

27 MHz Spread Spectrum Clock Synthesizer

Product Features

- Two High Precision outputs:
—27.000 MHz ssc clock output
—27.000 MHz clock output
- Four Down-Spread options:
—Down-spread: -1% to -1.75%
- 14.318 MHz input (crystal or external reference)
- Single 3.3V Power Supply
- Packaging (Pb-Free and Green):
— SOTiny™ 6-pin SOT-23 (T)

Description

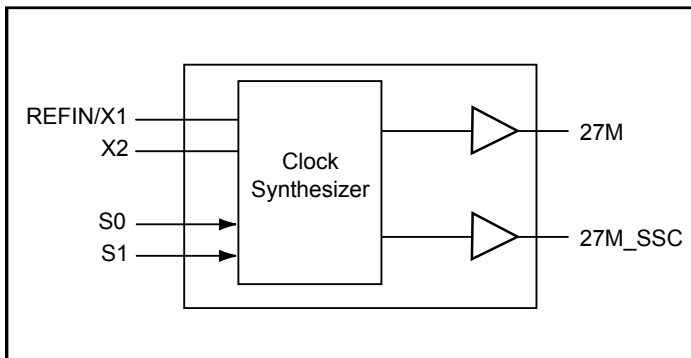
The PI6C3420A is spread spectrum clock synthesizer targeted for video and graphics applications. The primary purpose of the spread spectrum is to minimize EMI emissions. This device generates two 27.000 MHz outputs: a 27.000 MHz down spread spectrum output and a 27.000 MHz non-spread spectrum output. The PI6C3420A down spread range is from -1% to -1.75% when output frequency is at 27 MHz. Spread spectrums are selectable through external pins.

Typically, the PI6C3420A uses a 14.318 MHz input crystal or frequency source to generate a 27 MHz clock output. Users can also get the adequate output clock setting from 15.1 MHz to 46.2 MHz by tuning the input frequency which can be set from 8 MHz to 24.5 MHz; the frequency multiplication factor is 1.886X.

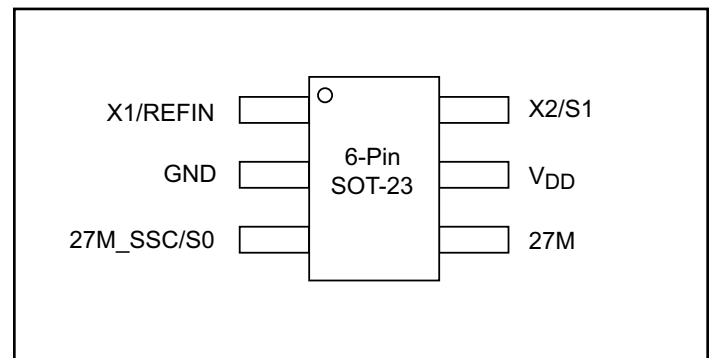
The PI6C3420A is housed in a lead-free and green, SOT-23, 6-pin SOTiny package.

The PI6C3420A belongs to Pericom's clock and timing products. For other frequencies, features, functions or input/output not specified, please contact Pericom for information.

Block Diagram



Pin Configuration



Pin Description

Pin Name	Pin No	I/O Type	Description
VDD	5	Power	Power Supply
GND	2	Ground	Ground
27M	4	I/O	27 MHz clock output.
27M_SSC/S0	3	I/O	S0 is activated during power on for logic state strapping, then switches to 27 MHz SSC clock output.
X1/REFIN	1	I/O	Crystal or reference clock input
X2/S1	6	I/O	X2/S1 is a multiple function pin. S1 is active during power on selection of SSC spread then switches to crystal input.

Spread Spectrum Selection Table

(V_{CC} = 3.3V±10%, Ambient temperature +25°, f_{OUT} = 27 MHz)

S0	S1	Down Spread(%)
0	0	-1
0	1	-1.25
1	0	-1.50
1	1	-1.75

Electrical Specifications

Maximum Ratings⁽¹⁾

Supply Voltage to Ground Potential.....	5.5V
All Inputs and Outputs.....	-0.5V to $V_{DD}+0.5V$
Ambient Operating Temperature	-10°C to +80°C
Storage Temperature	-65°C to +150°C
Operating Temperature	0 to +70°C,
Junction Temperature	150°C
Soldering Temperature	260°C

Note:

1. 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 Characteristics ($V_{DD} = 3.3V \pm 10\%$, Ambient Temperature 0°C to +70°C, $f_{IN} = 14.318$ MHz, $f_{OUT} = 27$ MHz)

