



Serial No, 2008-0365

DATE: 2008.03.19

ITEM: CRYSTAL OSCILLATOR

TYPE: DSA535SD

NOMINAL FREQUENCY: 10.000MHz

SPEC No. 1XTQ10000VFA

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

RECEIPT	
DATE	
RECEIVED	(signature) (name)

C.ENG. M. Yamashita
ENG. S. Sakamoto

1. Device Name TCXO
2. Model DSA535SD
3. Nominal Frequency 10.000 MHz
4. Mass 0.08g max.
5. Absolute Maximum Value

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

6. Recommended Operating Conditions

	Item	Symbol	Min.	Typ.	Max.	Unit
1	Supply Voltage	V _{CC}	+3.15	+3.3	+3.45	V
2	Load impedance (resistance part) (parallel capacitance)	R _L	9	10	11	kΩ
		C _L	9	10	11	pF
3	Control Voltage Range	V _{CONT}	+0.5	+1.5	+2.5	V
4	Operable Temperature Range	T _A	-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	Test Conditions	Limits			Unit	Notes
			Min.	Typ	Max.		
1	Current consumption		-	-	1.5	mA	
2	Output Level	peak to peak	0.8	-	-	V	1
3	Harmonics		-	-	-5	dBc	
4	Symmetry	GND. level (DC cut)	40/60	-	60/40	%	
5	Frequency Stability						
	1.Tolerance	After 2 times reflow	-	-	±1.5	ppm	2,3
	2.vs. Temperature	T _A = -40 ~ +85°C	-	-	±0.5	ppm	4
	3.vs. Temperature Slope	T _A = -30 ~ +85°C	-	-	±0.2	ppm/°C	5
	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/years	
6	Start up	@90% of Final Vout level	-	-	2.0	ms	
7	Frequency Control						
	1.Control Range	V _{cont} =+1.5V±1.0V	±3.0	-	±5.0	ppm	6
	2.Input Resistance		500	-	-	kΩ	
8	SSB Phase Noise	Relative to Level Offset 100Hz	-	-	-115	dBc/Hz	
		Relative to Level Offset 1kHz	-	-	-135	dBc/Hz	
		Relative to Level Offset 10kHz	-	-	-145	dBc/Hz	

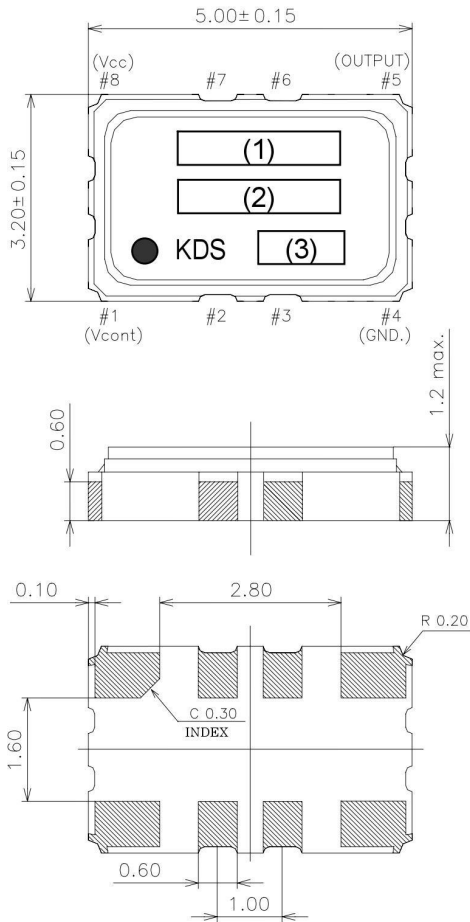
Notes

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
6. Positive slope

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8. Outline, Pin Connections

Outline



Pin Connections

Pin No.	Connection
#1	VCONT
#2	T.P.
#3	T.P.
#4	GND.
#5	OUTPUT
#6	T.P.
#7	T.P.
#8	Vcc

