

**Product Features**

- Extremely low output skew: 0.5ns
- Monitor output pin
- Clock busing with Hi-Z state control
- TTL input and CMOS output compatible
- Extremely low static power (1mW, typ.)
- Hysteresis on all inputs
- Packages available:
  - 20-pin 209 mil wide SSOP (H)
  - 20-pin 300 mil wide SOIC (S)
  - 20-pin 150 mil wide QSOP (Q)
- Device models available on request
- Industrial Operation at -40°C to +85°C

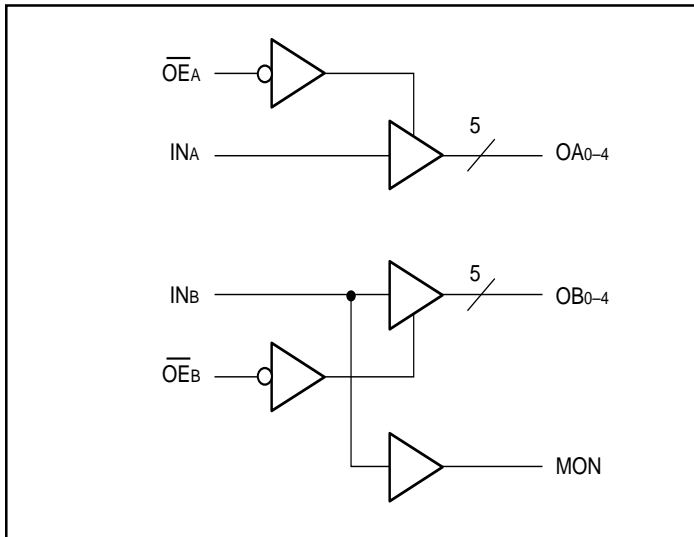
**Product Description**

Pericom Semiconductor’s PI49FCT series of logic circuits are produced using the Company’s advanced 0.8 micron CMOS technology, achieving industry leading speed grades.

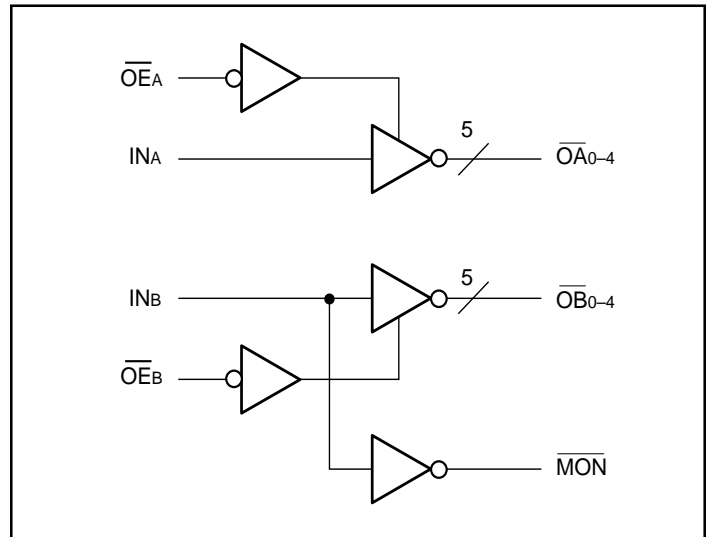
The PI49FCT805T and PI49FCT2805T are non-inverting clock drivers. The PI49FCT806T is an inverting clock driver designed with two independent groups of buffers that have Hi-Z state Output Enable inputs (active LOW) with a 1-in, 5-out configuration per group. Each clock driver consists of two banks of drivers, driving five outputs each from a standard TTL-compatible CMOS input.

The PI49FCT2805T also features a 25-ohm on-chip resistor for lower noise.

