

3.3V VCXO and Low Noise PLL Clock Generator for Digital Video Applications

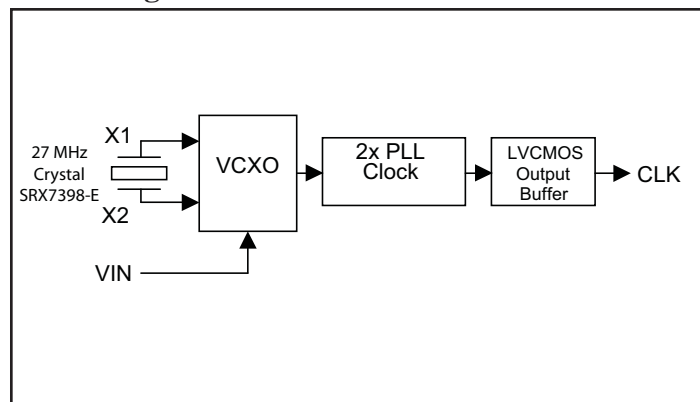
Features

- Fully integrated 27 MHz VCXO and low phase noise 2x PLL clock generator
- Uses a SaRonix 27 MHz crystal for optimum performance
- On-chip (patented) VCXO with wide pull range
- Low phase noise LVC MOS output
- 12mA output drive capability at TTL levels
- 3.3V $\pm 5\%$ operating voltage
- Packaging (Pb-free & Green):
— 8-pin SOIC (W)

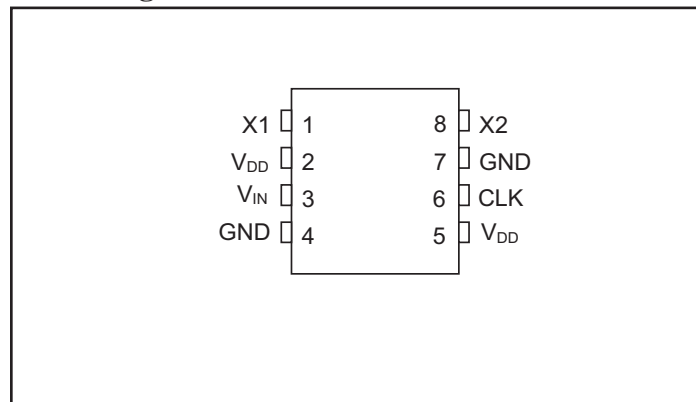
Description

The PI6CX233 is a 3.3V $\pm 5\%$ VCXO and low phase noise 2x PLL clock generator available in discrete IC form with external SaRonix crystal. The PI6CX233 features a low-noise 2x clock multiplication circuit with improved phase noise performance and LVC MOS output clock signal. The device accepts an external analog control voltage signal that pulls the output frequency by ± 120 ppm. Contact Pericom/SaRonix for recommended crystal specifications.

Block Diagram



Pin Configuration



Pin Functions

Pin Name	Number	Type	Description
X1, X2	1, 8	I	External crystal
V _{DD}	2	PWR	3.3V Positive power supply. Bypass with 0.1 μ F 0.01 μ F capacitors and place as close to the V _{DD} pins as possible.
GND	4, 7	PWR	Ground
V _{IN}	3	I	Analog control VCXO voltage input
CLK	6	O	54 MHz clock output

Maximum Ratings

Storage Temperature	-55°C to +125°C
Operating Temperature	0°C to +70°C
Supply Voltage V_{DD}	-0.5V to +7V
Inputs/Outputs Voltage.....	-0.5V to $V_{DD}+0.5V$
Output Current	50mA
Soldering Lead Temperature (10s).....	+260°C
Junction Temperature	-50°C to +150°C

Note:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

DC Electrical Characteristics

(Unless otherwise specified, $V_{DD} = +3.3V \pm 5\%$, $V_{IN} = 0.5V_{DD}$, $f_O = 54$ MHz, $C_{CLK} = 5pF$, $T_A = 0^\circ C$ to $+70^\circ C$)

