Serial No. 2006-0570

DATE : 2006/04/27

ITEM : QUARTZ CRYSTAL

TYPE : DSX321G

NOMINAL FREQUENCY : 24.000000MHz

SPEC No. : 1B224000BC0E
1C224000BC0E

USER PARTS NO . :

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

RECEIPT	
DATE	
RECEIVED	(signature) (name)

General Manufacture of Quartz Devices

DAISHINKU CORP.

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675-0194 Japan
http://www.kds.info/english.html

Phone(81)794-25-3141

Fax (81)794-25-1134

C.ENG.

ENG.

1. ELECTRICAL CHARACTERISTICS

(This test shall be performed under the conditions of temp.at 25 +/- 3deg. C, humidity 60% max.)

1-1	NOMINAL FREQUENCY	24.000000 MHz
1-2	MODE	Fundamental
1-3	LOADING CAPACITANCE	12.0 pF
1-4	FREQUENCY TOLERANCE	+/- 20 ppm Max. at +25 deg.C +/- 3 deg.C
1-5	DRIVE LEVEL	10 uW +/- 2 uW
1-6	EQUIVALENT SERIES RESISTANCE	60 ohms Max. / Series
1-7	OPERATING TEMPERATURE RANGE	-10 deg.C to +70 deg.C
1-8	FREQUENCY TEMPERATURE CHARACTERISTICS	+/- 30 ppm Max. / -10 deg.C to +70 deg.C
1-9	SHUNT CAPACITANCE	2.0 pF Max.
1-10	INSULATION RESISTANCE	500 Mohms Min. / DC100V +/- 15V
1-11	STORAGE TEMPERATURE RANGE	-40 deg.C to +85 deg.C

2.CONSTRUCTION

2-1	HOLDER	DSX321G Ceramic Base
2-2	DIMENSIONS AND MARKING	Refer to Fig.-1 and Table-1.

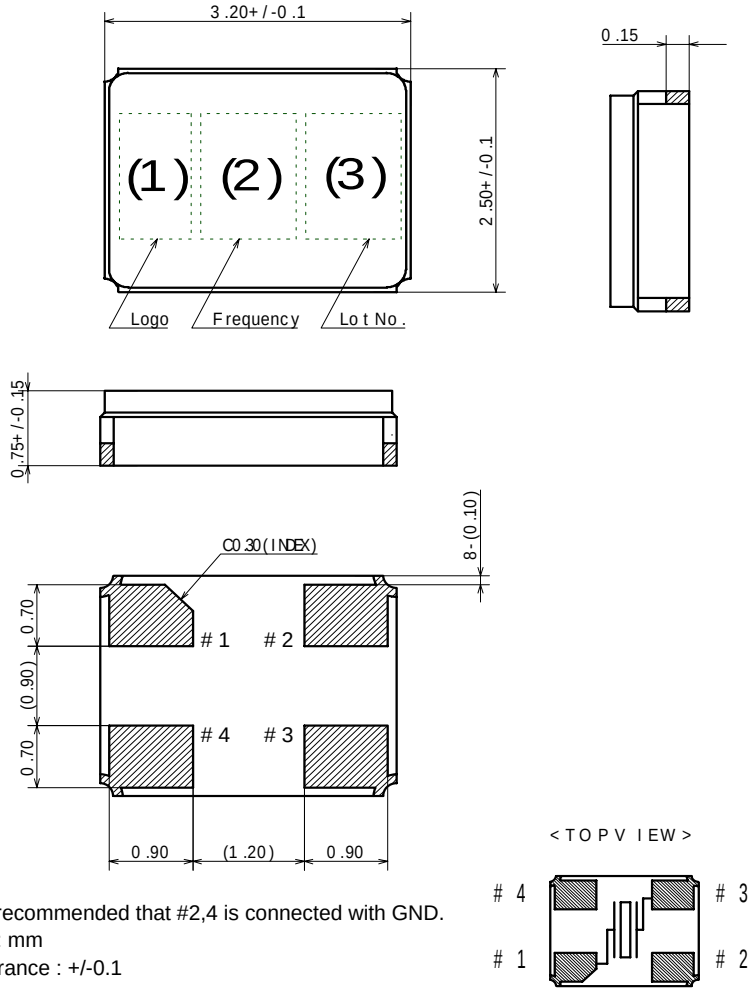
3.OTHER SPECIFICATIONS

3-1	EMBOSS CARRIER TAPE & REEL	Refer to Fig.-2,3,4,5 and Table-2.
3-2	PACKING	Refer to Fig.-6.
3-3	REFLOW CONDITIONS (REFERENCE)	Refer to Fig.-7.
3-4	LAND PATTERN (REFERENCE)	Refer to Fig.-8.

