



Actual Size = 5 x 7mm



Product Features

- Thicker crystal for improved reliability
- Less than 1 ps RMS jitter with advanced non-PLL, patent-pending design
- ± 50 ppM accuracy (all rated conditions including aging) standard for commercial or industrial operating conditions
- 3.3V CMOS/TTL compatible logic levels
- Pin-compatible with standard 5x7mm packages
- Designed for standard reflow and washing techniques
- IBIS model available
- Pb-free and RoHS/Green compliant**
(**per #7, Annex of Directive 2002/05/EC)

Product Description

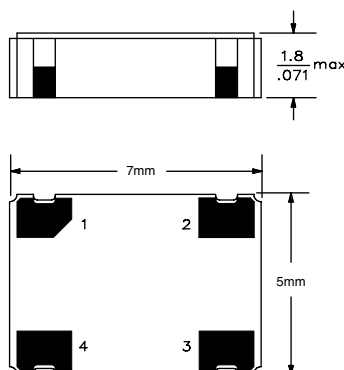
The S1613XP Series is an enhanced high-frequency version of the popular S1613 series, a 3.3V crystal clock oscillator that achieves superb jitter and stability over a broad range of operating conditions and frequencies. The output clock signal, generated internally with a non-PLL oscillator design, is compatible with LVCMOS/LVTTL logic levels. The device, available on tape and reel, is contained in a 5x7mm surface-mount ceramic package.

Applications

The S1613XP 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

Packaging Outline



Pin Functions

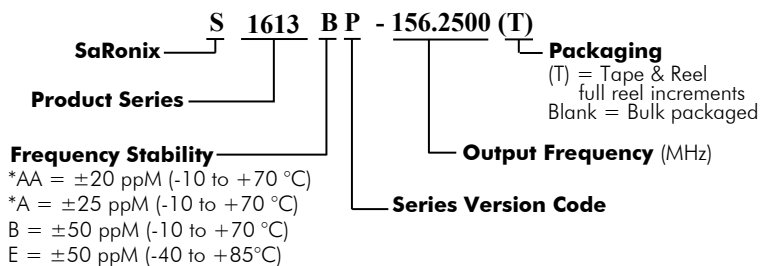
Pin	Function
1	OE Function
2	Ground
3	Clock Output
4	V _{DD}

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



* Availability varies by frequency. Please consult SaRonix.

Electrical Performance

Parameter	Min.	Typ.	Max.	Units	Notes
Output frequency	100		160	MHz	As specified
Supply voltage	+2.97	+3.3	+3.63	V	
Supply current, output enabled			30	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, +70 to +85°C measured 50%VDD
Rise and fall time			2	ns	measured 20/80% of waveform
Jitter, phase		0.25	1	ps RMS (1-σ)	12kHz to 40MHz frequency band
Jitter, accumulated			7	ps RMS (1-σ)	20,000 adjacent periods
Jitter, total			40	ps pk-pk	100,000 random periods
Subharmonic Level			-40	dBc	