**PI49FCT805T/2805T Logic Block Diagram**



**PI49FCT806T Logic Block Diagram**



### Product Pin Description

| Pin Name                           | Description                                  |
|------------------------------------|--|
| $\overline{OE}_A, \overline{OE}_B$ | Hi-Z State Output Enable Inputs (Active LOW) |
| $IN_A, IN_B$                       | Clock Inputs                                 |
| $OA_N, OB_N$                       | Clock Outputs (PI49FCT805T/PI49FCT2805T)     |
| $\overline{OA}_N, \overline{OB}_N$ | Clock Output (PI49FCT806T)                   |
| MON                                | Monitor Output                               |
| GND                                | Ground                                       |
| $V_{CC}$                           | Power  |

### PI49FCT805T/2805T Truth Table<sup>(1)</sup>

| 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   |

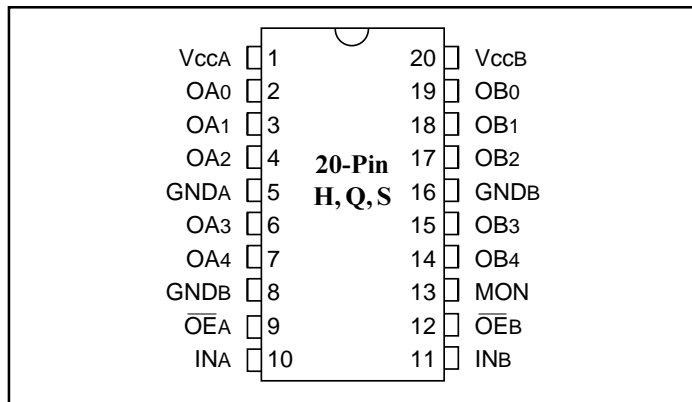
### PI49FCT806T Truth Table<sup>(1)</sup>

| Inputs                             |              | Outputs                            |                  |
|------------------------------------|--------------|------------------------------------|------------------|
| $\overline{OE}_A, \overline{OE}_B$ | $IN_A, IN_B$ | $\overline{OA}_N, \overline{OB}_N$ | $\overline{MON}$ |
| L                                  | L            | H                                  | H                |
| L                                  | H            | L                                  | L                |
| H                                  | L            | Z                                  | H                |
| H                                  | H            | Z                                  | L                |

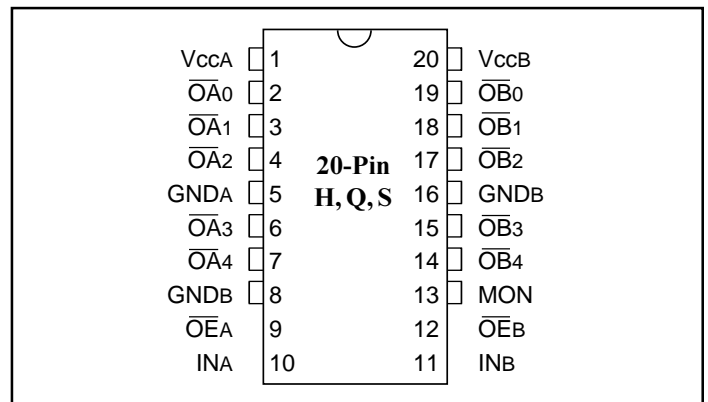
**Note:**

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

### PI49FCT805T/2805T Product Pin Configuration



### PI49FCT806T Product Pin Configuration



### 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 <sub>CC</sub> 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            |

