

**HONHEVER(HK)LIMITED****SPECIFICATION**Product Name **CRYSTAL OSCILLATOR**Type **DSA321SDN**Nominal Frequency **19.200MHz**Spec No. **7DD01920A07**

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

RECEIPT	
DATE	
RECEIVED	(signature) (name)

**General Manufacturer of Quartz Devices****DAISHINKU CORP.**1389 Shinzaike, Hiraoka-cho, Kakogawa, Hyogo  
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[http://www.kds.info/index\\_en.htm](http://www.kds.info/index_en.htm)C.ENG. *T. Hanaki*ENG. *E.Kameda*

1. Device Name VC-TCXO
2. Model Name DSA321SDN
3. Nominal Frequency 19.200 MHz
4. Mass 0.03g max.

## 5. Absolute Maximum Ratings

	Item	Symbol	Rating	unit
1	Supply voltage	V <sub>CC</sub>	-0.3~+4.6	V
2	Storage temperature range	T <sub>STG</sub>	-40~+85	°C

## 6. Recommended Operating Conditions

	Item	Symbol	min.	typ.	max.	unit
1	Supply voltage	V <sub>CC</sub>	+2.97	+3.3	+3.63	V
2	Load impedance (resistance part) (parallel capacitance)	LOAD_R	9	10	11	kΩ
		LOAD_C	9	10	11	pF
3	Control voltage range	V <sub>CONT</sub>	+0.5	+1.5	+2.5	V
4	Operating temperature range	T <sub>OPR</sub>	-40	-	+85	°C

## 7. Electrical Characteristics

(T<sub>A</sub>=-40~+85°C, LOAD\_R//C=10kΩ//10pF, V<sub>CC</sub>=+3.3V, V<sub>CONT</sub>=+1.5V, unless otherwise noted)

	Item	Conditions	Limits			unit	Notes
			min.	typ	max.		
1	Current consumption		-	-	+1.5	mA	
2	Output level		0.8	-	1.2	V <sub>P-P</sub>	1
3	Symmetry	GND level (DC cut)	40/60	-	60/40	%	
4	Harmonics	2 <sup>nd</sup> and 3 <sup>rd</sup> Harmonics	-	-	-8	dBc	
		Other Harmonics	-	-	-15	dBc	
5	Frequency stability 1.Tolerance	At shipping Ref. to nominal frequency V <sub>CONT</sub> =+1.5V	-	-	±0.5	ppm	2
		After 2 times reflow Ref. to nominal frequency V <sub>CONT</sub> =+1.5V	-	-	±1.0	ppm	2,3
	2.vs Temperature	T <sub>A</sub> =-40~+85°C (V <sub>CONT</sub> =+1.5V)	-	-	±1.0	ppm	4
		T <sub>A</sub> =-30~+85°C (V <sub>CONT</sub> =+1.5V)	-	-	±0.5	ppm	4
	3.vs Supply voltage	V <sub>CC</sub> =+3.3V±10%	-	-	±0.2	ppm	
4.vs Load variation	LOAD_R//C=(10kΩ//10pF)±10%	-	-	±0.2	ppm		
	5.vs Aging	T <sub>A</sub> =Room ambient	-	-	±3.0	ppm/10years	
6	Start up time	@90% of final V <sub>OUT</sub> level	-	-	2.0	ms	
		Within ±0.5ppm of final frequency	-	-	2.0	ms	
7	Frequency control 1.Control range	V <sub>CONT</sub> =+1.5±1.0V	±3	-	±5	ppm	5
		2.Input resistance	500	-	-	kΩ	
8	SSB phase noise	Relative to f <sub>0</sub> level offset 100Hz	-	-	-110	dBc/Hz	
		Relative to f <sub>0</sub> level offset 1kHz	-	-	-130	dBc/Hz	
		Relative to f <sub>0</sub> level offset 10kHz	-	-	-140	dBc/Hz	
		Relative to f <sub>0</sub> level offset 100kHz	-	-	-145	dBc/Hz	

