



Shanghai SiRF Technology Co., Ltd.

ITEM: CRYSTAL OSCILLATOR

TYPE: ..... DSB321SDA .....

NOMINAL FREQUENCY: ..... 16.369 MHz .....

SPEC No. .... 1XTW16369CEB .....

Please acknowledge receipt of this specification by signing and returning a copy to us

<b>RECEIPT</b>	
<b>DATE</b>	
<b>RECEIVED</b>	(signature) (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](http://www.kds.info/index_en.htm)

C.ENG. \_\_\_\_\_

ENG. \_\_\_\_\_

1. Device Name TCXO
2. Model Name DSB321SDA
3. Nominal Frequency 16.369 MHz
4. Mass 0.03g max.
5. Absolute Maximum Value

	Item	Symbol	Rating	Unit
1	Supply Voltage	V <sub>CC</sub>	-0.3 ~ +6.0	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>	+2.66	+2.80	+3.00	V
2	Load Impedance (resistance part) (parallel capacitance)	Z <sub>LR</sub>	9	10	11	kΩ
		Z <sub>LC</sub>	9	10	11	pF
3	Operable Temperature Range	T <sub>A</sub>	-30	-	+85	°C

## 7. Electrical Characteristics

(T<sub>A</sub> = -30 ~ +85 °C, Load=10kΩ//10pF, V<sub>CC</sub>=+2.8V, unless otherwise noted)

	Item	Conditions	Limits			Unit	Notes
			min.	typ	max.		
1	Current Consumption		-	-	1.5	mA	
2	Output Level		0.8	-	-	V <sub>p-p</sub>	1
3	Symmetry	GND level(DC cut)	40/60	-	60/40	%	
4	Frequency Stability 1. Tolerance	Initial Tolerance(T <sub>A</sub> =+25°C)	-	-	±0.5	ppm	2
		After 2 times reflow(T <sub>A</sub> =+25°C) Ref. to Frequency(before reflow)	-	-	±1.0	ppm	2,3
	2. vs Temperature	T <sub>A</sub> = -30 ~ +85 °C	-	-	±0.5	ppm	4
	3. vs Slope	T <sub>A</sub> = -30 ~ +85 °C	-	-	±0.1	ppm/°C	5
	4. vs Supply Voltage	V <sub>CC</sub> =+3.0V±5%	-	-	±0.1	ppm	
	5. vs Load Variation	Load=(10kΩ//10pF)±10%	-	-	±0.1	ppm	
	6. vs Aging	T <sub>A</sub> = Room ambient	-	-	±1.0	ppm/year	
5	Short Term Stability	Tau=1s	-	-	1.0	ppb	
6	Start Up	@90% of final V <sub>out</sub> level	-	-	2.0	ms	
7	Phase Noise	Relative to F0 level offset 1Hz	-	-	-57	dBc/Hz	
		Relative to F0 level offset 10Hz	-	-	-85	dBc/Hz	
		Relative to F0 level offset 100Hz	-	-	-110	dBc/Hz	
		Relative to F0 level offset 1kHz	-	-	-130	dBc/Hz	
		Relative to F0 level offset 10kHz	-	-	-140	dBc/Hz	

