



## SPECIFICATION FOR APPROVAL

CUSTOMER: 福建百城新能源科技有限公司

PRODUCT TYPE: 石英晶体谐振器 SMD3215

NOMINAL FREQUENCY: 32.768KHz

GNW P/N: T32.768A

DATE: 2023/12/04

CUSTOMER P/N: \_\_\_\_\_

APPROVED	PREPARED	QA/RD
李继锋	张利军	孙旭波
<b>APPROVED BY CUSTOMER 客户批准</b>		
(PLEASE RETURN A COPY WITH APPROVAL 请批准后回签一份)		

- (1) GNW requires one copy returned with signature and title of authorized individual that signifies acceptance of the attached specifications.
- (2) Orders received and accepted by GNW after return of signed copy of specification will be produced per these specifications.
- (3) Any changes to these specifications must be agreed upon by both parties and new revision of the Product Specification Sheet will be issued.
- (4) Any issuance of purchase order prior to consigning back the Approval page of "Specification Sheets" from customers will be regarded as the agreement on the contents of these specifications.

## CRYSTAL SPECIFICATION 晶体谐振器规格

1. Description 产品描述: Quartz Crystal
2. Nominal Frequency 标称频率: 32.768KHz
3. Dimension 尺寸: 3.2×1.5mm
4. Oscillation Mode 振荡模式: Fundamental
5. Measurement Instrument 测量设备: S&A 250B(Calculated FL)

Unless otherwise specified, the standard range of atmospheric conditions for making measurement and tests are as follow:

