PI49FCT3805D/E

3.3V, 2 x 1:5 CMOS Clock Driver

Features

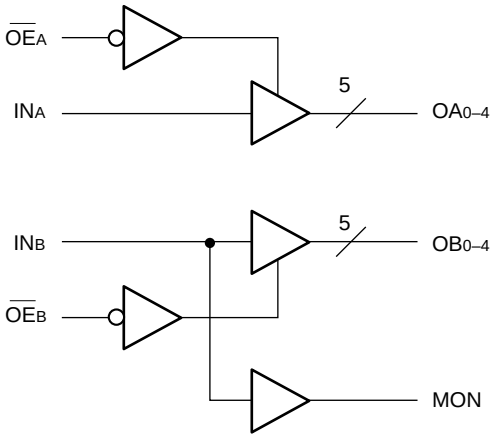
- Low output skew: <150ps
- Switching frequency of 166 MHz
- Fast output rise/fall time: <1.0ns
- Low propagation delay: <2.0ns
- Low input capacitance: <6.0pF
- Balanced CMOS outputs
- Industrial Temperature: –40°C to +85°C
- 3.3V ±10% operation
- Packages available:
  – 20-pin 300-mil wide SOIC (S)
  – 20-pin 150-mil wide QSOP (Q)
  – 20-pin 209-mil wide SSOP (H)
  – 20-pin 173-mil wide TSSOP (L)

Description

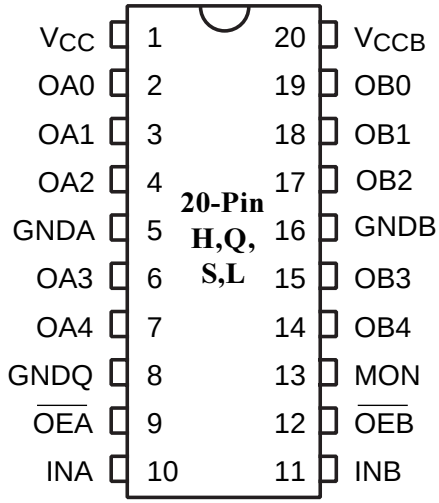
Pericom Semiconductor's PI49FCT series of logic circuits are produced using the Company's advanced submicron CMOS technology to achieve fast speed, low skew, fast slew rate, and low propagation delay for most computing and communication applications.

The PI49FCT3805D/E is composed of non-inverting drivers. The outputs are configured into 2 groups of one-in, five-out with independent output enable. Group B has an extra MON output. Excellent output signals to power and ground ratio minimize power and ground noise and also improves output performance.

Logic Block Diagram



Pin Configuration



Product Pin Description

Pin Name	Description
$\overline{OE}$A, $\overline{OE}$B	Hi-Z State Output Enable Inputs (Active LOW)
INA, INB	Clock Inputs
OAN, OBN	Clock Outputs
MON	Monitor Output
GND	Ground
Vcc	Power

Truth Table[1]

Inputs		Outputs	
$\overline{OE}$a, $\overline{OE}$b	INa, INb	OAn, OBn	MON
L	L	L	L
L	H	H	H
H	L	Z	L
H	H	Z	H

Note: H = High Voltage Level
L = Low Voltage Level Z = High Impedance

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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	–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 & I/O Only)	–0.5V to +V_{CC} +0.5V
DC Input Voltage	–0.5V to +4.6V
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.

