PRODUCT SPECIFICATION SHEET



Customer			
Customer P/N	-		
Product Type	Temperature Compensated Crystal Oscillator		
Part Number	9T260R2002	**Version**	S0
Part Description	SMD TCXO 2.0 x 1.6		
Nominal Frequency	26.000000MHz		

Prepared	Li Xiang
Reviewed	Kuro Peng
Approved	Liu Feng
Date	2023/10/27

Customer's Approval & Date：

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RoHS&HF COMPLIANT

Pb Lead-Free

Moisture Sensitivity Level 1

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* Attention

If you intend to use products on the controlling equipment that relate to medical, aeronautical, aerospace, military science, space and etc, please make sure to let us know your intentions in advance.

Ultrasonic related process may cause damage to crystal blank by resonance itself. If ultrasonic related process is used, we strongly recommend to assess the damage risk under related ultrasonic conditions before use in production.

1. History of Specification Revision

Ver.	Contents	Date	Reviser	NOTE
S0	Initial released	2023/10/27	Li Xiang	

2. Electrical Specifications

2.1 Operation conditions

#	Parameters	Min.	Typ.	Max.	Unit	NOTE
1	Nominal frequency		26.000000		MHz	-
2	Supply voltage (V_{DD})	1.70	1.80	1.90	V	-
3	ESD		HBM＞2000V		-	ANSI/ESDA/JEDEC JS-001
4	MSL		Level 1		-	J-STD-020
5	Current consumption	-	-	1.5	mA	-
6	Operating temperature range	-40	-	+85	℃	-
7	Storage temperature range	-55	-	+125	℃	-
8	Electro static discharge (HBM)	2000	-	-	V	R=1.5KΩ, C=100pF

2.2 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	-	1.2	V_{pp}	-
4	Duty cycle	40	50	60	%	-
5	Harmonics	-	-	-10	dB	-
6	Start-up time vs. frequency	-	-	2.0	ms	Within ±0.5 ppm
7	Start-up time vs. output level	-	-	2.0	ms	≥90% of Vpp

2.3 Frequency stability characteristics

#	Parameters	Min.	Typ.	Max.	Unit	NOTE
1	Nominal frequency		26.000000		MHz	-
2	Frequency tolerance after reflow	-1.5	-	+1.5	ppm	At 25±2°C after 2 times reflow, refer to nominal frequency
3	Frequency stability vs. temperature	-0.5	-	+0.5	ppm	Refer to frequency at 25 °C within operating temperature range
4	Frequency stability vs. supply voltage	-0.1	-	+0.1	ppm	±5% V_{DD} variation
5	Frequency stability vs. load variation	-0.1	-	+0.1	ppm	±5% load variation
6	Slope of frequency drift over temperature	-0.1	-	+0.1	ppm/°C	Minimum of one measurement every 2°C
7	Frequency Aging	-1.0	-	+1.0	ppm	Frist year
8	Frequency drift rate after V_{DD} power applied 1	-0.1	-	+0.1	ppm/s	From 0.1 to 0.5s
9	Frequency drift rate after V_{DD} power applied 2	-0.015	-	+0.015	ppm/s	From 0.5 to 1.5s
10	Frequency drift rate after V_{DD} power applied 3	-0.005	-	+0.005	ppm/s	From 1.5s onwards

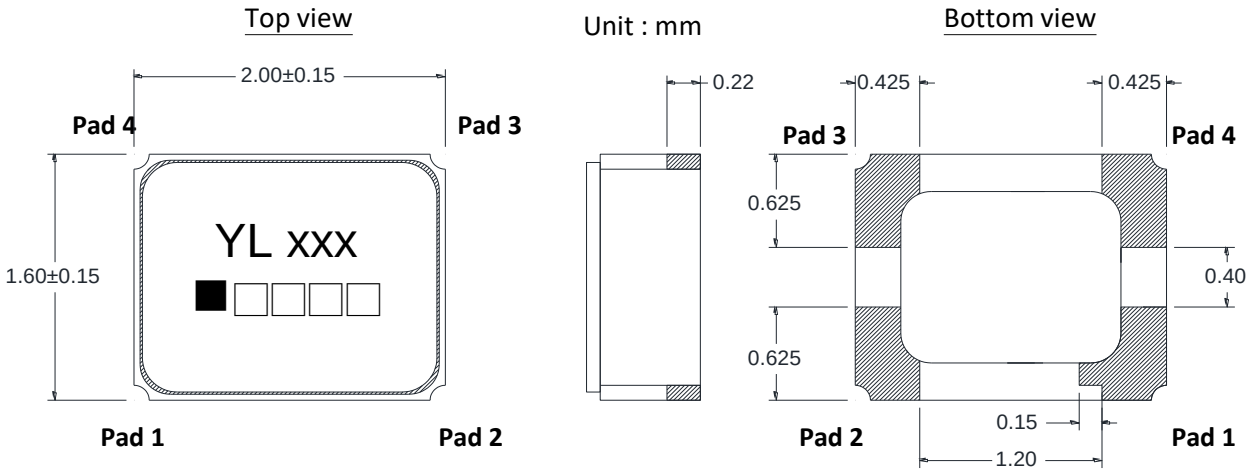
2. Electrical Specifications (Cont.)

