



Serial No. : 2022-0664
 DATE: 2022/9/5

Huizhou Foryou General Electronics Co. Ltd.

SPECIFICATION

Product Name **CRYSTAL RESONATOR**

Type **DSX321G**

Nominal Frequency **12.000MHz**

Spec No. **7AD01200A2P**

If there is a change in this specifications,
 the specification number may be changed.

RECEIPT	
DATE	
RECEIVED	(signature) (name)

General Manufacturer of Quartz Devices

DAISHINKU CORP.

1389 Shinzaike, Hiraoka-cho, Kakogawa, Hyogo
 675-0194 Japan
 Phone : (81)79-425-3161 Fax.:(81)79-425-1134
http://www.kds.info/index_en.htm

C.ENG.

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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) NOMINAL FREQUENCY	12.000 MHz		
(2) OVERTONE ORDER	Fundamental		
(3) LOAD CAPACITANCE(CL)	12.0 pF		
(4) FREQUENCY TOLERANCE	±20 ppm (at +25 ± 3 °C)		
(5) DRIVE LEVEL	10 ± 2 μW		(200 μW max.)
(6) SERIES RESISTANCE	120 Ω max. (at Series)		
(7) OPERATING TEMPERATURE RANGE	-40 ~ +125 °C		
(8) FREQUENCY CHARACTERISTICS OVER TEMPERATURE	±50 ppm /	-40 ~ +125 °C	(ref. to +25°C)
(9) SHUNT CAPACITANCE	2.0 pF max.		
(10) INSULATION RESISTANCE	500 MΩ min. / DC 100 ± 15V		
(11) STORAGE TEMPERATURE RANGE	-40 ~ +150 °C		

2. CONSTRUCTION

(1) DIMENSIONS AND MARKING	Refer to 4.
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3. OTHER SPECIFICATIONS

(1) EMBOSS CARRIER TAPE AND REEL	Refer to 5.
(2) PACKING	Refer to 6.
(3) REFLOW CONDITIONS (REFERENCE)	Refer to 7.
(4) LAND PATTERN (REFERENCE)	Refer to 8.
(5) SUPPLEMENTARY NOTE	Refer to 9.
(6) RELIABILITY SPECIFICATION	Refer to 10.~11.
(7) OTHER HANDLING INSTRUCTIONS	Refer to 12.

• Compatible with AEC-Q200

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4. DIMENSIONS AND MARKING

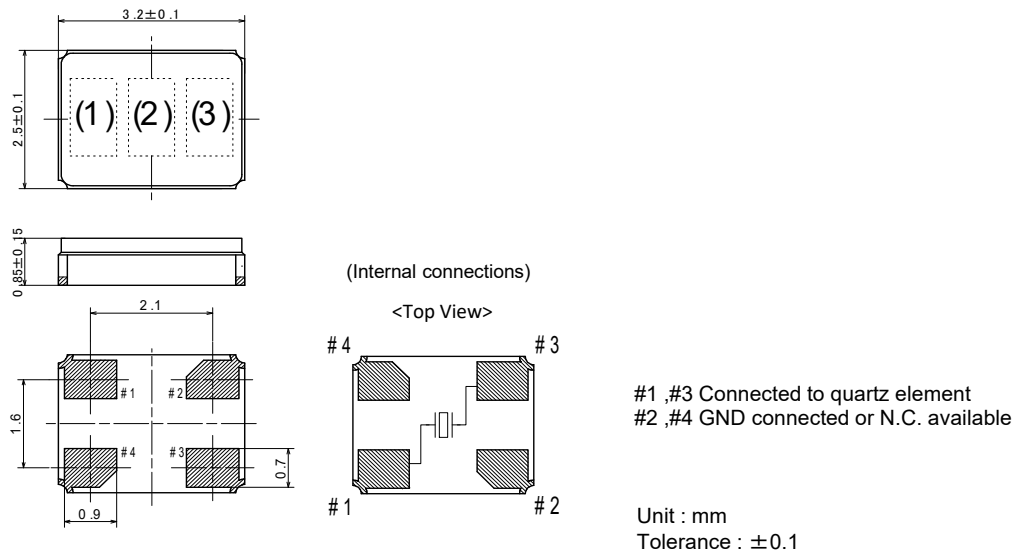


Figure-1

Logo(1) and Nominal Frequency (2) should be printed as follows by producing district

Made in INDONESIA --> Logo : D , Frequency: 12 : Under Bar with D

Nominal Frequency (2) = Mark two digits from upper decimal point
(ex. 12.000 MHz ----> 12)

Manufacturing lot No.(3)

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 nine weeks.

The week means are from Sunday to Saturday.

(ex. 2022/9/5 ----> 237)

Plating material of a terminal. : Ni Plating + Au Plating.

A clearance between the soldering terminal portion and a print circuit board side should be less than 0.1mm.

