Serial No. : 2017-0417
DATE : 2017/05/12

Shanghai Winson Electronics Co., LTD.

ITEM : CRYSTAL OSCILLATOR

| | |
|---|---|
| TYPE : | DSA321SDN |
| NOMINAL FREQUENCY : | 16.320MHz |
| SPEC No. : | 1XTV16320MAA |

If there is a change in this specifications, the specification number may be changed.

| RECEIPT | |
|---|---|
| DATE | |
| RECEIVED | (signature)<br>(name) |

General Manufacturer of Quartz Devices
DAISHINKU CORP.
1389 Shinzaike, Hiraoka-cho, Kakogawa, Hyogo
675-0194 Japan
Phone (81)79-425-3141 Fax (81)79-425-1134
http://www.kds.info/index_en.htm

C.ENG.

ENG. E. Kameda

1. Device Name VC-TCXO
2. Model Name DSA321SDN
3. Nominal Frequency 16.320 MHz
4. Mass 0.03g max.

5. Absolute Maximum Ratings

| | Item | Symbol | Rating | unit |
|---|---|---|---|---|
| 1 | Supply Voltage | $V_{CC}$ | -0.3~+4.6 | V |
| 2 | Storage Temperature Range | $T_{_STG}$ | -40~+85 | °C |

6. Recommended Operating Conditions

| | Item | Symbol | min. | typ. | max. | unit |
|---|---|---|---|---|---|---|
| 1 | Supply Voltage | $V_{CC}$ | +2.85 | +3.0 | +3.15 | V |
| 2 | Load Impedance (resistance part) | $L_{OAD}_R$ | 9 | 10 | 11 | kΩ |
| | (parallel capacitance) | $L_{OAD}_C$ | 9 | 10 | 11 | pF |
| 3 | Control Voltage Range | $V_{CONT}$ | +0.5 | +1.5 | +2.5 | V |
| 4 | Operating Temperature Range | $T_{_OPR}$ | -40 | - | +85 | °C |

7. Electrical Characteristics

($T_A$=-40~+85°C, $L_{OAD}$_R//C=10kΩ//10pF, $V_{CC}$=+3.0V, $V_{CONT}$=+1.5V, unless otherwise noted)

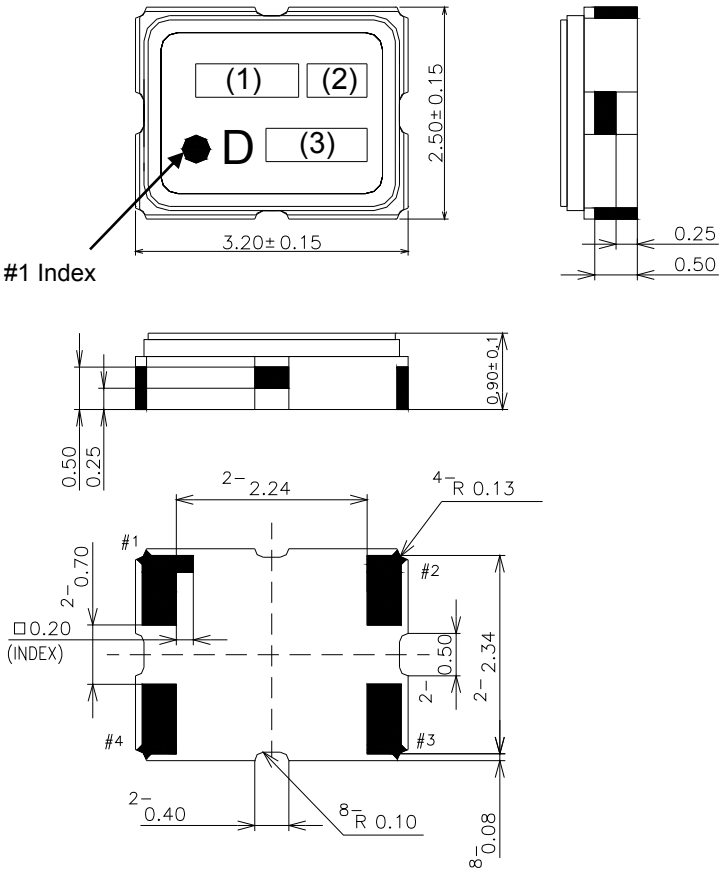
| | Item | Conditions | Limits | | | unit | Notes |
|---|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | | |
| 1 | Current Consumption | | - | - | +1.5 | mA | |
| 2 | Output Level | | 0.8 | - | - | $V_{P-P}$ | 1 |
| 3 | Symmetry | GND level (DC cut) | 40/60 | - | 60/40 | % | |
| 4 | Frequency Stability<br>1.Tolerance | After 2 times reflow<br>Ref. to Nominal Frequency | - | - | ±1.5 | ppm | 2,3 |
| | 2.vs Temperature | $T_A$=-40~+85°C<br>Ref. to Frequency ($T_A$=+25°C) | - | - | ±0.5 | ppm | |
| | 3.vs Supply Voltage | $V_{CC}$=+3.0V±5% | - | - | ±0.2 | ppm | |
| | 4.vs Load Variation | $L_{OAD}$_R//C=(10kΩ//10pF)±10% | - | - | ±0.2 | ppm | |
| | 5.vs Aging | $T_A$=Room ambient | - | - | ±1.0 | ppm/year | |
| 5 | Start Up Time | @90% of final Vout level | - | - | 2.0 | ms | |
| 6 | Frequency Control<br>1.Control Range | $V_{CONT}$=+1.5V±1.0V | ±9 | - | ±15 | ppm | 4 |
| | 2.Input Resistance | | 500 | - | - | kΩ | |
| 7 | SSB Phase Noise | Relative to f0 level offset 1kHz | - | - | -130 | dBc/Hz | |

