

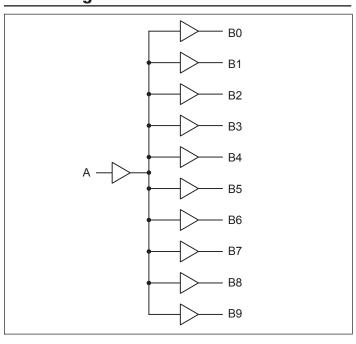


3.3V Fast CMOS Clock Driver

Description

The DIODES 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 reduced loading on input clock. TTL level outputs reduce noise levels on the part. Typical applications are clock and signal distribution.

Block Diagram



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
- TTL Input and CMOS Output Compatible
 - VOH = 3.3V (typical)
 - VOL = 0.3V (typical)
- Industrial Temperature: -40°C to +85°C
- $3.3V \pm 10\%$ Operation
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative.

https://www.diodes.com/quality/product-definitions/

- Packaging (Pb-free & Green):
 - 20-pin 150-mil wide QSOP (Q)
 - 20-pin 209-mil wide SSOP (H)

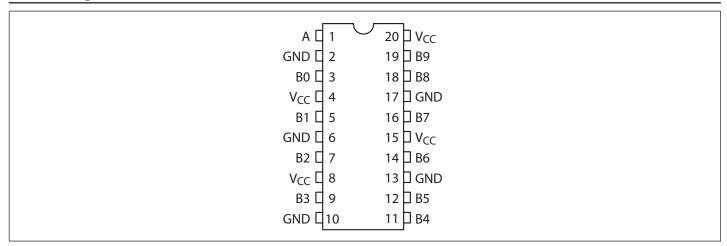
Notes

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.





Pin Configuration



Pin Description

Pin #	Pin Name	Type	Description
1	A	I	Input Clock
3	В0	О	Output Clock
5	B ₁	О	Output Clock
7	B ₂	О	Output Clock
9	В3	О	Output Clock
11	B ₄	О	Output Clock
12	B ₅	О	Output Clock
14	В6	О	Output Clock
16	B ₇	О	Output Clock
18	B ₈	О	Output Clock
19	В9	О	Output Clock
2, 6, 10, 13, 17	GND	Ground	Ground Supply
4, 8, 15, 20	V _{CC}	Power	Power Supply





Maximum Ratings

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

Storage Temperature65°C to +150°C
Ambient Temperature with Power Applied—40°C to +85°C
Supply Voltage to Ground Potential (Inputs & V _{CC} Only)–0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only) –0.5V to +7.0V
DC Input Voltage0.5V to +7.0V
DC Output Current
Power Dissipation
Latchup
ESD Protection (Input)
Junction 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 periods may affect reliability.

DC Electrical Characteristics

 $T_A = -40$ °C to +85°C $V_{CC} = 3.3V \pm 0.3V$

Symbol	Parameter	Test Condition ⁽¹⁾		Min.	Тур.	Max.	Units
V _{OH}	Output High Voltage	V_{CC} = Min., V_{IN} = V_{IL} or V_{IH}	$I_{OH} = -0.1 \text{mA}$ $I_{OH} = -8 \text{mA}$	V _{CC} - 0.2 2.4	3.0		
V _{OL}	Output Low Voltage	V_{CC} = Min., V_{IN} = V_{IL} or V_{IH} I_{OH} = 0.1mA I_{OH} = 16mA I_{OH} = 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_{IL}	Input Low Voltage	Guaranteed Logic LOW Level (Input pins)		-0.5		0.8	
I_{IH}	Input High Current	$V_{CC} = Max.$ $V_{IN} = V_{CC}$				1	4
I_{IL}	Input Low Current	$V_{CC} = Max.$	$V_{CC} = Max.$ $V_{IN} = GND$			-1	μΑ
V _{IK}	Clamp Diode Voltage	$V_{CC} = Min., I_{IN} = -18mA$			-0.7	-1.2	V
I _{OH}	Output HIGH Current ^(4,5)	$V_{OUT} = 1.5V$, $V_{IN} = V_{IL}$ or V_{IH} , $V_{CC} = 3.3V$		-35	-60	-110	
I _{OL}	Output LOW Current (4,5)	$V_{OUT} = 1.5V$, $V_{IN} = V_{IL}$ or V_{IH} ,	50	90	200	mA	
I _{OS}	Short Circuit Current (4,5)	V _{CC} = Max., V _{OUT} = GND		-60	-135	-240	
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 $V_{CC} = 3.3V$, $+25^{\circ}C$ 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.	$V_{IN} = GND \text{ or } V_{CC}$		3	30	
ΔI_{CC}	Supply Current per Inputs @ TTL HIGH	V _{CC} = Max.	$V_{IN} = V_{CC} \ 0.6 V^{(3)}$		2.0	300	μΑ
I _{CCD}	Supply Current per Input per MHz ⁽⁴⁾	V _{CC} = Max., Outputs OpenPer Output Tog- gling 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 $V_{CC} = 3.3V$, +25°C ambient.
- 3. Per TTL driven input ($V_{IN} = V_{CC} 0.6V$); all other inputs at V_{CC} 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	Тур	Max.	Units
C _{IN}	Input Capacitance	$V_{IN} = 0V$	4.5	6.0	F
C _{OUT}	Output Capacitance	$V_{OUT} = 0V$	5.5	8.0	pF

