

SPECIFICATIONS FOR APPROVAL



Customer Part No. _____ HELE. Part No: X3S027000BA1H-U
Application For: _____ Products: CRYSTAL
Accepted Model: _____ Type & Freq.: HSX321S / 27.000MHz
Sample Order No: EOS-970245-3 Date: 2009/07/21

Approved By :

加高電子股份有限公司
加高電子股份有限公司

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Title HSX321S				Country of origin TAIWAN FACTORY		
QUARTZ CRYSTAL SPECIFICATION				THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	1

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HSX321S SPECIFICATION

INDEX

ITEM	PAGE
1. QUARTZ CRYSTAL UNIT SPECIFICATION	3
2. MARKING & DIMENSIONS	4
3. INSIDE STRUCTURE	5
4. EMBOSS CARRIER TAPE&REEL	
a. DIMENSIONS OF CARRIER TAPE	6
b. DIMENSIONS OF REEL	6-7
c. STORAGE CONDITION	7
d. STANDARD PACKING QUANTITY	7
e. MATERIAL OF TAPE	7
f. LABEL CONTENTS	7
g. TAPING DIMENSION	8
h. JOINT OF TAPE	8
i. RELEASE STRENGHT OF COVER TAPE	8
5. MECHANICAL PERFORMANOE	9
6. ENVIRONMENTAL PERFORMANOE	9
7. SUPPLRMENT	10-11
8. FLOW CHARD	12
9. Environmental Workload Chemical Substance Components List .	13
10. TEST DATA	

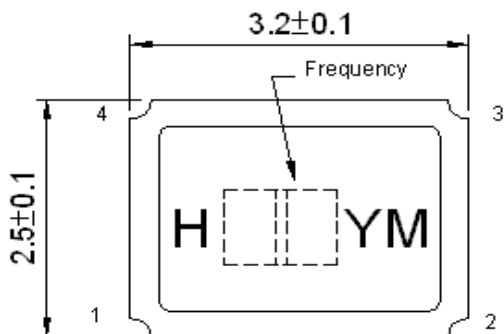
Title HSX321S QUARTZ CRYSTAL SPECIFICATION				Country of origin TAIWAN FACTORY THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	2

1. QUARTZ CRYSTAL UNIT SPECIFICATION

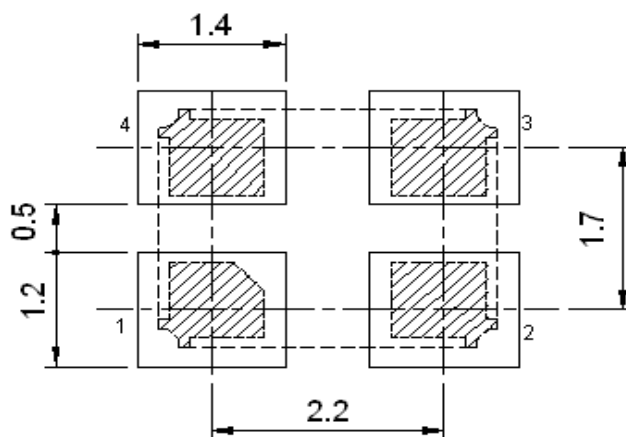
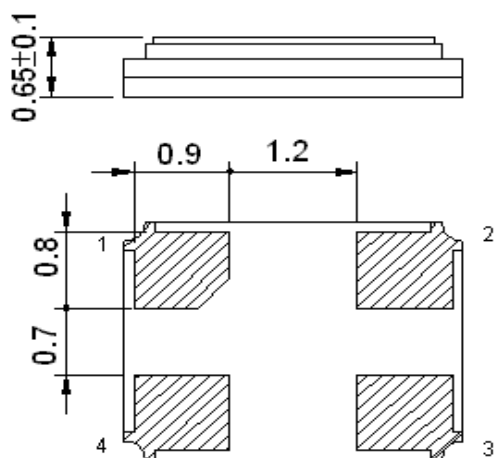
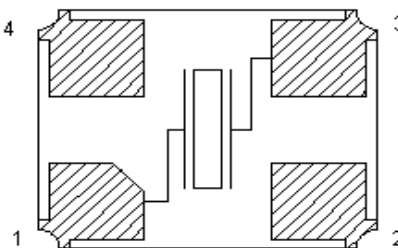
- | | |
|--------------------------------|---|
| 1. Frequency: | 27.000000MHz |
| 2. Holder type : | HSX321S |
| 3. Frequency tolerance: | +/-10 ppm at 25deg.C +/-3deg.C |
| 4. Equivalent resistance: | 60 ohms Max. / SERIES |
| 5. Storage temperature range: | -40 deg.C To +85 deg.C |
| 6. Operable temperature range: | -20 deg.C To +70 deg.C |
| 7. Temperature drift: | +/-10 ppm -20 deg.C To +70deg.C |
| 8. Loading capacitance (CL) : | 10.0 pF +/- 0.2 pF |
| 9. Drive level: | 10 uW +/- 2 uW |
| 10. Shunt Capacitance: | 2.0 pF Max |
| 11. Insulation resistance : | More than 500M ohms at DC 100V |
| 12. Mode of oscillation: | Fundamental |
| 13. Circuit: | Measured in S&A 250B ,HP/E5100A |
| 14. Shocking : | Dropping from 50 cm height 3 times on firm wood |
| Variation : | Frequency less than +/-5 ppm
Resistance less than +/- 15 % or 2ohms max. |
| 15. Aging: | Less than +/- 5 ppm/Year |
| 16. Holder | HSX321S Seam type |
| 17. Dimensions and marking | Refer to page.4 |
| 18. Emboss carrier tape & reel | Refer to page.6 and page.7 |
| 19. Note: | |

