



## XO SPECIFICATION



Customer: \_\_\_\_\_  
Customer P/N: \_\_\_\_\_  
TKD P/N: XO32F024000GDHE001  
Part Name: SMD XO 3225  
Product Description: 24.000000MHz  
Issue Date: 2023/7/13

### **CUSTOMER'S APPROVAL**

**(PLEASE RETURN A COPY WITH APPROVAL )**

TKD Science and Technology Co.,Ltd  
泰晶科技股份有限公司

<b>Approved</b>	<b>Checked</b>	<b>Designer</b>
Zhong Yuan Hua	Zhan Chao	Li Yan

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Rev.	Description of Revision History	Date	Designer	Checked By
A	New Revision	2021/12/2	Li Yan	Zhan Chao
B	Add The Product Reliability	2023/7/13	Li Yan	Zhan Chao



## XO SPECIFICATION

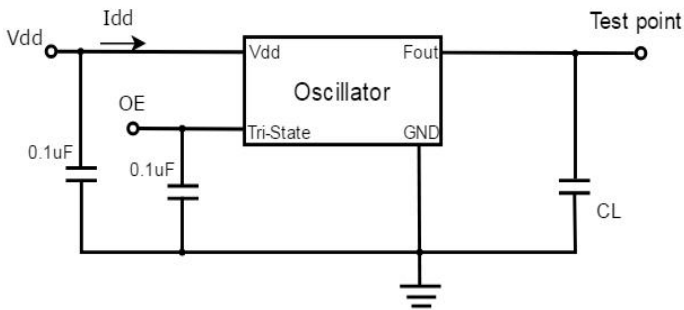
- 1.Description** : SMD Simple Packaged Xtal Oscillator 3225
- 2.Nominal Frequency** : 24.000000MHz
- 3.Electrical Specifications** :

Item	Parameters	Condition	Electrical Specifications			
			Min	Typ	Max	Units
1	Nominal Frequency		24.000000			MHz
2	Frequency Stability Overall	Note1	-30		30	ppm
3	Operating Temperature Range		-40		85	°C
4	Supply Voltage		3.3±10%			V
5	Current Consumption	Operating			10	mA
		Standby			10	uA
6	Output Waveform		CMOS			
7	Output Load		15			pF
8	Duty Cycle		45	50	55	%
9	Output Rise/Fall Time				8	ns
10	High Output Voltage		0.9Vdd			V
11	Low Output Voltage				0.1Vdd	V
12	Enable		Vdd*70%			V
13	Disable				Vdd*30%	V
14	Aging	Frist year	-3		3	ppm
15	Start Time				5	ms
16	Storage Temperature		-55		125	°C

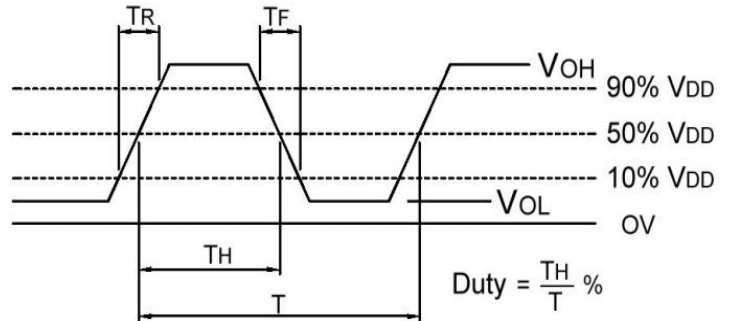
Note1 Frequency stability includes frequency tolerance@25°C and frequency stability vs. operating temperature range and voltage variance and first year aging