Operating Range

Ambient Temperature = –40°C to +85°C, V_{CC} = 3.3V ± 0.3V

DC Electrical Characteristics (Over the Operating Range)

Symbol	Description	Test Conditions[1]		Min.	Typ.[2]	Max.	Units
V_{OH}	Output high voltage V_{CC} = Min. V_{IN} = V_{IL} or V_{IH}	I_{OH} = –0.1mA I_{OH} = –8mA I_{OH} = –12mA		V_{CC}-0.2 2.4[3] 2.4[3]	– 3.0 3.0	– – –	V
V_{OL}	Output low voltage V_{CC} = Min. V_{IN} = V_{IL} or V_{IH}	I_{OH} = 0.1mA I_{OH} = 8mA I_{OH} = 12mA		– – –	– 0.2 0.3	0.2 0.4 0.4	
V_{IH}	Input high voltage	LOW logic		2.0	–	5.5	
V_{IL}	Input low voltage	HIGH logic		–0.5	–	0.8	
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	
I_{OZH} I_{OZL}	High impedance output current	V_{CC} = Max, all outputs disabled	V_{OUT} = V_{CC} V_{OUT} = GND	– –	– –	1 –1	
V_{IK}	Clamp diode voltage	V_{CC} = Min., I_{IN} = –18mA		–	–0.7	–1.2	V
I_{OH}	Output HIGH[4] current	V_{OUT} = 1.5V, V_{IN} = V_{IL} or V_{IH}, V_{CC} = 0V		–45	–74	–180	mA
I_{OL}	Output LOW[4] current	V_{OUT} = 1.5V, V_{IN} = V_{IL} or V_{IH}, V_{CC} = 0V		50	90	200	
I_{OS}	Short circuit[5] current	V_{CC} = Max.		–60	–135	–240	

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°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.

Capacitance (T_A = 25°C, f = 1 MHz)

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

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

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}	—	0.1	30	µA
I_{CC}	Dynamic Supply Current	V_{CC} = 3.6V, No Load	10MHz	—	12		mA
			67MHz		81		
			80MHz		86		
			100MHz		93		
			110MHz		110		
			150MHz		159		
ΔI_{CC}	Supply Current per Inputs @ TTL High	V_{CC} = Max.	V_{IN} = GN_D–0.6V(3)	—	110	300	µA

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.

Switching Characteristics over Operating Range

Symbol	Description	Condition[2]	3805D Max.[1]	3805E Max.[1]	Units
t_{PLH} t_{PHL}	Propagation Delay IN_n to O_n	CL = 15pF 133MHz for 3805D 166MHz for 3805E	3.0	2.0	ns
t_R/t_F	Rise/Fall Time 0.8V ~ 2.0V		1.5	1.0	
$t_{SK(p)}$	Pulse Skew		270	200	ps
$t_{SK(o)}$	Output Skew		270	150	
$t_{SK(t)}$	Package Skew		550	500	
t_{ZL}, t_{ZH}, t_{LZ}, t_{HZ}	Enable/Disable Time		5.2	5.0	ns
F_{MAX}	Input Frequency		133	166	MHz

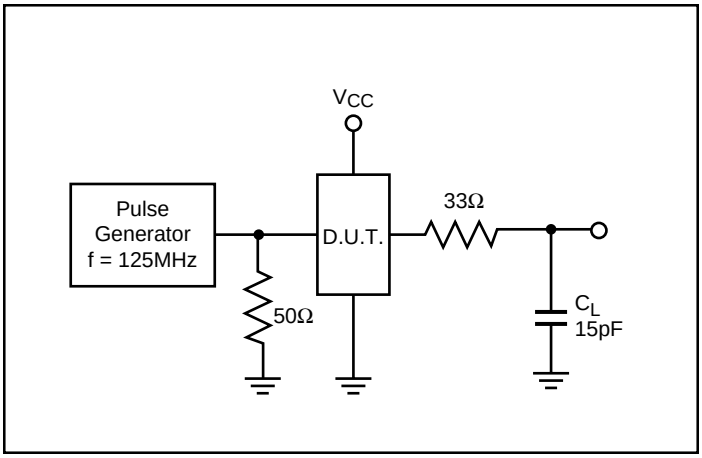
Note:
1. These parameters are guaranteed by design
2. Series Resistor loading = 33ohms (See Test Circuit)

