PRODUCT SPECIFICATION SHEET



Customer	Suntsu		
Customer P/N	TBA		
Product Type	Temperature Compensated Crystal Oscillator		
Part Number	9T48000001	Version	S0
Part Description	SMD TCXO 2.0 x 1.6		
Nominal Frequency	48.000000MHz		

Prepared	Chen XuanRu
Reviewed	Jin Zhe
Approved	Xing Yue
Date	2022-4-12

Customer's Approval & Date：

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RoHS COMPLIANT

Pb Lead-Free

Moisture Sensitivity Level 1

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1. History of Specification Revision

Ver.	Contents	Date	Reviser	Remark
S0	Initial release	2022-4-12	Chen XuanRu	

2. Electrical Specifications

2.1 Operation conditions

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Nominal frequency		48.000000		MHz	
2	Supply voltage (V_{DD})	3.135	3.3	3.465	V	
3	Current consumption	-	-	2.0	mA	
4	Operating temperature range	-40	-	+85	°C	

2.2 Output characteristics

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Output type		Clipped sine wave		-	Decoupling capacitor is required in external circuit
2	Standard output Load		10 KΩ//10 pF		-	
3	Output level	0.8	-	1.5	V_{pp}	
4	Duty cycle	40	50	60	%	
5	Harmonics	-	-	-5	dBc	
6	Start-up time vs. frequency	-	-	2.0	ms	Within ±1.0 ppm of final frequency
7	Start-up time vs. output level	-	-	2.0	ms	Reach 90% of final Vpp output level

2.3 Frequency characteristics

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Nominal frequency		48.000000		MHz	
2	Frequency tolerance after reflow	-2.0	-	+2.0	ppm	At 25±2°C after 1 reflow, refer to nominal frequency
4	Frequency stability vs. temperature	-1.0	-	+1.0	ppm	Refer to frequency at 25° C within operating temperature range
5	Frequency stability vs. supply voltage	-0.2	-	+0.2	ppm	±5% V_{DD} variation
6	Frequency stability vs. load variation	-0.2	-	+0.2	ppm	±10% load variation
7	Aging over 1st year	-1.0	-	+1.0	ppm	At 25±°C
8	ESD		HBM＞2000V		-	JESD22-A114-B
9	MSL		Level 1		-	IPC/JEDEC J-STD-033C

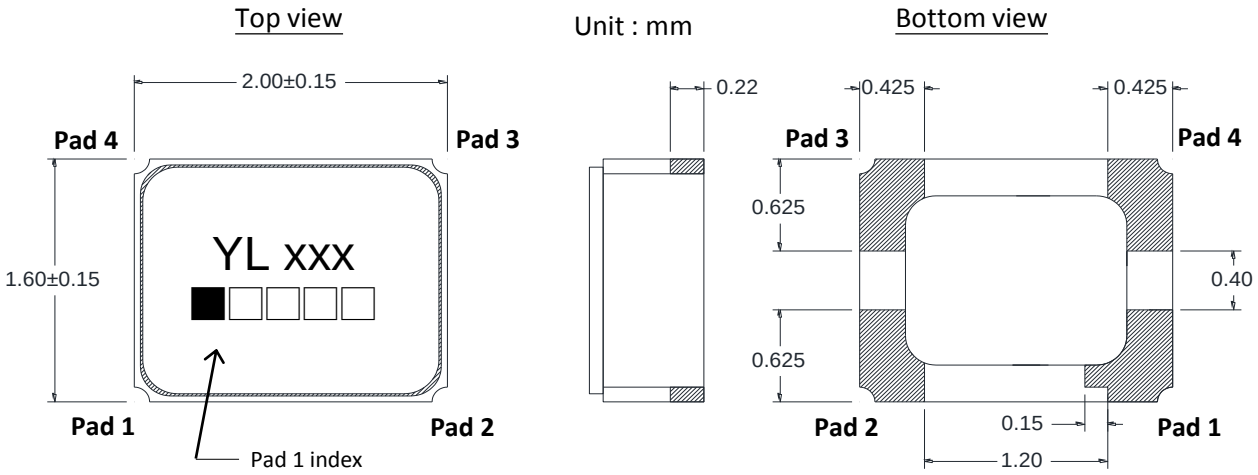
2. Electrical Specifications (Cont.)

2.4 Phase noise characteristics

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Phase noise at 1Hz offset	-	-	-61	dBc/Hz	
2	Phase noise at 10Hz offset	-	-	-89	dBc/Hz	
3	Phase noise at 100Hz offset	-	-	-112	dBc/Hz	
4	Phase noise at 1kHz offset	-	-	-135	dBc/Hz	
5	Phase noise at 10kHz offset	-	-	-152	dBc/Hz	
6	Phase noise at 100KHz offset	-	-	-158	dBc/Hz	
5	Phase noise at 1MHz offset	-	-	-159	dBc/Hz	