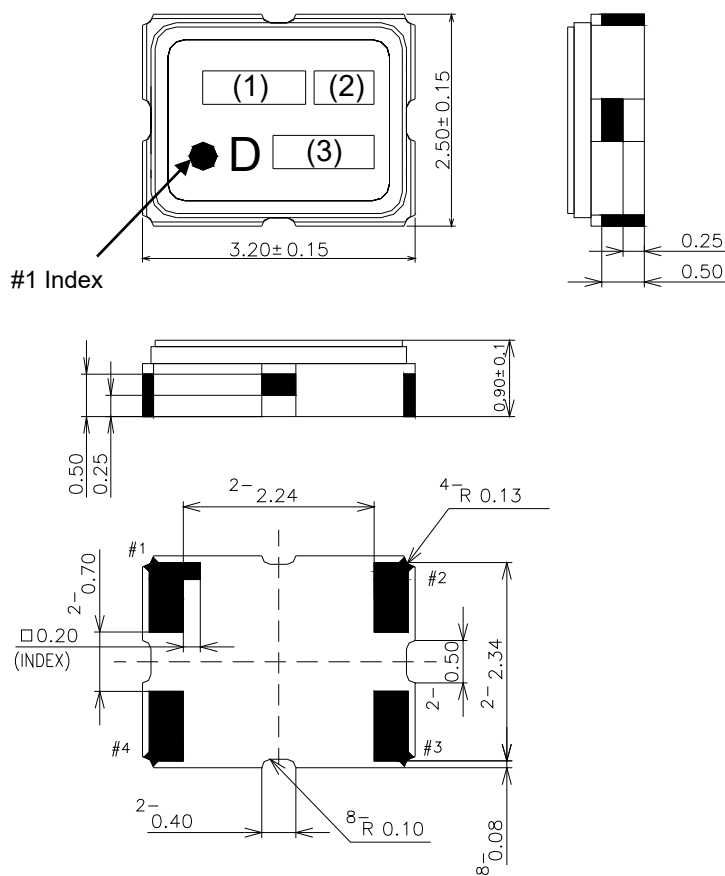
## Notes

1. Clipped sine wave (DC-coupled)
2. T<sub>A</sub>=+25°C
3. Please leave after reflow in 2h or more at room ambient.
4. Ref.to frequency (T<sub>A</sub>=+25°C)
5. Positive slope (Frequency becomes high in proportion to frequency control voltage.)

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### 8. Outline, Pin Connections

#### Outline



#### Pin Connections

Pin No.	Connection
#1	V <sub>CONT</sub>
#2	GND
#3	Output
#4	V <sub>CC</sub>

#### Marking

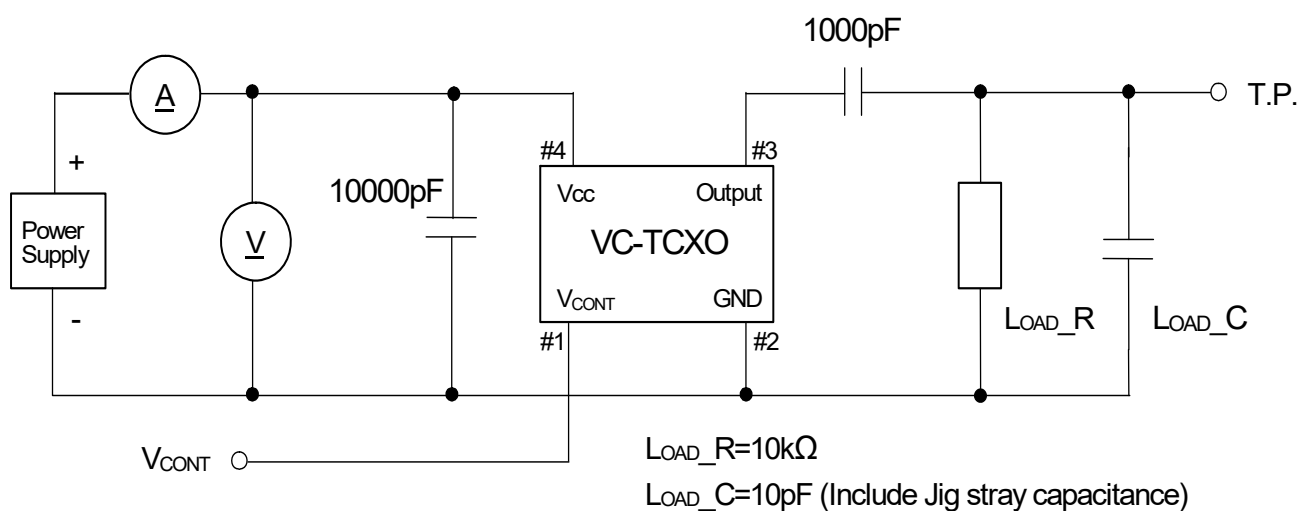
- (1) Frequency 19.20 (MHz, 4digits)
- (2) Model code AN
- (3) Date code Year (1digit) +Week (2digits)  
e.g.2020/01/01 → 001

unit: mm

Dimensional Tolerance: ±0.15

(Unless otherwise noted)

