



ITEM : QUARTZ CRYSTAL

TYPE : DSX321G

NOMINAL FREQUENCY : 16.000000MHz

SPEC No. : 1N216000AB0D

"RoHS product "

Please acknowledge receipt of the specification attached hereto signing and returning to us one copy thereof.

RECEIVED OF SPECIFICATION	
DATE	
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## 1. SCOPE

(This specification applies to DSX321G 16MHz Crystal Unit.)

Country	Spec. No.
Thailand	1N216000AB0D
Indonesia	1C216000AB0D

## 2. ELECTRICAL CHARACTERISTICS

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

2. 1 NOMINAL FREQUENCY	16.000000 MHz
2. 2 MODE	Fundamental
2. 3 LOADING CAPACITANCE	9.0 pF
2. 4 FREQUENCY TOLERANCE	+/- 10 ppm Max. at +25 deg.C +/- 3 deg.C
2. 5 DRIVE LEVEL	10 uW +/- 2 uW
2. 6 EQUIVALENT SERIES RESISTANCE	60 ohms Max. / Series
2. 7 OPERATING TEMPERATURE RANGE	-20 deg.C to +75 deg.C
2. 8 FREQUENCY TEMPERATURE CHARACTERISTICS	+/-10 ppm Max. / -20 deg.C to +75 deg.C
2. 9 SHUNT CAPACITANCE	2.0 pF Max.
2.10 INSULATION RESISTANCE	500 Mohms Min. / DC100V +/- 15V
2.11 STORAGE TEMPERATURE RANGE	-40 deg.C to +85 deg.C

## 3.CONSTRUCTION

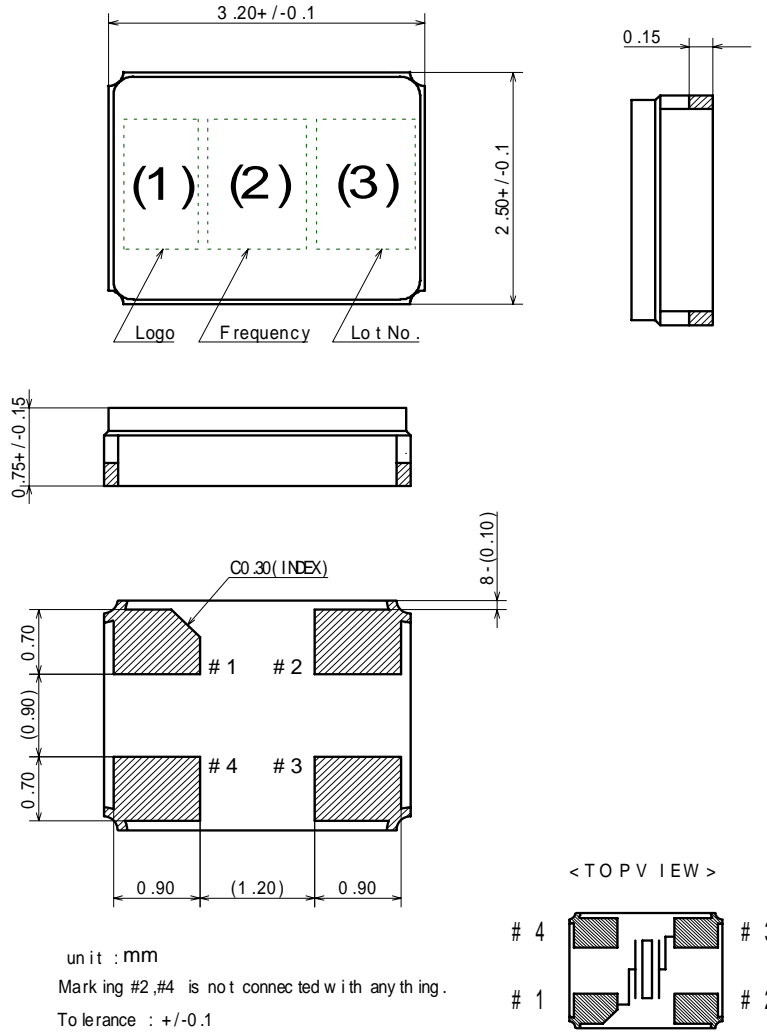
3. 1 HOLDER	DSX321G Ceramic Base
3. 2 DIMENSIONS AND MARKING	Refer to Fig.-1 and Table-1.
3. 3 EMBOSS CARRIER TAPE & REEL	Refer to Fig.-2,3,4,5 and Table-2.
3. 4 PACKING	Refer to Fig.-6.