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5. EMOSS CARRIER TAPE AND REEL

(1) DIMENSIONS OF EMOSS CARRIER TAPE

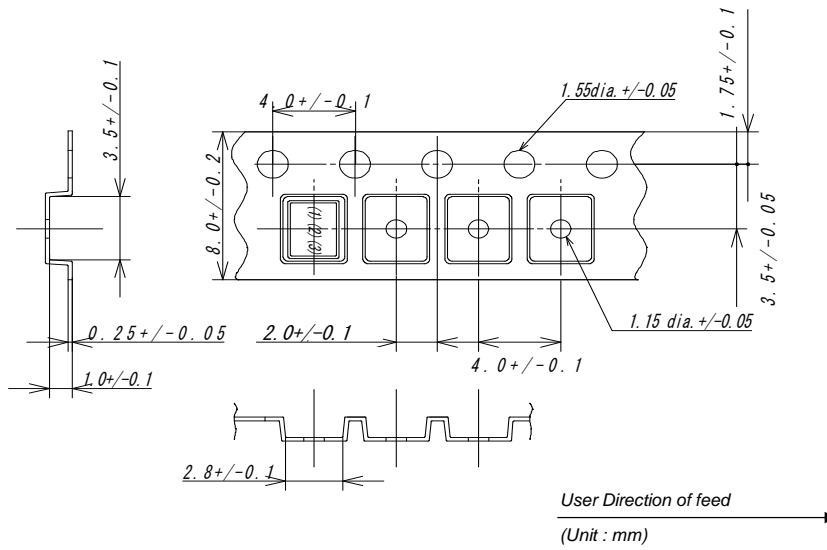


Figure-2

(2) DIMENSIONS OF TAPE REEL

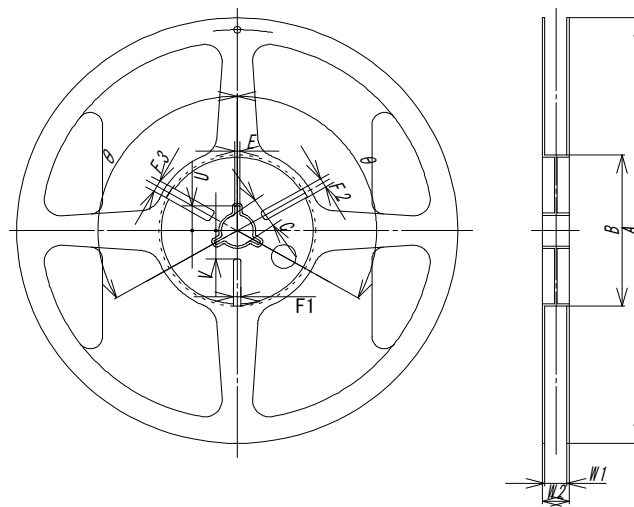


Figure-3

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(Unit:mm)

Item		Mark	Dimensions	Angle	
Flange	Diameter	A	$\Phi 180 +0.0 / -3.0$		
	Inside of Flange	W1	9.0 ± 0.3		
	Outside of Flange	W2	11.4 ± 1.0		
	Inside Diameter	B	$\Phi 60 +1.0 / -0.0$		
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	$11.9 +0.5 / -0.0$	
		Angle	θ	120°	
	Spindle Diameter		C	$\Phi 13 \pm 0.2$	
	Key Seats	Width	E	2.0 ± 0.5	
		Length	U	10.5 ± 0.4	
		Angle	θ	120°	

(3) MATERIAL OF THE REEL

Reel	Polystyrene+Carbon (Black)
	Polystyrene(White)

(4) STORAGE CONDITION

Temperature : +40°C max.

Relative Humidity : 80% max.

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

(5) STANDARD PACKING QUANTITY

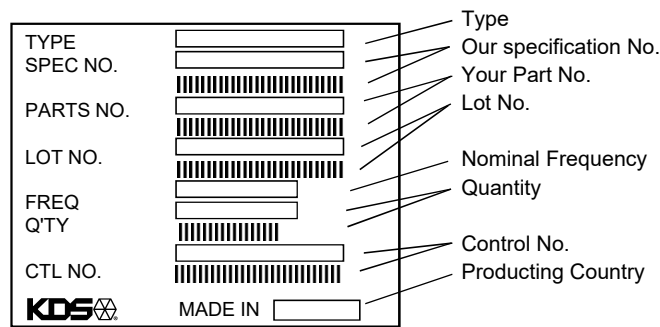
3,000pcs/reel

(6) MATERIAL OF THE TAPE

Tape	Material
Carrier tape	Polystyrene+Carbon
Cover tape	Polyester

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(7) LABEL CONTENTS



Stick a label on the each reel.

(8) 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.

