



## PRODUCT SPECIFICATION SHEET



<b>Customer</b>			
<b>Customer P/N</b>	-		
<b>Product Type</b>	Temperature Compensated Crystal Oscillator		
<b>Part Number</b>	9T260T5002	<b>Version</b>	S2
<b>Part Description</b>	SMD TCXO 2.0 x 1.6		
<b>Nominal Frequency</b>	26.000000		

<b>Prepared</b>	Li Xiang
<b>Reviewed</b>	Kuro Peng
<b>Approved</b>	Xing Yue
<b>Date</b>	2022-12-8

**Customer's Approval & Date :**

### 廣東惠倫晶體科技股份有限公司

中国广东省东莞市黄江镇东环路鸡啼岗段68号  
 68 Donghuan Road, Jitigang Village,  
 Dongguan, Guangdong Province, P. R. China



WEB : <http://www.dgylec.com/>

TEL : +86 ( 0 ) 769 - 38879888

FAX : +86 ( 0 ) 769 - 38879889

EMAIL : yl@dgylec.com



**Moisture Sensitivity Level 1**

## CONTENTS

#	Item	Page
1	<b>History of Specification Revision</b>	3
2	<b>Electrical Specifications</b>	4
	2.1 Operation conditions	4
	2.2 Output characteristics	4
	2.3 Frequency stability characteristics	4~5
	2.4 Phase noise and jitter characteristics	5
3	<b>Product Design</b>	6
	3.1 Package dimensions and pad functions	6
	3.2 Recommended land pattern	6
	3.3 Recommended reflow profile	6
4	<b>Testing Circuit</b>	7
5	<b>Reliability</b>	8
	5.1 Mechanical endurance	8
	5.2 Environmental endurance	9
6	<b>Marking and Packing</b>	10
	6.1 Marking definition	10
	6.2 Packing	11

## 1. History of Specification Revision

Ver.	Contents	Date	Reviser	Remark
S0	Initial released	2022-9-16	Li Xiang	
S1	Update the remark of item 2.3-3 and 2.3-5	2022-9-29	Li Xiang	
S2	Add ESD & MSL	2022-12-8	Li Xiang	

## 2. Electrical Specifications

### 2.1 Operation conditions

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Nominal frequency	26.000000			MHz	-
2	Supply voltage (V <sub>DD</sub> )	1.71	1.80	1.89	V	-
3	Current consumption	-	-	1.5	mA	-
4	Operating temperature range	-40	-	105	°C	-
5	Storage temperature range	-40	-	105	°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 K $\Omega$ //10 pF			-	-
3	Output level	0.8	-	-	V <sub>pp</sub>	-
4	Duty cycle	40	50	60	%	-
5	Start-up time	-	-	2	ms	-

### 2.3 Frequency stability characteristics

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Nominal frequency	26.000000			MHz	-
2	Frequency tolerance after reflow	-2.0	-	+2.0	ppm	At 25 $\pm$ 2°C after 2 times reflow, refer to nominal frequency.
3	Frequency stability vs. temperature 1	-0.5	-	+0.5	ppm	Within -30 ~ +85°C, refer to frequency at 25 °C.
4	Frequency stability vs. temperature 2	-2.5	-	+2.5	ppm	Within -40 ~ -30°C, refer to frequency at 25 °C.
5	Frequency slope vs. temperature 1	-0.1	-	+0.1	ppm/°C	Minimum of one measurement every 2°C Within -30°C to +85°C.
6	Frequency slope vs. temperature 2	-0.5	-	+0.5	ppm/°C	Minimum of one measurement every 2°C Within -40°C to -30°C
7	Frequency stability vs. supply voltage	-0.1	-	+0.1	ppm	$\pm$ 0.1V V <sub>DD</sub> variation.
8	Frequency slope vs. load	-0.2	-	+0.2	ppm	10 k $\Omega$ // 10 pF $\pm$ 10%
9	Frequency Aging	-1.0	-	+1.0	ppm	over 1st year
		-2.0	-	+2.0	ppm	over 5 years
		-4.0	-	+4.0	ppm	over 10 years
10	G sensitivity		-	1.5	ppb	All 3 axes, Random vibration.30 Hz to 1.5KHz
11	Shock	-0.5	-	+0.5	ppm	Freuency shift after 1000 G 250 $\mu$ s sine

