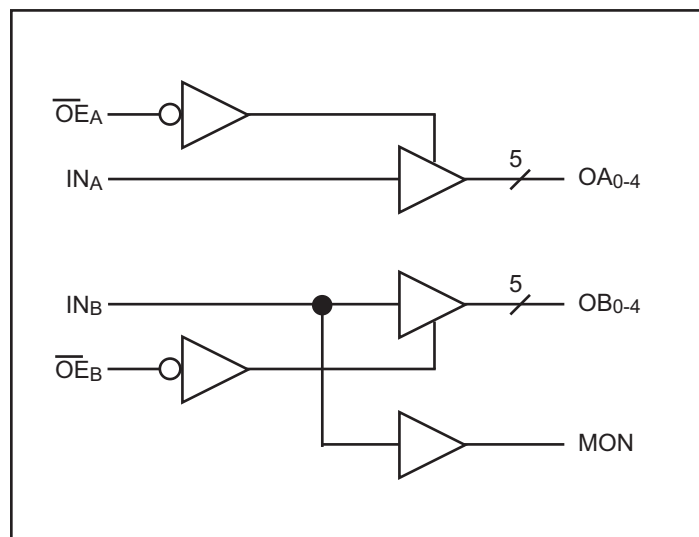
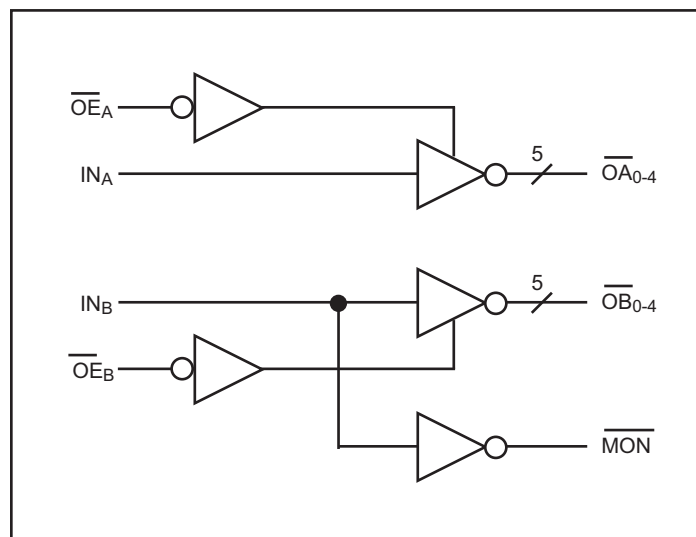


3.3V Fast CMOS Buffer/Clock Driver
Features

- 3.3V version of PI49FCT805/806
- Extremely low output skew: 0.5ns
- Monitor output pin
- Clock busing with 3-state control
- TTL input and CMOS output compatible
- Industrial operation at -40°C to 85°C
- Extremely low static power (1mW, typ.)
- Hysteresis on all inputs
- Packaging (Pb-free & Green available):
 - 20-pin 300-mil wide SOIC (S)
 - 20-pin 150-mil wide QSOP (Q)
 - 20-pin 209-mil wide SSOP (H)

Description

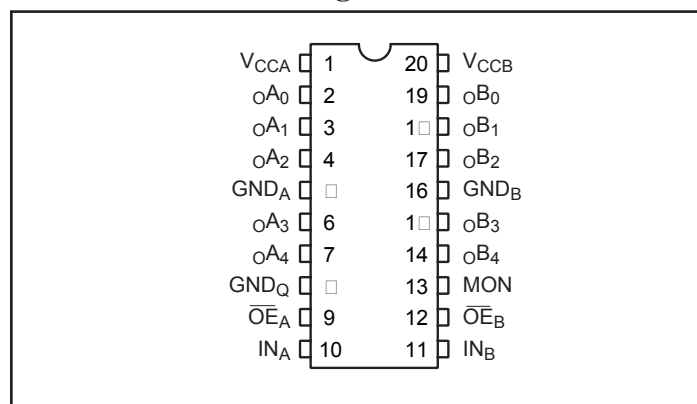
Pericom Semiconductor's PI49FCT3805 is a 3.3V non-inverting clock driver and the PI49FCT3806 is a 3.3V inverting clock driver designed with two independent groups of buffers. These buffers have 3-state Output Enable inputs (active LOW) with a 1-in, 5-out configuration per group. Each clock driver consist of two banks of drivers, driving five outputs each from a standard TTL compatible CMOS input.

