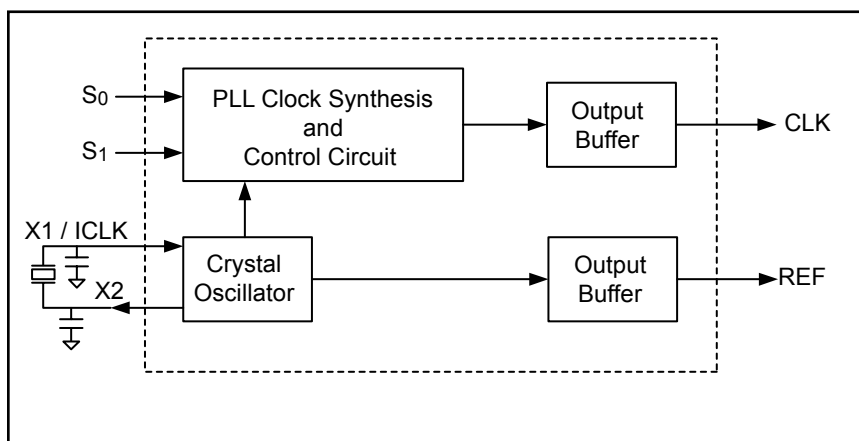
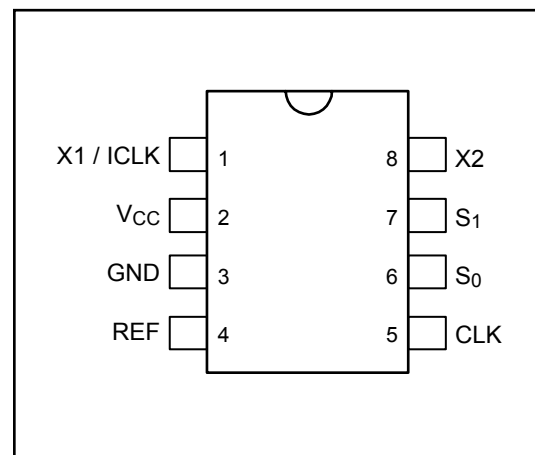


**Features**

- Zero ppm multiplication error
- Input crystal frequency range: 5 - 30MHz
- Input clock frequency range: 4 - 50MHz
- Output clock frequencies range  $\leq 200\text{MHz}$
- Period jitter  $\leq 100\text{ps}$  (typ)
- 9 Selectable frequencies controlled by  $S_0$  and  $S_1$  pins
- Supply voltage:  $3.3\text{V} \pm 10\%$  or  $5.0\text{V} \pm 10\%$
- Packaging (Pb-Free and Green):  
—8-pin SOIC (W)

**Description**

The PI6C4512 is a precision general-purpose clock synthesizer with  $f_{\text{max}} \leq 200\text{MHz}$ . The PI6C4512 uses an external low-cost crystal to generate a very accurate rate and stable system clocks.

**Block Diagram**

**Pin Configuration**

**Clock Output Table(1)**

$S_1$	$S_0$	CLK
0	0	x 4
0	M	x (16/3)
0	1	x 5
M	0	x 2.5
M	M	x 2
M	1	x (10/3)
1	0	x 6
1	M	x 3
1	1	x 8

**Notes:**

1. M = Mid-level (unconnected, biases to  $V_{CC}/2$ ).

## Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested)

Storage temperature .....	-65°C to +150°C
Ambient Operating Temperature .....	0°C to +70°C
Supply Voltage to Ground Potential (V <sub>CC</sub> ).....	-0.3V to +7.0V
Inputs (Referenced to GND).....	-0.5V to V <sub>CC</sub> +0.5V
Clock Output (Referenced to GND) .....	-0.5V to V <sub>CC</sub> +0.5V
Soldering Temperature (Max of 10 seconds).....	260°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.

## Pin Description

Name	Pin	Description
X1/ICLK	1	Crystal connection or clock input.
V <sub>CC</sub>	2	Supply voltage: 3.3V ±10% or 5.0V ±10%
GND	3	Connect to GND
REF	4	Buffered crystal oscillator output clock
CLK	5	Clock output
S <sub>0</sub>	6	Multiplier select pin 0. Connect to GND or V <sub>CC</sub> or float (no connection).
S <sub>1</sub>	7	Multiplier select pin 1. Connect to GND or V <sub>CC</sub> or float (no connection).
X2	8	Crystal connection. Leave unconnected for clock input.