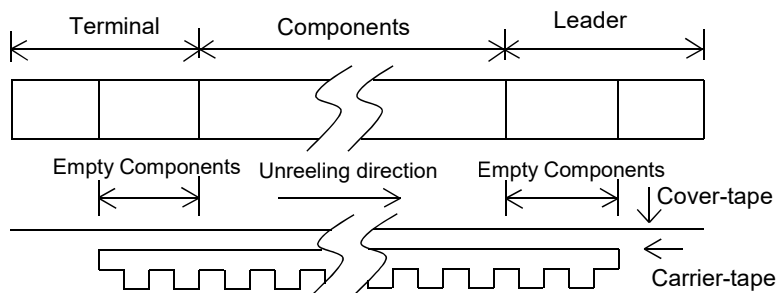


Figure-4

(9) JOINT OF TAPE

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

(10) RELEASE STRENGTH OF COVER TAPE

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

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

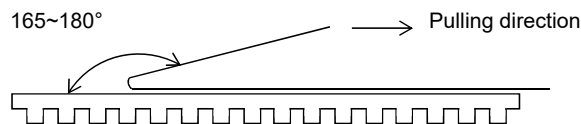


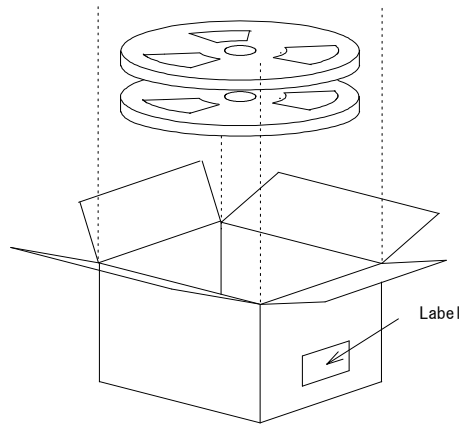
Figure-5

Other standards shall be based on JIS C 0806 -1990-

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6. PACKING

(1) STORAGE METHOD



Label contents

TYPE
 SPEC NO.
 LOT NO.
 FREQ.
 Q'TY
 CTL NO.

Figure-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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7. REFLOW CONDITIONS (REFERENCE)

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

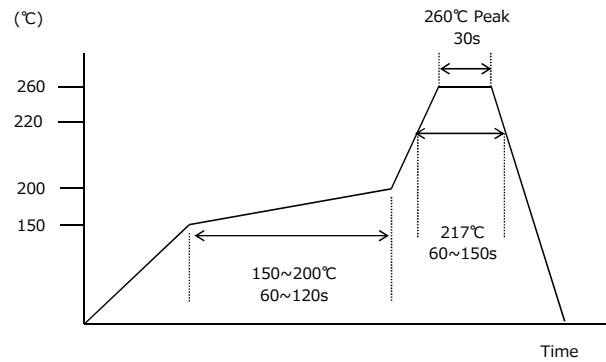
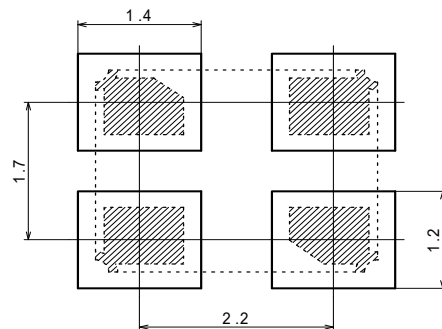


Figure-7

8. LAND PATTERN (REFERENCE)



Unit : mm

Figure-8

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9. SUPPLEMENTARY NOTE

(1) MOISTURE SENSITIVITY LEVEL(MSL)

LEVEL=1 (No dry pack required) Refer to IPC/JEDEC J-STD-033C

(2) QUARTZ CRYSTAL WEIGHT

about 0.02g

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10. RELIABILITY SPECIFICATION Compatible with AEC-Q200

TEST No.	Stress	Reference	Additional Requirements	Requirement
1	Preconditioning	-	Reflow 3times perform the attached Reflow conditions to reference.	-
2	Sealing Tightness (Helium Leak Test)	IEC 60068-2-17	Helium Leak Detector	Less than 2.0×10^{-9} Pa·m ³ /s
3	High Temperature Exposure(Storage)	MIL-STD-202 Method 108	+125°C 1000h	Parts shall conform specification 11.A
4	Temperature Cycling	JESD22 Method JA-104	-40<->+125°C 1000cycles	Parts shall conform specification 11.A
7	Biased Humidity	MIL-STD-202 Method 103	+85°C 85%RH biased 1000h	Parts shall conform specification 11.C
8	Operational Life	MIL-STD-202 Method 108	+125°C biased 1000h	Parts shall conform specification 11.C
9	External Visual	MIL-STD-883 Method 2009	Construction, marking and workmanship	Without abnormal visual
12	Resistance to Solvents	MIL-STD-202 Method 215	Also aqueous wash	No marking off
13	Mechanical Shock	MIL-STD-202 Method 213	980m/s ² 6ms 6directions 3cycles(18shocks)	Parts shall conform specification 11.A
14	Vibration	MIL-STD-202 Method 204	10~2,000Hz 49m/s ² 20min 12cycles	Parts shall conform specification 11.A
15	Resistance to Soldering Heat	MIL-STD-202 Method 210	+260±5°C 10±1s	Parts shall conform specification 11.A
18	Solderability	J-STD-002 Method B SMD a)	+155°C dry heat 4h Sn-3Ag-0.5Cu no-clean RMA +235°C 5s	New solder shall be cover 95% min.
		J-STD-002 Method B SMD b)	Steam conditioning:+100°C 8h Sn-Pb no-clean RMA +215°C 5s	New solder shall be cover 95% min.
		J-STD-002 Method D SMD c)	Steam conditioning:+100°C 8h Sn-3Ag-0.5Cu no-clean RMA +260°C 30s	Leaching/dewetting shall be no more than 5%
21	Board Flex	AEC-Q200 Method 005	2mm 60s	Parts shall conform specification 11.A
22	Terminal Strength	AEC-Q200 Method 006	A force of 17.7N for 60s	Parts shall conform specification 11.A

* The test No. 3, 4, 7, 8 are implemented after preconditioning.

TEST No.	Stress	Reference	Additional Requirements	Requirement
23	ESD (Human Body Model)	-	Vs = ±1500V max. C1=100pF, R2=1.5kΩ Number of times : 1times	Parts shall conform specification 11.A

11. SPECIFICATION

Frequency Variation and Equivalent Resistance shall be within Table below after the reliability test.