Symbol	Description	Test Condition	Min.	Typ.	Max.	Units
V_{DD}	Operating Supply Voltage		+3.15	+3.3	+3.45	V
I_{DD}	Operating Supply Current			45	55	mA
V_{IH}	Input HIGH Voltage		+2.0			V
V_{IL}	Input LOW Voltage				+0.8	V
V_{OH}	Output HIGH Voltage	$I_{OH} = -12$ mA	2.4			V
V_{OL}	Output LOW Voltage	$I_{OL} = +12$ mA			0.4	V

AC Electrical Characteristics

(Unless otherwise specified, $V_{DD} = +3.3V \pm 5\%$, $V_{IN} = 0.5V_{DD}$, $f_O = 54$ MHz, $C_{CLK} = 5pF$, $T_A = 0^\circ C$ to $+70^\circ C$)

Symbol	Description	Test Condition	Min.	Typ.	Max.	Units
f_i	Crystal Input Frequency		24	27	30	MHz
f_O	Output Frequency		48	54	60	
T_R/T_F	CLK Rise / Fall Time	Rise Time: 20% to 80% Fall Time: 80% to 20%		0.6	1.0	ns
T_{DC}	CLK Duty Cycle	at $V_{DD}/2$	48	50	52	%
T_{PN1}	CLK Phase Noise @ 1kHz offset			-104		dBc/Hz
T_{PN2}	CLK Phase Noise @ 10 kHz offset			-118		dBc/Hz
T_{PN3}	CLK Phase Noise @ 100 kHz offset			-120		dBc/Hz
T_{PN4}	CLK Phase Noise @ 1 MHz offset			-116		dBc/Hz
T_{PN5}	CLK Phase Noise @ 10 MHz offset			-140		dBc/Hz
T_S	Oscillator Start Time	$V_{DD} = 0.9V_{DD}$			12	ms
J_{ST}	Period Jitter	$C_L = 15pF$		110		ps

VCXO Electrical Characteristic

(Unless otherwise specified, $V_{DD} = +3.3V \pm 5\%$, $f_0 = 54 \text{ MHz}$, $C_{CLK} = 5\text{pF}$, $T_A = 0^\circ\text{C to } +70^\circ\text{C}$)

