

Crystal Oscillator

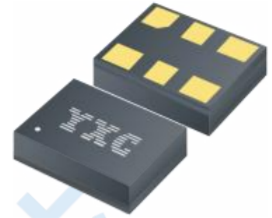
YSO212PU



General Description (概述)

YSO212PU is a programmable, low-jitter differential crystal oscillator. Output frequency is factory programmed as per customer requirements between **200 kHz to 1.5 GHz**. YSO212PU is a low Noise PLL with Integrated XTAL which provides clocks with Jitter of **69 fs**.

With on chip NVM and factory programming, we can service customer requirements with very fast lead times.



Features (产品特性)

- Available with any frequency from 200 kHz to 1.5 GHz
- Low Jitter: 69fs@156.25MHz Typ Jrms, 12 kHz – 20 MHz
- 26fs Typ Jrms, 12 kHz – 20 MHz with 4 MHz HPF
- Fractional N fully integrated PLL
- 3.3 V, 2.5 V and 1.8 V VDD supply operation
- Best in class PSRR performance of -85 dBC
- LVPECL, HCSL-LP, LVDS, LVDS-Boost, HCSL, AC Coupled CML output options available on differential output pads.
- HCSL-LP Output Driver type frequency support is from 20 kHz to 500MHz
- ± 50 ppm stability (-40°C to 85 °C)
- Package Options: Available in 6pin Plastic Package : 3.2*2.5mm, 2.5*2.0mm

Applications (应用领域)

- 100G/200G/400G OTN, coherent optics
- 10G/40G/100G optical ethernet
- 3G-SDI/12G-SDI/24G-SDI broadcast video
- Datacenter
- Test and measurement
- Clock and data recovery
- FPGA/ASIC clocking

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1 Specifications (规格参数)

Table 1 Electrical Characteristic

Item/Type		Value			Remarks
Output Frequency Range 额定频率范围		200K~1.5GHz			
Supply Voltage 电源电压		1.71V	1.8V	1.89V	Voltage Tolerance: $\pm 5\%$
		2.375V	2.5V	2.625V	
		3.135V	3.3V	3.465V	
Current Consumption 消耗电流	LVPECL		71mA		F _{out} =156.25M
	LVDS		53mA		
	LVDS-Boost		57mA		
	HCSL		66mA		
	HCSL-LP		50mA		
Input Voltage 输入电压		V _{IH} =70% VDD Min V _{IL} =30%VDD Max			OE terminal
Output Disable Time 输出禁用时间			1 us + 3clock Cycles us	2 us + 3clock Cycles us	F _{CLK} > 10 MHz
Output Enable Time 输出启用时间			1 us + 3clock Cycles us	2 us + 3clock Cycles us	
Operating Temperature Range 工作温度		-40~+85°C, or specify			
Total Stability 频率偏差		± 50 ppm, or specify			Total stability includes frequency tolerance(initial accuracy),temperature stability,load and VDD variation and 10 year aging at 25°C
Start-up time 启动时间		10mS			

Table 2 Absolute Maximum Ratings

Item/Type		Value			Remarks
Core Supply Voltage 核心工作电压		-0.5V		3.63V	
Voltage range (All inputs) 输入引脚电压范围		-0.5V		3.63V	Relative to GND
Maximum Junction Temperature in Operation 最大工作温度				+125°C	
Storage Temperature Range 储存温度		-55°C		+150°C	
Programming Voltage 编程电压		2.375V	2.5V	2.625V	
Latch Up 闳锁效应		100 mA Max			
ESD 静电防护		Human body model: 2000V Max			
		Charged device model: 500V Max			

Notes:

- Exceeding maximum ratings may shorten the useful life of the device.
- Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or at any other conditions beyond those indicated under the DC Electrical Characteristics is not implied. Exposure to Absolute-Maximum-Rated conditions for extended periods may affect device reliability or cause permanent device damage.