**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, T<sub>A</sub> = -40°C to +85°C, V<sub>CC</sub> = 5.0V ± 5%)

| Parameters       | Description           | Test Conditions <sup>(1)</sup>   |                                    | Min. | Typ <sup>(2)</sup> | Max. | Units |
|------------------|-----------------------|--|------------------------------------|------|--------------------|------|-------|
| V <sub>OH</sub>  | Output HIGH Voltage   | V <sub>CC</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> | I <sub>OH</sub> = -24.0mA          | 2.4  | 3.3                |      | V     |
| V <sub>OL</sub>  | Output LOW Current    | V <sub>CC</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> | I <sub>OL</sub> = 64mA             |      | 0.3                | 0.55 | V     |
|                  |                       |  | I <sub>OL</sub> = 12mA (25Ω)       |      | 0.3                | 0.50 | V     |
| V <sub>IH</sub>  | Input HIGH Voltage    | Guaranteed Logic HIGH Level  |                                    | 2.0  |                    |      | V     |
| V <sub>IL</sub>  | Input LOW Voltage     | Guaranteed Logic LOW Level   |                                    |      |                    | 0.8  | V     |
| I <sub>IH</sub>  | Input HIGH Current    | V <sub>CC</sub> = Max.   | V <sub>IN</sub> = V <sub>CC</sub>  |      |                    | 1    | μA    |
| I <sub>IL</sub>  | Input LOW Current     | V <sub>CC</sub> = Max.   | V <sub>IN</sub> = GND              |      |                    | -1   | μA    |
| I <sub>OZH</sub> | High Impedance        | V <sub>CC</sub> = Max.   | V <sub>OUT</sub> = V <sub>CC</sub> |      |                    | 1    | μA    |
| I <sub>OZL</sub> | Output Current        |  | V <sub>OUT</sub> = GND             |      |                    | -1   | μA    |
| I <sub>I</sub>   | Input HIGH Current    | V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub> (Max.)             |                                    |      |                    | 20   | μA    |
| V <sub>IK</sub>  | Clamp Diode Voltage   | V <sub>CC</sub> = Min., I <sub>IN</sub> = -18mA                              |                                    |      | -0.7               | -1.2 | V     |
| I <sub>OS</sub>  | Short Circuit Current | V <sub>CC</sub> = Max. <sup>(3)</sup> , V <sub>OUT</sub> = GND               |                                    | -60  | -120               | -225 | mA    |
| V <sub>H</sub>   | Input Hysteresis      | V <sub>CC</sub> = 5 V  |                                    |      | 200                |      | mV    |

### Capacitance (T<sub>A</sub> = 25°C, f = 1 MHz)

| Parameters <sup>(4)</sup> | Description        | Test Conditions        | Typ | Max. | Units |
|---------------------------|--------------------|------------------------|-----|------|-------|
| C <sub>IN</sub>           | Input Capacitance  | V <sub>IN</sub> = 0 V  | 6   | 10   | pF    |
| C <sub>OUT</sub>          | Output Capacitance | V <sub>OUT</sub> = 0 V | 8   | 12   | pF    |

**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<sub>CC</sub> = 5.0V, +25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. This parameter is determined by device characterization but is not production tested.

### Power Supply Characteristics

| Parameters       | Description                                     | Test Conditions <sup>(1)</sup>  |  | Min. | Typ <sup>(2)</sup> | Max.                | Units      |
|------------------|---|---|--|------|--------------------|---------------------|------------|
| I <sub>CC</sub>  | Quiescent Power Supply Current                  | V <sub>CC</sub> =Max.   | V <sub>IN</sub> =GND or V <sub>CC</sub>                  |      | 3                  | 30                  | μA         |
| ΔI <sub>CC</sub> | Supply Current per Input @ TTL HIGH             | V <sub>CC</sub> =Max.   | V <sub>IN</sub> =3.4V <sup>(3)</sup>                     |      | 0.5                | 2.0                 | mA         |
| I <sub>CCD</sub> | Supply Current per Input per MHz <sup>(4)</sup> | V <sub>CC</sub> =Max.,<br>Outputs Open<br>$\overline{OE}_A = \overline{OE}_B = \text{GND}$<br>Per Output Toggling<br>50% Duty Cycle                                 | V <sub>IN</sub> =V <sub>CC</sub><br>V <sub>IN</sub> =GND |      | 0.15               | 0.25                | mA/<br>MHz |
| I <sub>C</sub>   | Total Power Supply Current <sup>(6)</sup>       | V <sub>CC</sub> =Max.,<br>Outputs Open<br>f <sub>i</sub> = 10 MHz<br>50% Duty Cycle<br>$\overline{OE}_A = \overline{OE}_B = \text{GND}$<br>Five Outputs Toggling    | V <sub>IN</sub> =V <sub>CC</sub><br>V <sub>IN</sub> =GND |      | 7.7                | 14.0 <sup>(5)</sup> | mA         |
|                  |   |   | V <sub>IN</sub> =3.4V<br>V <sub>IN</sub> =GND            |      | 8.0                | 15.0 <sup>(5)</sup> |            |
|                  |   | V <sub>CC</sub> =Max.,<br>Outputs Open<br>f <sub>i</sub> = 2.5 MHz<br>50% Duty Cycle<br>$\overline{OE}_A = \overline{OE}_B = \text{GND}$<br>Eleven Outputs Toggling | V <sub>IN</sub> =V <sub>CC</sub><br>V <sub>IN</sub> =GND |      | 4.3                | 8.4 <sup>(5)</sup>  |            |
|                  |   |   | V <sub>IN</sub> =3.4V<br>V <sub>IN</sub> =GND            |      | 4.8                | 10.4 <sup>(5)</sup> |            |

