SaRonix™
A PERICOM® COMPANY

S1614XP Series

2.5V CMOS Low Jitter, High Frequency Crystal Clock Oscillator (XO)

Actual Size = 7 x 5mm

Product Features

- Thicker crystal than conventional overtone for improved reliability
- Less than 1 ps RMS jitter with advanced non-PLL, patented clock circuit (U.S. Patent# 7002423)
- 2.5V CMOS/TTL compatible logic levels
- Pin-compatible with standard 7x5mm packages
- Designed for standard reflow and washing techniques
- RoHS compliant**
  (** per #7, Annex of Directive 2002/05/EC)

Product Description

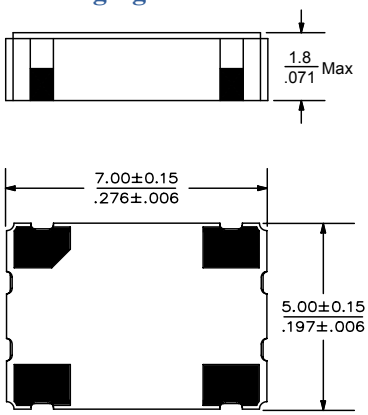
The S1614XP Series is an enhanced high-frequency version of the popular S1614 series, a 2.5V crystal clock oscillator that achieves superb jitter and stability over a broad range of operating conditions and frequencies. The output clock signal, generated internally with a patented oscillator design, is compatible with LVCMOS logic levels. The device, available on tape and reel, is contained in a 7x5mm surface-mount ceramic package.

Applications

The S1614XP Series is an ideal reference clock for high-speed applications requiring low jitter, including:

- 1/10 Gigabit Ethernet
- FibreChannel
- Serial Attached SCSI (SAS)
- Server & Storage platforms
- SONET/SDH linecards
- Passive Optical Network (PON) devices

Packaging Outline



Pin Functions

Pin	Function
1	OE Function
2	Ground
3	Clock Output
4	V_{DD}

Common Frequencies

Contact SaRonix for additional frequencies

100.0000 MHz	150.0000 MHz
106.2500 MHz	155.5200 MHz
125.0000 MHz	156.2500 MHz
127.0000 MHz	159.3750 MHz
133.0000 MHz	

Ordering Information

S 1614 B P - 156.2500 (T)

- **SaRonix**
- **Product Series**
- **Frequency Stability**
  *AA = ±20 ppM (-10 to +70 °C)
  *A = ±25 ppM (-10 to +70 °C)
  B = ±50 ppM (-10 to +70 °C)
  E = ±50 ppM (-40 to +85°C)
- **Series Version Code**
- **Output Frequency** (MHz)
- **Packaging**
  (T) = Tape & Reel full reel increments
  Blank = Bulk packaged

* Availability varies by frequency. Please consult SaRonix.

Electrical Performance

Parameter	Min.	Typ.	Max.	Units	Notes
Output frequency	100		160	MHz	As specified
Supply voltage	+2.38	+2.5	+2.62	V	
Supply current, output enabled			25	mA	
Supply current, output disabled			10	mA	Output Hi-Z
Frequency stability			±20 to ±50	ppM	See Note 1 below
Operating temperature	-40		+85	°C	As specified
Output logic 0, VOL			10% V_{DD}	V	
Output logic 1, VOH	90% V_{DD}			V	
Output load	15 pF (max) or 10 LSTTL				
Duty cycle	45		55	%	-10 to +70°C measured 50%VDD
Duty cycle	40		60	%	-40 to -10°C and +70 to +85°C measured 50%VDD
Rise and fall time			2	ns	Measured 20/80% of waveform
Jitter, phase			1	ps RMS (1-σ)	12kHz to 40MHz frequency band
Jitter, total			40	ps pk-pk	100,000 random periods
Subharmonic Level			-40	dBc	

