# Winding Type Chip Inductor

PAS3225V-102J

## 1. Features

1. Hearing Aid Compatibility-/Telecoil-antennas;
2. PAS3225V-series realizes small size and low profile. 3.6x2.8x2.6mm.
3. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
4. Meets the T3/T4 FCC requirements(HAC) . ANSI C63.19
5. High reliability -Reliability tests comply with AEC-Q200
6. Operating temperature -55~+125℃(Including self - temperature rise)

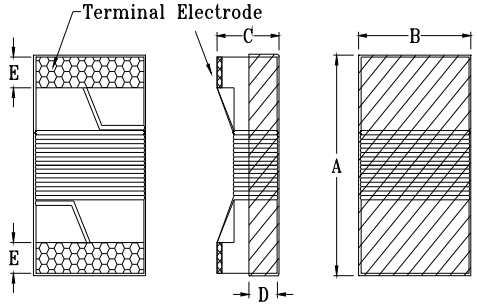
Halogen-free

RoHS

## 2. Applications

1. T-coil/HAC-coil for hearing and aid compatible cell phones .
2. Decoupling in RF and IF-circuit .
3. Transponder antenna .

## 3. Dimension




| Size | A | B | C | D | E |
|---|---|---|---|---|---|
| PAS3225 | 3.60 max. | 2.80 max. | 2.60 max. | 0.80 ref. | 0.55±0.10 |

Unit:mm

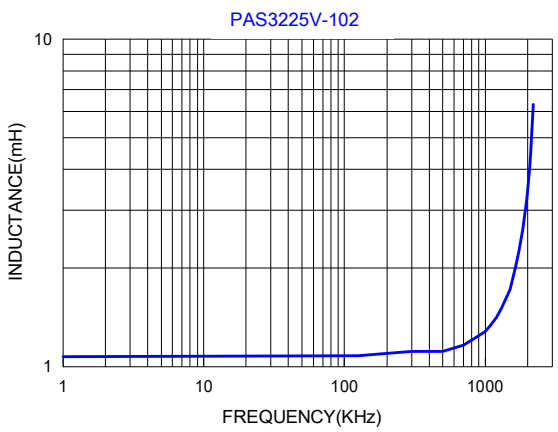
## 4. Part Numbering

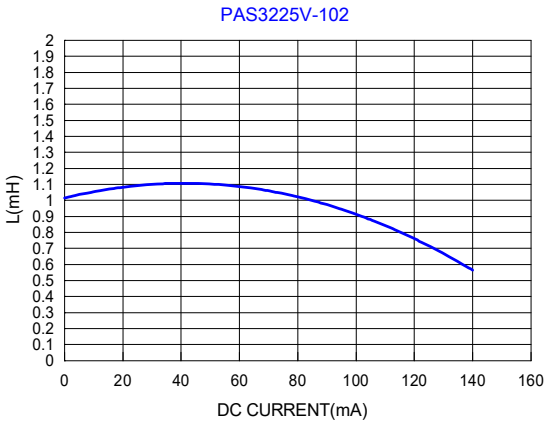
| PAS | 3225 | V | - | 102 | J |
|---|---|---|---|---|---|
| A | B | C | | D | E |

A: Series
B: Dimension L x W
C: Category Code V=Vehicle
D: Inductance 102=1080uH
E: Inductance Tolerance J =±5%

## 5. Specification

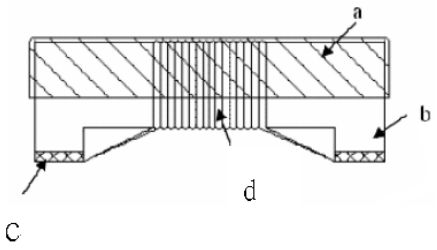
| TAI-TECH Part Number | Inductance (uH) | Tolerance | Test Frequency(Hz) | Q min. | Test Frequency(KHz) | IDC(mA) max. | DCR(Ω) max. | SRF(MHz) min. |
|---|---|---|---|---|---|---|---|---|
| PAS3225V-102J | 1080 | J | 0.1V/125K | 15 | 125K | 50 | 35.00 | 1.5 |