Spec.	Frequency Variation	Equivalent Resistance
A	±10ppm	±25% or ±10.0Ω (Use larger specification)
B	±20ppm	±25% or ±10.0Ω (Use larger specification)
C	±10ppm	-
D	±20ppm	-

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12. DSX321G TYPE QUARTZ CRYSTAL HANDLING INSTRUCTIONS

(1) SOLDERING

Please perform the attached Reflow conditions to reference within 3times.

(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 crystal resonator and becoming the cause of characteristic deterioration and not oscillating, it does not recommend.

Underfilling Material for DSX321G Types, KDS considers underfilling material such as heat-cured resin would not affect the characteristics of the DSX321G crystal mounted, however, we recommend the crystal be tested and checked in such a case prior to use so that there are the possibility that the crystal may have a lid off or a crack in the ceramic base.

(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 crystal resonator simple substance, the check by the use state is recommended again.

(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 between crystal land pattern's since there is a possibility to cause crack in base.

If the temperature is higher than +280°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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Prepared for:

Huizhou Foryou General Electronics Co. Ltd.



No.R22NH35801

Reliability Test Data

Product : Crystal Resonator

Type : DSX321G 12.000MHz

(Test Data on 10.000MHz substituted for 12.000MHz.)

RoHS Compliant Part

JEITA Phase 3A

(PT. KDS INDONESIA)

Date: Sep. 7, 2022

Daishinku Corp.

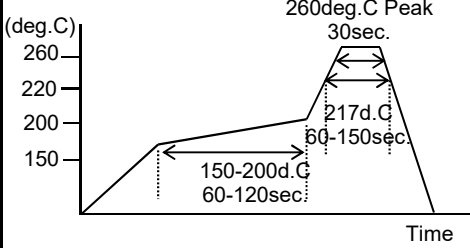
Quality Assurance Dept.

H. Watanabe

Hideki Watanabe / Manager

Performance Test Procedures and Results

<DSX321G>

No.	Stress	Reference	Additional Requirements	Requirement	Result	Page
-	Preconditioning	-	Reflow 3times 	-	n=308	-
2	Sealing Tightness (Helium Leak Test)	IEC 60068-2-17	Helium Leak Detector	2.0×10-9 [Pa m3/s]	all Passed	-
3	High Temperature Exposure(Storage)	MIL-STD-202 Method 108	+125deg.C 1000 hrs	Parts shall conform Specification A	r/n=0/77 Passed	1
4	Temperature Cycling	JESD22 Method JA-104	-40<->+125deg.C 1000 cycles	Parts shall conform Specification A	r/n=0/77 Passed	1
7	Biased Humidity	MIL-STD-202 Method 103	+85deg.C 85%RH biased 1000hrs	Parts shall conform Specification C	r/n=0/77 Passed	1
8	Operational Life	MIL-STD-202 Method 108	+125deg.C biased 1000hrs	Parts shall conform Specification C	r/n=0/77 Passed	1
9	External Visual	MIL-STD-883 Method 2009	Construction , marking and workmanship	Without abnormal visual	r/n=0/77 Passed	-
12	Resistance to Solvents	MIL-STD-202 Method 215	Also aqueous wash	No marking off	r/n=0/5 Passed	-
13	Mechanical Shock	MIL-STD-202 Method 213	980m/s2 6msec 3times(18 shocks)	Parts shall conform Specification A	r/n=0/30 Passed	2
14	Vibration	MIL-STD-202 Method 204	10-2,000Hz 49m/s2 20minutes 12cycles	Parts shall conform Specification A	r/n=0/30 Passed	2
15	Resistance to Soldering Heat	MIL-STD-202 Method 210	260±5deg.C 10±1sec	Parts shall conform Specification A	r/n=0/30 Passed	2
18	Solderability	J-STD-002 Method B SMD a)	155 deg.C dry heat 4 hours Sn-3Ag-0.5Cu no-clean RMA 235 deg.C 5sec	New solder shall be cover 95%min.	r/n=0/15 Passed	-
		J-STD-002 Method B SMD b)	Steam conditioning: 100 deg.C 8 hours Sn-Pb no-clean RMA 215 deg.C 5sec	New solder shall be cover 95%min.	r/n=0/15 Passed	-
		J-STD-002 Method D SMD c)	Steam conditioning: 100 deg.C 8 hours Sn-3Ag-0.5Cu no-clean RMA 260 deg.C 30sec	Leaching/dewetting shall be no more than 5%.	r/n=0/15 Passed	-
21	Board Flex	AEC-Q200 Method 005	2mm 60sec.	Parts shall conform Specification A	r/n=0/30 Passed	3
22	Terminal Strength	AEC-Q200 Method 006	A force of 17.7N 60sec	Parts shall conform Specification A	r/n=0/30 Passed	3

Based on AEC-Q200

* The test No.3, 4, 7 and 8 are implemented after preconditioning.