## 2. Electrical Specifications (Cont.)

### 2.3 Frequency stability characteristics

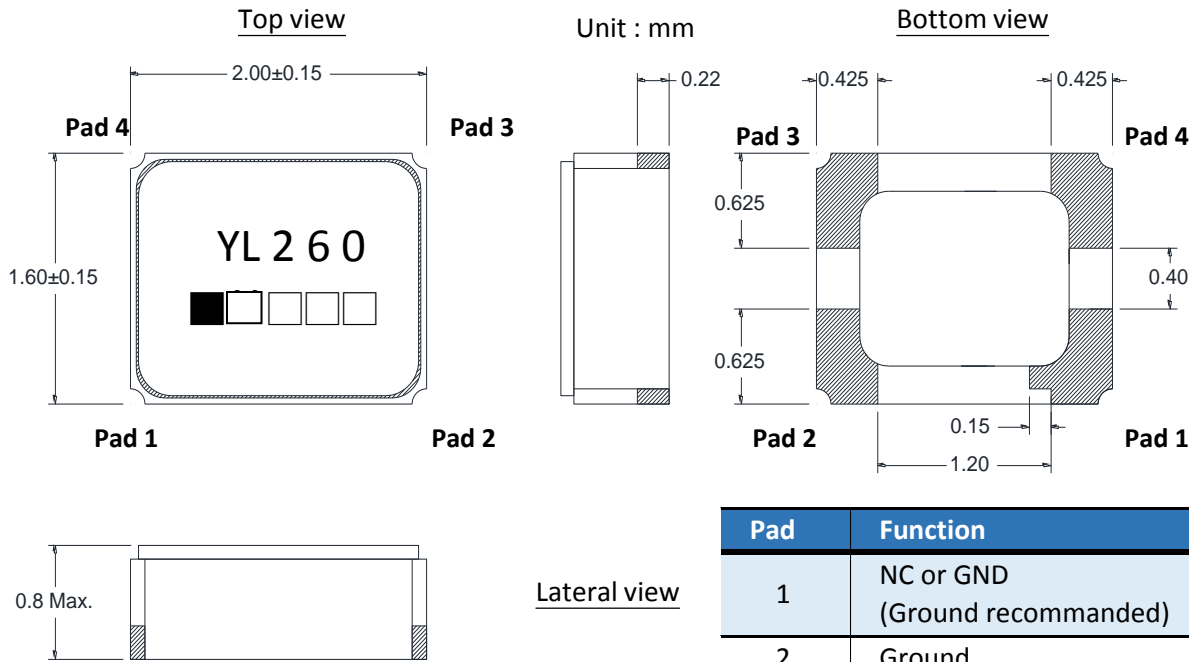
#	Parameters	Min.	Typ.	Max.	Unit	Remark
12	ESD	HBM $\geq$ 2000V			-	JESD22-A114-B
13	MSL	Level 1			-	IPC/JEDEC J-STD-033C

### 2.4 Phase noise and jitter characteristics

#	Parameters	Min.	Typ.	Max.	Unit	Remark
1	Phase noise at 1Hz offset	-	-	-57	dBc/Hz	At 25 $\pm$ 2°C.
2	Phase noise at 10Hz offset	-	-	-88	dBc/Hz	At 25 $\pm$ 2°C.
3	Phase noise at 100Hz offset	-	-	-112	dBc/Hz	At 25 $\pm$ 2°C.
4	Phase noise at 1KHz offset	-	-	-130	dBc/Hz	At 25 $\pm$ 2°C.
5	Phase noise at 10KHz offset	-	-	-140	dBc/Hz	At 25 $\pm$ 2°C.

