Serial No. 2005-2054

DATE : 2005/09/08

.

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	
RECEIVED	(signature) (name)

Pioneering New Breakthroughs in Electronics

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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

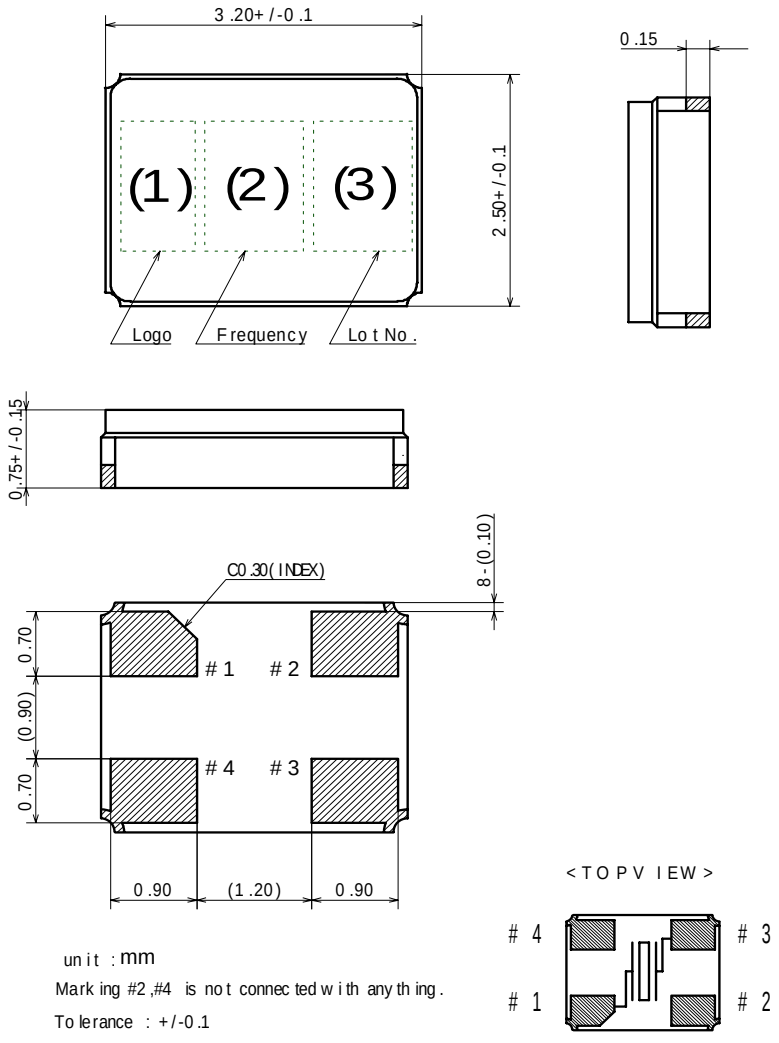
3. 1 HOLDER	DSX321G Ceramic Base
3. 2 DIMENSIONS AND MARKING	Refer to Fig.-1 and Table-1.
3. 3 EMBOSS CARRIER TAPE & REEL	Refer to Fig.-2,3,4,5 and Table-2.
3. 4 PACKING	Refer to Fig.-6.

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.

< DIMENSIONS AND MARKING >



(Fig.-1)