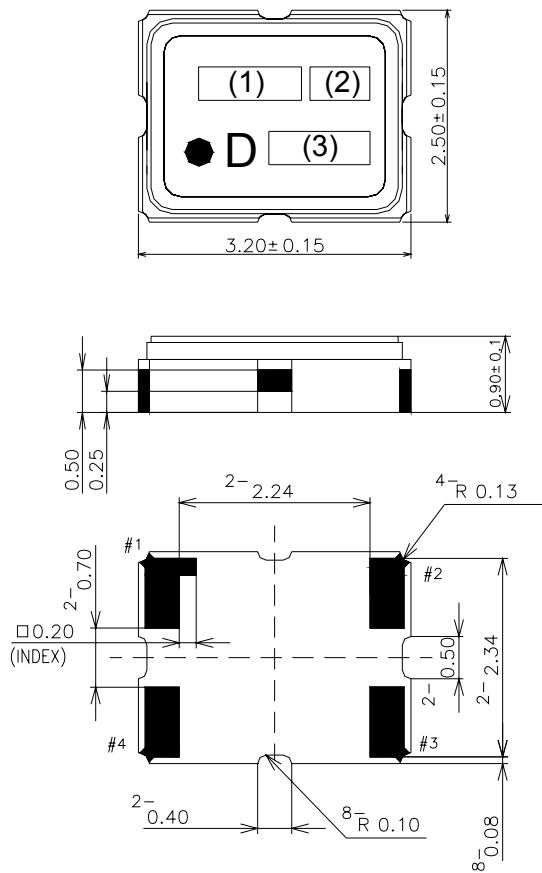
## Notes

1. Clipped sine wave (DC-coupled)
2. Ref. to Nominal Frequency.
3. Please leave after reflow in 2-hour or more at room ambient.
4. Ref. to Frequency (T<sub>A</sub>=+25 °C)
5. 1 Frequency reading for every 2°C

TITLE TCXO SPECIFICATION	Remark		
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 1/12

## 8. Outline, Pin Connections

### Outline



### Pin Connections

Pin No.	Connection
#1	GND
#2	GND
#3	OUTPUT
#4	Vcc

### Marking

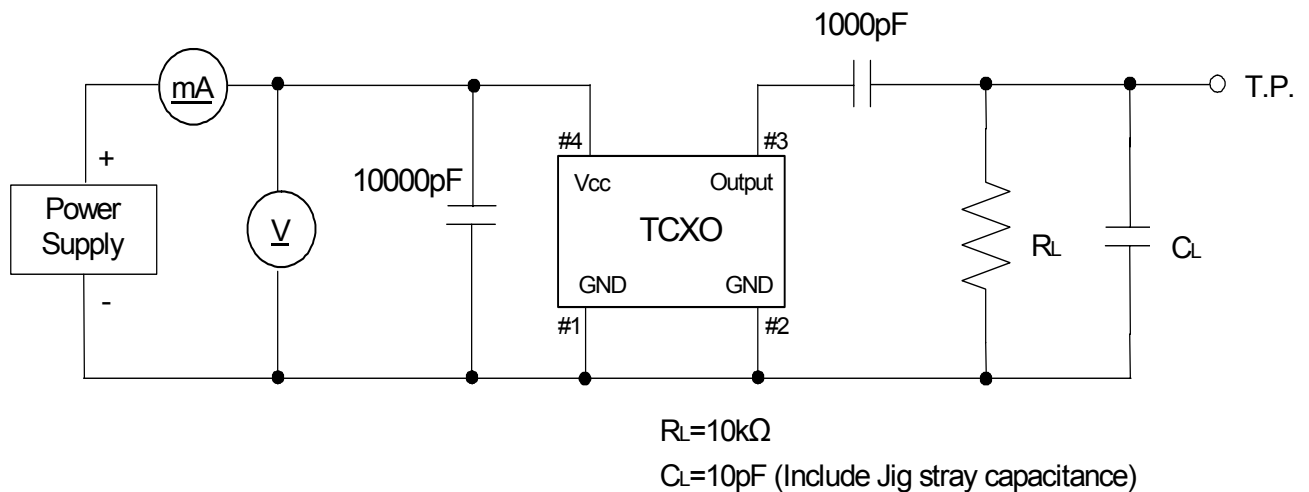
- (1) Frequency 16.36(MHz, 4digits)
- (2) Model code "T"
- (3) EIA Date code Year(1digit)+Week(2digits)  
e.g. 2008/1/1 → 801

Unit:[mm]

Dimensional Tolerance: ±0.15

(Unless otherwise noted)

