

1. ELECTRICAL CHARACTERISTICS

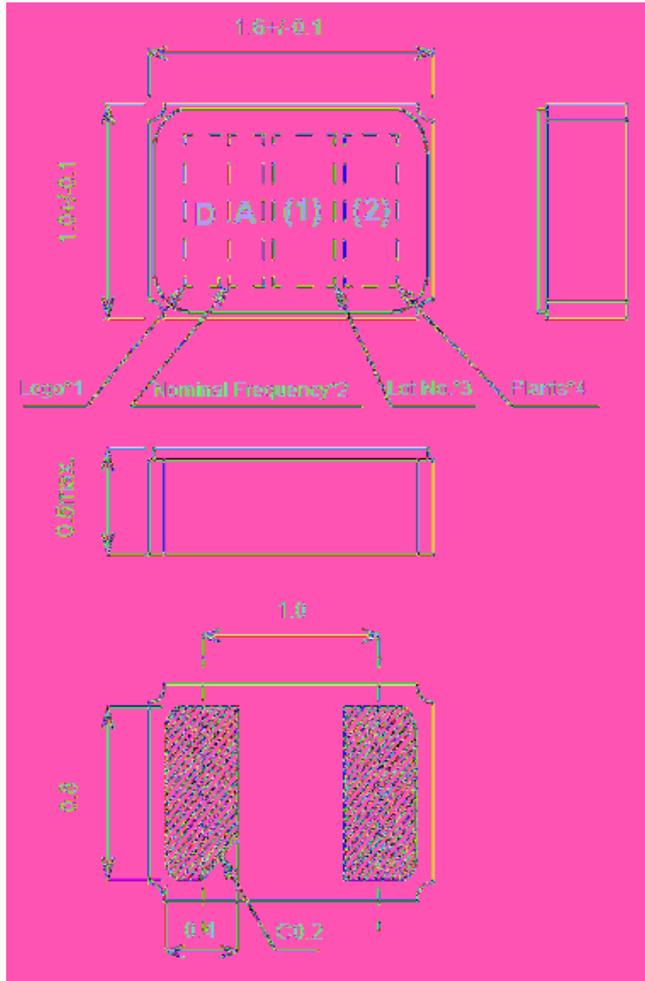
(This test shall be performed under the conditions of temp.at +25±3°C,Relative humidity 60%max.)

1.1. NOMINAL FREQUENCY	32.768 kHz
1.2. OVERTONE ORDER	Fundamental
1.3. LOADING CAPACITANCE(CL)	12.5 pF
1.4. FREQUENCY TOLERANCE	±20 ×10 ⁻⁶ max. (at +25±3°C)
1.5. DRIVE LEVEL	0.1 μW ± 20% (0.5μW max.)
1.6. SERIES RESISTANCE	90 kΩ max. (at Series)
1.7. TURNOVER TEMPERATURE	+25 ±5°C
1.8. PARABOLIC COEFFICIENT	-0.04×10 ⁻⁶ / °C ² max.
1.9. SHUNT CAPACITANCE	1.3 pF typ.
1.10. OPERATING TEMPERATURE RANGE	-40 ~ +85 °C
1.11. STORAGE TEMPERATURE RANGE	-40 ~ +85 °C
1.12. INSULATION RESISTANCE	500 MΩ min. (at DC100±15V)

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2. DIMENSIONS AND MARKING

2.1. DIMENSIONS



unit : mm

Tolerance ± 0.1

Fig.-1

2.2. MARKING

Marking should be printed as follows:

Logo(*1),Nominal Frequency(*2),Lot No.(*3),Plants(*4)

*1 Manufacturer's trademark shall be marked 'D' as Logo.

*2 In case of 32.768kHz, nominal frequency shall be marked 'A'.

*3 Lot No. shall be marked three figures.

(1) Year:The last digit of the year.

Week:We gave the sequence of week numbers 01(first week) for production date.

There are starting from 1st of Jan.

However, add '0' figure to the first week during the 9th weeks.

The week means are from Sunday to Saturday.

ex. Manufactured day: 2020.01.01 \longrightarrow 0 01
Year Week

*4 Plants puts "C" mark only for TIANJIN KDS CORP.

