



# PI49FCT3807/PI49FCT3807A/ PI49FCT3807B/PI49FCT3807C

## 3.3V Fast CMOS Clock Driver

### Features

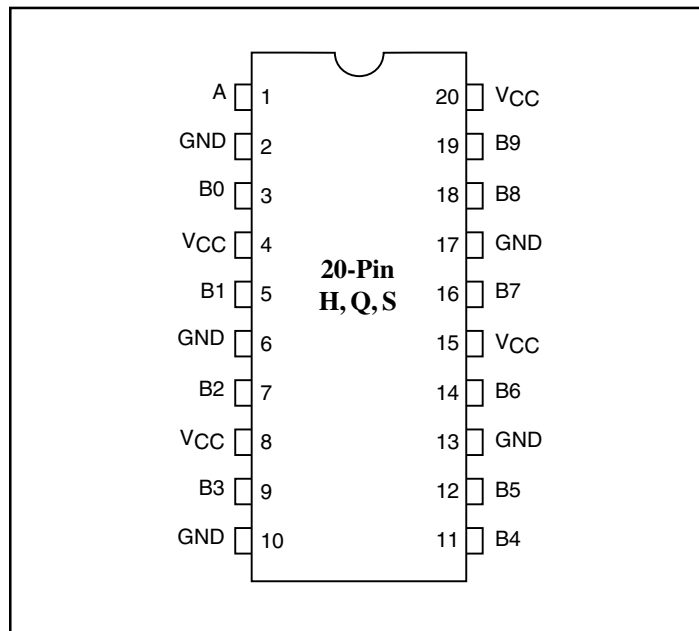
- 3.3V version of PI49FCT807
- Ultra low skew: 0.35ns
- Low Input Capacitance
- Minimum duty cycle distortion
- 1:10 fanout
- High speed: 3.5ns propagation
- TTL input and CMOS output compatible
  - $V_{OH} = 3.3V$  (typ.)
  - $V_{OH} = 0.3V$  (typ.)
- Industrial operation at  $-40^{\circ}C$  to  $85^{\circ}C$
- 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 industry leading speed grades.

The PI49FCT3807 is a 3.3V 1-to-10 clock driver. This low skew clock driver features one input and ten outputs fanout. The large fanout from a single input line reduces loading on input clock. TTL level outputs reduce noise levels on the part. Typical applications are clock and signal distribution.