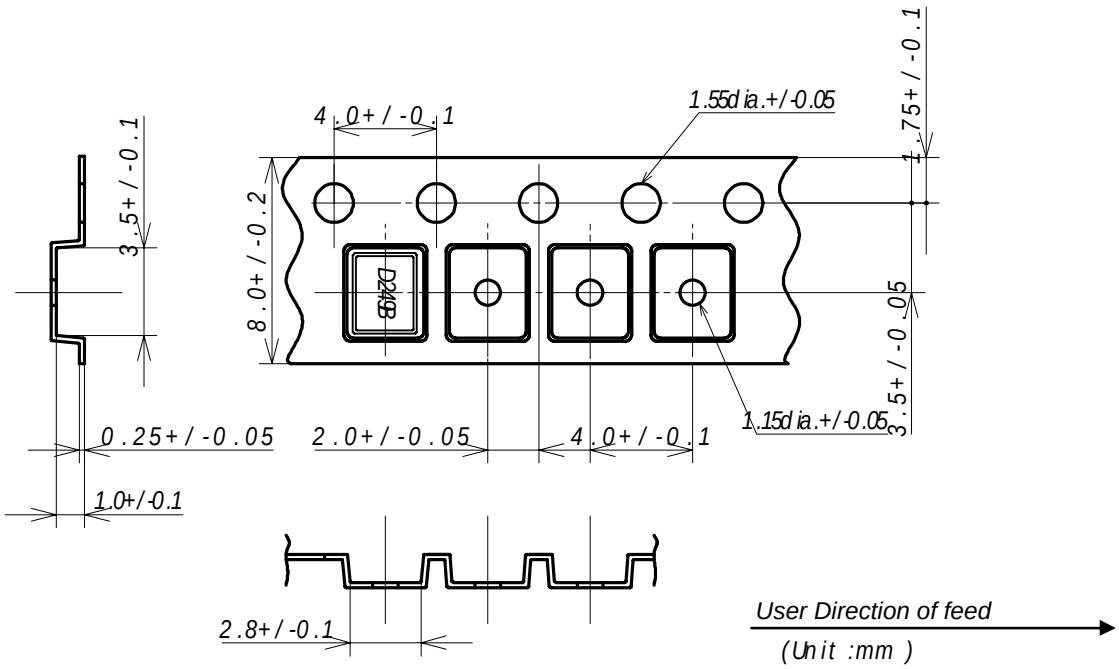
Marking is Laser Marking:
Marking should be printed as follows:
Logo , Nominal Frequency , manufactured year & month
Logo and manufacturing location (1)
Made in Japan -> marked as "D"
Made in Indonesia -> marked as "D"
Nominal Frequency (2) = Mark two dights from upper
(ex. 16.0000 MHz --> 16)
Manufacturing 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