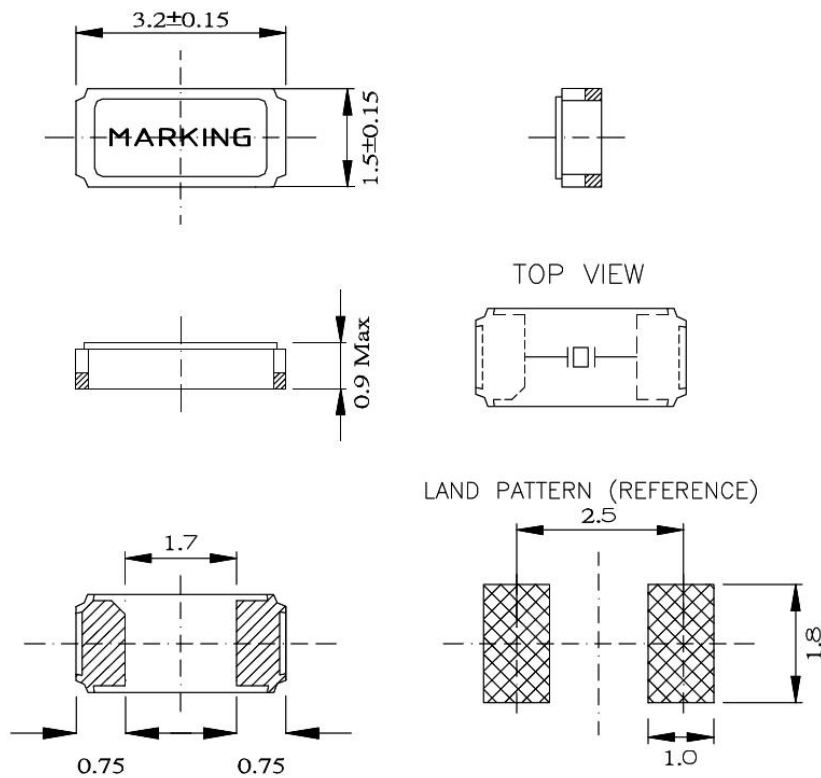
Ambient temperature : 25±3°C

Relative humidity : 40%~70%

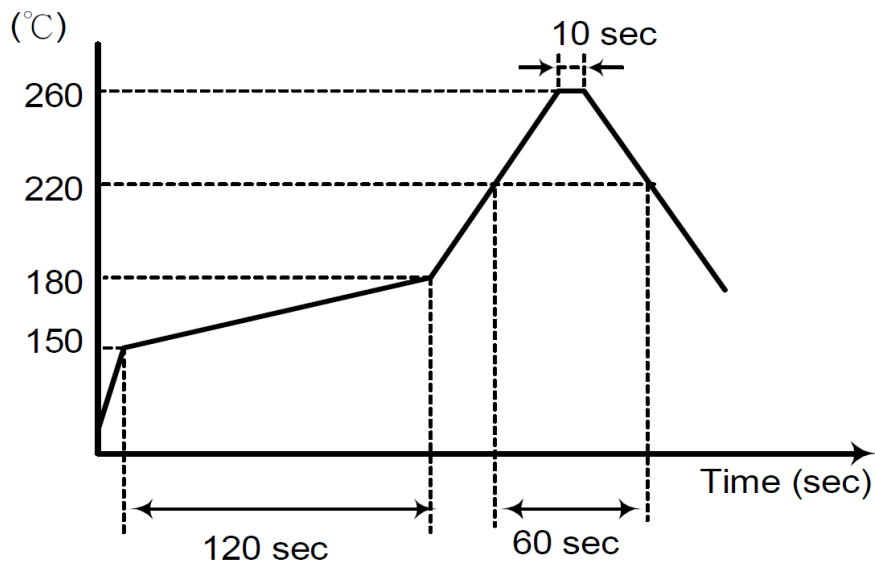
### Electrical Characteristics 电气参数

items	Electrical Spec.			Unit	Notes
	Min.	Type.	Max.		
1. Nominal Frequency (FL) 标称频率	32.768			KHz	
2. Frequency tolerance 调整频差	-20		+20	ppm	Refer to Center Frequency @25±3°C DL = 0.1μW
3. Freq. vs Temp. Coefficient 频率温度系数	-0.025	-0.035	-0.045	ppm/°C <sup>2</sup>	Values are calculated by frequencies at 10°C, 25°C, and 40°C
4. Operable temperature range 工作温度	-40		+85	°C	
5. Storage temperature range 储存温度	-55		+125	°C	
6. Loading capacitance (CL) 负载电容		12.5		pF	
7. Drive level (DL) 激励功率		0.1	0.5	μW	
8. Equivalent resistance (ESR) 等效阻抗			70	kΩ	@Series
9. Shunt Capacitance (C0) 静电容			2.0	pF	
10. Motional Capacitance (C1) 动态电容	3			fF	
11. Insulation resistance 绝缘阻抗	500			MΩ	at DC 100V
12. Aging 老化率	-3		+3	ppm/Year	

## MARKING AND DIMENSIONS 外形尺寸图 (Unit:mm)



## SUGGESTED REFLOW PROFILE 回流焊作业说明



Solder melting point :  $220 \pm 10^{\circ}\text{C}$ , 60 sec. Min.

Peak Temperature:  $260 \pm 5^{\circ}\text{C}$ , 10 sec. Max.

## Handling Instructions 应用指南

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.

若超声波清洗频率与音叉晶振频率接近，可能引发共振，使晶振的电气特性恶化，甚至破坏晶振的整体结构。因此，应避免使用超声波清洗音叉晶振。如果需要使用这种方法来清洁音叉晶振，建议在清洁之前和之后对晶振功能进行确定。

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. 请避免超声波安装和超声波焊接晶振，因为超声波有可能产生过度振动，若其危害扩散到晶体内部，会引发晶振电气特性恶化，造成停振。

3. Manual soldering heat resistance 手工焊接耐热性

Pressing a soldering iron of 400°C on the terminal electrode for four seconds (twice).  
在烙铁温度 400°C 条件下，焊接时间控制在 4 秒钟以内（焊接次数不可超过两次）。

Our products are manufactured in a dust-free environment. To keep them clean and dust free, keep them in a clean environment after they are unpacked.

