SPECIFICATIONS FOR APPROVAL

Customer Part No.: _____ HELE. Part No: **SSW32768KF3CHC-IT**

Application For: _____ Products: **OSCILLATOR**

Accepted Model: _____ Type & Freq.: **HSO321S(RTC)/32.768KHz**

Sample Order No: **EOS-C30007-1** Date: **2012/03/07**

Approved By :

加高電子股份有限公司

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HSO321S(RTC) SPECIFICATION

INDEX

1. **Type Name：**
   HSO321S(RTC)

2. **Output Frequency：**
   32.768000 KHz

3. **Absolute Maximum Ratings：**

Item	Symbol	Value	Unit
Vdd terminal voltage	Vdd	-0.5 ~ 4.0	V
Input terminal voltage	Vcont	-0.5 ~ Vdd+0.5	V
Output terminal voltage	Vout	-0.5 ~ Vdd+0.5	V
Output terminal current	Iout	20	mA
Storage temp. range	Tstr	-55 ~ 125	deg.C

4. **Electric Specifications：**

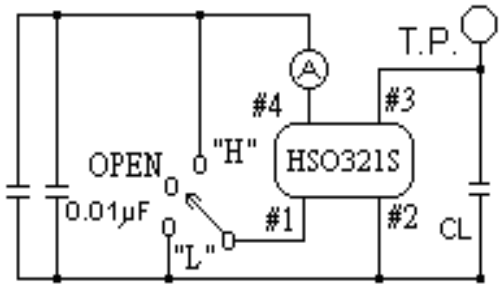
Item	Symbol	Value			Unit	Condition		
		Min	Typ	Max		Etc	Vdd	Temp
Frequency Stability	△f/F	-30	-	+30	ppm		3.3+/-0.3V	-40~85℃
Operating temp. range	Topr	-40	25	+85	℃			
Supply voltage	Vdd	3.0	3.3	3.6	V			
Current consumption 1 (#1 pin: open or "H")	Idd1	-	-	3	mA	Fig1,2	3.3V	25+/-3℃
Current consumption 2 (#1 pin: "L" level)	Idd2	-	-	0.01	mA			
Symmetry	Duty	40	50	60	%			
Low level output voltage	Vol	-	-	0.1xVdd	V			
High level output voltage	Voh	0.9xVdd	-	-	V			
Rise & Fall time	Tr & Tf	-	-	10	ns			
Pin #1 options	YES							
Output load	C-MOS CL = 15pF (Idd1, Idd2 test at No Load)							
Low level input current	Iil	-	-	10	uA	Fig3	3.3V	25+/-3℃
High Level input current	Iih	-	-	10	uA			
Low level input voltage	Vil	-	-	Vddx0.3	V			
High level input voltage	Vih	Vddx0.7	-	-	V			
Output disable time	Tplz	-	-	150	nsce			
Output enable time	Tpzl	-	-	5	msce			
Aging	-	-5	-	5	ppm/year			

F :Output Frequency

△f =Oscillation Frequency – F

Frequency Stability is inclusive of 25℃
Tolerance, operating temperature range, input voltage change,
Load chang, first of aging , shock and vibration.

Fig. 1) Measurement Circuit ：



CL = Include jig & probe capacitance
(Refer to 4)

