

CRYSTAL SPECIFICATION



Customer : \_\_\_\_\_  
Customer P/N : \_\_\_\_\_  
Agent : \_\_\_\_\_  
Agent Code : \_\_\_\_\_  
SIWARD P/N : XTL721-S999-286

Customer Approval :

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

業務部/ SALE DEPARTMENT  
TEL: (04)25347909  
FAX: (04)25327885 / 25337396  
URL HTTP://www.siward.com.tw

DATE : 2012/07/04

Approved By : Steve Chen

品質保證部/ QUALITY ASSURANCE DEPT.  
TEL: (04)25347909 EXT 1340/1341

Checked By : Tom Tang

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

Designer : \_\_\_\_\_

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	2009/07/21	Sally Lin	Tom Tang
2	Dimension Before Changed: AX-3215.(K0912-009)	2009/12/22	Sally Lin	Tom Tang
3	Measurement Instrument Before Changed : S&A 250B(Measured FL) ; Tolerance condition Add DL = 0.1 μW.(K1103-006)	2011/03/09	Sally Lin	Tom Tang
4	Freq. vs Temp. Coefficient Before Changed : -0.04 MIN , -0.036 TYP ; And Add Condition .(K1106-022)	2011/07/01	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. : SX-3215 ; SXD-00281
  - 5. Oscillation Mode : Fundamental
  - 6. Cutting Mode :
  - 7. Packing Style : TP-125
  - 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	1	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 = 0.1 μW
Freq. vs Temp. Coefficient	dF/dT	-0.025	-0.035	-0.045	ppm/°C <sup>2</sup>	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			70	KΩ	@Series
Shunt Capacitance	Co	0.6	0.9	1.2	pF	
Motional Capacitance	C1	3	3.7	4.4	fF	
Quality Factor	Q	13000				
Insulation Resistance	IR	500			MΩ	@DC 100 Volt

10. Marking : Laser

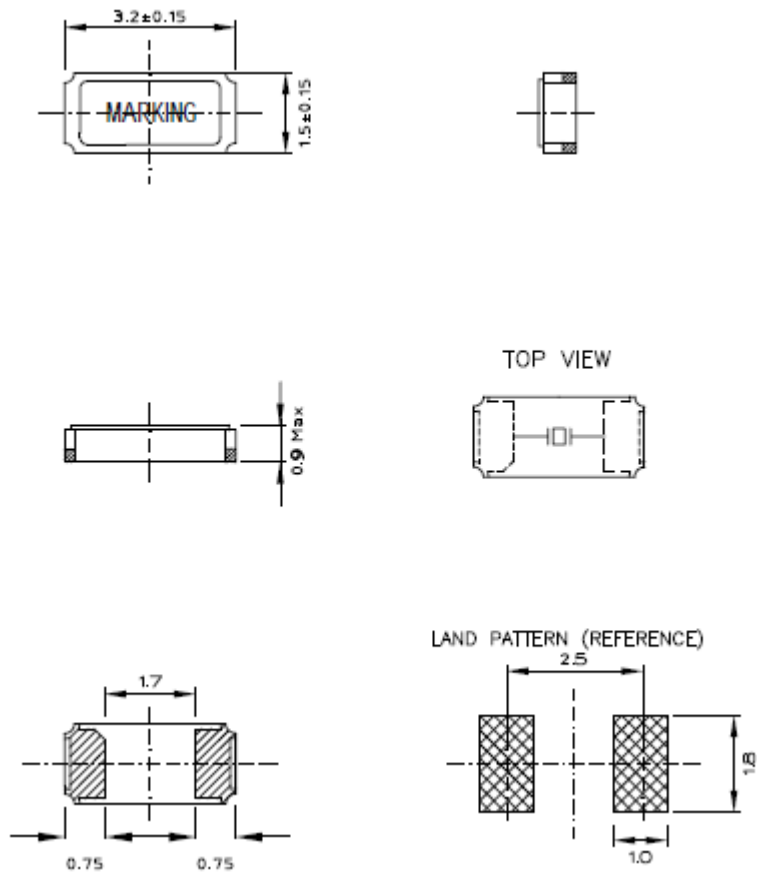
<p>*MARKING : D -&gt;YEAR C -&gt; MONTH          YEAR : 1 2 3 4 5 6 7 8 9 0          CODE : A B C D E F G H J K          MONTH: 1 2 3 4 5 6 7 8 9 10 11 12          CODE : A B C D E F G H J K L M          * S -&gt; SIWARD * ### -&gt; Lot No</p>	<div style="border: 1px solid black; width: 150px; height: 80px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <span>SDC###</span> </div>
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11. Remark :