### 9. Measurement Circuit



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## 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) 1.6mm thick FR-4 board mounting on set or test fixture.(Aluminum material weight 100g) Height : 150cm Test cycle : 10cycles Direction : X,Y,Z,6directions Reference specification EIAJ-ED-4702C Method 5	df/f=<±1.0ppm
2	Vibration	Sweep range : 10~2000Hz Sweep speed : 20min/cycle Amplitude : 1.5mm (10~55Hz) Acceleration : 200m/s <sup>2</sup> (55~2000Hz) Direction : X,Y,Z,3directions Test time : each 2h Reference specification IEC 60068-2-6	df/f=<±0.5ppm
3	Shock	Acceleration : 1000m/s <sup>2</sup> Direction : X,Y,Z,6directions Duration : 6ms Test cycle : 10times/each direction Reference specification IEC 60068-2-27	df/f=<±0.5ppm
4	PCB bend strength	PWB : t=1.6mm Pressure Jig Tip : R5 PCB holding distance : 90mm Pressure speed : 1.0mm/s Bend width : 3mm Duration : 5±1s Reference specification IEC 60068-2-21 Ue1	df/f=<±0.5ppm No visible damage. No leak damage.
5	Adherence nature	PWB : t=1.6mm Pressure Jig Tip : R0.5 Direction : X,Y, 2directions Pressure : 10N Duration : 10±1s Reference specification IEC 60068-2-21 Ue3	df/f=<±0.5ppm No visible damage. No leak damage.
6	Package strength	Pressure Jig Tip : R0.5 Product holding distance 1/2 product long side Z axis direction from top of product Pressure : 10N Duration : 10±1s Reference specification IEC 60068-2-77	df/f=<±0.5ppm No mechanical damage. No leak damage.
7	Fine leak	It shall be measured by the He leak detector Reference specification IEC 60068-2-17	Less than 1.0x10 <sup>-9</sup> Pa·m <sup>3</sup> /s.
8	Solderability	Coating ROSIN Flux. Solder bath temperature : +245±5°C Duration : 3±0.5s Reference specification IEC 60068-2-58	A new uniform coating of solder shall cover a minimum of 90% of the surface being immersed.
9	Resistance to soldering heat	Reflow In refer to temperature profile shown in clause 13. Test cycle : 3cycles It shall be measured after 2h at room temperature, humidity. Measurement after 24h or 48h. Reference specification IEC 60068-2-58	df/f=<±1.0ppm dV <sub>OUT</sub> =<±0.2V <sub>P-P</sub> No visible damage.

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## 11. Environmental Characteristics

All test is performed after 3times reflow (Clause13)

	Item	Description	Requirements
1	Low temperature storage	Temperature : $-40\pm 2^{\circ}\text{C}$ Duration : 240h It shall be measured after 2h at room temperature, humidity. Reference specification IEC 60068-2-1 Ab	$df/f < \pm 1.0\text{ppm}$ $dV_{\text{OUT}} < \pm 0.2V_{\text{P-P}}$ The electrical characteristics are satisfied.
2	High temperature storage	Temperature : $+85\pm 2^{\circ}\text{C}$ Duration : 240h It shall be measured after 2h at room temperature, humidity. Reference specification IEC 60068-2-2 Bb	$df/f < \pm 1.0\text{ppm}$ $dV_{\text{OUT}} < \pm 0.2V_{\text{P-P}}$ The electrical characteristics are satisfied.
3	Humidity	Temperature : $+85\pm 2^{\circ}\text{C}$ Humidity : $85\pm 5\%$ R.H. Duration : 240h It shall be measured after 2h at room temperature, humidity. Reference specification IEC 60068-2-78	$df/f < \pm 1.0\text{ppm}$ $dV_{\text{OUT}} < \pm 0.2V_{\text{P-P}}$ The electrical characteristics are satisfied.
4	HTB	Temperature : $+85\pm 2^{\circ}\text{C}$ Duration : 240h BIAS : Max value of supply voltage It shall be measured after 2h at room temperature, humidity. Reference specification IEC 60068-2-2 Bb	$df/f < \pm 1.0\text{ppm}$ $dV_{\text{OUT}} < \pm 0.2V_{\text{P-P}}$ The electrical characteristics are satisfied.
5	THB	Temperature : $+40\pm 2^{\circ}\text{C}$ Humidity : 90~95% R.H. Duration : 240h BIAS : Max value of supply voltage It shall be measured after 2h at room temperature, humidity. Reference specification IEC 60068-2-78	$df/f < \pm 1.0\text{ppm}$ $dV_{\text{OUT}} < \pm 0.2V_{\text{P-P}}$ The electrical characteristics are satisfied.
6	Thermal shock	Thermal shock : $-40^{\circ}\text{C}:30\text{min} \leftrightarrow +85^{\circ}\text{C}:30\text{min}$ Test cycle : 200cycles Shift time : 2~3min It shall be measured after 2h at room temperature, humidity. Reference specification IEC 60068-2-14	$df/f < \pm 1.0\text{ppm}$ $dV_{\text{OUT}} < \pm 0.2V_{\text{P-P}}$ The electrical characteristics are satisfied.
7	ESD	Model : Charge Device Model (CDM) $V = \pm 0.75\text{kV}$ Number of times : 3times Test Terminal : Each terminals Except common terminal (Connect to test terminal) Reference specification EIA/JESD22-C101	$df/f < \pm 1.0\text{ppm}$ $dV_{\text{OUT}} < \pm 0.2V_{\text{P-P}}$ The electrical characteristics are satisfied.
		Model : Human Body Model (HBM) $V = \pm 1.5\text{kV}$ (C=100pF, R=1500 $\Omega$ ) Number of times : 1time Test Terminal : Each terminals Except common terminal. (Connect to test terminal) Reference specification EIA/JESD22-A114	$df/f < \pm 1.0\text{ppm}$ $dV_{\text{OUT}} < \pm 0.2V_{\text{P-P}}$ The electrical characteristics are satisfied.