我司产品为无尘车间制造。打开包装后，请在洁净环境中使用。

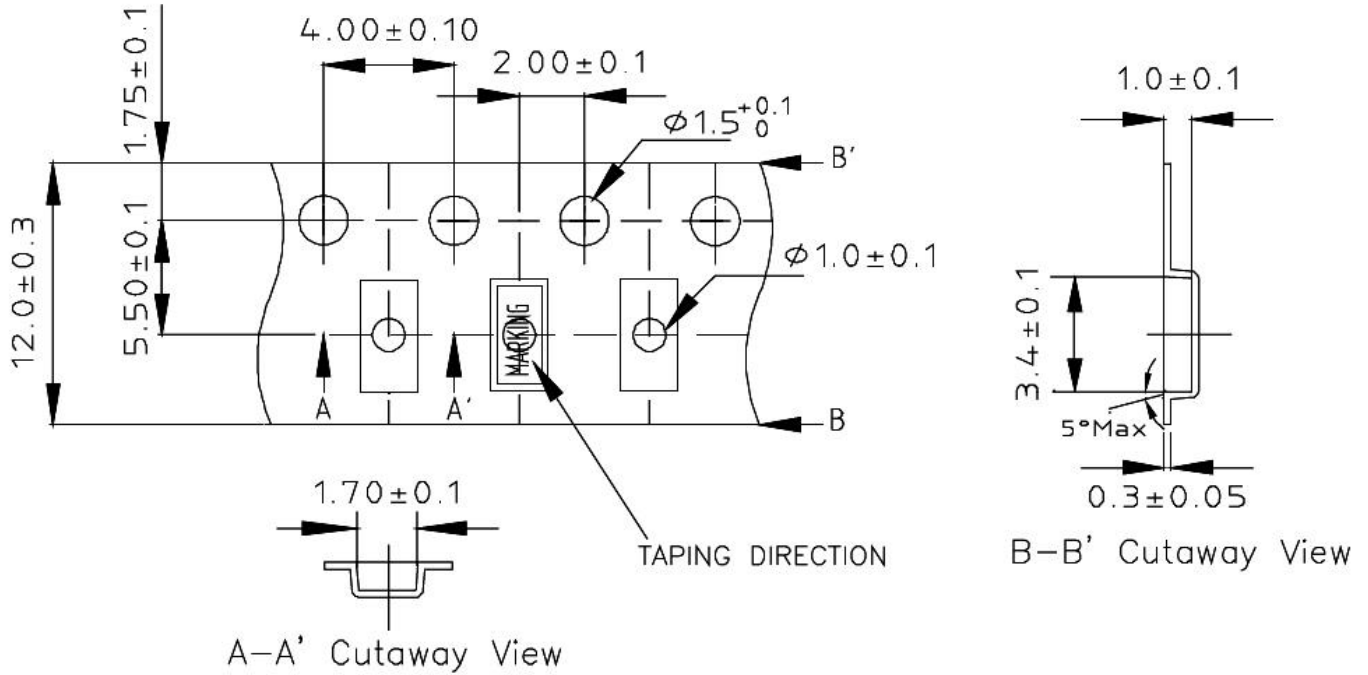
## Reliability Test 可靠性测试

Item	Conditions										
Humidity 湿度	Stored at 60±2°C and humidity 90~95% for 500±2 hours. Then 25±2°C over 2 hours before testing.										
Storage in Low Temperature 低温储存	Stored at -40±2°C for 500±12h. Then 25±2°C over 2h before testing.										
Storage in High Temperature 高温储存	Stored at 85±2°C for 500±12h. Then 25±2°C over 2h before testing.										
Temperature cycles 高低温循环	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="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Temperature</td> <td style="text-align: left;">Duration</td> </tr> <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> </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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4. 25°C±2°C	2~3 minutes										
Shock 跌落冲击试验	Dummy: 150 g, Height: 180 cm, dropped cycle: 3 cycle, drop it onto a concrete board for 6 directions. This should be 1 cycle.										