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at V<sub>CC</sub> = 5.0V, +25°C ambient.
- Per TTL driven input (V<sub>IN</sub> = 3.4V); all other inputs at V<sub>CC</sub> 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<sub>CC</sub> formula. These limits are guaranteed but not tested.
- I<sub>C</sub> = I<sub>QUIESCENT</sub> + I<sub>INPUTS</sub> + I<sub>DYNAMIC</sub>

$$I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_i N_I)$$

I<sub>CC</sub> = Quiescent Current

ΔI<sub>CC</sub> = Power Supply Current for a TTL High Input (V<sub>IN</sub> = 3.4V)

D<sub>H</sub> = Duty Cycle for TTL Inputs High

N<sub>T</sub> = Number of TTL Inputs at D<sub>H</sub>

I<sub>CCD</sub> = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)

f<sub>CP</sub> = Clock Frequency for Register Devices (Zero for Non-Register Devices)

f<sub>i</sub> = Input Frequency

N<sub>I</sub> = Number of Inputs at f<sub>i</sub>

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

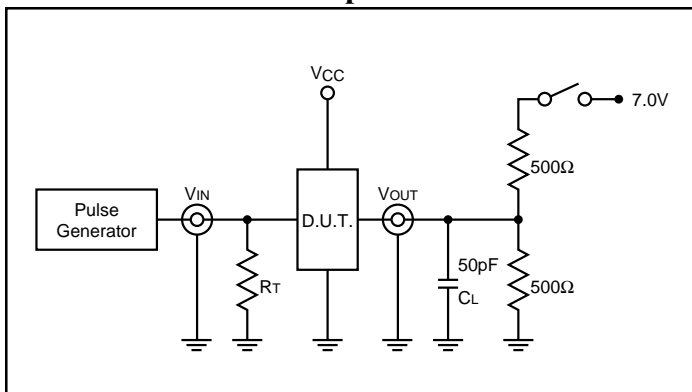
**PI49FCT805/806T Switching Characteristics over Operating Range**

| Parameters                   | Description  | Conditions <sup>(1)</sup> | 805T/2805T/<br>806T |      | 805AT/2805AT/<br>806AT |      | 805BT/2805BT/<br>806BT |      | 805CT/2805CT/<br>806CT |      | Units |
|------------------------------|--|---------------------------|---------------------|------|------------------------|------|------------------------|------|------------------------|------|-------|
|                              |  |                           | Com.                |      | Com                    |      | Com.                   |      | Com                    |      |       |
|                              |  |                           | Min.                | Max. | Min.                   | Max. | Min.                   | Max. | Min.                   | Max. |       |
| $t_{PLH}$<br>$t_{PHL}$       | Propagation Delay<br>$IN_A$ to $OA_N$ ,<br>$IN_B$ to $OB_N$                              | CL = 50pF<br>RL = 500Ω    | 1.5                 | 6.5  | 1.5                    | 5.8  | 1.5                    | 5.0  | 1.5                    | 4.5  | ns    |
| $t_{PZH}$<br>$t_{PZL}$       | Output Enable Time<br>$\overline{OE}_A$ to $OA_N$ ,<br>$OE_B$ to $OB_N$                  |                           | 1.5                 | 8.0  | 1.5                    | 8.0  | 1.5                    | 8.5  | 1.5                    | 6.2  |       |
| $t_{PHZ}$<br>$t_{PLZ}$       | Output Disable Time <sup>(4)</sup><br>$\overline{OE}_A$ to $OA_N$ ,<br>$OE_B$ to $OB_N$  |                           | 1.5                 | 7.0  | 1.5                    | 7.0  | 1.5                    | 6.0  | 1.5                    | 5.0  |       |
| $t_{SKEW(o)}$ <sup>(3)</sup> | Skew twx two outputs<br>of same package<br>(same transition)                             |                           | —                   | 0.7  | —                      | 0.5  | —                      | 0.4  | —                      | 0.4  |       |
| $t_{SKEW(p)}$ <sup>(3)</sup> | Skew twx opposite<br>transitions ( $t_{PHL}$ - $t_{PLH}$ )<br>of same output             |                           | —                   | 1.0  | —                      | 0.7  | —                      | 0.5  | —                      | 0.5  |       |
| $t_{SKEW(t)}$ <sup>(3)</sup> | Skew twx two outputs<br>of different package at<br>same temperature<br>(same transition) |                           | —                   | 1.5  | —                      | 1.0  | —                      | 1.0  | —                      | 1.0  |       |