Switch	Out term.
H	Oscillation out
Open	Oscillation out
L	High Z

Fig. 2) Output Wave Form：

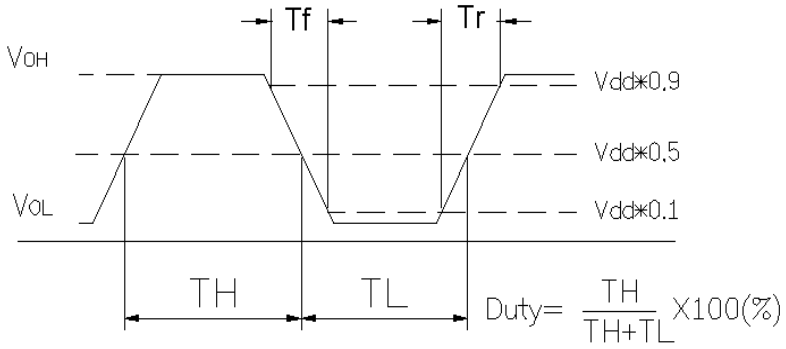
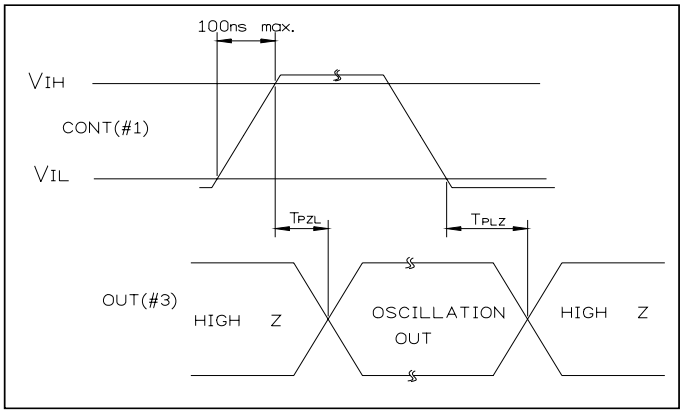
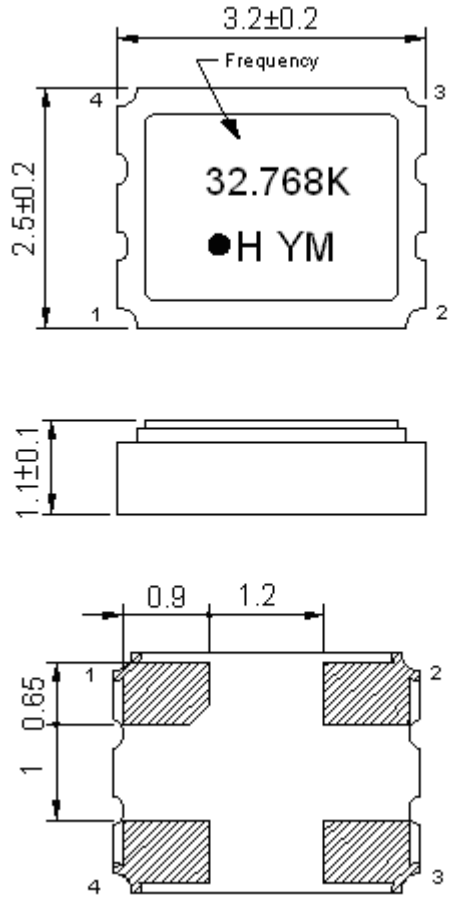


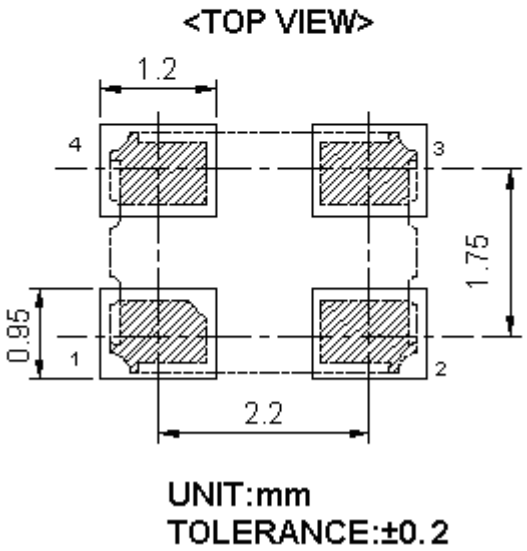
Fig. 3) Input Output Condition：



5. Dimensions：



Pin Connections	
1	OE(Output Enable)
2	GND
3	Output
4	Vdd



UNIT:mm
TOLERANCE:±0.2

Lot No.：

Year : Last digit of the year

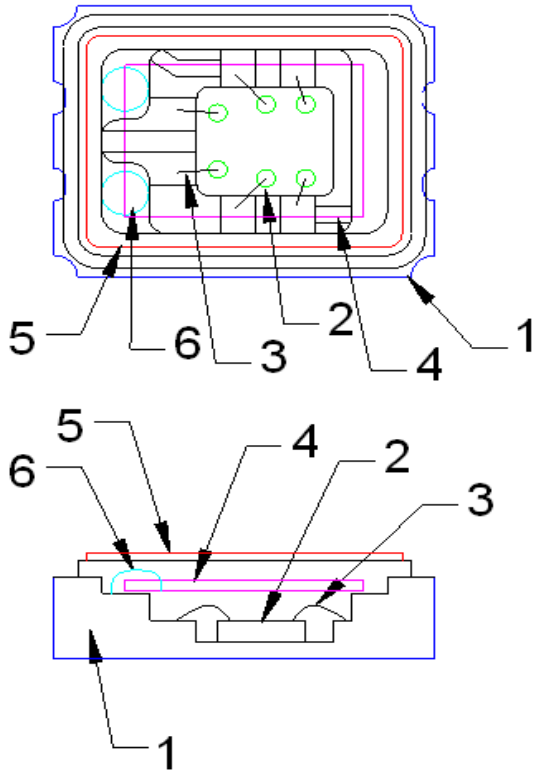
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Code	0	1	2	3	4	5	6	7	8	9

