Low Cost 3V 8-Pin CPU Frequency Generator

Features

- 3V version of PI6C9107U-05
- Generate popular CPU clocks — 40, 50, 66.6, 80 MHz, and the reference clock 14.318 MHz
- Generate all the CPU Clocks for 286, 386, 486, and Pentium CPU
- Replace two crystal oscillators, for cost savings and board space savings
- On-chip loop filter — no external loop filter circuit.
- Low power CMOS technology
- ESD protection exceeds 2000V
- Package available:
  - 8-pin 300 mil wide DIP (P8)
  - 8-pin 150 mil wide SOIC (W8)

General Description

The PI6C9108-05 CPU clock generator provides a small footprint solution for generating two simultaneous clocks. The first clock CLK1 is user selectable from one of the four popular CPU frequencies, by selecting two selection signals FS1 and FS0. The second clock REFCLK is a fixed clock frequency, identical to the input reference clock.

The device includes on-chip loop filter circuit, for simplifying the board design. An external loop filter circuit is no longer needed. The output drive characteristics are also improved.

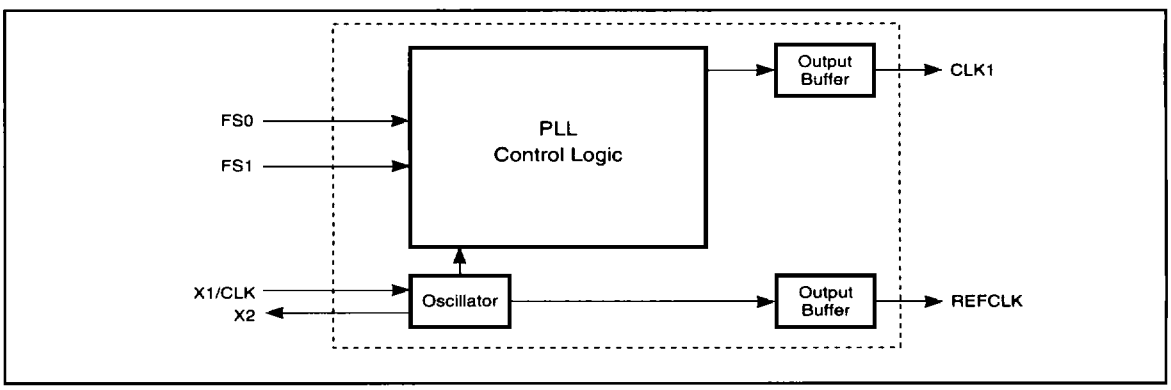
Enhanced versions with customized frequencies and features are also available. Contact factory for the enhanced versions.

Applications

CPU — The PI6C9108-05 is an ideal substitute for metal-can oscillators, for cost savings and board space savings. It offers additional features of reducing the operating clock speeds for saving power of the entire computer while the computer is idling. This feature cannot be accomplished by metal-can oscillators. A smooth, jitter-free frequency transition is provided for the CPU clock during slow down and speed up. The frequency transition rates are meeting the specifications of all 386DX, 386SX, 486DX, 486DX2, and 486SX.

Peripherals — The device is also an ideal substitute for metal-can oscillators on disk drive controllers, laser printer controllers, and other peripherals controllers. Contact factory for the custom frequencies required.