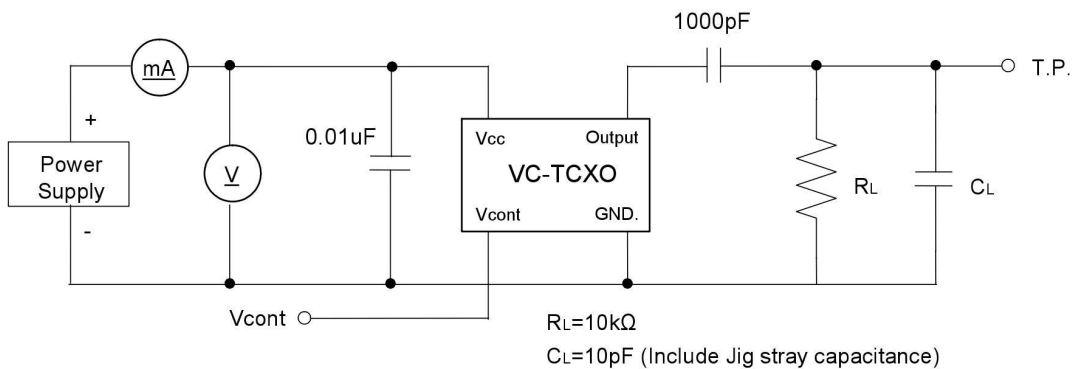
Marking

(1) Frequency XXXXX(kHz, 5digits)
 (2) Model code "A535SD"
 (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



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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 : 6ms 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→2000Hz→10Hz Sweep speed : 20min./cycle Amplitude : 1.5mm(10~55Hz) Acceleration : 200m/s ² (55~2000Hz) 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)×10 ⁵ Pa in a helium gas atmosphere. Reference specification : IEC 60068-2-17	Less than 1.0×10 ⁻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.

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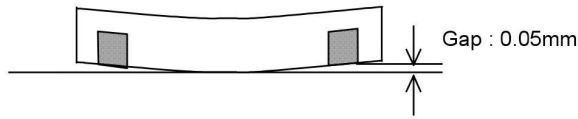
11. Environmental Characteristics

	Test Item	Test Description	Requirements
1	Low Temperature Storage	Temperature: $-40\pm 3^{\circ}\text{C}$ Duration: 1000 h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-1 Ab	$df/f < \pm 1.0\text{ppm}$ $dV_{out} < \pm 0.2V_{p-p}$
2	High Temperature Storage	Temperature: $+85\pm 2^{\circ}\text{C}$ Duration: 1000 h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-2 Bb	$df/f < \pm 1.0\text{ppm}$ $dV_{out} < \pm 0.2V_{p-p}$
3	Humidity	Temperature: $+85\pm 2^{\circ}\text{C}$ R.H. $85\pm 5\%$ Duration: 1000 h It shall be measured after 2h at room temperature, humidity. Reference specification : IEC 60068-2-3	$df/f < \pm 1.0\text{ppm}$ $dV_{out} < \pm 0.2V_{p-p}$
4	HTB	Temperature: $+85\pm 2^{\circ}\text{C}$ 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	$df/f < \pm 1.0\text{ppm}$ $dV_{out} < \pm 0.2V_{p-p}$
5	THB	Temperature: $+40\pm 2^{\circ}\text{C}$ 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	$df/f < \pm 1.0\text{ppm}$ $dV_{out} < \pm 0.2V_{p-p}$
6	Temperature Cycle	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	$df/f < \pm 1.0\text{ppm}$ $dV_{out} < \pm 0.2V_{p-p}$ 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 : 3 times 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 : 3 times Each terminals except common terminal. (Connect to test terminal) Reference specification : EIA/JESD22-A115	$df/f < \pm 1.0\text{ppm}$ No visible damage.