## 6. Materials

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

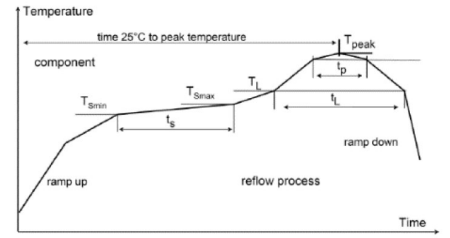


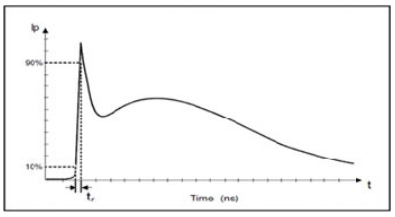

## 7. Reliability and Test Condition

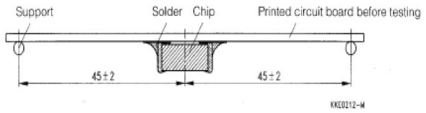
| Item | Performance | Test Condition |
|---|---|---|
| Operating temperature | -55~+125℃(Including self - temperature rise) | |
| Storage temperature | -55+125℃(on board) | |
| **Electrical Performance Test** | | |
| **Inductance L** | Refer to standard electrical characteristic list | Agilent E4991A , Keysight E4991B ,Keysight 4980AL<br>Agilent-4287, Agilent-4285 |
| **Q** | | |
| **SRF** | | Agilent E4991A , Keysight E4991B |
| **IDC** | | Agilent-34420A<br>Agilent-4338B |

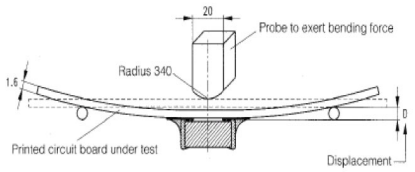
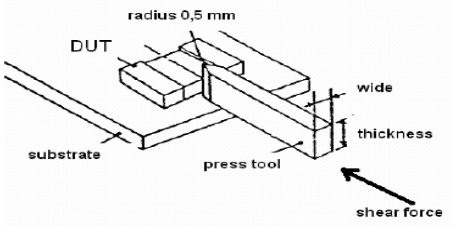
**Reliability Test**