No.	Stress	Reference	Additional Requirements	Requirement	Result	Page
23	ESD Human Body Model	-	V=+/-1500V (C1=100pF,R2=1.5kohms) Number of times : 1times	Parts shall conform Specification B	r/n=0/15 Passed	3

Specification A) Freq.variation : delta F/F=+/- 10 ppm Max , ESR variation : delta ESR=+/- 25 % Max or +/- 10 ohm Max

Specification B) Freq.variation : delta F/F=+/- 20 ppm Max , ESR variation : delta ESR=+/- 25 % Max or +/- 10 ohm Max

Specification C) Freq.variation : delta F/F=+/- 10 ppm Max

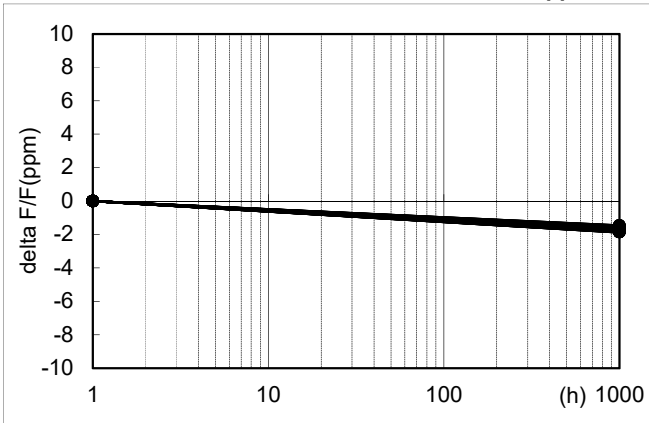
Specification D) Freq.variation : delta F/F=+/- 20 ppm Max

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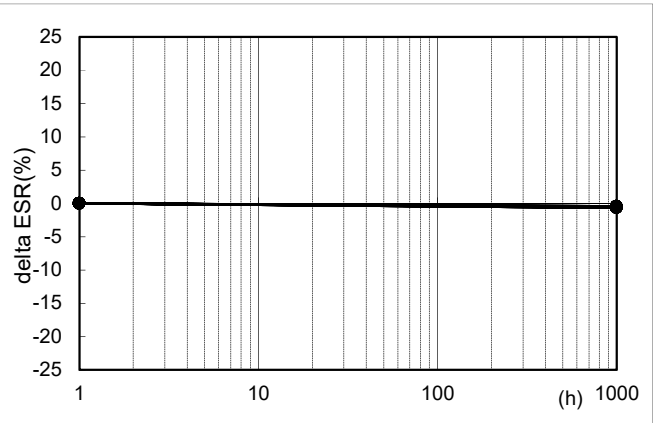
3.High Temperature Exposure (Storage)

SPEC : $\Delta F/F = \pm 10\text{ppm MAX.}$

SPEC : $\Delta \text{ESR} = \pm 25\% \text{ MAX.}$



	1000h
X-bar	-1.66
3S	0.38
MAX.	-1.5
MIN.	-1.9

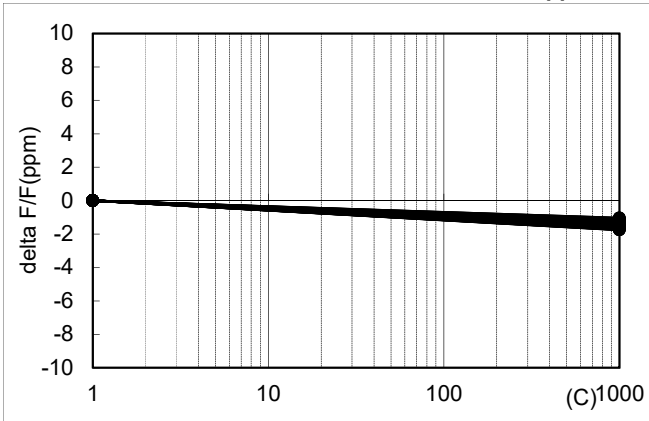


	1000h
X-bar	-0.54
3S	0.20
MAX.	-0.4
MIN.	-0.6

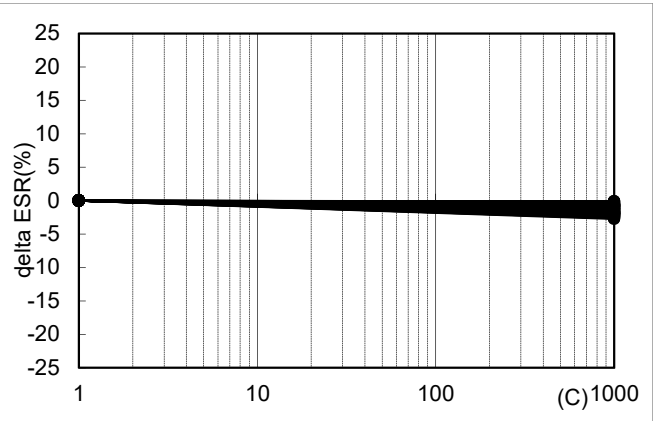
4.Temperature Cycling

SPEC : $\Delta F/F = \pm 10\text{ppm MAX.}$

SPEC : $\Delta \text{ESR} = \pm 25\% \text{ MAX.}$



	1000C
X-bar	-1.38
3S	0.62
MAX.	-1.0
MIN.	-1.8



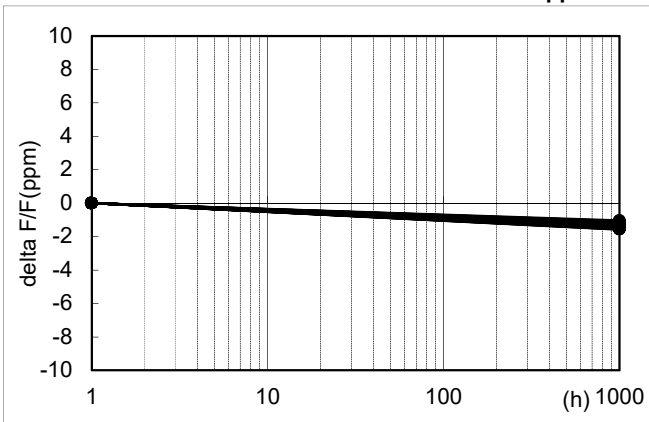
	1000C
X-bar	-1.43
3S	2.09
MAX.	-0.1
MIN.	-2.7