PI49FCT3805 Block Diagram

PI49FCT3806 Block Diagram


Pin Description

| Pin Name | Description |
|------------------------------------|---|
| $\overline{OE}_A, \overline{OE}_B$ | 3-State Output Enable Inputs (Active LOW) |
| IN_A, IN_B | Clock Inputs |
| oA_N, oB_N | Clock Outputs |
| MON | Monitor Output |
| GND | Ground |
| VCC | Power |

PI49FCT3805 Pin Configuration



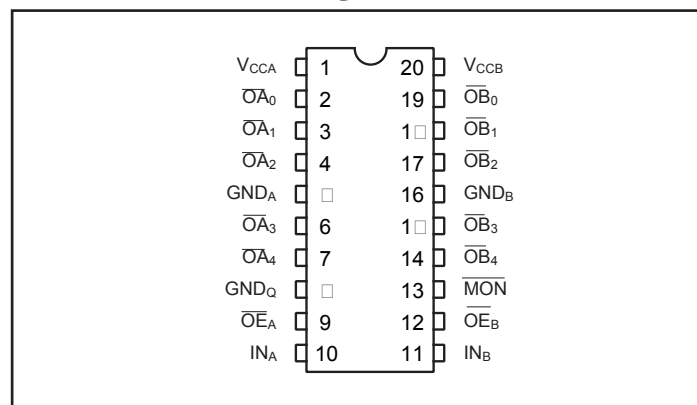
PI49FCT3805 Truth Table⁽¹⁾

| Inputs | | Outputs | |
|------------------------------------|--------------|--------------|-----|
| $\overline{OE}_A, \overline{OE}_B$ | IN_A, IN_B | oA_N, oB_N | 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

PI49FCT3806 Pin Configuration



PI49FCT3806 Truth Table⁽¹⁾

| Inputs | | Outputs | |
|------------------------------------|--------------|------------------------------------|------------------|
| $\overline{OE}_A, \overline{OE}_B$ | IN_A, IN_B | $\overline{O}A_N, \overline{O}B_N$ | \overline{MON} |
| L | L | H | H |
| L | H | L | L |
| H | L | Z | H |
| H | H | Z | L |

Note:

- H = High Voltage Level, L = Low Voltage Level
Z = High Impedance

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

| Parameters ⁽¹⁾ | Description | Test Conditions | Typ | Max. | Units |
|---------------------------|--------------------|-----------------|-----|------|-------|
| C_{IN} | Input Capacitance | $V_{IN} = 0V$ | 3.0 | 6.0 | pF |
| C_{OUT} | Output Capacitance | $V_{OUT} = 0V$ | 6.0 | 8.0 | |

Note:

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

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 +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.

DC Electrical Characteristics (T_A = -40°C to +85°C, V_{CC} = 3.3V ±0.3V)

| Symbol | Parameter | Test Condition ⁽¹⁾ | | Min. | Typ. | Max. | Units |
|-------------------|---|---|---|---------------------------------|-----------------|-------------------|-------|
| V _{OH} | Output High Voltage V _{CC} = 3.0V, V _{IN} = V _{IL} or V _{IH} | 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} = 3.0V, V _{IN} = V _{IL} or V _{IH} | 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 _{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} (Input Pins) | -1 | | 1 | μA |
| I _{IL} | Input Low Current | V _{CC} = Max | V _{IN} = GND (Input & I/O Pins) | -1 | | 1 | |
| I _{IOZH} | High Impedance Output Current | V _{CC} = Max., All outputs Disabled | V _{OUT} = V _{CC} V _{OUT} = GND | -1 | | 1 | |
| I _{IOZL} | 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 _{ODH} | Output HIGH Current | V _{OUT} = 3.3V, V _{IN} = V _{IL} or V _{IH} , V _{OUT} = 1.5V ⁽⁴⁾ | | -35 | -86 | -110 | mA |
| I _{ODL} | Output LOW Current | V _{OUT} = 3.3V, V _{IN} = V _{IL} or V _{IH} , V _{OUT} = 1.5V ⁽⁴⁾ | | 50 | 168 | 200 | |
| I _{OS} | Short Circuit ⁽⁵⁾ Current | V _{CC} = Max., V _{OUT} = GND ⁽⁵⁾ | | -60 | -135 | -240 | |
| V _H | Input Hysteresis | | | | 150 | | 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 ($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 0.3\text{V}$)

