1. Device Name TCXO
2. Model Name DSB221SDA
3. Nominal Frequency 16.369 MHz
4. Mass 0.02g max.
5. Absolute Maximum Ratings

	Item	Rating	Unit
1	Supply Voltage	-0.3 ~ +6.0	V
2	Storage Temperature Range	-40 ~ +85	°C

6. Recommended Operating Conditions

	Item	min.	typ.	max.	Unit
1	Supply Voltage	+1.7	+1.8	+1.9	V
2	Load Impedance (resistance part)	9	10	11	kΩ
	(parallel capacitance)	9	10	11	pF
3	Operable Temperature Range	-30	-	+85	°C

7. Electrical Characteristics

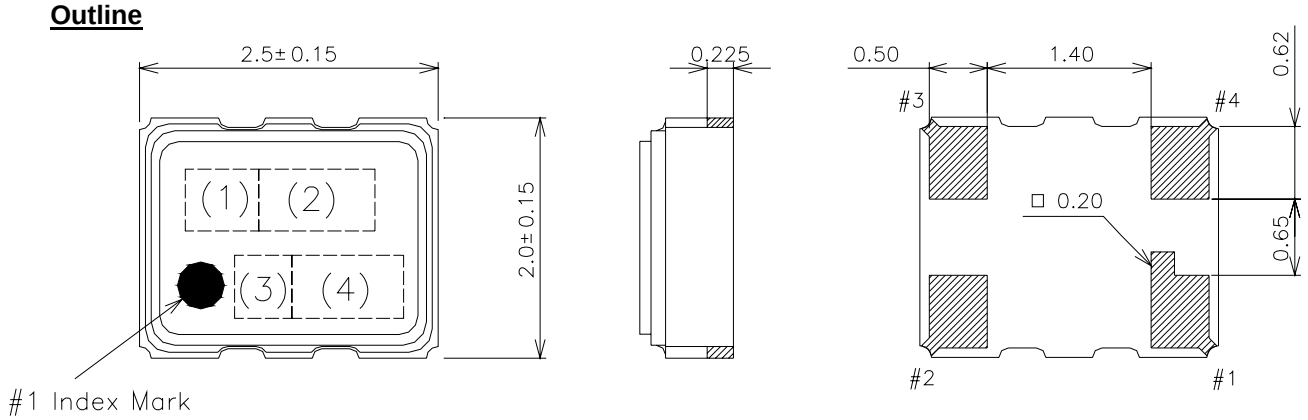
(T_A =-30 ~ +85°C, Load=10kΩ//10pF,V_{CC}=+1.8V, unless otherwise noted)

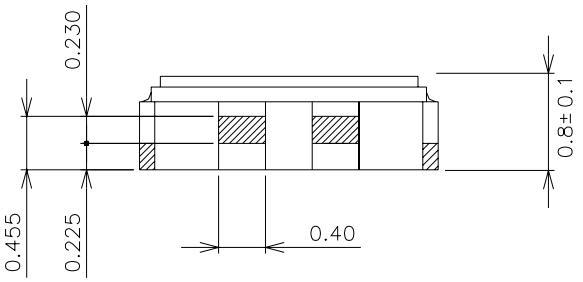
	Item	Conditions	Limits			Unit	Notes
			Min.	Typ.	Max.		
1	Current Consumption		-	-	1.5	mA	
2	Output Level		0.8	-	-	V_{p-p}	1
3	Duty	AC-DUTY	40/60	-	60/40	%	
4	Frequency Stability						
	1.Tolerance	After 2 times reflow	-	-	±2.0	ppm	2,3
	2.vs Temperature	T_A =-30 ~ +85°C	-	-	±0.5	ppm	4
	3.vs Slope	T_A =-20 ~ +70°C	-	-	±0.1	ppm/°C	5
	4.vs Hysteresis		-	-	0.6	ppm	
	5.vs Supply Voltage	V_{CC}=+1.8V±0.1V	-	-	±0.2	ppm	
	6.vs Load Variation	Load=(10kΩ//10pF)±10%	-	-	±0.2	ppm	
	7.vs Aging	T_A= Room ambient	-	-	±1.0	ppm/year	
5	Start Up	@90% of final Vout level	-	-	2.0	ms	
6	Phase Noise	Relative to F0 level offset 1Hz	-	-	-50	dBc/Hz	
		Relative to F0 level offset 10Hz	-	-	-80	dBc/Hz	
		Relative to F0 level offset 100Hz	-	-	-105	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_A=+25°C)
5. 1 Frequency reading for every 2°C