7.Biased Humidity

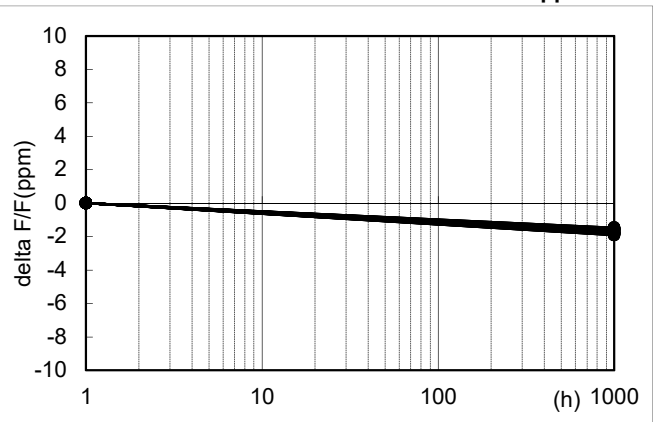
SPEC : $\Delta F/F = \pm 10\text{ppm MAX.}$

8.Operational Life

SPEC : $\Delta F/F = \pm 10\text{ppm MAX.}$



	1000h
X-bar	-1.32
3S	0.46
MAX.	-1.0
MIN.	-1.6



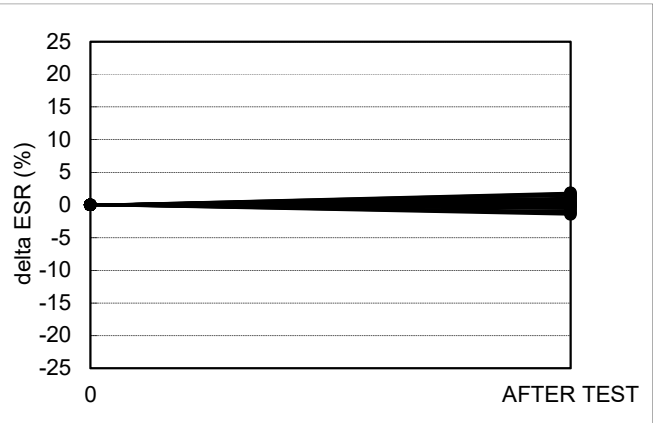
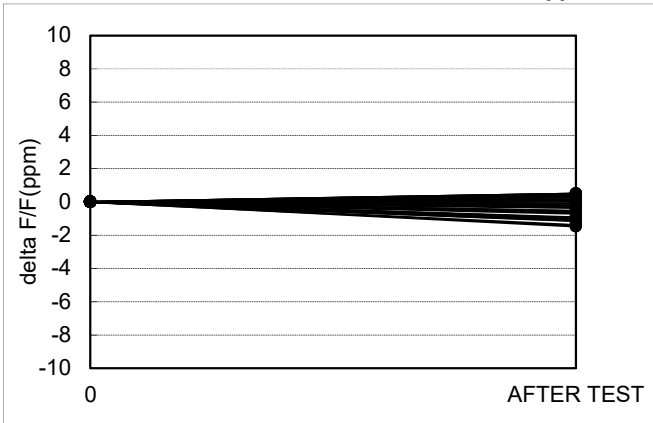
	1000h
X-bar	-1.69
3S	0.41
MAX.	-1.5
MIN.	-1.9

DSX321G 10.000MHz (PT.KDS INDONESIA)