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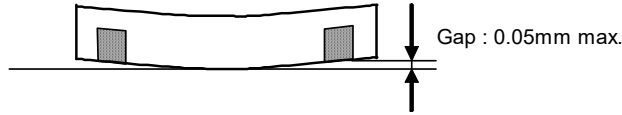
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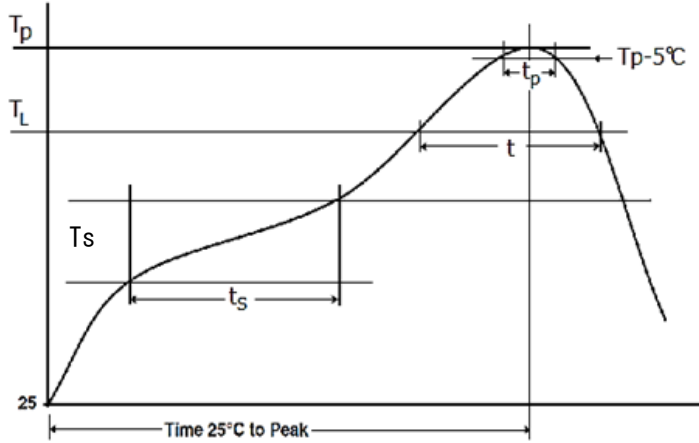
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### 12. Flatness of Terminal

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



### 13. Reflow Profile

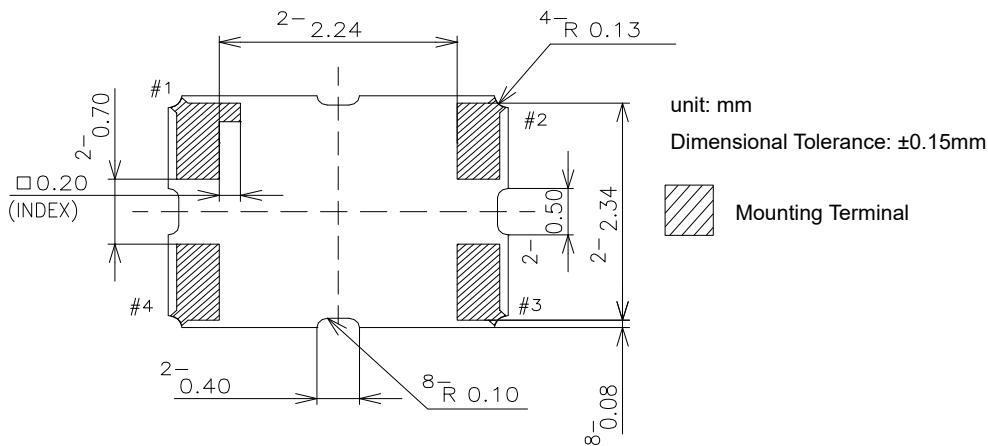


Ts	(°C)	150~200
ts time	(s)	60~120
T <sub>L</sub>	(°C)	217
t time	(s)	60~90
Tp	(°C)	max.260
tp	(s)	max.30