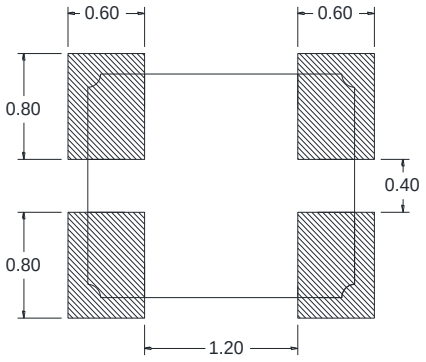
3. Product Design

3.1 Package dimensions and pad functions



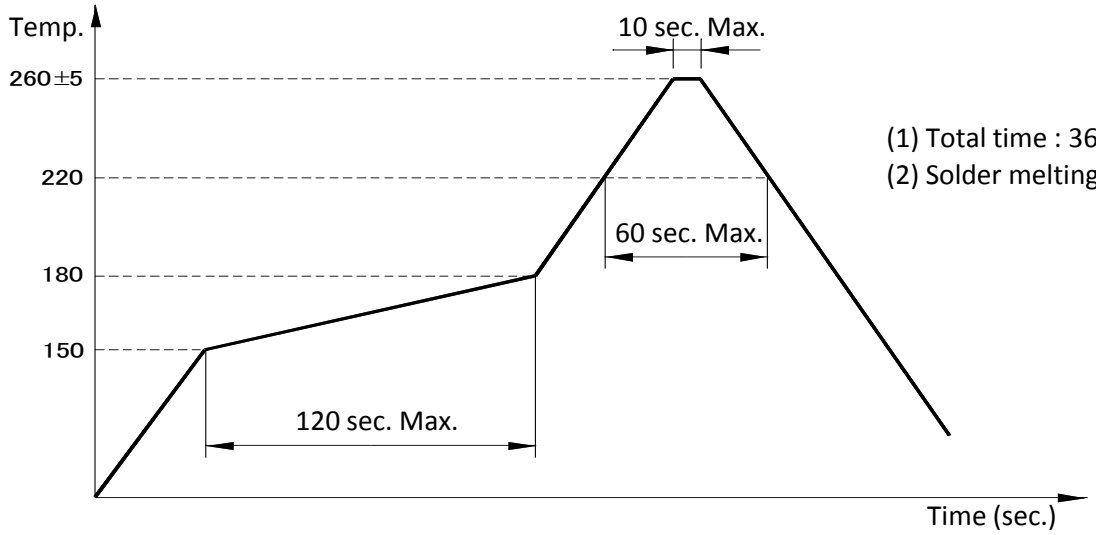
Pad	Function	Symbol
1	NC or GND (Ground recommended)	NC
2	Ground	GND
3	Output	OUT
4	Supply voltage	V_{DD}

3.2 Recommended land pattern



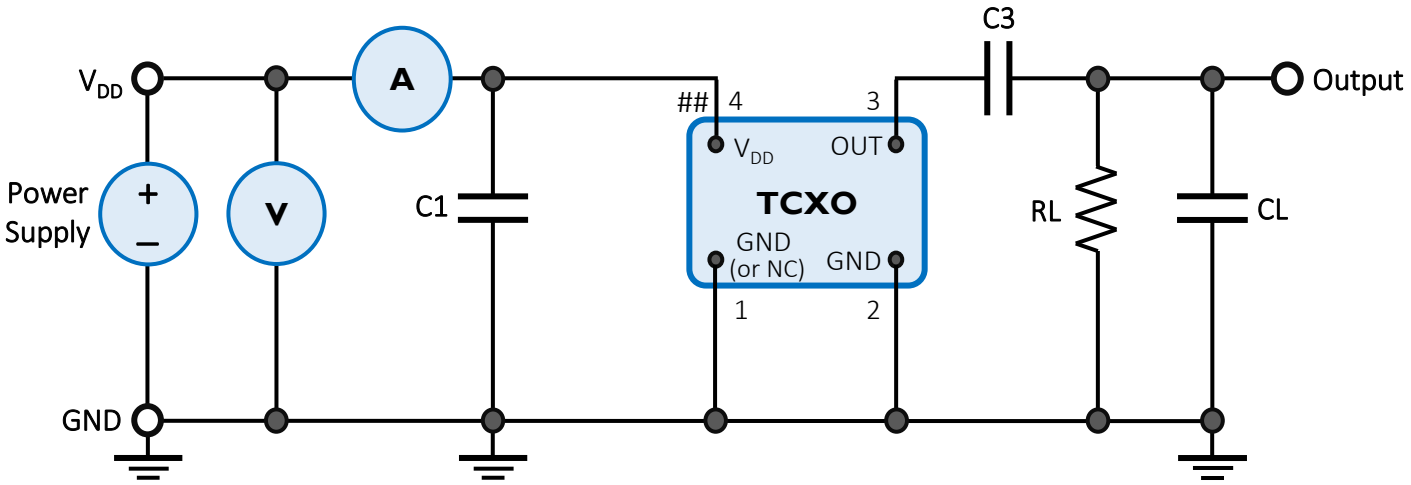
Unit : mm

3.3 Recommended reflow profile



(1) Total time : 360 sec. Max.
(2) Solder melting point : 225℃

4. Testing Circuit



External Components:

Parts	Function	Recommended
C1	AC noise bypass for V_{DD}	10nF
C3	DC block for output	10nF
RL	Load resistance	10KΩ
CL	Load capacitance	10pF