

广东惠伦晶体科技股份有限公司
GUANGDONG FAILONG CRYSTAL TECHNOLOGY Co.,Ltd.

PRODUCT SPECIFICATION SHEET

Customer			
Customer P/N	TBA		
Product Type	Temperature-Compensated Crystal Oscillator		
Failong Part Number	1T52000001S	**Version**	S0
Part Description	SMD TCXO 1.6×1.2		
Nominal Frequency	52.000000MHz		

Prepared	Kuro Peng
Reviewed	Kuro Peng
Approved	Jay Lee
Date	2019/8/27

Customer's Approval & Date：

广东惠伦晶体科技股份有限公司
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RoHS Compliant

Pb LEAD FREE

Appendix: History of Specification Revision

Ver.	Contents	Date	Reviser	NOTE
S0	Initial released	2019/8/27	Kuro Peng	

1. Product Specifications

1.1 Operation conditions

#	Parameters	Min.	Typ.	Max.	Unit	Note
1	Nominal frequency		52.0		MHz	
2	Supply voltage	1.71	1.8	1.89	V	
3	Current consumption	-	-	2	mA	
4	Operating temperature range	-30	-	85	℃	

1.2 Output characteristics

#	Parameters		Min.	Typ.	Max.	Unit	Note
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	-	-	V_{pp}	
4	Harmonics		-	-	-5	dBc	
5	Start-up time	vs. frequency	-	-	2.0	ms	Within ±0.5 ppm
6		vs. output level	-	-	2.0	ms	≥90% of Vpp

1.3 Frequency characteristics

#	Parameters		Min.	Typ.	Max.	Unit	Note
1	Nominal frequency		-	52.0	-	MHz	
2	Frequency tolerance after reflow		-2.0	-	+2.0	ppm	At 25±2°C after 2 times reflow, refer to nominal frequency
3	Frequency stability	vs. temperature	-2.0	-	+2.0	ppm	Refer to frequency at 25°C within operating temperature range
4		vs. supply voltage	-0.1	-	+0.1	ppm	±5% Vcc variation
5		vs. load variation	-0.1	-	+0.1	ppm	±5% load variation
6	Slope of frequency drift over temperature		-0.2	-	+0.2	ppm/°C	
7	Duty Cycle		40	50	60	%	
8	Aging over 1st year		-1.0	-	+1.0	ppm	

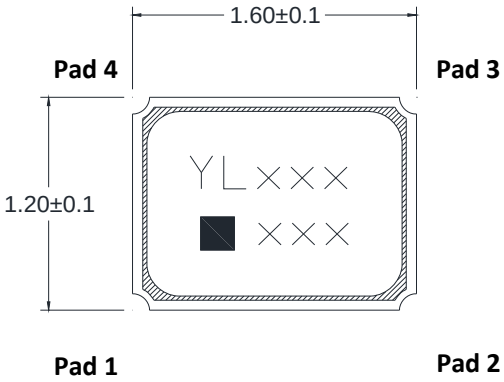
1.4 Phase noise characteristics

#	Parameters	Min.	Typ.	Max.	Unit	Note
1	At 1kHz offset	-	-135	-	dBc/Hz	At 25±2°C
2	At 100kHz offset	-	-152	-	dBc/Hz	

2. Product Design

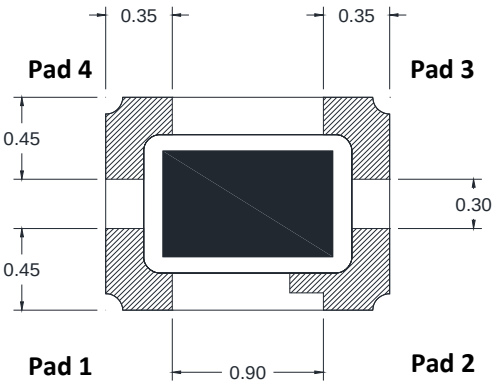
2.1 Dimensions (unit: mm)