8. Outline, Pin Connections

Outline





Pin Connections

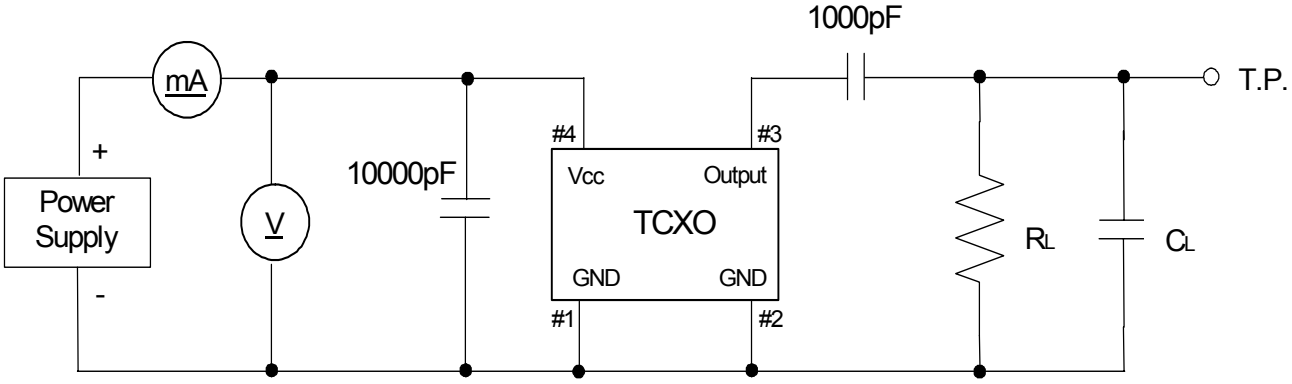
Pin No.	Connection
#1	GND
#2	GND
#3	Output
#4	Vcc

Unit:[mm]
Dimensional Tolerance: ±0.15
(Unless otherwise noted)

Marking

(1) Model code "H"
(2) Frequency 16.3(MHz, 3digits)
(3) Logo "D"
(4)EIA Date code Year(1digit)+Week(2digits)
e.g. 2007/1/1 → 701

9. Measurement Circuit



R_L=10kΩ
C_L=10pF (Include Jig stray capacitance)

TITLE	Remark		
TCXO SPECIFICATION			
Date	Spec. No.	Rev.	Page
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10. Mechanical Characteristics

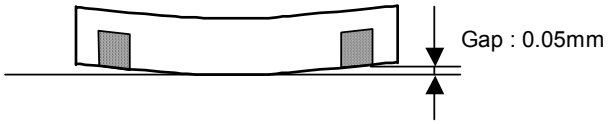
	Test Item	Test Description	Requirements
1	Shock	Acceleration: 1000m/s^2 Direction : X,Y,Z -6 directions Duration : 3ms Test cycle : 3 times/each directions Reference specification : IEC 60068-2-27	df/f=<±0.5ppm
2	Drop	Natural drop (on concrete) Mounting on the set or test fixture.(Total weight 100g) Height : 150cm Direction : X,Y,Z -6 directions Test cycle : 10 cycles Reference specification : EIAJ-ED-4702A Method5	df/f=<±1.0ppm
3	Vibration	Sweep range : 10Hz→500Hz→10Hz Sweep speed : 11min./cycle Amplitude : 1.5mm(10~55Hz) Acceleration : 200m/s^2(55~500Hz) Direction: X,Y,Z,-3 directions Test cycle : 10 cycles Reference specification : IEC 60068-2-6	df/f=<±0.5ppm
4	Sealing Tightness (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.
5	Sealing Tightness (Fine leak)	It shall be measured by the helium leak detector after pressurization for 60 minutes by the pressure of (3.92±0.49)x10^5 Pa in a helium gas atmosphere. Reference specification : IEC 60068-2-17	Less than 1.0x10^{-9}Pa m^3/s.
6	Solderability	Solder bath method(Flow soldering) Soldering temperature: 245±5°C Duration: 3s±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.
7	Resistance to Soldering heat	Solder iron method Bit temperature:350±10°C Duration: 3s+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 : 3 cycles It shall be measured after 2-hours at room temperature, humidity.	df/f=<±1.0ppm No visible damage.
8	Boad Bending Strength	PWB : t=1.6mm Pressure speed : 1mm/sec Bend width : ±3mm Duration : 10±1s Reference specification : IEC 60068-2-21 Ue1	df/f=<±0.5ppm No visible damage.
9	Shear	PWB : t=1.6mm Pressure : 10N Duration : 10±1s Direction: X,Y,-2 directions Reference specification : IEC 60068-2-21 Ue3	df/f=<±0.5ppm No visible damage.
10	Body Strength	Pressure : 10N Duration : 10±1s Reference specification : IEC 60068-2-77	df/f=<±0.5ppm No mechanical damage. No leak damage.

