

## 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
- Packages available:
  - 20-pin 300mil wide SOIC (S)
  - 20-pin 150mil wide QSOP (Q)
  - 20-pin 209mil wide SSOP (H)

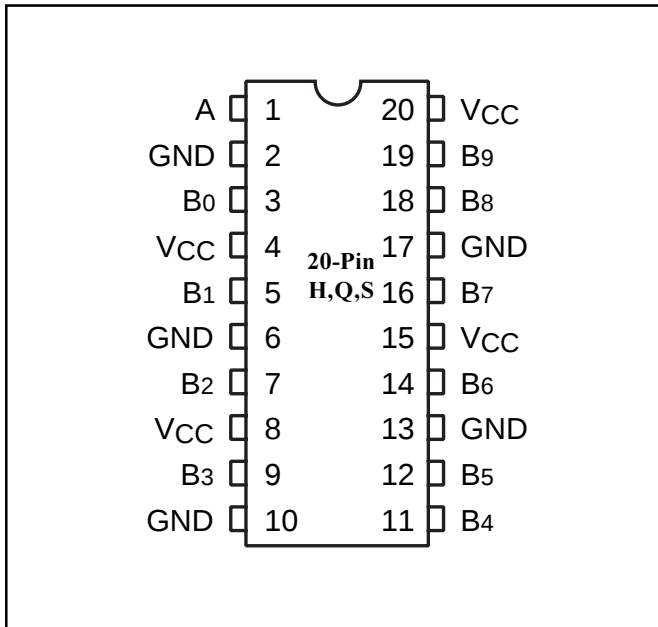
## Description

Pericom Semiconductor's PI49FCT series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving speeds up to 133 MHz, low-power dissipation, and output skew less than 250ps.

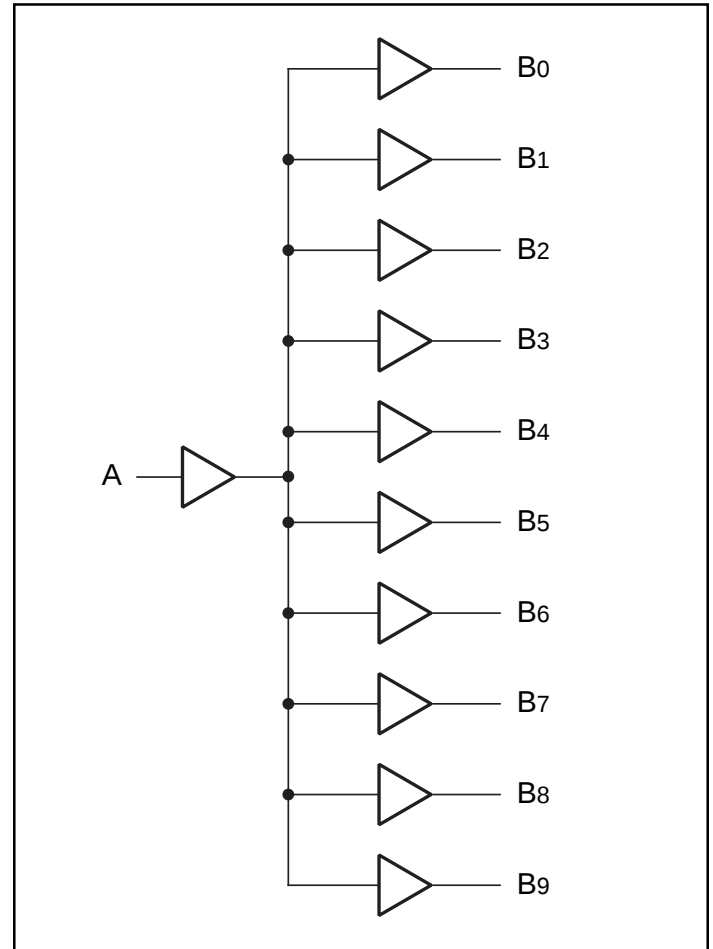
The PI49FCT32807 is a 3.3V very low-skew clock buffer that produces ten outputs from a single low-capacitance input. Excellent output signals to power and ground ratio minimize power and ground noise, and also improves output performance.

The PI49FCT32807 integrates series damping resistors on all outputs.