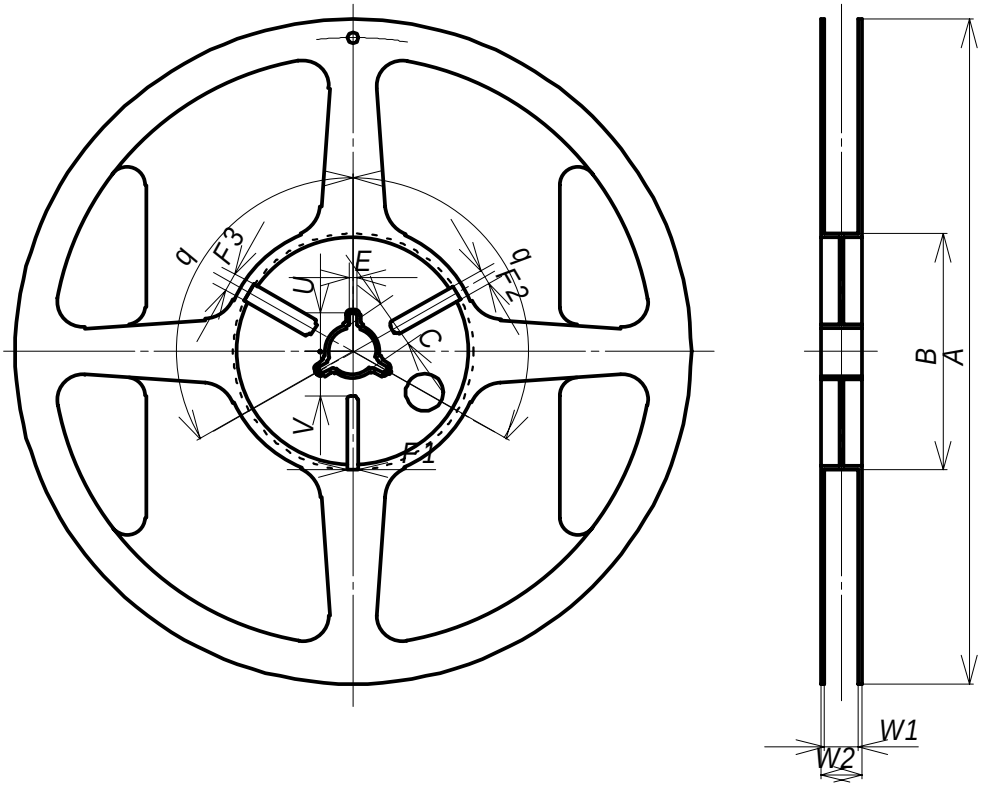
< EMBOSS CARRIER TAPE & REEL >

(1)Dimensions of embossed carrier tape



(Fig.-2)

(2)Dimensions of tape reel



(Fig.-3)

TITLE DSX321G TYPE SURFACE MOUNT TYPE QUARTZ CRYSTAL SPECIFICATION	Trigonometry	Unit	Scale
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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.

(4)Standard packing quantity
3,000 pcs/reel for 180 dia.

(5)Material of the tape

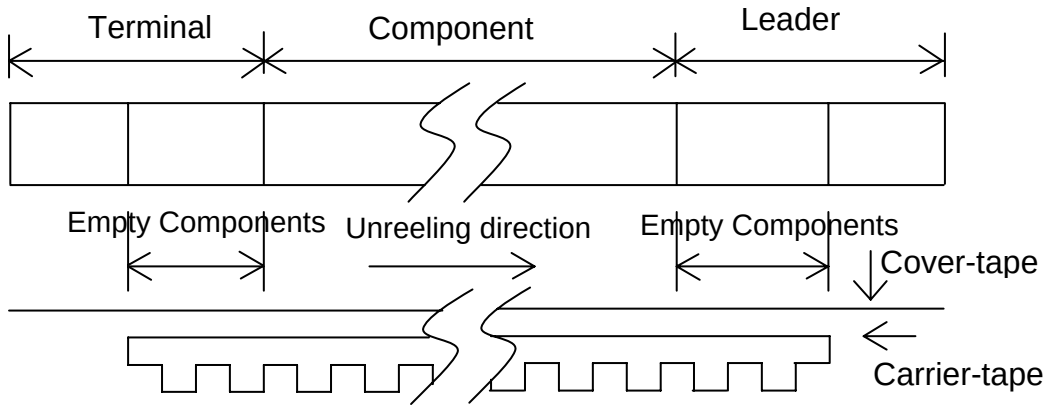
Tape	Material
Carrier tape	Polystyrene+Carbon
Cover tape	Polyester

(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.

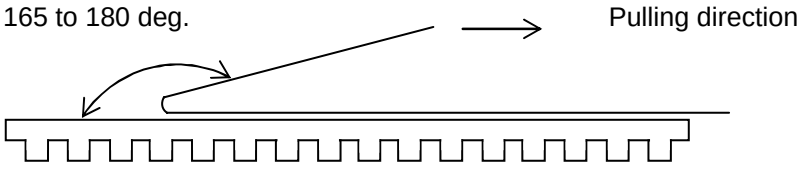
(9)Release strength of cover tape

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.

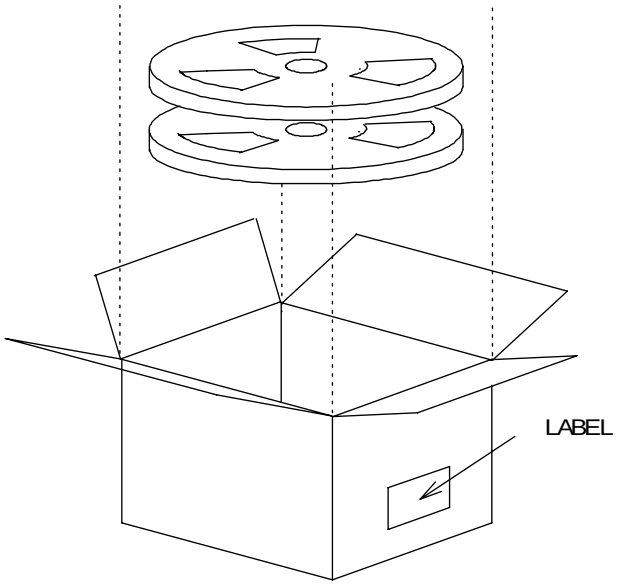


(Fig.-5)