Title HSX321S				Country of origin TAIWAN FACTORY		
QUARTZ CRYSTAL SPECIFICATION				THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	3

2. HSX321S MARKING & DIMENSIONS



<TOP VIEW>



UNIT: mm

TOLERANCE: ± 0.2

*Marking should be printed as following:

Logo, Nominal Frequency, Manufactured year & month

*Nominal frequency = integer only

(ex. 14.31818 MHz \rightarrow 14)

*Manufacturing Lot No.

(Y: year) ex. 2000 shall be marked as ' 0 ' (The last digit of the year)

(M: month) ex. June shall be marked as ' F ' (As shown on the Table-1).

Marking : Laser marking.

(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

Title HSX321S

QUARTZ CRYSTAL SPECIFICATION

Country of origin

TAIWAN FACTORY

THAILAND FACTORY

Date

Confirm

Check

Prepare

Spec. No.

Rev.

Page

2009/07/21

F. S. TSAI

C. L. WANG

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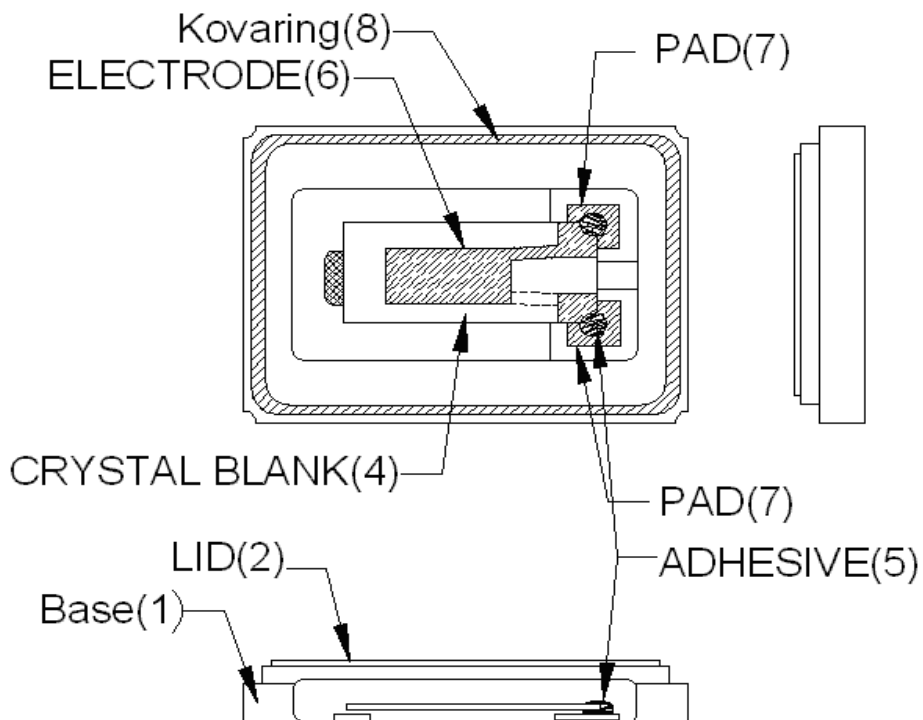
X3S027000BA1H-U

