Serial No. : 2009-0290
DATE : 2009/03/09

Shanghai Winson Electronics Co.,Ltd.

ITEM : CRYSTAL OSCILLATORS

TYPE :	DSA535SD
NOMINAL FREQUENCY :	12.800MHz
SPEC No. :	1XTQ12800VBA

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

RECEIPT	
DATE	
RECEIVED	(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

C.ENG. M. Yamashita

ENG. S. Sakamoto

1. Device Name VC-TCXO
2. Model Name DSA535SD
3. Nominal Frequency 12.800 MHz
4. Mass 0.08g max.

5. Absolute Maximum Ratings

	Item	Symbol	Rating	unit
1	Supply Voltage	V_{CC}	-0.3 ~ +6.0	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}	+3.135	+3.3	+3.465	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

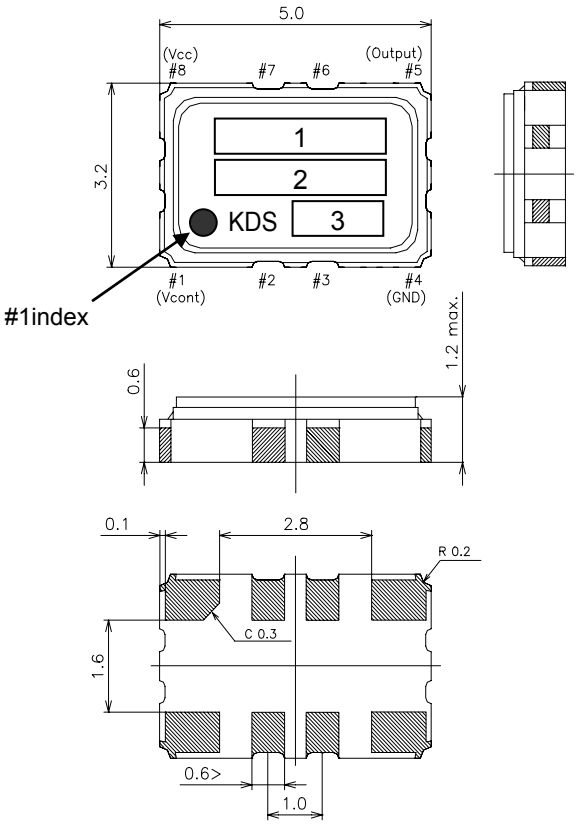
(T_A =-40~+85 °C, Load=10kΩ//10pF, V_{CC}=+3.3V, V_{CONT}=+1.5V unless otherwise noted)

	Item	Conditions	Limits			unit	Notes
			min.	typ.	max.		
1	Current Consumption		-	-	1.4	mA	
2	Output Level		0.8	-	-	Vp-p	1
3	Harmonics		-	-	-5	dBc	
4	Symmetry	GND level (DC cut)	40/60	-	60/40	%	
5	Frequency Stability						
	1.Tolerance	After 2 times reflow (T_A=+25°C)	-	-	±1.5	ppm	2,3
	2.vs Temperature	T_A=-40 ~ +85 °C	-	-	±1.0	ppm	4
	3.vs Slope	T_A=-30 ~ +85 °C	-	-	±0.2	ppm/°C	
		T_A=-40 ~ -30 °C	-	-	±0.4	ppm/°C	
	4.vs Supply Voltage	V_{CC}=+3.3V±5%	-	-	±0.2	ppm	
	5.vs Load Variation	Load=(10kΩ//10pF)±10%	-	-	±0.2	ppm	
	6.vs Aging	T_A= Room ambient	-	-	±1.0	ppm/year	
		T_A= Room ambient	-	-	±2.0	ppm/4years	
6	Start Up	@90% of final Vout level	-	-	2.0	ms	
7	Frequency Control						
	1.Control Range	V_{CONT}=+1.5±1.0V	±3.0	-	±5.0	ppm	5
	2.Input Resistance		500	-	-	kΩ	
8	SSB Phase Noise	Relative to f0 level offset 100Hz	-	-	-100	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 2h or more at room ambient.
4. Ref. to Frequency (T_A=+25°C)
5. 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	N.C.
#3	N.C.
#4	GND
#5	Output
#6	N.C.
#7	N.C.
#8	Vcc