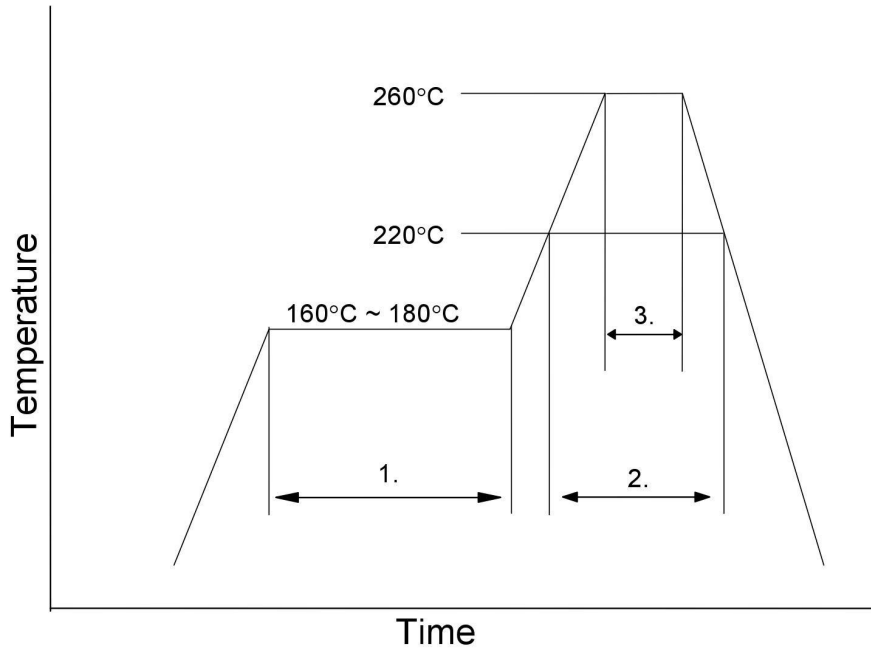
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12. Flatness of Terminal

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



13. Reflow Profile

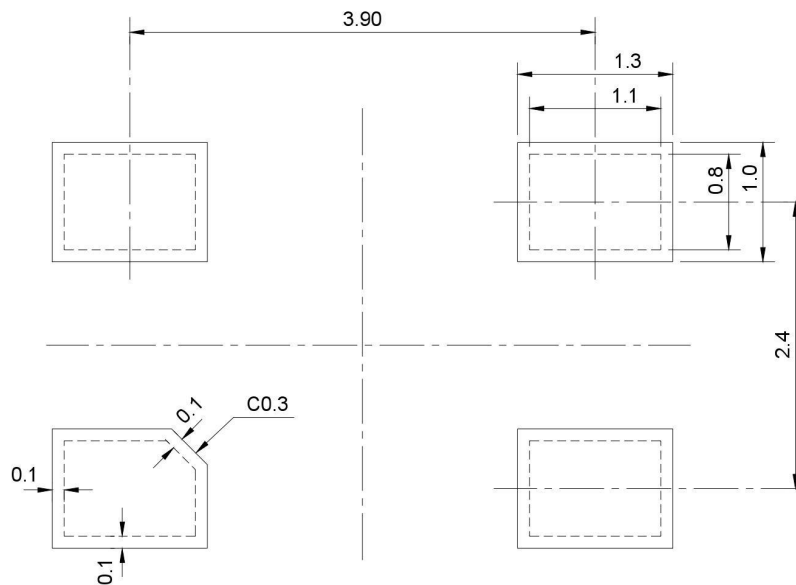


1.	Preheat	160 ~ 180°C	120sec.
2.	Primary heat	220°C	60sec.
3.	Peak	260°C	10sec. max.

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14. Land Pattern Layout(Example)

TOP VIEW



TOP VIEW
Unit: [mm]

—— Land Pattern
- - - - Metal Mask Hole

Unit: [mm]
Dimensional Tolerance: +/- 0.1

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15. Packing condition

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

4000pcs. max. per Reel.