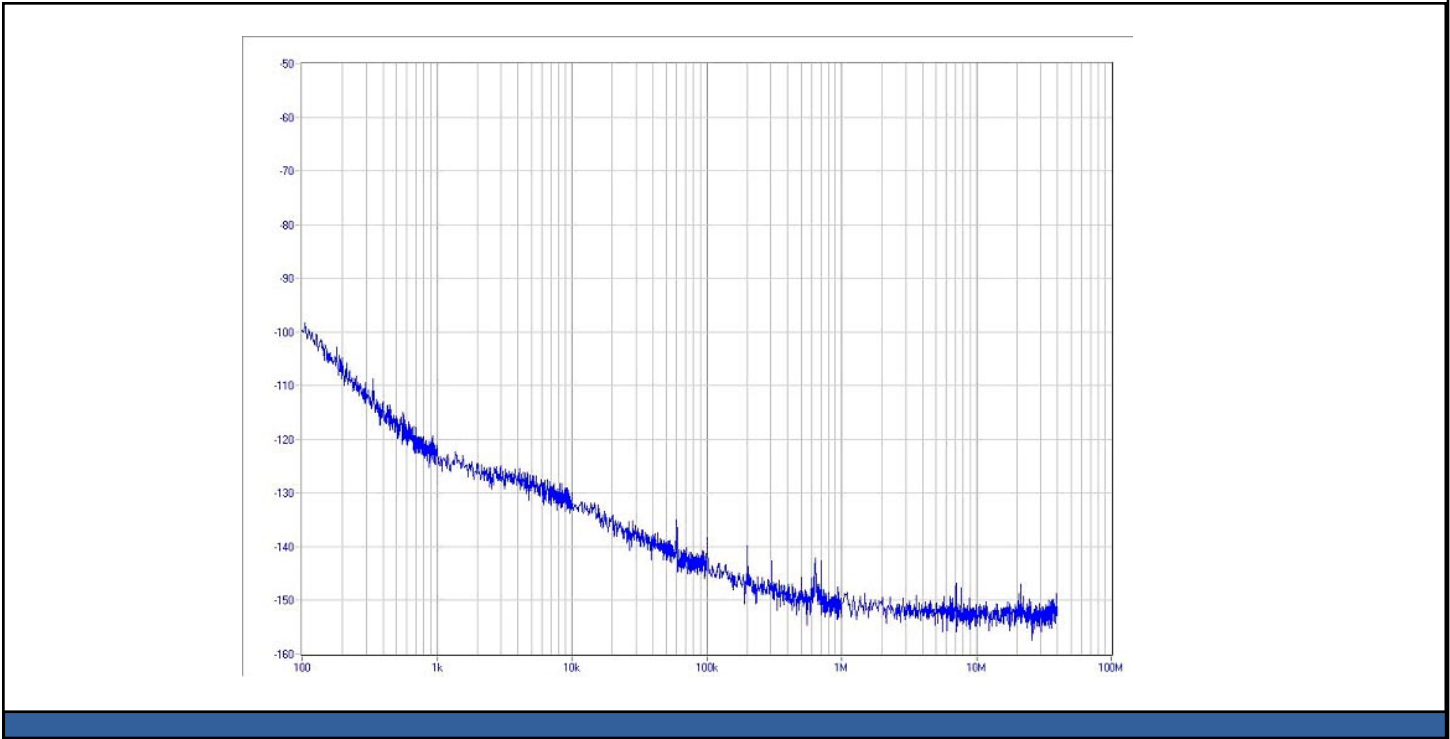
Notes:

- 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.

