



Serial No. : 2011-0476

DATE : 2011/04/14

ITEM : **CRYSTAL RESONATOR**

TYPE : **DST310S**

NOMINAL FREQUENCY : **32.768KHz**

SPEC No. : **1TJF090DP1AI075**

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

RECEIPT	
DATE	
RECEIVED	(signature)  (name)

General Manufacturer of Quartz Devices

**DAISHINKU CORP.**

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## 1. ELECTRICAL CHARACTERISTICS

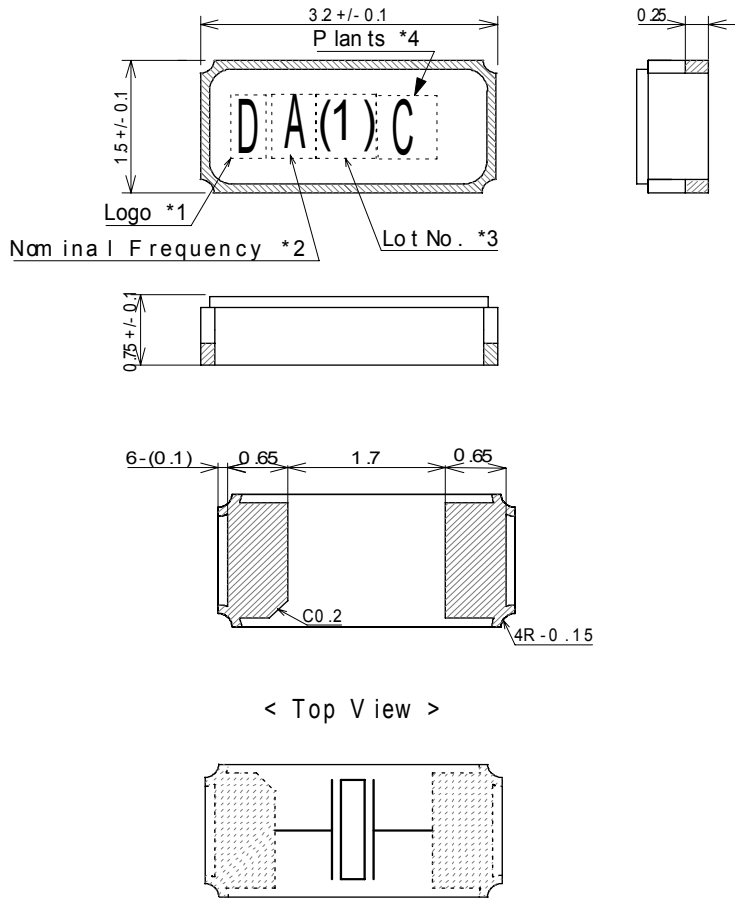
(This test shall be performed under the conditions of temp.at +25±3°C,Relative humidity 60%max.)

1.1. NOMINAL FREQUENCY	32.768 kHz
1.2. OVERTONE ORDER	Fundamental
1.3. LOADING CAPACITANCE(CL)	9.0 pF
1.4. FREQUENCY TOLERANCE	±20 ×10 <sup>-6</sup> max. (at +25±3°C)
1.5. DRIVE LEVEL	0.2 μW ± 20% (1μW max.)
1.6. SERIES RESISTANCE	80 kΩ max. (at Series)
1.7. TURNOVER TEMPERATURE	+25 ±5°C
1.8. PARABOLIC COEFFICIENT	-0.04×10 <sup>-6</sup> / °C <sup>2</sup> max.
1.9. SHUNT CAPACITANCE	1.3 pF Typ.
1.10. OPERATING TEMPERATURE RANGE	-40 ~ +85 °C
1.11. STORAGE TEMPERATURE RANGE	-40 ~ +125 °C
1.12. INSULATION RESISTANCE	500 MΩ min. (at DC100±15V)

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2. DIMENSIONS AND MARKING

2.1. DIMENSIONS



< Top View >

unit : mm

Tolerance  $\pm 0.1$

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.

(2)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: 2011.04.14  $\longrightarrow$  1 16  
Year Week

\*4 Manufactured in TIANJIN KDS CORP. shall be marked 'C' as Plants.