## 9. Measurement Circuit



TITLE  
TCXO SPECIFICATION

Remark

Date  
2008/02/15

Spec. No.  
1XTW16369CEB

Rev.  
-

Page  
2/12

## 10. Mechanical Characteristics

	Test Item	Test Description	Requirements
1	Drop	Natural drop (on concrete) Mounting on the set or test fixture.(Total weight 100g) Height : 150cm Direction : X,Y,Z, 6directions Test cycle : 10cycles Reference specification : EIAJ-ED-4702A Method5	df/f=<±1.0ppm
2	Vibration	Sweep range : 10Hz→500Hz→10Hz Sweep speed : 11min./cycle Amplitude : 1.5mm(10~55Hz) Acceleration : 200m/s <sup>2</sup> (55~500Hz) Direction : X,Y,Z, 3directions Test cycle : 10cycles 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 : 3times/each directions Reference specification : IEC 60068-2-27	df/f=<±0.5ppm
4	PCB Bend Strength	PWB : t=1.6mm Pressure speed : 1mm/s Bend width : ±3mm Duration : 10±1s Reference specification : IEC 60068-2-21 Ue1	df/f=<±0.5ppm No visible damage.
5	Adherence nature	PWB : t=1.6mm Pressure : 10N Duration : 10±1s Direction : X,Y, 2directions Reference specification : IEC 60068-2-21 Ue3	df/f=<±0.5ppm No visible damage.
6	Package Strength	Pressure : 10N Duration : 10±1s Reference specification : IEC 60068-2-77	df/f=<±0.5ppm No mechanical damage. No leak damage.
7	Gross leak	It is immersed for 3 min into 125±5°C Chlorofluorocarbon (CFCs) liquid. 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 60 min by the pressure of (3.92±0.49)×10 <sup>5</sup> Pa in a helium gas atmosphere. Reference specification : IEC 60068-2-17	Less than 1.0×10 <sup>-9</sup> Pa m <sup>3</sup> /s.
9	Solderability	Solder bath method(Flow soldering) Soldering temperature : 245±5°C Duration : 3±0.3s Reference specification : IEC 60068-2-58	A new uniform coating of solder shall cover a minimum of 90% of the surface being immersed.
10	Resistance to Soldering heat	Solder iron method Bit temperature : 350±10°C Duration : 3+1/-0s /each terminal Reference specification : IEC 60068-2-58	df/f=<±0.5ppm No visible damage.
		Reflow In refer to temperature profile shown in clause 13. Test cycle : 3cycles It shall be measured after 2h at room temperature, humidity.	df/f=<±1.0ppm No visible damage.

TITLE  
TCXO SPECIFICATION

Remark

Date  
2008/02/15

Spec. No.  
1XTW16369CEB

Rev.  
-

Page  
3/12

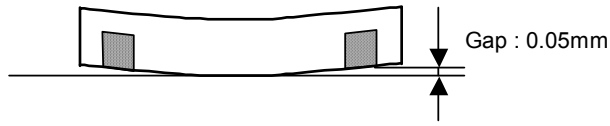
## 11. Environmental Characteristics

	Test Item	Test Description	Requirements
1	Cold	Temperature : $-40\pm 3^{\circ}\text{C}$ Duration : 1000h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-1 Ab	$df/f = < \pm 1.0\text{ppm}$ $dV_{out} = < \pm 0.2\text{Vp-p}$
2	Hot	Temperature : $+85\pm 2^{\circ}\text{C}$ Duration : 1000h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-2 Bb	$df/f = < \pm 1.0\text{ppm}$ $dV_{out} = < \pm 0.2\text{Vp-p}$
3	Humidity	Temperature : $+85\pm 2^{\circ}\text{C}$ R.H. $85\pm 5\%$ Duration : 1000h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-3	$df/f = < \pm 1.0\text{ppm}$ $dV_{out} = < \pm 0.2\text{Vp-p}$
4	HTB	Temperature : $+85\pm 2^{\circ}\text{C}$ Duration : 1000h BIAS : Max value of supply voltage It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-2 Bb	$df/f = < \pm 1.0\text{ppm}$ $dV_{out} = < \pm 0.2\text{Vp-p}$
5	THB	Temperature : $+40\pm 2^{\circ}\text{C}$ R.H. 90~95% Duration : 1000h BIAS : Max value of supply voltage It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-3	$df/f = < \pm 1.0\text{ppm}$ $dV_{out} = < \pm 0.2\text{Vp-p}$
6	Change in Temperature (Temperature cycling)	200 cycles of Temperature: $-40\pm 3^{\circ}\text{C}:0.5\text{h} \rightarrow +85\pm 2^{\circ}\text{C}:0.5\text{h}$ It shall be measured after 2h at room temperature, humidity. Reference specification : IEC pub.68-2-14.Na	$df/f = < \pm 1.0\text{ppm}$ $dV_{out} = < \pm 0.2\text{Vp-p}$ Any cracks shall not appear.
7	ESD	Model : Machine Model(MM) $V_s = \pm 200\text{V}(C_1=200\text{pF}, R_2=0\Omega)$ Number of times : 3times Each terminals except common terminal. (Connect to test terminal) Reference specification : EIA/JESD22-A114	$df/f = < \pm 1.0\text{ppm}$ No visible damage.
		Model : Human Body Model(HBM) $V_s = \pm 1500\text{V}(C_1=100\text{pF}, R_2=1500\Omega)$ Number of times : 3times Each terminals except common terminal. (Connect to test terminal) Reference specification : EIA/JESD22-A115	$df/f = < \pm 1.0\text{ppm}$ No visible damage.