(2) Tottori Production Div.:Nothing

TIANJIN KDS CORP.: "C"

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3. PACKING

3.1. EMBOSS CARRIER TAPE AND REEL

(1)Dimensions of Emboss carrier tape

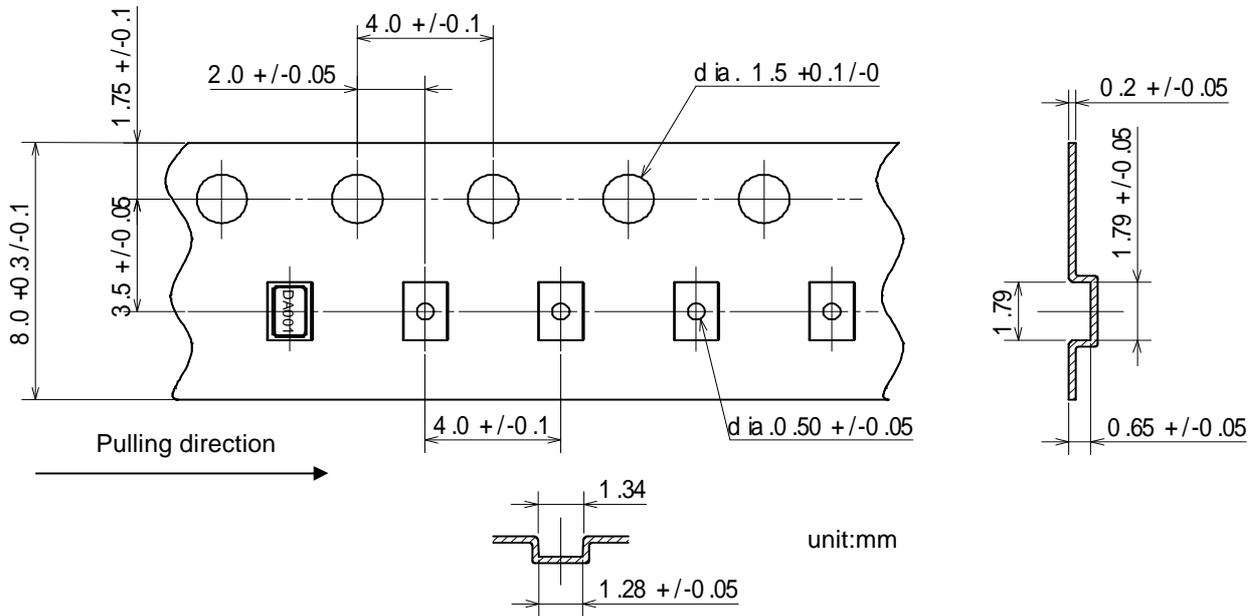


Fig.-2

(2)Dimensions of tape reel

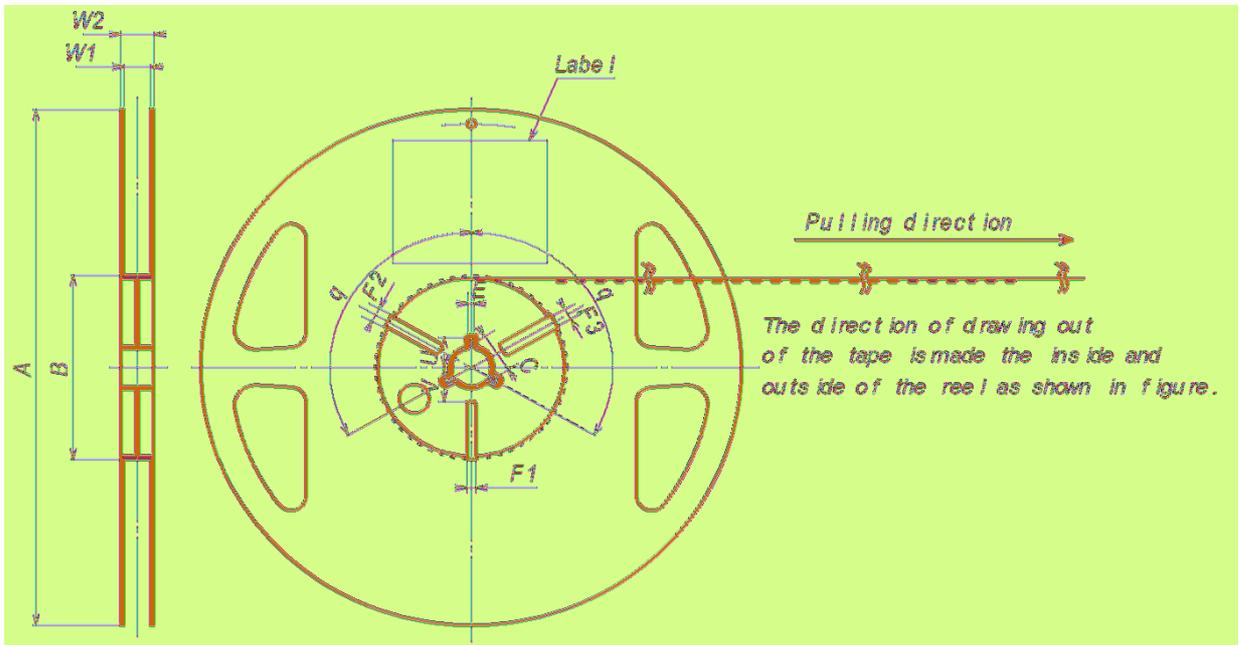


Fig.-3

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Table-1

unit:mm

Item		Mark	Dimensions / Angle	
Flange	Diameter	A	Φ180 +0.0 / -3.0	
	Inside width	W1	9.0 ± 0.3	
	Outside width	W2	11.4 ± 1.0	
	Inside diameter	B	Φ60 +1.0 / -0.0	
Center Core	Center core slit	Width	F1	3.0 ± 0.2
			F2	4.0 ± 0.2
			F3	5.0 ± 0.2
		Length	V	11.9
		Position	q	120 °
	Spindle diameter		C	Φ13 ± 0.2
	key Seats	Width	E	2.0 ± 0.5
		Length	U	10.5 ± 0.4
		Position	q	120 °
Indication of type		Sticker label on one side of flange		

(3)Storage Condition