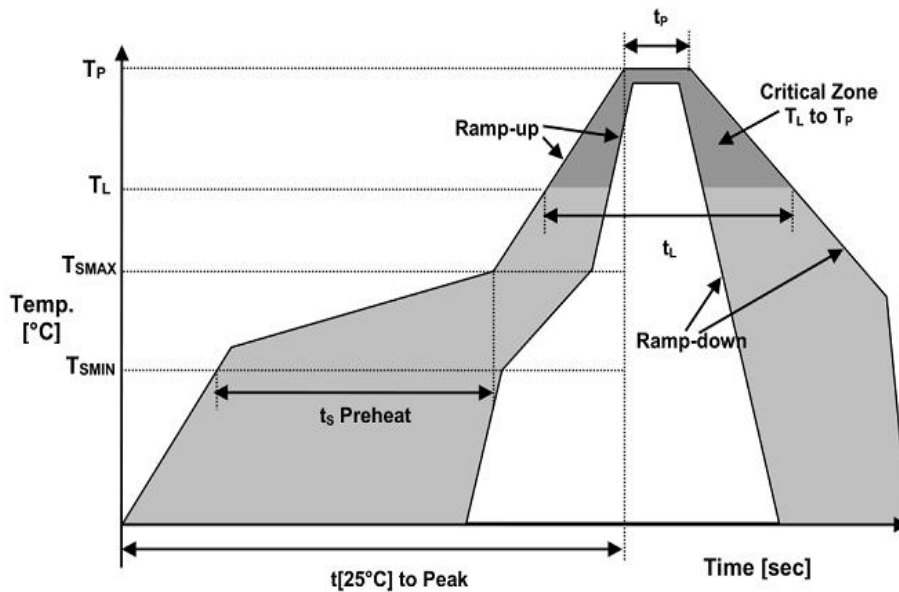
#### 4. Test Circuit (CMOS Load)