15-5. Taping material List

See right table

15-6. Packaging Procedure

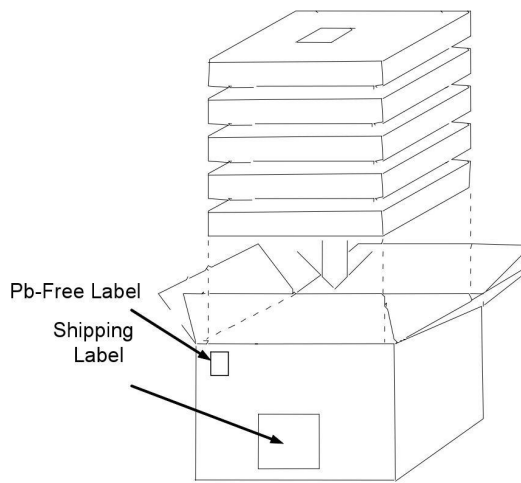
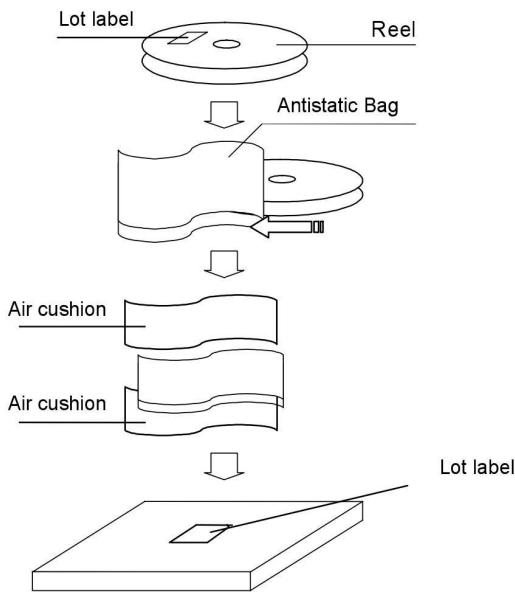
See below figure

15-7. Moisture Sensitivity

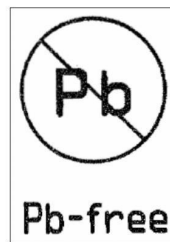
Moisture Sensitivity Level of this part is **MSL = 1** (No dry pack required)

Refer to IPC/JEDEC J-STD-033B

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



Pb-free Label detail



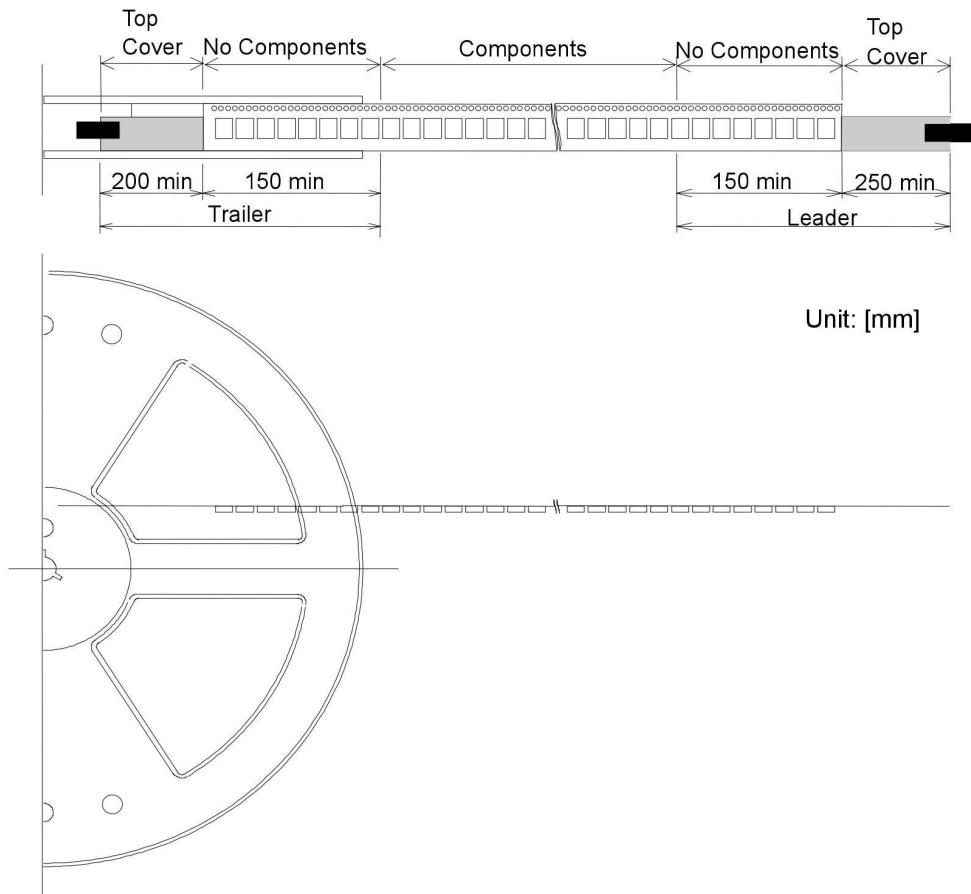
Lot label detail

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.