4. Environmental and mechanical performance shall be specified by attached general specification.

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< DIMENSIONS AND MARKING >



It is recommended that #2,4 is connected with GND.
unit : mm
Tolerance : +/-0.1

(Fig.-1)

Marking is Laser Marking:
Marking should be printed as follows:
Logo , Nominal Frequency , manufactured year & month
Logo and manufacturing location (1)

Producing District	Marking	Our Specification.No.
Japan	D	1B224000BC0E
Indonesia	D	1C224000BC0E

Nominal Frequency (2) = Mark two dights from upper
(ex. 24.0000 MHz --> 24)
Manufacturing lot No.(3)
(year) ex. 2006 shall be marked as ' 6 ' (The last digit of the year)
(Month) ex. April shall be marked as ' D ' (As shown in Table-1.)

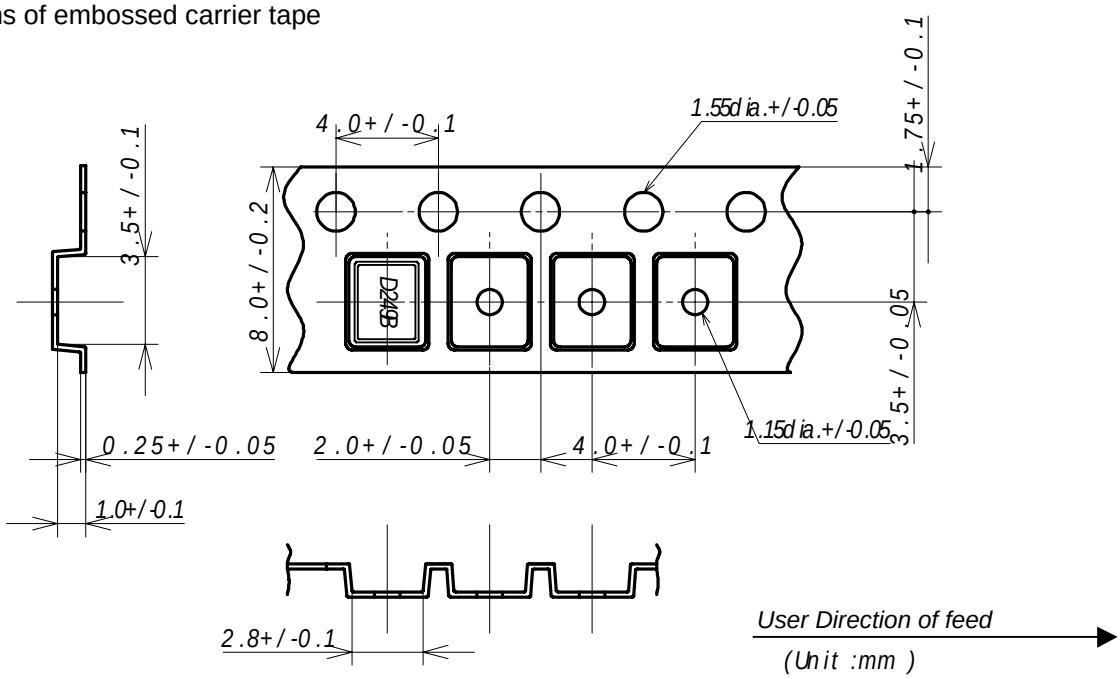
(Table-1)

Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
A	B	C	D	E	F	G	H	J	K	L	M

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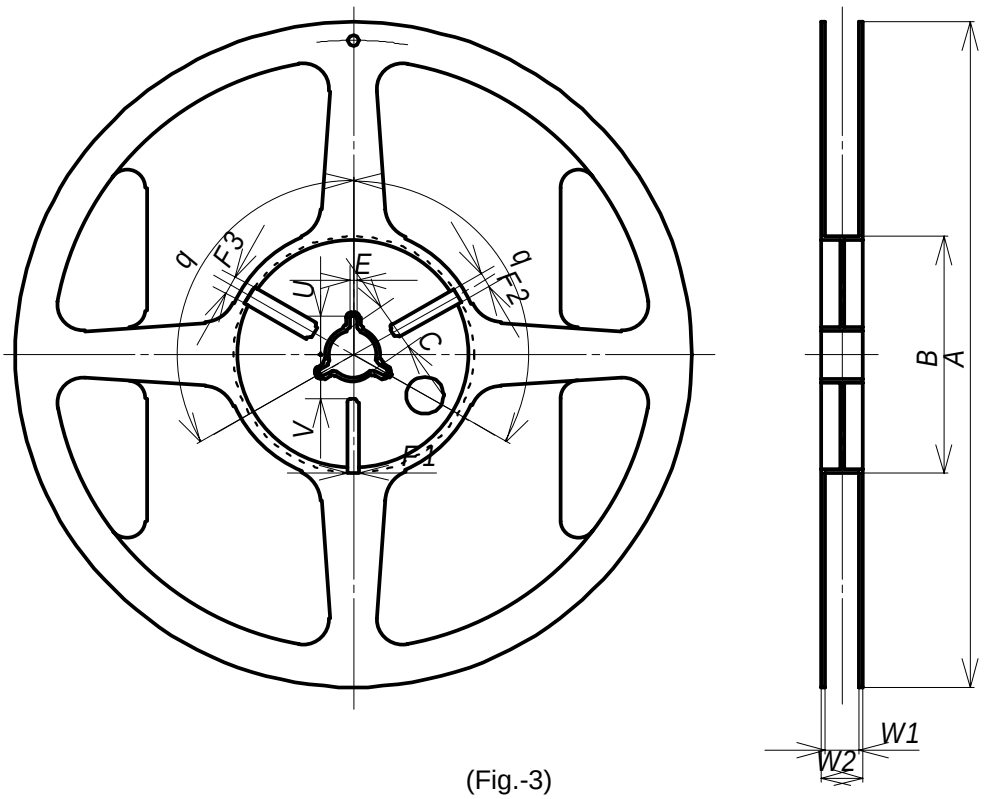
< EMBOSS CARRIER TAPE & REEL >

(1)Dimensions of embossed carrier tape



(Fig.-2)

(2)Dimensions of tape reel



(Fig.-3)

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(Table-2)

(UNIT:mm)

Item			Mark	Dimensions Angle
Flange	Diameter		A	180 dia. +0.0 / -3.0
	Inside of Frange		W1	9.0 + / - 0.3
	Outside of Frange		W2	11.4 + / - 1.0
	Inside Diameter		B	60 dia. +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
		Angle	q	120 deg.
	Spindle Diameter		C	13 dia. + / - 0.2
	Key Seats	Width	E	2.0 + / - 0.5
		Length	U	10.5 + / - 0.4
		Angle	q	120 deg.

(3)Storage condition

Temperature : +40 deg.C Max.

Relative Humidity : 80% Max.

(It is a guaranteed term because it obtains an excellent soldering: 6 months)

(4)Standard packing quantity

3,000 pcs/reel for 180 dia.

(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

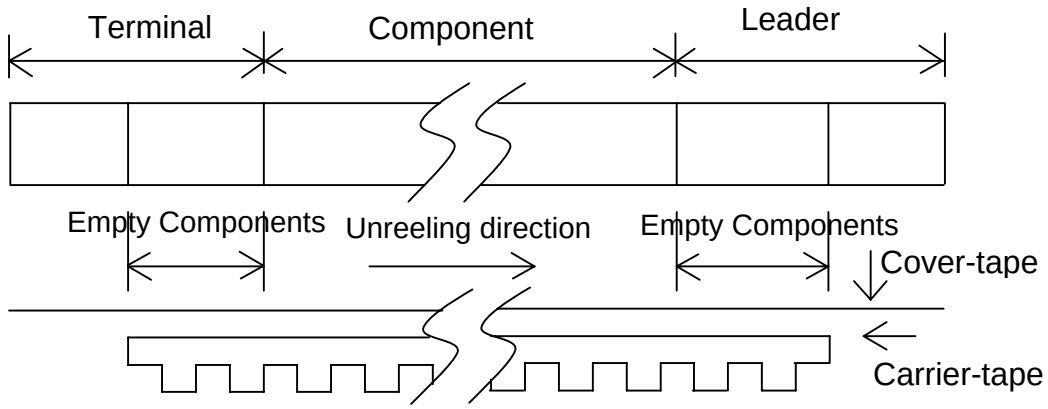
Our Company Name

Producting Country

Stick a label on the each reel.