Temperature;+40°C max.,Relative Humidity;80% max.
Storage Period:6months max.

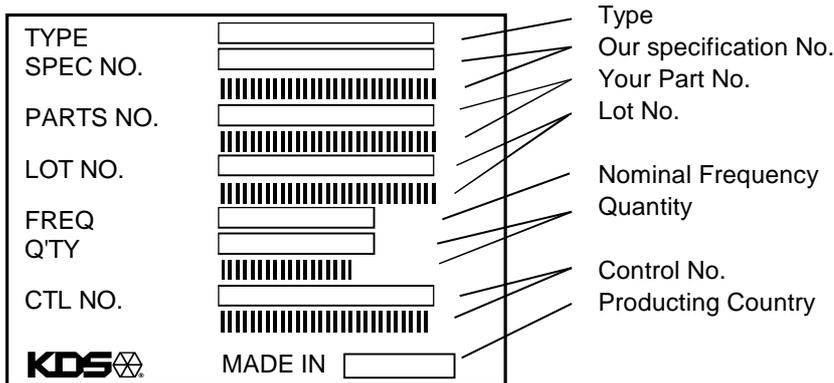
(4)Standard packing quantity

3,000pcs./reel for Φ180

(5)Material of the tape

tape	Material
Carrier tape	Polystyrene,Carbon
Cover tape	Polyethylene

(6)Label Contents



Stick a label on the each reel.

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(7)Taping Dimension

Leader	Cover tape	The length of cover tape in the leader is more than 400mm including empty embossed area.
	Carrier tape	After all products were packaged,must remain more than twenty pieces or 400mm empty embossed area,which should be sealed by cover tape.
Terminal	Cover tape	The empty embossed area which are sealed by cover tape must remain more than 40mm.
	Carrier tape	

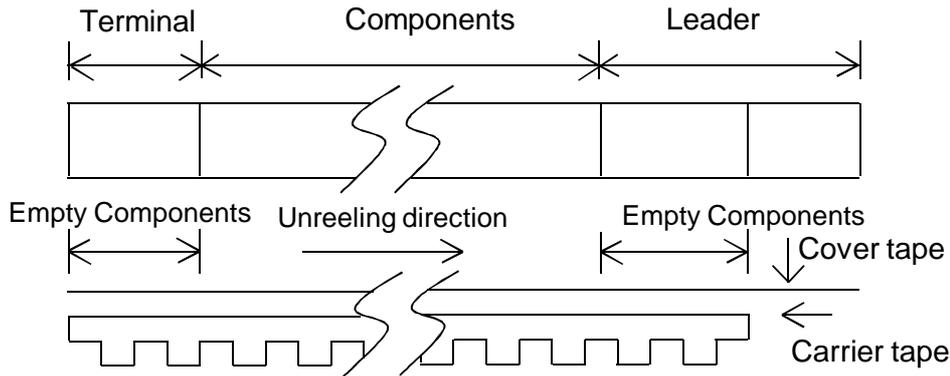


Fig.-4

(8)Joint of tape

The carrier tape and cover tape should not be jointed.