| 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} | — | | 30 | μA |
| ΔI_{CC} | Supply Current per Inputs @ TTL HIGH | $V_{CC} = \text{Max.}$ | $V_{IN} = V_{CC} - 0.6\text{V}$ ⁽³⁾ | — | 11 | 300 | |
| I_{CCD} | Supply Current per Input per MHz ⁽⁴⁾ | $V_{CC} = \text{Max.}$, Outputs Open \overline{OE}_A or $\overline{OE}_B = \text{GND}$ Per Output Toggling 50% Duty Cycle | $V_{IN} = V_{CC}$ $V_{IN} = \text{GND}$ | — | 0.1 | 0.16 | mA/ MHz |
| I_C | Total Power Supply Current ⁽⁶⁾ | $V_{CC} = \text{Max.}$, Outputs Open $f_O = 10\text{ MHz}$ 50% Duty Cycle \overline{OE}_A or $\overline{OE}_B = \text{GND}$ Mon. Outputs Toggling | $V_{IN} = V_{CC}$ $V_{IN} = \text{GND}$ | — | 3.3 | 9.0 ⁽⁵⁾ | mA |
| | | | $V_{IN} = V_{CC} - 0.6\text{V}$ $V_{IN} = \text{GND}$ | — | 3.3 | 10.0 ⁽⁵⁾ | |
| | | $V_{CC} = \text{Max.}$, Outputs Open $f_O = 2.5\text{ MHz}$ 50% Duty Cycle \overline{OE}_A or $\overline{OE}_B = \text{GND}$ Eleven Outputs Toggling | $V_{IN} = V_{CC}$ $V_{IN} = \text{GND}$ | — | 1.8 | 6.0 ⁽⁵⁾ | |
| | | | $V_{IN} = V_{CC} - 0.6\text{V}$ $V_{IN} = \text{GND}$ | — | 1.8 | 7.0 ⁽⁵⁾ | |

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.
- $I_C = I_{\text{QUIESCENT}} + I_{\text{INPUTS}} + I_{\text{DYNAMIC}}$
 $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_O N_O)$

 I_{CC} = Quiescent Current

 ΔI_{CC} = Power Supply Current for a TTL High Input ($V_{IN} = V_{CC} - 0.6\text{V}$)

 D_H = Duty Cycle for TTL Inputs High

 N_T = Number of TTL Inputs at D_H
 I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)

 f_O = Output Frequency

 N_O = Number of Outputs at f_O

All currents are in milliamps and all frequencies are in megahertz.

Switching Characteristics ($T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $V_{CC} = 3.3\text{V} \pm 0.3\text{V}$)

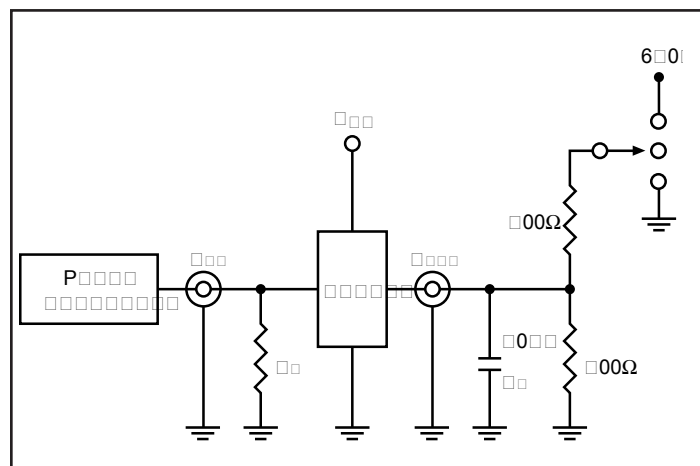
| Parameter | Description | Test Conditions (Note 1) | 3805/ 3806 | | 3805A/ 3806A | | 3805B/ 3806B | | 3805C/ 3806C | | Units |
|------------------------|---|--|---------------|------|-----------------|------|-----------------|------|-----------------|------|-------|
| | | | Com. | | Com. | | Com. | | Com. | | |
| | | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| t_{PLH} t_{PLH} | Propagation Delay IN_A to OA_N , IN_B to OB_N | $C_L = 50\text{pF}$ $R_L = 500\Omega$ | 1.5 | 6.5 | 1.5 | 5.8 | 1.5 | 5.0 | 1.5 | 4.5 | ns |
| t_{PZH} t_{PZL} | Output Enable Time \overline{OE}_A to OA_N , \overline{OE}_B to OB_N | | 1.5 | 8.0 | 1.5 | 8.0 | 1.5 | 6.5 | 1.5 | 6.2 | |
| t_{PHL} t_{PLZ} | Output Disable Time \overline{OE}_A to OA_N , \overline{OE}_B to OB_N | | 1.5 | 7.0 | 1.5 | 7.0 | 1.5 | 6.0 | 1.5 | 5.0 | |
| $t_{SK(O)}^{(3)}$ | Skew between two outputs of same package (same transition) | | | 0.7 | | 0.7 | | 0.5 | | 0.5 | |
| $t_{SK(P)}^{(3)}$ | Skew between opposite transitions ($t_{PHL} - t_{PLH}$) of the same output | | | 1.0 | | 0.7 | | 0.5 | | 0.5 | |
| $t_{SK(T)}^{(3)}$ | Skew between two outputs of different package at same temperature (Same transition) | | | 1.5 | | 1.2 | | 1.0 | | 0.8 | |