Table 3 Output Clock Specifications

Parameter		Symbol	Min	Typ	Max	Units
LVDS Outputs						
Output Common-Mode Voltage 输出共模电压	VDD=2.5/3.3V	Vocm	1.125	1.25	1.375	V
	VDD=1.8V		0.75	0.85	1.0	
Clock Output Frequency 时钟输出频率		Fout	0.2		1500	MHz
Output Rise/Fall Time 上升下降时间		Trf			350	ps
Output differential peak 输出差分峰值	@156.25M	VP		400		mV
	≤700M		250		500	
	>700M/<1500M		250		500	
LVDS-Boost Outputs						
Clock Output Frequency 时钟输出频率		Fout	0.2		1500	MHz
Output Rise/Fall Time 上升下降时间		Trf			350	ps
Output differential peak 输出差分峰值	@156.25M	VP		800		mV
	≤700M		600		950	
	>700M/<1500M		500		950	
LVPECL Outputs						
Output High Voltage 输出高电压	VDD=2.5/3.3V	VOH	VDD-1.165		VDD-0.8	V
Output Low Voltage 输出低电压		VOL	VDD-2		VDD-1.55	
Clock Output Frequency 时钟输出频率		Fout	0.2		1500	MHz
Output Rise/Fall Time 上升下降时间		Trf			350	ps
Output differential peak 输出差分峰值	@156.25M	VP		720		mV
	≤700M		500		1050	
	>700M/<1500M		400		800	
HCSL Outputs						
Output High Voltage 输出高电压	VDD=1.8/2.5/3.3V	VOH	0.65	0.83	1.05	V
Output Low Voltage 输出低电压		VOL	-0.1	0	0.1	
Clock Output Frequency 时钟输出频率		Fout	0.2		1500	MHz
Output Rise/Fall Time 上升下降时间		Trf			350	ps
Far End Termination Output differential peak 输出差分峰值	@156.25M	VP		800		mV
	≤700M		400		1050	

Table 3 (Continued)

HCSL-LP Outputs						
Output High Voltage 输出高电压	VDD=1.8/2.5/3.3V	VOH	0.7	0.8	0.9	V
Output Low Voltage 输出低电压		VOL	-0.1	0	0.1	
Clock Output Frequency 时钟输出频率		Fout	0.2		500	MHz
Output Rise/Fall Time 上升下降时间		Trf			350	ps
Output differential peak 输出差分峰值	@156.25M	VP		720		mV
	≤500M		500		900	

1.1 Phase Jitter (相噪抖动)

Table 4 Output RMS Jitter and Phase Noise

Item/Type	Value	Remarks
RMS Jitter [12 kHz ~ 20 MHz]	69fs rms Typ.	@156.25MHz
RMS Jitter for [12 kHz ~ 20 MHz]Integration Bandwidth with 4MHz High Pass Filter	26fs rms Typ.	
Phase Noise	-35 dBc/Hz@1Hz	
	-73 dBc/Hz@10Hz	
	-102 dBc/Hz@100Hz	
	-126 dBc/Hz@1kHz	
	-137 dBc/Hz@10kHz	
	-146 dBc/Hz@100kHz	
	-150 dBc/Hz@1MHz	
	-161 dBc/Hz@10MHz	

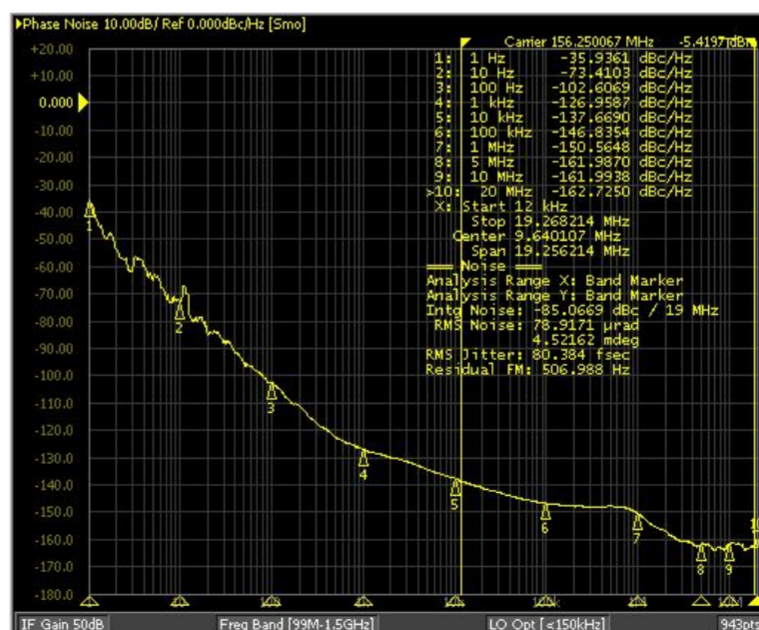


Figure 1 Representative Phase Noise Measurement

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1.2 Frequency vs Temperature Test (频率-温度特性测试)