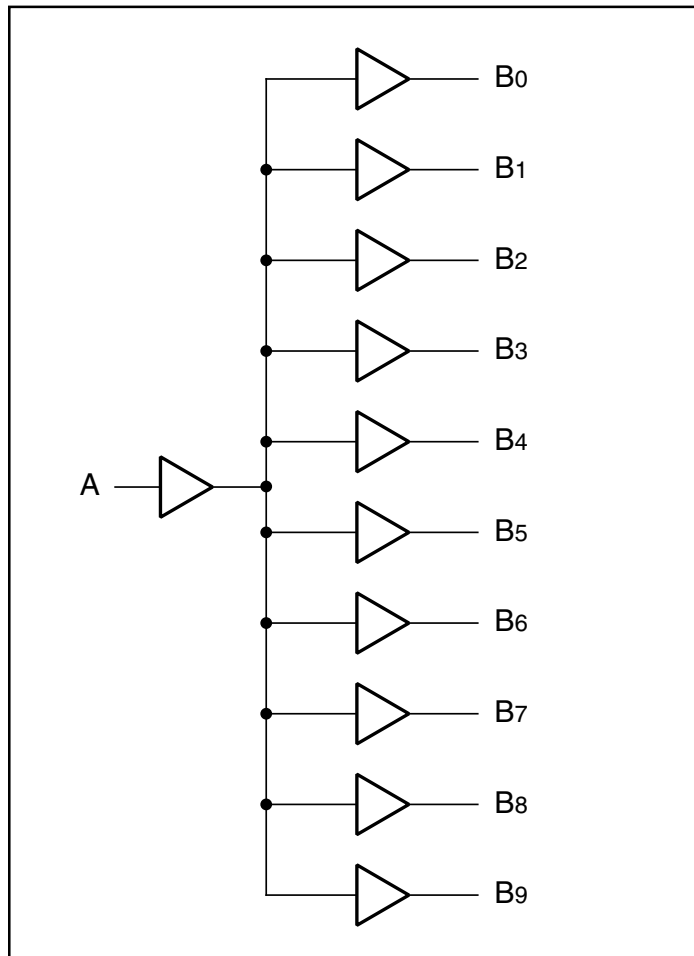
### Product Pin Configuration



### Product Pin Description

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

### Logic Block Diagram



## 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.

## Operating Range

Ambient Temperature = –40°C to +85°C V<sub>CC</sub> = 3.3V ±0.3V

## 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> =Min.,<br>V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                         | I <sub>OH</sub> = –0.1mA<br>I <sub>OH</sub> = –8mA                          | V <sub>CC</sub> –0.2<br>2.4 <sup>(3)</sup> | –<br>3.0        | –<br>–            | V     |
| V <sub>OL</sub>  | Output LOW voltage                   | V <sub>CC</sub> =Min.,<br>V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                         | I <sub>OL</sub> = 0.1mA<br>I <sub>OL</sub> = 16mA<br>I <sub>OL</sub> = 24mA | –<br>–<br>–                                | –<br>0.2<br>0.3 | 0.2<br>0.4<br>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> = 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                |       |
| V <sub>IK</sub>  | Clamp diode voltage                  | V <sub>CC</sub> = Min., I <sub>IN</sub> = –18mA                                                                       |                                                                             | –                                          | –0.7            | –1.2              | V     |
| I <sub>ODH</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> |                                                                             | –35                                        | –60             | –110              | mA    |
| I <sub>ODL</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> |                                                                             | 50                                         | 90              | 200               |       |
| I <sub>OS</sub>  | Short circuit current <sup>(5)</sup> | V <sub>CC</sub> = Max., V <sub>OUT</sub> = GND <sup>(5)</sup>                                                         |                                                                             | –60                                        | –135            | –240              |       |
| V <sub>H</sub>   | Input Hysteresis                     |                                                                                                                       |                                                                             | –                                          | 150             | –                 | mV    |

### 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 <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         |
| DI <sub>CC</sub> | Supply Current per Inputs @ TTL HIGH            | V <sub>CC</sub> =Max.                                                           | V <sub>IN</sub> = V <sub>CC</sub> – 0.6V <sup>(3)</sup>  | —    | 2.0                | 300  | μA         |
| I <sub>CCD</sub> | Supply Current per Input per MHz <sup>(4)</sup> | V <sub>CC</sub> =Max.,<br>Outputs Open<br>Per Output Toggling<br>50% Duty Cycle | V <sub>IN</sub> =V <sub>CC</sub><br>V <sub>IN</sub> =GND | —    |                    |      | mA/<br>MHz |

### 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>=3.3V, +25°C ambient.
- Per TTL driven input (V<sub>IN</sub> = V<sub>CC</sub> – 0.6V); 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>C</sub> formula. These limits are guaranteed but not tested.

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

| Parameters <sup>(1)</sup> | Description        | Test Conditions      | Typ | Max. | Units |
|---------------------------|--------------------|----------------------|-----|------|-------|
| C <sub>IN</sub>           | Input Capacitance  | V <sub>IN</sub> =0V  | 4.5 | 6.0  | pF    |
| C <sub>OUT</sub>          | Output Capacitance | V <sub>OUT</sub> =0V | 5.5 | 8.0  | pF    |