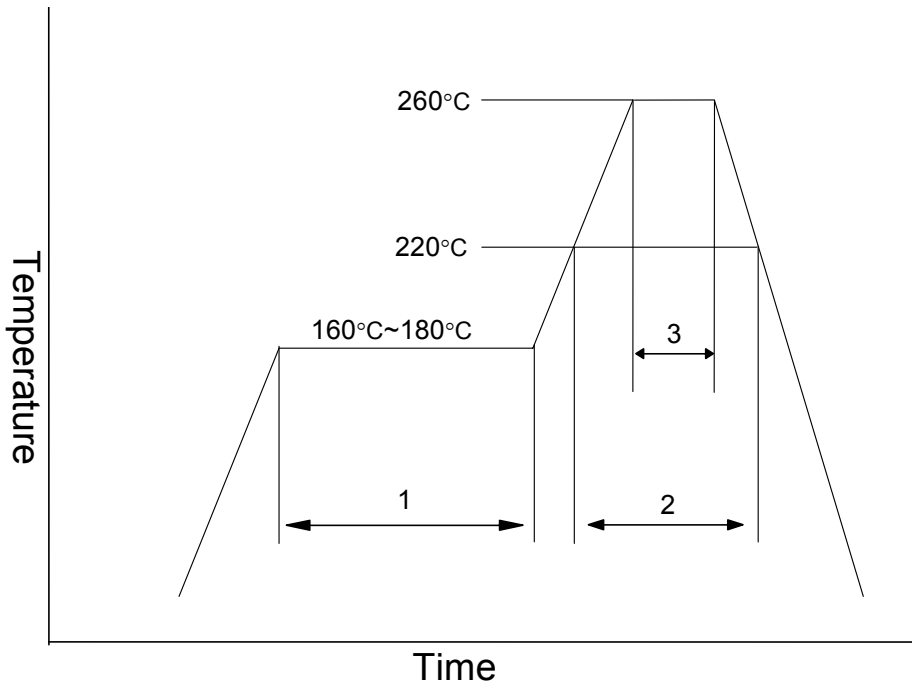
TITLE TCXO SPECIFICATION		Remark		
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 4/12	

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.