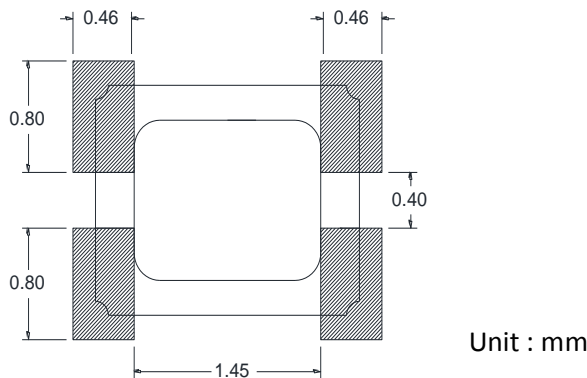
### 3. Product Design

#### 3.1 Package dimensions and pad functions

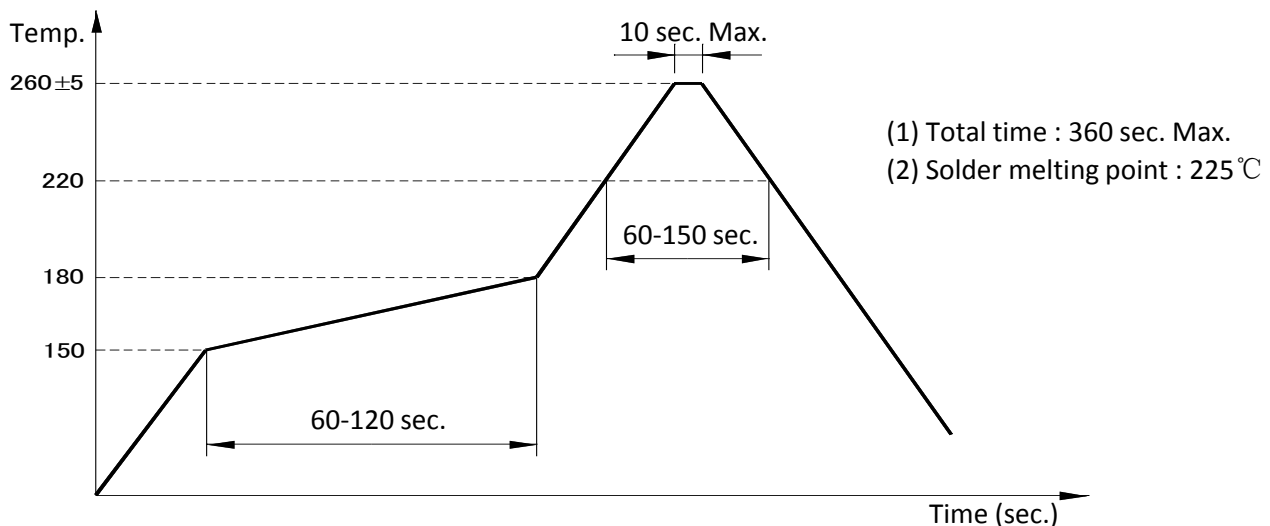


Pad	Function	Symbol
1	NC or GND (Ground recommended)	NC
2	Ground	GND
3	Output	OUT
4	Supply voltage	V <sub>DD</sub>