(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 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)

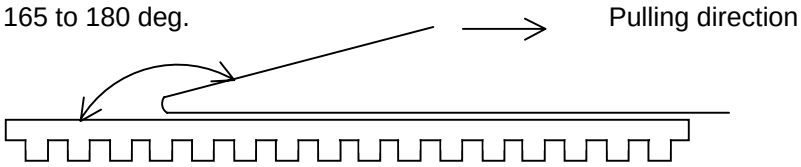
(8)Joint of tape

The carrier-tape and cover-tape should not be jointed.

(9)Release strength of cover tape

It has to between 0.1N to 0.7N under following condition.

Pulling direction 165 deg. to 180 deg.
Speed 300mm/min.
Otherwise unless specified.



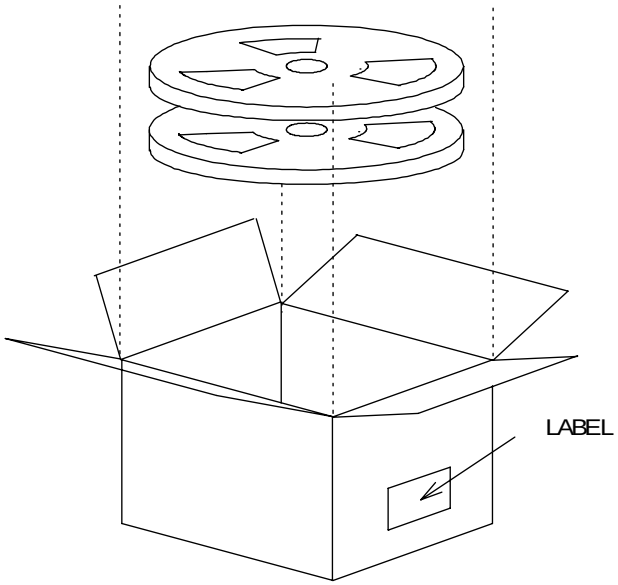
(Fig.-5)

Other standards shall be based on JIS C 0806$_{-1990.}$

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< PACKING >

(1)STORAGE METHOD



Label contents

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

(Fig-6)

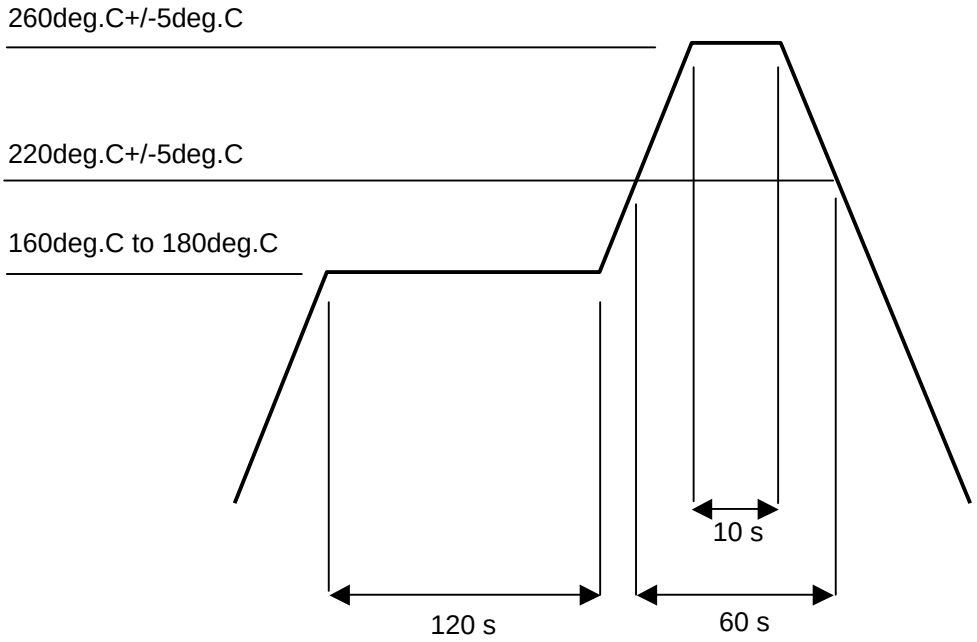
(2)BOX SIZE

From lot size packingsize shall be changed.
In the upper and lower part and the opening in box it shall be protected products using aircushion sheets.