## 4.OTHER SPECIFICATIONS

4. 1 REFLOW CONDITIONS (REFERENCE)	Refer to Fig.-7.
4. 2 LAND PATTERN (REFERENCE)	Refer to Fig.-8.
4. 3 Environmental and mechanical performance shall be specified by attached general specification.	

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< DIMENSIONS AND MARKING >



(Fig.-1)

Marking is Laser Marking:

Marking should be printed as follows:

Logo , Nominal Frequency , manufactured year & month

Logo and manufacturing location ( 1 )

Made in Japan -> marked as "D"

Made in Indonesia -> marked as "D"

Nominal Frequency ( 2 ) = Mark two digits from upper

( ex. 16.0000 MHz --> 16 )

Manufacturing lot No.( 3 )

(year) ex. 2005 shall be marked as ' 5 ' (The last digit of the year)

(Month) ex. September shall be marked as ' J '(As shown in Table-1.)

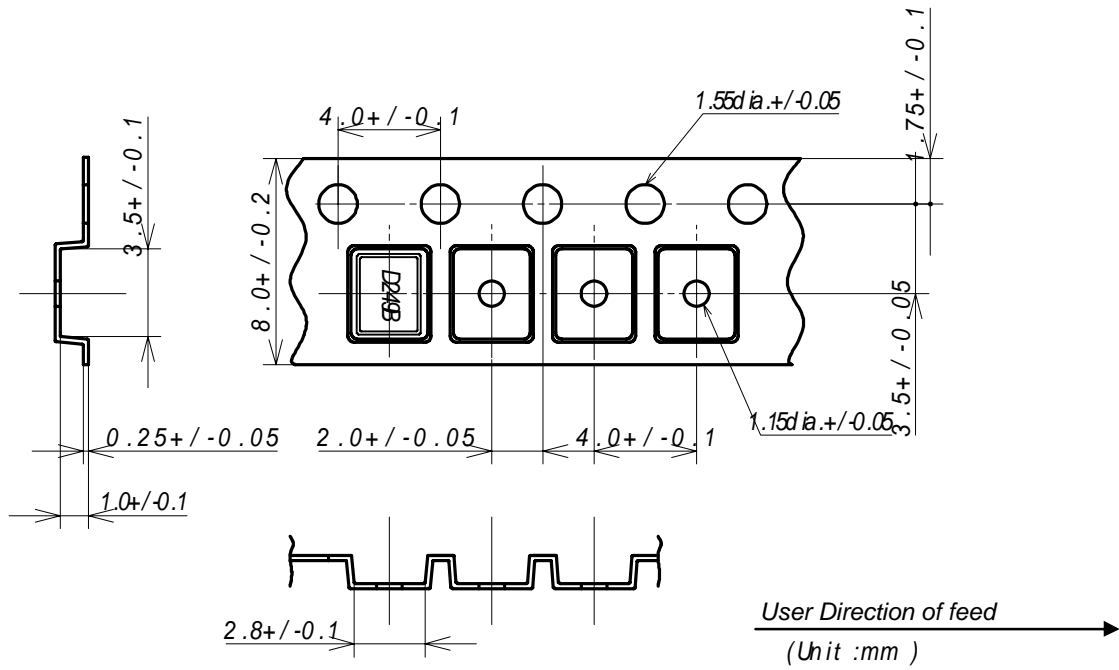
(Table-1)