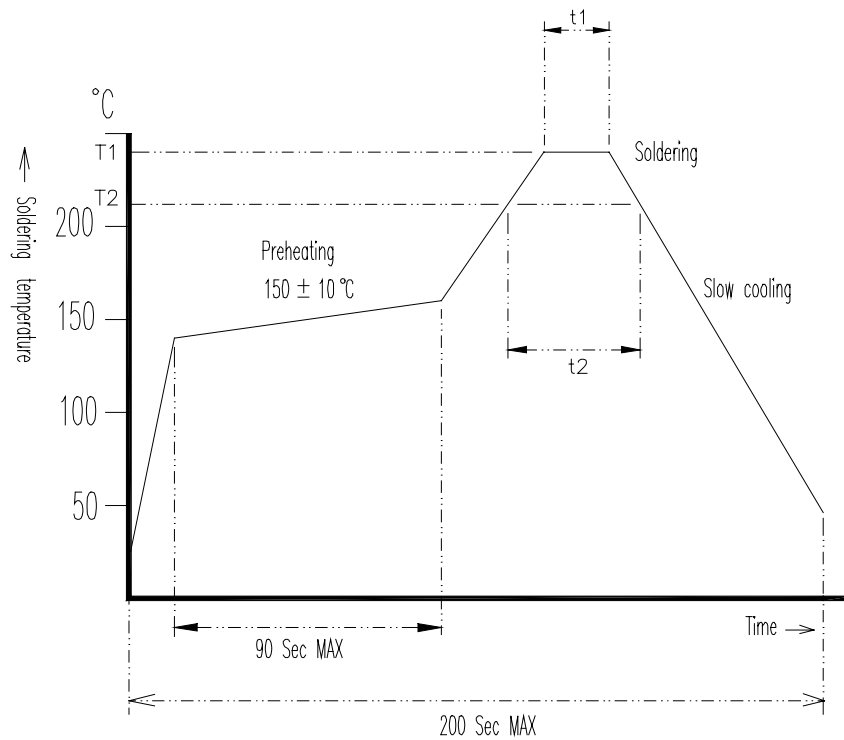
<p>*Lead Free, RoHS compliant</p>
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■ DIMENSIONS

Unit: mm



■ SUGGESTED REFLOW PROFILE



Application\Temperature Time	T1 / t1	T2 / t2
Lead Free	$260 \pm 5^\circ\text{C}$ / 10 Sec Max	225Min / 60 Sec Max
Non Lead Free	$240 \pm 5^\circ\text{C}$ / 10 Sec Max	200Min / 40 Sec Max

■ RELIABILITY SPECIFICATION

1. ENVIRONMENTAL PERFORMANCE

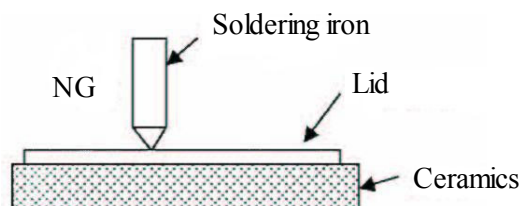
ITEM	CONDITION										
1. HIGH TEMPERATURE STORAGE	STORED AT 85±2°C FOR 500±12H. ( If Customer's temperature request is higher than the standard, Temperature test must be done for customer requirements. ) THEN 25±2°C OVER 2H BEFORE TESTING.										
2. LOW TEMPERATURE STORAGE	STORED AT -40±2°C FOR 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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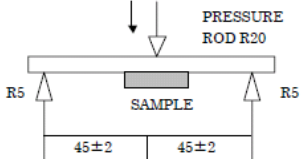
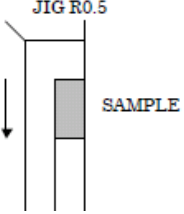
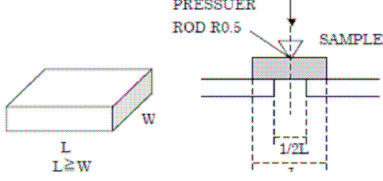
2. MECHANICAL PERFORMANCE

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 <sup>2</sup> 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.