11. Environmental Characteristics

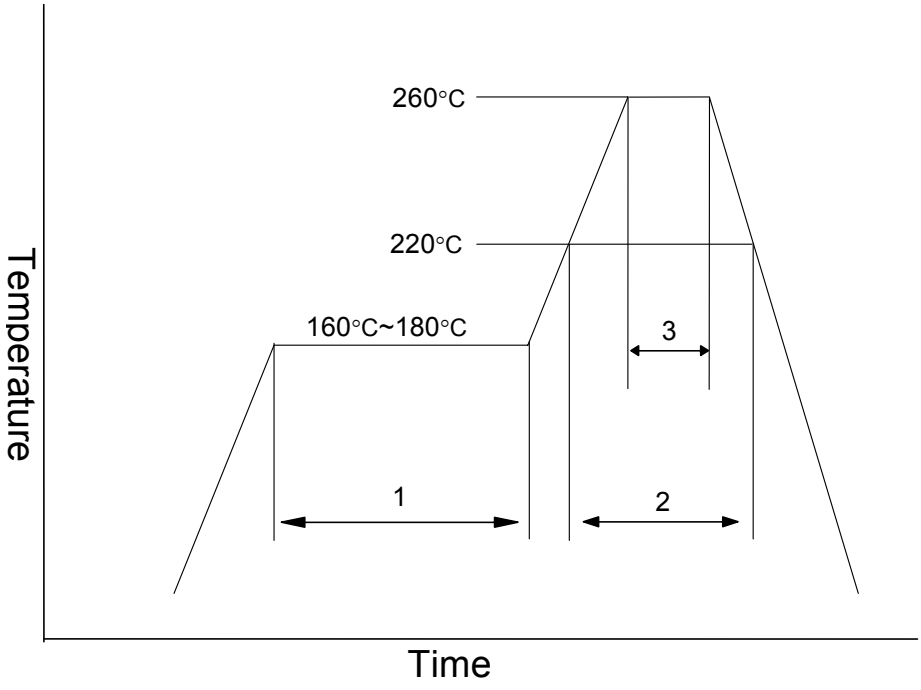
	Test Item	Test Description	Requirements
1	Low Temperature Storage	Temperature: -40±3°C Duration: 1000 h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-1 Ab	df/f=<±1.0ppm dVout=<±0.2Vp-p
2	High Temperature Storage	Temperature: +85±2°C Duration: 1000 h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-2 Bb	df/f=<±1.0ppm dVout=<±0.2Vp-p
3	Humidity	Temperature: +85±2°C R.H. 85±5% Duration: 1000 h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-3	df/f=<±1.0ppm dVout=<±0.2Vp-p
4	HTB	Temperature: +85±2°C Duration: 1000 h 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=<±1.0ppm dVout=<±0.2Vp-p
5	THB	Temperature: +40±2°C R.H. 90~95% Duration: 1000 h BIAS : Max value of supply voltage It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-3	df/f=<±1.0ppm dVout=<±0.2Vp-p
6	Temperature Cycle	200 cycles of Temperature: -40±3°C:0.5h → +85±2°C:0.5 h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC pub.68-2-14.Na	df/f=<±1.0ppm dVout=<±0.2Vp-p Any cracks shall not appear.
7	ESD	Model : Machine Model(MM) Vs=±200V(C1=200pF, R2=0Ω) Number of times : 3 times Each terminals except common terminal. (Connect to test terminal) Reference specification : EIA/JESD22-A114	df/f=<±1.0ppm No visible damage.
		Model : Human Body Model (HBM) Vs=±1500V(C1=100pF, R2=1500Ω) Number of times : 3 times Each terminals except common terminal. (Connect to test terminal) Reference specification : EIA/JESD22-A115	df/f=<±1.0ppm No visible damage.