Note:

1. See test circuit and waveforms
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. Skew measured at worst cast temperature (max. temp).

Tests Circuits for All Outputs⁽¹⁾

except for $F_{IN} > 100\text{ MHz}$



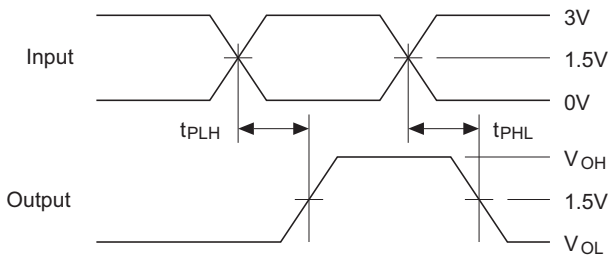
Switch Position

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

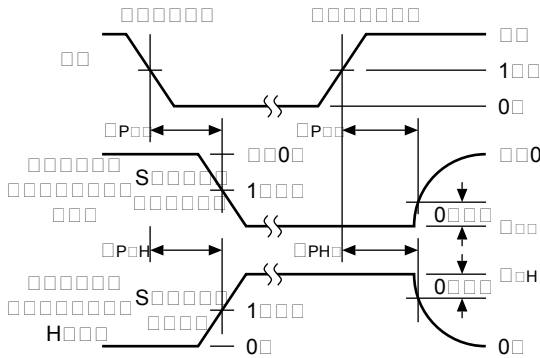
Definitions:

C_L = Load capacitance: includes jig and probe capacitance.
 R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

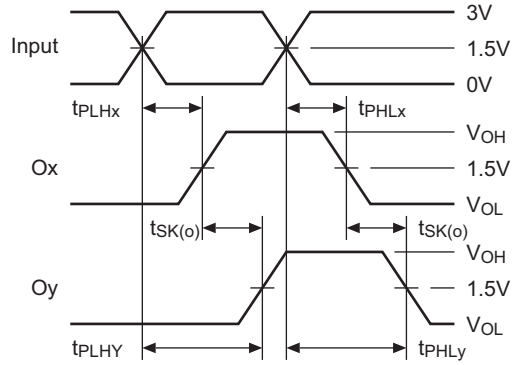
Switching Waveforms



Propagation Delay

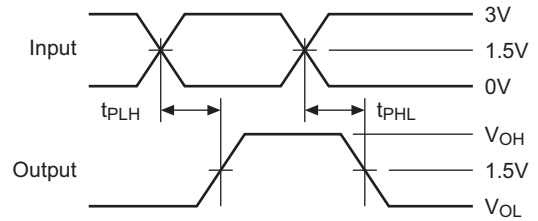


Enable and Disable Times



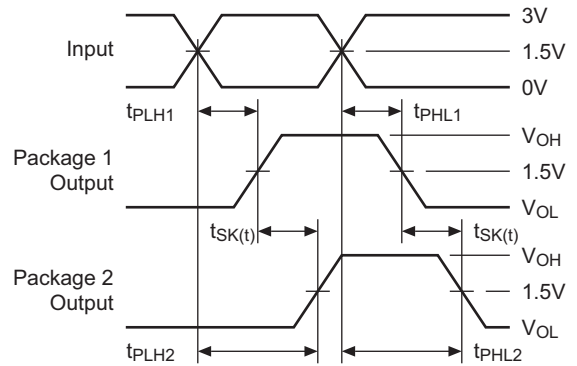
$$t_{SK(O)} = |t_{PLHy} - t_{PLHx}| \text{ or } |t_{PHLy} - t_{PHLx}|$$