**Notes:**

1. See test circuit and wave forms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. Skew measured at worst cast temperature (max. temp).
4. This parameter is guaranteed but not production tested.

**Tests Circuits For All Outputs<sup>(1)</sup>**



**Switch Position**

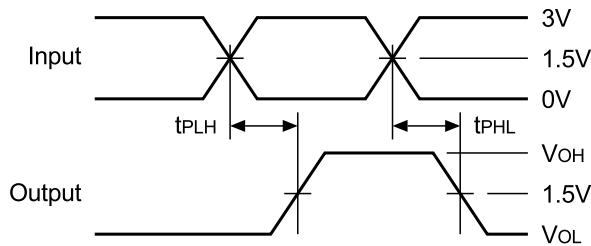
| Test                                    | Switch |
|---|--------|
| Open Drain<br>Disable LOW<br>Enable LOW | Closed |
| All Other Inputs                        | Open   |

**Definitions:**

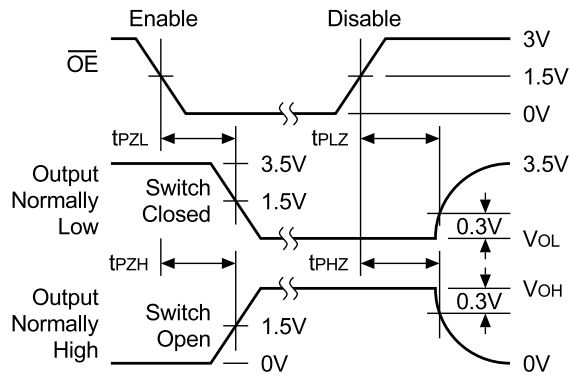
$C_L$  = Load capacitance: includes jig and probe capacitance.  
 $R_T$  = Termination resistance: should be equal to  $Z_{OUT}$  of the Pulse Generator.