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.

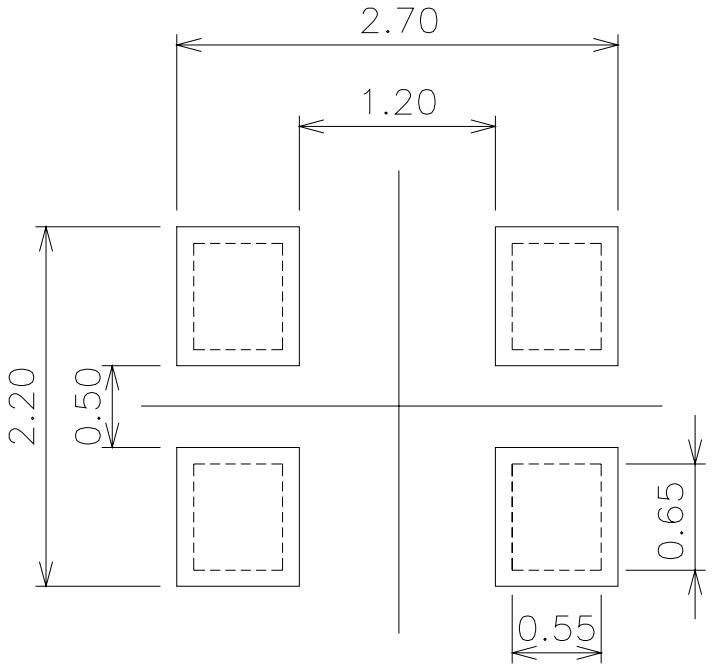


13. Reflow Profile



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

14. Land Pattern Layout(Example)



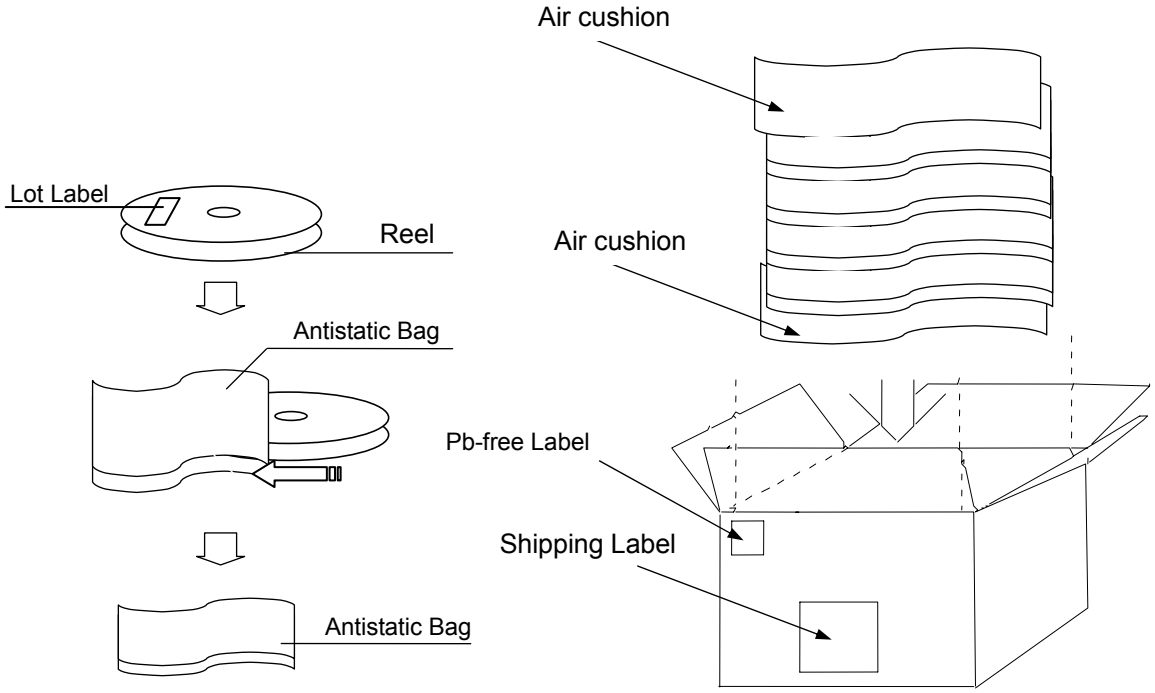
TOP VIEW
Unit: [mm]