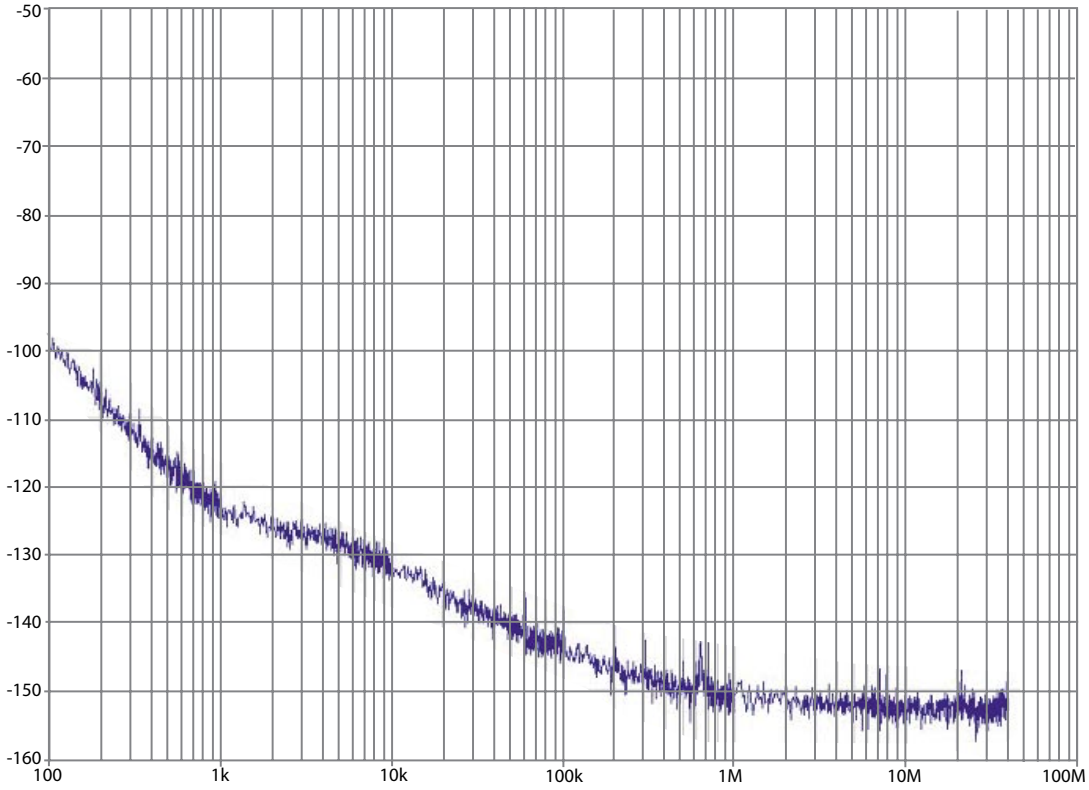
Notes:

1. As specified. Stability includes all combinations of operating temperature, load changes, rated input (supply) voltage changes, initial calibration tolerance (25°C), aging (1 year at 25°C average effective ambient temperature), shock and vibration.

Output Enable / Disable Function

Parameter	Min.	Typ.	Max.	Units	Notes
Input Voltage (pin 1), Output Enable	70% VDD			V	
Input voltage (pin 1), Output Disable			30% VDD	V	Output is Hi-Z
Internal pullup resistance	50			kΩ	
Output disable delay			100	ns	
Output enable delay			1	ms	