Notes

1. Clipped sine wave (DC-coupled)
2. $T_A$=+25°C
3. Please leave after reflow in 2h or more at room ambient.
4. Positive slope (Frequency becomes high in proportion to frequency control voltage.)

## 8. Outline, Pin Connections

Outline




Pin Connections

| Pin No. | Connection |
|---|---|
| #1 | $V_{CONT}$ |
| #2 | GND |
| #3 | Output |
| #4 | $V_{CC}$ |

Marking

(1) Frequency 16.32 (MHz, 4digits)

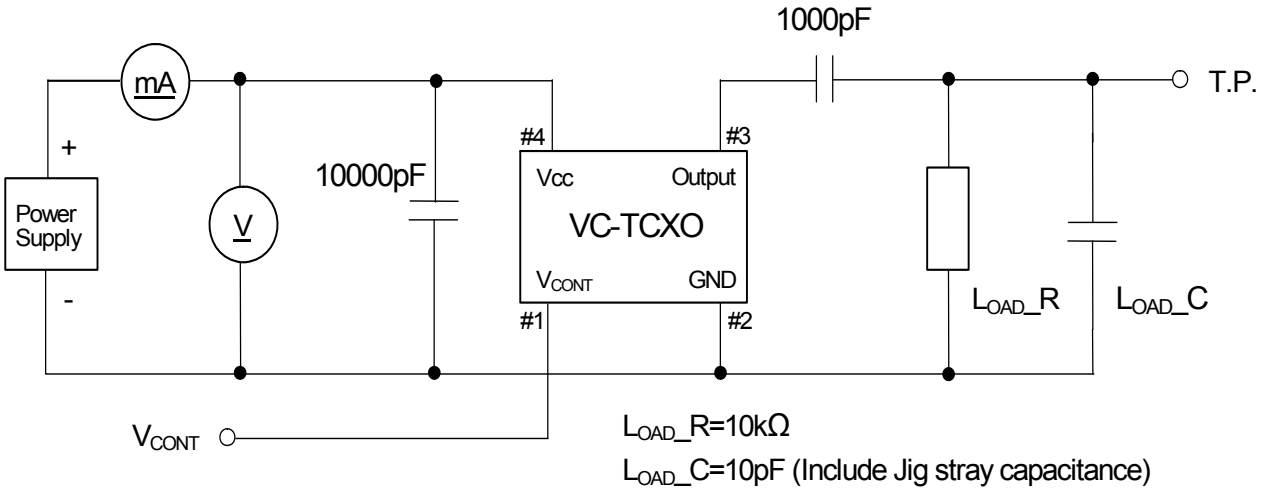
(2) Model code AN

(3) Date code Year (1digit) +Week (2digits)
e.g.2017/01/01→ 701

unit: mm

Dimensional Tolerance: ±0.15
(Unless otherwise noted)

## 9. Measurement Circuit




$L_{OAD}$_R=10kΩ

$L_{OAD}$_C=10pF (Include Jig stray capacitance)

## 10. Mechanical Characteristics

All test is performed after 3times reflow (Clause.13) except 10.10 (Resistance to soldering heat)