### 14. Terminals / Land Pattern Layout

#### 14.1 Terminals

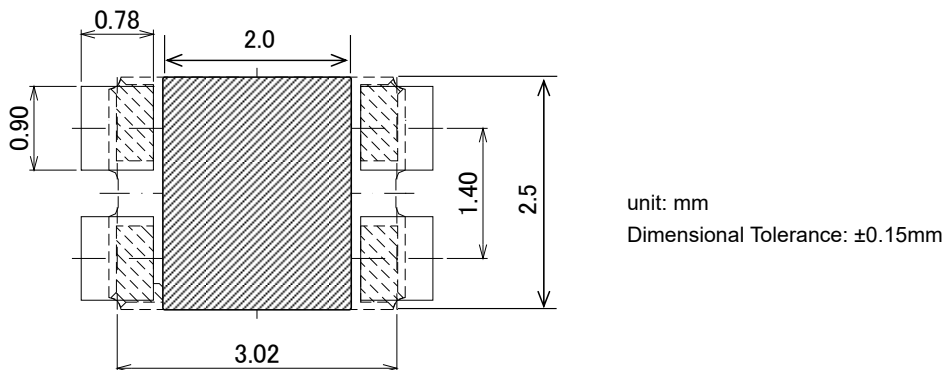
A through hole is not located on the bottom (mounting side).



#### 14.2 Land Pattern Layout

The following land pattern is reference design. The electrical characteristic shall be satisfied with mounting to this land. The land pattern can be changed in the limits to which test land and mounting land are not connected.

And it does not any effect to the electrical characteristics.



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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 / Level1

No dry pack required and baking after re-storage is unnecessary.

15.3 Packing box

Max 10reels/packing box. However, in the case of less than 10reels, It is contained by any boxes.

The space in a box is fill up with cushion.

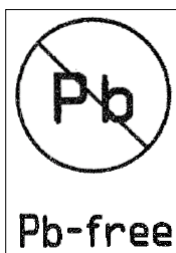
15.4 Label detail

A Lot label is put on a reel, and Indication label and Pb-free label is put on packing box.

Indication label

TYPE	XXXXXXXX
SPEC NO.	XXXXXXXXXXXXXX
PARTS NO.	XXXXXXXXXXXXXX
LOTNO.	XXXXXXXXXX
FREQ.	XX.XXX MHZ
Q'TY	XXXX
CTL NO.	XXXXXXXXXXXXXX
<b>KDS</b>	MADE IN JAPAN

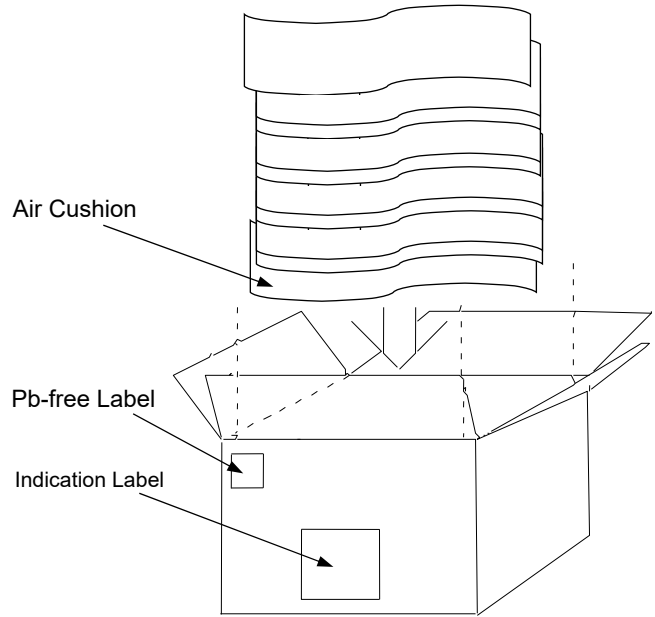
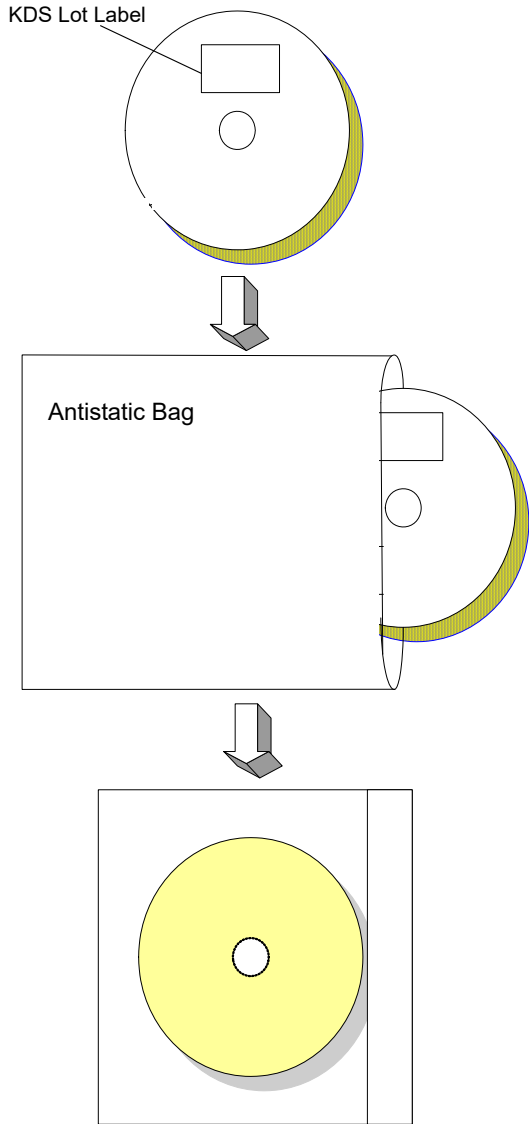
Pb-free Label