Land Pattern
Metal Mask Hole

Unit: [mm]
Dimensional Tolerance: ± 0.1

15. Packing Specification

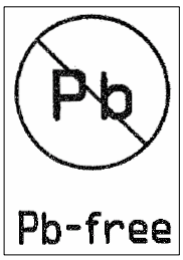
15-1. Reel Dimensions
Please see Fig.3
15-2. Embossed Carrier Format and Dimensions
Please see Fig.2
15-3. Taping specifications
Please see Fig.1
15-4. Quantity
2000pcs. max. per Reel.
15-5. Packaging Procedure

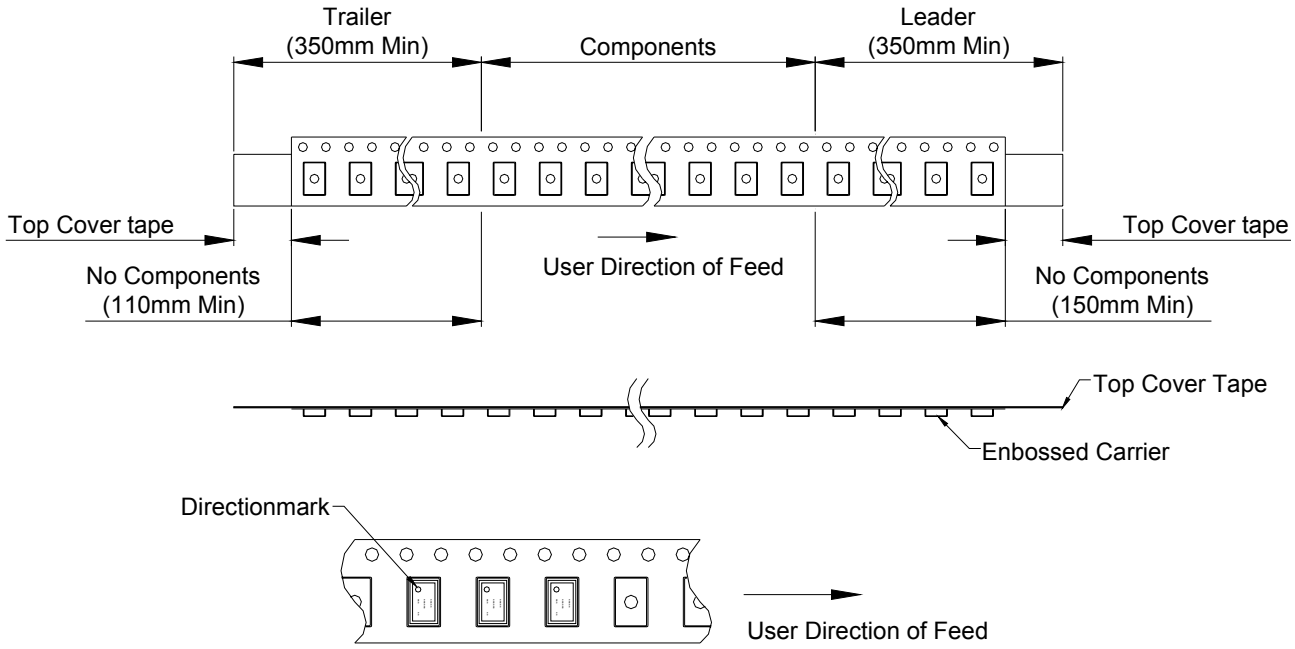


Lot label detail
TYPE (Model Name)
SPEC No. (Spec. Number)
Parts No. (User's Parts Number)
Lot No. (Lot Number)
FREQ. (Nominal Frequency)
Q'TY (Quantity)
KDS DAISHINKU CORP.