13.Mechanical Shock

SPEC : $\Delta F/F = \pm 10\text{ppm MAX.}$

SPEC : $\Delta \text{ESR} = \pm 25\% \text{ MAX.}$



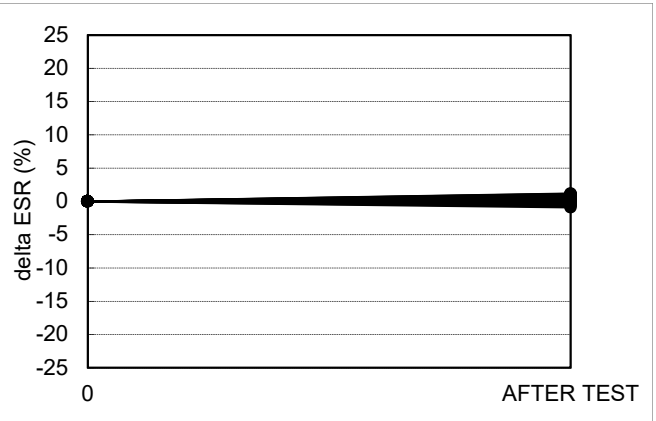
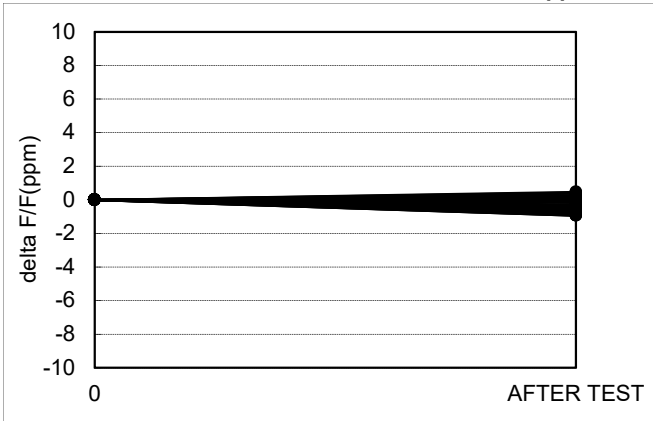
AFTER TEST	
X-bar	-0.28
3S	1.89
MAX.	0.5
MIN.	-1.5

AFTER TEST	
X-bar	0.31
3S	2.97
MAX.	1.9
MIN.	-1.5

14.Vibration

SPEC : $\Delta F/F = \pm 10\text{ppm MAX.}$

SPEC : $\Delta \text{ESR} = \pm 25\% \text{ MAX.}$



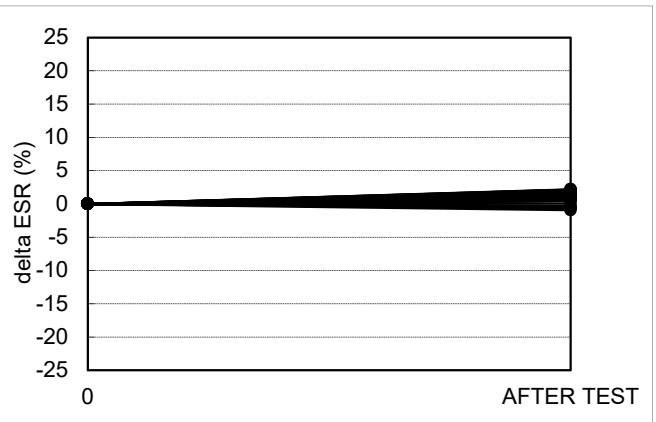
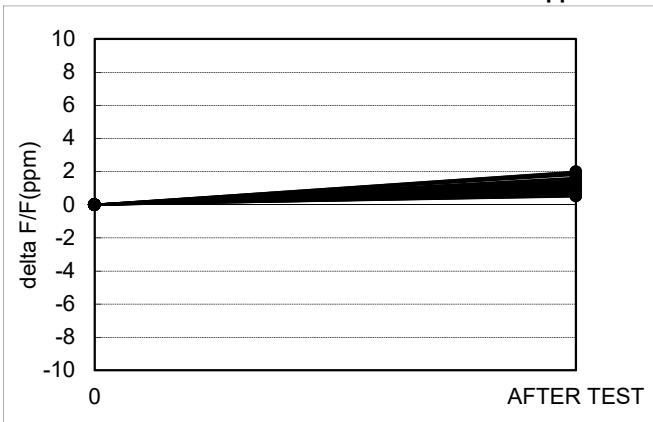
AFTER TEST	
X-bar	-0.28
3S	1.34
MAX.	0.5
MIN.	-0.9

AFTER TEST	
X-bar	0.33
3S	1.78
MAX.	1.2
MIN.	-0.9

15.Resistance to Soldering Heat

SPEC : $\Delta F/F = \pm 10\text{ppm MAX.}$

SPEC : $\Delta \text{ESR} = \pm 25\% \text{ MAX.}$



AFTER TEST	
X-bar	1.15
3S	1.31
MAX.	2.0
MIN.	0.5

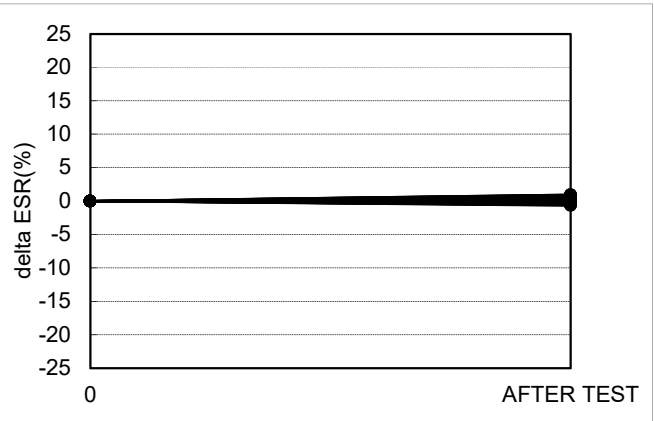
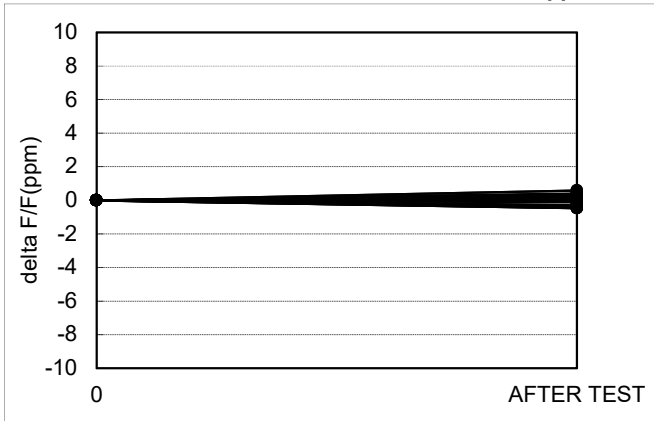
AFTER TEST	
X-bar	0.86
3S	2.93
MAX.	2.2
MIN.	-1.0

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21.Board Flex

SPEC : $\Delta F/F = \pm 10$ ppm MAX.

