

CRYSTAL SPECIFICATION



Customer : _____
Customer P/N : _____
Agent : _____
Agent Code : _____
SIWARD P/N : XTL721-S999-328

Customer Approval :

希華晶體科技股份有限公司
SIWARD CRYSTAL TECHNOLOGY CO., LTD.

業務部/ SALE DEPARTMENT
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DATE : 2016/03/28

Approved By : Steve Chen

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Checked By : Tom Tang

研發部/R & D DEPT.
TEL: (04)25347909 EXT 1521

Designer : Sally Lin

Address: 1-1, LANE 111, JUNG-SHAN RD., SEC.3, TANTZU HSING, TAICHUNG 427, TAIWAN, R.O.C.

Rev.	Description of Revision History	Date	Designer	Checked By
1	New Publication	2013/05/15	Sally Lin	Tom Tang
2	Freq. vs Temp. Coefficient Before Changed : - 0.025 MIN; - 0.035 TYP ; - 0.045 MAX .(K1312-017)	2014/01/02	Sally Lin	Tom Tang
3	C0 Before Changed : 0.9 ~ 1.5 pF; C1: 3 ~ 4.4 fF.(K1601-006)	2016/01/15	Sally Lin	Tom Tang

CRYSTAL SPECIFICATION

- 1. Description : Quartz Crystal
 - 2. Nominal Frequency : 32.768 KHz
 - 3. Center Frequency : 32.768 KHz
 - 4. Dimension & Drawing No. : SF-3215 ; SXD-00281
 - 5. Oscillation Mode : Fundamental
 - 6. Cutting Mode :
 - 7. Packing Style : TP-175
 - 8. Measurement Instrument : S&A 250B(Calculated FL)
 - 9. Electrical Characteristics :
- [1] Operating Conditions :

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Operating Temperature Range	Topt	-40		85	°C	
Storage Temperature Range	Tstg	-55		125	°C	
Load Capacitance	CL		12.5		pF	
Drive Level	DL		0.1	0.5	μW	

[2] Frequency Stability :

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Tolerance	dF/Fo	-20		20	ppm	Refer to Center Frequency @25±3°C DL = 0.1uW
Freq. vs Temp. Coefficient	dF/dT	-0.02	-0.03	-0.04	ppm/°C ²	Values are calculated by frequencies at 10 °C , 25 °C , and 40 °C
Turnover Temperature	TT	20	25	30	°C	
Aging	dF/F25	-3		3	ppm	Per Year


dF/Fo: Frequency Deviation Refer to Center Frequency

dF/F25: Frequency Deviation Refer to 25 °C Frequency

[3] Electrical Performance :

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Equivalent Series Resistance	ESR			70000	Ω	@Series
Shunt Capacitance	C0		1.1		pF	
Motional Capacitance	C1		4.7		fF	
Quality Factor	Q	13			K	
Insulation Resistance	IR	500			M Ω	@DC 100 Volt

10. Marking : Laser

<p>*MARKING : D ->YEAR C -> MONTH YEAR : 1 2 3 4 5 6 7 8 9 0 CODE : A B C D E F G H J K 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 * S -> SIWARD * ### -> Lot No</p>	
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11. Remark :

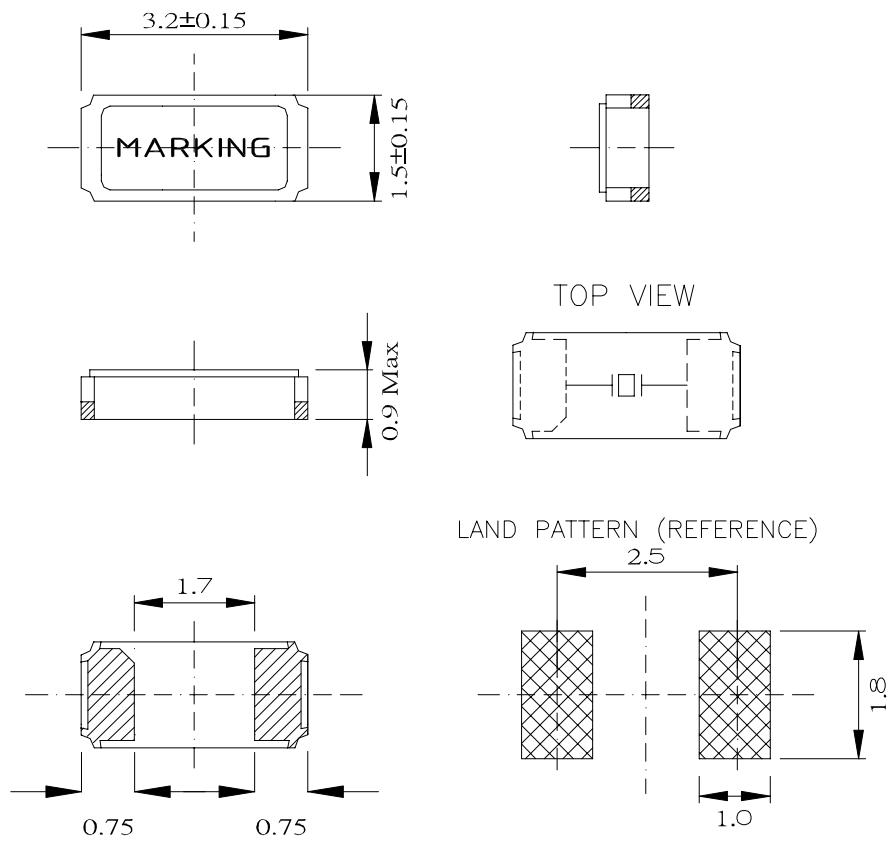
<p>* Compliant with RoHS and Siward QAD-S-116 Standard.</p>