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

< 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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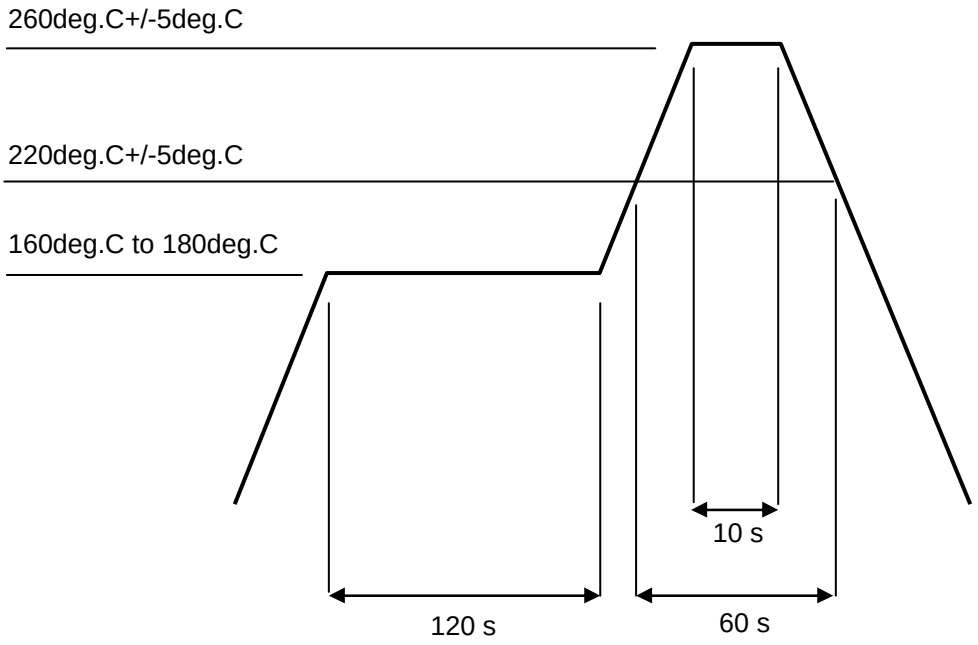
< REFLOW CONDITIONS (REFERENCE) >

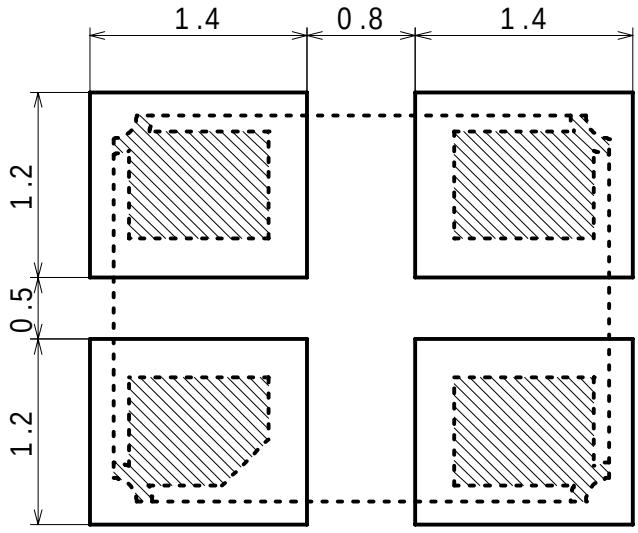
During the solder reflow process, please complete within following temperature, period.
Reflow soldering shall be allowed only two times.



Total time : 240 s Max.