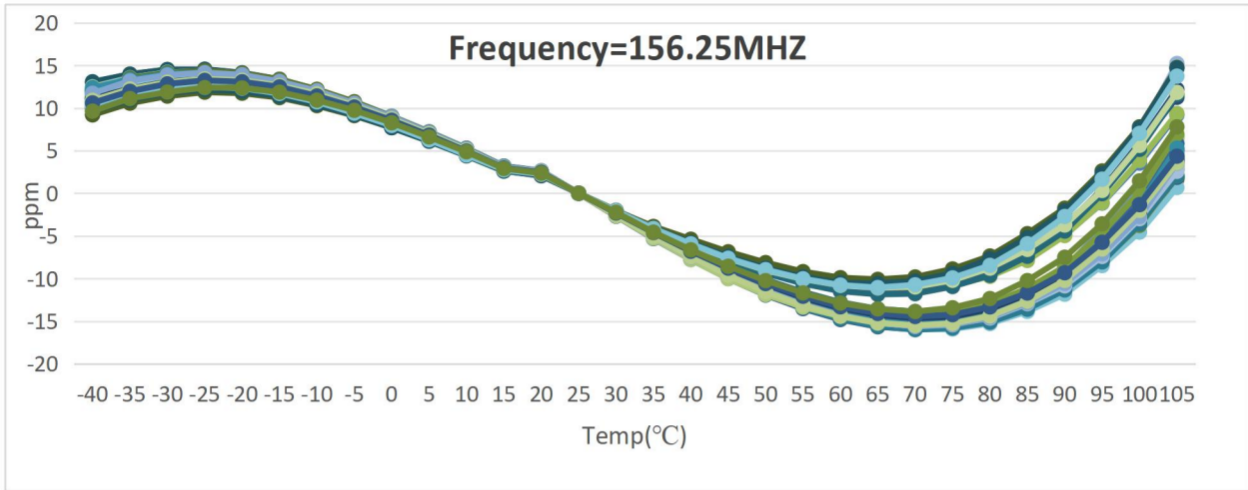


Figure 2 Frequency vsTemperature

2 Pin Dimension (脚位尺寸)

Table 5 Pin Description

Pin Name	Pin No.	I/O Type	Description
OE/NC	1,2	Input	Selectable by Ordering Information OE = Output Enable ; NC = No connect
GND	3		GND
CLKP	4	Output	Clock + for differential Output.
CLKN	5	Output	Clock - for differential Output.
VDD	6	Power	Chip Power Supply

Notes:The Output Enable Pin can be configured as Active High or Low based on the customer requirement.

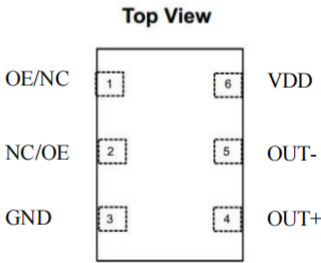


Figure 3 Pin Assignments

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3 Dimensions and Recommended Land Pattern (外观尺寸及推荐焊盘)

Dimensions (Unit: mm)	Recommended Land Pattern (Unit: mm)
2.5*2.0mm Top View Side View	
3.2*2.5mm Top View Side View	

4 Marking information (丝印说明)

YXC ①
270.000+ ②
* 3 19
③ ④ ⑤

or

YXC ①
1.2G+ ②
* 3 19
③ ④ ⑤

① YangXing LOGO
② Frequency
③ Line
④ Year
⑤ Production Cycle

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5 Inside Structure (内部结构)