## Product Pin Configuration



## Logic Block Diagram



## Product Pin Description

| Pin Name                       | Description |
|--------------------------------|-------------|
| A                              | Input       |
| B <sub>0</sub> -B <sub>9</sub> | Outputs     |
| GND                            | Ground      |
| VCC                            | Power       |

## 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)

| Symbol          | Description                          | Test Conditions <sup>(1)</sup>                                                                                        |                        | Min.        | Typ. | Max. | Units |
|-----------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------|-------------|------|------|-------|
| V <sub>OH</sub> | Output HIGH voltage                  | V <sub>CC</sub> =3V<br>V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                            | I <sub>OH</sub> = –8mA | 2.4         | 3.0  | –    | V     |
| V <sub>OL</sub> | Output LOW voltage                   | V <sub>CC</sub> =3V<br>V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                            | I <sub>OL</sub> = 12mA | –<br>–<br>– | 0.4  | 0.5  |       |
| V <sub>IH</sub> | Input HIGH voltage                   | Guaranteed Logic HIGH Level (Input Pins)                                                                              |                        | 2.0         | –    | 5.5  |       |
| V <sub>IL</sub> | Input LOW voltage                    | Guaranteed Logic LOW Level (Input Pins)                                                                               |                        | –0.5        | –    | 0.8  |       |
| I <sub>IH</sub> | Input HIGH current                   | V <sub>CC</sub> = 3.6V                                                                                                | V <sub>IN</sub> = 3.6V | –           | –    | 1    | μA    |
| I <sub>IL</sub> | Input LOW current                    | V <sub>CC</sub> = 3.6V                                                                                                | V <sub>IN</sub> = 0V   | –           | –    | –1   |       |
| V <sub>IK</sub> | Clamp diode voltage                  | V <sub>CC</sub> = Min., I <sub>IN</sub> = –18mA                                                                       |                        | –           | –0.7 | –1.2 | V     |
| I <sub>OH</sub> | Output HIGH current                  | V <sub>CC</sub> = 3.3V, V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> , V <sub>OUT</sub> = 1.5V <sup>(5)</sup> |                        | –25         | –45  | –80  | mA    |
| I <sub>OL</sub> | Output LOW current                   | V <sub>CC</sub> = 3.3V, V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> , V <sub>OUT</sub> = 1.5V <sup>(5)</sup> |                        | 25          | 45   | 90   |       |
| I <sub>OS</sub> | Short circuit current <sup>(5)</sup> | V <sub>CC</sub> = Max., V <sub>OUT</sub> = GND <sup>(5)</sup>                                                         |                        | –50         | –100 | –180 |       |
| V <sub>H</sub>  | Input Hysteresis                     |                                                                                                                       |                        | –           | 150  | –    | mV    |
| R <sub>S</sub>  | Input Hysteresis                     |                                                                                                                       |                        |             | 22   |      | Ohm   |

### 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> = 3.3V, +25°C ambient and maximum loading.
3. V<sub>OH</sub> = V<sub>CC</sub> – 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 <sup>(1)</sup>                                                   |                                            | Min. | Typ <sup>(2)</sup> | Max. | Units                        |
|-----------------|-------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------|------|--------------------|------|------------------------------|
| $I_{CC}$        | Quiescent Power Supply Current                  | $V_{CC} = \text{Max.}$                                                           | $V_{IN} = \text{GND or } V_{CC}$           | —    | 0.1                | 30   | $\mu\text{A}$                |
| $\Delta I_{CC}$ | Supply Current per Inputs @ TTL HIGH            | $V_{CC} = \text{Max.}$                                                           | $V_{IN} = V_{CC} - 0.6\text{V}^{(3)}$      | —    | 47                 | 300  | $\mu\text{A}$                |
| $I_{CCD}$       | Supply Current per Input per MHz <sup>(4)</sup> | $V_{CC} = \text{Max.},$<br>Outputs Open<br>Per Output Toggling<br>50% Duty Cycle | $V_{IN} = V_{CC}$<br>$V_{IN} = \text{GND}$ | —    | 0.08               | 0.16 | $\text{mA/}$<br>$\text{MHz}$ |

#### Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at  $V_{CC} = 3.3\text{V}$ ,  $+25^\circ\text{C}$  ambient.
3. Per TTL driven input ( $V_{IN} = V_{CC} - 0.6\text{V}$ ); 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 ( $T_A = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ )

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

#### Notes:

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

### Maximum Switching Characteristics (Over operating range)

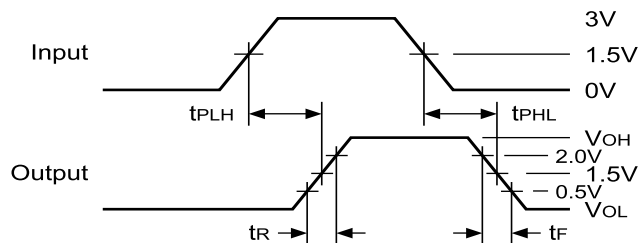
| Symbol                 | Description                                  | Condition                   | Max. | Units |
|------------------------|----------------------------------------------|-----------------------------|------|-------|
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay A to Bn <sup>(3)</sup>     | $C_L = 15\text{pF}$         | 2.5  | ns    |
| $t_R/t_F$              | Rise/Fall Time <sup>(2)</sup>                | $0.8\text{V} - 2.0\text{V}$ | 1.5  |       |
| $t_{SK(p)}$            | Pulse Skew (same pkg) <sup>(1,2)</sup>       | $C_L = 15\text{pF}$         | 0.35 |       |
| $t_{SK(o)}$            | Output Skew (same pkg) <sup>(1,2)</sup>      |                             | 0.20 |       |
| $t_{SK(t)}$            | Output Skew (different pkg) <sup>(1,2)</sup> |                             | 0.55 |       |
| $F_{IN}$               | Input Frequency <sup>(1,2)</sup>             |                             | 133  | MHz   |

#### Notes:

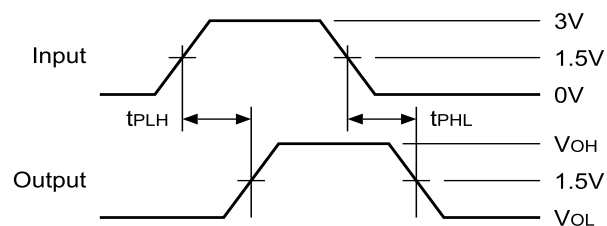
1. Other loading condition is described on page 4, “Test Circuits for All Outputs.”
2. These parameters are guaranteed by design.
3. Minimum propagation delay of 1.5ns is guaranteed by design.

## SWITCHING WAVEFORMS

### Propagation Delay

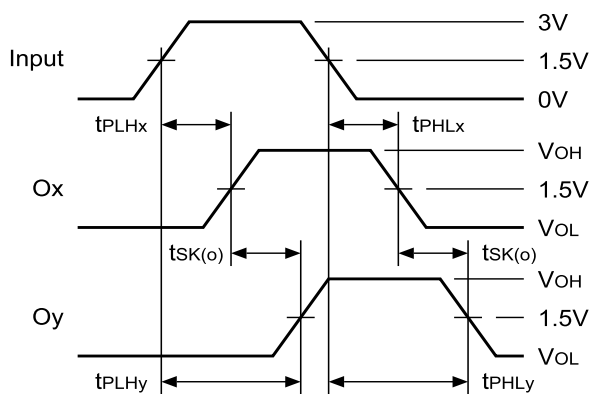


### Pulse Skew – $t_{sk(p)}$



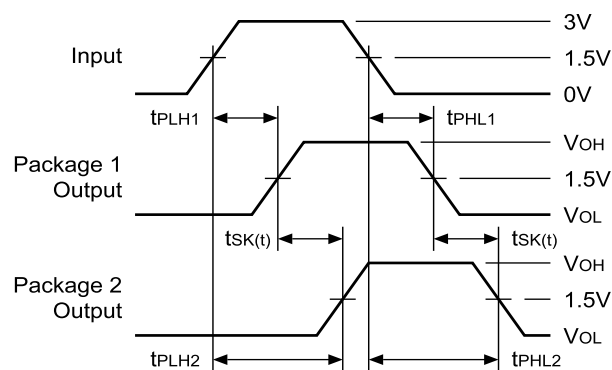
$$t_{sk(p)} = |t_{PHL} - t_{PLH}|$$

### Output Skew – $t_{sk(o)}$



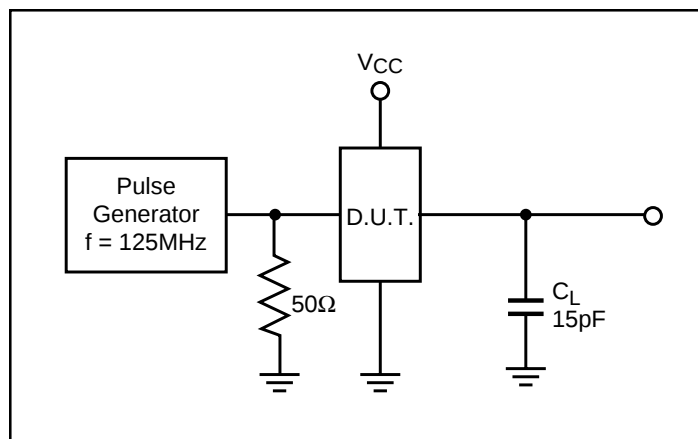
$$t_{sk(o)} = |t_{PLHy} - t_{PLHx}| \text{ or } |t_{PHLy} - t_{PHLx}|$$