Month : Alphabet assign below

Month	1	2	3	4	5	6	7	8	9	10	11	12
Code	A	B	C	D	E	F	G	H	J	K	L	M

Marking : Laser marking or Ink marking.

6. Inside Structure：



Reference drawing

(1) Base: Alumina Ceramic (Al_2O_3) Metalized Pad: Ni Plating Au Plating
(2)IC IC(Si. Al. Ti.)
(3) Au Bonding Wire: Au
(4) Crystal Blank Rectangular At-Cut Quartz Crystal Blank
(5) LID: Fe+Ni+Co
(6) Adhesive Silver Conductive Silicon Resin

The use prohibition chemistry substance of Table 1 of DHE-0204-1 (HE-QA-24) is not included in this item.

7. 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	(1) Leak Rate $1.0x10^{-8}$ Pa-m^3/sec. Max. Measured by Helium leak detector. – Fine Leakage. (2) Dipping in the FC-40 at +125 +/-5deg.C for 5 minutes, no gas bubble observed from the inside of the can.	---
4	Solderability	After applying ROSIN Flux, dipping in solder bath at 245deg.C+/-5deg.C for 3+/-0.5 sec.	B

8. Environment Performance：

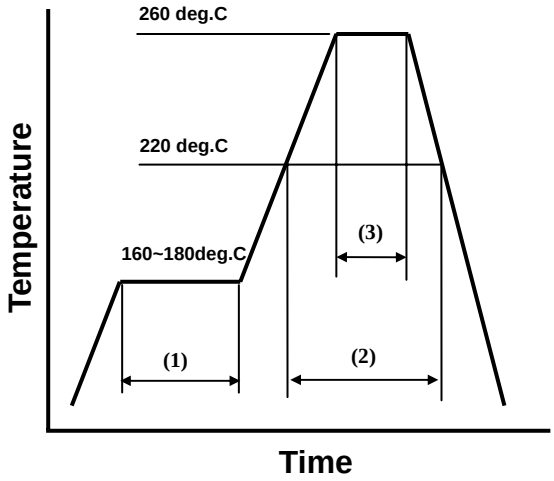
Item		Test Methods	Specifications Code
1	Humidity	Temperature 60℃+/-2℃,RH 90~95%, Duration of 240 hours. Back to room temperature first, then in 1~2 hours, the component shall be checked.	**A**
2	Storage in Low Temperature	-40deg.C +/-2deg.C, Duration of 240 hours. Back to the room temperature first, 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	-30deg.C +/-2deg.C (30min) ↔ +80deg.C +/-2deg.C (30min) 25 cycles. Temp. increasing or reducing time need to be within 3 minutes. Back to the room temperature first, then in 1~2 hours, the component shall be checked.	**A**
5	High Temperature Operation	+85deg.C +/-2deg.C, +3.3V Vdd Duration of 240 hours. 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.

9. Supplement：

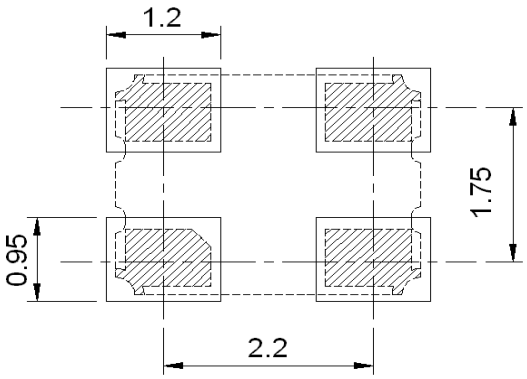
9.1. Please stay with our proposed reflow condition and do then soldering 2 times max.

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.