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4

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3. INSIDE STRUCTURE



※Reference drawing

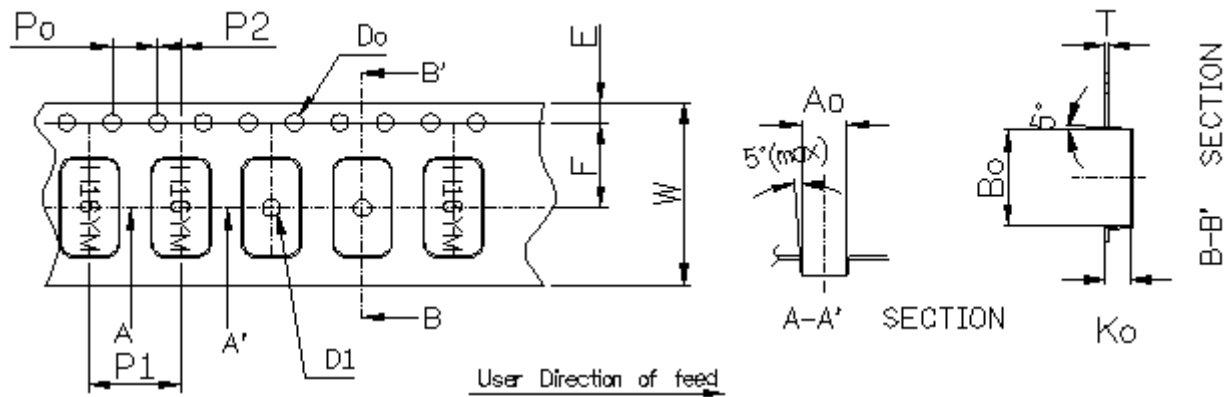
(1) Base: Alumina Ceramic (Al_2O_3) Metallized Pad: W Ni Plating Au Plating
(2) Lid : Fe- Ni -Co
(3) Crystal Enclosure Seal: Seal Seam
(4) Crystal Blank Rectangular At-Cut Quartz Crystal Blank
(5) Adhesive Silver Conductive Silicon Resin Adhesive bonding: upper & lower bonding/lower bonding only
(6) Electrode Cr+Ag
(7) PAD Alumina Ceramic (W. Ni. Au)
(8) Kovaring : Fe-Ni-Co Alloy

The use prohibition chemistry substance of Table 1 of DHE-0204-1 (QA-QM-08) is not included in this item.

Title HSX321S QUARTZ CRYSTAL SPECIFICATION				Country of origin TAIWAN FACTORY THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	5