#### 5. Output Waveform (CMOS Load)



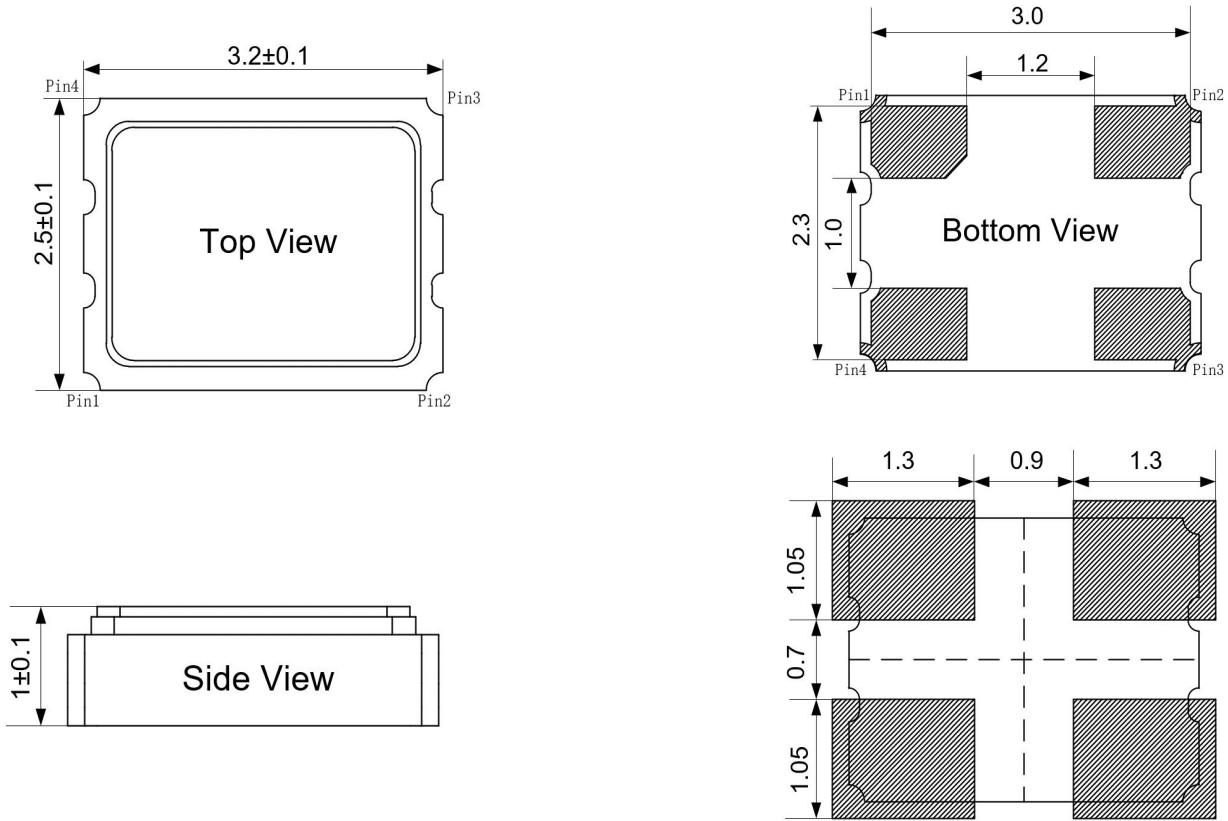
#### 6. Recommended Reflow Profile



Reflow Profile		
Temperature MIN Preheat	$T_{SMIN}$	150°C
Temperature MAX Preheat	$T_{SMAX}$	200°C
Time ( $T_{SMIN} - T_{SMAX}$ )	$t_s$	60-180sec
Temperature	$T_L$	217°C
Peak Temperature	$T_P$	260°C
Ramp-up Rate	$R_{UP}$	3°C/sec max
Ramp-Down Rate	$R_{DOWN}$	6°C/sec max
Time within 5°C of Peak Temperature	$t_p$	10sec
Time $t(25^\circ\text{C})$ to Peak Temperature	$t(25^\circ\text{C})\text{to Peak}$	480sec
Time	$t_L$	60-150sec

### 7.Product Dimensions

Unit: mm



Recommend Soldering Pattern

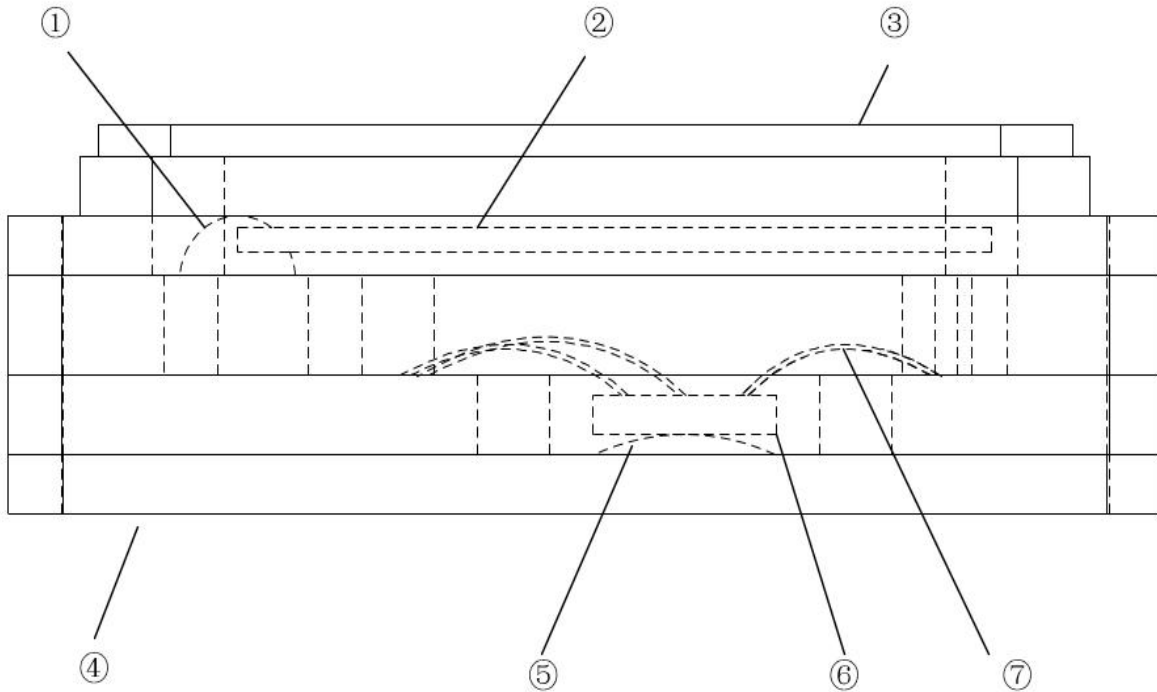
#### Pin Connection

Name	Connection
pin 1	Tri-State
pin 2	GND
pin 3	Fout
pin 4	Vdd

#### Function

Pin1 Input	Pin3 Output
High level	Oscillation Out
Open	
Low level	High Z


### 8. Structure illustration



No.	Components	Materials
①	Conductive Adhesive	Ag+Silicone resin
②	Crystal Blank	SiO <sub>2</sub>
③	Lid	Fe-Ni-Co Alloy
④	Base	Ceramic+Noble Metal
⑤	Conductive Adhesive of Solid IC	Ag+Epoxy resin
⑥	IC	Si
⑦	Gold wire	Au