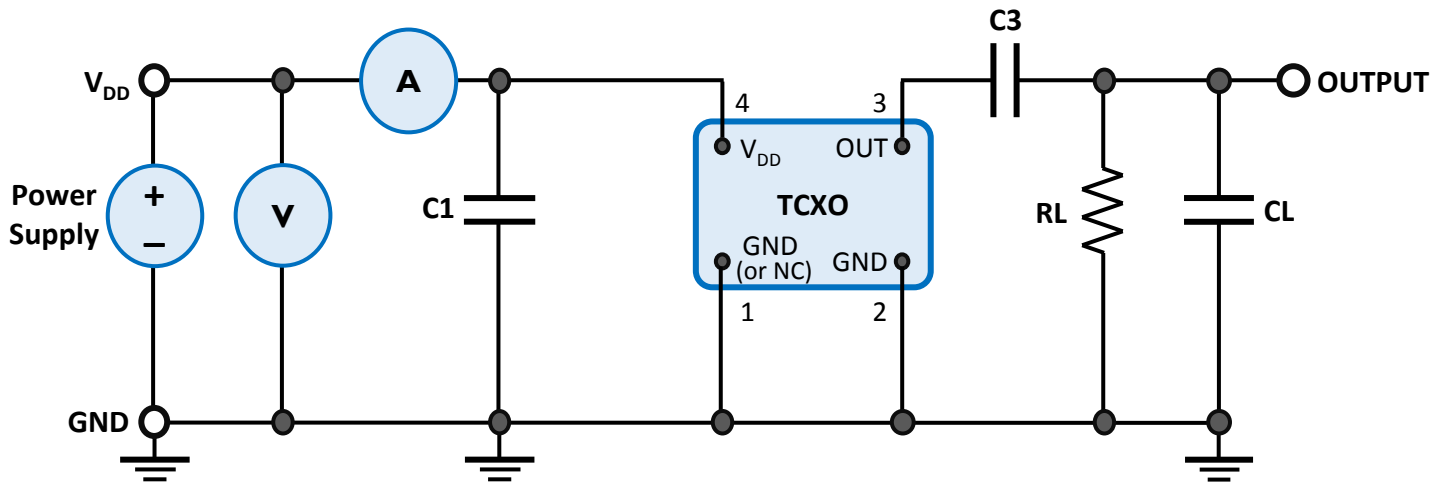
#### 3.2 Recommended land pattern



#### 3.3 Recommended reflow profile



#### 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	10K $\Omega$
CL	Load capacitance	10pF

## 5. Reliability

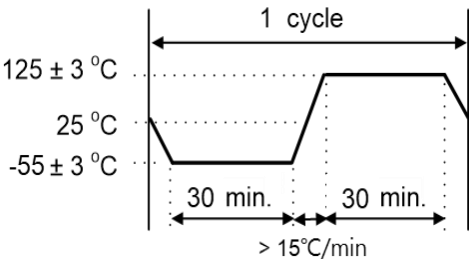
### 5.1 Mechanical endurance

#	Item	Test Condition	Reference
1	Drop 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
2	Mechanical shock	Acceleration : 100 g Duration : 6.0 ms half sine shock pulse Test cycles : 3 times for all 3 directions	JESD47F_JEDEC B
3	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_JEDEC B
4	Gross leak	Standard Sample For Automatic Gross Leak Detector. Test Pressure: 2kg /cm <sup>2</sup>	MIL-STD-883E
5	Fine leak	Helium bombing 4.5 kgf / cm <sup>2</sup> for 2 hours	MIL-STD-883E



## 5. Reliability (Cont.)

### 5.2 Environmental endurance

#	Item	Test Condition	Reference
1	High temperature storage	Temperature : $+125^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Duration : 1,000 hours	JESD47F_JEDEC B
2	Low temperature storage	Temperature : $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Duration : 1,000 hours	JESD47F_JEDEC B
3	High temperature & humidity	Temperature : $85^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Humidity : RH 85% Duration : 1,000 hours	JESD47F_JEDEC B
4	Thermal shock (air to air)	Total 500 cycles of the following temperature cycle 	JESD47F_JEDEC B
5	Highly accelerated stress test (un-bias)	Temperature : $130^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Humidity : RH 85% Pressure : 2 atms Duration : 96 hours	JESD47F_JEDEC B
6	Aging	Temperature : $105^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Duration : 1,000 hours Voltage input by specification	JESD47F_JEDEC B