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< REFLOW CONDITIONS (REFERENCE) >

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

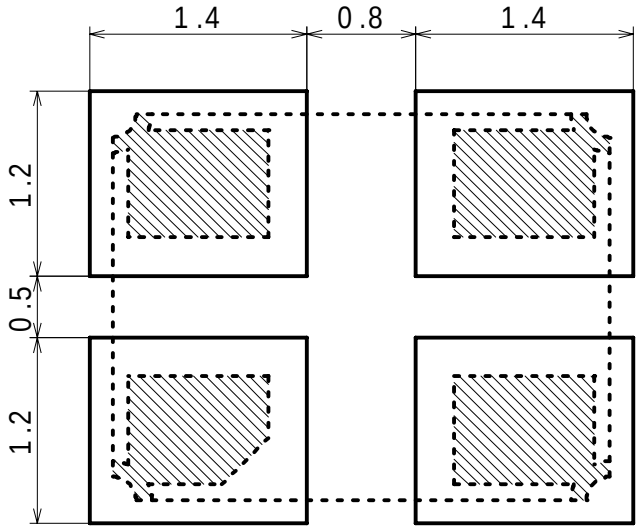


Total time : 240 s Max.

(Fig.-7)

HANDSOLDERING METHOD : 340 [deg.C] Max. / 3[s] Max.
(Please take care so that a soldering iron should not touch a product directly.)

< LAND PATTERN (REFERENCE) >



unit : mm

(Fig.-8)

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1.MECHANICAL ENDURANCE

1.1 SHOCK

After the following test,parts shall conform specification3-1-2.
10cycles(60times) drop from 150 [cm] heights to concrete.
Further,parts shall be solderd on substrate, fixed bakelite materials(about 100[g]).

Substrate materials	:	Glass Epoxy
1 cycle	:	each 1 times of 6 directions

1.2 VIBRATION

After the following test,parts shall conform specification3-1-1.
and no abnormal appearance shall be observed.

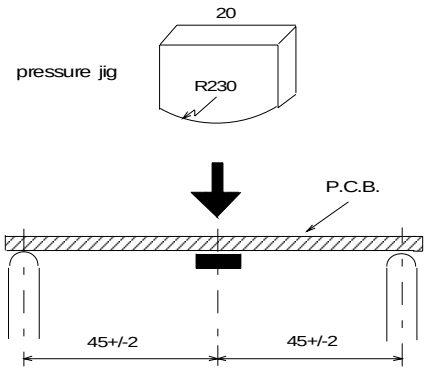
(1)Frequency of Vibration	:	10[Hz] to 55[Hz]
(2)Amplitude(p-p)	:	Sine waves of 1.5[mm]
(3)Vibration axis	:	X.Y.Z
(4)Vibration period	:	2 [h] for each axis

1.3 SUBSTRATE BENDING

After the following test,parts shall conform specification3-1-1.
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.-1
Speed	:	0.5 [mm/s]
Hours	:	5 +/- 1 [s]
Amount of substrate	:	3 [mm] Max.



(Fig.-1)

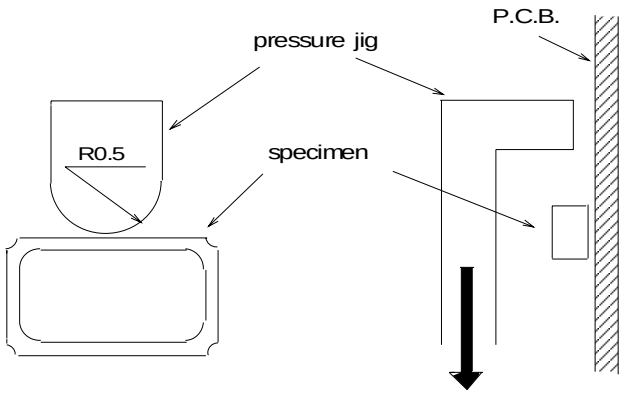
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1.4 SHEAR

After the following test, parts shall conform specification3-1-1.
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	:	10 [N]
Hours	:	10 +/- 1 [s]
Direction	:	see Fig.-2



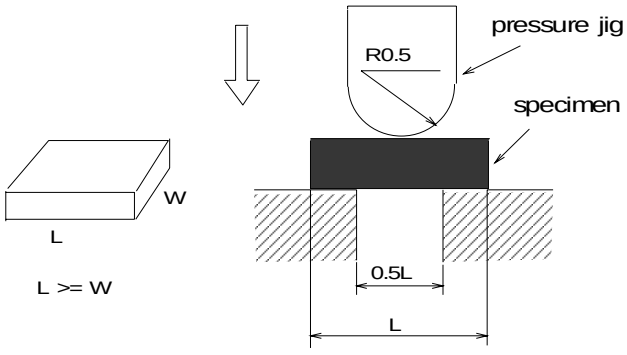
(Fig.-2)

1.5 BODY STRENGTH

After the following test, parts shall conform specification3-1-1.
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	:	10 [N]
Hours	:	10 +/- 1 [s]
Direction	:	see Fig.-3



(Fig.-3)

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1.6 SEAL

Less than 2.0×10^{-9} [Pa m^3/sec]. by Helium leak detector.
Also, no serial bubble is observed by Fluorinert tests.