2.4 Phase noise characteristics

#	Parameters	Min.	Typ.	Max.	Unit	NOTE
1	Phase noise at 10Hz offset	-	-	-75	dBc/Hz	At 25±2°C
2	Phase noise at 100Hz offset	-	-	-100	dBc/Hz	At 25±2°C
3	Phase noise at 1kHz offset	-	-	-126	dBc/Hz	At 25±2°C
4	Phase noise at 10kHz offset	-	-	-139	dBc/Hz	At 25±2°C
5	Phase noise at 100kHz offset	-	-	-144	dBc/Hz	At 25±2°C
6	Integrated phase noise (10Hz to 1MHz)	-	-	8.5	ps-rms	At 25±2°C

3. Product Design

3.1 Package dimensions and pad functions

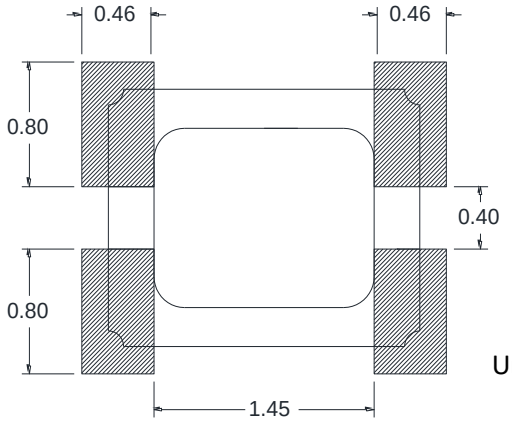




Lateral view

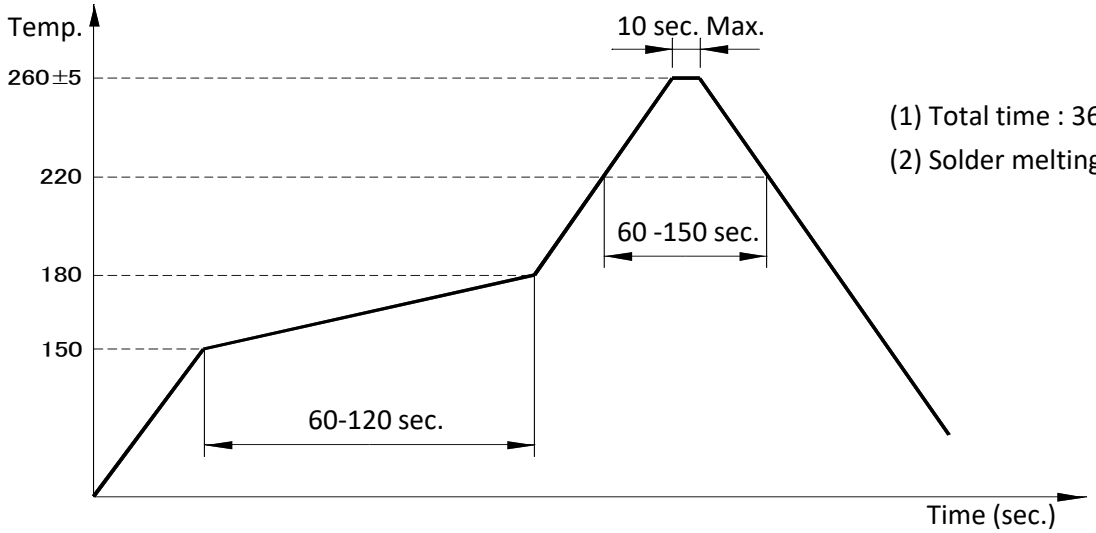
Pad	Function	Symbol
1	NC or GND (Ground recommanded)	NC
2	Ground	GND
3	Output	OUT
4	Supply voltage	V_{DD}