| | Item | Description | Requirements |
|---|---|---|---|
| 1 | Drop | Natural drop (On concrete)<br>Mounting on the set or test fixture.(Total weight 100g)<br>Height : 150cm<br>Direction : X,Y,Z, 6directions<br>Test cycle : 3cycles<br>Reference specification : EIAJ-ED-4702A Method5 | df/f=<±1.0ppm |
| 2 | Vibration | Sweep range : 10~500Hz<br>Sweep speed : 11min/cycle<br>Amplitude : 1.5mm (10~55Hz)<br>Acceleration : 200m/s$^2$ (55~500Hz)<br>Direction : X,Y,Z, 3directions<br>Test cycle : 10cycles<br>Reference specification : IEC 60068-2-6 | df/f=<±0.5ppm |
| 3 | Shock | Acceleration : 1000m/s$^2$<br>Direction : X,Y,Z, 6directions<br>Duration : 6ms<br>Test cycle : 3cycles/each directions<br>Reference specification : IEC 60068-2-27 | df/f=<±0.5ppm |
| 4 | PCB bend strength | PWB : t=1.6mm<br>Pressure speed : 1.0mm/s<br>Bend width : 1→2→3mm<br>Duration : 10±1s<br>Reference specification : IEC 60068-2-21 Ue1 | df/f=<±0.5ppm<br>No visible damage.<br>No leak damage. |
| 5 | Adherence nature | PWB : t=1.6mm<br>Direction : X,Y, 2directions<br>Pressure : 10N<br>Duration : 10±1s<br>Reference specification : IEC 60068-2-21 Ue3 | df/f=<±0.5ppm<br>No visible damage.<br>No leak damage. |
| 6 | Package strength | Pressure : 10N<br>Duration : 10±1s<br>Reference specification : IEC 60068-2-77 | df/f=<±0.5ppm<br>No mechanical damage.<br>No leak damage. |
| 7 | Gross leak | It is immersed for 3min into +125±5°C<br>Chlorofluorocarbon (CFCs) liquid.<br>Reference specification : IEC 60068-2-17 | No continuous air bubbles. |
| 8 | Fine leak | It shall be measured by the helium leak detector after pressurization for 60min by the pressure of (3.92±0.49) x10$^5$ Pa in a helium gas atmosphere.<br>Reference specification : IEC 60068-2-17 | Less than 1.0x10$^{-9}$Pa m$^3$/s. |
| 9 | Solderability | Solder bath temperature : +245±5°C<br>Duration : 3±0.3s<br>Reference specification : IEC 60068-2-58 | A new uniform coating of solder shall cover a minimum of 95% of the surface being immersed. |
| 10 | Resistance to soldering heat | 1) Solder iron method<br>Bit size : B(φ3)  Bit temperature : +350±10°C<br>Duration : 3+1/-0s /each terminal<br>It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-20 | df/f=<±0.5ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>No visible damage. |
| | | 2) Reflow<br>In refer to temperature profile shown in clause13.<br>Test cycle : 3cycles<br>It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-58 | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>No visible damage. |

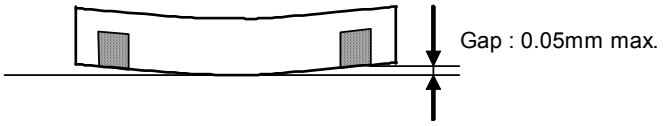
## 11. Environmental Characteristics

All test is performed after 3times reflow (Clause13)

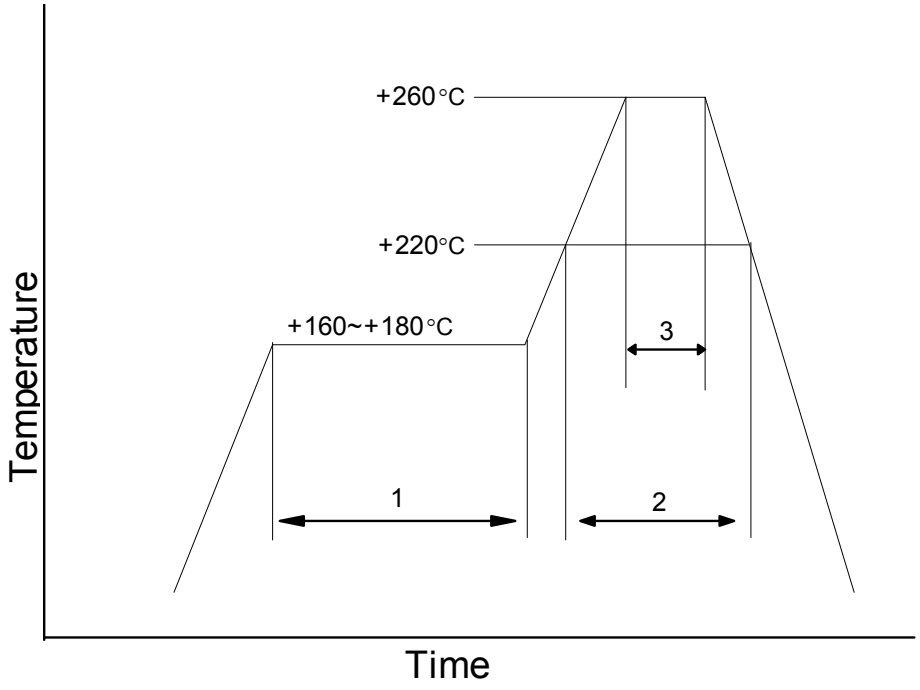
| | Item | Description | Requirements |
|---|---|---|---|
| 1 | Low temperature storage | Temperature : -40±3°C<br>Duration : 1000h<br>It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-1 Ab | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>The electrical characteristics are satisfied. |
| 2 | High temperature storage | Temperature : +85±2°C<br>Duration : 1000h<br>It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-2 Bb | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>The electrical characteristics are satisfied. |
| 3 | Humidity | Temperature : +85±2°C<br>R.H. 85±5%<br>Duration : 1000h<br>It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-3 | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>The electrical characteristics are satisfied. |
| 4 | HTB | Temperature : +85±2°C<br>Duration : 1000h<br>BIAS : Max value of supply voltage<br>It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-2 Bb | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>The electrical characteristics are satisfied. |
| 5 | THB | Temperature : +40±2°C<br>R.H. 90~95%<br>Duration : 1000h<br>BIAS : Max value of supply voltage<br>It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-3 | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>The electrical characteristics are satisfied. |
| 6 | Thermal shock | Thermal shock : -40±3°C : 0.5h ⇔ +85±2°C : 0.5h<br>Test cycle : 200cycles<br>Shift time : 2~3min<br>It shall be measured after 2h at room temperature, humidity. Reference specification : IEC pub.68-2-14.Na | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>The electrical characteristics are satisfied. |
| 7 | ESD | Model : Machine Model (MM)<br>V=±200V (C=200pF, R=0Ω)<br>Number of times : 3times<br>Each terminal except common terminal.<br>(Connect to test terminal)<br>Reference specification : EIA/JESD22-A115 | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>The electrical characteristics are satisfied. |
| | | Model : Human Body Model (HBM)<br>V=±1500V (C=100pF, R=1500Ω)<br>Number of times : 3times<br>Each terminal except common terminal.<br>(Connect to test terminal)<br>Reference specification : EIA/JESD22-A114 | df/f=<±1.0ppm<br>$dV_{OUT}$=<±0.2$V_{P-P}$<br>The electrical characteristics are satisfied. |