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3. PACKING

3.1. EMBOSS CARRIER TAPE & REEL

(1)Dimensions of Emboss carrier tape

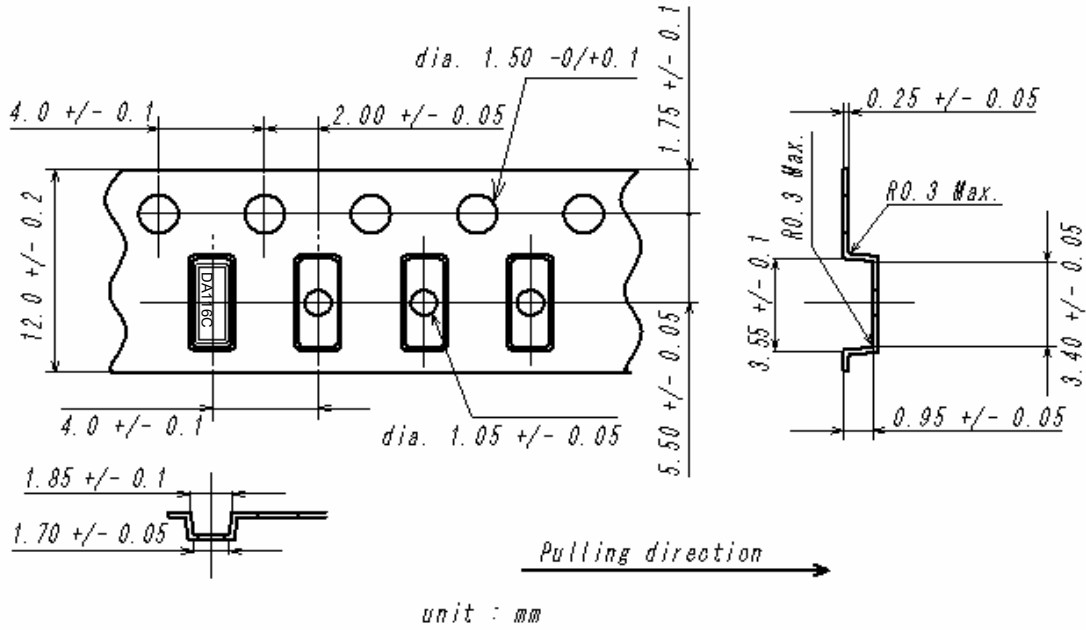


Fig.-2

(2)Dimensions of tape reel

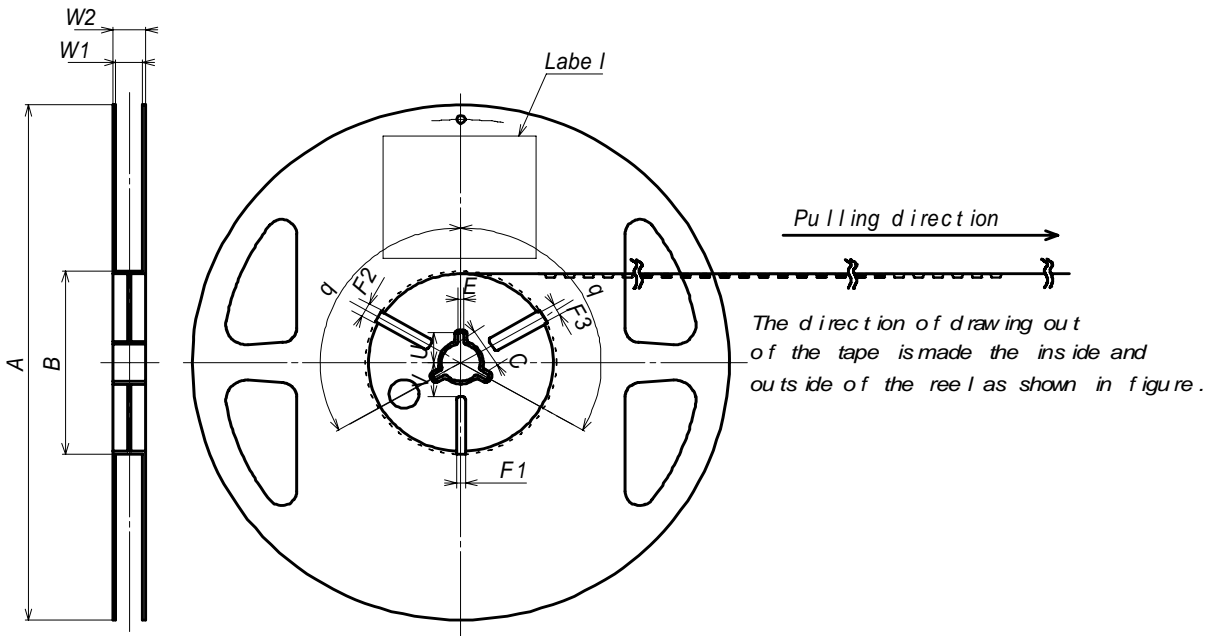


Fig.-3

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Table-1

unit:mm

Item		Mark	Dimensions / Angle	
Flange	Diameter	A	$\Phi 180 +0 -3.0$	
	Inside width	W1	$13.0 \pm 0.3$	
	Outside width	W2	$15.5 \pm 1.0$	
Center Core	Out Line diameter		B	$\Phi 60 +1.0 -0$
	Center core slit	Width	F1	$3.0 \pm 0.2$
			F2	$4.0 \pm 0.2$
			F3	$5.0 \pm 0.2$
		Length	V	11.9
		Position	q	$120^\circ$
	Spindle diameter		C	$\Phi 13 \pm 0.2$
	key Seats	Width	E	$2.0 \pm 0.5$
		Length	U	$10.5 \pm 0.4$
Position		q	$120^\circ$	
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  $\Phi 180$