3.2 Recommended land pattern



Unit : mm

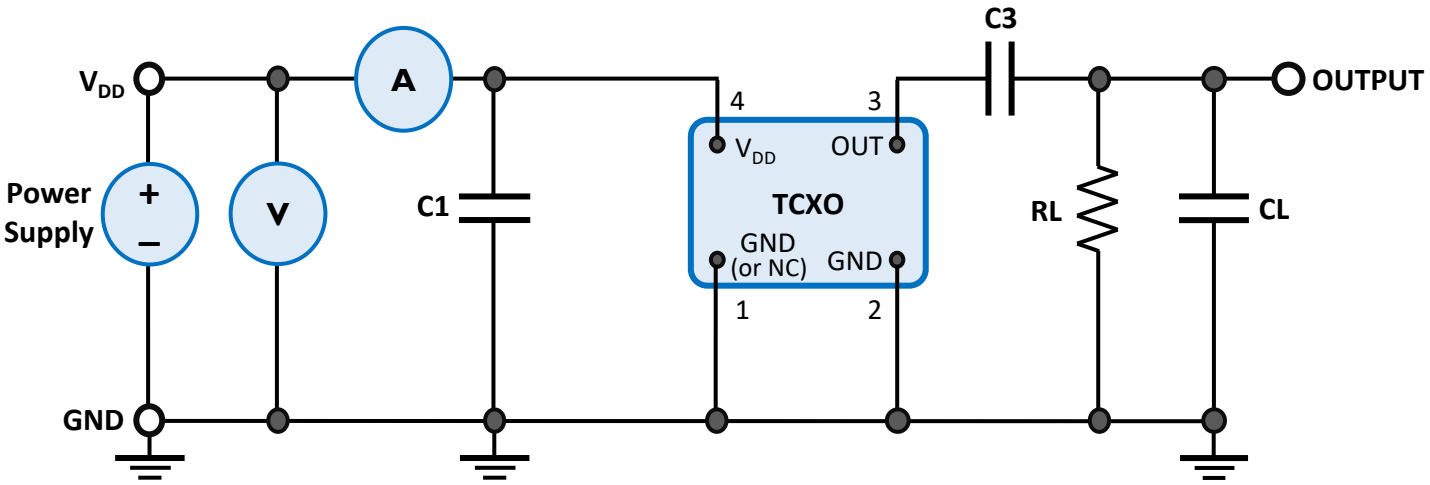
3.3 Recommended reflow profile



(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

5. Reliability

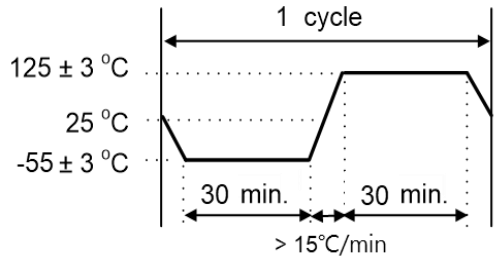
5.1 Mechanical endurance

#	Item	Test Condition	Reference
1	Mechanical shock	Acceleration : 100 g Duration : 6.0 ms half sine shock pulse Test cycles : 3 times for all 3 directions	JESD47F_JEDECB
2	Vibration	Acceleration : 20 g Duration : 4 hours/each direction Frequency range : 10 ~ 55 Hz and 55 ~ 2,000 Hz Amplitude : 0.75 mm (for 10 ~ 55 Hz) Direction : X, Y, Z, 3 directions	JESD47F_JEDECB
3	Gross leak	Standard Sample For Automatic Gross Leak Detector. Test Pressure: 2kg /cm^2	MIL-STD-883E
4	Fine leak	Helium bombing 4.5 kgf / cm^2 for 2 hours	MIL-STD-883E

*Storage conditions： 18 months
*Constant humidity： 40~70%

5. Reliability (Cont.)

5.2 Environmental endurance

#	Item	Test Condition	Reference
1	High temperature storage	Temperature : +125°C ± 3°C Duration : 1,000 hours	JESD47F_JEDECB
2	Low temperature storage	Temperature : -40°C ± 3°C Duration : 1,000 hours	JESD47F_JEDECB
3	High temperature & humidity	Temperature : 85°C ± 3°C Humidity : RH 85% Duration : 1,000 hours	JESD47F_JEDECB
4	Thermal shock (air to air)	Total 500 cycles of the following temperature cycle 	JESD47F_JEDECB
5	Highly accelerated stress test (un-bias)	Temperature : 130°C ± 3°C Humidity : RH 85% Pressure : 2 atms Duration : 96 hours	JESD47F_JEDECB
6	Aging	Temperature : 105°C ± 3°C Duration : 1,000 hours Voltage input by specification	JESD47F_JEDECB