Switch Position

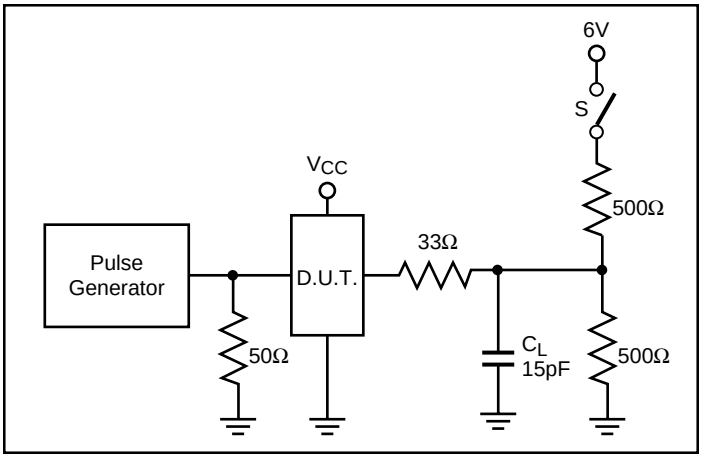
Test	Switch
Disable LOW Enable LOW	6V
Disable HIGH Enable HIGH	GND
All Other Inputs	Open

Definitions:
C_L = Load capacitance: includes jig and probe capacitance.
R_T = Termination resistance: should be equal to ZOUT of the Pulse Generator.