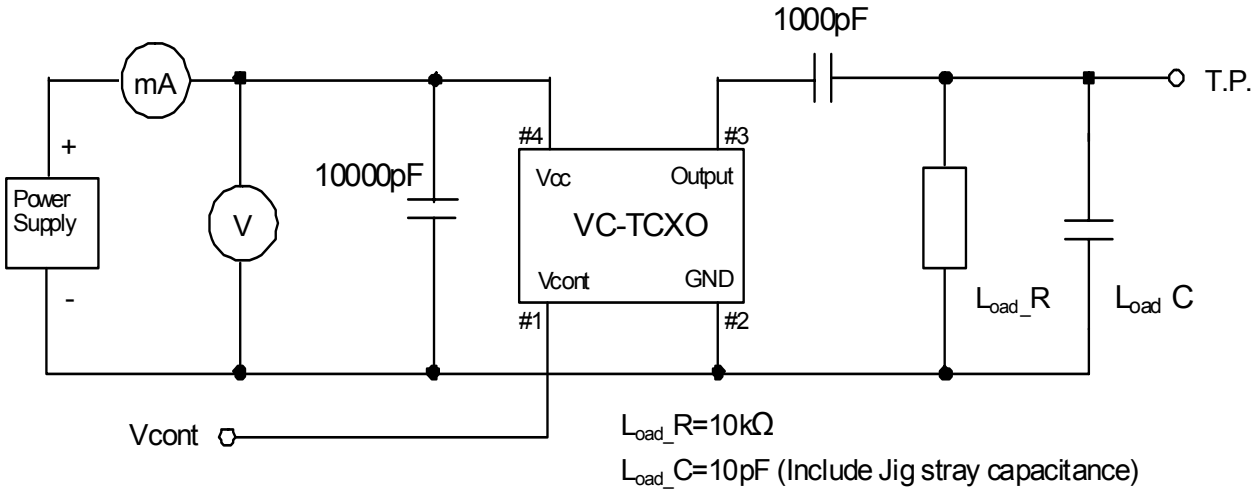
Marking

1. Frequency 12800 (kHz, 5digits)
2. Model code A535SD
3. EIA Date code Year (1digit) + Week (2digits)
   e.g. 2009/1/1 → 901

unit: mm

Dimensional Tolerance: ±0.15

9. Measurement Circuit



L_{oad}_R=10kΩ

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

10. Mechanical Characteristics

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

	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 : 3cycles Reference specification : EIAJ-ED-4702A Method5	df/f=<±1.0ppm
2	Vibration	Sweep range : 10Hz~500Hz Sweep speed : 11min./cycle Amplitude : 1.5mm 10~55Hz) Acceleration : 200m/s^2 (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^2 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 : 1.0mm/s Bend width : 1→2→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) x10^5 Pa in a helium gas atmosphere. Reference specification : IEC 60068-2-17	Less than 1.0x10^{-9}Pa m^3/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 95% 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 60068-2-20	df/f=<±0.5ppm dVout=<±0.2Vp-p 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. Reference specification : IEC 60068-2-58	df/f=<±1.0ppm dVout=<±0.2Vp-p No visible damage.