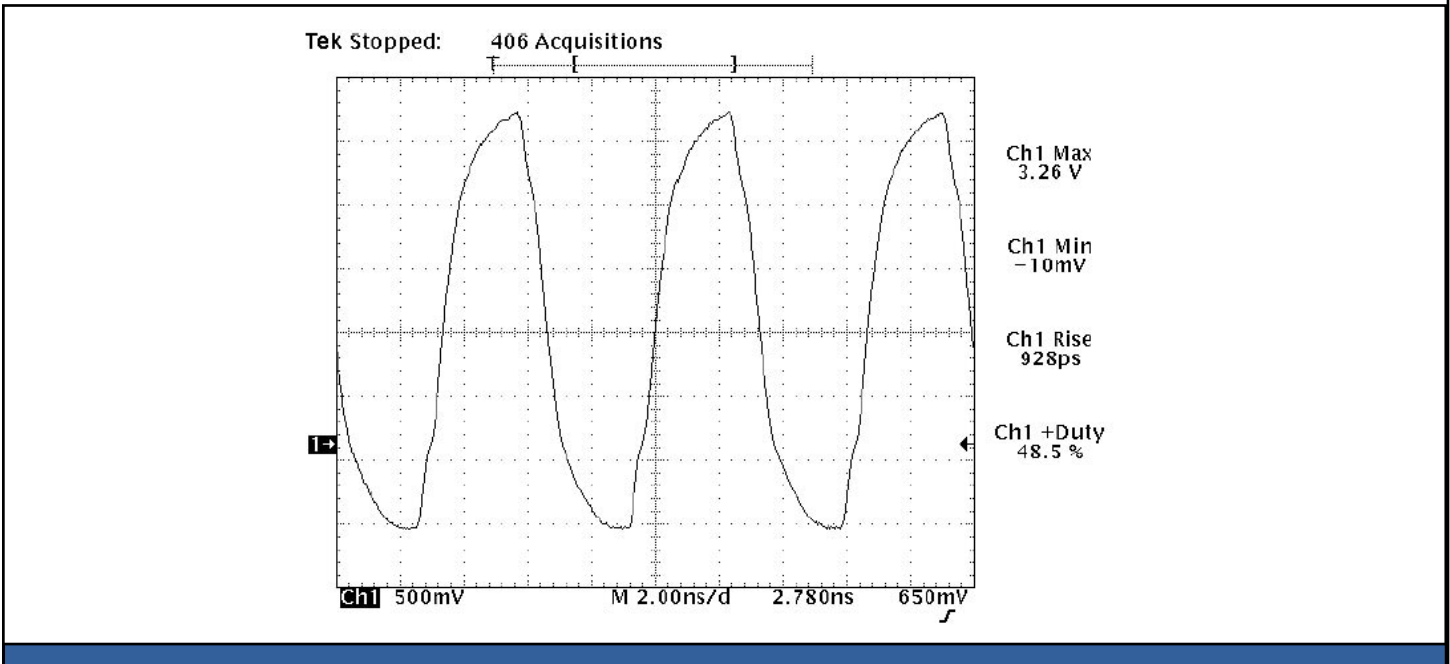
Output Enable / Disable Function

Parameter	Min.	Typ.	Max.	Units	Notes
Input Voltage (pin 1), Output Enable	2.2			V	or open
Input voltage (pin 1), Output Disable			0.8	V	Output is Hi-Z
Internal pullup resistance	50			kΩ	
Output disable delay			100	ns	
Output enable delay			1	ms	

Typical Phase Noise



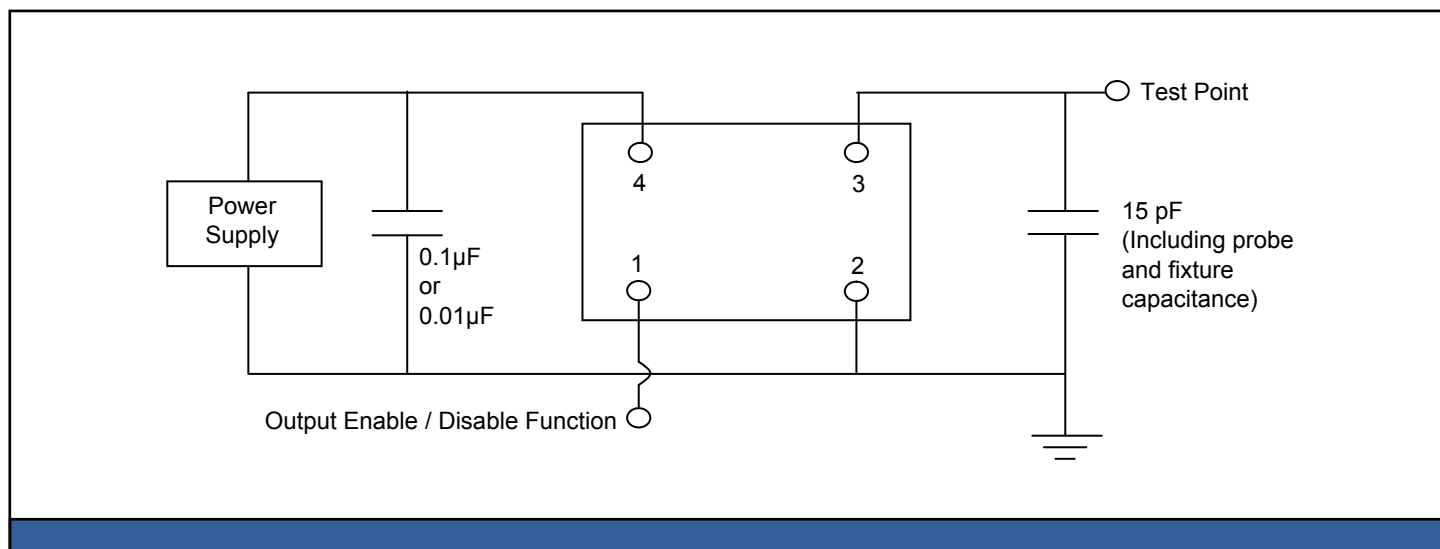
Typical Output Waveform (150 MHz output)