Tests Circuit

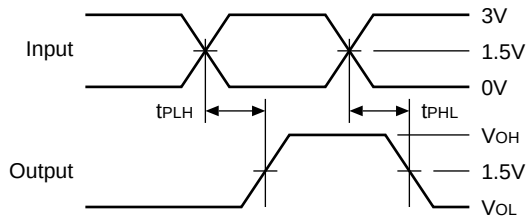


Enable/Disable Time Test Set-Up

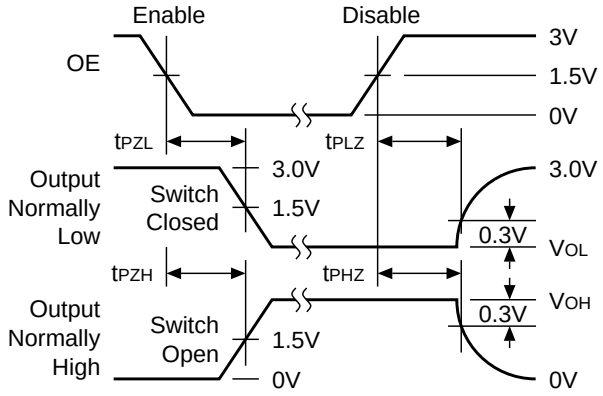


Switching Waveforms

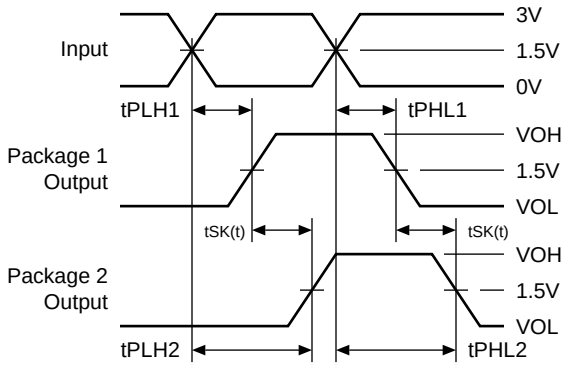
Propagation Delay



Enable and Disable Times

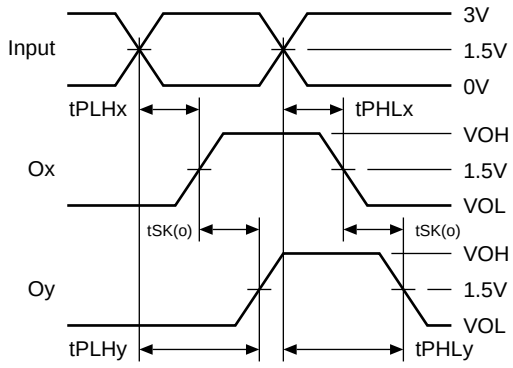


Package Skew – $t_{SK(t)}$



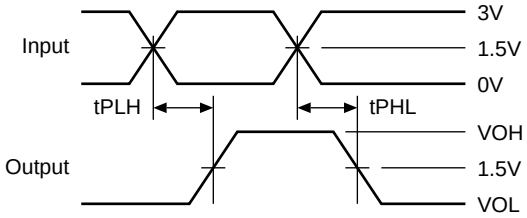
tSK(t) = | tPLH2 – tPLH1 | or | tPHL2 – tPHL1 |

Output Skew – $t_{SK(o)}$



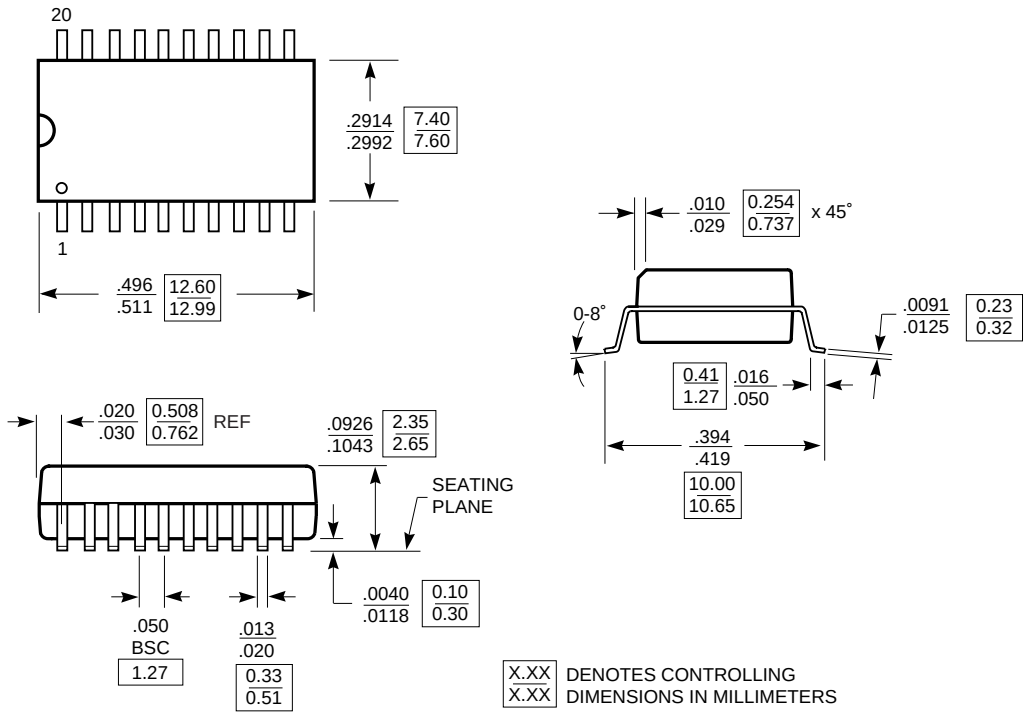
tSK(o) = | tPLHy – tPLHx | or | tPHLy – tPHLx |