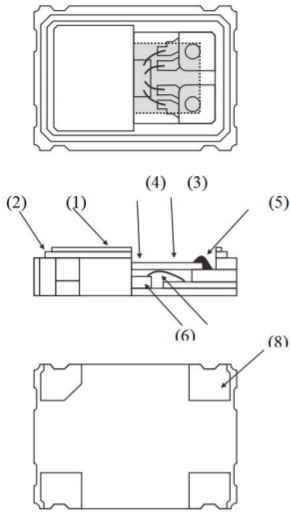
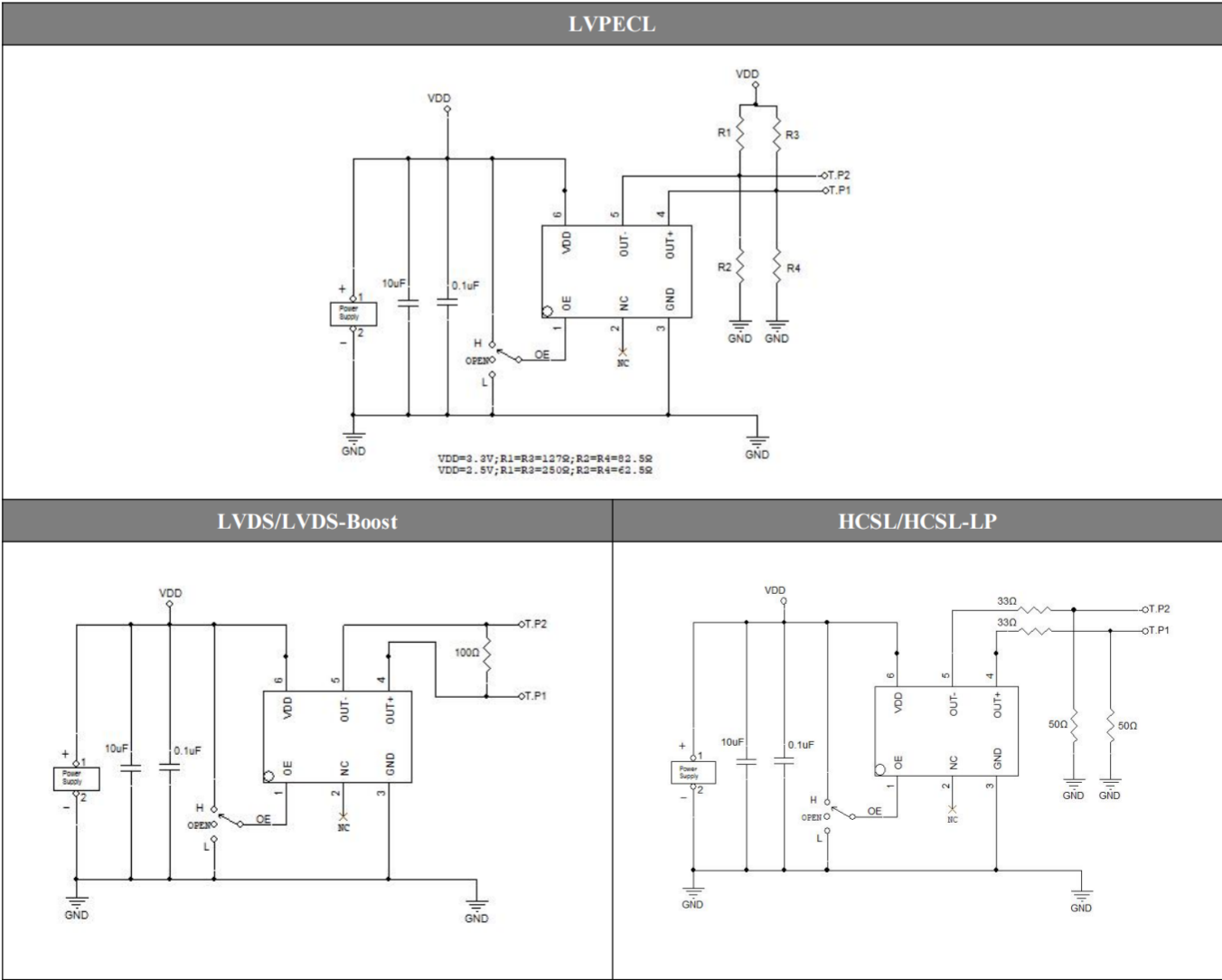


Figure 4. Internal Structure

Table 6 Materials of Internal Components

No.	Name	Material
(1)	Can	Fe-Co-Ni
(2)	Base	Ceramic
(3)	Blank	Quartz
(4)	Electrode	Ag
(5)	Epoxy	Slilcon+Ag
(6)	IC	Slilcon
(7)	Wire	Au
(8)	Soldering Pads	Au plated

6 Test Circuit (测试电路)



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7 Reflow profile (回流焊)