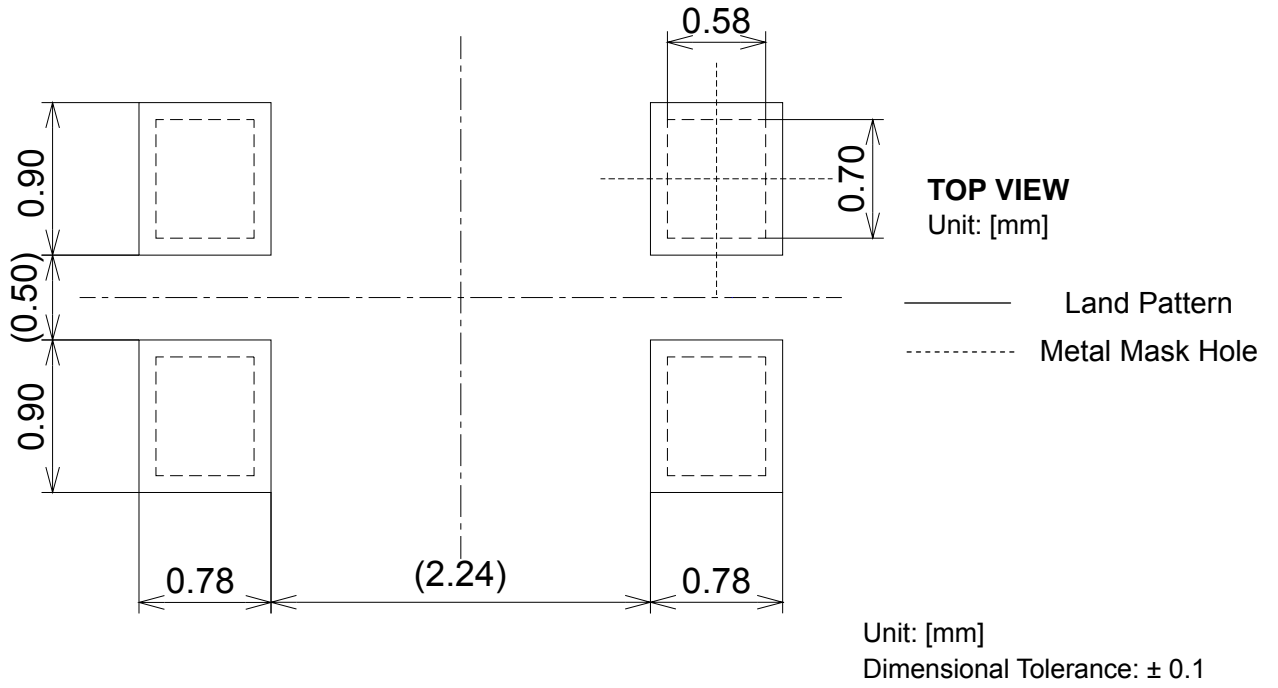
13. Reflow Profile



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

TITLE TCXO SPECIFICATION		Remark		
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 5/12	

14. Land Pattern Layout(Example)



TITLE TCXO SPECIFICATION		Remark	
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 6/12

## 15. Packing Specification

### 15-1. Reel Dimensions

Please see Fig.3

### 15-2. Embossed Carrier Format and Dimensions

Please see Fig.2

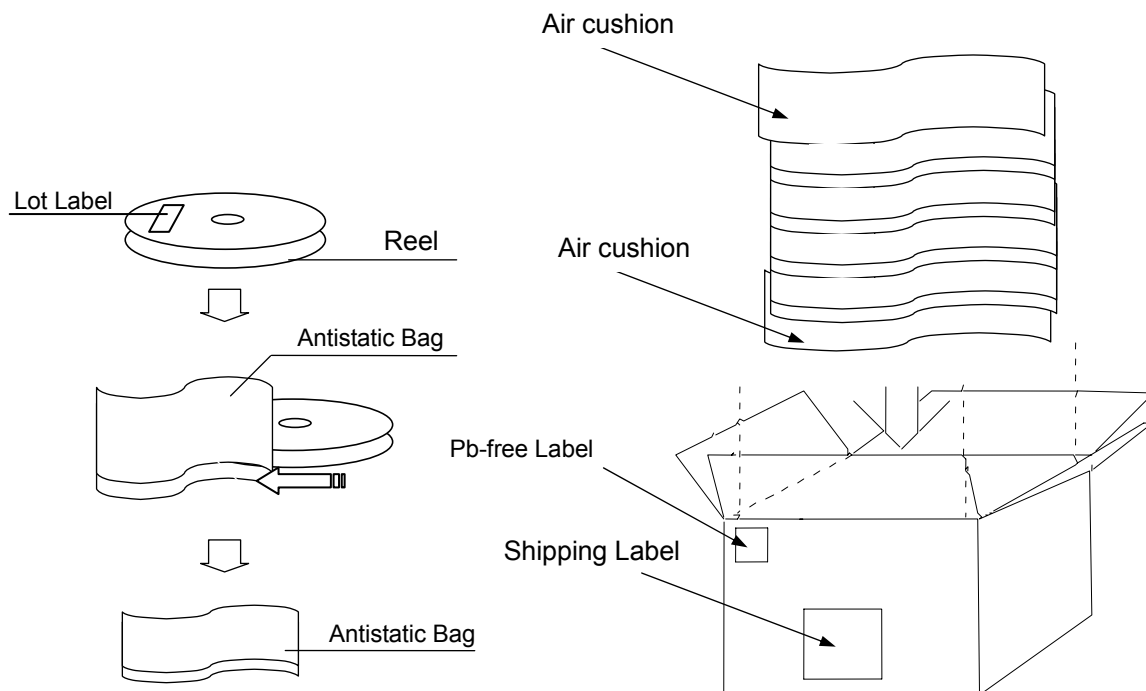
### 15-3. Taping specifications

Please see Fig.1

### 15-4. Quantity

2000pcs. max. per Reel.