## (5)Material of the tape

tape	Material
Carrier tape	Polystyrene,Carbon
Cover tape	Polyester

## (6)Label Contents

Type  
Our specification No.  
Your Part No.  
Lot No.  
Nominal Frequency  
Quantity  
Our Company Name

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 tip of cover tape shall be fixed temporary by paper tape and roll around the core of reel one round.
	Carrier tape	The empty embossed area which are sealed by cover tape must remain more than 40mm.

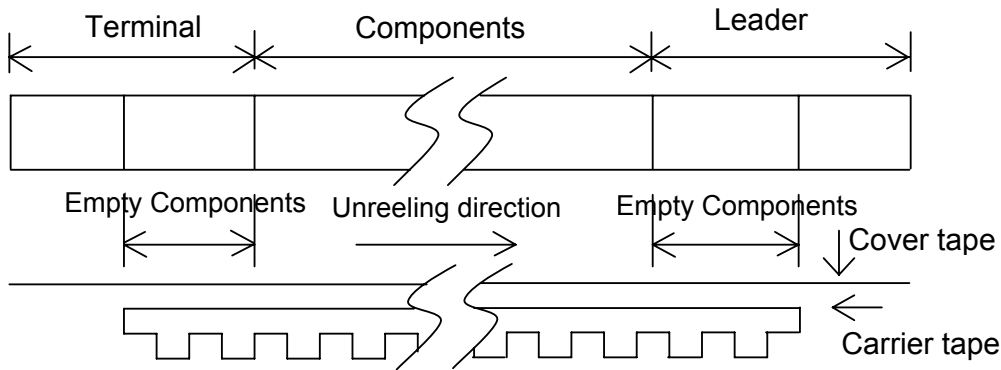


Fig.-4

(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

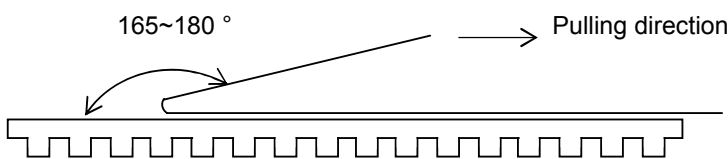


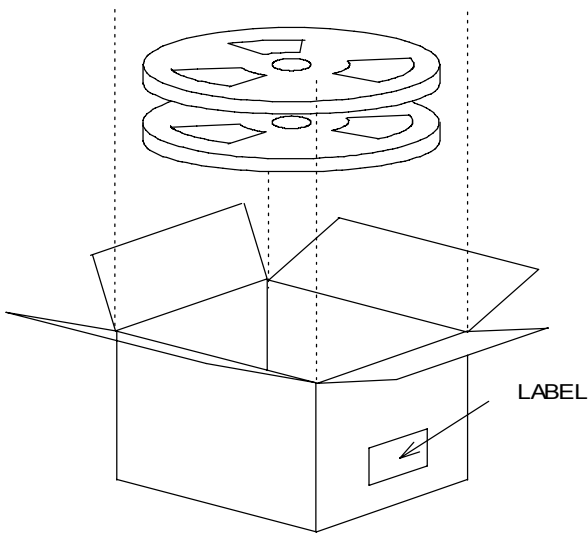
Fig.-5

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  
 The type of product  
 Lot No.  
 Specification  
 Quantity  
 Shipment Day  
 Remark