## Switching Waveforms

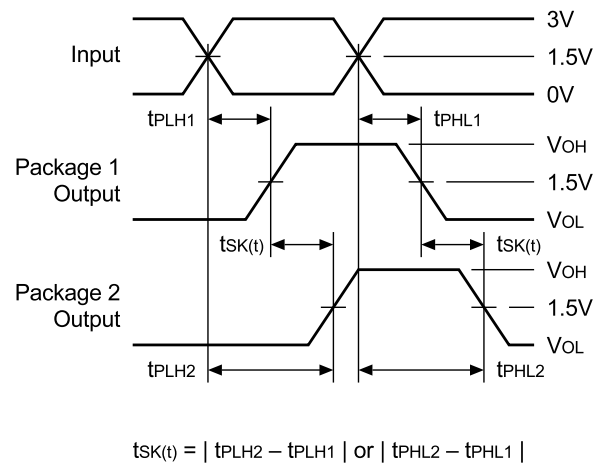
### Propagation Delay



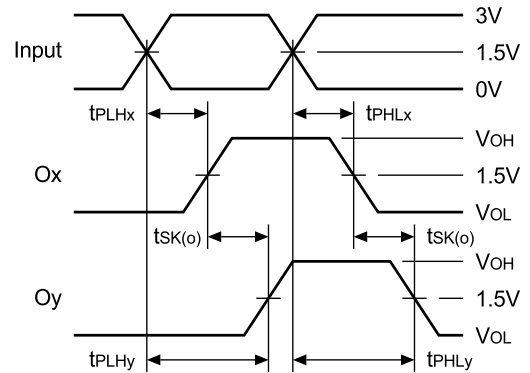
### Enable and Disable Times



### Package Skew – $t_{sk}(t)$

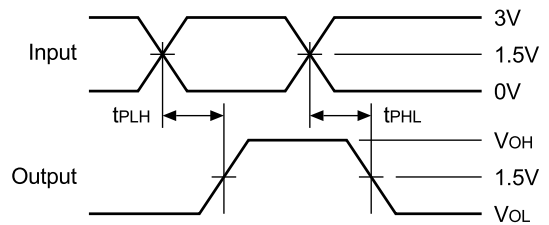


### Output Skew – $t_{sk}(o)$



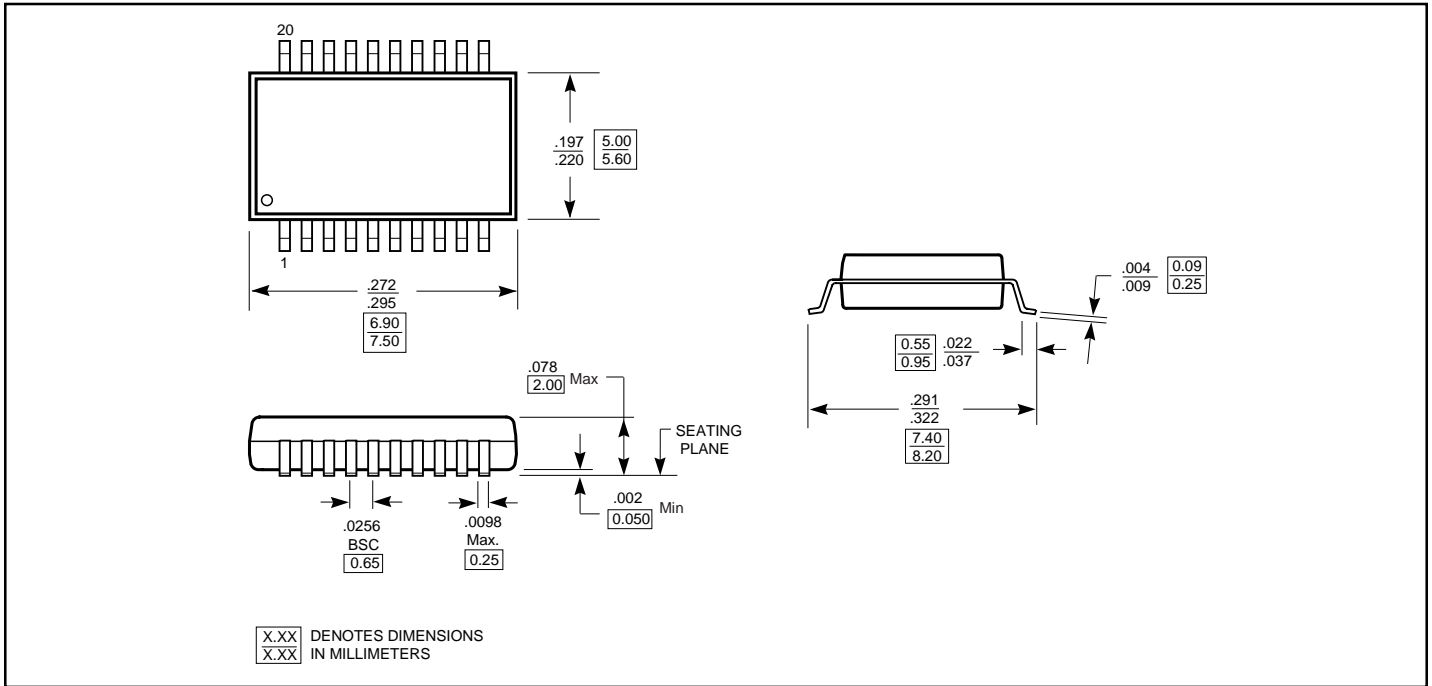
$$t_{sk}(o) = |t_{PLHy} - t_{PLHx}| \text{ or } |t_{PHLy} - t_{PHLx}|$$