Output Skew – tSK(O)



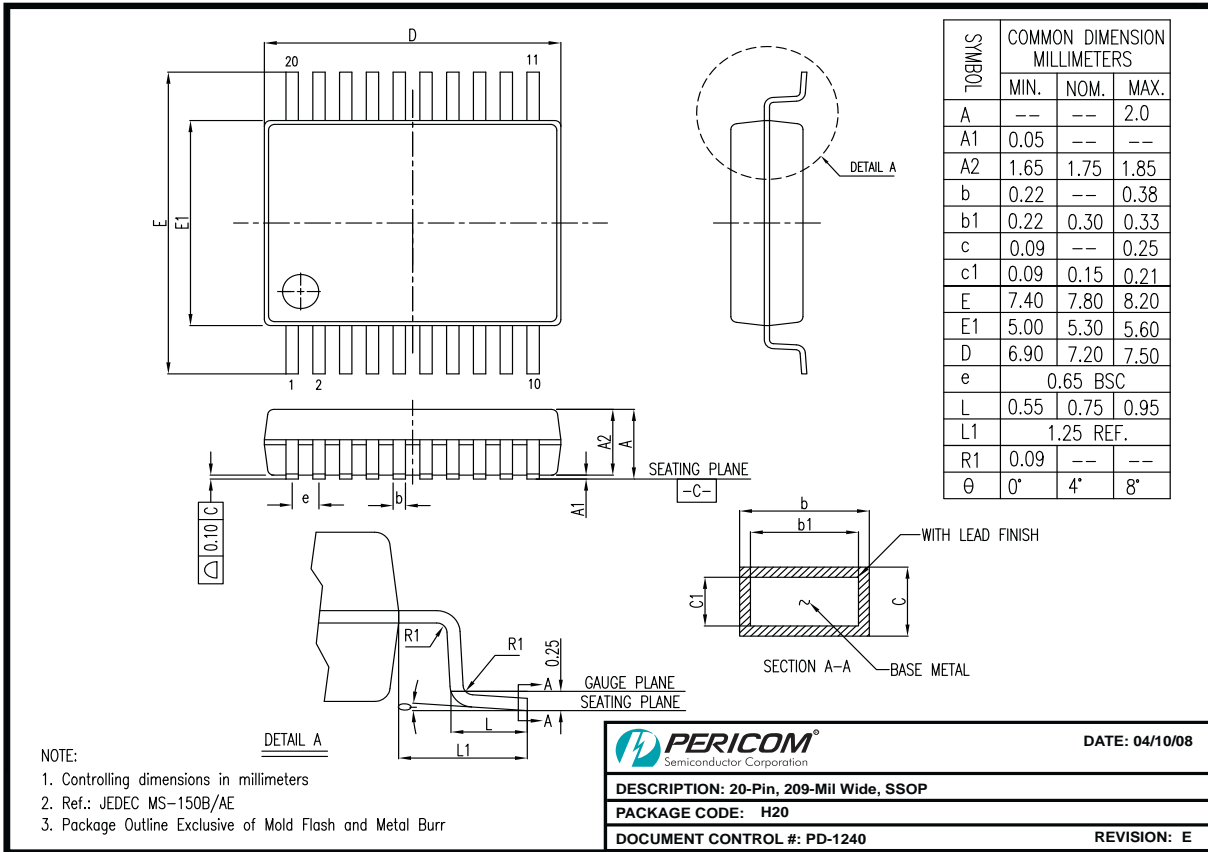
$$t_{SK(P)} = |t_{PHL} - t_{PLH}|$$

Pulse Skew – tSK(P)