1.7 SOLDERABILITY

After the following test, more than 90[%] of terminal shall be covered by new solder.
3 seconds +/- 1 second dip in 235 [deg.C] +/- 5 [deg.C] solder.
(Use rosin type flux for solder.)

2.ENVIRONMENTAL ENDURANCE

2.1 HUMIDITY

Two hours past at room temperature after following test, parts shall conform specification3-1-2.
240 hours +60 [deg.C] +/- 2 [deg.C] , relative humidity 85[%] +/- 5[%].

2.2 LOW TEMPERATURE

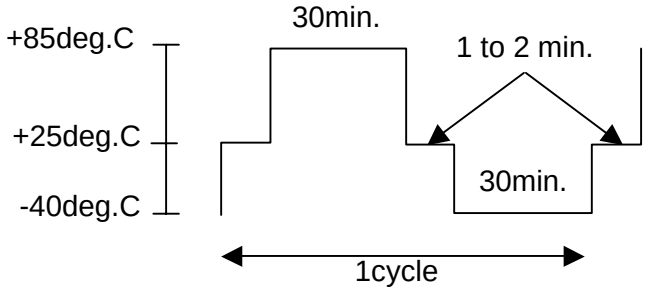
Two hours past at room temperature after following test, parts shall conform specification3-1-2.
240 hours -40 [deg.C] +/- 2 [deg.C].

2.3 HIGH TEMPERATURE

Two hours past at room temperature after following test, parts shall conform specification3-1-2.
240 hours +85 [deg.C] +/- 2 [deg.C].

2.4 TEMPERATURE CYCLE

Two hours past at room temperature after 25 cycles of following test, parts shall conform specification3-1-2.



(Fig.-4)

2.5 RESISTANCE TO SOLDERING HEAT

24 hours past at room temperature from following test, parts shall conform specification3-1-2.
VPS:30 Seconds in FC-70 vapor(215 [deg.C] Boiling Point)

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3.SPECIFICATION

Frequency Variation and Equivalent Resistance shall be within Table-1 after the test.

(Table-1)

	Frequency Variation	Equivalent Resistance
3-1-1	±2[ppm]	±15[%] or 2[ohms] max. (Use larger specification)
3-1-2	±5[ppm]	±20[%] or 3[ohms] max. (Use larger specification)
3-1-3	±10[ppm]	±20[%] or 3[ohms] max. (Use larger specification)

[DSX321G SERIES , IN USE]

1.SOLDERING

Please perform the attached Reflow conditions to reference within 2 times.

2.MOUNT

Although it corresponds to automatic mounting,
please carry out the loading test by the loading machine to be used,
and check that there is no influence in the characteristic.
Please be careful of the Curve not to influence
the characteristic of a product, and a soldering state
at the process which makes a substrate generate the Curve,
the break of a board etc. .

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.
Although the check about ultrasonic washing is performed,
since it is an examination with a simple substance,
the check for the second time by the use state is recommended.

4.THE CAUTIONS ON USE

The piece of crystal it is processed very smaller than the conventional thing
inside DSX321G series crystal unit may be damaged,
if excessive excitation electric power is applied.
Please use it below with the value specified on a catalog and specifications.
Please refrain from forming patterns under crystal resonators since there is
a possibility to cause crack in base.
If the temperature is higher than 280 [deg.C], there is a possibility for the sealing glass to remelt.
Avoid using the product at temperature higher than specified.

5.HANDLING OF A PRODUCT

DSX321G series has sufficient intensity to fall and vibration.
However when too much shock is added according to a certain cause,
the use after a characteristic check is recommended.

6.STORAGE

Since the soldering nature of a terminal may be degraded,
please avoid storage in high temperature and a humid place.
Please keep it in the place which direct rays do not hit
and dew condensation does not generate.

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2006-0570 REVISION RECORD

Rev.No	Date	Reason	Contents	Approved	Checked	Drawn
-	2006/04/27		The first edition.	T. Nakamura	H. Matsuda	K. Nakanishi