## External Components

The PI6C4512 requires a minimum number of external components for proper operation. Decoupling capacitors of 0.1µF || 0.01µF should be connected between each V<sub>DD</sub> and GND and placed as close to the chip as possible. A series termination resistor of 33Ω may be used for clock outputs. If a crystal is used, it should be a fundamental mode, parallel resonant crystal. Crystal capacitors should be connected from X<sub>1</sub> to ground and from X<sub>2</sub> to ground to according to the crystal specifications. The value of capacitors is given by the following equation, where C<sub>L</sub> is the crystal load capacitance: Crystal caps (pF) = (C<sub>L</sub> -15) x 2.

## Recommended Operation Conditions

Symbol	Description	Test Condition	Min.	Typ.	Max.	Units
V <sub>CC</sub>	Supply Voltage		3		5.5	V
T <sub>A</sub>	Operating Temperature		0		+70	°C

**DC Electrical Characteristics** ( $V_{CC} = 3.3V \pm 10\%$  and  $5.0V \pm 10\%$ ,  $T_A = 0^\circ C$  to  $+70^\circ C$ , unless otherwise noted)

Symbol	Description	Test Condition	Pin	Min.	Typ.	Max.	Units
$V_{CC}$	Supply voltage		$V_{CC}$	3		5.5	V
$I_{CC}$	Supply current	No load, 20MHz crystal	$V_{CC}$		12	30	mA
$V_{IH}$	Input logic HIGH		ICLK	$(V_{CC}/2) + 1$	$V_{CC}/2$		V
$V_{IL}$	Input logic LOW		ICLK		$V_{CC}/2$	$(V_{CC}/2) - 1$	V
$V_{IH}$	Input logic HIGH		$S_0, S_1$	$V_{CC} - 0.5$			V
$V_{IM}$	Input mid-level		$S_0, S_1$		$V_{CC}/2$		V
$V_{IL}$	Input logic LOW		$S_0, S_1$			0.5	V
$V_{OH}$	High-level output voltage	$I_{OH} = -12mA$	CLK, REF	2.4			V
$V_{OL}$	Low-level output voltage	$I_{OL} = +12mA$	CLK, REF			0.4	V
$I_S$	Short circuit current		CLK		$\pm 70$		mA

**AC Electrical Characteristics** ( $V_{CC} = 3.3V \pm 10\%$  and  $5.0V \pm 10\%$ ,  $T_A = 0^\circ C$  to  $+70^\circ C$ , unless noted)

Symbol	Parameter	Test Condition	Pin	Min.	Typ.	Max.	Unit
$F_{IN}$	Input Frequency	Crystal	ICLK	5		30	MHz
		Clock	ICLK	4		50	MHz
$F_{OUT}$	Output frequency <sup>(1)</sup>	$V_{CC}: 4.5V$ to $5.5V$	CLK	20		200	MHz
		$V_{CC}: 3.0V$ to $3.6V$	CLK	20		180	MHz
$T_R$	Output clock rise time	0.8V to 2.0V, $C_L = 15pF$ load	CLK		1		ns
$T_F$	Output clock fall time	2.0V to 0.8V, $C_L = 15pF$ load	CLK		1		ns
$T_{DC}$	Output clock duty-cycle	At $V_{CC}/2$ , $f \leq 150MHz$	CLK	45	50	55	%
		At $V_{CC}/2$ , $f > 150MHz$	CLK	40	50	60	
BW	PLL bandwidth	$f \leq 150MHz$	CLK	10			kHz
$T_{PJ}$	Period Jitter	100MHz to 200MHz	CLK		100	250	ps

**Notes:**

- The phase relationship between input and output clocks can change at power up.