### Notes:

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

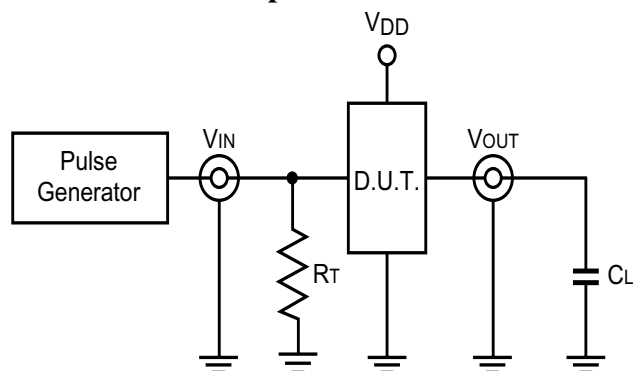
## Switching Characteristics over Operating Range

| Symbol                               | Description                                                                                                         | Condition <sup>(1)</sup> | 3807 |     | 3807A |     | 3807B |      | 3807C |      | Units |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------|------|-----|-------|-----|-------|------|-------|------|-------|
|                                      |                                                                                                                     |                          | Com. |     | Com.  |     | Com.  |      | Com.  |      |       |
|                                      |                                                                                                                     |                          | Min. | Max | Min.  | Max | Min.  | Max  | Min.  | Max  |       |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>A to B <sub>N</sub>                                                                            | CL = 50pF<br>RL = 500Ω   | 1.5  | 4.5 | 1.5   | 4.0 | 1.5   | 3.8  | 1.5   | 3.5  | ns    |
| t <sub>SK(O)</sub>                   | Skew between two outputs of<br>same package <sup>(3)</sup>                                                          |                          | —    | 0.5 | —     | 0.5 | —     | 0.35 | —     | 0.35 |       |
| t <sub>SK(P)</sub>                   | Skew between opposite<br>transitions of same output<br>(t <sub>PHL</sub> — t <sub>PHL</sub> ) <sup>(3)</sup>        |                          | —    | 0.5 | —     | 0.5 | —     | 0.35 | —     | 0.35 |       |
| t <sub>SK(t)</sub>                   | Skew between outputs of<br>different package at same<br>power supply, temperature and<br>speed grade <sup>(3)</sup> |                          | —    | 1.0 | —     | 1.0 | —     | 0.75 | —     | 0.75 |       |

### Notes:

- See test circuits and waveforms
- Minimum limits are guaranteed but not tested on Propagation Delays.
- These parameters are guaranteed by design.

## Tests Circuits for All Outputs<sup>(1)</sup>



### Switch Position

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

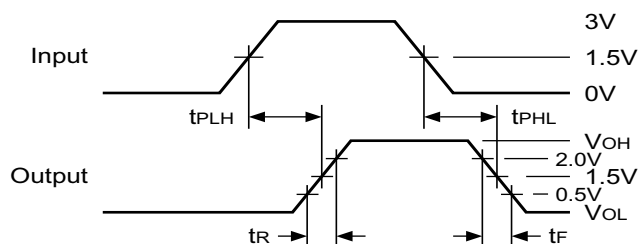
### DEFINITIONS:

CL = Load capacitance: includes jig and probe capacitance.

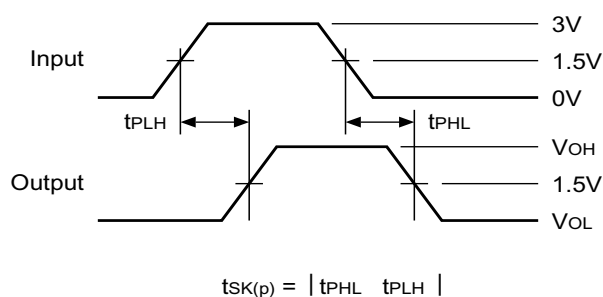
RT = Termination resistance: should be equal to ZOUT of the Pulse Generator.