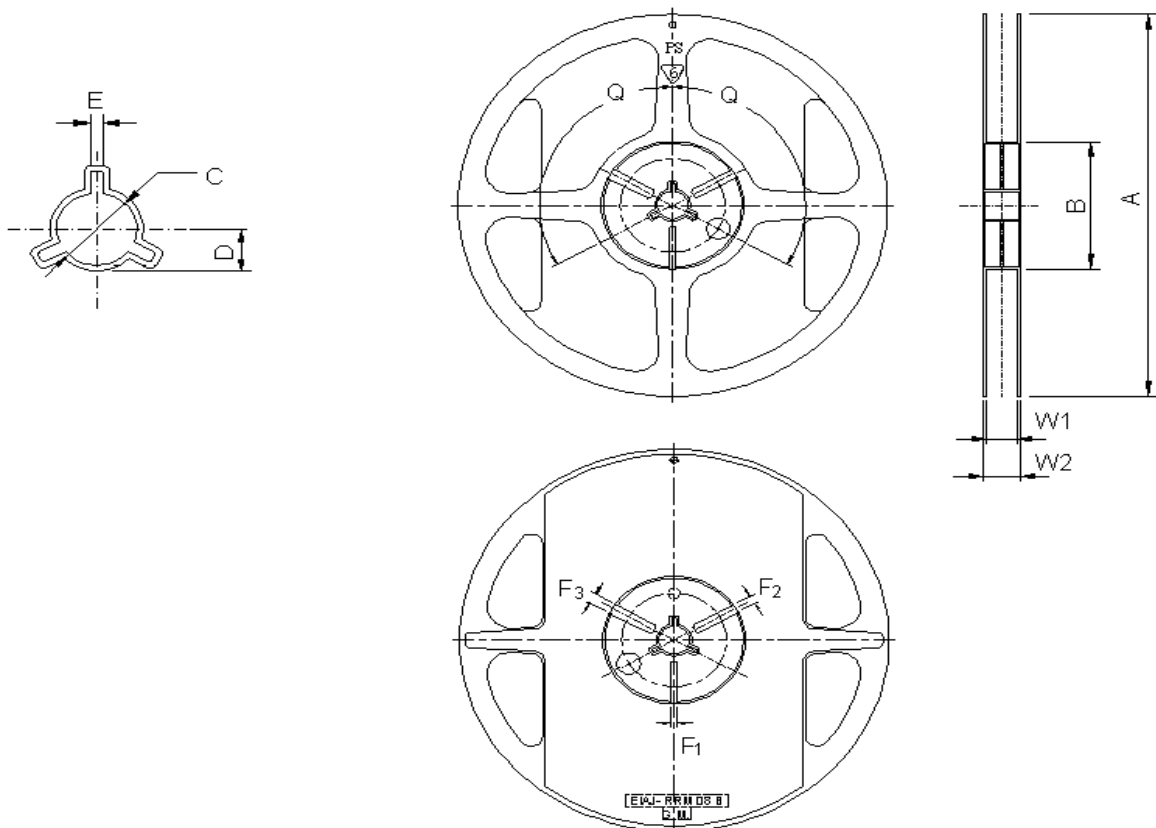
4. HSX321S EMBOSS CARRIER TAPE & REEL

a.) Dimensions of Carrier Tape



Symbol	A_0	B_0	K_0	P_0	P_1	P_2
Spec	2.70 ± 0.1	3.4 ± 0.1	1.40 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05
Symbol	E	F	D_0	D_1	W	T
Spec	1.75 ± 0.1	3.5 ± 0.05	$\phi 1.55 \pm 0.05$	$\phi 1.0$ (min)	8.0 ± 0.2	0.25 ± 0.05

b.) Dimensions of Reel



Title HSX321S

QUARTZ CRYSTAL SPECIFICATION

Country of origin

TAIWAN FACTORY

THAILAND FACTORY

Date

Confirm

Check

Prepare

Spec. No.

Rev.

Page

2009/07/21

F. S. TSAI

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X3S027000BA1H-U

0

6

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(Table-2)

(UNIT: mm)

ITEM		MARK	DIMENSIONS · ANGLE	
FLANCE	Diameter	A	ϕ 178+1/-1	
	Inner Width	W1	9.0+/-0.3	
	Outer Width	W2	11.5+/-0.2	
HUB	Out Line diameter	B	ϕ 60+1.0/-0.0	
	Center Core slit	Width	F1	3.0+0.5/-0
			F2	4.0+0.5/-0
			F3	5.0+0.5/-0
		Position	q	120deg
	Spindle diameter		C	ϕ 13+/-0.5
Key Ditch	Width	E	2.5+0.5/-0	

c.) Storage condition

Temperature: +40deg.C Max.

Relative Humidity: 80% Max.

d.) Standard packing quantity

3,000PCS / REEL

e.) Material of the tape

Tape	Material
Carrier tape	PS Conductive
Top tape	Polyester

f.) Label contents

- .The type of product
- .Our specification No.
- .Your Part No.
- .Lot No.
- .Nominal Frequency
- .Quantity
- .Our Company Name

Sticks label for every reel.

TYPE	
SPEC NO.	
Parts NO.	
Lot No.	
FREQ.	
Q'TY	(RoHS Compliance)
H.ELE. HARMONY ELECTRONICS CORP.	