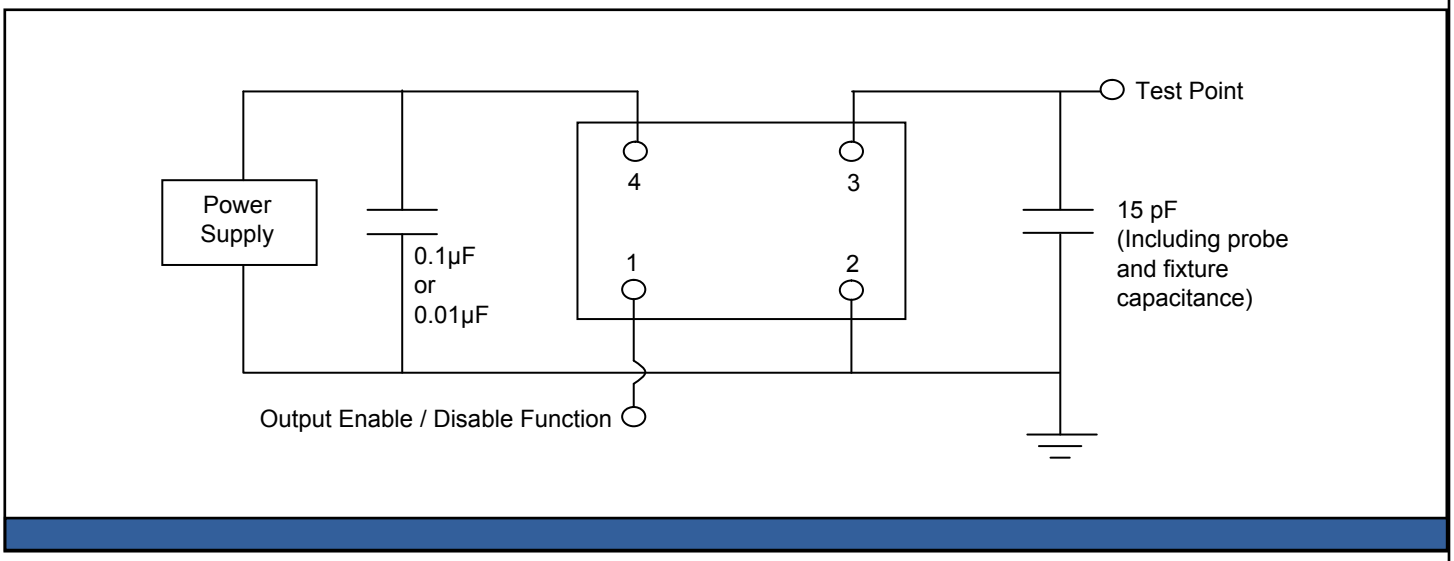
Typical Phase Noise



Absolute Maximum Ratings

Parameter	Min.	Typ.	Max.	Units	Notes
Storage temperature	-55		+125	°C	

Test Circuit

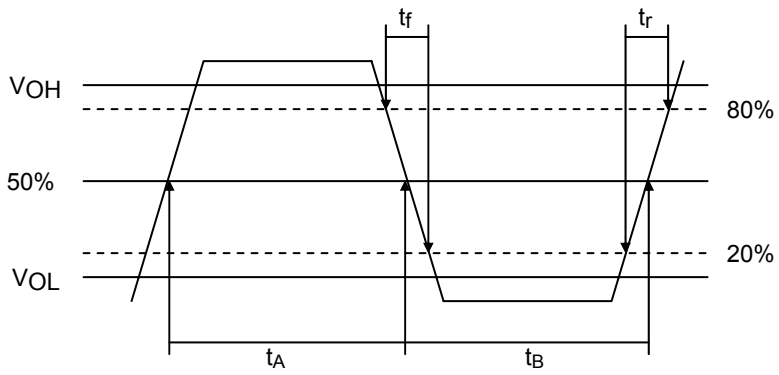


Reliability Test Ratings

This product is rated to meet the following test conditions:

Type	Parameter	Test Condition
Mechanical	Shock	MIL-STD-883, Method 2002, Condition B
Mechanical	Solderability	JESD22 -B102-D, Method 2003 (Preconditioning E)
Mechanical	Terminal strength	MIL-STD-883, Method 2004, Condition D
Mechanical	Gross leak	MIL-STD-883, Method 1014, Condition C
Mechanical	Fine leak	MIL-STD-883, Method 1014, Condition A2 ($R_1 = 2x10^{-8}$ atm cc/s)
Mechanical	Solvent resistance	MIL-STD-202, Method 215
Environmental	Thermal shock	MIL-STD-883, Method 1011, Condition A
Environmental	Moisture resistance	MIL-STD-883, Method 1004
Environmental	Vibration	MIL-STD-883, Method 2007, Condition A
Environmental	Resistance to soldering heat	J-STD -020C Table 5-2 Pb-free devices (2 cycle max)

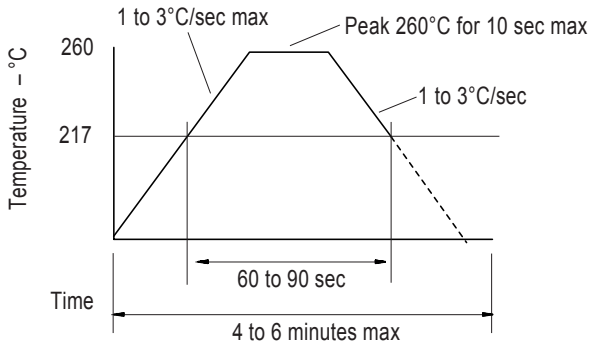
Output Waveform



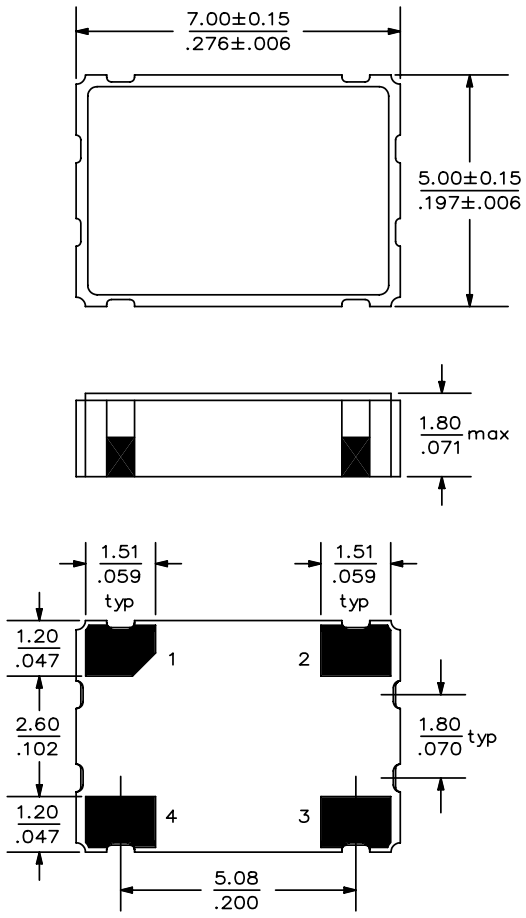
Duty cycle = 100% × (t_A) / (t_A + t_B)

Reflow Soldering Profile

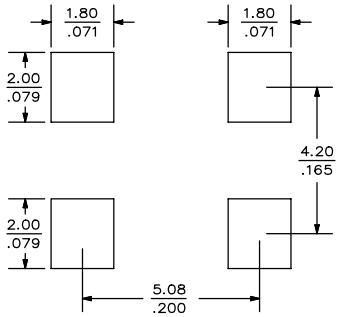
As per IPC/JEDEC J-STD-020C



Mechanical Drawings



Recommended Land Pattern*



*External high-frequency power decoupling is recommended.(see test circuit for minimum recommendation). To ensure optimal performance, do not route traces beneath the package.

Scale: None. Dimensions are in mm/inches.

Marking LINE 1:	**S P X P**	**(SaRonix, Model, Stability code, Version)**
Marking LINE 2:	**Frequency**	**(Frequency code)**
Marking LINE 3:	**● YY WW X**	**(Pin 1, Year, Week, Origin)**

**Exact location of markings may vary.