-2. Tape Dimension / 8mm

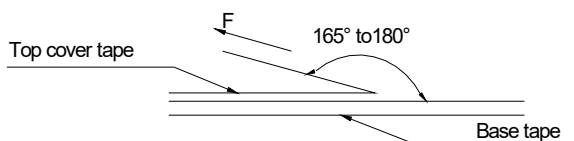


Series	Size	W(mm)	P(mm)	E(mm)	F(mm)	P2(mm)	D(mm)	D1(mm)	Bo(mm)	Ao(mm)	Ko(mm)	Po(mm)	t(mm)
WNLU	252018	8.00±0.10	4.00±0.10	1.75±0.10	3.50±0.05	2.00±0.05	1.50+0.10-0.00	1.00±0.10	2.95±0.10	2.20±0.10	2.00±0.10	4.00±0.10	0.24±0.05

9-3. Packaging Quantity

WNLU	252018
Chip / Reel	2000
Reel Size	7"x8mm

9-4. Tearing Off Force



The force for tearing off cover tape is 15 to 80 grams in the arrow direction under the following conditions.

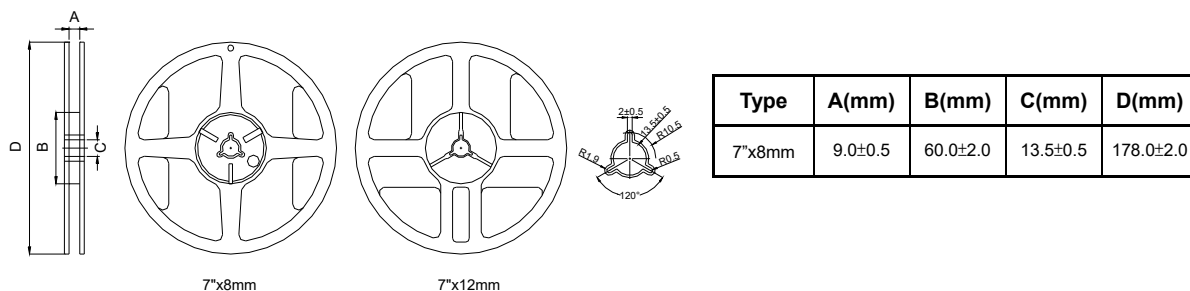
Room Temp. (°C)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

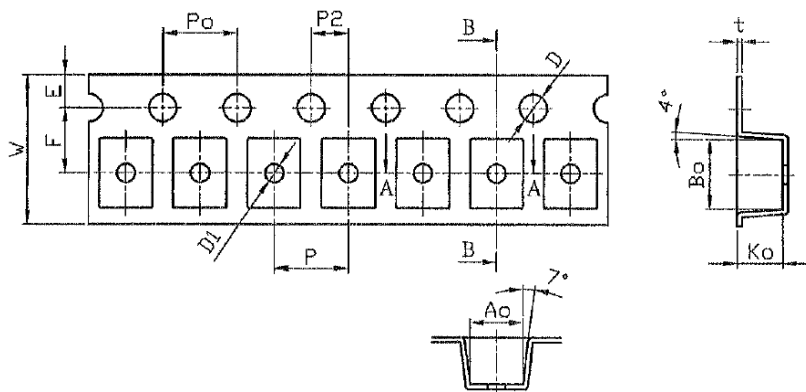
- Storage Conditions(component level)
 - To maintain the solderability of terminal electrodes:
 - 1.TAI-TECH products meet IPC/JEDEC J-STD-020E standard-MSL, level 1.
 2. Temperature and humidity conditions: Less than 40°C and 60% RH.
 3. Recommended products should be used within 12 months form the time of delivery.
 4. The packaging material should be kept where no chlorine or sulfur exists in the air.
- Transportation
 1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
 2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
 3. Bulk handling should ensure that abrasion and mechanical shock are minimized.

9. Packaging Information

9-1. Reel Dimension



9-2. Tape Dimension / 8mm

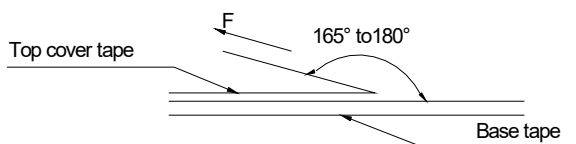


Series	Size	W(mm)	P(mm)	E(mm)	F(mm)	P2(mm)	D(mm)	D1(mm)	Bo(mm)	Ao(mm)	Ko(mm)	Po(mm)	t(mm)
WNLU	322522	8.00±0.10	4.00±0.10	1.75±0.10	3.50±0.05	2.00±0.05	1.50+0.10-0.00	1.00±0.10	3.72±0.10	2.88±0.10	2.50±0.10	4.00±0.10	0.26±0.05

9-3. Packaging Quantity

WNLU	322522
Chip / Reel	2000
Reel Size	7"x8mm

9-4. Tearing Off Force



The force for tearing off cover tape is 15 to 80 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

- Storage Conditions(component level)
 - To maintain the solderability of terminal electrodes:
 - 1.TAI-TECH products meet IPC/JEDEC J-STD-020E standard-MSL, level 1.
 2. Temperature and humidity conditions: Less than 40°C and 60% RH.
 3. Recommended products should be used within 12 months form the time of delivery.
 4. The packaging material should be kept where no chlorine or sulfur exists in the air.
- Transportation
 1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
 2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
 3. Bulk handling should ensure that abrasion and mechanical shock are minimized.