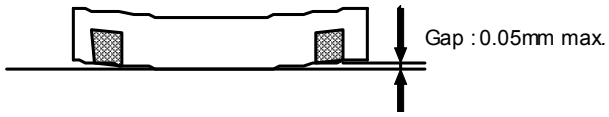
11. Environmental Characteristics

All Test is performed after 3 times reflow (Clause.13)

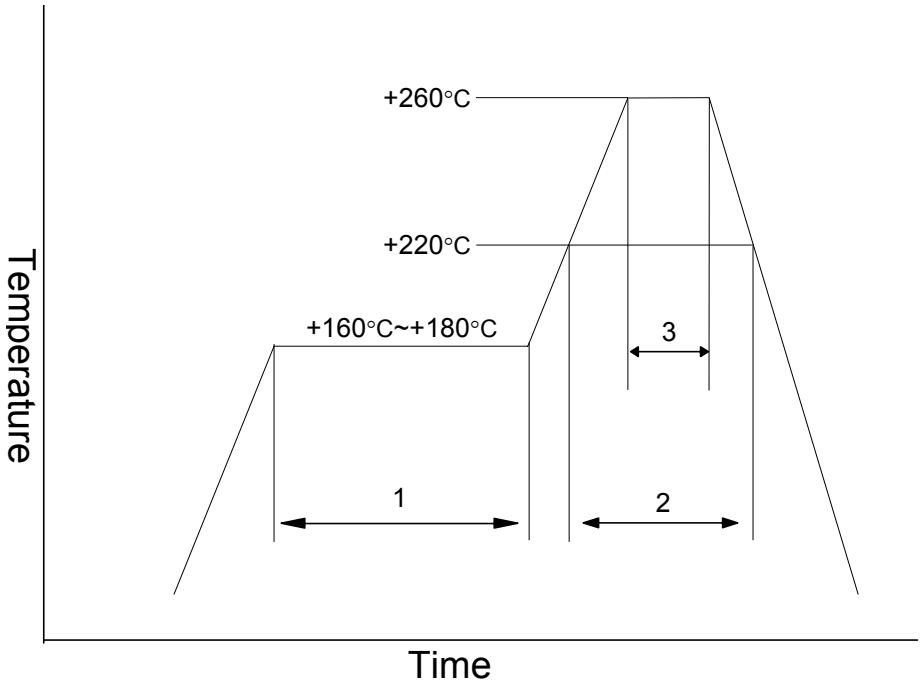
	Test Item	Test Description	Requirements
1	Low temperature storage	Temperature : -40±3°C Duration : 1000h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-1 Ab	df/f=<±1.0ppm dVout=<±0.2Vp-p
2	High temperature storage	Temperature : +85±2°C Duration : 1000h 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 : 1000h 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 : 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=<±1.0ppm dVout=<±0.2Vp-p
5	THB	Temperature : +40±2°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=<±1.0ppm dVout=<±0.2Vp-p
6	Thermal shock	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) V=±200V (C1=200pF, R1=0Ω) Number of times : 3times 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) V=±1500V (C1=100pF, R1=1500Ω) Number of times : 3times 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