## 12. Flatness of Terminal

When the component is placed on the flat surface, the gap from the connecting terminal shall not exceed 0.05 mm.




## 13. Reflow Profile

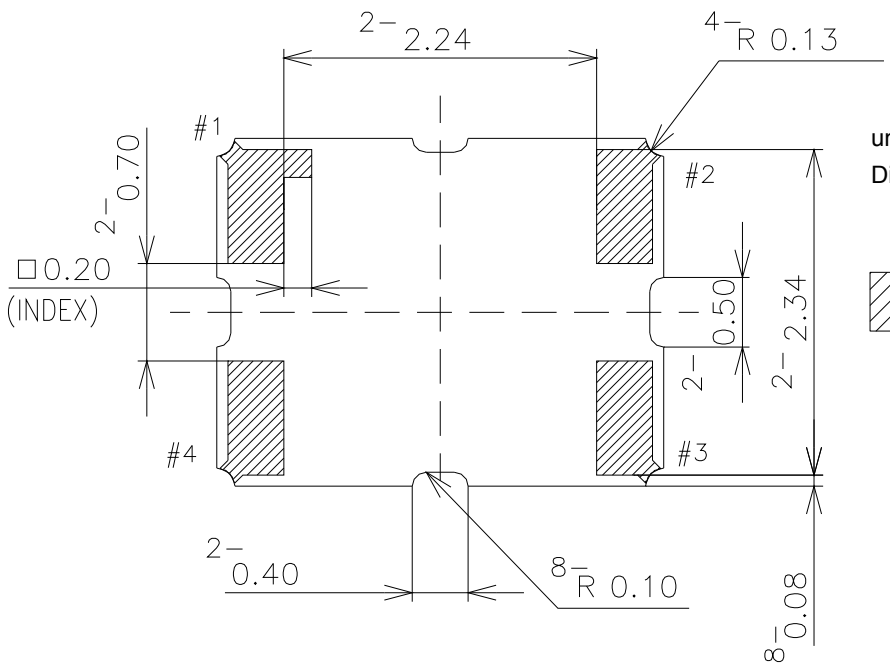



| | | |
|---|---|---|
| 1 | Preheat | +160~+180°C 120s |
| 2 | Primary Heat | +220°C 60s |
| 3 | Peak | +260°C 10s max. |

## 14. Terminals / Land Pattern Layout / Metal Mask Hole

### 14.1 Terminals

A through hole is not located on the bottom (mounting side).

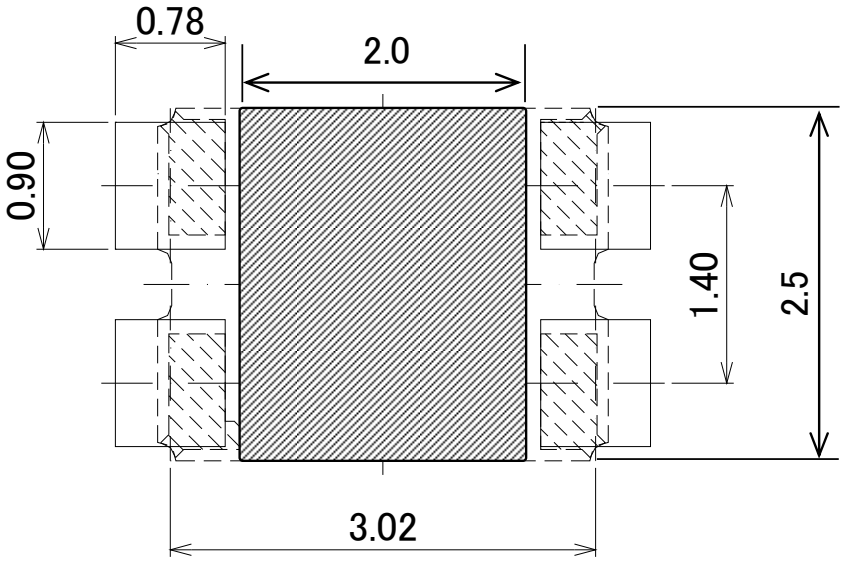



unit: mm
Dimensional Tolerance: ±0.15mm

Mounting Terminal

### 14.2 Land Pattern Layout / Metal Mask Hole

Please do not place any conductor pattern in the area of the TCXO bottom as shown in FIG.
When placing conductor patterns in the substrate inner layer, please keep away it from the bottom of the TCXO at least 0.5mm or more.