## SWITCHING WAVEFORMS

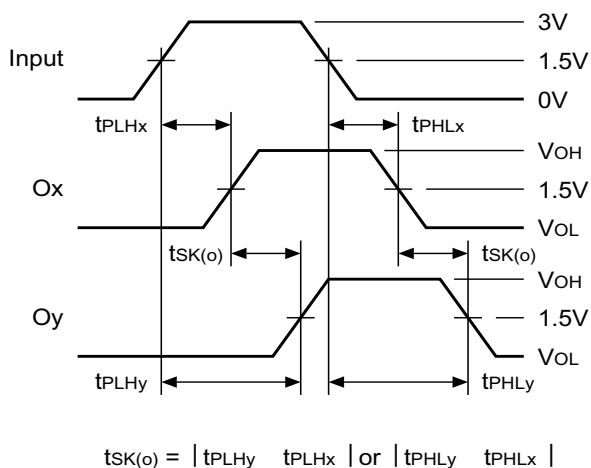
### Propagation Delay



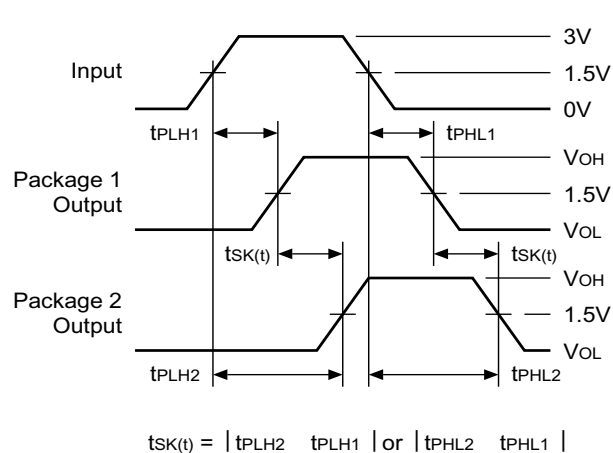
### Pulse Skew – tsk(p)