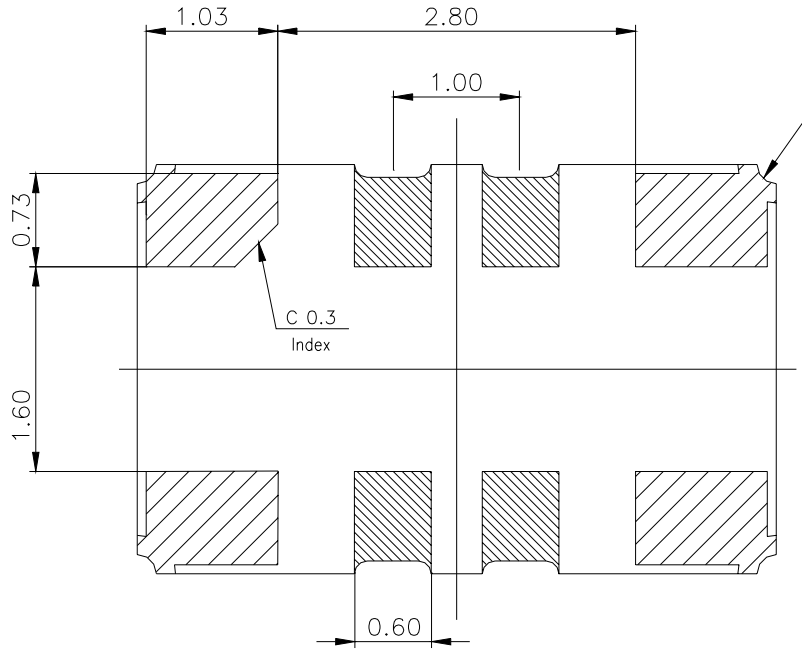


1	Preheat	+160~+180°C 120s
2	Primary Heat	+220°C 60s
3	Peak	+260°C 10s max.

14. Bottom View / Land Pattern Layout / Metal Mask Hole

(1) Bottom View

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



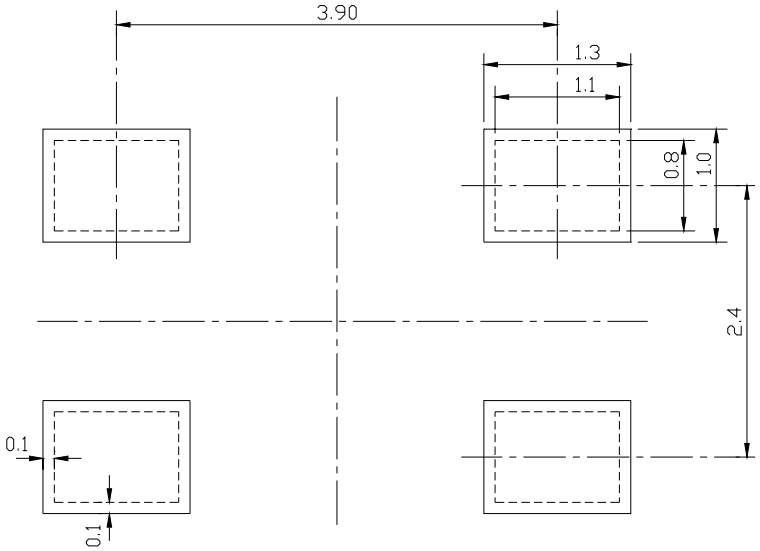
BOTTOM VIEW
unit : mm
Dimensional Tolerance: ±0.15mm

Mounting terminal

Test terminal

(2) Land Pattern Layout / Metal Mask Hole

The following land pattern is reference design.
The electrical characteristic clause7 shall be satisfied with mounting to this land.
The land pattern can be changed in the limits to which a test land and a mounting land are not connected. And it does not any effect to the electrical characteristics.
Mask thickness recommends 0.12mm.



TOP VIEW
unit : mm
Dimensional Tolerance: ±0.15mm

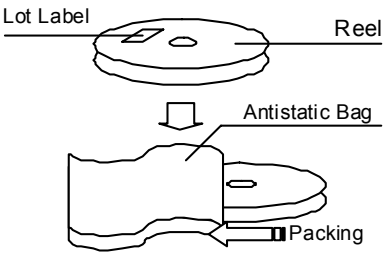
Land Pattern
Metal Mask Hole

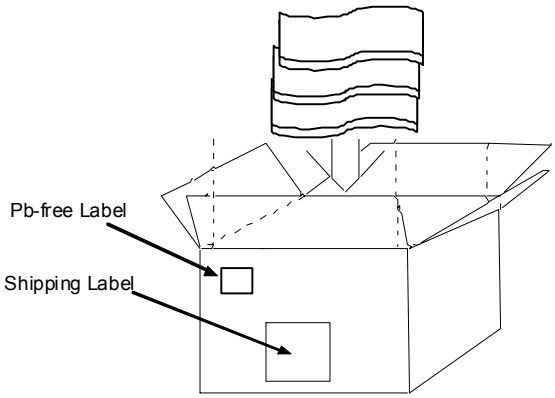
15. Packing Specification

15.1 Reel Dimensions
See Fig.3.
15.2 Embossed Carrier Format and Dimensions
See Fig.2.
15.3 Taping specifications
See Fig.1.
15.4 Quantity
4000 pcs. max. per Reel.
15.5 Taping material List
See right table
15.6 Packaging Procedure
See below figure
15.7 Moisture Sensitivity
Moisture Sensitivity Level of this part is MSL = 1 (No dry pack required)
Refer to IPC/JEDEC J-STD-033