| | | |
|---|---|---|
| High Temperature Exposure(Storage) AEC-Q200 | Appearance：No damage.<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within±15% of initial value and shall not exceed the specification value | Preconditioning: Run through reflow for 3 times.<br>( IPC/JEDECJ-STD-020F Classification Reflow Profiles)<br>Unpowered<br>Temperature：125±2℃<br>Upper Temperature: maximum specified operating temperature or maximum specified storage temperature (whichever is higher).<br>Minimum test temperature shall be 85℃<br>(For ferrite EMI suppressors/filters only)<br>Duration：1000hrs Min.<br>Measured at room temperature after placing for 24±4 hrs. |
| Temperature Cycling<br>AEC-Q200 | | Preconditioning: Run through reflow for 3 times.<br>( IPC/JEDECJ-STD-020F Classification Reflow Profiles)<br>Unpowered<br>Lower Temperature of the Chamber:<br>-40℃(For Inductors/Transformers)<br>-55℃(For ferrite EMI suppressors/filters)<br>Upper Temperature of the Chamber: maximum specified operating temperature and shall not exceed 125℃<br>Condition for 1 cycle<br>Step1：-55±2℃ 30min Min.<br>Step2：125±2℃ transition time 1min MAX.<br>Step3：125±2℃ 30min Min.<br>Step4：Dwell Time (Soak Time)<br>15 minutes minimum,<br>30 minutes minimum if component weighs above 28g<br>Transition Time: 1 minute maximum<br>Number of cycles：1000<br>Measured at room temperature at least 24 hours after test conclusion. |
| Humidity Bias<br>(AEC-Q200) | | Preconditioning: Run through reflow for 3 times.<br>( IPC/JEDEC J-STD-020F Classification Reflow Profiles)<br>Unpowered(For Inductors/Transformers)<br>Apply 10% of maximum rated power.<br>( For ferrite EMI suppressors/filters )<br>Humidity：85±3% R.H,<br>Temperature：85℃±2℃<br>Duration: 1000hrs Min.<br>Measured at room temperature after placing for 24±4hrs. |
| High Temperature Operating Life<br>(AEC-Q200) | | Preconditioning: Run through reflow for 3 times.<br>( IPC/JEDECJ-STD-020F Classification Reflow Profiles)<br>Temperature：125±2℃<br>Upper Temperature of the Chamber: maximum specified operating temperature (not including heat rise) at maximum rated power and shall not exceed 125°C.( For Inductors/Transformers)<br>Temperature of the Chamber: maximum specified operating temperature up to 150°C ( For ferrite EMI suppressors/filters )<br>Duration：1000hrs Min. with 100% rated current.<br>Measured at room temperature after placing for 24±4 hrs.<br>Rated IL applied.( For ferrite EMI suppressors/filters ) |
| External Visual | Appearance：No damage. | Inspect device construction, marking and workmanship. Pre and Post Electrical Test not required. |
| Physical Dimension | According to the product specification size measurement | Verify physical dimensions to the applicable component detail specification. Pre and Post Electrical Test not required. |
| Terminal Strength<br>(for axial and radial THT components) | Appearance：No damage.<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within±15% of initial value and shall not exceed the specification value | Test THT component lead integrity only.<br>Test Condition A (pull test)<br>Nominal cross- sectional area ($mm^2$) / Force (N)<br>≤ 0.05 / 1<br>0.06 to 0.10 / 2.5<br>0.11 to 0.20 / 5<br>0.21 to 0.50 / 10<br>0.51 to 1.20 / 20<br>> 1.20 / 40<br>Test Condition C (wire-lead bend test):<br>Section Modulus ($Z_X$) ($mm^3$) / Force (N)<br>≤ $1.5x10^{-3}$ / 0.5<br>$1.6x10^{-3}$ to $4.2x10^{-3}$ / 1.25<br>$4.3x10^{-3}$ to $1.2x10^{-2}$ / 2.5<br>$1.3x10^{-2}$ to $0.5x10^{-1}$ / 5<br>$0.6x10^{-1}$ to $1.9x10^{-1}$ / 10<br>> $1.9x10^{-1}$ / 20<br>For round terminations: ZX = (πd3)/32 where d is the lead diameter.<br>For strip terminations: ZX = (ba2)/6 where is the thickness of the rectangular strip perpendicular to the bending axis, b is the other dimension of the rectangular strip. |

<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Resistance to Solvents</td><td rowspan="5">Appearance：No damage.<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within±15% of initial value and shall not exceed the specification value</td><td>Add an Aqueous wash chemical and follow chemical manufacturer’s recommended parameters (i.e. solution temperature and immersion time).<br>Applicable to ink marked components and not laser marked components</td></tr>
<tr><td>Mechanical Shock</td><td>
<table>
<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>
<tr><td>SMD</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr>
<tr><td>THT</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr>
</table>
3 shocks in each direction along 3 perpendicular axes.<br>(18 shocks).</td></tr>
<tr><td>Vibration</td><td>Preconditioning: Run through reflow for 3 times.<br>( IPC/JEDEC J-STD-020F Classification Reflow Profiles)<br>Oscillation Frequency : 10Hz～2kHz～10Hz for 20 minutes<br>Equipment : Vibration checker<br>Total Amplitude : 5g<br>Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations)</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>Test condition ：<br>THT: Conditions B or C
<table>
<tr><th>Solder technique simulation</th><th>Test condition</th><th>Temperature (℃)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr>
<tr><td>Dip</td><td>B</td><td>260 ±5 (solder temp)</td><td>10±1</td><td>25mm/s ±6mm/s</td><td>1</td></tr>
<tr><td>Wave: Topside board-mou nt product</td><td>C</td><td>260 ±5 (solder temp)</td><td>20±1</td><td></td><td>1</td></tr>
</table>
Depth: completely cover the termination<br>SMD: Condition K, time above 217˚C, 60s-150s， Number of heat cycles:3<br>Continental<br> 