Symbol	Parameter	Conditions	Min.	Typ. ⁽¹⁾	Max.	Unit
V_{DD}	Operating Voltage		+3.0	+3.3	+3.6	V
V_{IH}	Input High Voltage		2			V
V_{IL}	Input Low Voltage				0.8	V
V_{OH}	Output High Voltage	$I_{OH} = -4$ mA	2.4			V
V_{OH}	Output High Voltage	$I_{OH} = -6$ mA	2.0			V
V_{OL}	Output Low Voltage	$I_{OL} = 4$ mA			0.4	V
V_{OL}	Output Low Voltage	$I_{OL} = 10$ mA			1.2	V
I_{DD}	Supply Current	All outputs active with $C_L = 15$ pF load			55	mA
$Z_{OUT\ UP}$	Nominal Output Impedance	High side buffer		65		Ω
$Z_{OUT\ LOW}$	Nominal Output Impedance	Low side buffer		40		Ω
C_{IN}	Input Capacitance	Input pins		5		pF

Note:

1. Typical conditions are at 3.3V for room temperature at 25°C

AC Characteristics ($V_{DD} = 3.3V \pm 10\%$, Ambient Temperature 0°C to +70°C)

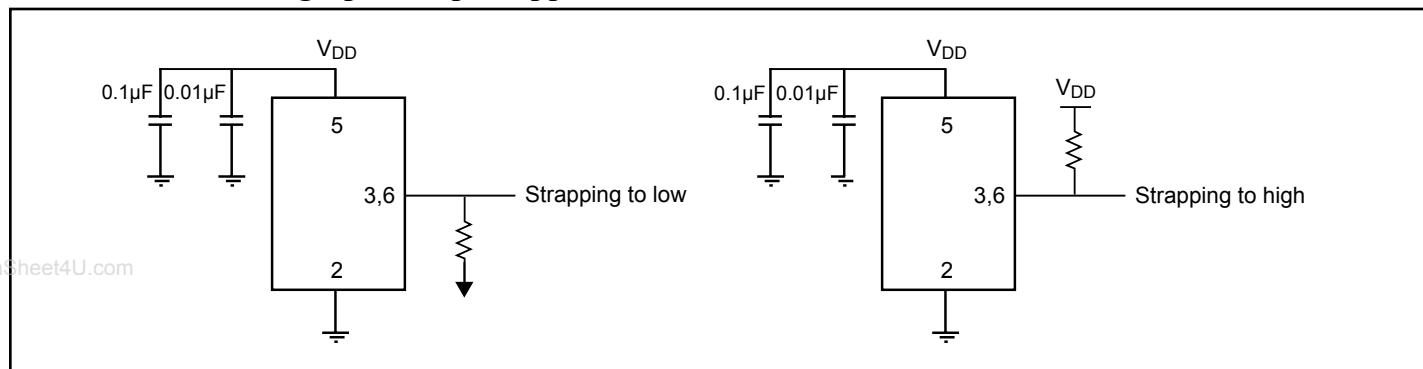
Symbol	Parameter	Conditions	Min.	Typ. ⁽¹⁾	Max.	Unit
f_{IN}	REFIN Input Frequency	REFIN Clock Input	8	14.318	24.5	MHz
f_{OUT}	Clock Output Frequency	Multiplication factor ($f_{IN}/f_{OUT} = 1.885715$)	15.1	27	46.2	MHz
t_{RISE}	Output Clock Rise Time	From 0.4V to 2.4V, $C_L = 15$ pF load		3		ns
t_{FALL}	Output Clock Fall Time	From 2.4V to 0.4V, $C_L = 15$ pF load		2.7		ns
T_{J_SHORT}	Short term jitter	Cycle-to-cycle jitter ($f_{OUT} = 27$ MHz)		250	350	ps
TDC	Input Clock Duty Cycle	REFIN/X1, Measured @ $V_{DD}/2$	20	50	80	%
TDC	Output Clock Duty Cycle	Measured @ $V_{DD}/2$ ($f_{OUT} = 27$ MHz)	45	50	55	%
$\Delta f/f$	Actual mean frequency error versus target	Input frequency = 14.31818 MHz, Output frequency = 27 MHz		0		ppm

Note:

1. Typical conditions are at 3.3V for room temperature at 25°C

Application Information

Reference circuit for graphic chipset application⁽¹⁻⁴⁾

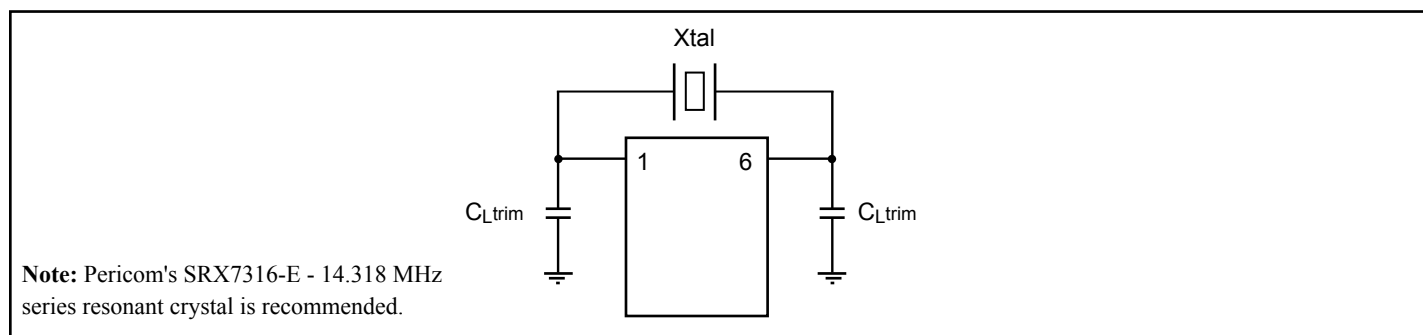


Notes:

1. PI6C3420A can accept a 14.31818MHz reference clock or crystal clock.
2. Power supply pin decoupling capacitors should be placed as close as possible to VDD pin. Via's at the VDD pin should be avoided.
3. Spread select pin's (S0 and S1):
 Pin 3 (27M_SSC/S0) and Pin 6 (X2/S1) provide logic state strapping function. When strapping resistor connects to VDD, S0 and S1 are set to logic HIGH. When strapping resistor connects to Ground, S0 or S1 will set to logic LOW.
4. Refer to "Spread Spectrum Selection Table", for more details on the strapping logic.

Crystal Load Capacitors

If a crystal is used with the device, the external trim capacitors C_{Ltrim} are used to adjust the effective capacitance to match the required crystal load capacitance. The C_{Ltrim} value can be derived from formula $C_{Ltrim} = 2 * CL - (C_s + C_i)$. Typical $C_{Ltrim} = 28pF$ when crystal load = 18pF, stray capacitance $C_s = 3pF$ and XTAL pins capacitance = 5pF.



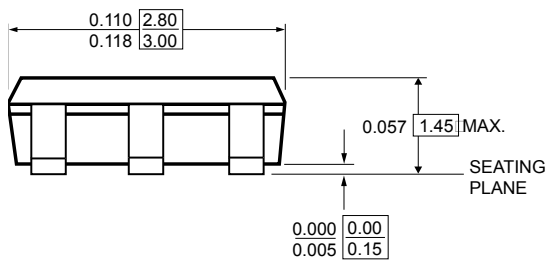
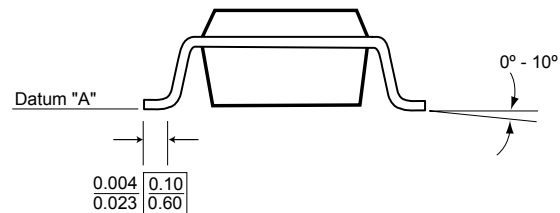
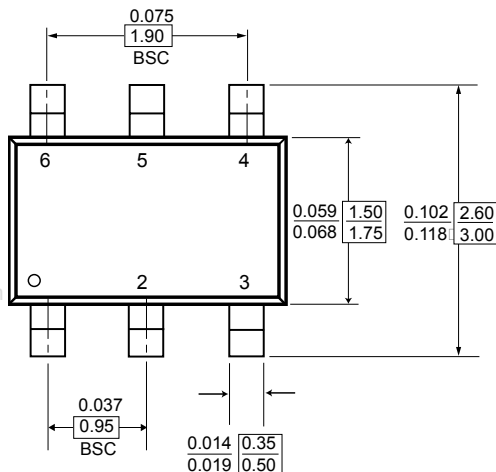
Recommended Crystal Specification

Pericom recommends: SRX7316-E Crystal for optimum performance.

Parameter	Value	Units
Mode of oscillation, and cut	Fundamental AT	
Frequency	14.318	MHz
Frequency tolerance	±20	PPM
Temperature	±30	PPM
Load Cap	18	pF
Equivalent series resistance	40	Ω
Drive to level	100	μW
Aging Stability	±5	PPM/YR
Size = Length x Width x Height	11.18(.440) x 4.65(.183) x 13.46(.530)	mm(inch)

DOCUMENT CONTROL NO.
PD - 1912

REVISION: C
DATE: 03/09/05



Notes:

- Controlling dimensions in millimeters
- Ref: EIAJ SC-74A
- Foot length is measured at flat portion of foot, reference to Datum "A"

X.XX DENOTES DIMENSIONS
X.XX IN MILLIMETERS



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DESCRIPTION: 6-Pin Small Outline Transistor
Plastic Package, SOT-23

PACKAGE CODE: T

Ordering Information(1-3)

Ordering Code	Package Code	Package Type
PI6C3420ATE	T	Pb-free & Green, 6-Pin SOT-23

Notes:

- Thermal characteristics and package top marking information can be found at <http://www.pericom.com/packaging/>
- E = Pb-free and Green
- X suffix = tape/reel