unit: mm
Dimensional Tolerance: ±0.15mm

# 15. Packing Condition

## 15.1 Taping package

(1) Emboss tape format and dimensions
See Fig.1

(2) Quantity on reel
2000pcs. max. / reel

(3) Taping specification
See Fig.2
No lack of a product.

(4) Reel specification
See Fig.3

(5) Taping material list
See right table.

| Taping material List |
|---|
| Cover Tape : PET + Olefin Resin (Conductivity) |
| Emboss : PS (Conductivity) |
| Reel : PS (Conductivity) |

## 15.2 Packing

The products packed in the antistatic bag.
*Moisture sensitivity level : IPC/JEDEC Standard J-STD-033 / Level 1
No dry pack required and baking after re-storage is unnecessary.

## 15.3 Packing box

Max 10 reels/packing box. However, in the case of less than 10 reels, It is contained by any boxes.
The space in a box is fill up with a cushion.

## 15.4 Label detail

A Lot label is put on a reel and a shipping label and Pb-Free label is put on a packing box.

Lot label

| | |
|---|---|
| TYPE | (Model Name) |
| SPEC NO. | (Spec. Number) |
| PARTS NO. | (User's Parts Number) |
| LOT NO. | (Lot Number) |
| FREQ. | (Nominal Frequency) |
| Q'TY | (Quantity) |
| KDS | DAISHINKU CORP. |

Shipping label

| | |
|---|---|
| ITEM | (Model Name) |
| SPEC | (Spec. Number) |
| DELIVERY DATE | (Delivery Date) |
| Q'TY | (Quantity) |
| NOTES | (User's Parts Number) |
| DAISHINKU CORP. | |

Pb-free Label




Lot label (Example)

| | |
|---|---|
| TYPE | XXXXXXXX |
| SPEC NO. | XXXXXXXXXXX |
| PARTS NO. | XXXXXXXXXXX |
| LOT NO. | XXXXXXXXX |
| FREQ | XX.XXX MHz |
| Q'TY | 2000pcs. |
| KDS | Made in Japan |