SPEC : $\Delta ESR = \pm 25\%$ MAX.



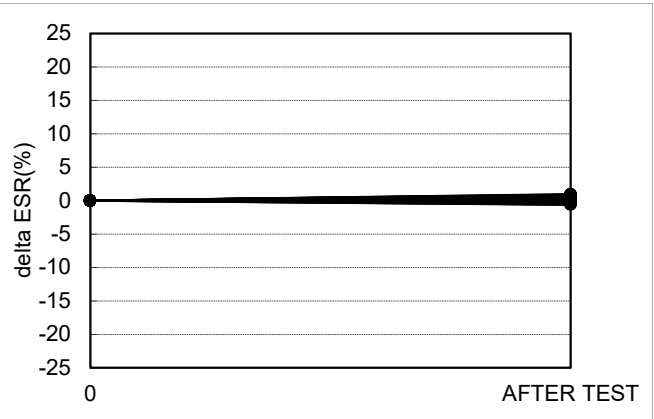
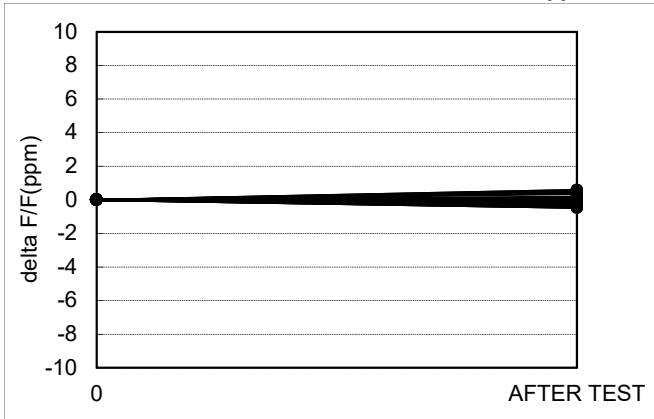
AFTER TEST	
X-bar	0.04
3S	0.97
MAX.	0.6
MIN.	-0.5

AFTER TEST	
X-bar	0.12
3S	1.68
MAX.	1.0
MIN.	-0.7

22.Terminal Strength

SPEC : $\Delta F/F = \pm 10$ ppm MAX.

SPEC : $\Delta ESR = \pm 25\%$ MAX.



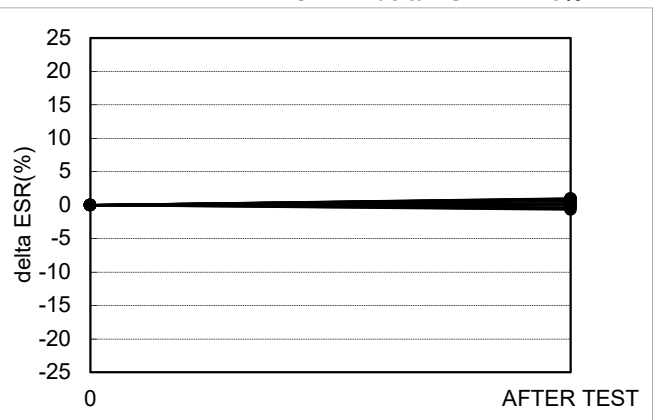
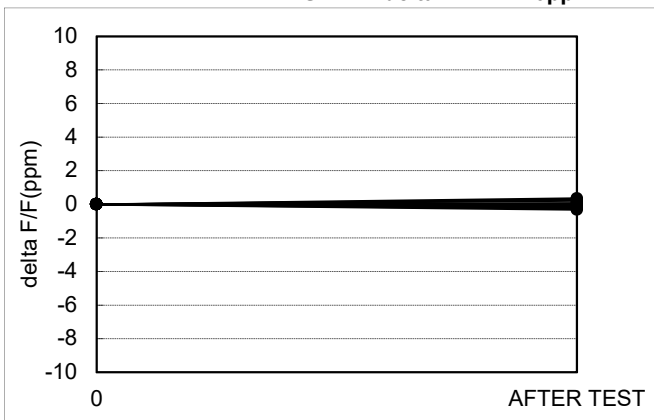
AFTER TEST	
X-bar	0.00
3S	1.09
MAX.	0.6
MIN.	-0.5

AFTER TEST	
X-bar	0.26
3S	1.56
MAX.	0.9
MIN.	-0.6

23.ESD(Human Body Model)

SPEC : $\Delta F/F = \pm 10$ ppm MAX.

SPEC : $\Delta ESR = \pm 25\%$ MAX.



AFTER TEST	
X-bar	-0.01
3S	0.61
MAX.	0.3
MIN.	-0.3

AFTER TEST	
X-bar	0.32
3S	1.72
MAX.	1.0
MIN.	-0.7