Pulse Skew – $t_{SK(p)}$

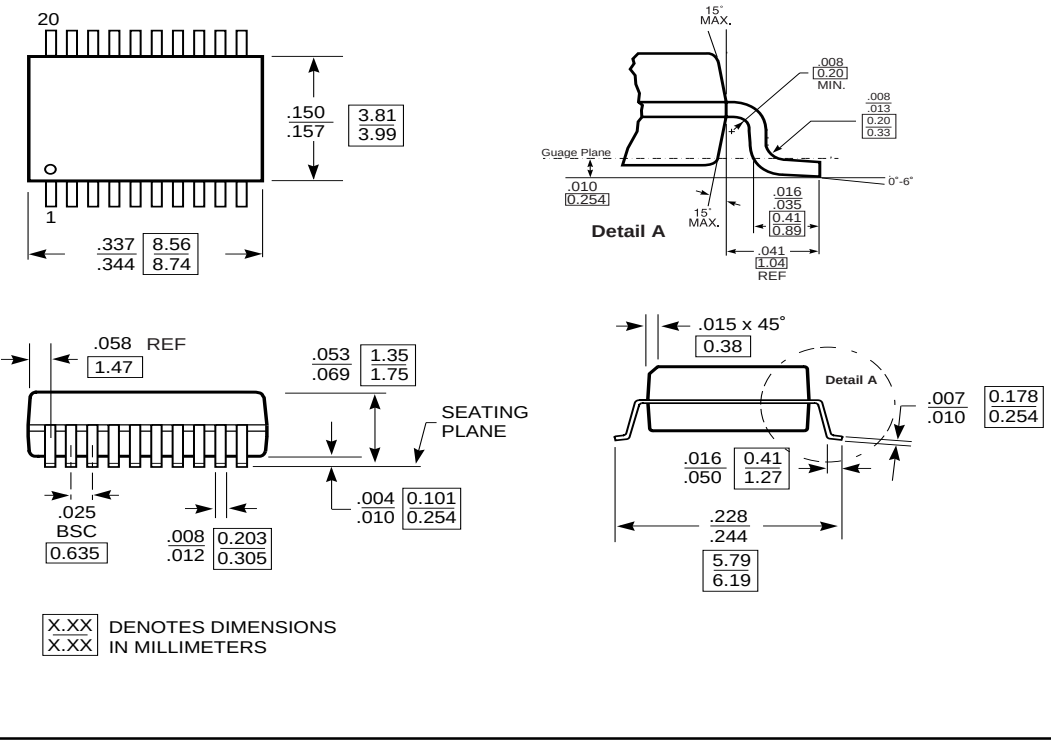


tSK(p) = | tPHL – tPLH |

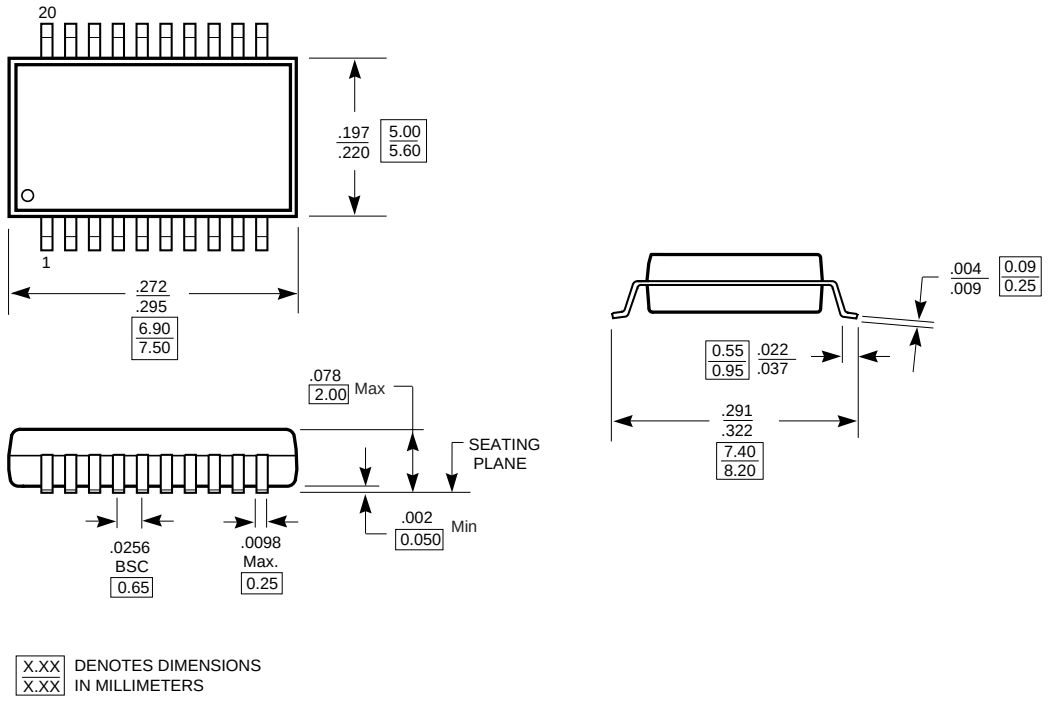
20-Pin 300-mil wide SOIC (S)