6. Marking and Packing

6.1 Marking definition

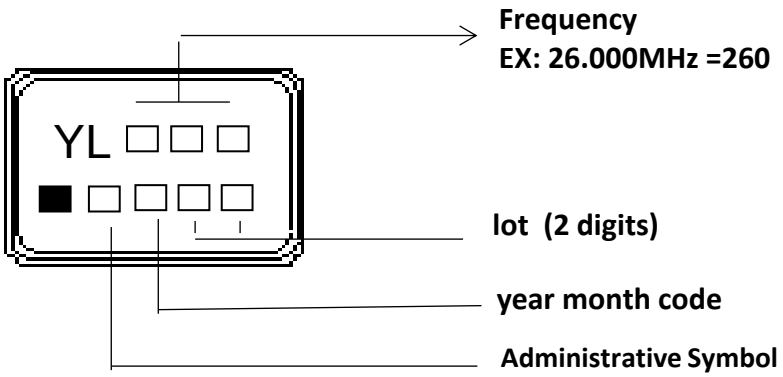
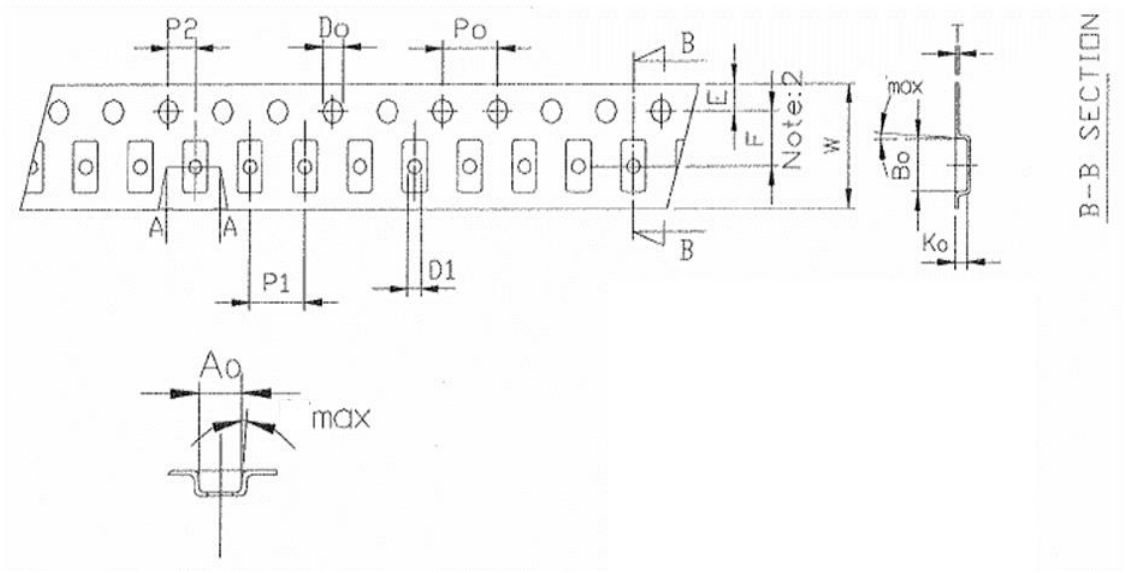


Table of Year and Month code

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

6.2 Packing (EIA-481-2)



PKG Type	Dimension (Unit : mm)						
2016 (8mm)	A_0	B_0	K_0	T	W	E	F
	1.90±0.1	2.30±0.1	0.65±0.1	0.25±0.05	8.00±0.3	1.75±0.2	3.50±0.1
	P1	P2	D1	D_0	P_0		
	4.00±0.1	2.00±0.1	1.00±0.1	1.55±0.05	4.00±0.1		

Standard Reel Quantity is 3000 pcs per reel.

6. Marking and Packing (Cont.)

6.2 Packing (EIA-481-2) (Cont.)

The inspection standard of tape tension

Item		Defect	Method
Appearance	All	1. The tape is not coincidence 2. The bubble	Visual inspection
Tape tension	8045, 7050 6035-12mm 5032-12mm 3225-12mm	Overstep 61±5g (55 to 67g)	Pull test
	3225-8mm	Overstep 40±5g (35 to 45g)	
	2520-8mm	Overstep 55±6g (49 to 61g)	
	2016-8mm	Overstep 34±6g (28 to 40g)	
	1612-8mm	Overstep 34±6g (28 to 40g)	
	6035-16mm 5032-16mm	Overstep 60±6g (54 to 66g)	