Vibration 震动测试	Frequency: 10~60hz, amplitude (total excursion): 1.5mm±15%, sweep time(period): 2~3 min, 3 direction, each for 2 hours.										
Leakage Test 气密性实验	Helium bombing 5.0~5.5kfg/cm <sup>2</sup> for 2 hours.										
Solder ability 可焊性	Refer to reflow chart. Twice pass.										
Bending Strength 折弯测试	Mount a sample on board. Apply pressure to the center of board until it is bent to 3 mm and hold for 5 ±1 sec. Pressure speed: 0.5 mm/sec.										
Adhesion 推力测试	Mount a sample on the circuit board. Apply pressure vertically to the side of specimen attached to the circuit board with the pressure jig. Pressure: 10N for 10±1 sec.										
Body strength 本体荷重	Apply pressure to the center of body with the R0.5 pressure jig. pressure:10N for 10±1sec.										

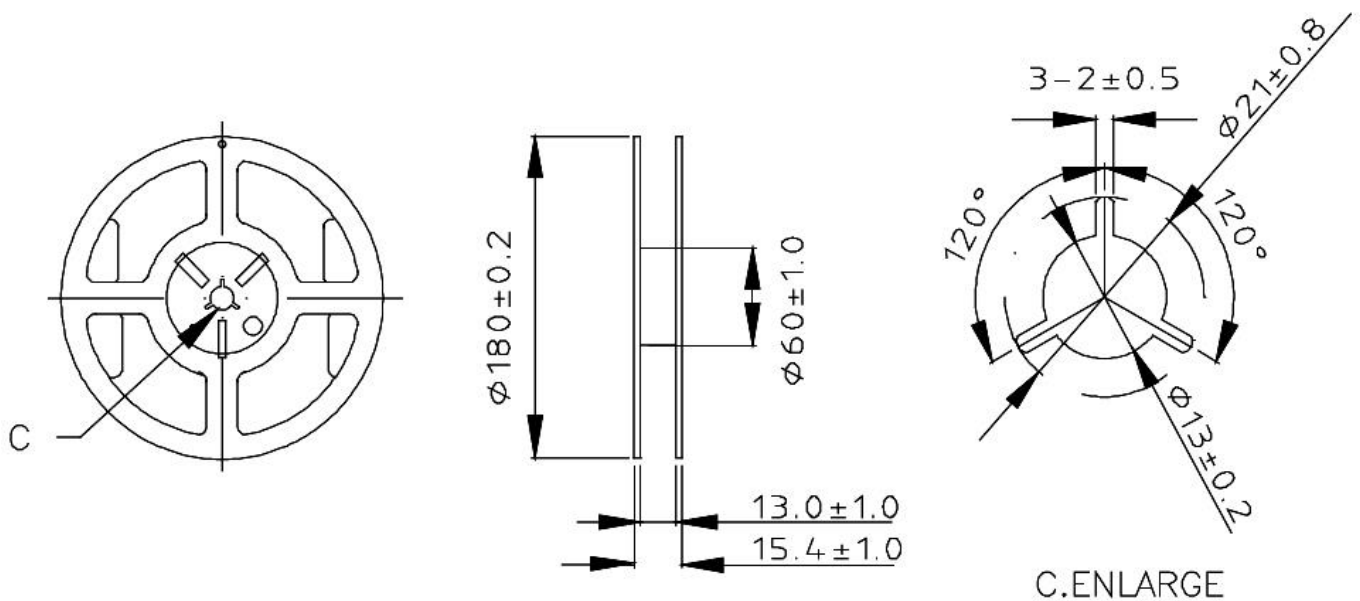
## EMBOSS CARRIER TAPE AND REEL 包装

(UNIT : mm)

### Carrier Tape



### Reel



Standard Reel Quantity is 3,000 pcs per reel