

PI49FCT32807

3.3V 1:10 CMOS Clock Driver

Features

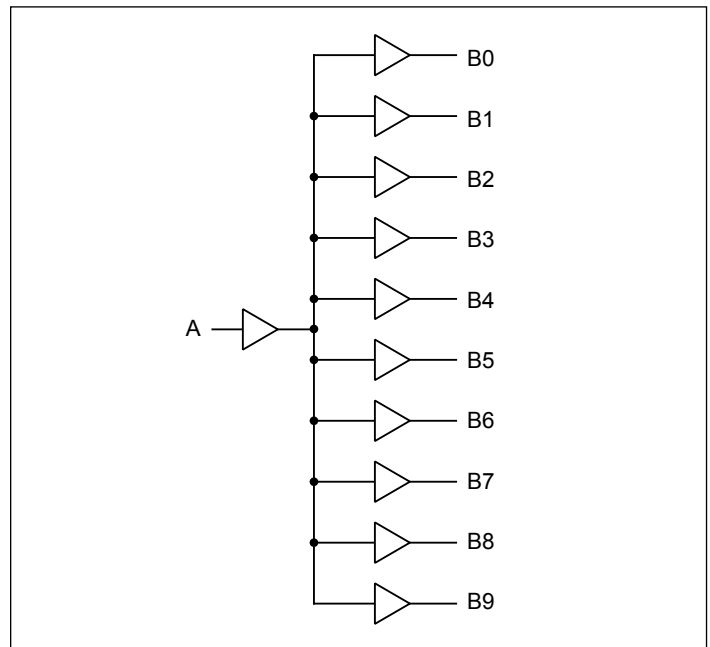
- Low skew: < 200ps
- Fast switching frequency >133 MHz
- Fast output rise/fall time < 1.5ns
- Low propagation delay < 2.5ns
- Low input capacitance < 6.0pF
- 5V I/O Tolerant input
- Rail-to-Rail CMOS outputs
- Industrial Temperature: -40°C to +85°C
- 3.3V ±10% operation
- Totally Lead-Free & Fully RoHS 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-Q100/101/200, 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)

Description

Diodes' PI49FCT32807 is a 3.3V very low-skew clock buffer that produces ten outputs from a single low-capacitance input. Excellent output signals to power and ground ratio minimize power and ground noise, and also improves output performance.

The PI49FCT32807 integrates series damping resistors on all outputs.

Block Diagram

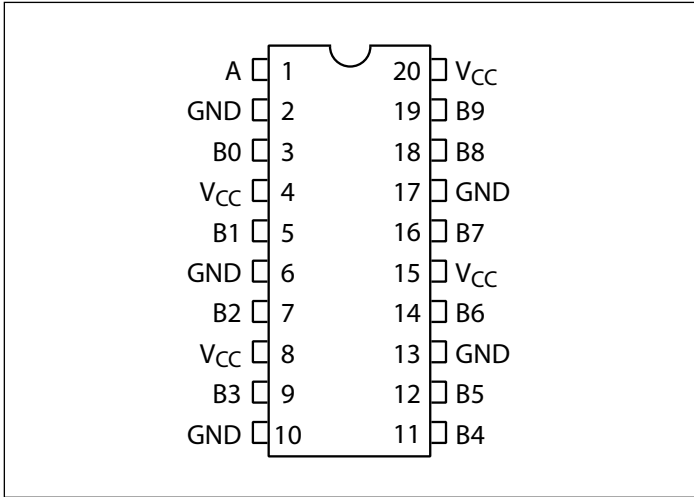


Notes:

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.

PI49FCT32807

Pin Configuration



Pin Description

Pin Name	Description
A	Input
B ₀ -B ₉	Outputs
GND	Ground
V _{CC}	Power

Maximum Ratings

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

Storage Temperature	-55°C to +150°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 Voltage	-0.5V to +7.0V
DC Output Current.....	120mA
Power Dissipation	0.5W
Latch up	200mA
ESD Protection (Input)	2000V min (HBM)
Junction Temperature.....	125°C Max.