(9)Release strength cover tape

It has between 0.1~0.7N under following condition.

- Pulling direction 165~180 °
- Speed 300mm/min
- Otherwise unless specified

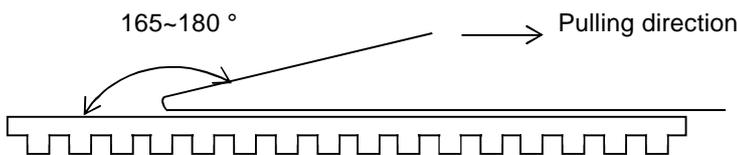


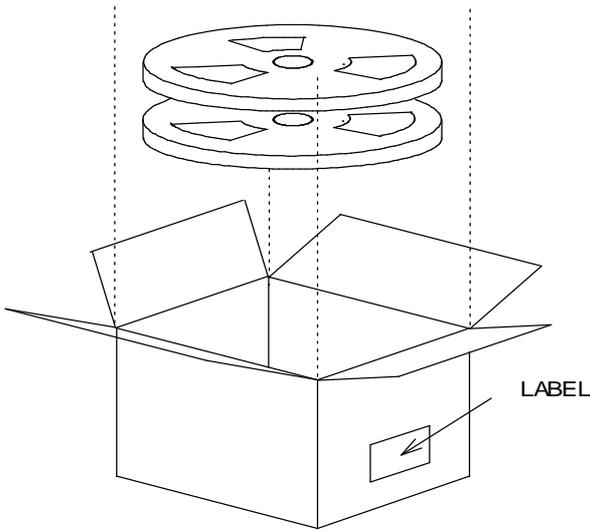
Fig.-5

The component must be free fall,when tear away the cover tape with upside-down the emboss carrier tape.

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3.2. PACKING

(1)The way of packing and label



Label contents
 TYPE
 SPEC NO.
 LOT NO.
 FREQ.
 QTY
 CTL NO.

Fig.-6

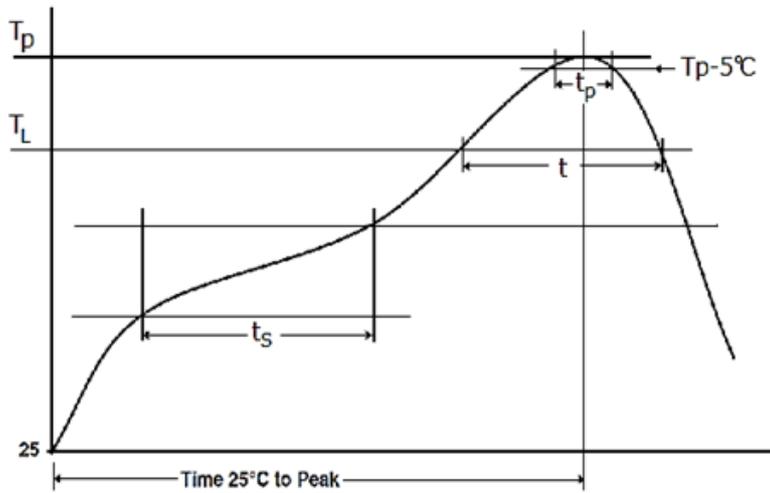
(2)The size of packing carton

There may be different size of packing carton used depending on the lot size.
 Also,the product packed inside shall be protected by air cushion.

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4. REFLOW CONDITIONS (REFERENCE)

During the solder reflow process, please complete within following temperature period.
 Reflow soldering shall be allowed only 3 times.



ts (°C)	150~200
ts time (s)	60~120
T _L (°C)	217
t time (s)	60~90
T _p (°C)	max. 260
tp (s)	max. 30