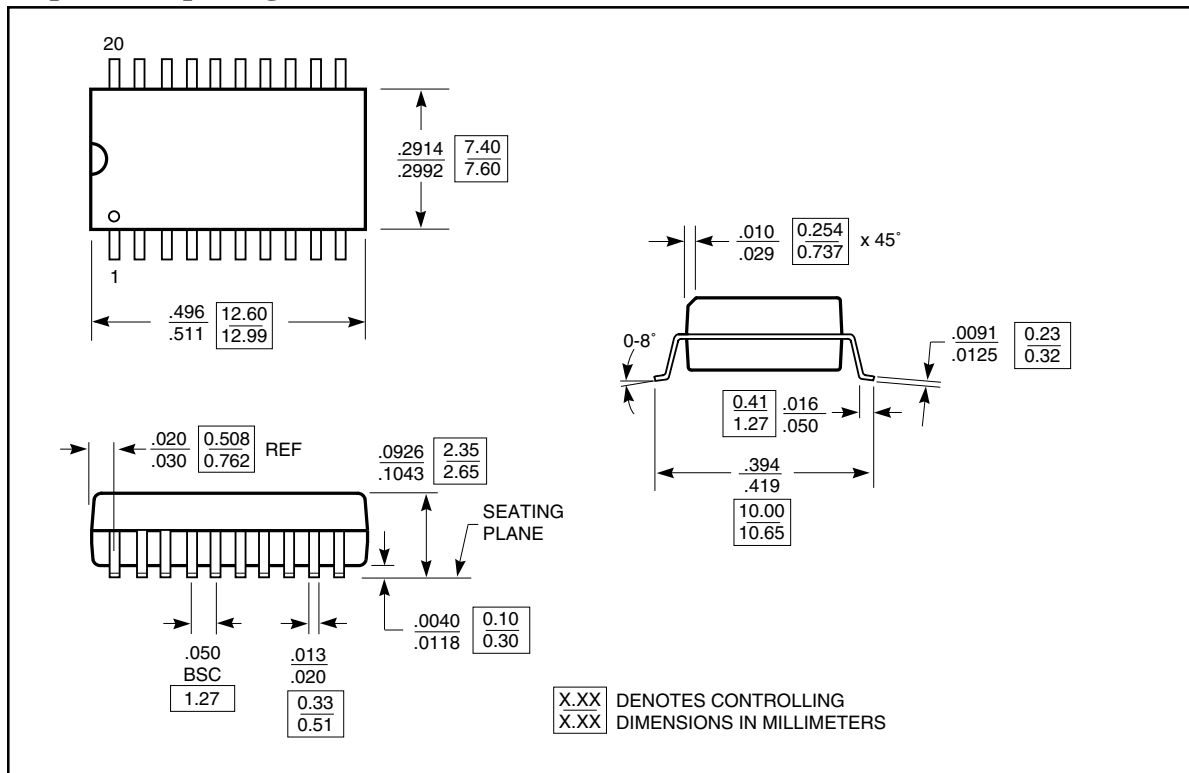
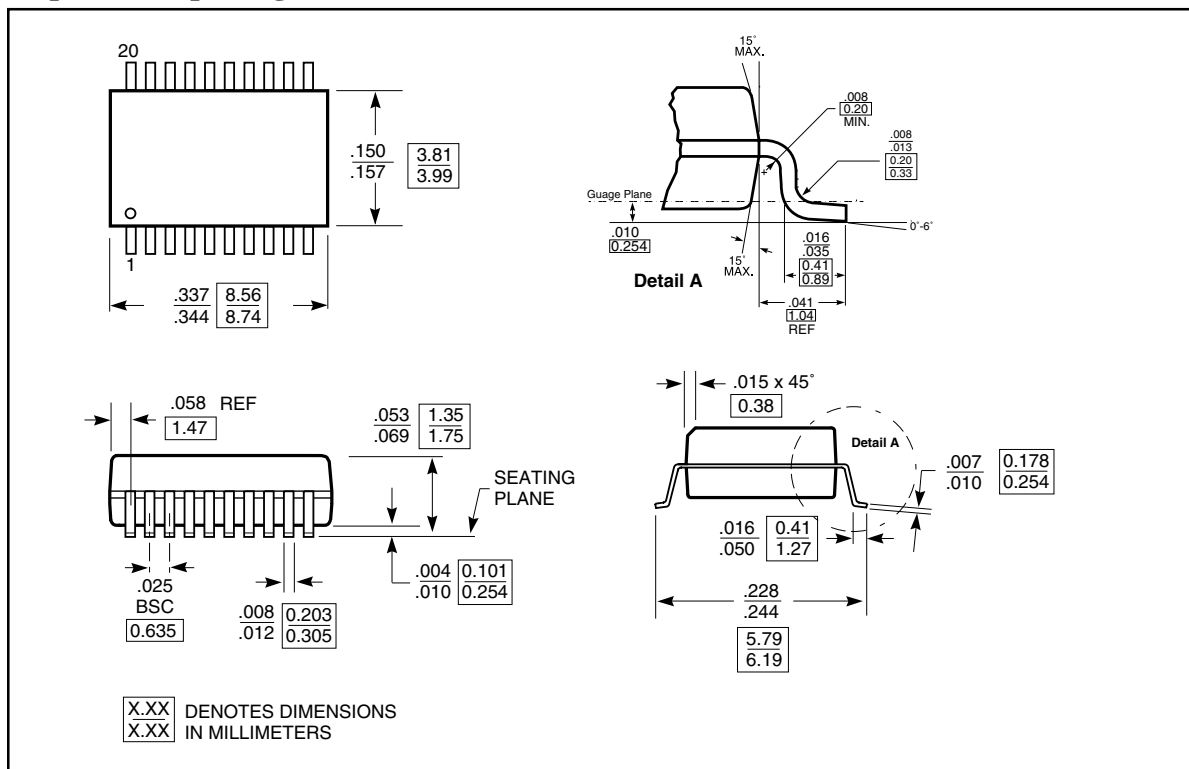