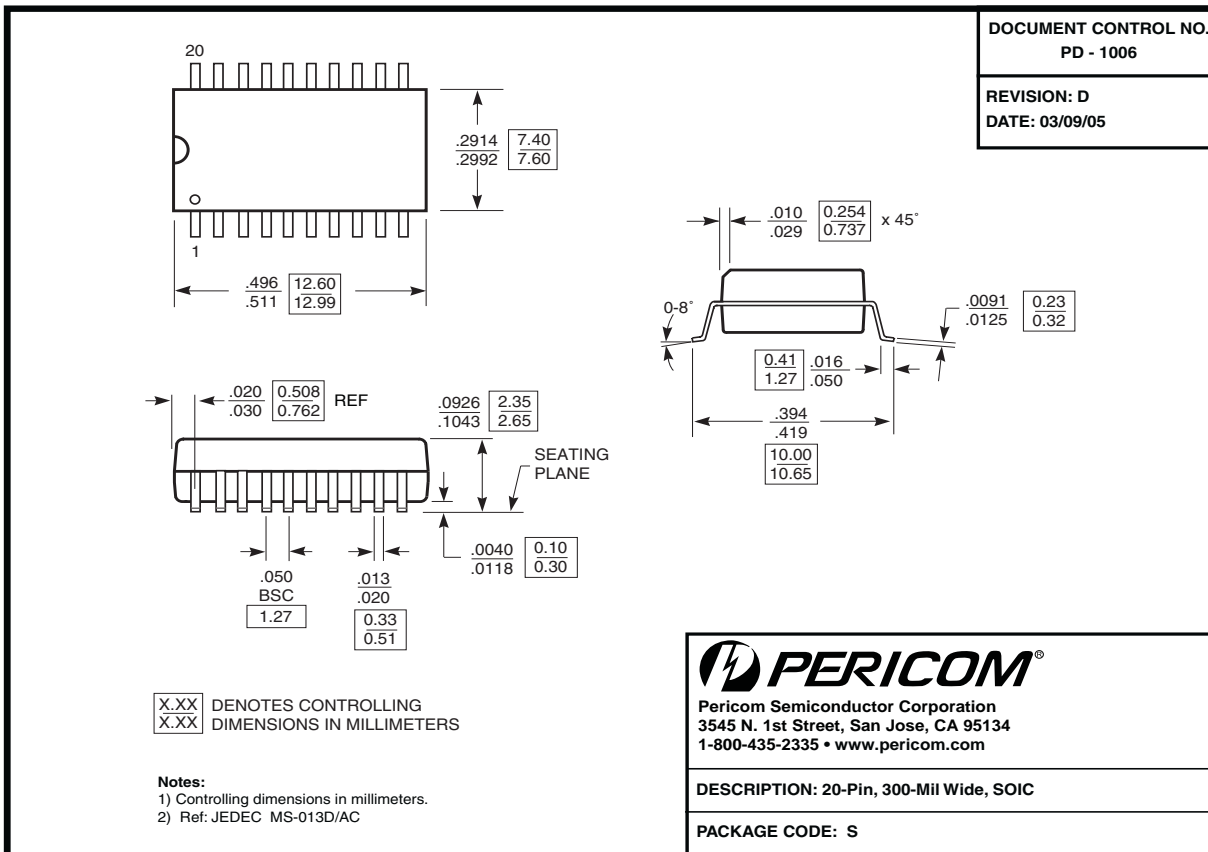


$$t_{SK(t)} = |t_{PLH2} - t_{PLH1}| \text{ or } |t_{PHL2} - t_{PHL1}|$$

Package Skew – tSK(t)

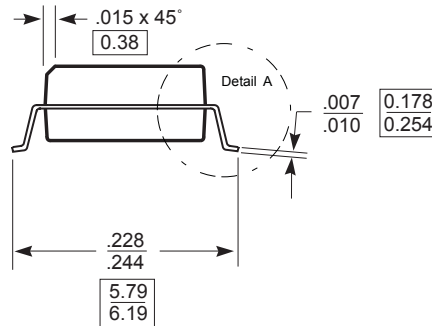
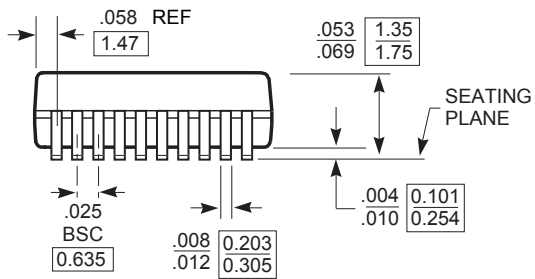
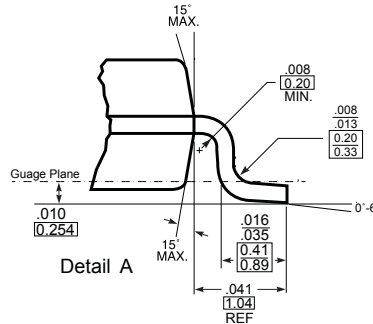
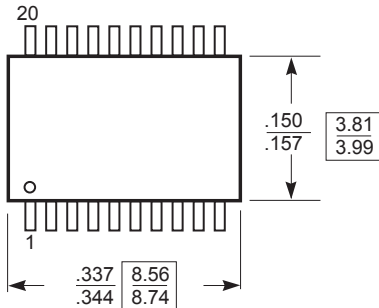