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 (Over the Operating Range)

Symbol	Parameter	Test Condition ⁽¹⁾		Min.	Typ.	Max.	Units
V _{OH}	Output High Voltage	V _{CC} = 3V, V _{IN} = V _{IH} or V _{IL}	I _{OH} = -8mA	2.4	3.0		V
V _{OL}	Output Low Voltage	V _{CC} = 3V V _{IH} or V _{IL}	I _{OL} = 12mA		0.4	0.5	
V _{IH}	Input High Voltage	Guaranteed Logic HIGH Level (Input pins)		2.0		505	
V _{IL}	Input Low Voltage	Guaranteed Logic LOW Level (Input pins)		-0.5		0.8	
I _{IH}	Input High Current	V _{CC} = 3.6V	V _{IN} = 3.6V			1	μA
I _{IL}	Input Low Current	V _{CC} = 3.6V	V _{IN} = 0V			-1	
V _{IK}	Clamp Diode Voltage	V _{CC} = Min., I _{IN} = -18mA			-0.7	-1.2	V
I _{OH}	Output HIGH Current	V _{CC} = 3.3V, V _{IN} = V _{IL} or V _{IH} , V _{OUT} = 1.5V ⁽⁵⁾		-25	-45	-80	mA
I _{OL}	Output LOW Current	V _{CC} = 3.3V, V _{IN} = V _{IL} or V _{IH} , V _{OUT} = 1.5V ⁽⁵⁾		25	45	90	
I _{OS}	Short Circuit ⁽⁵⁾ Current	V _{CC} = Max., V _{OUT} = GND ⁽⁵⁾		-50	-100	-180	
V _H	Input Hysteresis				150		mV
R _S	Internal Series Resistor				22		Ω

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V_{CC} = 3.3V, +25°C ambient and maximum loading.
- V_{OH} = V_{CC} - 0.6V at rated current.
- This parameter is determined by device characterization but is not production tested.
- 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	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND or } V_{CC}$	—	0.1	30	μA
ΔI_{CC}	Supply Current per Inputs @ TTL HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = V_{CC} - 0.6\text{V}^{(3)}$	—	47	300	
I_{CCD}	Supply Current per Input per MHz ⁽⁴⁾	$V_{CC} = \text{Max.},$ Outputs Open Per Output Toggling 50% Duty Cycle	$V_{IN} = V_{CC}$ $V_{IN} = \text{GND}$	—	0.08	0.16	mA/ MHz

Notes:

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

Capacitance ($T_A = 25^\circ\text{C}$, $f = 1\text{ MHz}$)

Parameters ⁽¹⁾	Description	Test Conditions	Typ	Max.	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$	3.0	4	pF
C_{OUT}	Output Capacitance	$V_{OUT} = 0\text{V}$		6	

Notes:

- This parameter is determined by device characterization but is not production tested.

Maximum Switching Characteristics (Over operating range)

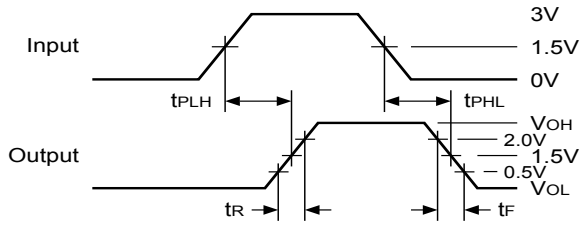
Symbol	Description	Condition	Max.	Units ⁽³⁾
t_{PLH} t_{PHL}	Propagation Delay A to B_N ⁽³⁾	$C_L = 15\text{pF}$	2.5	ns
t_R/t_F	Rise/Fall Time ⁽²⁾	0.8V - 2.0V	1.5	
$t_{SK(P)}$	Pulse Skew, same package ^(1,2)	$C_L = 15\text{pF}$	0.35	
$t_{SK(O)}$	Output Skew, same package ^(1,2)		0.20	
$t_{SK(I)}$	Package Skew, different package ^(1,2)		0.55	
F_{IN}	Input Frequency ^(1,2)		133	MHz

Notes:

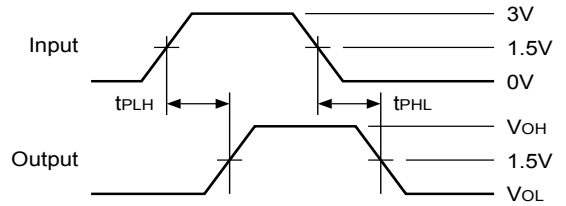
- Other loading condition is described on page 4, "Test Circuits for All Outputs."
- These parameters are guaranteed by design.
- Minimum propagation delay of 1.5ns is guaranteed by design.