Fig.-6

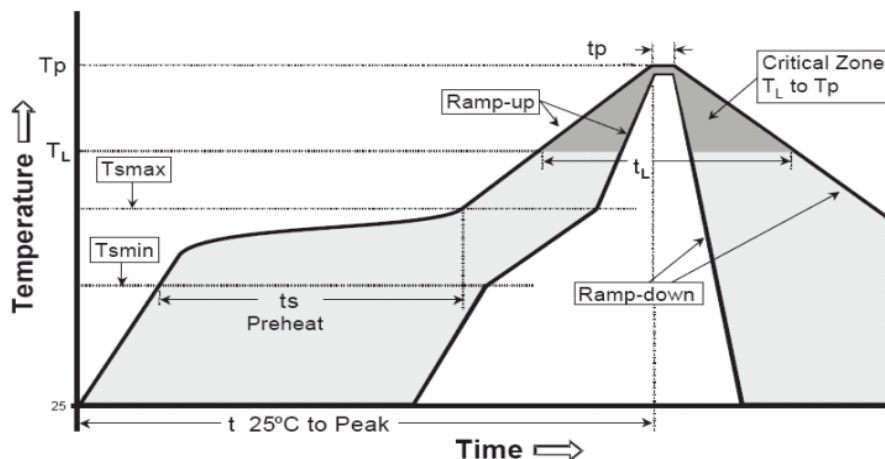
(2)The size of packing carton

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 2 times.



Profile Feature	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	3°C/s max.
Preheat	150°C
– Temperature Min ( $T_{smin}$ )	200°C
– Temperature Max ( $T_{smax}$ )	60~180 s
– Time (min to max) ( $t_s$ )	
$T_{smax}$ to $T_L$	3°C/s max.
– Ramp-up Rate	
Time maintained above:	217°C
– Temperature ( $T_L$ )	60~150s
– Time ( $t_L$ )	
Peak Temperature ( $T_P$ )	245 +0/-5°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	10~30s
Ramp-down Rate	6°C/s max.
Time 25°C to Peak Temperature	8min max.

Fig.-7

HANDSOLDERING METHOD

HANDSOLDERING METHOD : 350±10°C, 3+1/-0s Each terminal once  
(Please take care so that a soldering iron should not touch a lid directly.)

5. LAND PATTERN (REFERENCE)

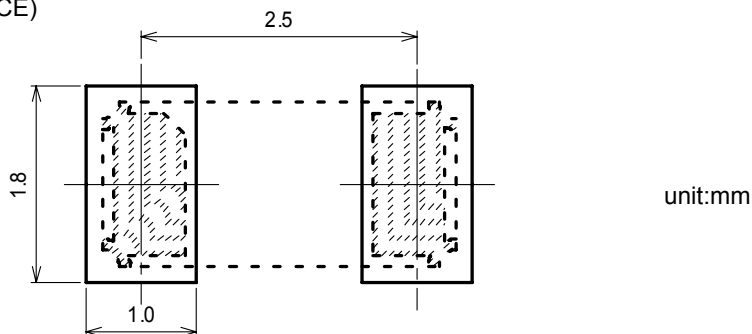


Fig.-8

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6. MECHANICAL ENDURANCE

6.1. SHOCK

After the following test, parts shall conform specification table-2-B.  
 3times free drop from 75cm heights to hard wood board of minimum thickness 30mm.

6.2. VIBRATION

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

- (1)Frequency of Vibration : 10~55Hz 15min
- (2)Amplitude total : 1.5mm
- (3)Vibration axis : X,Y,Z
- (4)Vibration period : 2h for X,Y,Z axis

6.3. SUBSTRATE BENDING

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  
 Direction : see Fig.-9  
 Speed : 0.5mm/s  
 Hours : 5±1s  
 Amount of substrate: 3mm max.

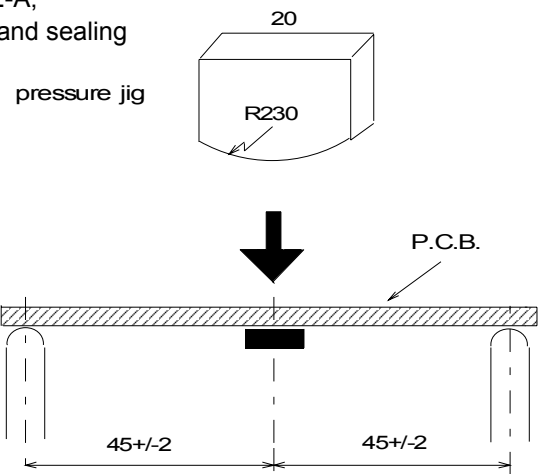


Fig.-9

6.4. 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  
 Weight : 10N  
 Hours : 10±1s  
 Direction : see Fig.-10