### 15-5. Packaging Procedure



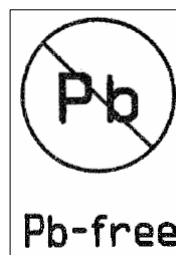
#### Lot label detail

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 detail

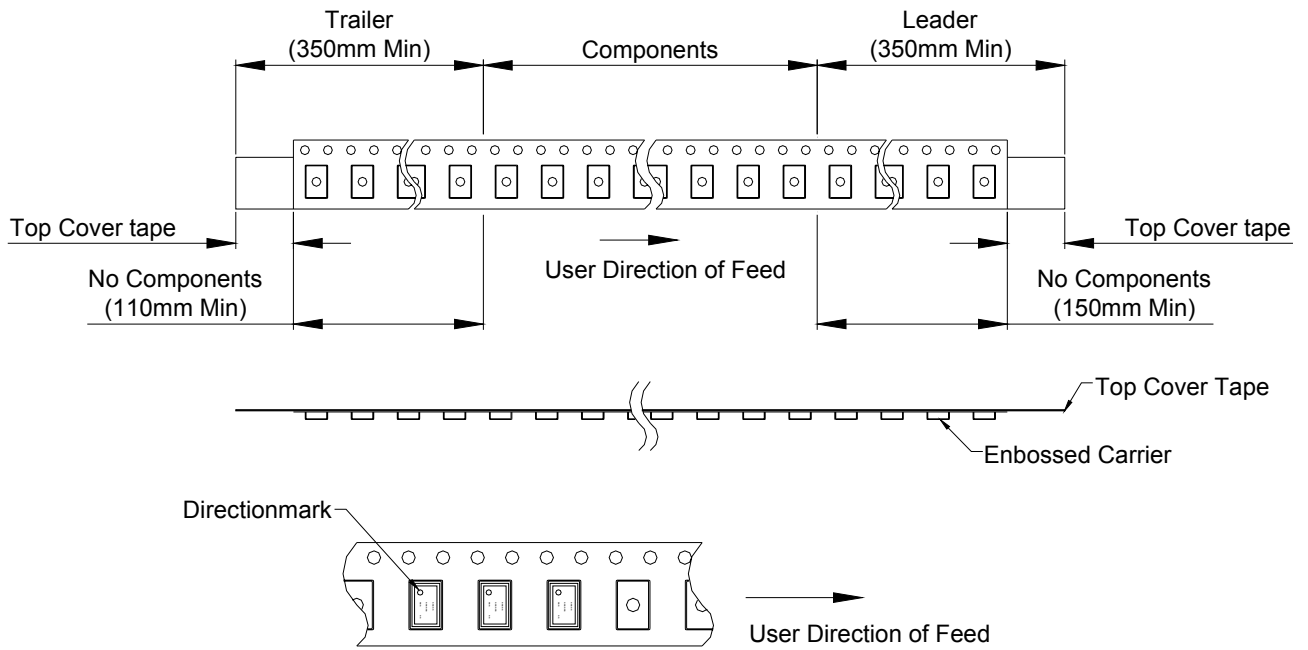
ITEM (Model Name)  
 SPEC (Spec. Number)  
 DELIVERY DATE (Delivery Date )  
 Q'TY (Quantity)  
 NOTES (User's Parts Number)  
 DAISHINKU CORP.

#### Pb-free Label detail



TITLE TCXO SPECIFICATION		Remark	
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 7/12





Direction of taking up reel is clock-wise as above.

There are sprocket holes on the right hand side of the tape when it is pulled out as shown above.