Title HSX321S

QUARTZ CRYSTAL SPECIFICATION

Country of origin

TAIWAN FACTORY

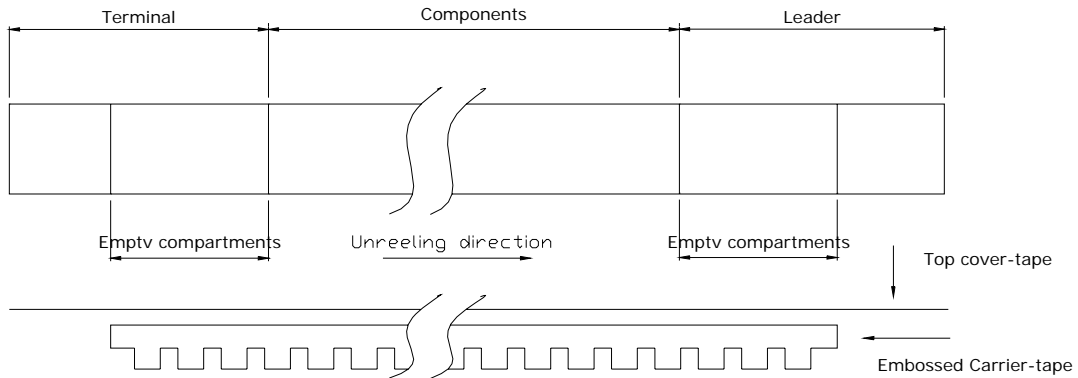
THAILAND FACTORY

Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	7

HARMONY ELECTRONICS CORP.

g.) Taping dimension

Leader	Cover-tape	The length of cover-tape in the leader is more than 400 mm including empty embossed area.
	Carrier-tape	After all products were packaged, must remain more than twenty pieces or 400 mm 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 top cover-tape must remain more the 40 mm.



h.) Joint of tape

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

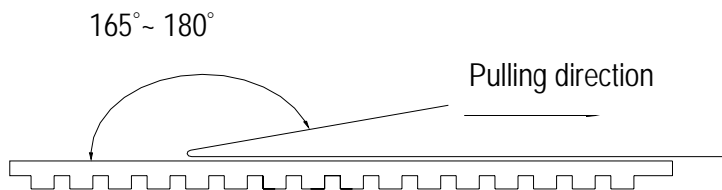
i.) Release strength of cover tape

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

Pulling direction 165° to 180°

Speed 300mm/min.

Otherwise unless specified.



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

Title HSX321S QUARTZ CRYSTAL SPECIFICATION				Country of origin TAIWAN FACTORY THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	8

5. Mechanical Performance

Item		Test Methods	Specifications Code
1	Natural Drop	Drop 3 times from the height of 50cm onto min. 30mm thickness hard wooden board.	A
2	Vibration	Frequency 10-55Hz, Sine Wave full amplitude of 0.8mm to X, Y and Z 3 axes, Duration of 2 hours to each axis.	A
3	Sealing Tightness	Leak Rate 1.0×10^{-8} Pa-m ³ /sec. Max. Measured by Helium leak detector. – Fine Leakage.	---
4	Solderability	After applying ROSIN Flux, dipping in solder bath at 245deg.C +/- 5deg.C for 3 +/- 0.5 sec.	B

6. Environment Performance

Item		Test Methods	Specifications Code
1	Humidity	Temperature 60°C +/- 2°C, RH 90~95%, Duration of 240 hours. Back to room temperature first, then in 1~2 hours, the component shall be checked.	A
2	Storage in Low Temperature	-40deg.C +/- 2deg.C, Duration of 240 hours. Back to the room temperature first, then in 1~2 hours, the component shall be checked.	A
3	Storage in High Temperature	+85deg.C +/- 2deg.C, Duration of 240 hours. Back to the room temperature first, then in 1~2 hours, the component shall be checked.	A
4	Temperature cycles	-40deg.C +/- 2deg.C (30min) ↔ +85deg.C +/- 2deg.C (30min) 25 cycles. Back to the room temperature first, then in 1~2 hours, the component shall be checked.	A
5	VPS	FC-70(the boiling point: +215°C) Vapor for 30 sec. Back to the room temperature first, then in 1~2 hours, the component shall be checked.	A

Specifications code	Specifications
A	Frequency variation shall be within +/- 5ppm and equivalent resistance shall be within the specification after the test
B	More than 90% of lead shall be covered by new solder.