9.2.Land Pattern Layout： (Example)



9.3.Solder Iron： (Example)

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

9.4.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.

9.5.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.

9.6.Handling：

HSO321S series is designed to withstand Drop and Vibration, however, the crystal blank might be broken. So, if excess force is given, please check the characteristics before use.
HSO321S series has C-MOS circuit inside. Please pay attention to static-electricity as same handling as other C-MOS. devices.

9.7.By-pass Capacitor：

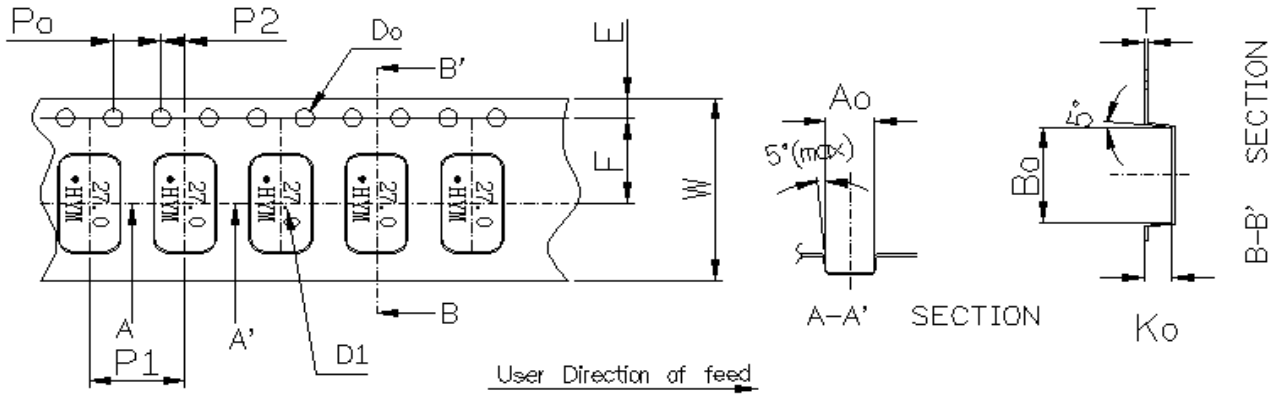
It has no by-pass capacitor integrated. We recommend you to use capacitor (like ceramic chip capacitor) 0.01 μF in-between Vdd and GND.

9.8.Storage：

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

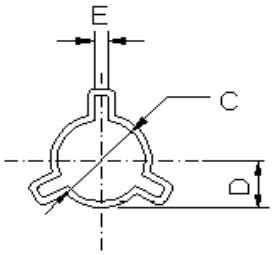
10. Taping and Packing：

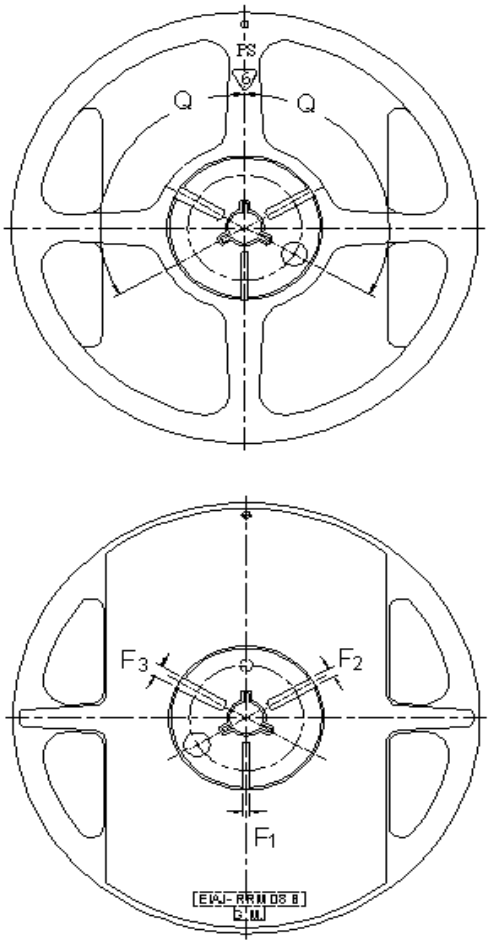
10.1.Emboss Tape Specifications：



Symbol	Ao	Bo	Ko	Po	P1	P2
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	Do	D1	W	T
Spec	1.75±0.1	3.5±0.05	ø1.55±0.05	ø1.0(min)	8.0±0.2	0.25±0.05

10.2.Reel Specifications：





(Table-2) (UNIT: mm)

ITEM			MARK	DIMENSIONS・ANGLE
FLANCE	Diameter		A	ϕ 180+0/-3
	Inner Width		W1	9.3+/-0.3
	Outer Width		W2	11.3+/-1.0
HUB	Out Line diameter		B	ϕ 60.5+/-0.5
	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 13.2+/-0.5
	Key Ditch	Width	E	3.0+/-0.2

10.3.Storage：
Temperature+40deg.C Max.
Humidity 80% Max.