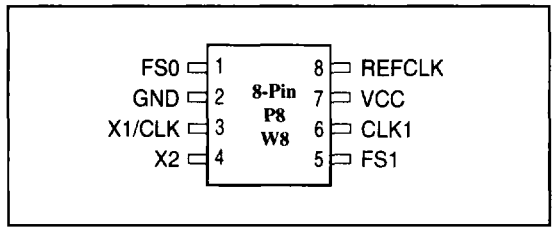
Block Diagram



PI6C9108-05 Decoding Table, 14.318 MHz Input

FS_1	FS_0	CLK_1
0	0	40 MHz
0	1	50 MHz
1	0	66.6 MHz
1	1	80 MHz

Product Pin Configuration, PI6C9108-05



PI6C9108-05 Product Pin Description

Pin Name	Pin Number	Pin Type	Description
FS_0	1	Input	Frequency Select 0 for CLK_1
FS_1	5	Input	Frequency Select 1 for CLK_1
GND	2	—	Digital Ground
X_1/ICLK	3	Input	Crystal Input or Input Clock frequency. Typically 14.318 MHz system clock
X_2	4	Output	Crystal Output (No Connect when clock used)
CLK_1	6	Output	Clock1 Output (see matrix tables)
V_{DD}	7	—	Digital power supply (+3V DC)
REFCLK	8	Output	Reference Clock output. Produces a buffered version of the input clock or crystal frequency (typically 14.318 MHz)

Maximum Ratings

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

Storage Temperature	–65°C to +150°C
Ambient Temperature with Power Applied	0°C to +70°C
Supply Voltage to Ground Potential (Inputs & V_{DD} Only)	–0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +7.0V
DC Output Current	120 mA
Operating Range: Ambient Temperature	0°C to +70°C
Power Dissipation	0.5W

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.

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ACTUAL FREQUENCIES

PI6C9108-05 Decoding Table, 14.318 MHz Input

FS_1	FS_0	CLK_1
0	0	40.01 MHz
0	1	50.11 MHz
1	0	66.82 MHz
1	1	80.01 MHz

DC Electrical Characteristics at 3.3V (Operating Range, V_{DD} = +3.3V ±0.3V, Temperature 0°C to +70°C)

Parameters	Description	Test Conditions		Min.	Typ.	Max.	Units
V_{OH}	Output HIGH Voltage	V_{DD} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OH} = –4 mA	2.4			V
V_{OL}	Output LOW Voltage	V_{DD} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OL} = 8 mA			0.4	V
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level,	V_{DD} = 3.3V	2.0			V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	V_{DD} = 3.3V			0.8	V
I_{IH}	Input HIGH Current	V_{DD} = Max., V_{IN} = V_{DD}				5	µA
I_{IL}	Input LOW Current	V_{DD} = Max., V_{IN} = 0V				–5	µA
I_{CC}	Supply Current[1]				10	20	mA
F_D	Output Freq. Change[2]	With Respect to Typical Frequency			0.002	0.01	%
C_I	Input Capacitance	Except X1, X2				10	pF
C_L	Load Capacitance	Pins X1, X2			20		pF

Notes:
1. PI6C9108-05 with no load, with 14.318 MHz crystal input and CLK1 running at 40 MHz.
   Power supply current varies with frequency. Consult factory for actual current at different frequencies.
2. Over Supply and Temperature.

AC Electrical Characteristics at 3.3V (Operating Range, V_{DD} = +3.3V ±0.3V, Temperature 0°C to +70°C)

Parameters	Description	Test Conditions	Min.	Typ.	Max.	Units
ICLK$_R$	Input Clock Rise Time				20	ns
ICLK$_F$	Input Clock Fall Time				20	ns
t_R	Output Rise Time, 0.8V to 2.0V	15 pF Load			2	ns
t_R	Rise Time, 20% to 80% V_{CC}	15 pF Load		2	4	ns
t_F	Output Fall Time, 2.0V to 0.8V	15 pF Load			2	ns
t_F	Fall Time, 80% to 20% V_{CC}	15 pF Load			4	ns
d_T	Duty Cycle, CPU	15 pF Load	40	50/50	60	%
T_{JIS}	Jitter, 1 Sigma	All Frequencies		±0.5	±2	%
T_{JABS}	Jitter, Absolute	Above 16 MHz		±3	±5	%
t_{FT}	Frequency Transition Time[1]				20	ms
t_{PU}	Power Up Time[1]				2	ms

Note:
1. Guaranteed by design only.