Notes:

Maximum Switching Characteristics

Over operating range

	Description	Test Conditions	3807 Com.		3087A Com.		3087B Com.		3807C Com.		Units
Symbol											
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
t _{PLH} t _{PHL}	Propagation Delay A to B _N		1.5	4.5	1.5	4.0	1.5	3.8	1.5	3.5	
t _{SK(O)}	Skew between two outputs of same package ⁽³⁾	$C_L = 15 pF$ $R_L = 500 \Omega$		0.5		0.5		0.5		0.5	ns
t _{SK(P)}	Skew between opposite transitions of the same output $(t_{PHL} - t_{PHL})^{(3)}$	Tt_ = 30002		0.5		0.5		0.35		0.35	
t_{DC}	Duty Cycle										
F _{IN}	Skew between outputs of different packages at the same power supply, temp. and speed grade ⁽³⁾			1.0		1.0		0.75		0.75	

Notes:

- 1. Other loading condition is described on page 4, "Test Circuits for All Outputs."
- 2. These parameters are guaranteed by design.
- 3. Minimum propagation delay of 1.5ns is guaranteed by design.

^{1.} This parameter is determined by device characterization but is not production tested.

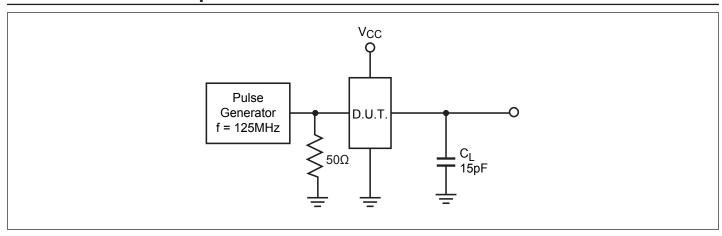




Phase Jitter Measurement Data

Frequency Band	Input	Output	Additive Jitter	Unit
12kHz-10MHz	342	483	341	fs _{RMS}
12kHz-20MHz	493	642	411	fs _{RMS}

Tests Circuits for All Outputs



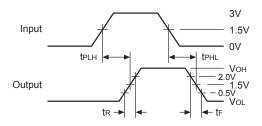
Switch Position

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

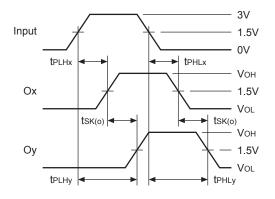


Switching Waveforms

Propagation Delay

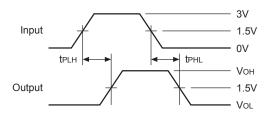


Output Skew - tsk(0)



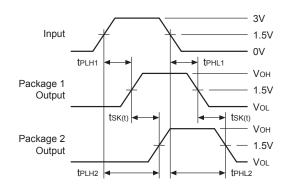
tsk(0) = |tPLHy - tPLHx| or |tPHLy - tPHLx|