Taping material List

Item	Materials	Disposition
Cover Tape:	PET + olefinic Resin (Conductive layer)	Conductive
Emboss tape	PS	Conductive
Reel	PS	Conductive





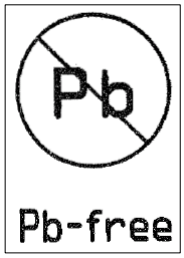
Lot label detail

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



Lot label (Example)

TYPE	DSA535SD
SPEC NO.	1XTQ12800VBA
PARTS NO.	
LOT NO.	AH9309041
FREQ.	12.800 MHz
Q'TY	4000 pcs.
KDS	

Formation of a lot number

e.g. AH9309041

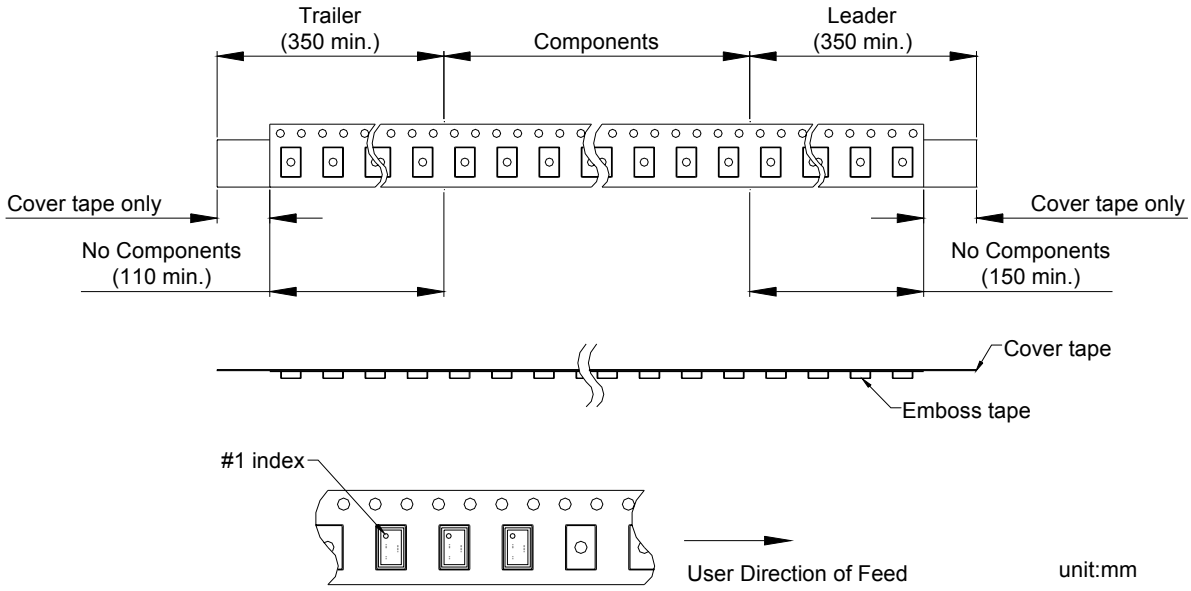
A	H	9309	041
Manufacturing site code	Product code	year/ month/ day	Serial No.

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

YMDD (4digits) e.g.) 2009 /03 /09→ 9309

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.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.
Symbol	1	2	3	4	5	6	7	8	9	O	N	D