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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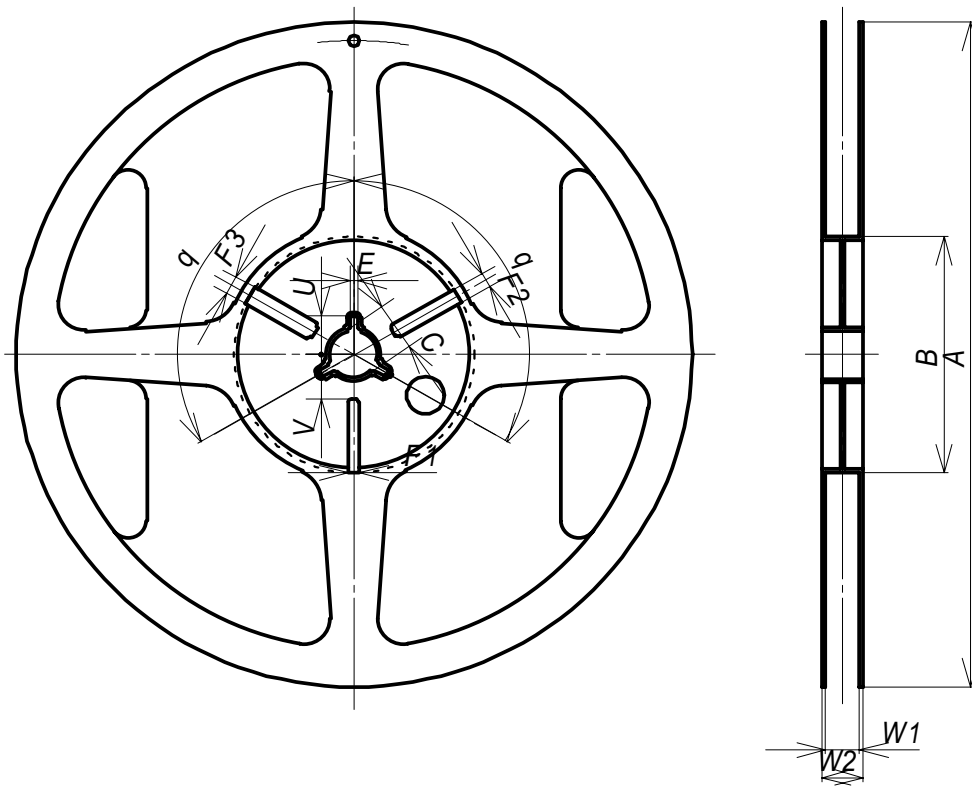
< EMBOSS CARRIER TAPE & REEL >

(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
	Center Core Slit	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.

## (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

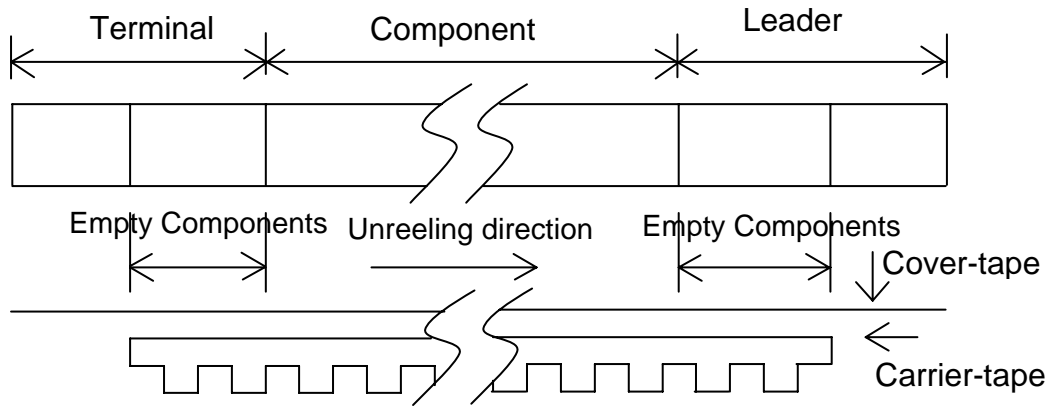
Producing Country

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 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.

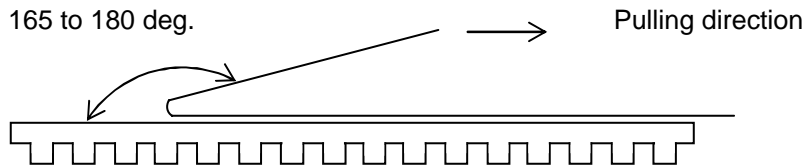
(9) Release strength of cover tape

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.



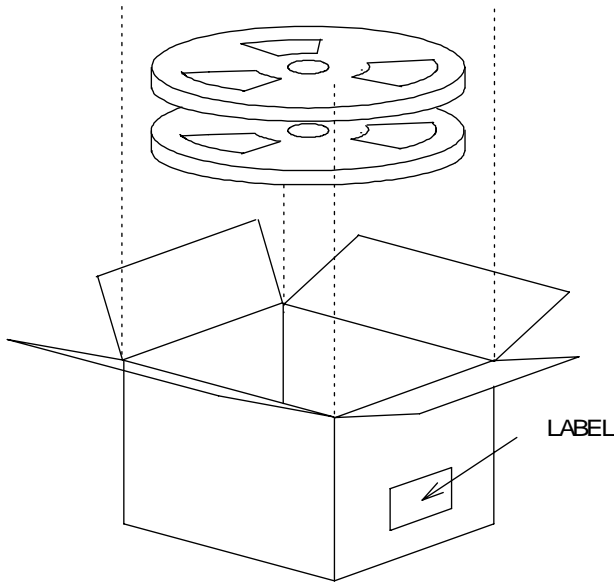
(Fig.-5)

