PI49FCT3805/PI49FCT3806

3.3V Fast CMOS Buffer/Clock Driver

Features

➜ 3.3V version of PI49FCT805/806

➜ Extremely low output skew: 0.5ns

➜ Monitor ouput pin

➜ Clock busing wih 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
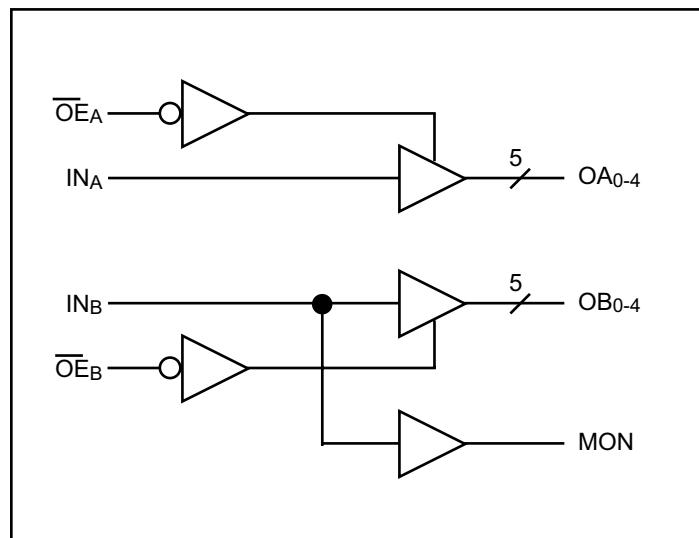

PI49FCT3806 Block Diagram
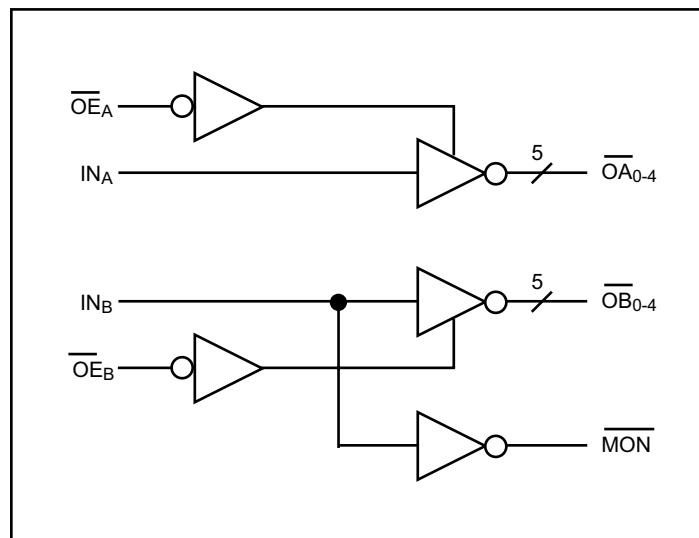
Pin Description

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
V_{CC}	Power

PI49FCT3805 Pin Configuration

```
        V_CCA  □ 1      20 □ V_CCB
         _OA_0 □ 2      19 □ _OB_0
         _OA_1 □ 3      18 □ _OB_1
         _OA_2 □ 4      17 □ _OB_2
        GND_A  □ 5      16 □ GND_B
         _OA_3 □ 6      15 □ _OB_3
         _OA_4 □ 7      14 □ _OB_4
        GND_Q  □ 8      13 □ MON
         OE_A  □ 9      12 □ OE_B
         IN_A  □ 10     11 □ IN_B
```
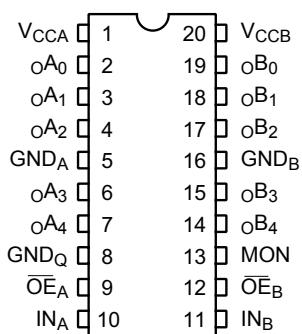
PI49FCT3805 Truth Table[1]

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:
1. H = High Voltage Level, L = Low Voltage Level
   Z = High Impedance

PI49FCT3806 Pin Configuration

```
        V_CCA  □ 1      20 □ V_CCB
        OA_0   □ 2      19 □ OB_0
        OA_1   □ 3      18 □ OB_1
        OA_2   □ 4      17 □ OB_2
        GND_A  □ 5      16 □ GND_B
        OA_3   □ 6      15 □ OB_3
        OA_4   □ 7      14 □ OB_4
        GND_Q  □ 8      13 □ MON
        OE_A   □ 9      12 □ OE_B
        IN_A   □ 10     11 □ IN_B
```
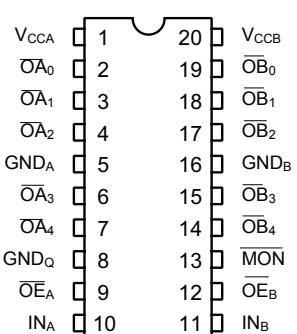
PI49FCT3806 Truth Table[1]