■Note

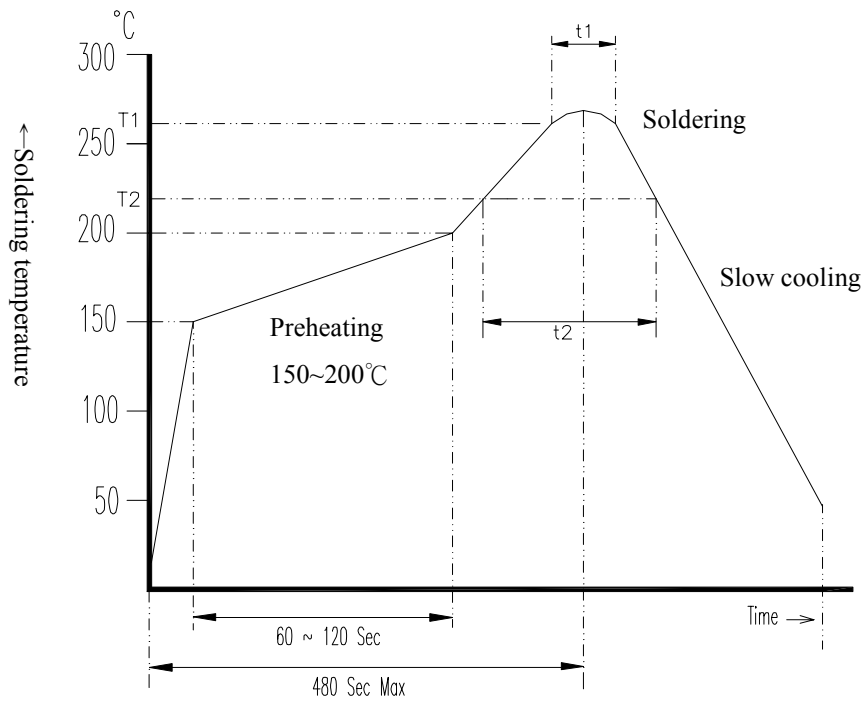
1. Tuning fork products oscillate at frequency bands that are close to the washing frequency of ultrasonic cleaning machine, which may cause resonance deteriorating the electrical characteristics in devices, and even damaging the overall structure of devices. Therefore, using ultrasonic cleaning machine to clean tuning fork devices should be avoided. If the use of this method to clean tuning fork devices is required, it's suggested to check the functionality of devices before and after the cleaning process.
2. Avoid mounting and processing by Ultrasonic welding this method has a possibility of an excessive vibration spreading inside the crystal products and becoming the cause of characteristic deterioration and not oscillating.
3. Manual soldering heat resistance
 Pressing a soldering iron of 400°C on the terminal electrode for four seconds (twice).