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

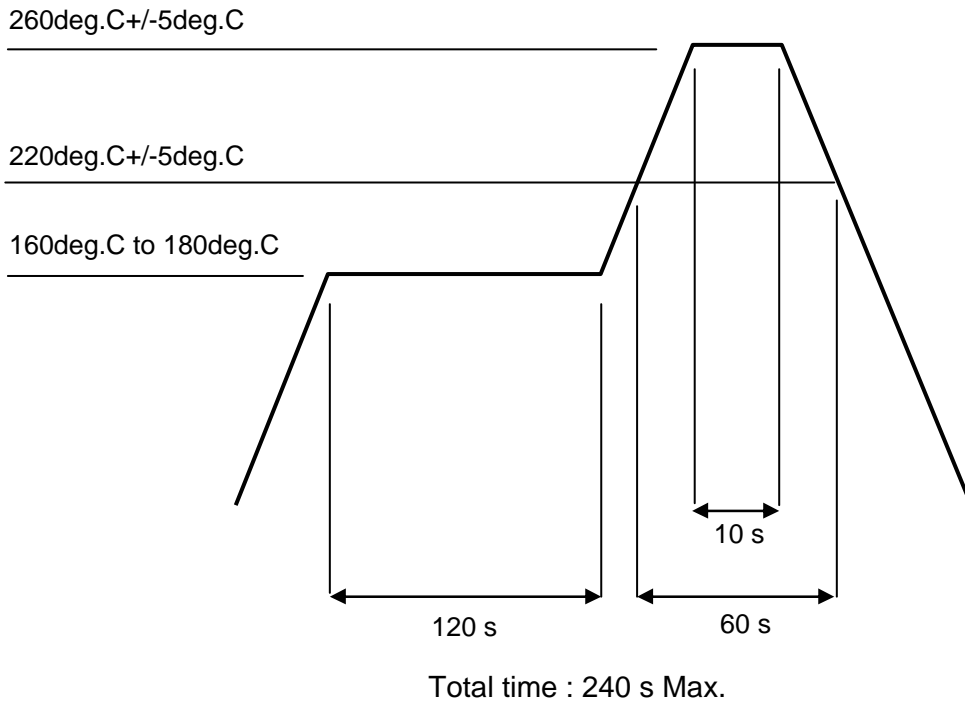
From lot size packingsize shall be changed.

In the upper and lower part and the opening in box it shall be protected products using aircushion sheets.

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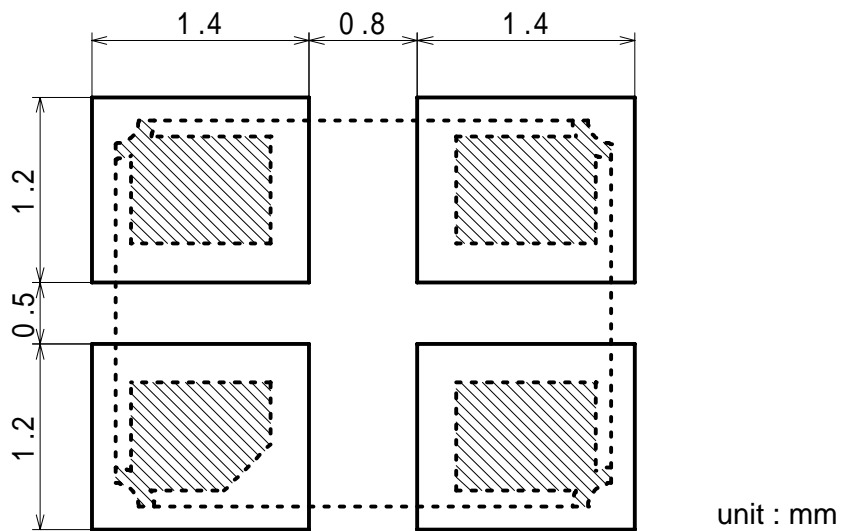
< REFLOW CONDITIONS (REFERENCE) >

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



(Fig.-7)

< LAND PATTERN (REFERENCE) >



(Fig.-8)

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## 1.MECHANICAL ENDURANCE

### 1.1 SHOCK

After the following test,parts shall conform specification3-1-3.