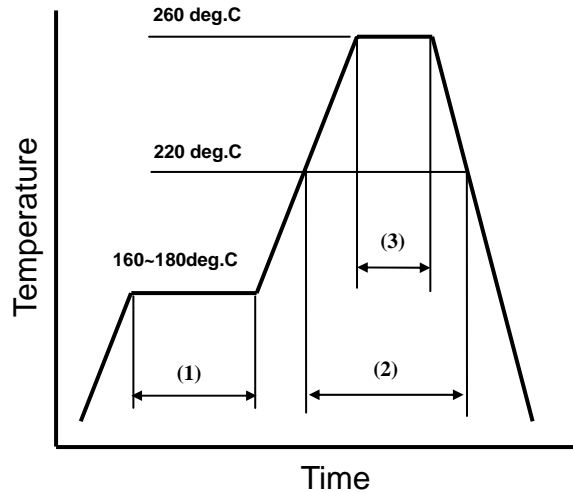
Title HSX321S QUARTZ CRYSTAL SPECIFICATION				Country of origin TAIWAN FACTORY THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	9

7. Supplement

7.1.Soldering

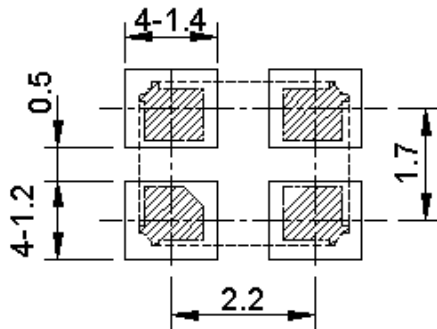
7.2.Please stay with our proposed reflow condition and do then soldering 2 times max.

Available for Lead Free Soldering



(1)	Preheat	160~180 deg.C	120sec.
(2)	Primary heat	220 deg.C	60sec.
(3)	Peak	260 deg.C	10sec. Max.

7.3.Land pattern layout(Example)



7.4.Solder iron (Example)

Bit temp.:350°C max.,Time:3sec max. ,Each terminal solder a 1 time max.

Title HSX321S QUARTZ CRYSTAL SPECIFICATION				Country of origin TAIWAN FACTORY THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	10

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7.5.Mounting

This component is designed for automatic insertion.

However, you are requested to do the trial with your insertion machine in order to be sure of proper operation and no damage of component.

Please pay attention to board warp which may damage the component and cause Soldering Process.

7.6.Cleaning

Cleaning liquid which corrodes Nickel shall not be used

It may cause the problem on the surface, color, marking etc.

Ultra-sonic cleaning is possible, however, you are requested to check on your board.

Because we only checked as single unit.