**9.Product Identification (Marking)**

T: TKD Logo	
O: Oscillator Code	
024A: Frequency Code	
●: Pin1 Index	
D: Date Code	
#####: XO Lot Code	

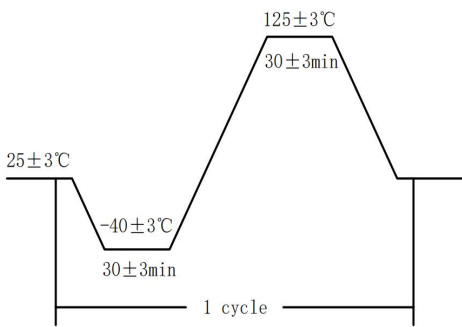
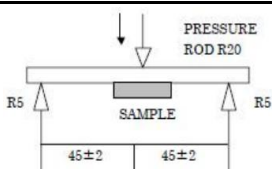
Date Code

Year		2019	2020	2021	2022		
				2023	2024	2025	2026
				2027	2028	2029	2030
				2031	2032	2033	2034
Month	JAN	a	n	A	N		
	FEB	b	p	B	P		
	MAR	c	q	C	Q		
	APR	d	r	D	R		
	MAY	e	s	E	S		
	JUN	f	t	F	T		
	JUL	g	u	G	U		
	AUG	h	v	H	V		
	SEP	j	w	J	W		
	OCT	k	x	K	X		
	NOV	l	y	L	Y		
	DEC	m	z	M	Z		

This date code will be cycled every four years.