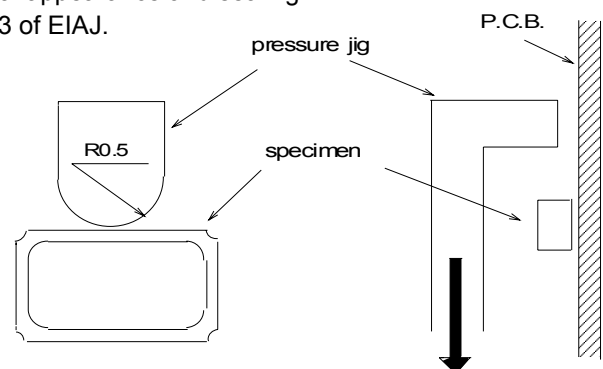


Fig.-10

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### 6.5. 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 : 10N

Hours : 10±1s

Direction : see Fig.-11

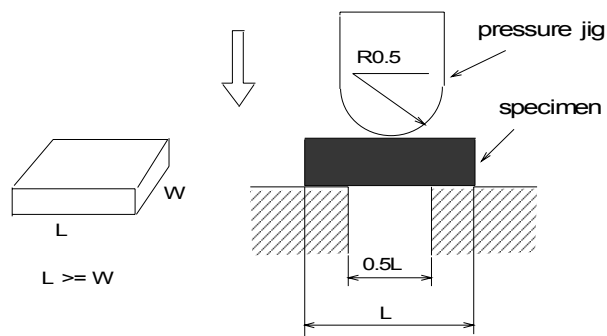


Fig.-11

### 6.6. SEAL

Less than  $2.0 \times 10^{-9}$  Pa·m<sup>3</sup>/s by Helium leak detector.

Also, no bubble is observed by Fluorinert tests

### 6.7. SOLDERABILITY

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

3±1s dip in 235±5°C solder.

(Use rosin type flux for solder.)

### 6.8. RESISTANCE TO SOLDERING HEAT (REFLOW)

48hours past at room temperature from following test, parts shall conform specification table-2-C.

perform the attached reflow conditions to reference.

### 6.9. RESISTANCE TO SOLDERING HEAT (HAND SOLDERING METHOD)

48hours past at room temperature from following test, parts shall conform specification table-2-C.

350±10°C, 3+1/-0s Each terminal once

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7. ENVIRONMENTAL ENDURANCE

7.1. HUMIDITY

2hours past at room temperature after following test,parts shall conform specification table2-C.  
 240h +85±2°C,relative humidity 85±5%.

7.2. LOW TEMPERATURE

2hours past at room temperature after following test,parts shall conform specification table2-C.  
 240h -40±3°C

7.3. HIGH TEMPERATURE

2hours past at room temperature after following test,parts shall conform specification table-2-C.  
 240h +85±2°C

7.4. TERMAL SHOCK TEST

2hours past at room temperature after 25cycles of following test,parts shall conform specification table-2-C.

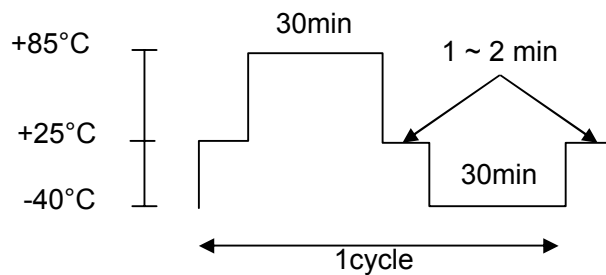


Fig.-12

8. SPECIFICATION

Table-2

	Frequency Variation	Equivalent Resistance
A	±5×10 <sup>-6</sup>	±25 % or ±10kΩ max. (Use larger specification)
B	±8×10 <sup>-6</sup>	±25 % or ±10kΩ max. (Use larger specification)
C	±10×10 <sup>-6</sup>	±25 % or ±10kΩ max. (Use larger specification)

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## 9. THE CAUTIONS ON USE FOR DST310S

### 9.1. SOLDERING

Please perform reflow conditions within 2 times.

### 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.

### 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 DST310S 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

DST310S series has sufficient intensity to fall and vibration. Crystal resonators should not have pattern to avoid causing base crack.

### 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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