KDS Lot label (Example)

TYPE	XXXXXXXX	—	The type of product
SPEC NO.	XXXXXXXXXXXXXX	—	Our specification No.
PARTS NO.	XXXXXXXXXXXXXX	—	Your part No.
LOT NO.	XXXXXXXXXX	—	Lot No.
FREQ.	XX.XXX MHZ	—	Nominal frequency
Q'TY	XXXX	—	Quantity
CTL NO.	XXXXXXXXXXXXXX	—	Control No.
<b>KDS</b>	MADE IN JAPAN	—	Producing country name

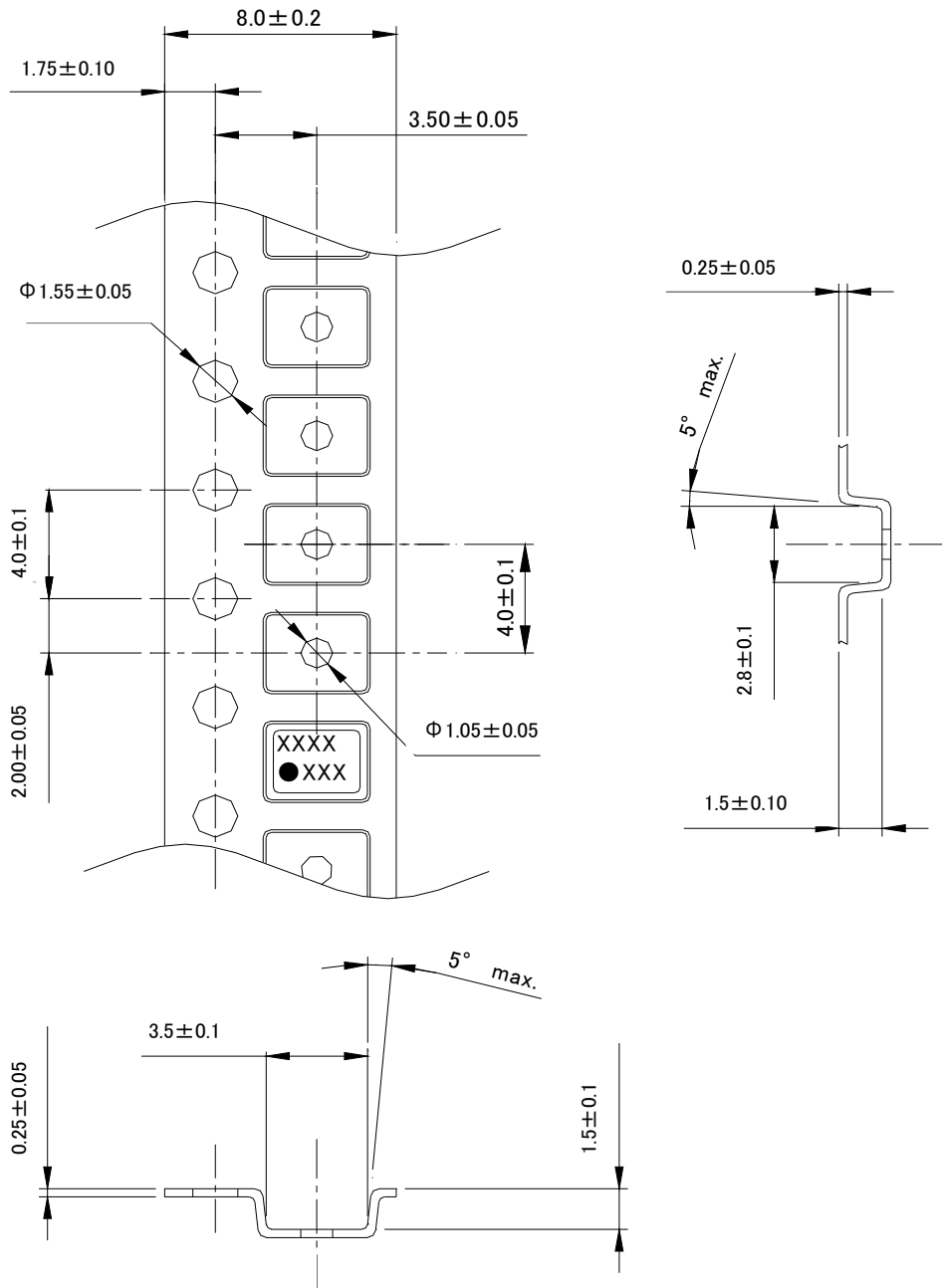
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The product is packed up with the method which does not break in the handling by shipping agent.