Fig.-7

5. LAND PATTERN (REFERENCE)

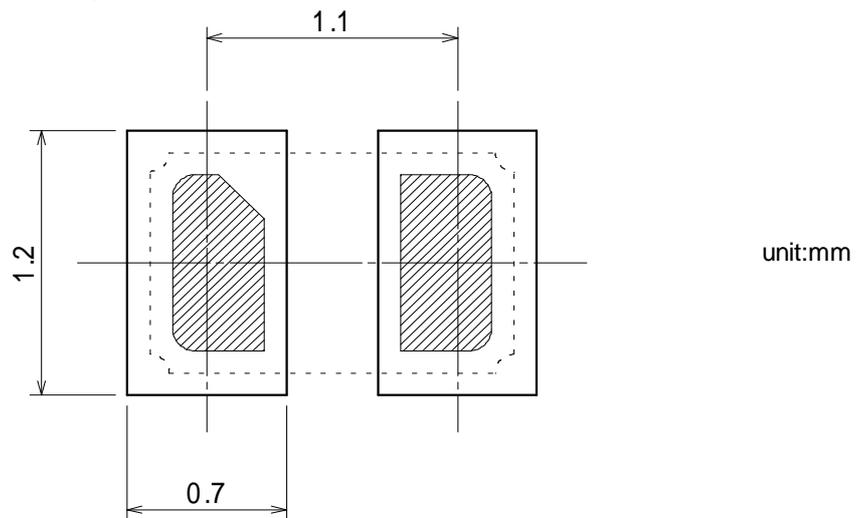


Fig.-8

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6. MECHANICAL ENDURANCE

6.1. SHOCK (MOUNTING DROP)

After the following test, parts shall conform specification table-2-A.

10cycles(60times) drop from 150cm heights to concrete.

Further, parts shall be solderd on substrate, fixed Aluminum materials(about 100g).

- Substrate materials : FR-4, t=1.6mm
- 1cycle : each 1times of 6directions

6.2. SHOCK (ACCELERATION)

After the following test, parts shall conform specification table-2-A.

1000m/s² by 6ms X,Y,Z each axis (6directions), 10cycles

6.3. VIBRATION

After the following test,parts shall conform specification table-2-A,
and no abnormal appearance shall be observed.

- (1)Frequency of Vibration : 10~2000Hz
- (2)Amplitude total : Sine waves of 1.5mm (10~55Hz) and 200m/s² (55~2000Hz)
- (3)Vibration axis : X,Y,Z
- (4)Vibration period : 2h for each axis
- (5)Cycle : 20min

6.4. SUBSTRATE BENDING

After the following test, parts shall conform specification table-2-A,
and no abnormality shall be observed in external appearance and sealing
tightnen and others shall be based on ET-7403 of EIAJ.

Mount the specimen on substrate.

Apply the following pressure

- Direction : see Fig.-9
- Speed : 1.0mm/s
- Hours : 5±1s
- Amount of substrate: 3mm max.
- Substrate materials : FR-4, t=1.6mm



Fig.-9

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6.5. SHEAR

After the following test, parts shall conform specification table-2-A, and no abnormality shall be observed in external appearance and sealing tightness and others shall be based on ET-7403 of EIAJ.

Mount the specimen on substrate.

Apply the following pressure

- Pressure jig : R0.5
- Weight : 5N
- Hours : 10±1s
- Direction : see Fig.-10

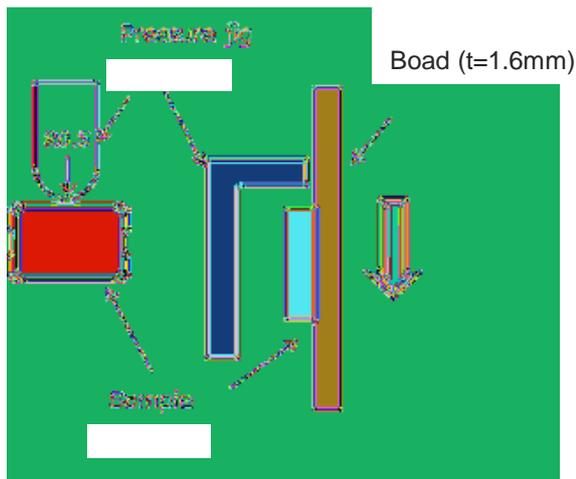


Fig.-10

6.6. BODY STRENGTH

After the following test, parts shall conform specification table-2-A, and no abnormality shall be observed in external appearance and sealing tightness and others shall be based on ET-7403 of EIAJ.

Mount the specimen on substrate.

Apply the following pressure

- Pressure jig : R0.5
- Weight : 3N
- Hours : 10±1s
- Direction : see Fig.-11

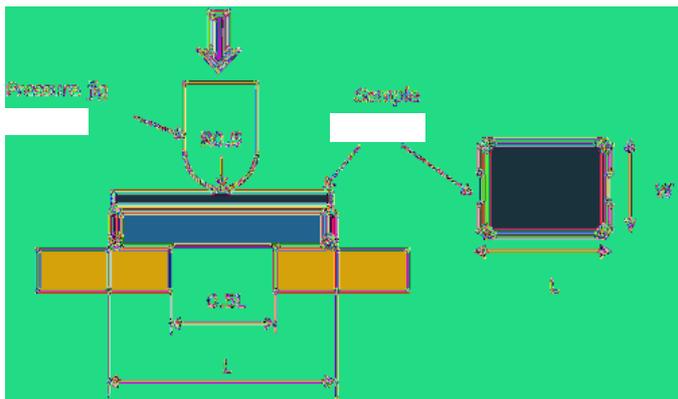


Fig.-11

6.7. SEAL

Less than 1.0×10^{-9} Pa·m³/s by Helium leak detector.