08-0140



DOCUMENT CONTROL NO.
 PD - 1202

REVISION: H
 DATE: 10/22/07



X.XX DENOTES DIMENSIONS
 X.XX IN MILLIMETERS

- Note:
- 1) Controlling dimensions in inches.
 - 2) Ref. JEDEC MO-137B/AD
 - 3) Dimensions do not include mold flash, protrusions or gate burrs



Pericom Semiconductor Corporation
 3545 N. 1st Street, San Jose, CA 95134
 1-800-435-2335 • www.pericom.com

DESCRIPTION: 20-Pin, 150-Mil Wide, QSOP

PACKAGE CODE: Q

Note:

- For latest package info, please check: <http://www.pericom.com/products/packaging/mechanicals.php>

PI49FCT3805 Ordering Information

| Ordering Code | Package Code | Speed Grade | Package Description |
|-----------------|--------------|-------------|--------------------------------------|
| PI49FCT3805AHEX | H | A | Pb-free & Green, 20-pin 209-mil SSOP |
| PI49FCT3805AQEX | Q | A | Pb-free & Green, 20-pin 150-mil QSOP |
| PI49FCT3805ASEX | S | A | Pb-free & Green, 20-pin 300-mil SOIC |
| PI49FCT3805BHEX | H | B | Pb-free & Green, 20-pin 209-mil SSOP |
| PI49FCT3805BQEX | Q | B | Pb-free & Green, 20-pin 150-mil QSOP |
| PI49FCT3805CHEX | H | C | Pb-free & Green, 20-pin 209-mil SSOP |
| PI49FCT3805CQEX | Q | C | Pb-free & Green, 20-pin 150-mil QSOP |
| PI49FCT3805CSEX | S | C | Pb-free & Green, 20-pin 300-mil SOIC |
| PI49FCT3805DHEX | H | D | Pb-free & Green, 20-pin 209-mil SSOP |
| PI49FCT3805DQEX | Q | D | Pb-free & Green, 20-pin 150-mil QSOP |
| PI49FCT3805HEX | H | Blank | Pb-free & Green, 20-pin 209-mil SSOP |
| PI49FCT3805QEX | Q | Blank | Pb-free & Green, 20-pin 150-mil QSOP |
| PI49FCT3805SEX | S | Blank | Pb-free & Green, 20-pin 300-mil SOIC |

Notes:

- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- E = Pb-free and Green
- Adding an X suffix = Tape/Reel

PI49FCT3806 Ordering Information

| Ordering Code | Package Code | Speed Grade | Package Description |
|----------------|--------------|-------------|--------------------------------------|
| PI49FCT3806H | H | Blank | 20-pin 209-mil SSOP |
| PI49FCT3806QE | Q | Blank | Pb-free & Green, 20-pin 150-mil QSOP |
| PI49FCT3806S | S | Blank | 20-pin 300-mil SOIC |
| PI49FCT3806SE | S | Blank | Pb-free & Green, 20-pin 300-mil SOIC |
| PI49FCT3806AHE | H | A | Pb-free & Green, 20-pin 209-mil SSOP |
| PI49FCT3806BQE | Q | B | Pb-free & Green, 20-pin 150-mil QSOP |
| PI49FCT3806CHE | H | C | Pb-free & Green, 20-pin 209-mil SSOP |
| PI49FCT3806CQE | Q | C | Pb-free & Green, 20-pin 150-mil QSOP |

Notes:

- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- E = Pb-free and Green
- Adding an X suffix = Tape/Reel