10. Reliability

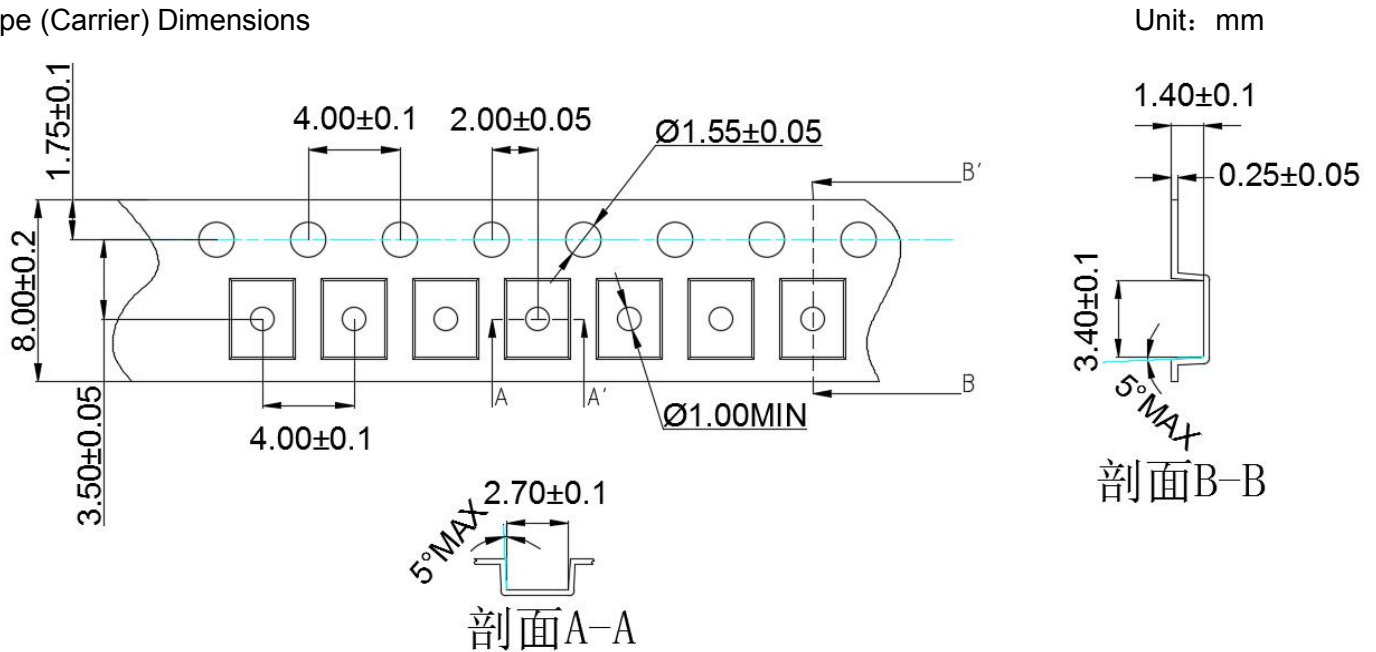
No.	Item	Test Methods	Criteria
1	Low Temperature Storage	Temperature: $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ (or the specification shall prevail) Duration: 500 hours	$\pm 5.0$ ppm
2	High temperature and humidity	Temperature: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Humidity: RH 85% Duration: 500 hours	$\pm 5.0$ ppm
3	Thermal Shock	 <p>Temperature: <math>-40^{\circ}\text{C} \sim 125^{\circ}\text{C}</math> (or the specification shall prevail) Duration: 100 cycles</p>	$\pm 5.0$ ppm
4	High Temperature Operating Life	Temperature : $85^{\circ}\text{C}$ (or the specification shall prevail) Duration : 1000 hours Vdd Applied	$\pm 10.0$ ppm
5	Vibration	Duration : 2 hours/each direction Frequency range: 10 ~ 55 Hz Direction: 3 axis	$\pm 5.0$ ppm
6	Mechanical Shock	Acceleration: 100 g Duration: 6.0 ms Test cycles: 3 times for all 6 axis , half sina	$\pm 5.0$ ppm
7	Drop Test	Height: 100 cm Test cycles: 3 times	$\pm 5.0$ ppm
8	Solderability	Soldering bath temperature: $245^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Duration: $2 \pm 0.6$ second	95% Coated
9	Resistance to Soldering Heat	Soldering temperature : $260^{\circ}\text{C} \pm 10^{\circ}\text{C}$ Duration : $15 \pm 5$ second	$\pm 5.0$ ppm
10	Board Flex	Height: 3.0 mm Duration: 5 second Speed: 0.5mm/sec 	$\pm 5.0$ ppm