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The extraction direction from a reel is a clockwise rotation as shown 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 to 180 degree, pulling speed at 300mm/min, strength
 Peel strength should be 0.1N to 0.7N

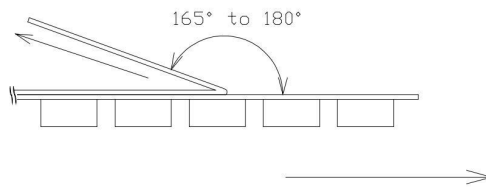
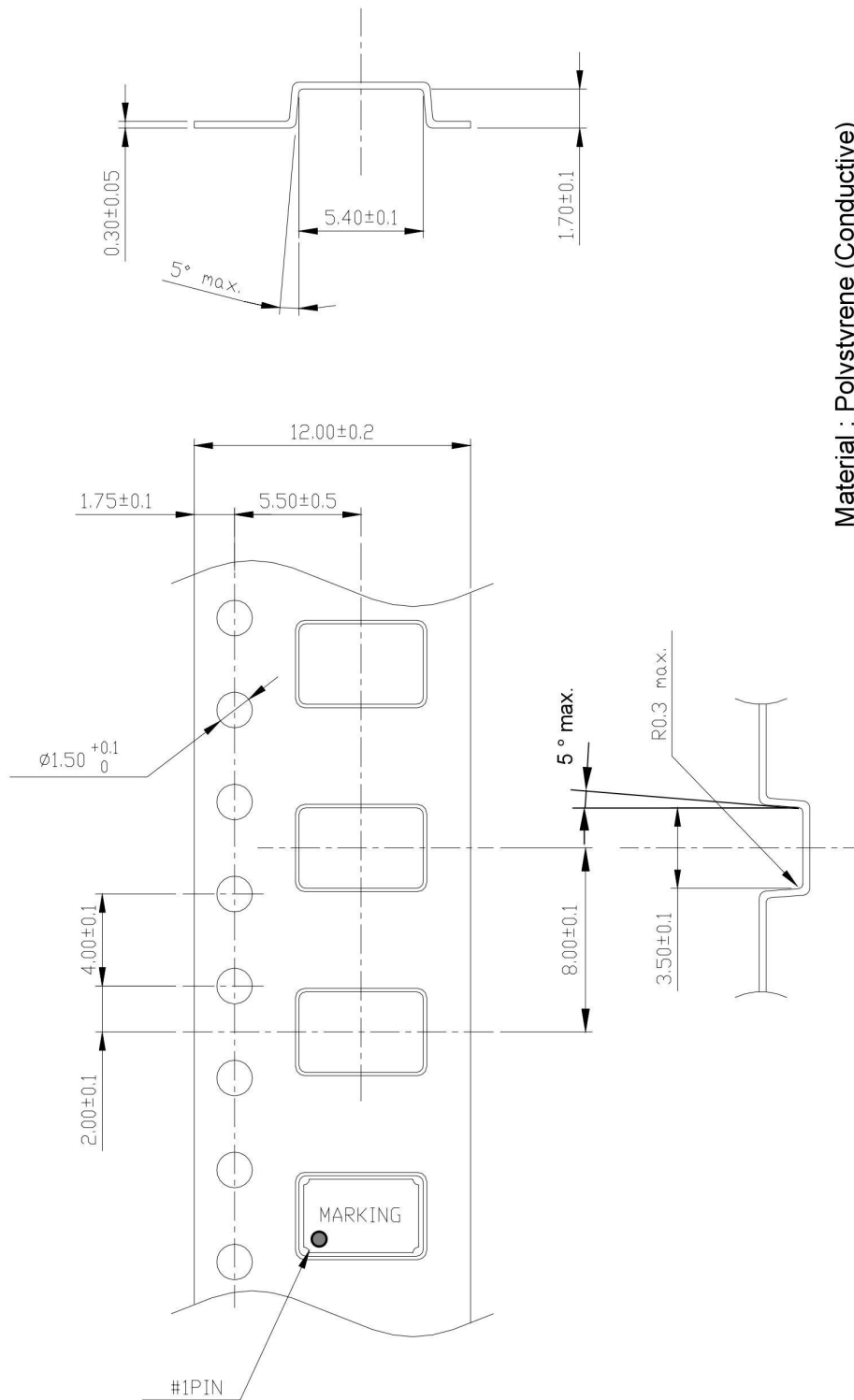