Formation of a lot number

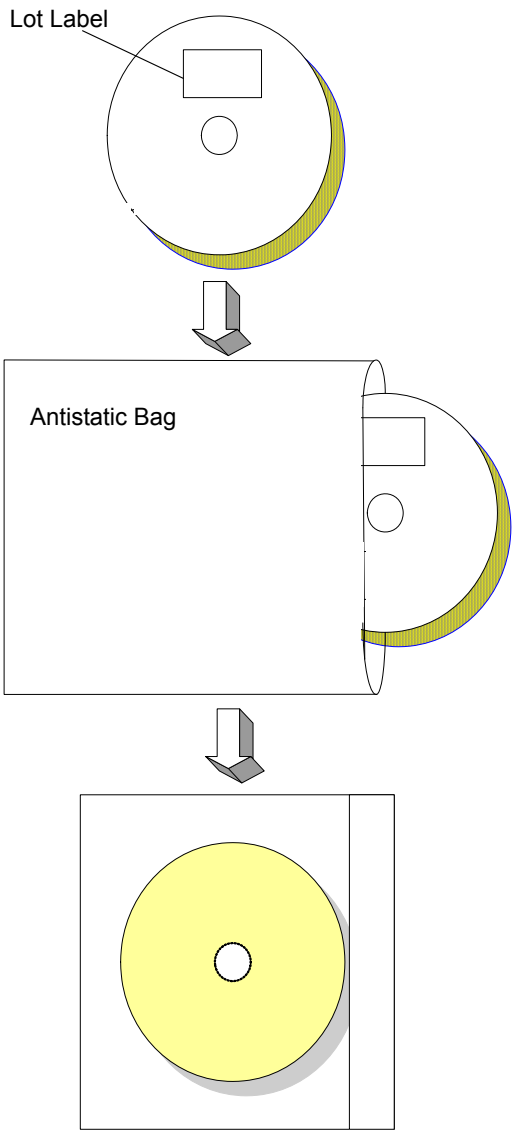
e.g. AH7101001

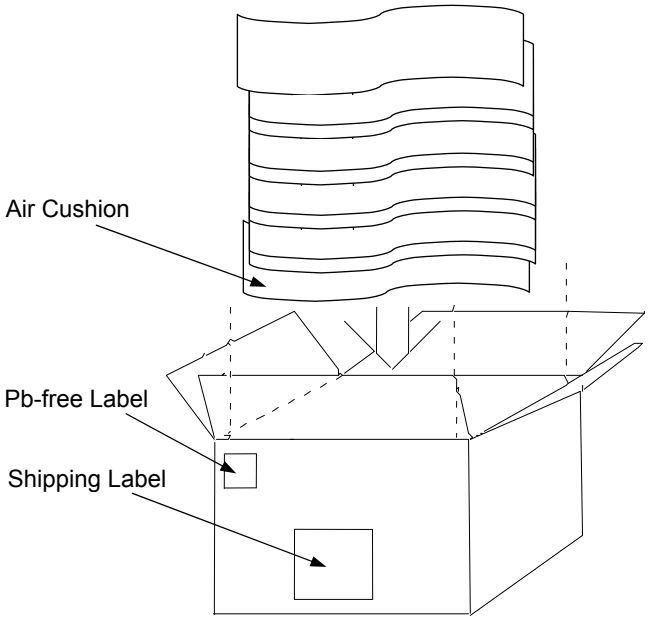
| A | H | 7101 | 001 |
|---|---|---|---|
| Manufacturing site code | Product code | year/ month/ day | Serial No. |

The notation method of a manufacture year, month, and day. (4digits alphanumeric character)

| | | |
|---|---|---|
| YMDD | (4digits) | e.g.) 2017 /01 /01→ 7101 |
| Y | Year | 1digit (Last digit of Year) |
| M | Month | 1digit alphanumeric symbol |
| DD | Day | 2digits numerical characters of day |

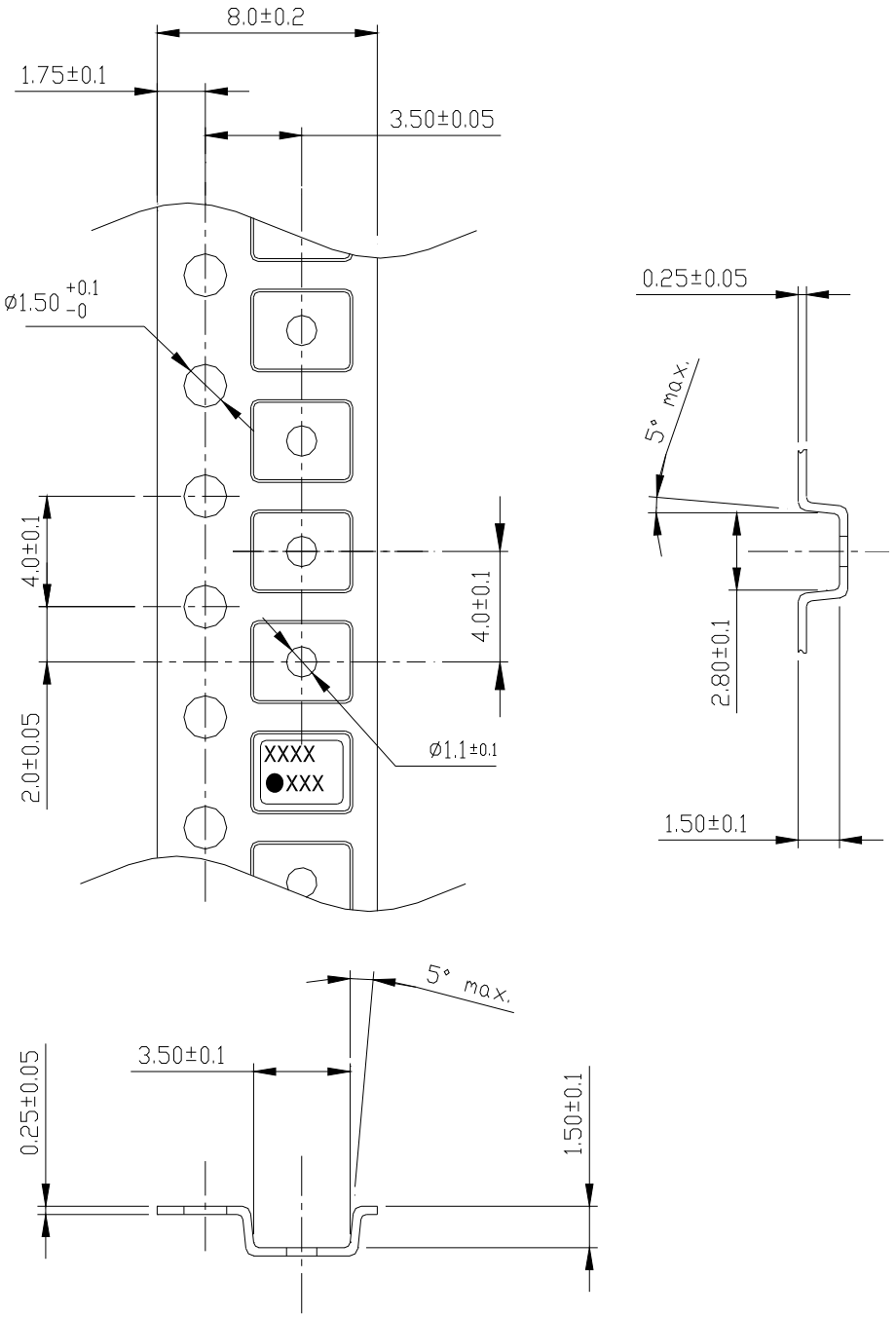
| Month | Jan. | Feb. | Mar. | Apr. | May. | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |




The product is packed up with the method which does not break in the handling by a shipping agent.

| TITLE<br>DSA321SDN TYPE SPECIFICATION | Remark | | |
|---|---|---|---|
| Date<br>2017/05/12 | Spec. No.<br>1XTV16320MAA | Rev.<br>- | Page<br>8/13 |




1. Clearance of an embossing tape, and a product unit: mm

| Direction | Pocket size | TCXO size | Clearance |
|---|---|---|---|
| L | 3.5±0.1 | 3.2±0.15 | 0.3±0.25 |
| W | 2.8±0.1 | 2.5±0.15 | 0.3±0.25 |
| H | 1.5±0.1 | 1.0 max. | 0.5 min. |

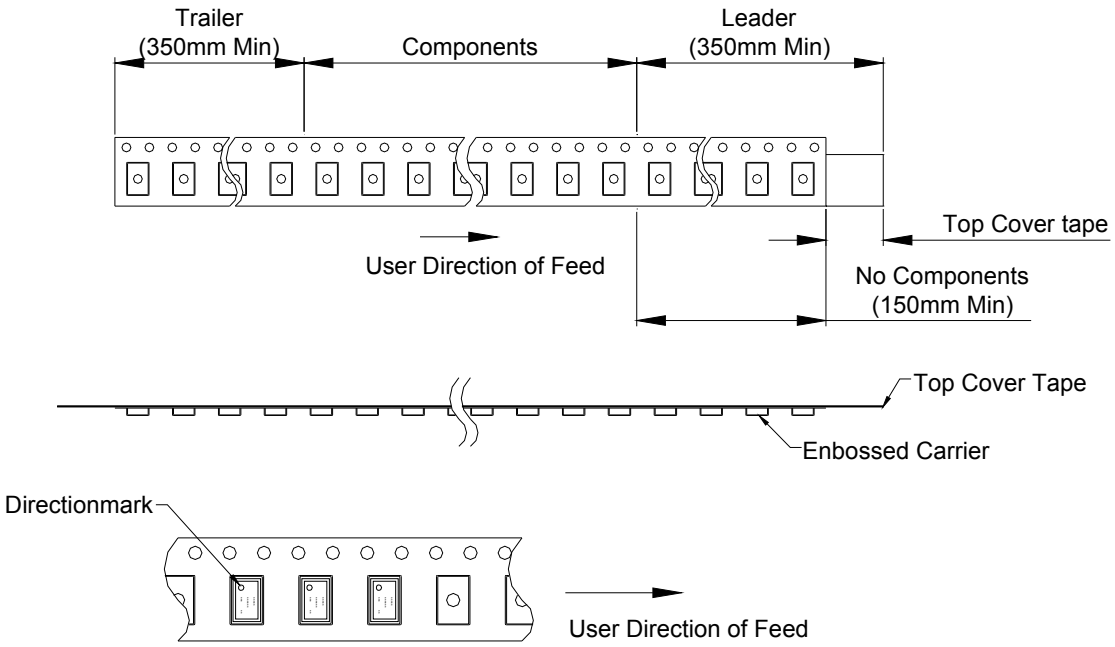
2. Quality : Polystyrene(Conductivity)

3. Tensile strength of an embossing tape : more than 14N

unit: mm

Fig.1. Emboss tape format and dimensions

| TITLE | Remark | | |
|---|---|---|---|
| DSA321SDN TYPE SPECIFICATION | | | |
| Date | Spec. No. | Rev. | Page |
| 2017/05/12 | 1XTV16320MAA | - | 9/13 |




When a tape end is taken out to the front, sprocket holes becomes right hand side.

Peel strength

Pulling angle 165~180°, pulling speed at 300mm/min, strength should be 0.2~0.7N.