■ DIMENSIONS

Unit: mm



■ SUGGESTED REFLOW PROFILE



Application\Temperature Time	T1 / t1	T2 / t2
Lead Free	$260 \pm 5^\circ\text{C}$ / 10 ± 5 Sec Max	217°C Min / $60 \sim 150$ Sec
Non Lead Free	$240 \pm 5^\circ\text{C}$ / 10 ± 5 Sec Max	183°C Min / $60 \sim 150$ Sec

■ RELIABILITY SPECIFICATION

REFER TO JIS C 6701

1. ENVIRONMENTAL PERFORMANCE

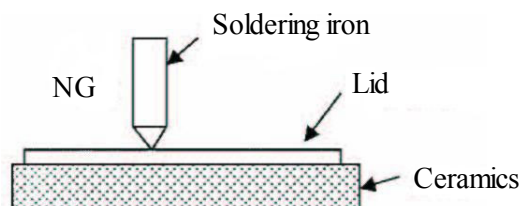
ITEM	CONDITION										
1. HIGH TEMPERATURE STORAGE	STORED AT 85±2°C FOR 500±12H. (If Customer's temperature request is higher than the standard, Temperature test must be done for customer requirements.) THEN 25±2°C OVER 2H BEFORE TESTING.										
2. LOW TEMPERATURE STORAGE	STORED AT -40±2°C FOR 500±12H. (If Customer's temperature request is lower than the standard, Temperature test must be done for customer requirements.) THEN 25±2°C OVER 2H BEFORE TESTING.										
3. HIGH TEMP. & HUMIDITY	STORED AT 60±2°C AND HUMIDITY 90~95% FOR 500±12 H. THEN 25±2°C OVER 2H BEFORE TESTING.										
4. TEMPERATURE CYCLE	THE CRYSTAL UNIT SHALL BE SUBJECTED TO 100 SUCCESSIVE CHANGE OF TEMPERATURE CYCLES, THEN 25±2°C OVER 2 H BEFORE TESTING, EACH CYCLE AS BELLOW : <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>TEMPERATURE</th> <th>DURATION</th> </tr> </thead> <tbody> <tr> <td>1. -40+0/-6°C</td> <td>30±3 MINUTES</td> </tr> <tr> <td>2. 25°C±2°C</td> <td>2~3 MINUTES</td> </tr> <tr> <td>3. 85+4/-0°C</td> <td>30 ±3 MINUTES</td> </tr> <tr> <td>4. 25°C±2°C</td> <td>2~3 MINUTES</td> </tr> </tbody> </table>	TEMPERATURE	DURATION	1. -40+0/-6°C	30±3 MINUTES	2. 25°C±2°C	2~3 MINUTES	3. 85+4/-0°C	30 ±3 MINUTES	4. 25°C±2°C	2~3 MINUTES
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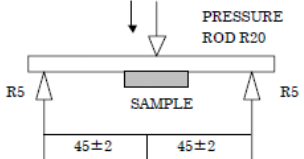
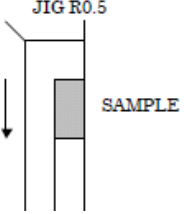
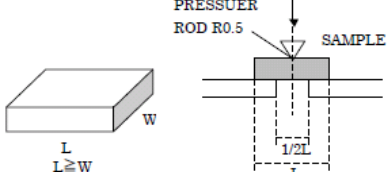
2. MECHANICAL PERFORMANCE

ITEM	CONDITION
5. RESISTANCE TO SOLDERING HEAT	REFLOW CHART AS ATTACH SHEET. TWICE PASS.
6. DROP	Dummy : 150 g, Height : 180 cm, Dropped Cycle : 3 Cycle, DROP IT ONTO A CONCRETE BOARD FOR 6 DIRECTIONS (XX',YY'ZZ'). THIS SHOULD BE 1 CYCLE.
7. VIBRATION	FREQUENCY : 10~60Hz, AMPLITUDE (TOTAL EXCURSION) : 1.5mm±15%, SWEEP TIME(PERIOD) : 2~3 min, 3 DIRECTION (X, Y, Z) EACH FOR 2 Hrs.
8. FINE LEAK	HELIUM BOMBING 5.0~5.5 Kgf / cm ² FOR 2 HOURS.

(Remark)

Please note that parts should specify above test condition each by each article not all at once. Also the variation of series resistance should ±20% min or ±15kΩ min which ever big value on above test. Please do not touch by hot soldering iron and do not put shock on top lid.