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 specification3-1-2.

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

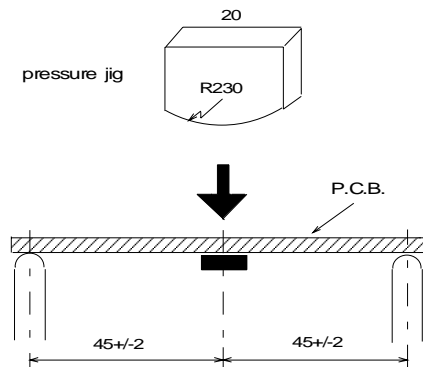
After the following test,parts shall conform specification3-1-2.

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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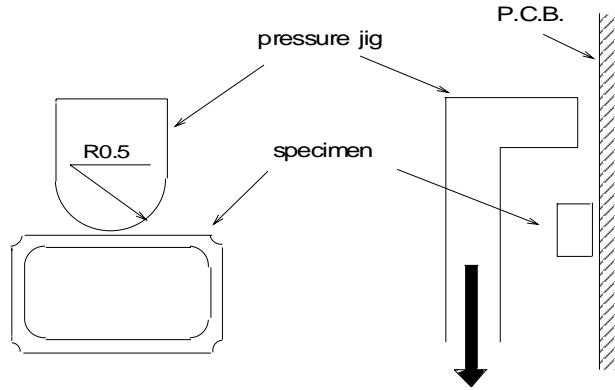
### 1.4 SHEAR

After the following test, parts shall conform specification3-1-2.  
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)

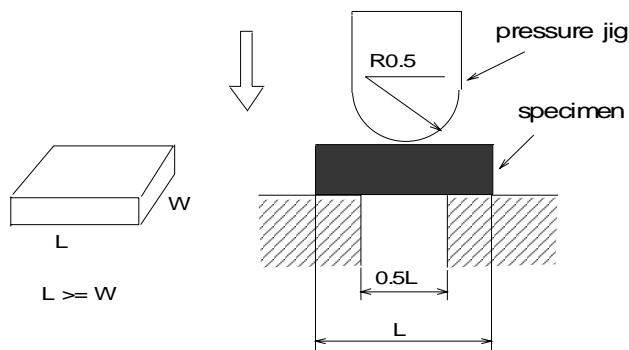
### 1.5 BODY STRENGTH

After the following test, parts shall conform specification3-1-2.  
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  $2.0 \times 10^{-9}$  [Pa m<sup>3</sup>/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 specification 3-1-3.  
 240 hours +60 [deg.C] +/- 2 [deg.C] , relative humidity 85[%] +/- 5[%].

2.2 LOW TEMPERATURE

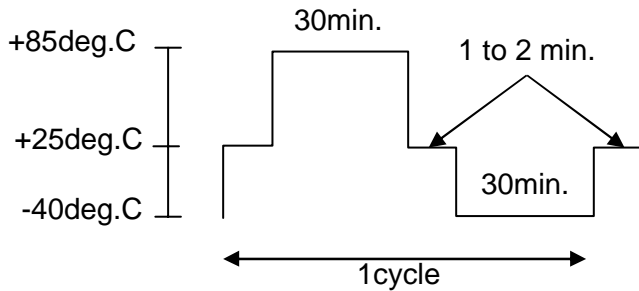
Two hours past at room temperature after following test, parts shall conform specification 3-1-3.  
 240 hours -40 [deg.C] +/- 2 [deg.C].

2.3 HIGH TEMPERATURE

Two hours past at room temperature after following test, parts shall conform specification 3-1-3.  
 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 specification 3-1-3.



(Fig.-4)

2.5 RESISTANCE TO SOLDERING HEAT

24 hours past at room temperature from following test, parts shall conform specification 3-1-2.  
 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	±1[ppm]	±10[%] or 1.5[ohm ] max. (Use larger specification)
3-1-2	±2[ppm]	±15[%] or 2[ohms] max. (Use larger specification)
3-1-3	±5[ppm]	±20[%] or 3[ohms] max. (Use larger specification)
3-1-4	±10[ppm]	±20[%] or 3[ohms] max. (Use larger specification)

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