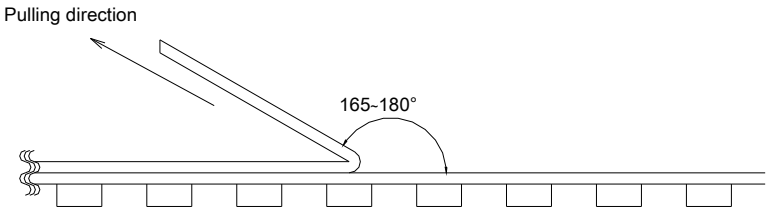
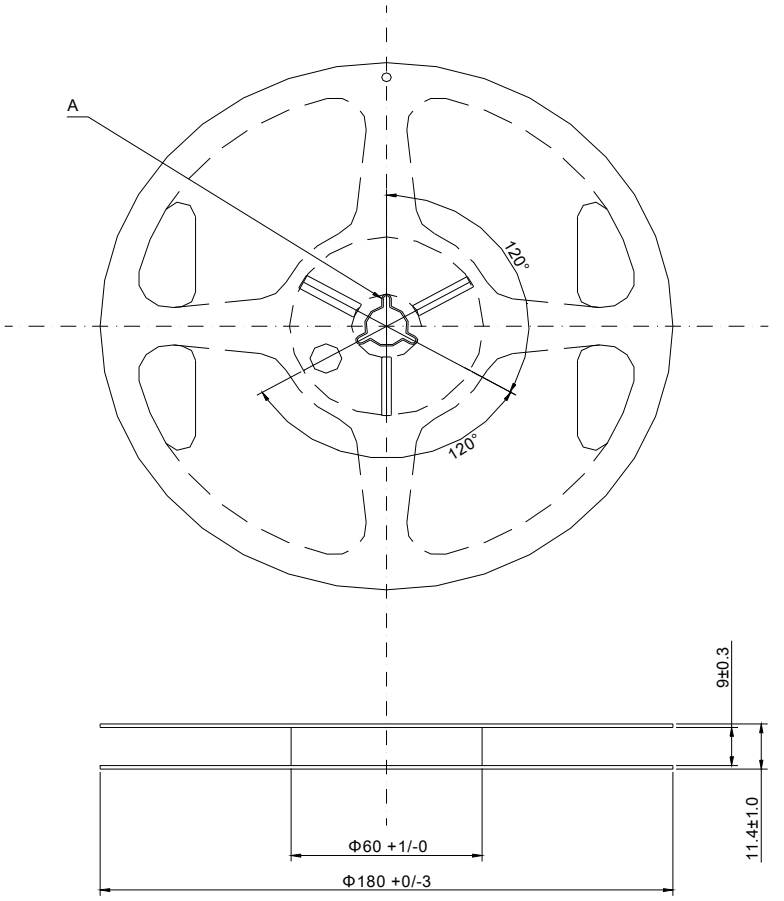



Fig.2. Taping specification




Material:Polystyrene (Conductivity)
unit:mm

Section A

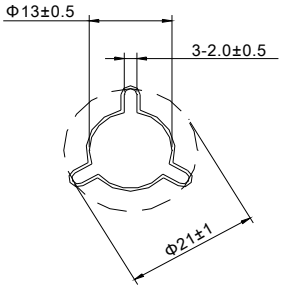



Fig.3. Reel specification

| TITLE<br>DSA321SDN TYPE SPECIFICATION | Remark | | |
|---|---|---|---|
| Date<br>2017/05/12 | Spec. No.<br>1XTV16320MAA | Rev.<br>- | Page<br>11/13 |

## 16. Notes on mounting and handling

16.1 Storage environment

(1) The temperature and humidity of a storage place, Please give +5~+40°C and 40~85% as a standard.

(2) Please use this product within one year from the packing label date of issue.

(3) Please avoid the place which generates corrosive gas, and the place with much dirt.

(4) Please keep it in a place with little temperature change.

Dew condensation arises owing to a rapid temperature change and solderability becomes bad.

16.2 Be cautions to static electricity and high voltage.

16.3 This product has sufficient durability to fall and vibration. However, conditions may change to the fall after mounting to a PWB, and vibration. When you should drop on a floor the PWB which mounted the product or too much shock is added. Please use after a performance check.

16.4 Please check that the curvature of the substrate at the time of substrate cutting does not affect product. Moreover, especially when a product is near the position of a PWB guide pin, and the position of PWB break, be careful.

16.5 The part concerned does not correspond to washing.

16.6 Please repair at +260°C in 10s with hot air or +350°C in 5s with solder Iron.

## 17. Mandatory control

17.1 Ozone-depleting substance

It regulates by the U.S. air purifying method (November, 1990 establishment). ODS of CLASS1 and CLASS2 is not contained or used.

17.2 PBDE, PBBs

PBDE, PBBs are not contained into all the material currently used for this product.

17.3 RoHS

Following material restricted by RoHS (2011/65/EU) is not included or used. Lead, mercury, cadmium, hexavalent , chromium ,PBB and PBDE.

17.4 Law Concerning Examination and Regulation of Manufacture, etc. of Chemical Substances

All the material currently used for this product is based on "Law Concerning Examination and Regulation of Manufacture, etc. of Chemical Substances". It is a registered material.

17.5 Lead

Leads, such as solder, are not used for this product. (Lead Free)

17.6 About the existence of silver and mercury use

The silver of very small quantity is contained in the conductive adhesives used for adhesion of Blank.
Moreover, mercury is used. It does not get down.

## 18. The country of origin / factory name / address

Country of origin: Japan

Factory name: DAISHINKU Corp. Tottori Production Div.

Address: 7-3-21 Wakabadai minami, Tottori 689-1112

# 2017-0417 REVERSION RECORD

| Rev. No. | Date | Reason | Contents | Approved | Checked | Drawn |
|---|---|---|---|---|---|---|
| - | 2017/05/12 | - | Initial Release | T.Soga | T.Soga | E.Kameda |
| | | | | | | |
| | | | | | | |
| | | | | | |