3.3V Fast CMOS Clock Driver

Product Features

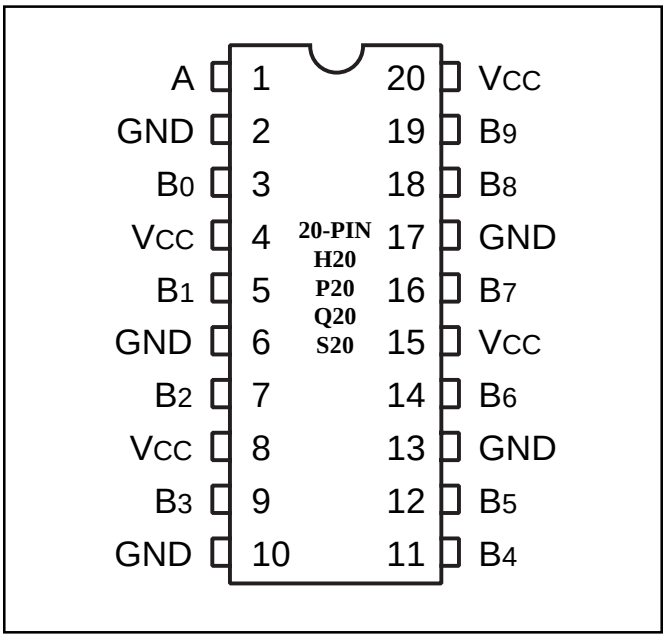
- 3.3V version of PI49FCT807
- Ultra low skew: 0.35ns
- Low input capacitance
- Minimum duty cycle distortion
- 1:10 fanout
- High speed: 3.5ns propagation delay
- TTL input and CMOS output compatible
  – V_{OH} = 3.3V (typ.)
  – V_{OL} = 0.3V (typ.)
- Industrial operation at –40°C to +85°C
- Packages available:
  – 20-pin 300 mil wide DIP (P20)
  – 20-pin 300 mil wide SOIC (S20)
  – 20-pin 150 mil wde QSOP (Q20)
  – 20-pin 209 mil wde SSOP (H20)
- Device models available on request

Product Description

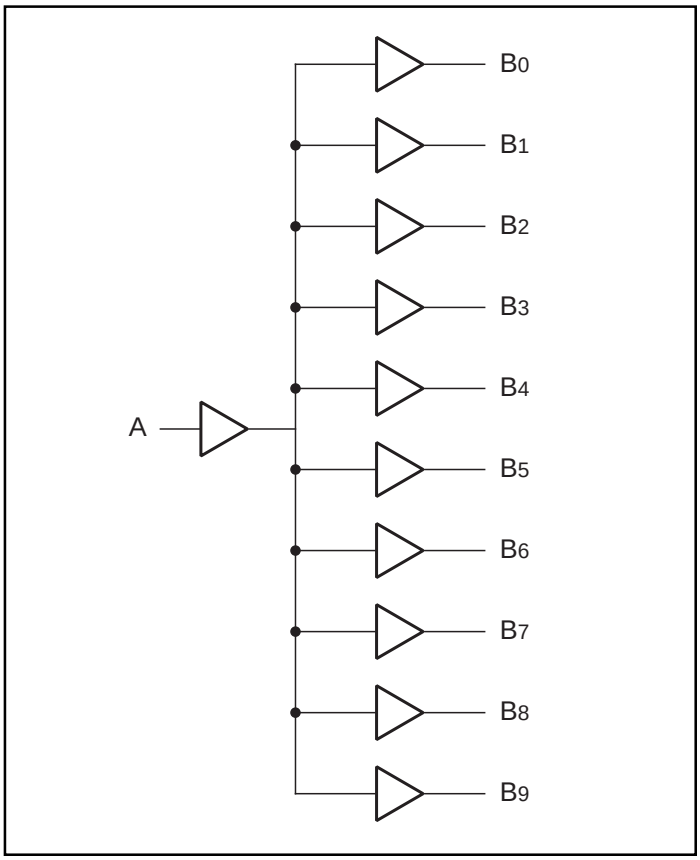
Pericom Semiconductor's PI49FCT series of logic circuits are produced in the Company's advanced 0.6 micron CMOS technology, achieving industry leading speed grades.

The PI49FCT3807 is a 3.3V 1-to-10 clock driver. This low skew clock driver features one input and ten outputs fanout. The large fanout from a single input line reduces loading on input clock. TTL level outputs reduce noise levels on the part. Typical applications are clock and signal distribution.