### Output Skew – tsk(o)

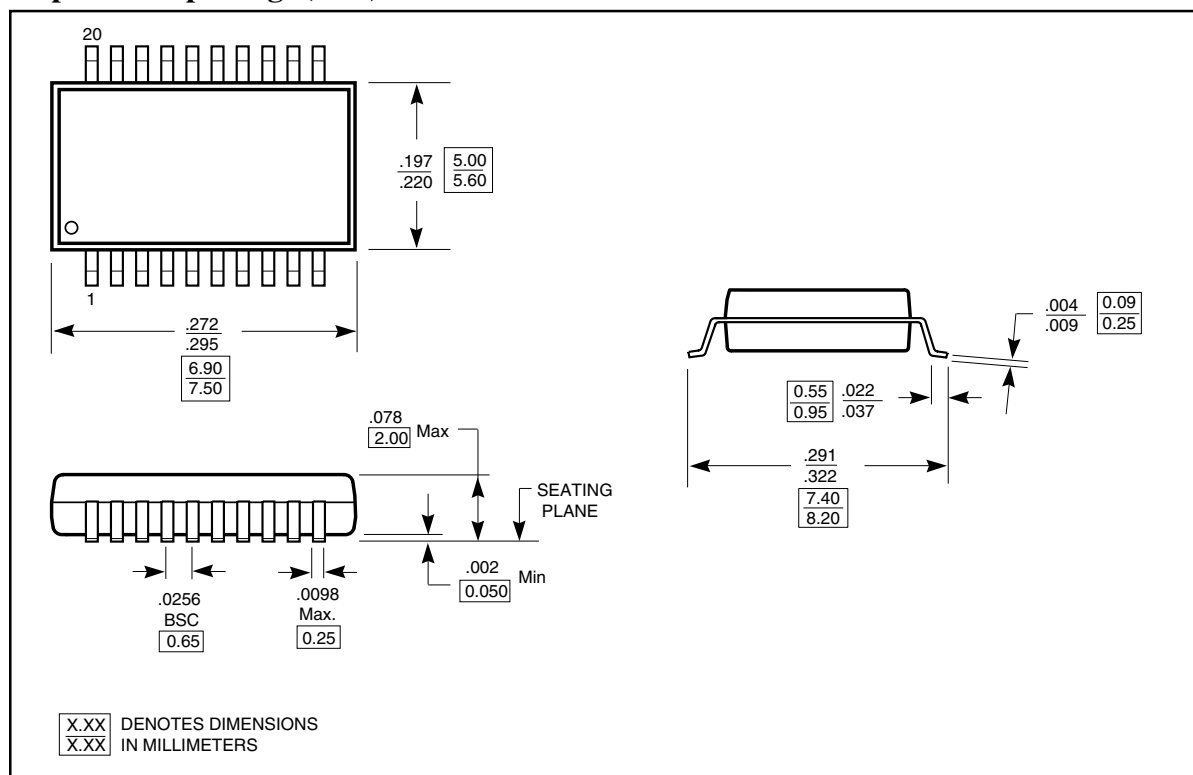


### Package Skew – tsk(t)



**20-pin SOIC package (S20)**

**20-pin QSOP package (Q20)**


## 20-pin SSOP package (H20)



## Ordering Information

| Ordering Code | Package Type | Rating     | Note                                                                    |
|---------------|--------------|------------|-------------------------------------------------------------------------|
| PI49FCT3807S  | 300-mil SOIC | Industrial | Refer to Switching Characteristic Table for Speed Grade Characteristics |
| PI49FCT3807Q  | 150-mil QSOP |            |                                                                         |
| PI49FCT3807H  | 209-mil SSOP |            |                                                                         |
| PI49FCT3807AS | 300-mil SOIC |            |                                                                         |
| PI49FCT3807AQ | 150-mil QSOP |            |                                                                         |
| PI49FCT3807AH | 209-mil SSOP |            |                                                                         |
| PI49FCT3807BS | 300-mil SOIC |            |                                                                         |
| PI49FCT3807BQ | 150-mil QSOP |            |                                                                         |
| PI49FCT3807BH | 209-mil SSOP |            |                                                                         |
| PI49FCT3807CS | 300-mil SOIC |            |                                                                         |
| PI49FCT3807CQ | 150-mil QSOP |            |                                                                         |
| PI49FCT3807CH | 209-mil SSOP |            |                                                                         |