Fig.1 Taping Specification

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Material : Polystyrene (Conductive)

Fig.2 Embossed Carrier tape Format and Dimensions (Unit: [mm])

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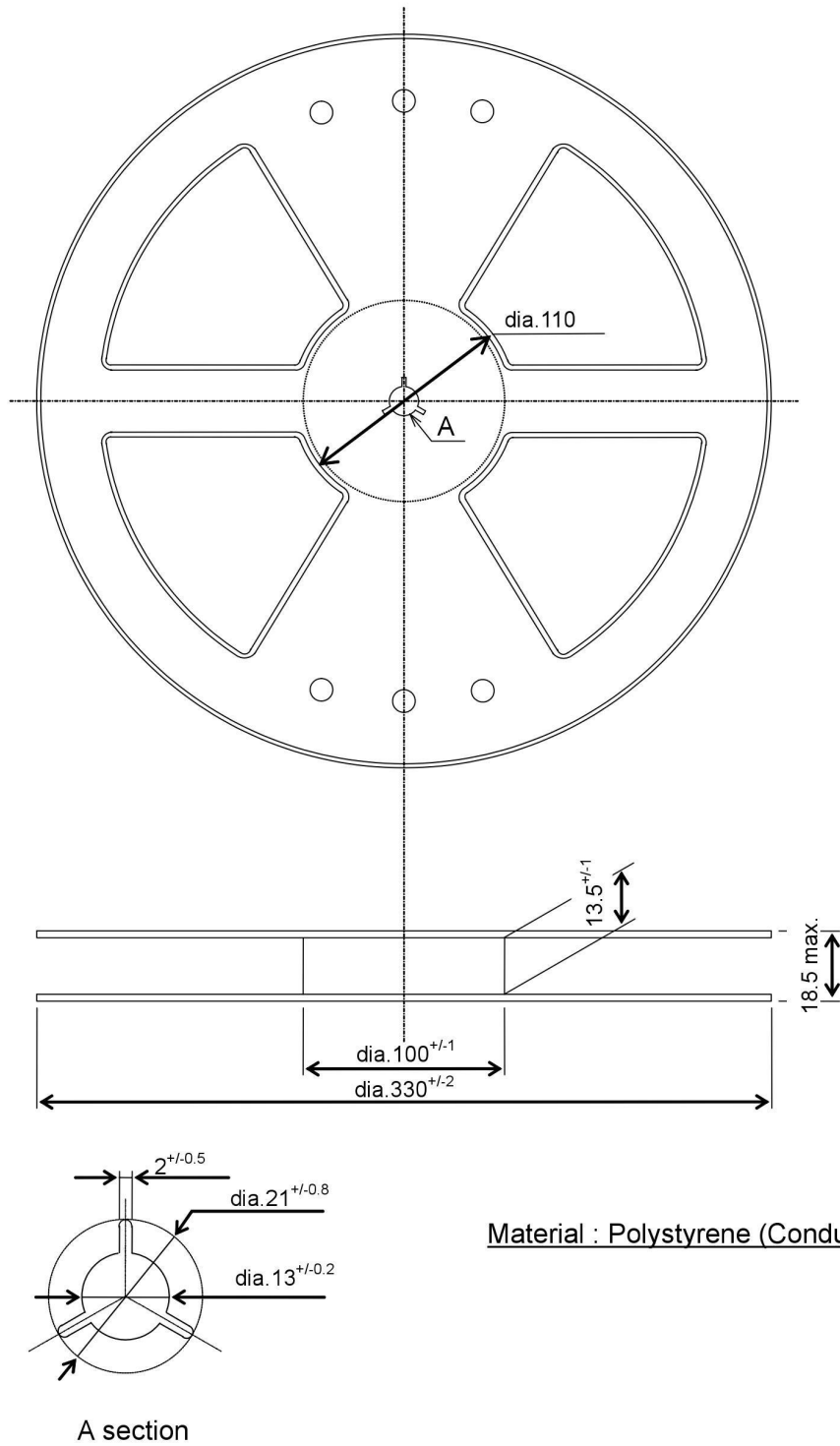


Fig 3. Reel Dimensions (Unit: [mm])

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