**Peel strength**

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

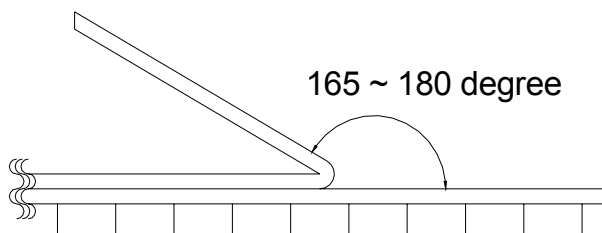


Fig.1 Taping Specification

TITLE TCXO SPECIFICATION		Remark	
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 8/12

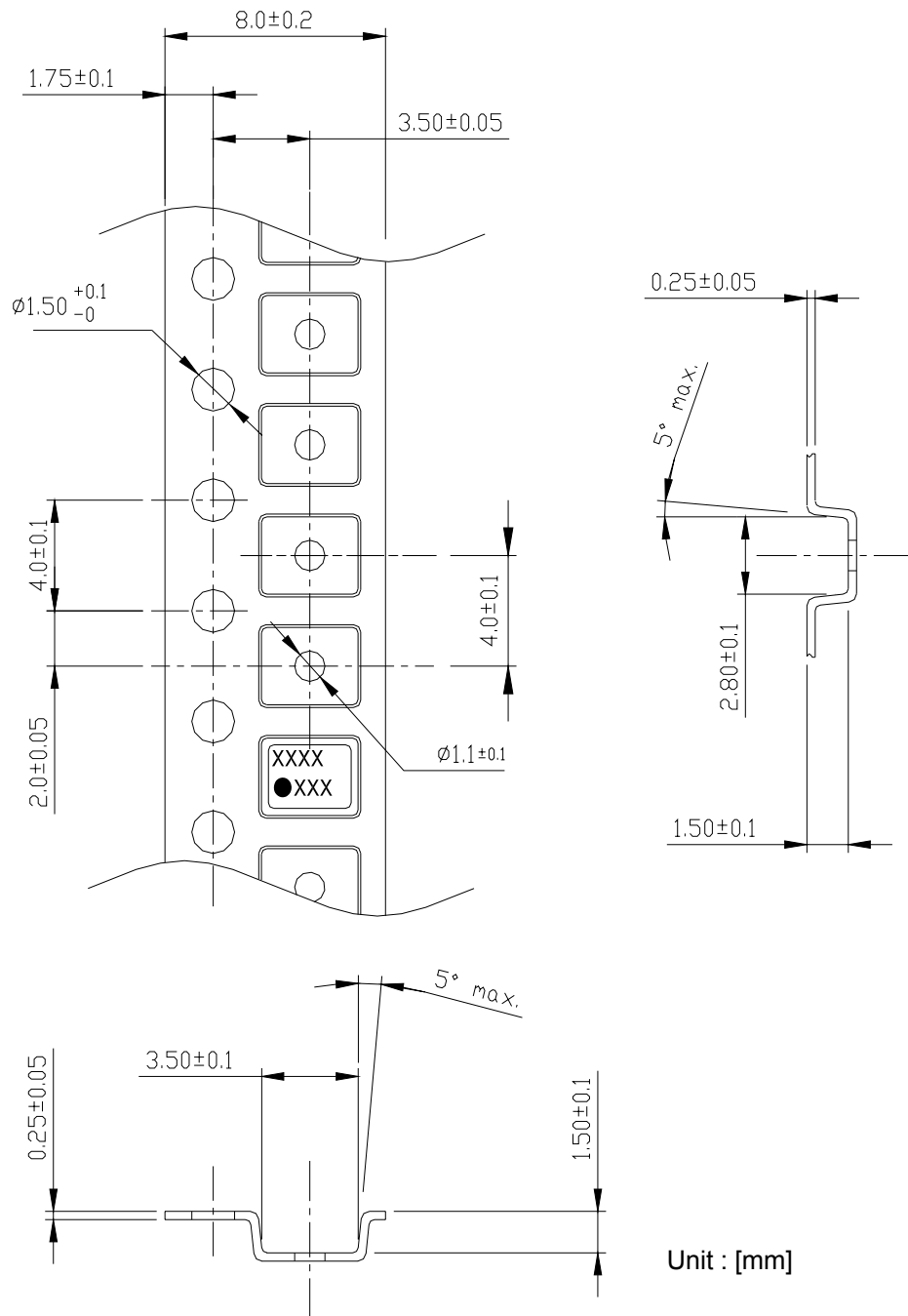
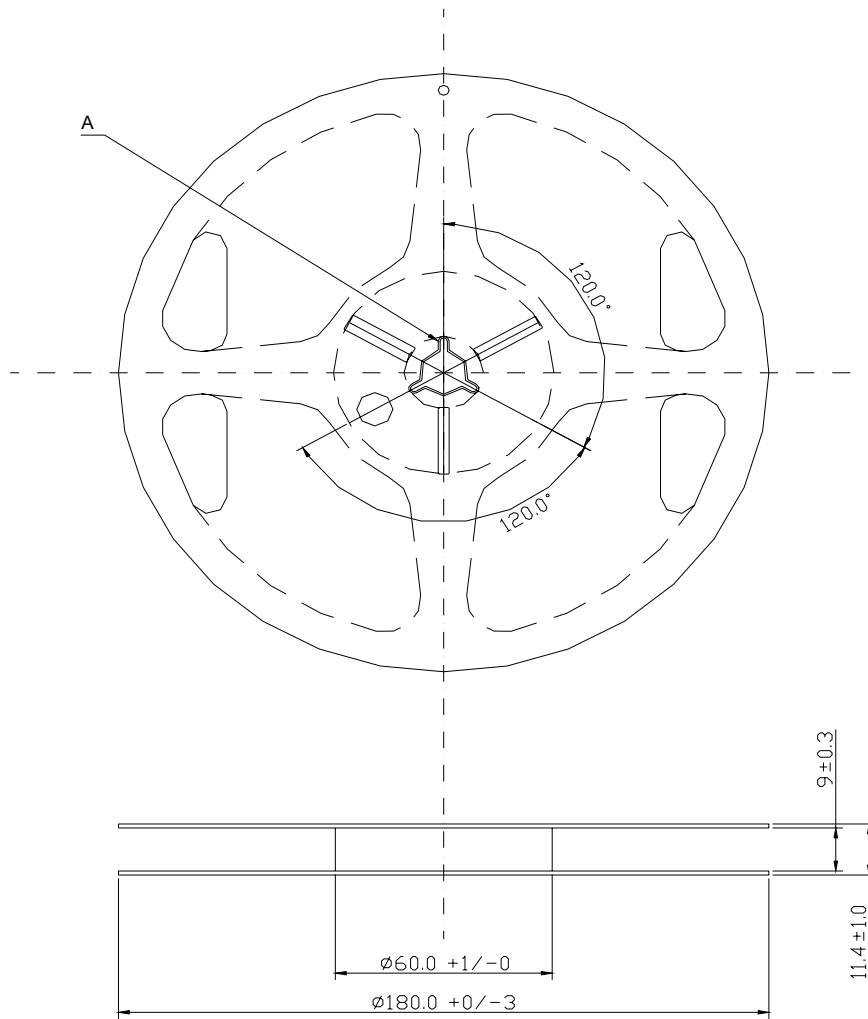


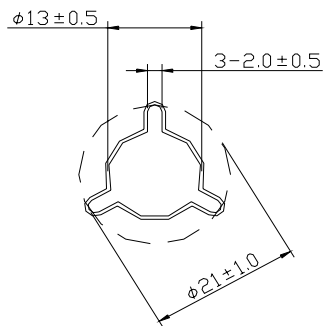
Fig.2 Embossed Carrier Format and Dimensions

TITLE TCXO SPECIFICATION		Remark	
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 9/12



Unit:mm

Section A



Material : Polystyrene (Conductivity)

Fig 3. Reel Dimensions

TITLE TCXO SPECIFICATION		Remark		
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 10/12	

## 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 a product.

Moreover, especially when a product is near the position of a PWB guide pin, and the position of a 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. 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-shi, Tottori-ken

TITLE TCXO SPECIFICATION	Remark		
Date 2008/02/15	Spec. No. 1XTW16369CEB	Rev. -	Page 11/12

## 2008-0208 REVERSION RECORD

Rev. No.	Date	Reason	Contents	Approved	Checked	Drawn
-	2008/02/15	-	Initial Release	M.Yamashita		H.Takase