Absolute Maximum Ratings

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

Test Circuit

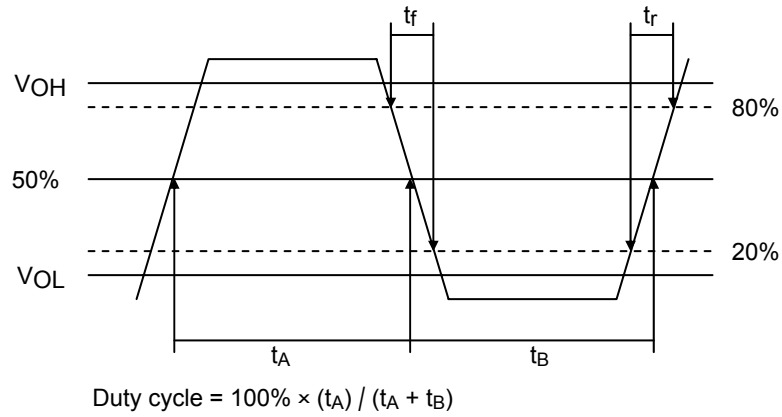


Reliability Test Ratings

This product is rated to meet the following test conditions:

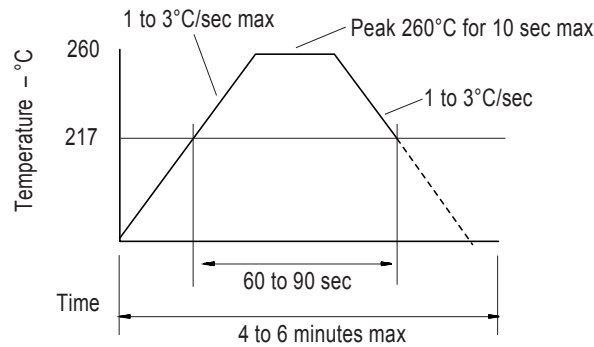
Type	Parameter	Test Condition
Mechanical	Shock	MIL-STD-883, Method 2002, Condition B
Mechanical	Solderability	JESD22-B102-D Method 2 (Preconditioning E)
Mechanical	Terminal strength	MIL-STD-883, Method 2004, Condition D
Mechanical	Gross leak	MIL-STD-883, Method 1014, Condition C
Mechanical	Fine leak	MIL-STD-883, Method 1014, Condition A2 ($R_1 = 2 \times 10^{-8}$ 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 cycles max)

Output Waveform

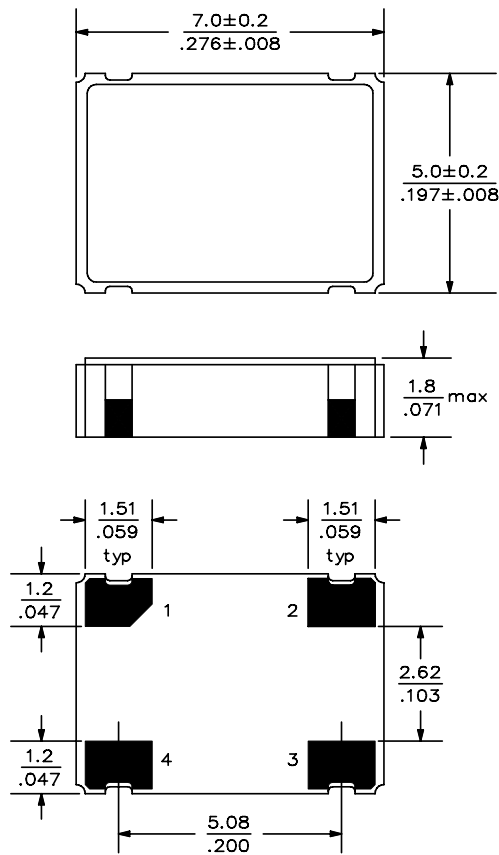


Reflow Soldering Profile

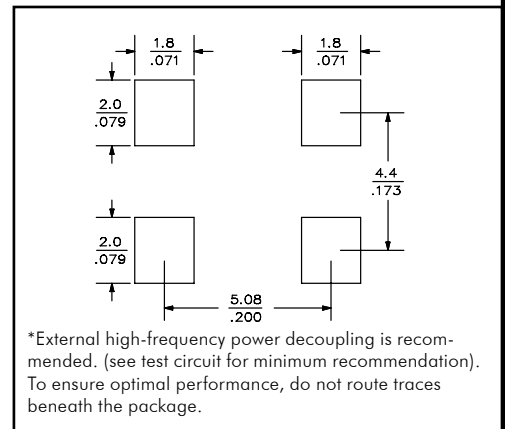
As per IPC/JEDEC J-STD-020C



Mechanical Drawings



Recommended Land Pattern*



Scale: None. Dimensions are in mm/inches.

Marking LINE 1: S J 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.