

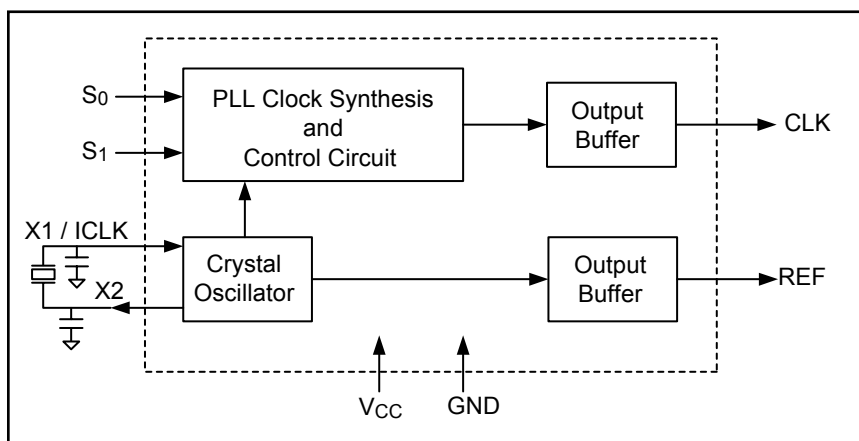
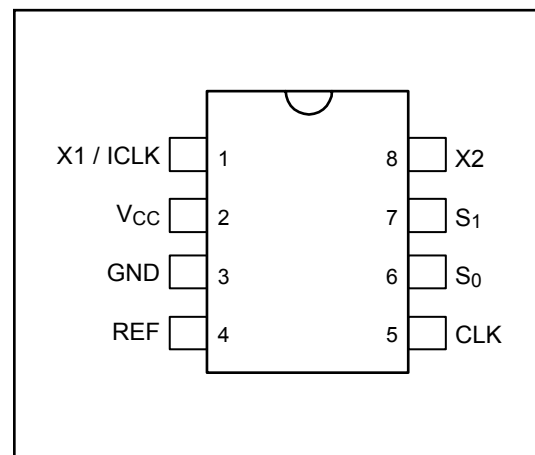
**Features**

- Zero ppm multiplication error
- Input crystal frequency of 5 - 30MHz
- Input clock frequency of 4 - 50MHz
- Output clock frequencies up to 200MHz
- Low period jitter 80ps (100~200MHz)
- Duty cycle 45/55% of output clock
- 9 Selectable frequencies controlled by S<sub>0</sub> and S<sub>1</sub> pins
- Operating voltages of 3.0 to 5.5V
- Packaging:
  - 8-pin SOIC (W)
  - Pb-Free and Green 8-pin SOIC (WE)

**Description**

Pericom Semiconductor's PI6C4512 is a precision general-purpose clock synthesizer that reaches maximum 200MHz. This device uses an external low-cost crystal to generate very accurate rate and stable system clocks. This is the most cost effective way to reduce high-price, high frequency crystals. Using PLL techniques, the device uses a standard fundamental mode, inexpensive crystal to produce output clocks up to 200 MHz.

The internal Logic divider is to generate nine different popular multiplication factors, allowing one chip to output many common frequencies.

**Block Diagram**

**Pin Configuration**

**Clock Output Table**

S <sub>1</sub>	S <sub>0</sub>	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 = leave unconnected (self-biases to V<sub>CC</sub>/2).

## Maximum Ratings

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

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

**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	Connect to +3.3V or +5V.
GND	3	Ground
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 0.01μF should be connected between each V<sub>DD</sub> and GND as close to the chip as possible. A series termination resistor of 33Ω may be used for each clock output. The crystal should be a fundamental mode, parallel resonant. Crystal capacitors should be connected from X<sub>1</sub> to ground and X<sub>2</sub> to ground to optimize the initial accuracy. The value of these 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. So for a crystal with 18pF load capacitance, two 6pF caps should be used.

**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<sub>CC</sub> = 3.3V ± 0.3V, T<sub>A</sub> = 0~70°C, unless otherwise noted)

Symbol	Description	Test Condition	Pin	Min.	Typ.	Max.	Units
V <sub>CC</sub>	Supply voltage		V <sub>CC</sub>	3		5.5	V
I <sub>CC</sub>	Supply current	no load, 20MHz Crystal	V <sub>CC</sub>		12	20	mA
V <sub>IH</sub>	Input logic high		ICLK	(V <sub>CC</sub> /2) +1	V <sub>CC</sub> /2		V
V <sub>IL</sub>	Input logic low		ICLK		V <sub>CC</sub> /2	(V <sub>CC</sub> /2)-1	
V <sub>IH</sub>	Input logic high		S <sub>0</sub> , S <sub>1</sub>	V <sub>CC</sub> -0.5			
V <sub>IM</sub>	Input mid-level		S <sub>0</sub> , S <sub>1</sub>		V <sub>CC</sub> /2		
V <sub>IL</sub>	Input logic low		S <sub>0</sub> , S <sub>1</sub>			0.5	
V <sub>OH</sub>	High-level output voltage	I <sub>OH</sub> = -12mA	CLK, REF	2.4			
V <sub>OL</sub>	Low-level output voltage	I <sub>OL</sub> = 12mA	CLK, REF			0.4	
I <sub>S</sub>	Short circuit current		CLK		±70		