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

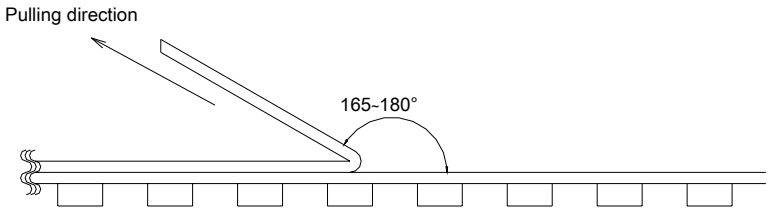
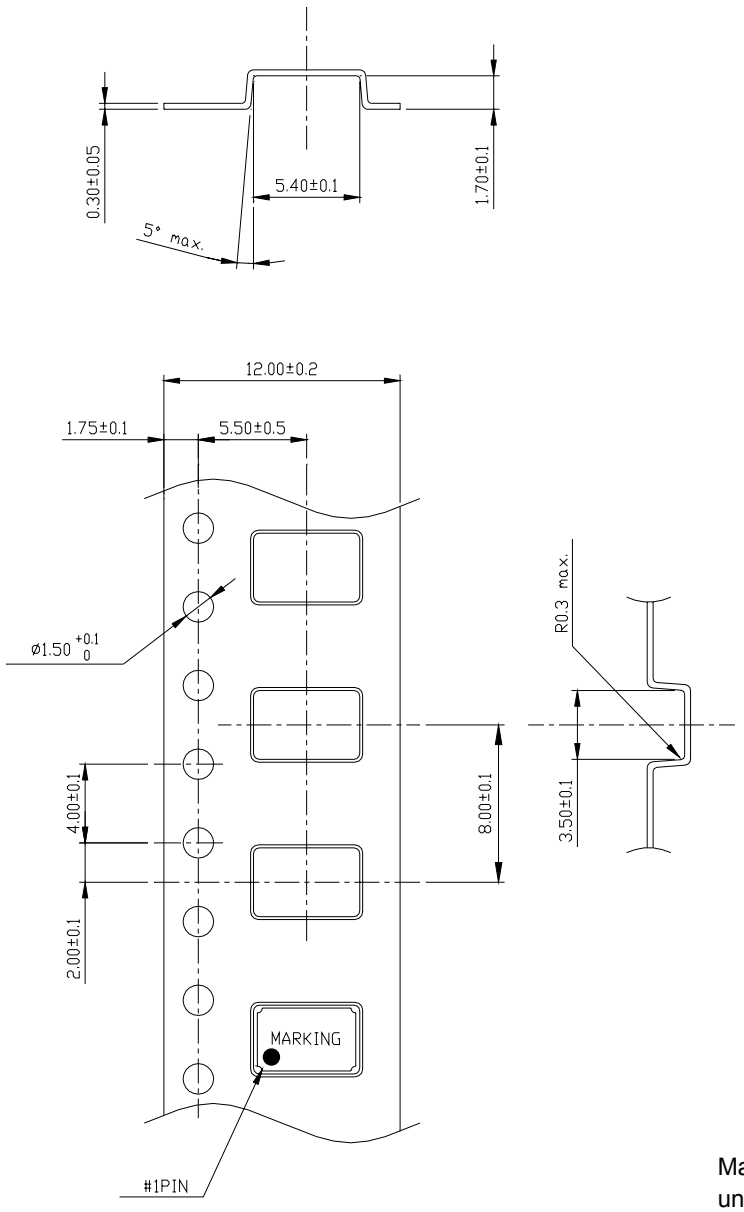


