Precision Clock Generator

Features

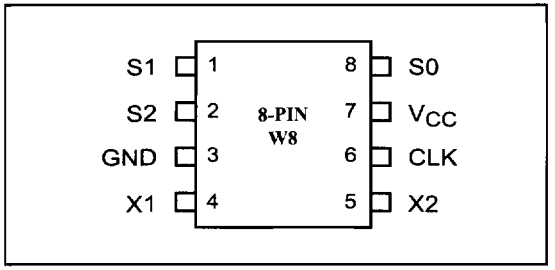
- Optimized for crystal-can oscillator applications
- Generate clock signal at a very low jitter rate
  – competitive with crystal can-oscillator
- Excellent signal quality:
  – minimal undershoot, ringback, and overshoot
  – nearly perfect 50% duty cycle
- Use a low cost crystal of 14.318 MHz or other crystal frequency
- Lower cost replacement for crystal can-oscillators above 50 MHz frequencies.
- Operate at Vcc = 5V
- Package available:
  – 8-pin 150-mil wide, 50-mil pin-pitch, plastic SOIC (W8)

Description

The PI6C951-01 clock generator produces a clock output at a very low jitter rate, competitive with crystal can-oscillator. This clock generator is optimized for crystal-can oscillator applications. The clock output signal has a minimal undershoot, ringback, and overshoot. A 2X clock is internally generated then divided by two, therefore the clock output's duty cycle is nearly perfect 50%.

A high precision clock frequency output is produced either from a low cost crystal of 14.318 MHz or other low frequency crystals. An 8-pin SOIC package with 150-mil body width and 50-mil pin-pitch occupies a very tiny area. This part offers a lower cost solution as compared with crystal-can oscillators of above 50 MHz frequencies. At a higher frequency this part offers further cost savings.

Product Pin Configuration



Output CLK Frequency Selection

Selection	Crystal Freq	CLK Freq. Samples	
S2, S1, S0	Multiplier	14.318 MHz Crystal	22.6 MHz Crystal
001	2.80	40 MHz	63 MHz
010	3.50	50 MHz	79 MHz
011	5.60	80 MHz	126 MHz
100	4.66	66.6 MHz	105 MHz
101	7.00	100 MHz	158 MHz

Product Pin Description

Pin Name	I/O	Description
S0	I	Select 0, Internal Pull-up
S1	I	Select 1, Internal Pull-up
S2	I	Select 2, Internal Pull-up
X1	C	Crystal Connection, 10 MHz to 32 MHz
X2	C	Crystal Connection
CLK	O	Clock Output

Note:

1. I = Input
   O = Output
   C = Connection

Product Speed Grades

Part No.	Max CLK Output Freq.
PI6C951-01	80 MHz
PI6C951-01A	120 MHz
PI6C951-01C[1]	158 MHz

Note:

1. The operating Vcc should be within the +4.75V to +5.25V range above the 120 MHz clock generation.

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 & Vcc Only)	–0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +7.0V
DC Input Voltage	–0.5V to +7.0V
DC Output Current	120mA
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.

DC Electrical Characteristics at 5V[1] (Operating Range, V_{CC} = +4.5V to +5.5V, Temperature 0°C to +70°C)

Symbol	Description	Test Conditions		Min.	Typ.	Max.	Units
V_{OH}	Output HIGH Voltage	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OH} = –8mA	2.4	—	—	V
V_{OL}	Output LOW Voltage	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OL} = 8mA	—	—	0.4	V
V_{IH}	Select Input HIGH Voltage	Guaranteed Logic HIGH Level	V_{CC} = 5V	2.0	—	—	V
V_{IL}	Select Input LOW Voltage	Guaranteed Logic LOW Level	V_{CC} = 5V	—	—	0.8	V
I_{IH}	Select Input HIGH Current	V_{CC} = Max., V_{IN} = V_{CC}		—	—	5	µA
I_{IL}	Select Input LOW Current	V_{CC} = Max., V_{IN} = 0V		—	—	–5	µA
I_{CC}	Supply Current[2]			—	10	20	mA
F_D	Output Freq. Change[3]	With Respect to Typical Frequency		—	0.002	—	%
C_L	Load Capacitance	Pins X1, X2		—	20	—	pF

Notes:
1. Vcc requirement:
   PI6C951-01C = 5.0V ±5%.
   PI6C951-01 = 5.0V ±10%.
   PI6C951-01A = 5.0V ±10%.
2. PI6C951 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.
3. Over the temperature. Guaranteed by design only.

AC Electrical Characteristics at 5V (Operating Range, V_{CC} = +4.5V to +5.5V, Temperature 0°C to +70°C)

Symbol	Description	Test Conditions	Min.	Typ.	Max.	Units
d_T	Duty Cycle, CPU	15 pF Load	45	50/50	55	%
T_{JIS}	Jitter, 1 Sigma	All Frequencies	—	±0.2	—	%

Note:
1. Guaranteed by design only.