<table>
<tr><th>Component Size</th><th>Ramp up to 150˚C</th><th>$T_{Smin}$</th><th>$t_s$</th><th>$T_{Smax}$</th><th>$T_L$</th><th>$t_L$</th><th>$T_{peak}$*</th><th>$t_p$**</th><th>time 25°C to peak</th><th>Ramp down</th></tr>
<tr><td>Thickness < 1.6mm or Thickness 1.6mm-2.5mm and Volume < 350 mm3</td><td rowspan="3">3.0±0.1°C/s (The component shall be specified for usage in serial production with up to 3.0°C/s)</td><td rowspan="3">≥190° C</td><td rowspan="3">≥110s</td><td rowspan="3">≥200°C</td><td rowspan="3">≥217°C</td><td rowspan="3">≥90s</td><td>≥260°C</td><td>≥40s</td><td rowspan="3">≥300s</td><td rowspan="3">6.0±0.1°C/s (The component shall be specified for usage in serial production with up to 6.0°C/s)</td></tr>
<tr><td>Thickness 1.6mm-2.5mm and Volume 350-2000 mm³ or Thickness > 2.5mm and Volume < 350 mm3</td><td>≥250°C</td><td rowspan="2">≥30s</td></tr>
<tr><td>Thickness 1.6mm-2.5mm and Volume > 2000 mm³ or Thickness > 2.5mm and Volume > 350 mm3</td><td>≥245°C</td></tr>
</table>
Table 1: Minimum requirements for lead-free soldering<br>*peak temperature is measured on the centre top of the component package<br>** tp measured @ Tpeak-5°C</td></tr>
<tr><td>ESD</td><td>Direct Contact and Air Discharge PASSIVE COMPONENT HBM ESD<br>Discharge Waveform to a Coaxial Target<br>Test method: AEC-Q200-002<br>Test mode：Contact Discharge<br>Discharge level：4 KV (Level: 2 )<br> 
</td></tr>
</table>

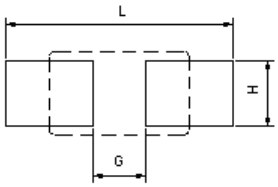
<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Solderability</td><td>Appearance：No damage.<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within±15% of initial value and shall not exceed the specification value</td><td>Through-hole Technology (THT: Method A1, Coating Durability Category 2)<br>▪ SMD:<br>Method B1, Coating Durability Category 2<br>Method D, Coating Durability Category 2<br>▪ Magnification 50x<br>▪ Pre and Post Electrical Test not required.<br>▪ Non-soldered type mounting/attach are not applicable.
<table>
<tr><td>參照</td><td>Method A1</td><td>Method B1</td><td>Method D</td></tr>
<tr><td>焊接工藝</td><td>再流焊</td><td>其他器件的再流焊</td><td>無鉛銲接</td></tr>
<tr><td>焊接類型</td><td>錫銀銅焊料</td><td>錫銀銅焊料</td><td>錫銀銅焊</td></tr>
<tr><td>浸入助焊劑時</td><td>5-10s</td><td>5-10s</td><td>5-10s</td></tr>
<tr><td>浸入錫爐角度</td><td>20˚~45˚</td><td>20˚~45˚</td><td>20˚~45˚</td></tr>
<tr><td>焊料溫度</td><td>245 ±5˚C</td><td>245 ±5˚C</td><td>260 ±5˚C</td></tr>
<tr><td>浸入焊料時間</td><td>5+0/-0.5s</td><td>5+0/-0.5s</td><td>30+5/-0s</td></tr>
<tr><td>浸入和提出速</td><td>25 ±6mm/s</td><td>25 ±6mm/s</td><td>25</td></tr>
</table></td></tr>
<tr><td>Electrical Characterization</td><td>Refer Specification for Approval</td><td>Parametrically test per lot and sample size requirements, summary to show Min, Max, Mean and Standard deviation at room as well as Min and Max operating temperatures.<br>Pre and Post Electrical Test not required</td></tr>
<tr><td>Flammability</td><td>In accordance with Referenced Standards</td><td>UL-94 or IEC 60695-11-5</td></tr>
<tr><td>Board Flex<br>(SMD)</td><td rowspan="2">Appearance：No damage.<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within±15% of initial value and shall not exceed the specification value</td><td>Preconditioning: Run through reflow for 3 times.<br>( IPC/JEDEC J-STD-020F Classification Reflow Profiles)<br>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.<br> 