6.8. SOLDERABILITY

After the following test. More than 90% of terminal shall be covered by new solder.

- 3±0.5s dip in +245±5°C solder.
- (Solder composition : Sn-3Ag-0.5Cu)
- (Use rosin type flux for solder.)

6.9. RESISTANCE TO SOLDERING HEAT (REFLOW)

48h past at room temperature from following test, parts shall conform specification table-2-B. perform the attached reflow conditions to reference.

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7. ENVIRONMENTAL ENDURANCE

7.1. HUMIDITY

2h past at room temperature after following test, parts shall conform specification table-2-C.

240h $+85\pm 2^{\circ}\text{C}$, relative humidity $85\pm 5\%$.

7.2. LOW TEMPERATURE

2h past at room temperature after following test, parts shall conform specification table-2-B.

240h $-40\pm 2^{\circ}\text{C}$

7.3. HIGH TEMPERATURE

2h past at room temperature after following test, parts shall conform specification table-2-C.

240h $+85\pm 2^{\circ}\text{C}$

7.4. TEMPERATURE CYCLE

2h past at room temperature after 200cycles of following test, parts shall conform specification table-2-C.

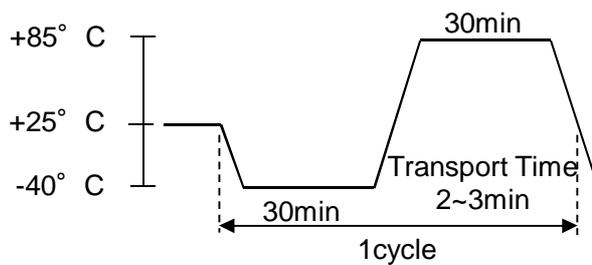


Fig.-12

8. SPECIFICATION

Table-2

	Frequency Variation	Series Resistance Variation
A	$\pm 5 \times 10^{-6}$	$\pm 10\text{k}\Omega$ max.
B	$\pm 10 \times 10^{-6}$	$\pm 10\text{k}\Omega$ max.
C	$\pm 15 \times 10^{-6}$	$\pm 10\text{k}\Omega$ max.

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9. THE CAUTIONS ON USE FOR DST1610A

9.1. SOLDERING

Please perform reflow conditions within 3times.

9.2. MOUNT

Crystal products are designed to be compatible with automatic mounting.

Be sure to have a mounting test in advance by using the actual mounting machine and check that the characteristics of the products are not damaged by the automatic mounting.

In the process where the board is warped,such as board separation process, be careful that the warping does not influence the characteristics and soldering of crystal products.

Since mounting by Ultrasonic welding and processing have a possibility of an excessive vibration spreading inside a tuning fork crystal resonator and becoming the cause of characteristic deterioration and not oscillating,it does not recommend.

Please repair at +260°C in 10s within hot air.

9.3. WASHING

About use of the washing liquid of a basin system, an alcoholic system,and a chlorofluorocarbon-replacing material system,it is checking that it is satisfactory.

However please consult in advance about other washing liquid.

Tuning fork crystal resonators should not have ultrasonic washing because their frequency band is close to the washing frequency band of ultrasonic washing machines,very probably causing resonance destruction.

To use ultrasonic washing to clean these resonators, tests must be performed in advance under actual application conditions.

9.4. DRIVE LEVEL

The piece of crystal it is processed very smaller than the conventional thing inside DST1610A series crystal unit may be damaged,

if crystal resonators are exposed to an excessively high drive level.

Please use the products within the limits specified in the catalogs and specifications.

9.5. HANDLING OF A PRODUCT

DST1610A series has sufficient intensity to fall and vibration.

However,if a crystal product is pressed hard, be sure to check for any damages before using.

Crystal resonators should not have pattern to avoid causing base crack.

Avoid heating this product at +280 deg.C or higher since its sealingmaterial may be melted.

9.6. STORAGE

Since the solderability of pins may deteriorate, please avoid storage in high-temperature,high-humidity place.

Please store crystal products in a place free from direct sunlight and condensation.

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