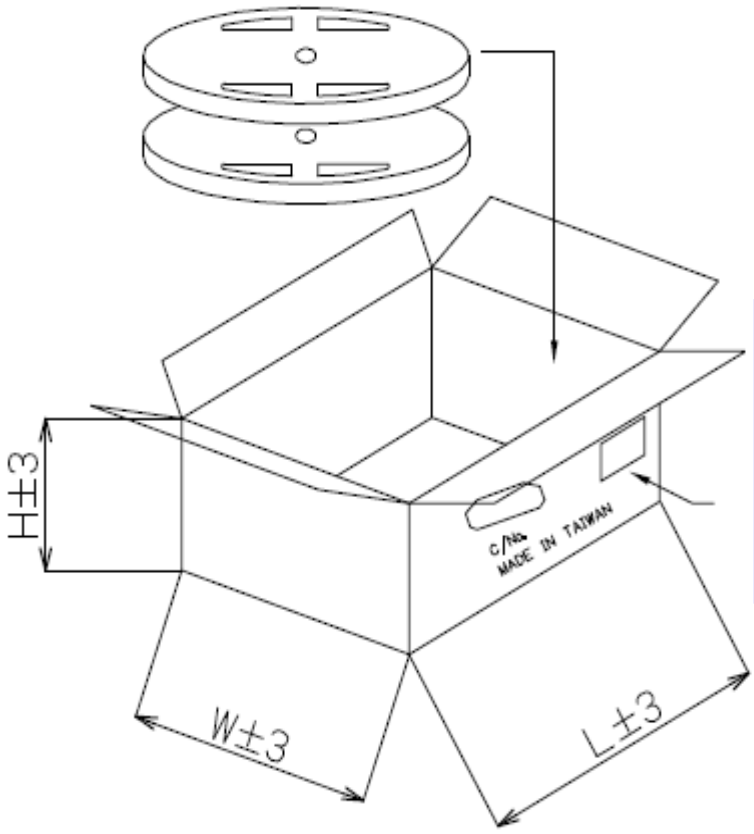
10.4.Quantity on Reel：
3,000 PCS/REEL

10.5.Label：
Label is following information：

TYPE:
SPEC.No.:
Parts No.:
Lot No.:

FREQ.: MHz
Q'TY: PCS
HARMONY ELECTRONICS CORP. H.ELE. HSF

10.6.Shipping Carton：
The size carton box is shown as below. One carton contains 10 reels. In case of less than 10 reels, suitable size of carton will be used. The cushion is filled in the carton box, which material shall be anti-static.