### Package Skew – $t_{sk(t)}$



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

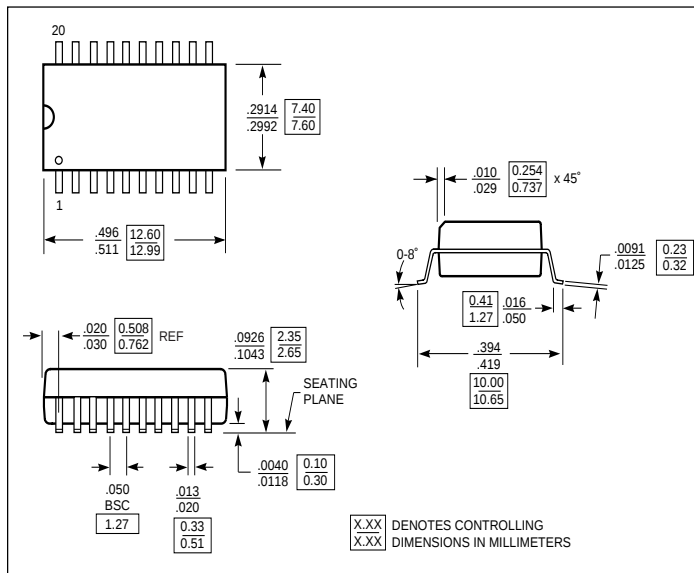
## Tests Circuits for All Outputs



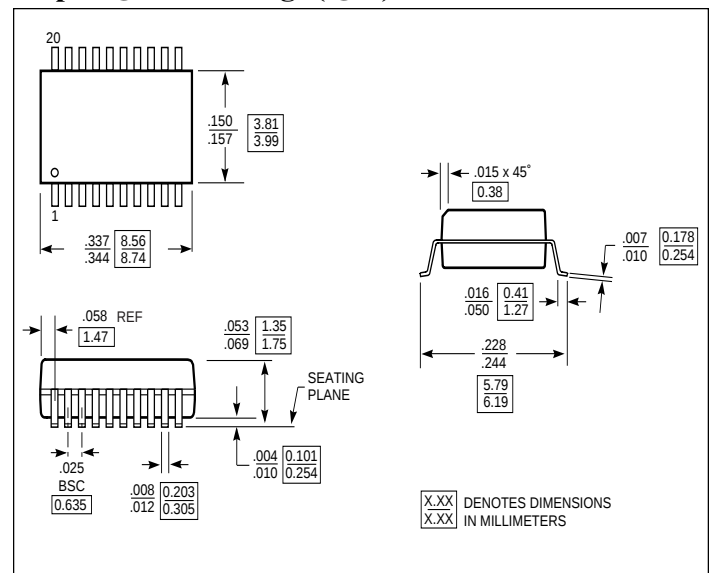
## Ordering Information

| Ordering Code | Package Type |
|---------------|--------------|
| PI49FCT32807S | 300mil SOIC  |
| PI49FCT32807Q | 150mil QSOP  |
| PI49FCT32807H | 209mil SSOP  |

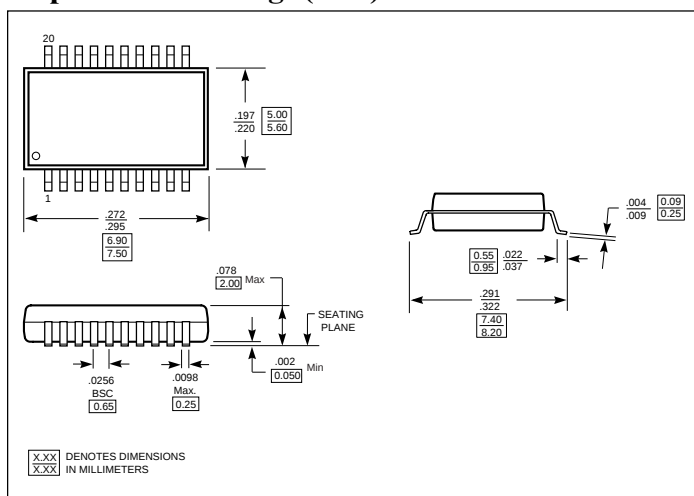
### 20-pin SOIC Package (S20)



### 20-pin QSOP Package (Q20)



### 20-pin SSOP Package (H20)



# Mouser Electronics

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