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





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.

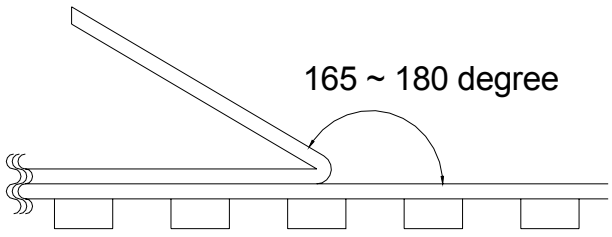
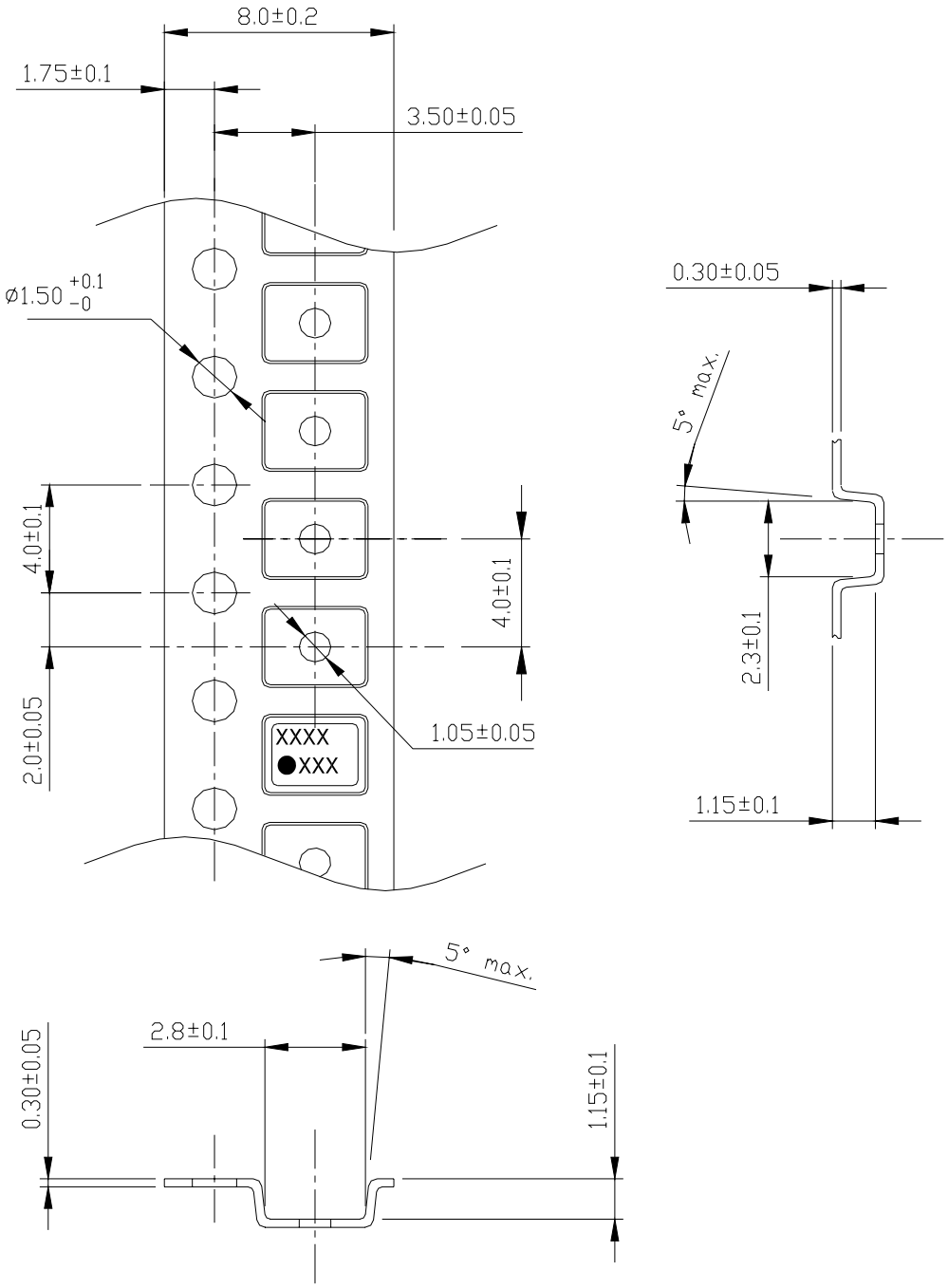
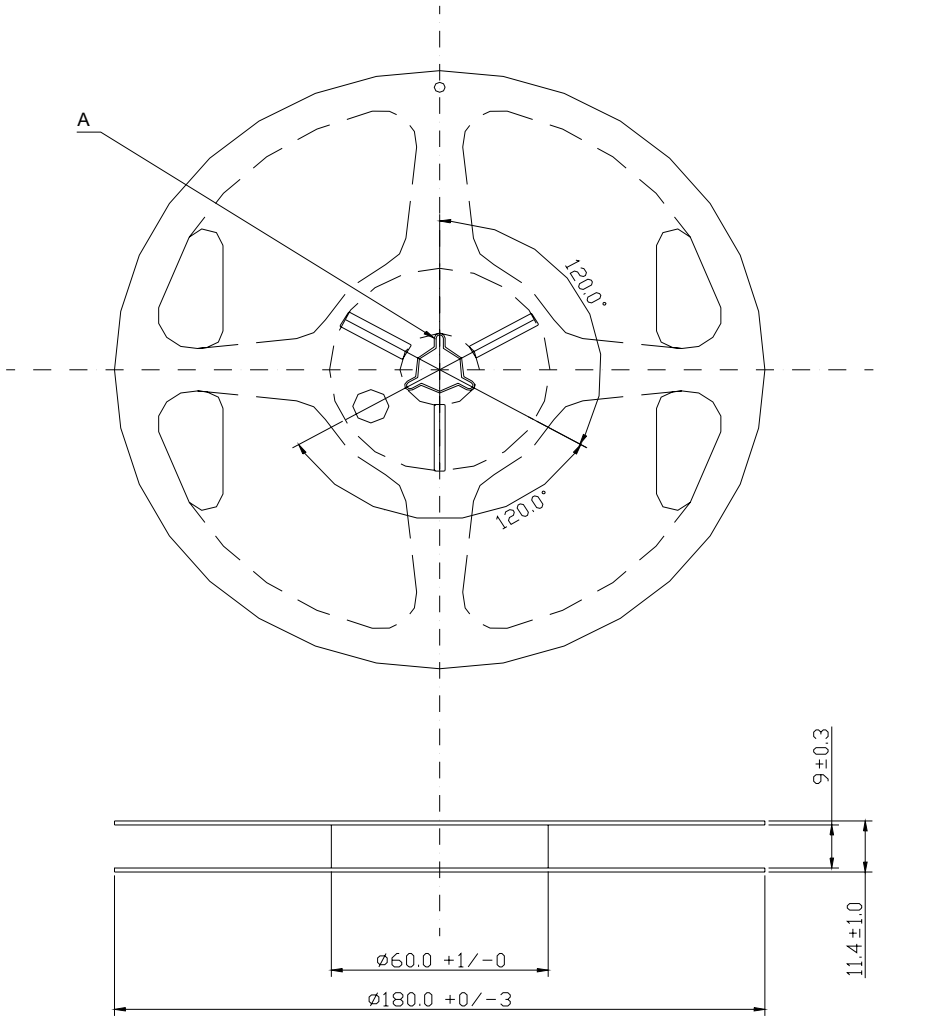


Fig.1 Taping Specification



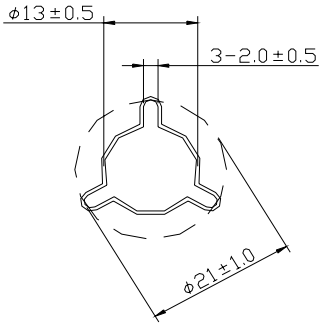
Unit : [mm]

Fig.2 Embossed Carrier Format and Dimensions



Unit:mm

Section A



Material : Polystyrene (Conductivity)

Fig 3. Reel Dimensions

TITLE	Remark		
TCXO SPECIFICATION			
Date	Spec. No.	Rev.	Page
2007/10/31	T07-0287	-	10/11

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