</td></tr>
<tr><td>Terminal Strength(SMD)</td><td>Preconditioning: Run through reflow for 3 times.<br>( IPC/JEDEC J-STD-020E Classification Reflow Profiles)<br>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.<br> 
</td></tr>
</table>

# 8. Soldering and Mounting

### 8-1. Recommended PC Board Pattern

| Chip size | | | | | | | Land Patterns For Reflow Soldering | | |
|---|---|---|---|---|---|---|---|---|---|
| Series | Type | A(mm) | B(mm) | C(mm) | D(mm) | E(mm) | L(mm) | G(mm) | H(mm) |
| PAS | 3225 | 3.60max | 2.80max | 2.60max | 0.80 ref. | 0.55±0.1 | 3.82 | 1.78 | 2.80 |




### 8-2. 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:

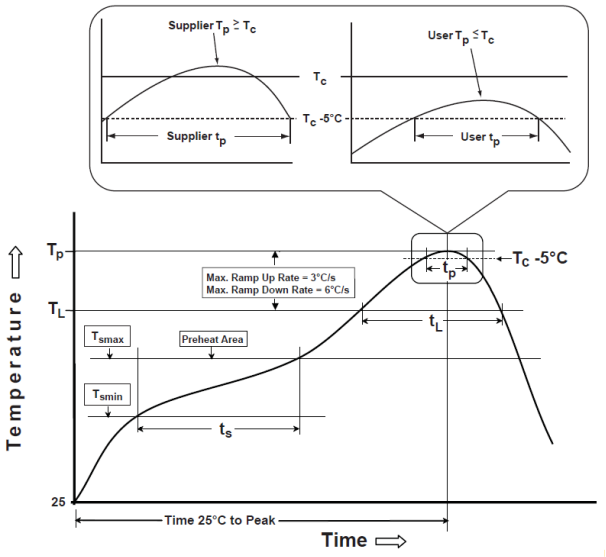
Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020E)

### 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.)

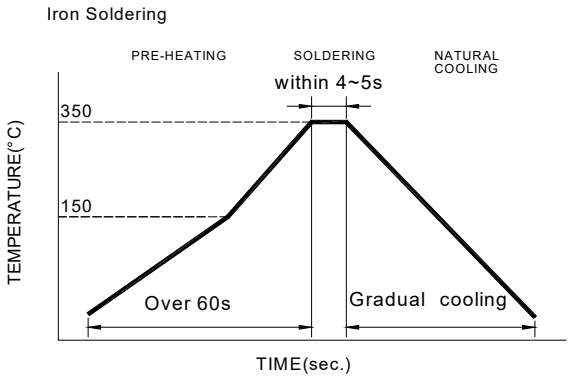
- Preheat circuit and products to 150℃
- 350℃ tip temperature (max)
- Never contact the ceramic with the iron tip
- 1.0mm tip diameter (max)
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- Limit soldering time to 4~5sec.