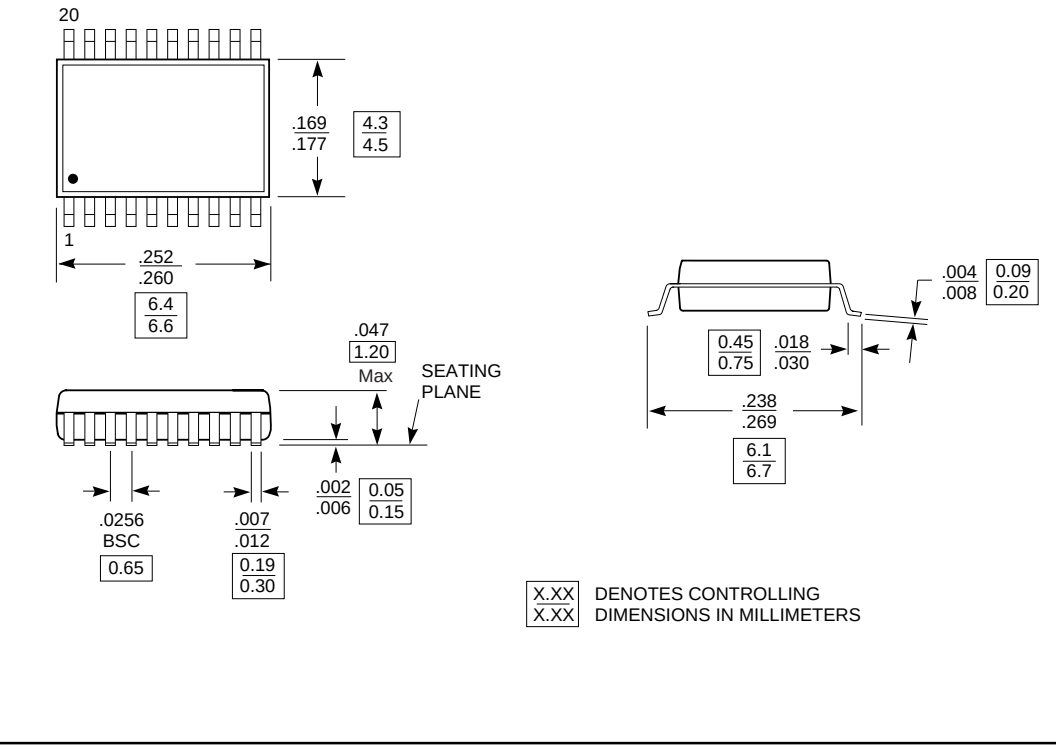
20-Pin 150-mil wide QSOP (Q)



20-Pin 209-mil wide SSOP (H) Package



20-Pin 173-mil wide TSSOP (L) Package



Ordering Information

Ordering Code	Package Type	Rating
PI49FCT3805DH	20-pin 209 mil SSOP	Industrial
PI49FCT3805DQ	20-pin 150 mil QSOP	
PI49FCT3805DS	20-pin 300mil TSSOP	
PI49FCT3805EH	20-pin 209 mil SSOP	
PI49FCT3805EQ	20-pin 150 mil QSOP	
PI49FCT3805EL	20-pin 173mil TSSOP	