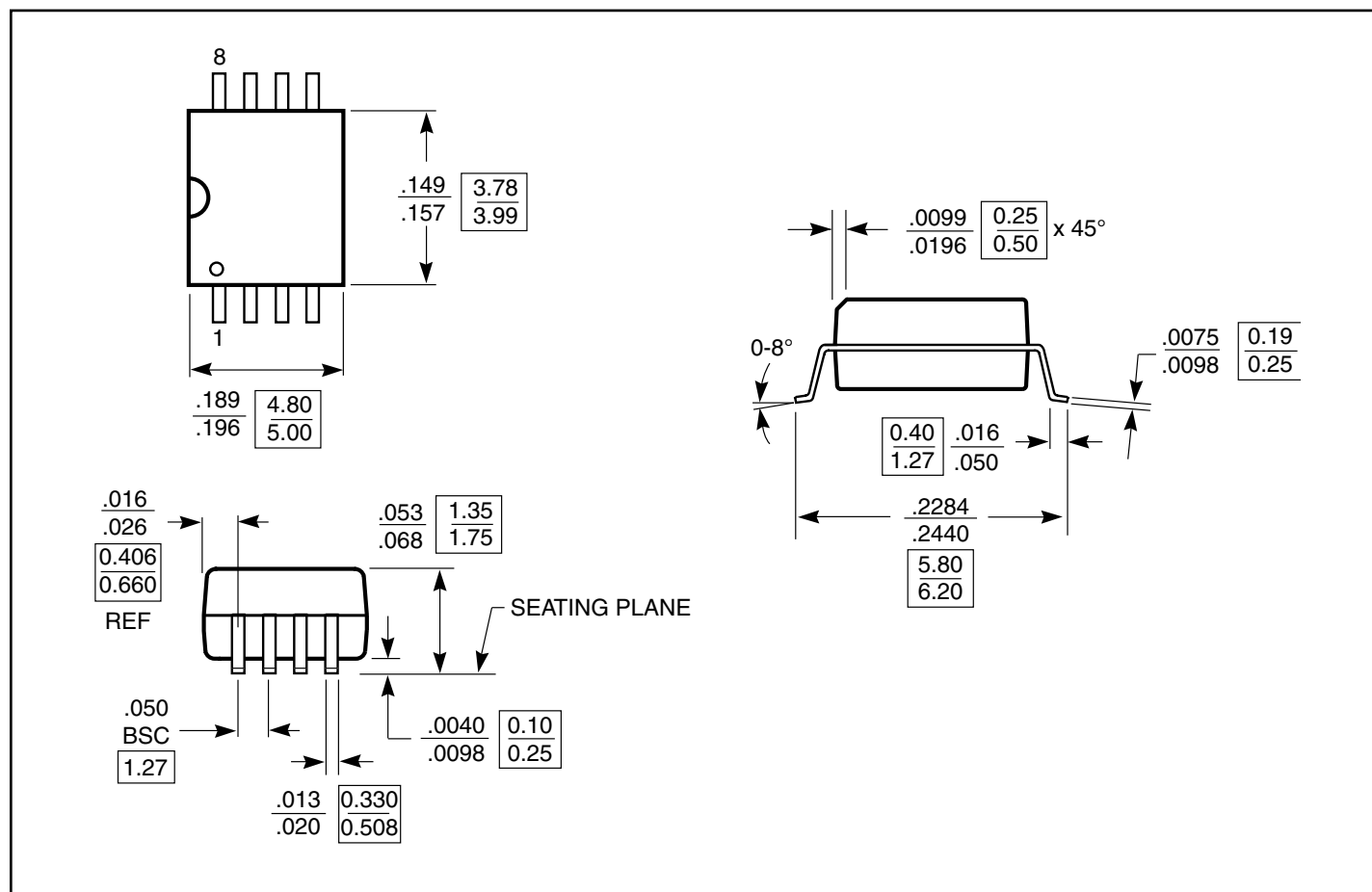
**AC Electrical Characteristics** (V<sub>CC</sub> = 3.3V ± 0.3V, T<sub>A</sub> = 0 ~ 70°C, unless noted)

Symbol	Parameter	Test Condition	Pin	Min.	Typ.	Max.	Unit
f <sub>IN</sub>	Input Frequency	Crystal	ICLK	5		30	MHz
		Clock	ICLK	4		50	
f <sub>OUT</sub>	Output frequency <sup>(2)</sup>	V <sub>CC</sub> : 4.5 to 5.5V	CLK	20		200	
		V <sub>CC</sub> : 3.0 to 3.6V	CLK	20		180	
t <sub>r</sub>	Output clock rise time	0.8 to 2.0V, with 15pF load	CLK		1		ns
t <sub>f</sub>	Output clock fall time	2.0 to 0.8V, with 15pF load	CLK		1		
Duty	Output clock duty cycle	At V <sub>CC</sub> /2	CLK	45	50	55	%
	PLL bandwidth <sup>(1)</sup>			10			kHz
	Period Jitter	100MHz~200MHz	CLK		80	100	ps

**Notes:**

1. Only reference for design
2. The phase relationship between input and output clocks can change at power up.

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



**Ordering Information**

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

**Notes:**

- Thermal characteristics can be found on the company web site at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)