外箱尺寸	20個以下	10個以下
L±3	360	195
W±3	195	195
H±3	120	150

Label

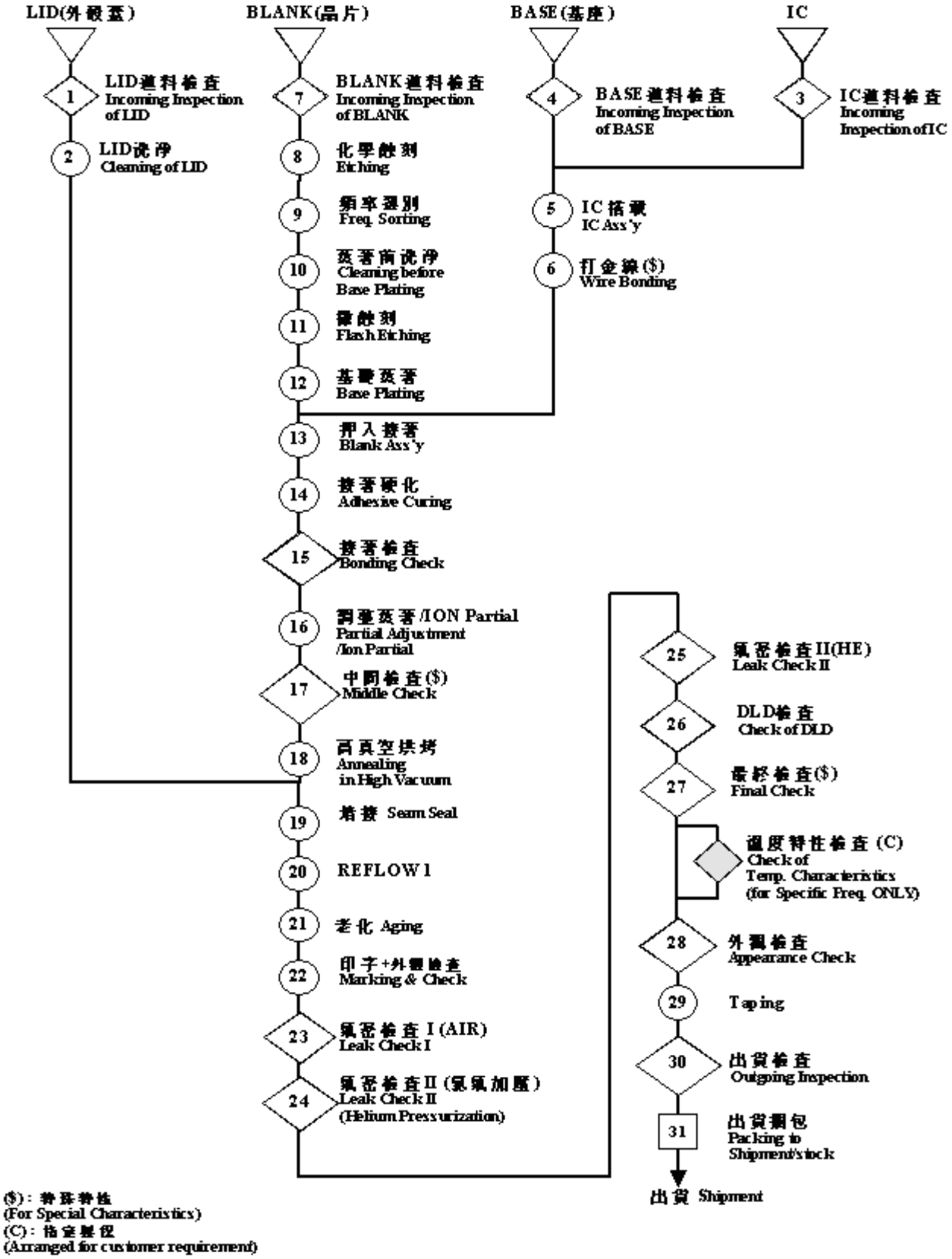
TYPE:
SPEC.No.:
Parts No.:
Lot No.:

FREQ.: MHz
Q'TY: PCS
HARMONY ELECTRONICS CORP. H.ELE. HSF

註：1.外箱側面須印如下圖面

2.外箱:五層瓦楞紙(紙厚:7±1mm)
3.尺寸線為外徑尺寸線

11. Flow Chart：



12. Environmental Workload Chemical Substance Components List

Environmental Workload Chemical Substance Components List		
TYPE / PERCENTAGE / Chemical Substance Components	D(H)SO321S	
	25.2(mg)	ppm
WOLFRAM AND ITS COMPOUND(W)	**0.21168**	**53.3434**
COBALT AND ITS COMPOUND(Co)	**0.96900**	**244.1880**
CHROMIUM AND ITS COMPOUND(Cr)	**0.07308**	**18.4162**
SILVER(Ag)	**0.15876**	**40.0075**
COPPER(Cu)	**0.07812**	**19.6862**
NICKEL AND ITS COMPOUND(Ni)	**2.26044**	**569.6309**
MANGANESE AND ITS COMPOUND(Mn)	**0.02016**	**5.0803**
MOLYBDENUM AND ITS COMPOUND(Mo)	**0.12348**	**31.1170**
SILICON AND ITS COMPOUND(Si)	**0.28476**	**71.7595**
ALUMINIUM AND ITS COMPOUND(Al)	**7.96320**	**2006.7264**
GOLD(Au)	**0.15372**	**38.7374**
IRON(Fe)	**3.37176**	**849.6835**

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