Product Pin Configuration



Logic Block Diagram



Product Pin Description

Pin Name	Description
A	Input
B0-B9	Outputs
GND	Ground
VCC	Power

Maximum Ratings

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

Storage Temperature	–40°C to +85°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	120 mA
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.

Operating Range

Ambient Temperature = -40°C to +85°C Vcc = 3.3V ± 0.3V

DC Electrical Characteristics (Over the Operating Range)

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
V_{OH}	Output HIGH Voltage	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OH} = –0.1mA I_{OH} = –8mA	V_{CC}–0.2 2.4[3]	— 3.0	—	V
V_{OL}	Output LOW Voltage	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OL} = 0.1mA I_{OL} = 16mA I_{OL} = 24mA	— — —	— 0.2 0.3	0.2 0.4 0.5	V
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level (Input Pins)		2.0	—	5.5	V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level (Input Pins)		–0.5	—	0.8	V
I_{IH}	Input HIGH Current	V_{CC} = Max.	V_{IN} = V_{CC}	—	—	1	µA
I_{IL}	Input LOW Current	V_{CC} = Max.	V_{IN} = GND	—	—	–1	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA		—	–0.7	–1.2	V
I_{ODH}	Output HIGH Current	V_{CC} = 3.3V, V_{IN} =V_{IH} or V_{IL}, V_{OUT} = 1.5V[4]		–35	–60	–110	mA
I_{ODL}	Output LOW Current	V_{CC} = 3.3V, V_{IN} =V_{IH} or V_{IL}, V_{OUT} = 1.5V[4]		50	90	200	mA
I_{OS}	Short Circuit Current[5]	V_{CC} = Max., V_{OUT} = GND[5]		–60	–135	–240	mA
V_H	Input Hysteresis			—	150	—	mV

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 3.3V, +25°C ambient and maximum loading.
3. V_{OH} = V_{CC} – 0.6V at rated current.
4. This parameter is determined by device characterization but is not production tested.
5. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.

Power Supply Characteristics

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}	—	3	30	µA
ΔI_{CC}	Supply Current per Inputs @ TTL HIGH	V_{CC} = Max.	V_{IN} = V_{CC} – 0.6V[3]	—	2.0	300	µA
I_{CCD}	Supply Current per Input per MHz[4]	V_{CC} = Max., Outputs Open Per Output Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND	—			mA/ MHz

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at Vcc = 3.3V, +25°C ambient.
3. Per TTL driven input (V_{IN} = V_{CC} – 0.6V); all other inputs at Vcc or GND.
4. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
5. Values for these conditions are examples of the I_C formula. These limits are guaranteed but not tested.

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters[1]	Description	Test Conditions	Typ	Max.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	4.5	6.0	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	5.5	8.0	pF

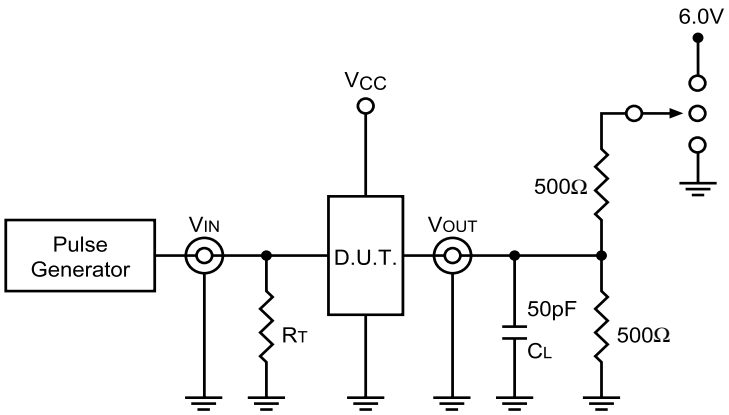
Notes:
1. This parameter is determined by device characterization but is not production tested.

Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	3807 Com. Min	3807 Com. Max	3807A Com. Min	3807A Com. Max	3807B Com. Min	3807B Com. Max	3807C Com. Min	3807C Com. Max	Unit
t_{PLH} t_{PHL}	Propagation Delay A to Bn	C_L = 50pF R_L = 500Ω	1.5	4.5	1.5	4.0	1.5	3.8	1.5	3.5	ns
$t_{SK(o)}$	Skew between two outputs of same package[3]		—	0.5	—	0.5	—	0.35	—	0.35	ns
$t_{SK(p)}$	Skew between opposite transitions of same output ($\lvert t_{PHL} - t_{PLH} \rvert$)[3]		—	0.5	—	0.5	—	0.35	—	0.35	ns
$t_{SK(t)}$	Skew between outputs of different package at same power supply, temperature and speed grade[3]		—	1.0	—	1.0	—	0.75	—	0.75	ns

Notes:
1. See test circuit and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. This parameter is guaranteed but not tested.

Tests Circuits For All Outputs[1]



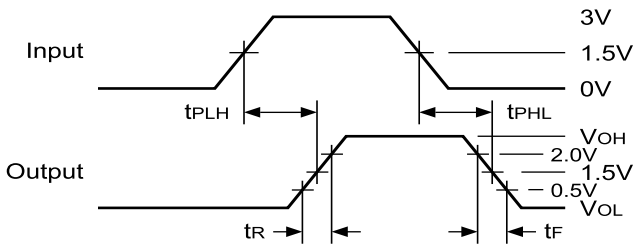
Switch Position

Test	Switch
Disable LOW Enable LOW	6V
Disable HIGH Enable HIGH	GND
All Other Inputs	Open

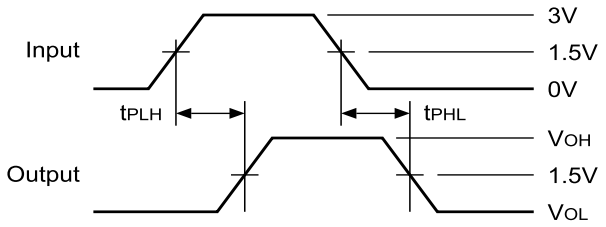
DEFINITIONS:
C$_L$ = Load capacitance: includes jig and probe capacitance.
R$_T$ = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

SWITCHING WAVEFORMS

Propagation Delay

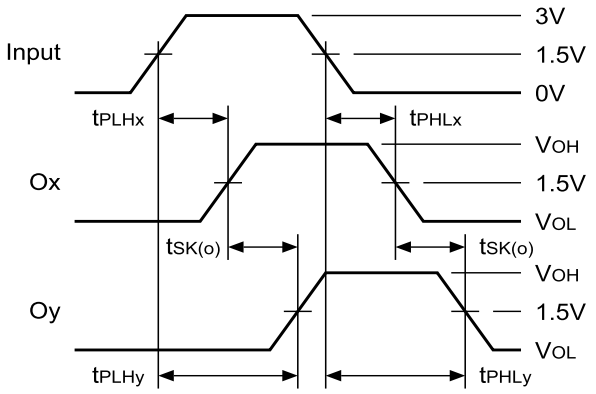


Pulse Skew – $t_{SK(p)}$



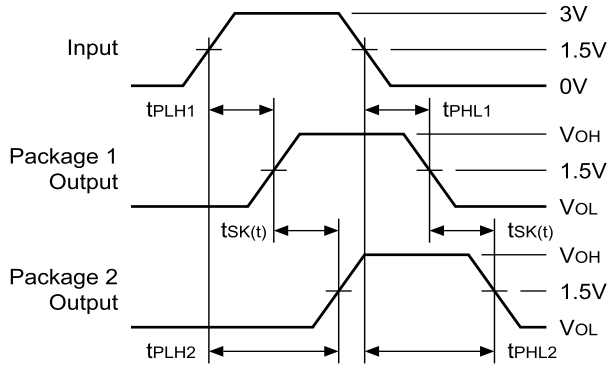
$t_{SK(p)} = |t_{PHL} - t_{PLH}|$

Output Skew – $t_{SK(o)}$



$t_{SK(o)} = |t_{PLHy} - t_{PLHx}|$ or $|t_{PHLy} - t_{PHLx}|$

Package Skew – $t_{SK(t)}$



$t_{SK(t)} = |t_{PLH2} - t_{PLH1}|$ or $|t_{PHL2} - t_{PHL1}|$

Ordering Information

Ordering Code	Package Type
PI49FCT3807-P20	20-pin 300 mil wide DIP
PI49FCT3807-S20	20-pin 300 mil wide SOIC
PI49FCT3807-Q20	20-pin 150 mil wide QSOP
PI49FCT3807-H20	20-pin 209 mil wide SSOP