(Fig.-7)

< LAND PATTERN (REFERENCE) >



unit : mm

(Fig.-8)

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1.MECHANICAL ENDURANCE

1.1 SHOCK

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

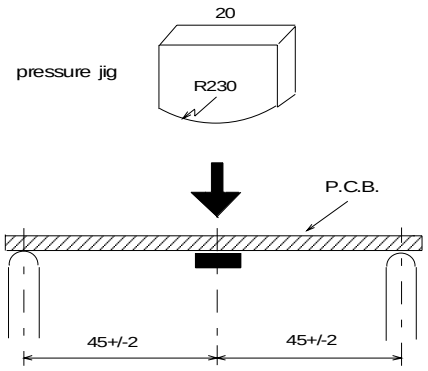
(1)Frequency of Vibration	:	10[Hz] to 55[Hz]
(2)Amplitude(p-p)	:	Sine waves of 1.5[mm]
(3)Vibration axis	:	X.Y.Z
(4)Vibration period	:	2 [h] for each axis

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)

TITLE DSX321G TYPE SURFACE MOUNT TYPE QUARTZ CRYSTAL SPECIFICATION	Trigonometry	Unit	Scale
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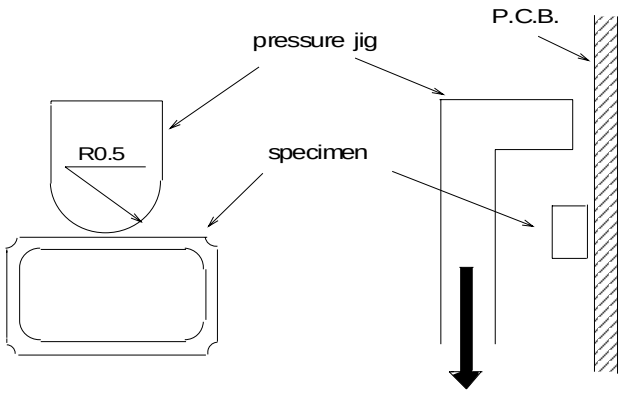
1.4 SHEAR

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



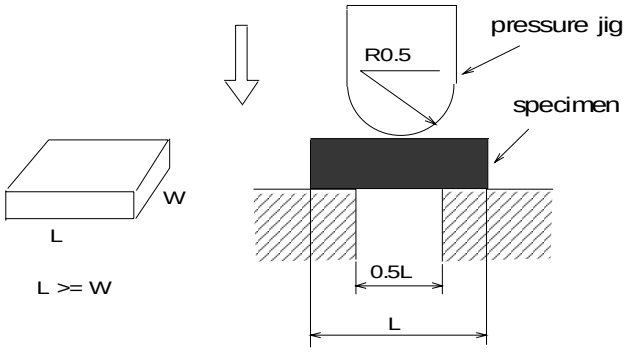
(Fig.-2)

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)

TITLE DSX321G TYPE SURFACE MOUNT TYPE QUARTZ CRYSTAL SPECIFICATION	Trigonometry	Unit	Scale
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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 specification3-1-3.
240 hours +60 [deg.C] +/- 2 [deg.C] , relative humidity 85[%] +/- 5[%].

2.2 LOW TEMPERATURE

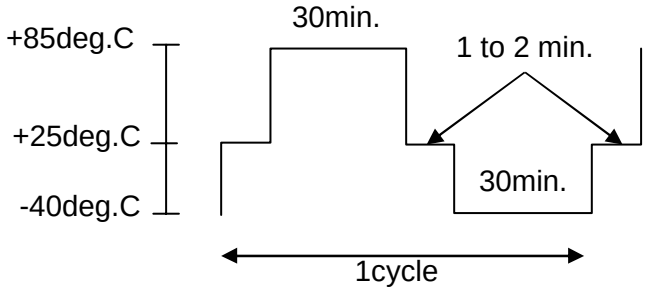
Two hours past at room temperature after following test, parts shall conform specification3-1-3.
240 hours -40 [deg.C] +/- 2 [deg.C].

2.3 HIGH TEMPERATURE

Two hours past at room temperature after following test, parts shall conform specification3-1-3.
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 specification3-1-3.



(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	±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)

2005-2054 REVISION RECORD

Rev.No	Date	Reason	Contents	Approved	Checked	Drawn
-	2005/09/08		The first edition.	M. Iizuka	H. Matsuda	K. Nakanishi