Switching Waveforms

Propagation Delay

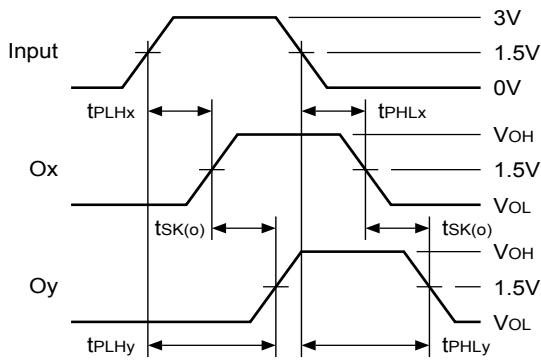


Pulse Skew – $t_{sk(p)}$



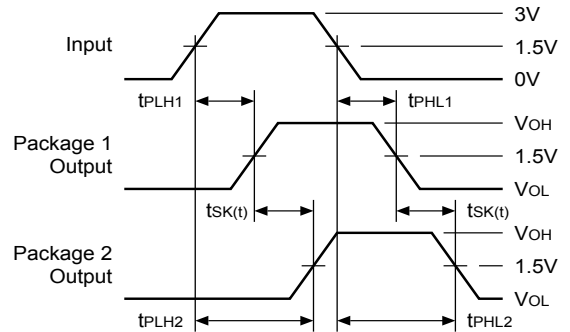
$$t_{sk(p)} = | t_{PHL} - t_{PLH} |$$

Output Skew – $t_{sk(o)}$



$$t_{sk(o)} = | t_{PLHy} - t_{PLHx} | \text{ OR } | t_{PHLy} - t_{PHLx} |$$

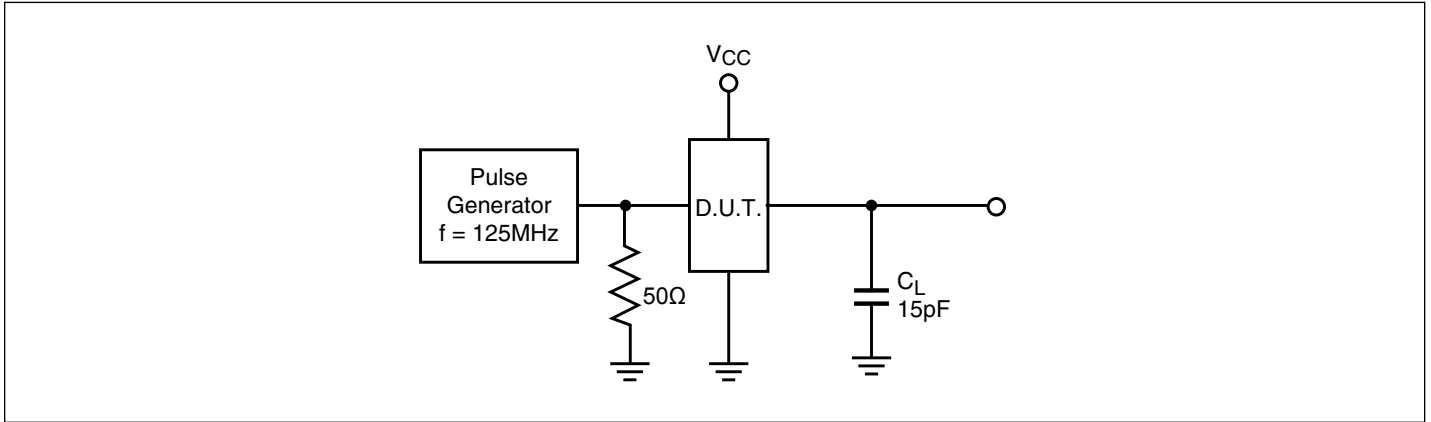
Package Skew – $t_{sk(t)}$




$$t_{sk(t)} = | t_{PLH2} - t_{PLH1} | \text{ OR } | t_{PHL2} - t_{PHL1} |$$

PI49FCT32807

Tests Circuits for All Outputs



Part Marking

	PI49FCT
	32807QE
	YYWWXX

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

PI49FCT32807

Packaging Mechanical: 20-QSOP (Q)

SYMBOLS	MIN.	NOM.	MAX.
A	—	—	0.069
A1	0.004	—	0.0098
A2	0.049	—	—
b	0.008	—	0.012
c	0.004	—	0.010
D	0.337	0.341	0.345
E	0.228	0.236	0.244
E1	0.150	0.154	0.158
e	0.025 BSC		
L	0.016	0.025	0.050
L1	0.041 REF		
θ°	0°	—	8°

UNIT : INCH

0.004 C

SEATING PLANE

GAUGE PLANE
SEATING PLANE

0.010

DETAIL A

PERICOM
Enabling Serial Connectivity

DATE: 03/24/16

DESCRIPTION: 20-Pin, 150mil Wide QSOP

PACKAGE CODE: Q (Q20)

DOCUMENT CONTROL #: PD-1202

REVISION: I

NOTES:
1. ALL DIMENSIONS IN INCH. ANGLES IN DEGREES.
2. JEDEC MO-137E
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

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	Package Description
PI49FCT32807QEX	Q	20-pin, 150-mil Wide (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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