Fig.1 Soldering Reflow




Reflow times: 3 times max

Fig.2 Iron soldering temperature profiles




Iron Soldering times：1 times max

**Table (1.1): Reflow Profiles**

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

**Tp**: maximum peak package body temperature, **Tc**: the classification temperature.

For user (customer) **Tp** should be equal to or less than **Tc.**

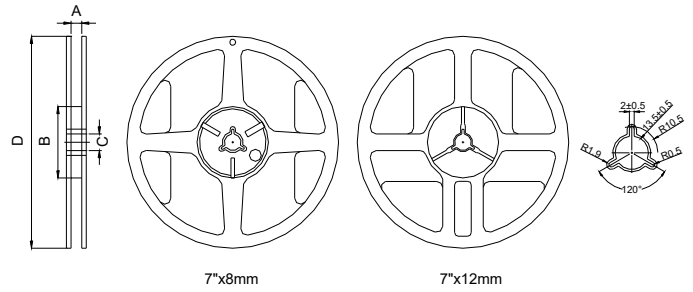
**Table (1.2) Package Thickness/Volume and Classification Temperature ($T_c$)**

| | Package Thickness | Volume $mm^3$ <350 | Volume $mm^3$ 350-2000 | Volume $mm^3$ >2000 |
|---|---|---|---|---|
| PB-Free Assembly | <1.6mm | 260℃ | 260℃ | 260℃ |
| | 1.6-2.5mm | 260℃ | 250℃ | 245℃ |
| | ≥2.5mm | 250℃ | 245℃ | 245℃ |

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

# 9. Packaging Information

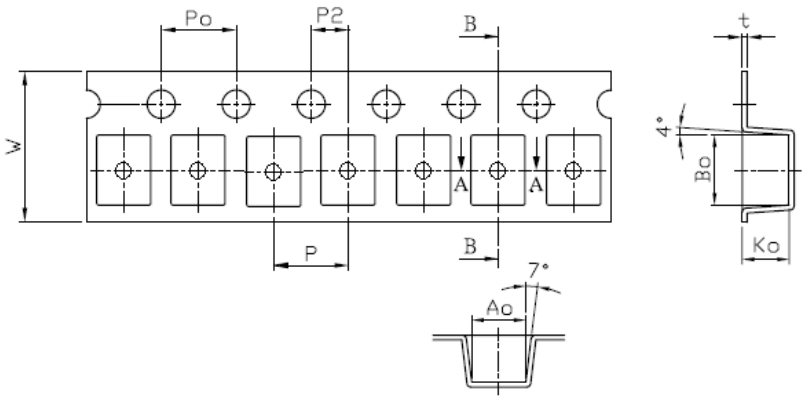
### 9-1. Reel Dimension




7"x8mm 7"x12mm

| 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

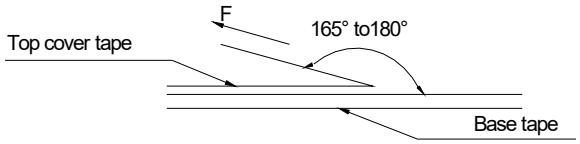



| Series | P(mm) | Po(mm) | P2(mm) | Bo(mm) | Ao(mm) | Ko(mm) | W(mm) | t(mm) |
|---|---|---|---|---|---|---|---|---|
| PAS | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 3.72±0.10 | 2.88±0.10 | 2.50±0.10 | 8.00±0.10 | 0.26±0.05 |

### 9-3. Packaging Quantity

| PAS | 3225 |
|---|---|
| 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. (℃) | 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-020F standard-MSL, level 1.
  2. Temperature and humidity conditions: Less than 40℃ 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.