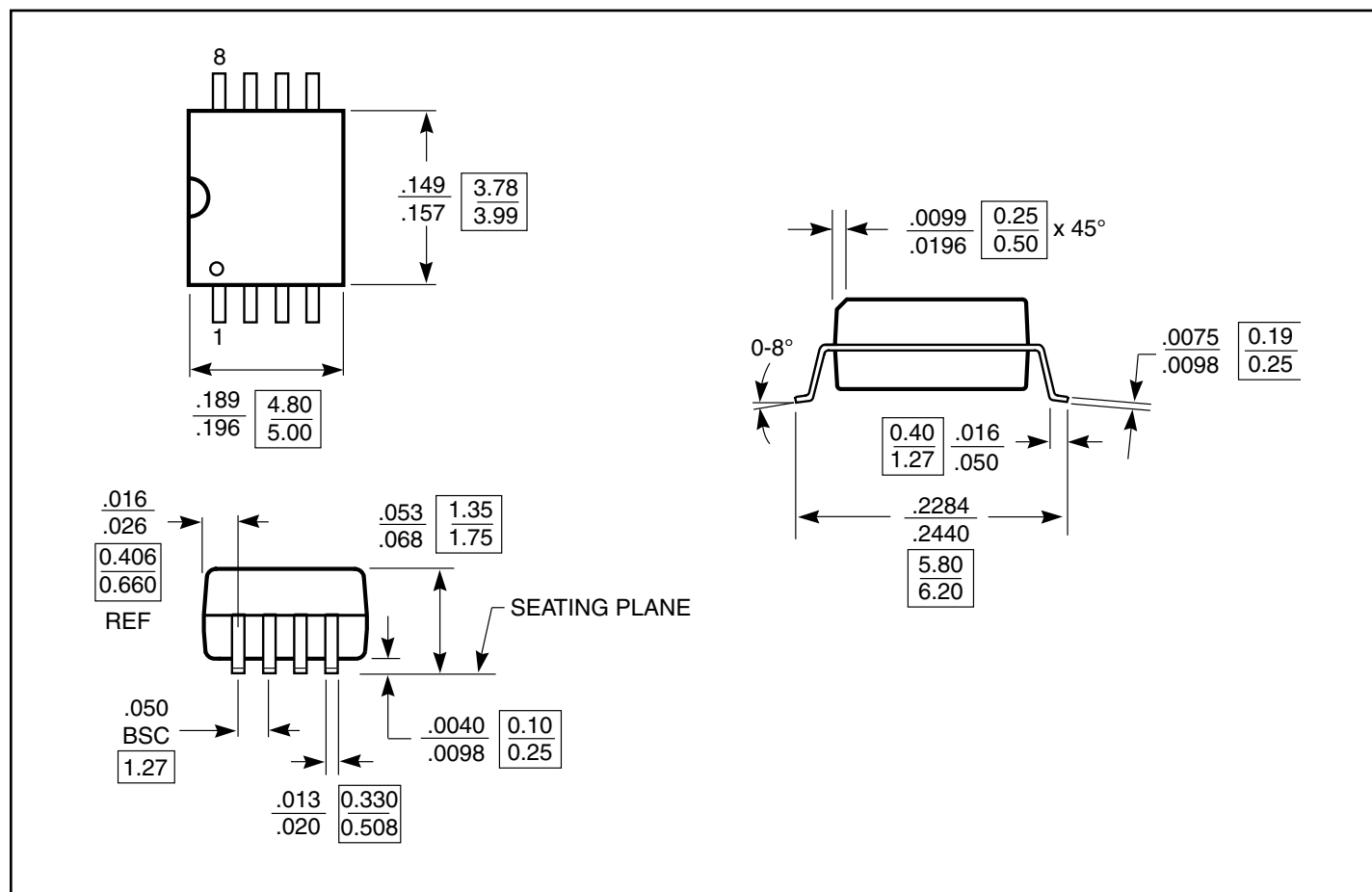
**Recommended Crystal**

Pericom recommends the Pericom 49S SMD series crystal, which is a low cost, low profile SMD crystal packaged in a HC-49/u short SMD package.

**Recommended Crystal Specifications**

Parameter	Value	Units
Mode of Oscillation	Fundamental	AT
Frequency	5 - 30	MHz
Frequency Tolerance	$\pm 50$	PPM
Temperature and Aging Stability	$\pm 50$	PPM
CO/CI Ratio	240	
Load Cap	18	pF
Equivalent Series Resistance	30	$\Omega$

**Packaging Mechanical: 8-Pin SOIC (W)**



**Ordering Information(1,2)**

Ordering Code	Package Code	Package Description
PI6C4512W	W	8-pin SOIC
PI6C4512WE	WE	Pb-Free and Green 8-pin SOIC

**Note:**

1. Thermal characteristics can be found on the company web site at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)
2. E = Pb-free and Green