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1. Clearance of an embossing tape, and a product

Direction	Pocket size	TCXO size	Clearance
L	3.5±0.1	3.20±0.15	0.3±0.25
W	2.8±0.1	2.50±0.15	0.3±0.25
H	1.5±0.1	0.9±0.1	0.6±0.2

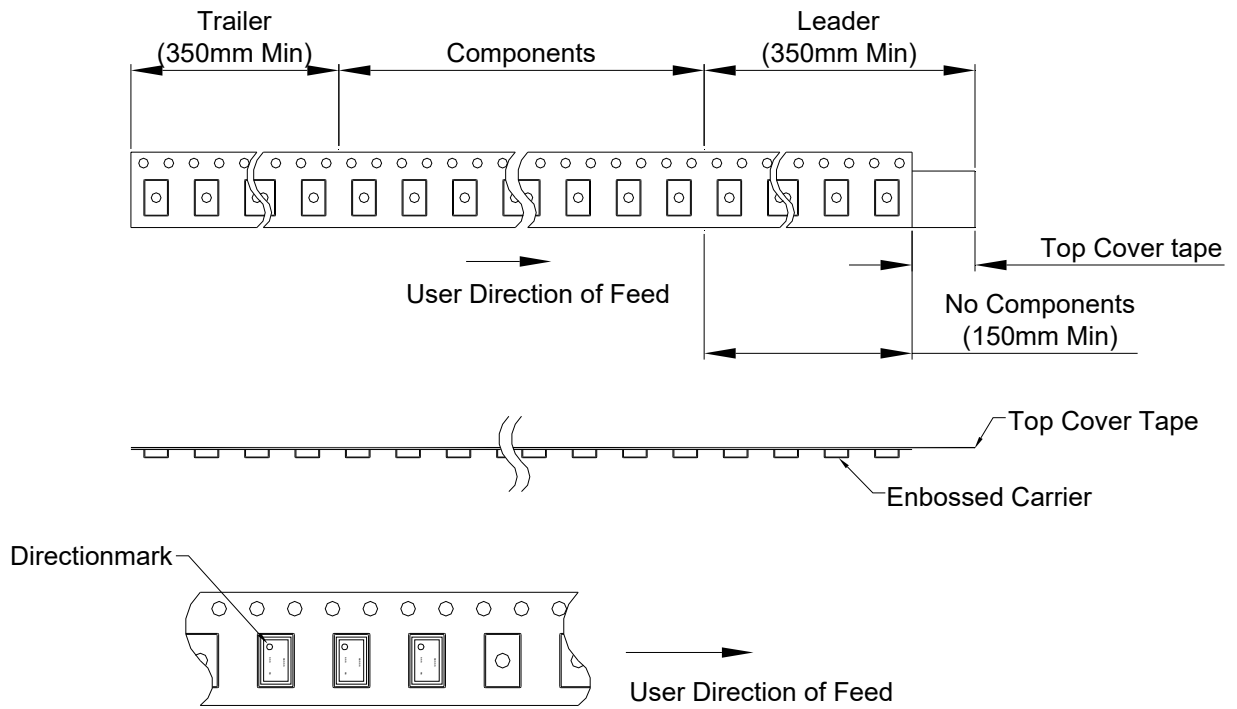
2. Quality : Polystyrene(Conductivity)

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

unit: mm

Fig.1. Emboss tape format and dimensions

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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 0.1~0.7N.