Pulse Skew − tsk(p)



tsk(p) = |tPHL - tPLH|

Package Skew - tsk(t)



tsk(t) = |tplh2 - tplh1| or |tphl2 - tphl1|





Part Marking

H Package



D: Speed Code

YY: Year

WW: Workweek 1st X: Assembly Code 2nd X: Fab Code

Q Package



YY: Year

WW: Workweek

1st X: Assembly Code

2nd X: Fab Code

PI49FCT 3807QEB YYWWXX

B: Speed Code

YY: Year

WW: Workweek

1st X: Assembly Code

2nd X: Fab Code

D::

PI49FCT 3807QEC YYWWXX

C: Speed Code

YY: Year

WW: Workweek

1st X: Assembly Code

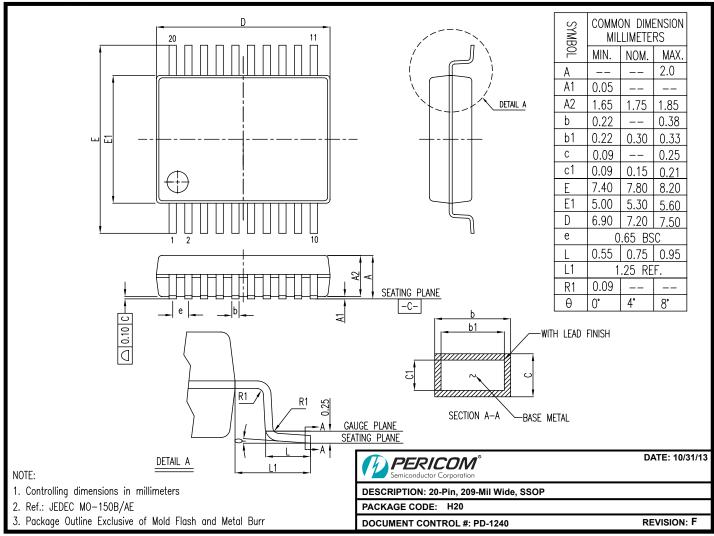
2nd X: Fab Code





Packaging Mechanical

20-SSOP (H)

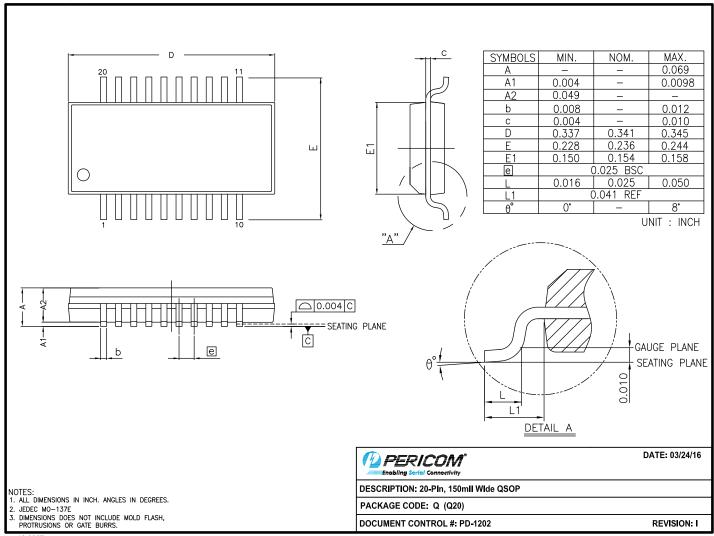


13-0214





20-QSOP (Q)



16-0057

For latest package info.

please check: http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/

Ordering Information

Ordering Code	Package Code	Speed Grade	Package Description
PI49FCT3807BQEX	Q	В	20-pin 150-mil QSOP
PI49FCT3807CQEX	Q	С	20-pin 150-mil QSOP
PI49FCT3807DHEX	Н	D	20-pin 209-mil SSOP
PI49FCT3807DQEX	Q	D	20-pin 150-mil QSOP
PI49FCT3807QEX	Q	Blank	20-pin 150-mil QSOP

Notes

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- 4. E = Pb-free and Green
- 5. X suffix = Tape/Reel





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