Top view





Bottom view



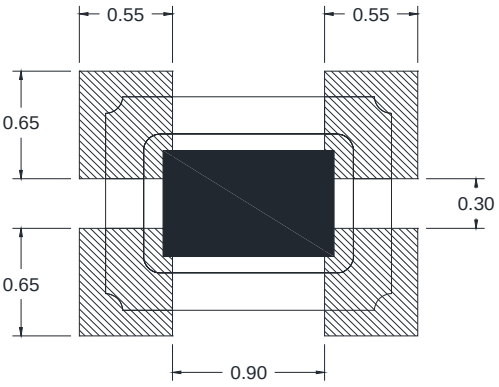


Lateral view

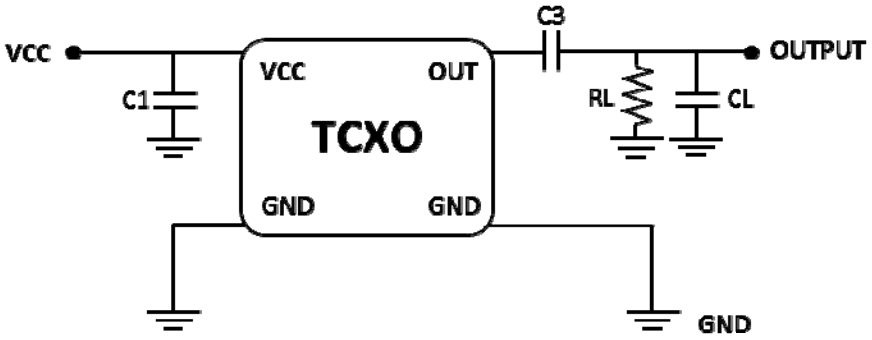
2.2 Pad connections and functions

Pad	Function
1	GND
2	GND
3	Output
4	Vcc

2.3 Recommended land pattern (unit: mm)



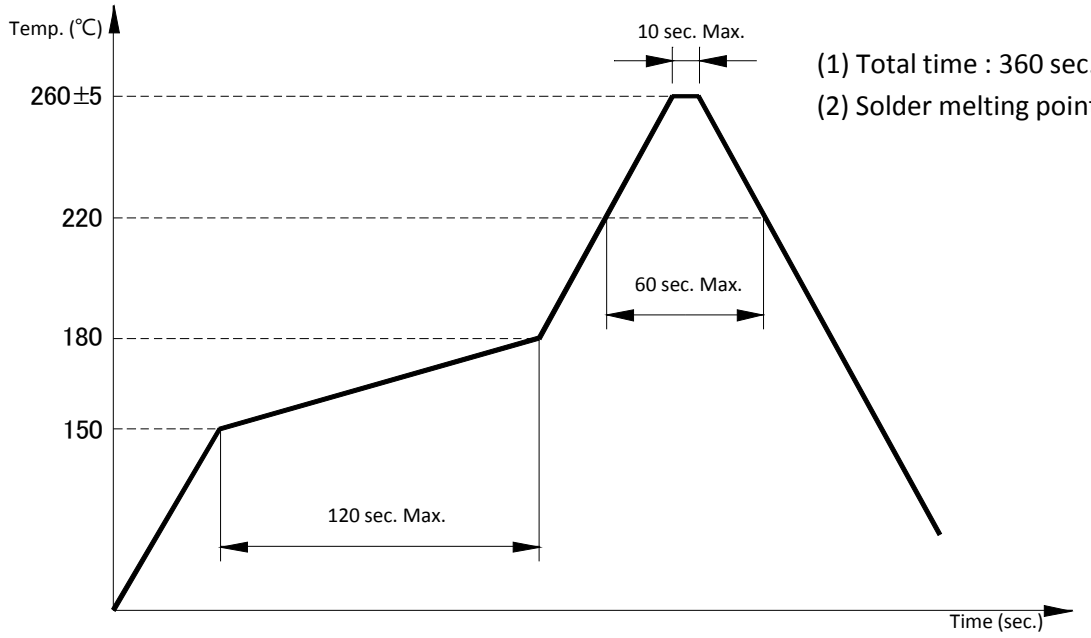
3. Testing Circuit



External Components:

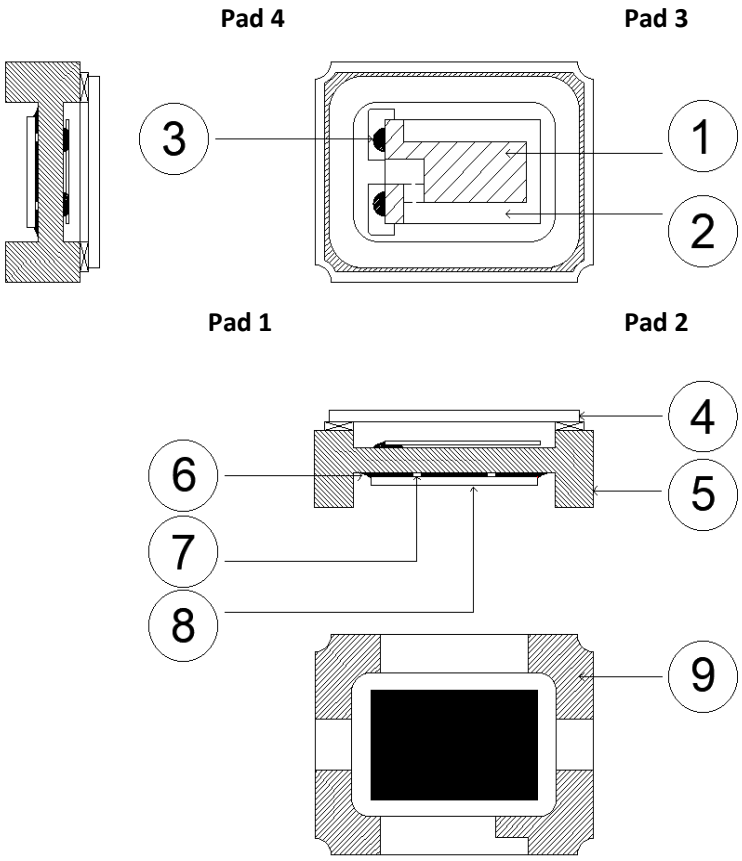
Parts	Function
C1	AC noise bypass for VCC
C3	DC block for output
RL	Load resistance
CL	Load capacitance

4. Recommended Reflow Profile



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

5. Structure Illustration



#	Components	Materials	Q'ty	Finish/Specifications
1	Electrode	Noble metal	2	-
2	Quartz blank	SiO_2	1	-
3	Conductive adhesive	Ag	2	Silicone resin
4	Lid	Fe+Co+Ni	1	-
5	Package	Ceramic	1	-
6	Underfill	Epoxy resin	1	-
7	Bump	Au	6	-
8	IC	Silicon	1	-
9	Solder pad	Ni + Au	4	Ni plating + Au plating

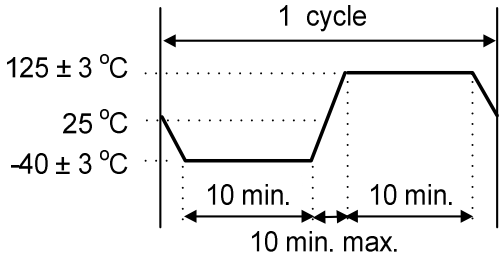
6. Reliability

6.1 Mechanical endurance

#	Item	Test Methods	
		Condition	Reference
1	Drop test	Height : 150 cm height Direction : fall freely Test cycles : 3 cycles Stainless plate	JIS C6701
2	Shock test	Height : 150 cm height Direction : X, Y, Z, 6 directions Test cycles : 3 cycles Concrete floor Mounting on test fixture (total weight=150 g)	IEC-68-02-27
3	Mechanical shock	Acceleration : 1000 g Duration : 1.0 ms Test cycles : 3 times for all 3 directions	MIL-STD-202F
4	Vibration	Acceleration : 20 g Duration : 4 hours/each direction Frequency range : 10 ~ 55 Hz Amplitude : 1.52 mm Direction : X, Y, Z, 3 directions Sweep speed : 20 minutes/cycle	MIL-STD-883E
5	Gross leak	Standard sample for automatic gross leak detector. Test Pressure : 2 kg / cm^2	MIL-STD-883E
6	Fine leak	Helium bombing 4.5 kgf / cm^2 for 2 hours	MIL-STD-883E
7	Solderability	Preheated temperature : 125°C ± 5°C Preheated time : 120 sec Soldering temperature : 245°C ± 5°C Duration : 5 ± 1 second Method : Solder bath method	MIL-STD-883E

6. Reliability (Cont.)

6.2 Environmental endurance

#	Item	Test Methods	
		Condition	Reference
1	High temperature storage	Temperature : +125℃ ± 3℃ Duration : 168 hours	MIL-STD-883E
2	Low temperature storage	Temperature : -40℃ ± 3℃ Duration : 500 hours	MIL-STD-883E
3	Thermal shock (Air-to-air)	Total 100 cycles of the following temperature cycle : 	MIL-STD-883E
4	High temperature and humidity	Temperature : 85℃ ± 3℃ Humidity: RH 85% Duration : 168 hours	JIS C5023
5	Aging	Temperature : 85℃ ± 3℃ Duration : 500 hours Voltage input by specification	JESD22-A108