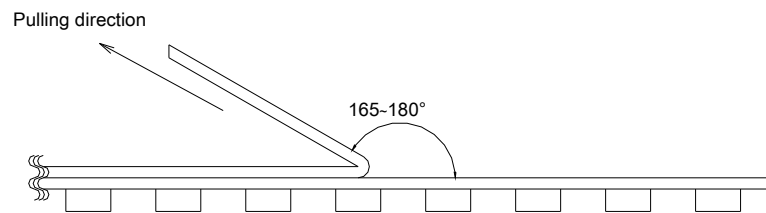
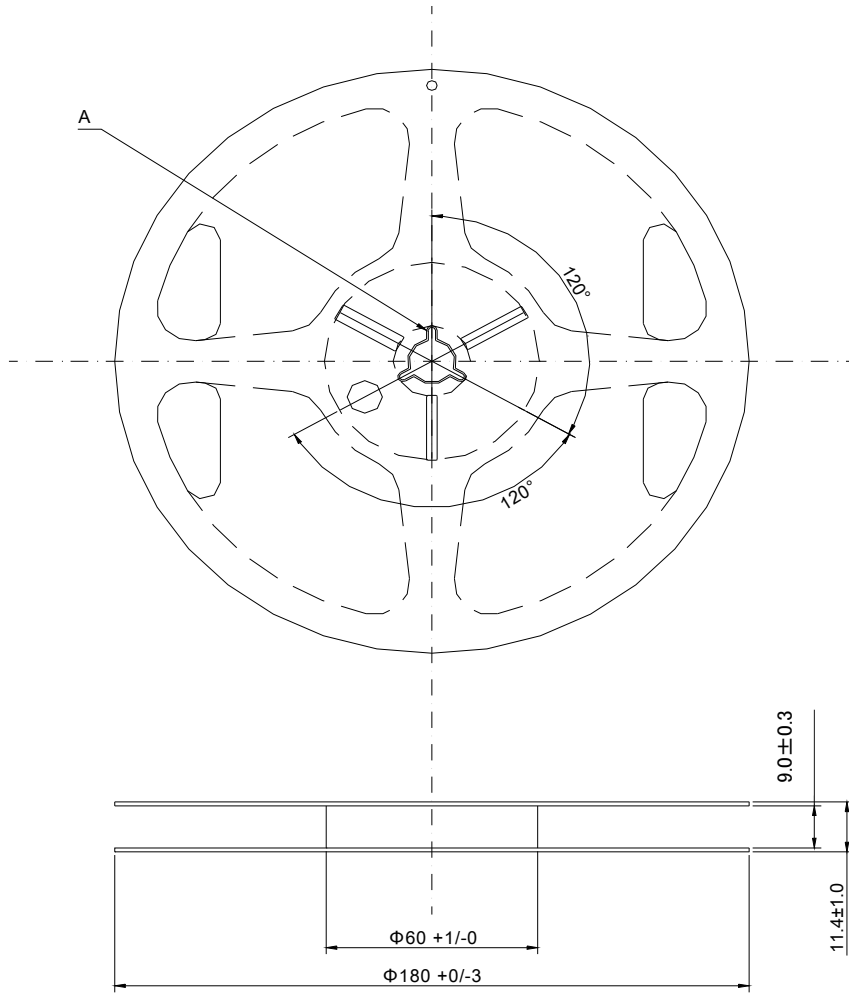


Fig.2. Taping specification

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Material:Polystyrene (Conductivity)  
unit:mm

Section A

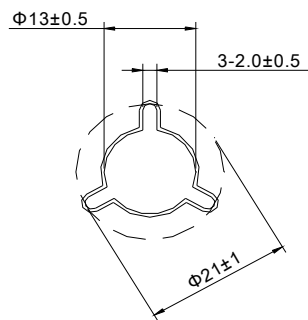


Fig.3. Reel specification

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**16. Notes on mounting and handling****16.1 Storage environment**

- (1) The temperature and humidity of storage place, Please give +5~+40°C and 40~85% R.H. as 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 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 PWB, and vibration. When you should drop on floor the PWB which mounted the product or too much shock is added. Please use after 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 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, (EU) 2015/863) is not included or used.

**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

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### 2020-0036 REVISION RECORD

Rev. No.	Date	Reason	Contents	Approved	Checked	Drawn
-	2020/01/20	-	Initial Release	T.Hanaki	S.Sakamoto	E.Kameda