### Pulse Skew – $t_{sk}(p)$

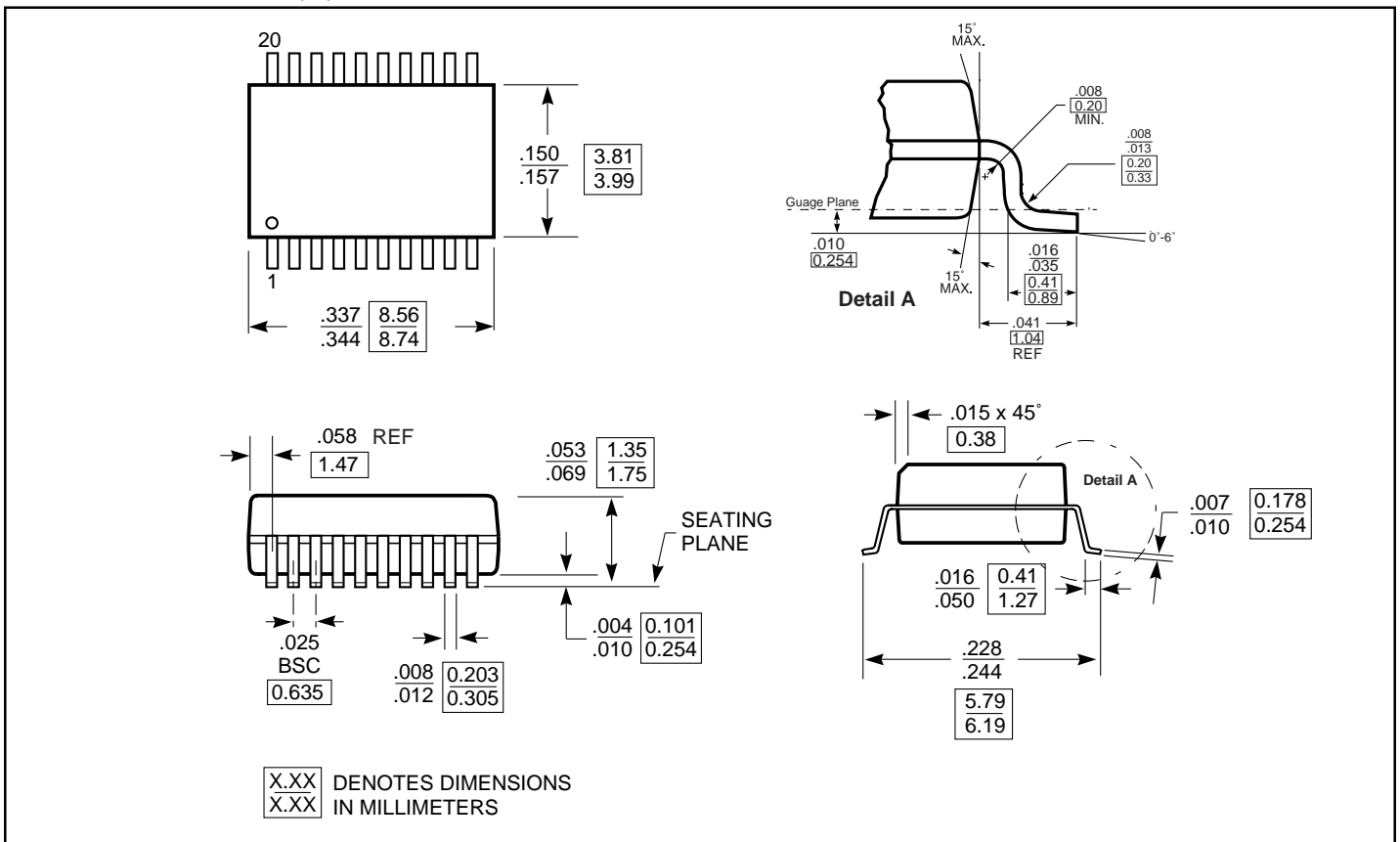


$$t_{sk}(p) = |t_{PHL} - t_{PLH}|$$

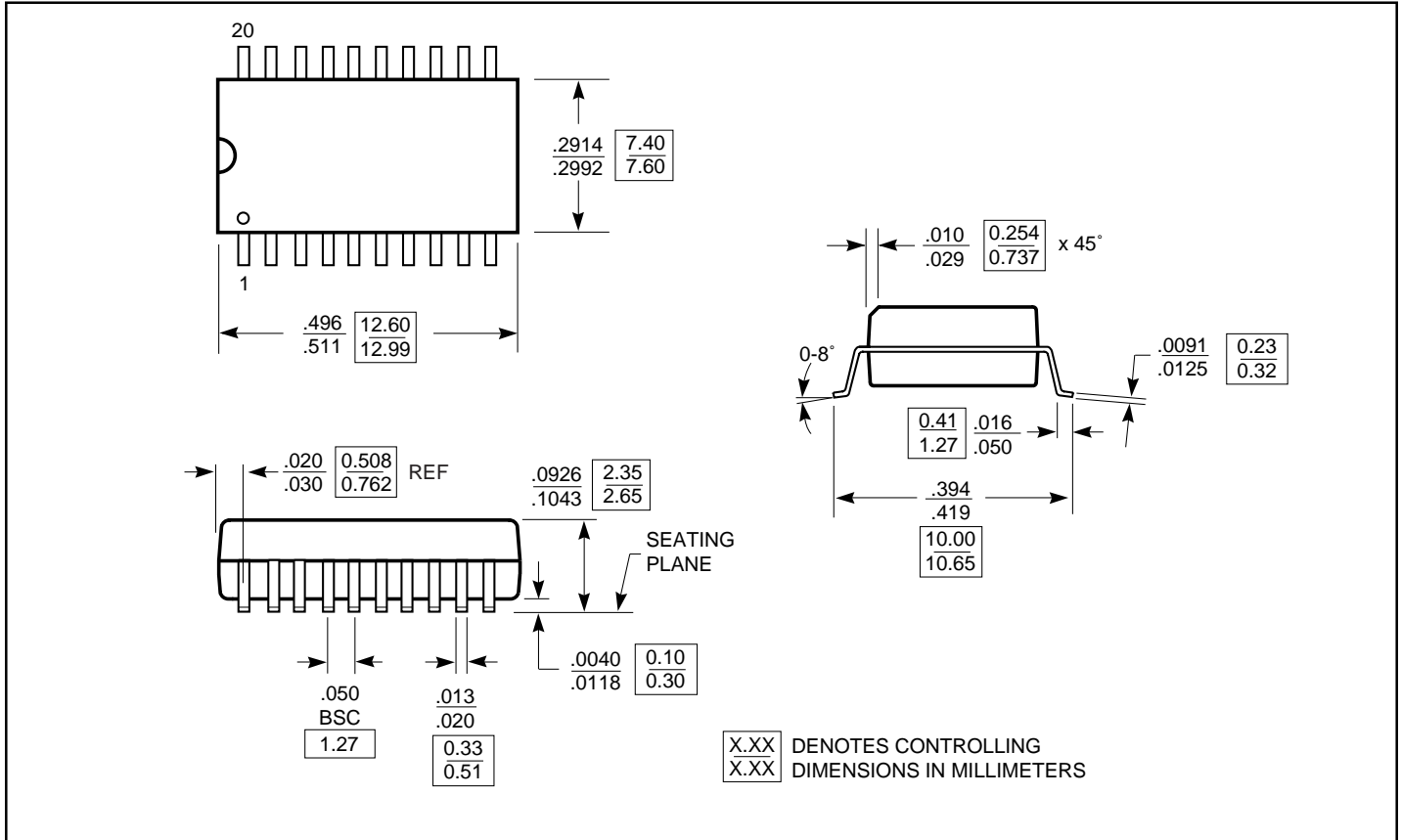
20-Pin 209-Mil SSOP (H)



20-Pin 150-Mil QSOP (Q)



20-Pin 300-Mil SOIC (S)



Ordering Information

| Ordering Code  | Marking Code   |
|----------------|----------------|
| PI49FCT805xTp  | PI49FCT805Tpx  |
| PI49FCT2805xTp | PI49FCT2805Tpx |
| PI49FCT806xTp  | PI49FCT806Tpx  |

**Note:** x = Speed Grades: "blank", A, B, C.  
p = Package Type:  
H = 209-mil SSOP  
Q = 150-mil QSOP  
S = 300-mil SOIC

**Example:**  
PI49FCT2805ATH = A grade, Hpkg marked as PI49FCT2805THA