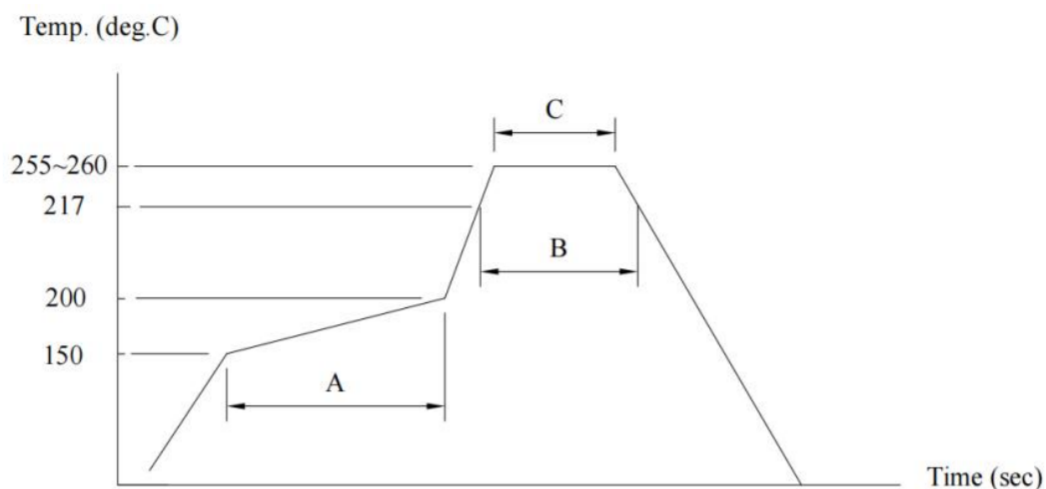


Figure 5. Reflow Profile

- (A)→Preheating area : 150~200°C, 60~120sec.
- (B)→Heating area : 217°C, 60~150sec.
- (C)→Peak temperature : 255~260°C, 30sec. Max.
- Ramp-up rate (217→260°C) : 3°C/sec. Max.
- Ramp-down rate (260→217°C) : 6°C/sec. Max.
- Time 25°C→260°C : 480sec. Max.

8 Taping Specification (载带规格) (Unit: mm)

Size	A	B	C	D	E	F	G	H	Pcs/reel
SMD-2520	180±2.0	8.0±0.3	2.70±0.1	2.25±0.1	4.0±0.1	0.8±0.1	61.0±1.0	9.5±0.5	3000
SMD-3225	180±2.0	8.0±0.3	3.40±0.1	2.70±0.1	4.0±0.1	1.40±0.1	61.0±1.0	9.5±0.5	3000



9 Notice (注意)

包装 PACKING

包装方式应符合运输和装卸要求，特殊包装须经双方认可。

Packing must prevent damage during transportation and handing. Specific method will be settled by mutual Agreement.

对环境影响 INFLUENCE TO ENVIRONMENT

本产品在生产过程中不使用 ODS I，对臭氧层无破坏。

This product doesn't use the class I ODS at any of production process.

生产厂家 MANUFACTURER

公司名称：深圳扬兴科技有限公司

Shenzhen YangXing Technology Co., Ltd.

其它 OTHERS

1.如果您对公司产品规格书有疑问或书中未列出，请与我方联系，协商解决及改进。

If you have some doubt or unknowing about this specification, Please contact us for settlement or development.

2.我们按照产品规格书要求保证晶体品质，若客户要求具体数据，我们可提供。

We guarantee that quartz crystal unit satisfies this specification, If you need the data, we will provide it.

3.如需应用于超声波环境下，请与我们联系。

For application in ultrasonic environment, please contact us.

4.变更与联络 (MODIFY AND CONTACT)

本产品在设计、工艺、材料、生产场所、关键设备、操作人员等影响产品质量的因素有变更时，应事先提供更改后的产品并经过质量认可后，方可大批量供货。

When the quality is changed due to the changes of the design, technology, material, manufacture place, main equipment and workers, we will first supply the modified products and obtain approval from you, then start to supply mass production.

5.售前售后服务 (AFTER SALE SERVICE)

若在生产过程中遇到不良品，本公司负责调换，并及时提交不良品的分析及改进措施报告经认可。

If the defection product was found in the production process, we will exchange and provide the improving measures in time.

此规格书仅供参考。若有需要，请与我方索要正式承认书作为物料承认及质量判定依据。

This specification is for reference only. If needed, please request a formal letter of acknowledgment from our side to serve as the basis for material acknowledgment and quality judgment.