\*Storage conditions : 18 months

\*Constant humidity : 40~70%

## 6. Marking and Packing

### 6.1 Marking definition

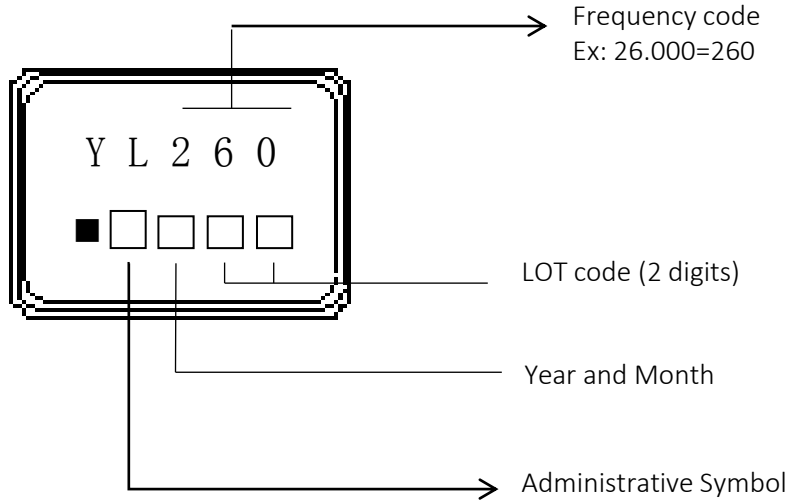
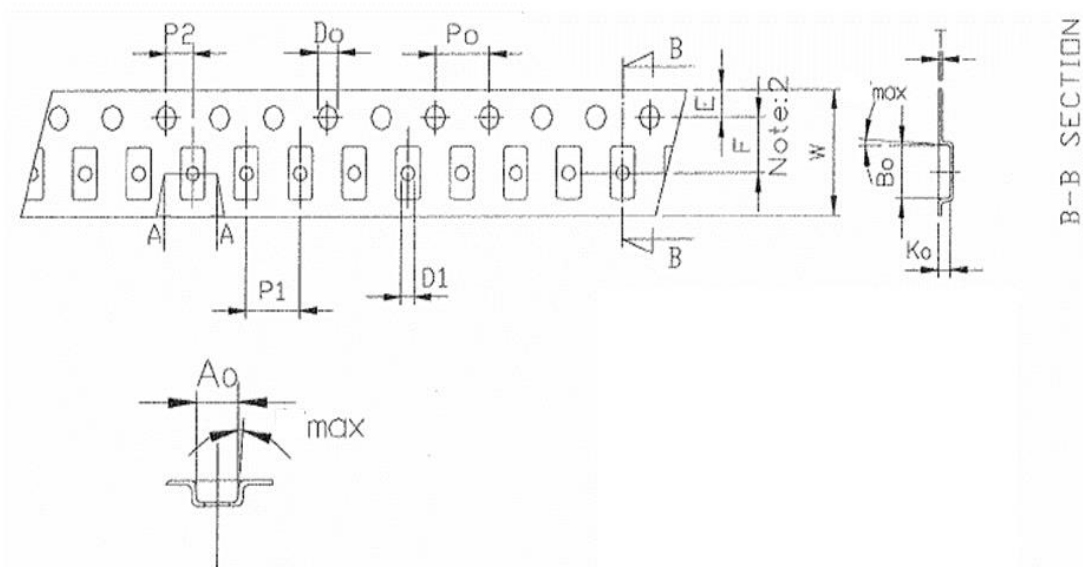


Table of Year and Month code

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
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)						
	A <sub>0</sub>	B <sub>0</sub>	K <sub>0</sub>	T	W	E	F
2016 (8mm)	1.90±0.1	2.30±0.1	1.25±0.1	0.25±0.05	8.00±0.3	1.75±0.2	3.50±0.1
	P1	P2	D1	D <sub>0</sub>	P <sub>0</sub>		
	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 $61 \pm 5g$ (55 to 67g)	Pull test
	3225-8mm	Overstep $40 \pm 5g$ (35 to 45g)	
	2520-8mm	Overstep $55 \pm 6g$ (49 to 61g)	
	2016-8mm	Overstep $34 \pm 6g$ (28 to 40g)	
	1612-8mm	Overstep $34 \pm 6g$ (28 to 40g)	
	6035-16mm 5032-16mm	Overstep $60 \pm 6g$ (54 to 66g)	