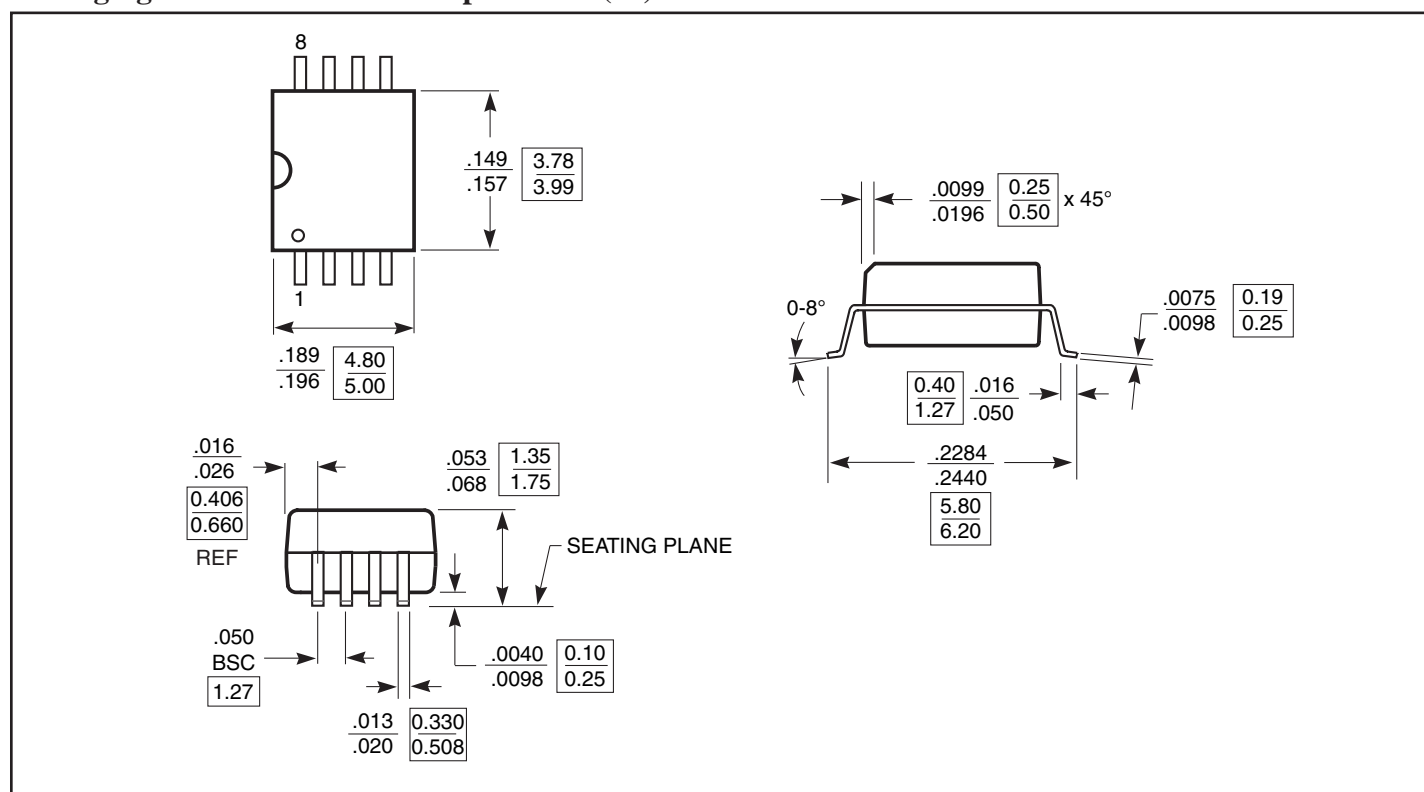
Symbol	Description	Test Condition	Min.	Typ.	Max.	Units
V_{IN}	Control Voltage Input		0		V_{DD}	V
ΔF_{CLK}	Control Pull Range	$V_{IN} = 0 \text{ to } V_{DD}$		± 120		ppm
L_{IN}	Monotonic Linearity				10	%
MB	Modulation Bandwidth	$V_{IN} = 0.5V_{DD}$		20		kHz

Recommended Crystal: Pericom/Saronix SRX7398-E Crystal

The PI6CX233 consists of an integrated 27 MHz VCXO and PLL circuit. The VCXO was designed to operate at 27 MHz (center frequency), with $C_{LXTAL} = 12\text{pF}$. C_{LXTAL} includes the on-chip + stray + external pull capacitance. The pull capacitors should be placed as close as possible to the PI6CX233 and should be placed on the same side of the board as the PI6CX233. There should be no signal traces underneath or close to the crystal to prevent coupling of unwanted signals.

Description	Crystal
Mode of Oscillation and Cut	Fundamental AT
Frequency (as specified)	27 MHz
Frequency Tolerance	$\pm 20\text{ppm}$
Temperature plus Aging Stability	$\pm 30\text{ppm}$
C0 /C1	230
Load Capacitance (C_{LXTAL})	12pF
Equivalent Series Resistance (ESR)	35 Ω (max.)

Packaging Mechanical: Plastic 8-pin SOIC (W)



Ordering Information(1,2,3)

Ordering Code	Package Code	Crystal Input (MHz)	Clock Output (MHz)	Package Description
PI6CX233WE	W	24 to 30	48 to 60	Pb-free & Green, 8-pin SOIC

Notes:

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
2. E = Pb-free and Green
3. X Suffix = Tape/Reel