Fig.1. Taping Specification



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

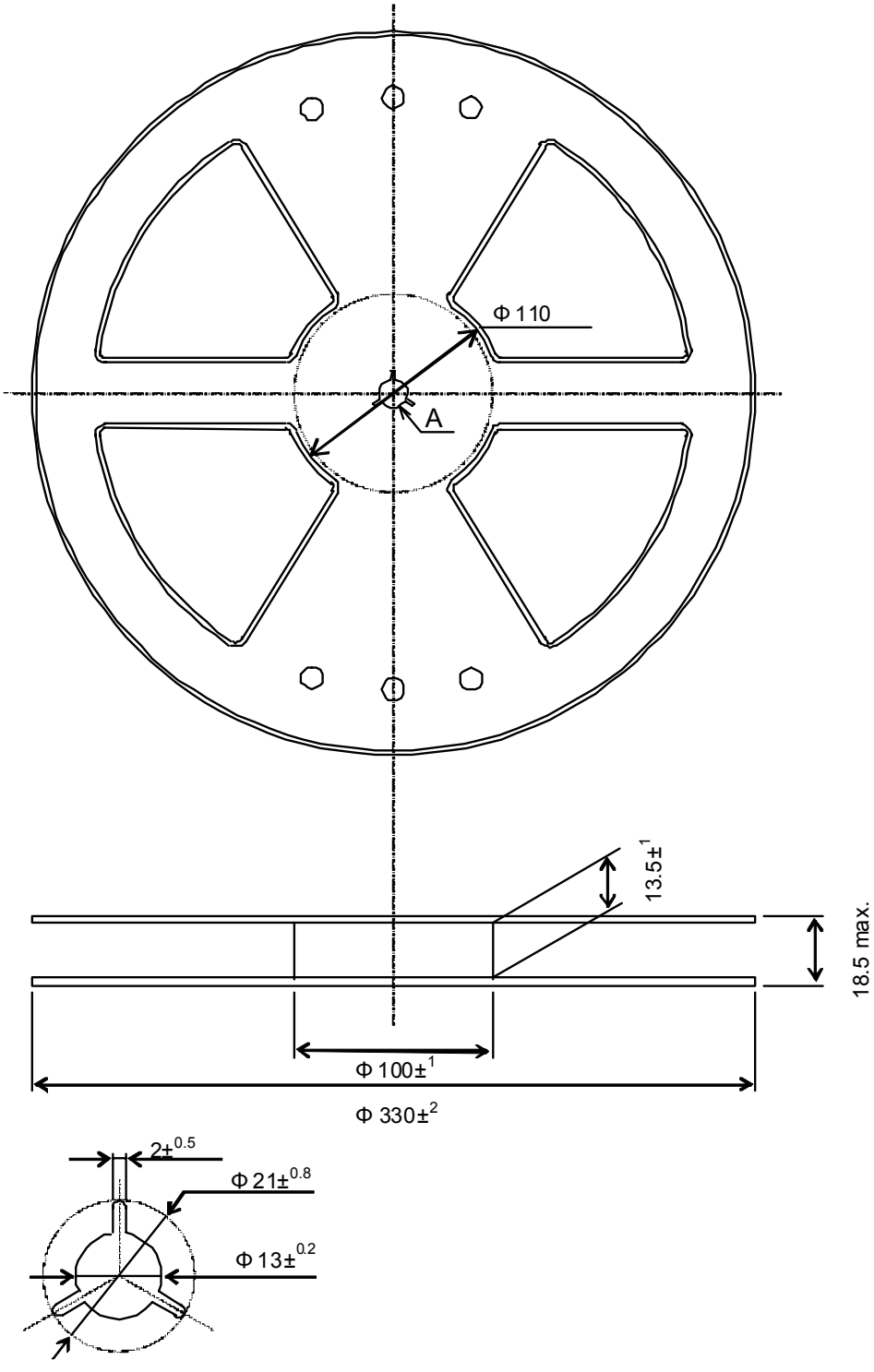
Direction	Pocket size	TCXO size	Clearance
L	5.4±0.1	5.0±0.15	0.4±0.25
W	3.5±0.1	3.2±0.15	0.3±0.25
H	1.7±0.1	1.2 max.	0.5 min.

2) Quality : Polystyrene(Conductivity)

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

Material : Polystyrene (Conductivity)
unit: mm

Fig.2. Emboss tape Format and Dimensions



Material : Polystyrene (Conductivity)
unit: mm

Fig.3. Reel Dimensions

TITLE DSA535SD TYPE SPECIFICATION	Remark		
Date 2009/03/09	Spec No. 1XTQ12800VBA	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. 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 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

2009-0290 REVERSION RECORD

Rev. No.	Date	Reason	Contents	Approved	Checked	Drawn
-	2009/03/09	-	Initial Release	M.Yamashita	S.Sakamoto	J.Kawakami