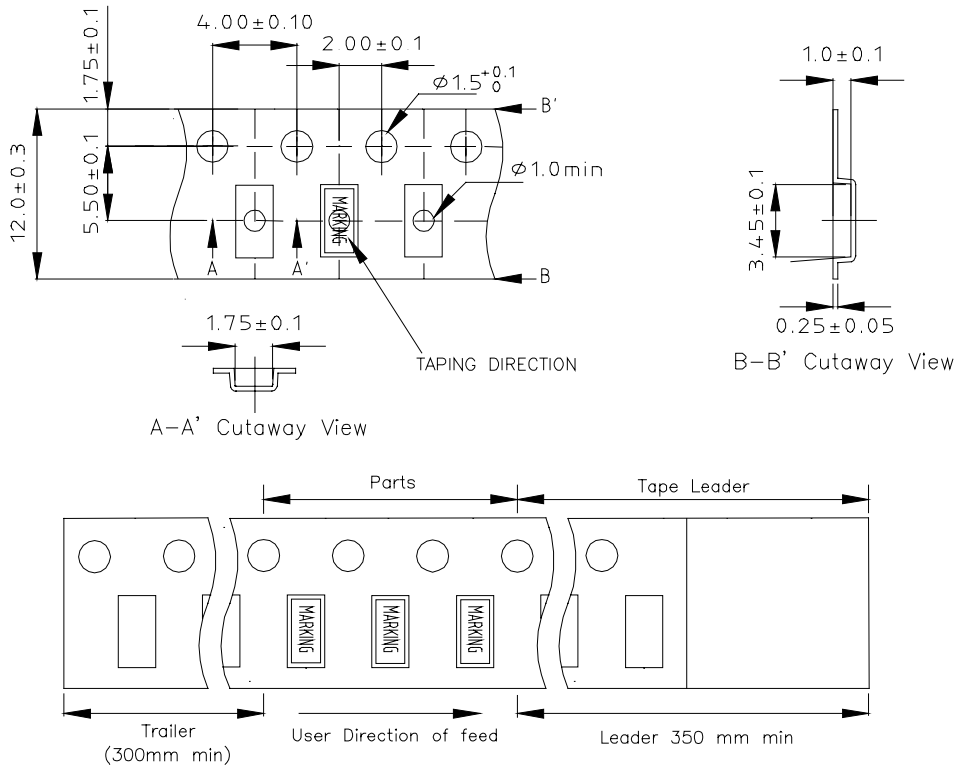


<p>9. TERMINAL STRENGTH</p>	<p>SHALL BE PRESSURIZED AT A SPEED OF APPROX.0.5mm/sec IN THE DIRECTION INDICATED BY THE ARROW UNTIL THE BENDING WIDTH REACHES 3mm AND HELD FOR 5 SECONDS.</p> 
<p>10. STICKING TENDENCY</p>	<p>A R0.5 JIG SHALL BE USED TO APPLY A 10N DEAD LOAD IN THE DIRECTION INDICATED BY THE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

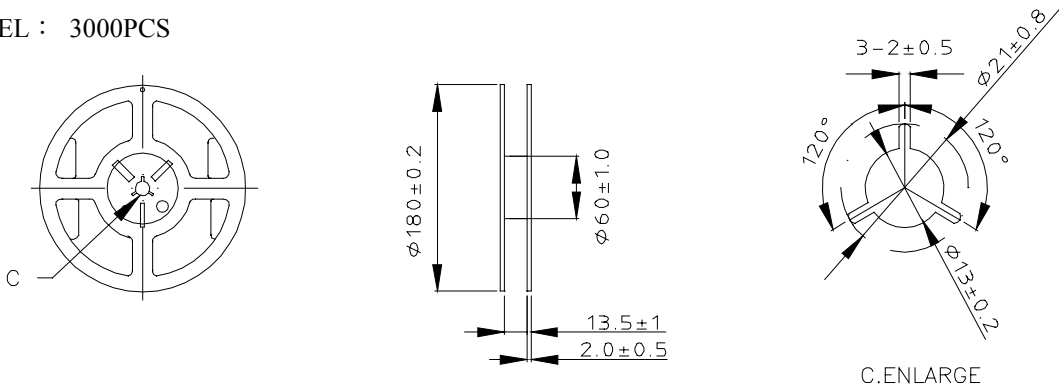
■ PACKING

Unit: mm

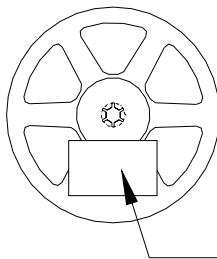
1. CARRIER TYPE



2. REEL : 3000PCS



3. LABEL



CUSTOMER :	_____	
P.O.# :	_____	
CUST.P/N :	_____	
MFG.P/N :	_____	
FREQ. :	_____	MHZ
		MHZ
TYPE :	D.C. :	
Q'TY. :	SPEC. :	
LOT NO :	_____	
REMARK 1 :	_____	
REMARK 2 :	_____	