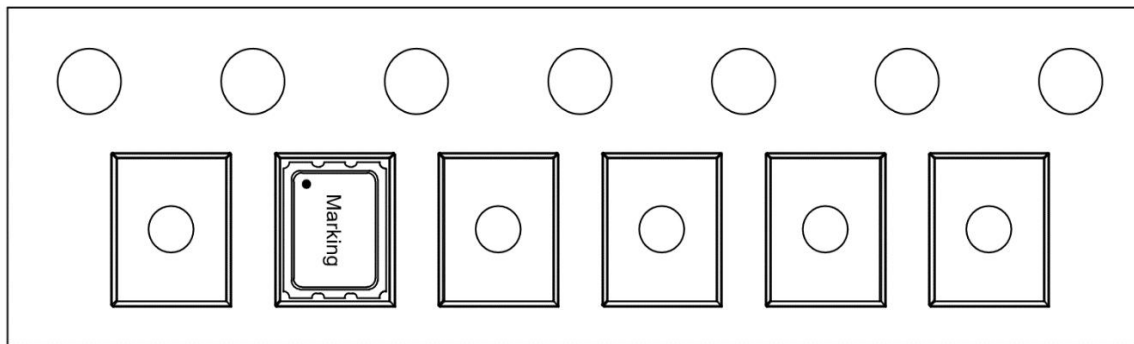


### 11.Package Information

#### Tape (Carrier) Dimensions

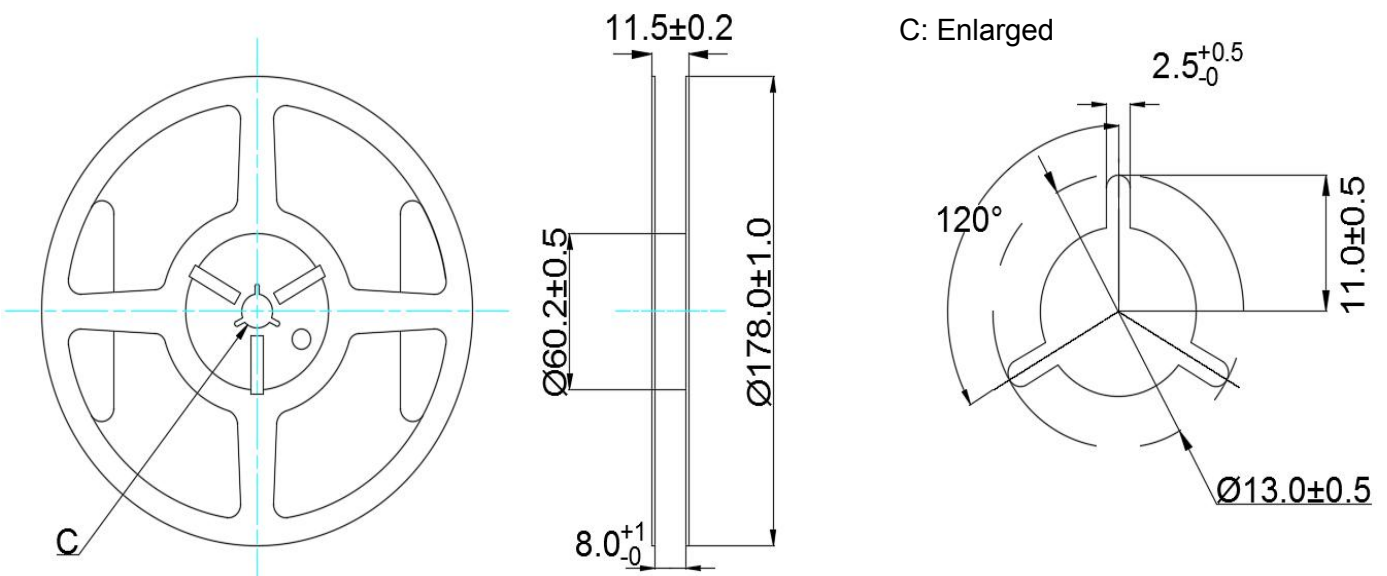


#### The Direction of Packing



#### Reel Dimensions 3000 Pcs/Reel

Unit: mm





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## Handling Instructions

### 1. Cautions for Handling

a) Prevention against electrostatic breakdown

Your full attention to static electricity is still requested.

b) Direction

Before mounting the crystal oscillator on board, Please confirm the direction to make sure the GND terminal and the terminal of power supply are not taken wrongly.

### 2. Prevention against Vibration and Shock

While the product is being transported or mounted onto board, if undue hock and vibration exceeding the specification is put on, there is risk hat the built-in crystal blank is broken.

When undue shock and vibration exceeding the specification is put on the product, please be sure to make confirmation of the product's characteristics.

### 3. Soldering

In order to assure the reliability of the crystal oscillator, please use the product under the recommended conditions.

### 4. Surface mounting

a) This product is surface-mounting device.

So, Please pay attention to the following things.

b) Extreme deformation of board may make pattern off, the electrode of terminals off and solder broken. Full attention is requested especially when splitting the board with the oscillator mounted where the camber of the board occurs.

c) In case that automatic mounter is used, please choose the type with small shock generation and make confirmation of the shock before use.

### 5. Cleaning

Because cleaning will cause change to all characteristics, cleaning is forbidden.

### 6. Store keeping (method and duration)

Long-time storage in the high/low temperature and high humidity leads to deterioration of solderability. So, please keep the product in the temperature of +5~+35 and humidity of 45~70%.

Moreover, please keep the product in the circumstance with measures against static electricity.

(Please use it after confirming the product solderability.)

### 7. Caution

This product should not be used in toxic, harmful, or corrosive environments such as mercury, chlorine, sulfur, acid-base environments etc.

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