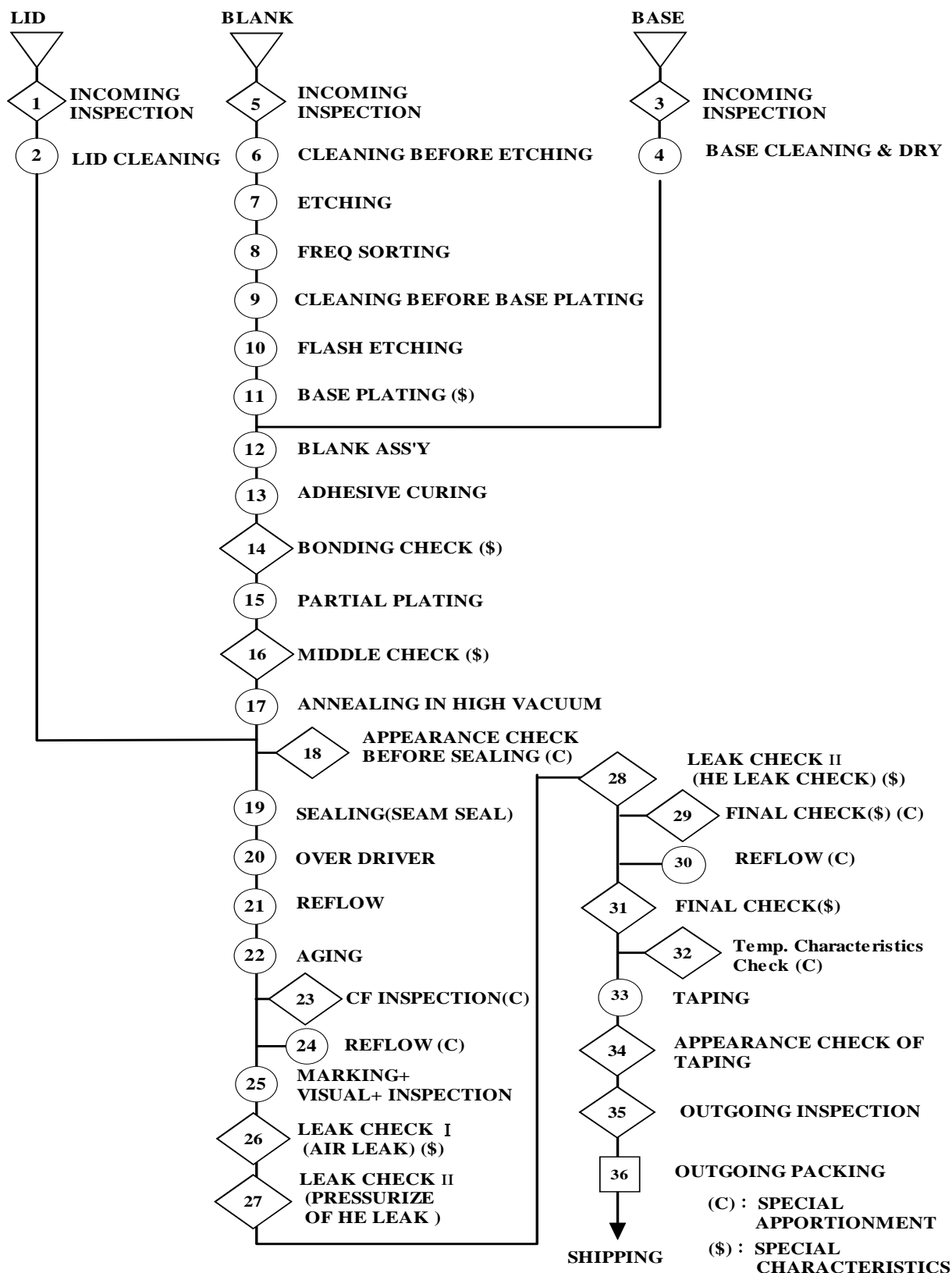
7.7.Storage

Please keep away from high temperature and high humidity ,which may cause put solderbility. No direct Sunlight, No dew as well.

Title HSX321S QUARTZ CRYSTAL SPECIFICATION				Country of origin TAIWAN FACTORY THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	11

HARMONY ELECTRONICS CORP.

8. Flow Chard



Title HSX321S				Country of origin TAIWAN FACTORY		
QUARTZ CRYSTAL SPECIFICATION				THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	12

9. Environmental Workload Chemical Substance Components List

Environmental Workload Chemical Substance Components List		
TYPE	H(D)SX321S	
PERCENTAGE		
Chemical Substance Components	19(mg)	ppm
Si	0.0437	2,300
Au	0.1463	7,700
Co & Co Compound	1.1286	59,400
Mo & Mo Compound	0.0380	2,000
Ag	0.3952	20,800
Cu	0.1102	5,800
Cr & Cr Compound	0.0380	2,000
Al	4.7234	248,600
Mn & Mn Compound	0.0228	1,200
W & W Compound	0.1843	9,700
Ni & Ni Compound	2.8424	149,600
Fe	3.8437	202,300

Title HSX321S				Country of origin TAIWAN FACTORY		
QUARTZ CRYSTAL SPECIFICATION				THAILAND FACTORY		
Date	Confirm	Check	Prepare	Spec. No.	Rev.	Page
2009/07/21	F. S. TSAI	C. L. WANG	U. F. CHEN	X3S027000BA1H-U	0	13

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