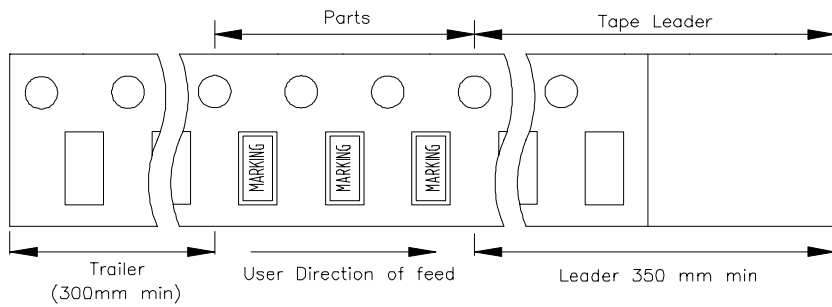
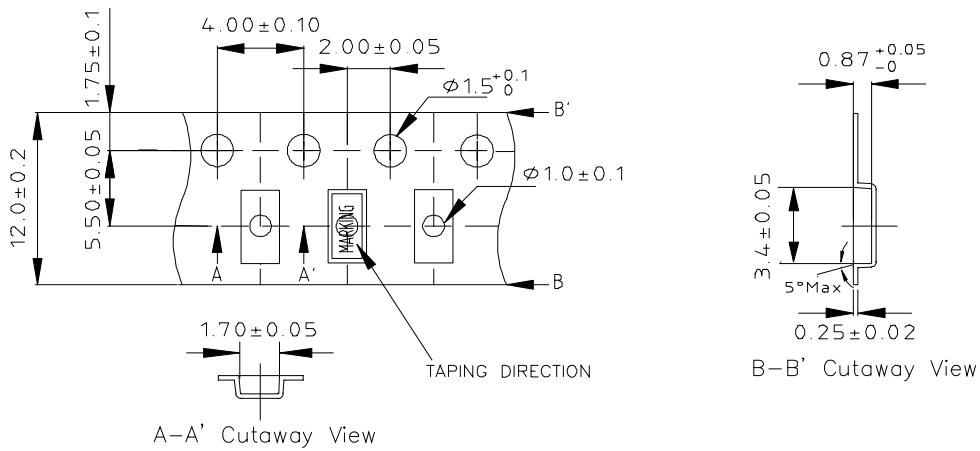


<p>9. TERMINAL STRENGTH</p>	<p>SHALL BE PRESSURIZED AT A SPEED OF APPROX.0.5mm/sec IN THE DIRECTION INDICATED BY THE ARROW UNTIL THE BENDING WIDTH REACHES 3mm AND HELD FOR 5 SECONDS.</p> 
<p>10. STICKING TENDENCY</p>	<p>A R0.5 JIG SHALL BE USED TO APPLY A 10N DEAD LOAD IN THE DIRECTION INDICATED BY THE ARROW TO THE ELEMENT AND RETAIN IT FOR 10 SECONDS.</p> 
<p>11. ELEMENT ASSEMBLY STRENGTH</p>	<p>A R0.5 PRESSURIZED BAR SHALL BE USED TO APPLY A 10N LOAD IN THE CENTER OF ELEMENT AND RETAIN IT FOR 10 SECONDS.</p> 

■ PACKING

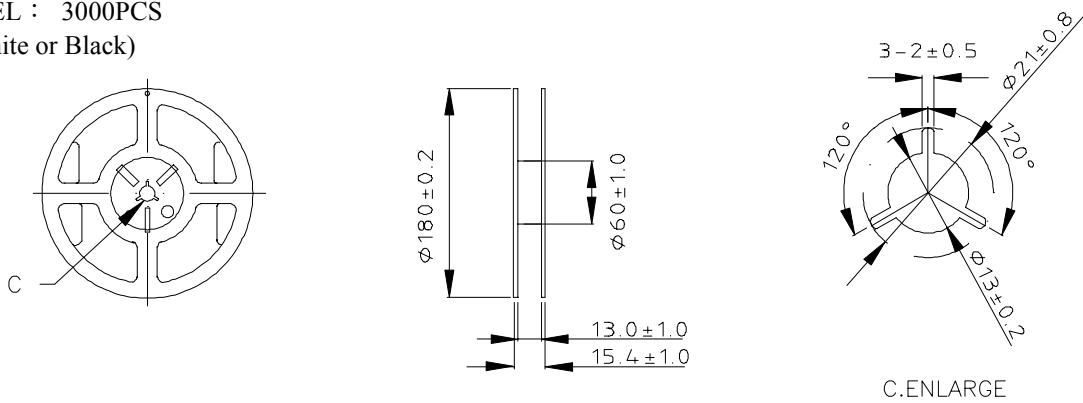
Unit: mm

1. CARRIER TYPE

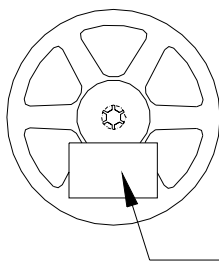


2. REEL : 3000PCS

(White or Black)



3. LABEL



CUSTOMER:		
FREQ :		QC
TYPE :		OK
SPEC :		Pb
P.O.:		HF
CUST.P/N.:		RoHS
LOT NO.:		
MFG.P/N.:		
D.C.:	QTY.:	

STWARD