

## PI6C3450

# **DLP Spread Spectrum Clock Synthesizer**

### **Product Features**

- 3.3V operation voltage
- 27 MHz reference input
- Selectable CPU clock output with Spread Spectrum
- Selectable video clock output
- Synthesized error versus target 0 ppm
- 6-pin SOT23 Package
- Commercial temperature 0°C to +70°C

## Description

The PI6C3450 is a clock signal synthesizer with Spread Spectrum function to minimize EMI interference. By using a 27 MHz reference clock or crystal as input, the PI6C3450 generates a CPU clock and a video clock.

Spread Spectrum control is selectable through external logic state setting. The small SOT23 package outline can save board size and is easy for layout.

PI6C3450 is one of many Pericom clock products. If you have application needs with clock input or output not specified here, please contact Pericom for further information.

#### **Block Diagram**



## **Pin Configuration**



## **Pin Description**

Pin Name	Pin No	ІО Туре	Descriptions
X1/REFIN	1	I/O	Crystal or reference clock input
GND	2	Ground	Ground
CLK_CPU/S0	3	I/O	S0 is activated during power on for logic state strapping and then switches to selected CPU clock output.
CLK_Video/S1	4	I/O	S1 is activated during power on for logic state strapping and then switches to selected video decoder clock output.
VDD	5	Power	Power Supply
X2/82	6	I/O	X2/S2 is a multiple function pin. S2 is activated during power on for logic state strapping and then switches to crystal input.

#### **Clock Control Selection Tables**

VDD =  $3.3V \pm 10\%$ , Ambient Temperature 0°C to +70°C

#### **CPU Clock Output Selection**

CLK_CPU	<b>S0</b>
50MHz	0
100MHz	1

#### **Video Decoder Clock Output Selection**

CLK_Video	S1
24.576MHz	0
20.25MHz	1

#### Spread Spectrum Ratio Selection for CPU Clock

S2	Spread
0	0 %
1	-0.5%



## **Electrical Specifications**

#### **Maximum Ratings**

Supply Voltage to Ground Potential
All Inputs and Outputs0.5V to $V_{DD}$ +0.5V
Storage Temperature65°C to +150°C
Junction Temperature
Soldering Temperature

**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 period may affect reliability.

#### **Recommended Operation Conditions**

Parameter	Min.	Тур.	Max.	Unit
Ambient Operating Temperature	0		+70	°C
Power Supply Voltage	+3.0		+3.6	V

#### **DC Characteristics** (VDD = $3.3V \pm 10\%$ , Ambient Temperature 0 to $+70^{\circ}$ C)

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
V <sub>DD</sub>	Operating Voltage		2.5	3.3	3.6	
V <sub>IH</sub>	Input High Voltage		2			
V <sub>IL</sub>	Input Low Voltage				0.8	
V <sub>OH_CPU</sub>	Output High Voltage for CLK_CPU	I <sub>OH</sub> = -14 mA	2.4			V
V <sub>OL_CPU</sub>	Output Low Voltage for CLK_CPU	$I_{OL} = 14 \text{ mA}$			0.5	
V <sub>OH VIDEO</sub>	Output High Voltage for CLK_VIDEO	$I_{OH} = -7 \text{ mA}$	2.4			
V <sub>OL VIDEO</sub>	Output Low Voltage for CLK_VIDEO	$I_{OL} = 7 \text{ mA}$			0.5	
I <sub>DD</sub>	Supply Current with all outputs activated	$C_L = 15 pF$		47	60	mA
Z <sub>OUT_up_CPU</sub>	Nominal Output Impedance for CLK_CPU	Up side buffer		22		
Z <sub>OUT_low_CPU</sub>	Nominal Output impedance for CLK_CPU	Low side buffer		22		
Z <sub>OUT_up_VIDEO</sub>	Nominal Output Impedance for CLK_VIDEO	Up side buffer		43		Ω
Z <sub>OUT_low_VIDEO</sub>	Nominal Output impedance for CLK_VIDEO	Low side buffer		43		
Cin	Input Capacitance	Input pins		5		pF



Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
$f_{in}$	REFIN Input Frequency			27		MHz
t <sub>Rise_CPU</sub>	Output Clock Rise Time for CLK_CPU	20% to 80% VDD, 15 pF load		1		
t <sub>Fall_CPU</sub>	Output Clock Fall Time for CLK_CPU	80% to 20% VDD, 15 pF load		1.3		
t <sub>Rise_Video</sub>	Output Clock Rise Time for CLK_Video	20% to 80% VDD, 15 pF load		2.2		IIS
t <sub>Fall_Video</sub>	Output Clock Fall Time for CLK_Video	80% to 20% VDD, 15 pF load		2.6		
T <sub>dcin</sub>	Input Clock Duty Cycle	REFIN/X1	20	50	80	0/
T <sub>dcout</sub>	Output Clock Duty Cycle	Measured at V <sub>DD</sub> /2	45	50	55	70
Tj_short	Short term jitter	Cycle to cycle		250	350	ps
$\Delta f/f$	Actual mean frequency error versus target	Input frequency = 27 MHz Output frequency = CLK_CPU or CLK_Video		0		ppm

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

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



## **Application Information**

#### **Reference Circuits**



#### Notes:

- 1. PI6C3450 accepts two kinds of clock input, a system clock generator reference and a crystal.
- 2. Power pin decoupling capacitors should be placed close to VDD pin and avoid using via at VDD
- 3. Logic state strapping:

Pin 3 (CLK\_CPU/S0), Pin 4(CLK\_Video/S1) and Pin 6 (X2/S2) provide logic state strapping function. When strapping resistor connects to VDD, the selection pins of S0, S1 or S2 will set to logic HIGH. When strapping resistor connects to GND, the selection pins of S0, S1 or S2 will set to logic LOW.

4. Strapping logic for spread spectrum is set to ON or OFF through S2.

#### **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 the formula:  $C_{Ltrim} = 2*C_L - (C_s + C_i)$ . Typically,  $C_{Ltrim} = 28pF$  when crystal load = 18pF, stray capacitance  $C_s = 3pF$ , and XTAL pins capacitance = 5pF.





## **Recommended Crystal Specifications**

(Pericom recommends NYP27.0000-18GGC-E crystal for optimum performance.)

Parameter	Value	Unit
Mode of oscillation, cut	Fundamental, AT	
Frequency	27.0000	MHz
Frequency Tolerance	±30	PPM
Temperature stability (-20°C to +70°C)	±30	PPM
Load Capacitance	18	pF
Equivalent series resistance	20	Ω
Size = Length x Width x Height	11.18(.440) x 4.65(.183) x 13.46(.530)	mm(inch)





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Note:

· For latest package info, please check: http://www.pericom.com/products/packaging/mechanicals.php

# **Ordering Information** <sup>(1, 2, 3)</sup>

Ordering Code	Package Code	Package Description
PI6C3450TEX	Т	Pb-free & Green, 6-pin, SOT23

#### 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

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