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:
1. H = High Voltage Level, L = Low Voltage Level, Z = High Impedance

Capacitance (T_A = 25°C, f = 1 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:

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

Electrical Specifications

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 & Vcc 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 RAT-INGS 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	V_{CC} -0.2	-		V
			I_{OH} = -8mA	2.4 (3)	3.0		
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		-	0.2	
			I_{OL} = 16mA		0.2	0.4	
			I_{OL} = 24mA		0.3	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_{OZH}	High Impedance Output Current	V_{CC} = Max., All outputs Disabled	V_{OUT} = V_{CC} V_{OUT} = GND	-1		1	
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_{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		mV

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.

Power Supply Characteristics (T_A = –40°C to +85°C, V_{CC} = 3.3V ±0.3V)

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

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.

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 Ic formula. These limits are guaranteed but not tested.

6. I_C = $I_{QUIESCENT}$ + I_{INPUTS} + $I_{DYNAMIC}$
   I_C = I_{CC} + ΔI_{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} – 0.6V)
   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 $(T_A = -40°C$ to $+85°C$, $V_{CC} = 3.3V \pm 0.3V)$

Parameter	Description	Test Conditions[1]	3805 3806 Com.		3805A 3806A Com.		3805B 3806B Com.		3805C 3806C Com.		Units
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
t_{PLH} t_{PLH}	Propagation Delay IN_A to OA_N, IN_B to OB_N		1.5	6.5	1.5	5.8	1.5	5.0	1.5	4.5	
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	$C_L = 50pF$ $R_L = 500\Omega$	1.5	7.0	1.5	7.0	1.5	6.0	1.5	5.0	ns
$t_{SK(o)}$[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 $F_{IN} > 100$ MHz
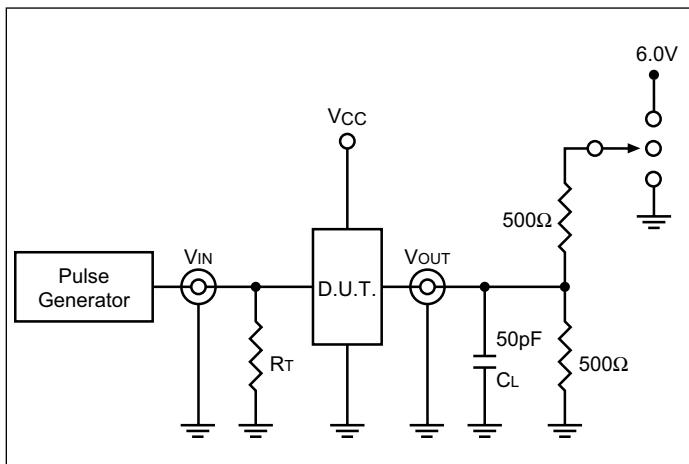
Switch Position

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.

Switching Waveforms
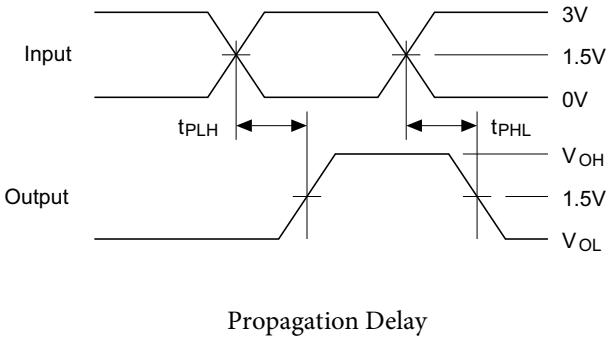
Propagation Delay
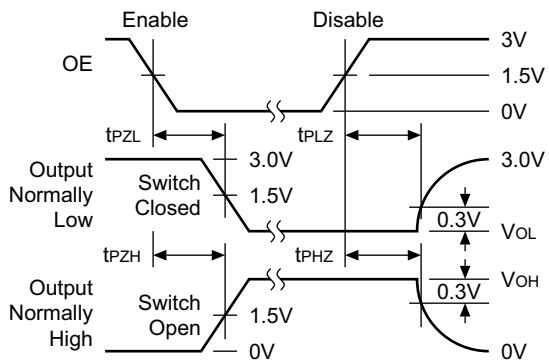
Enable and Disable Times
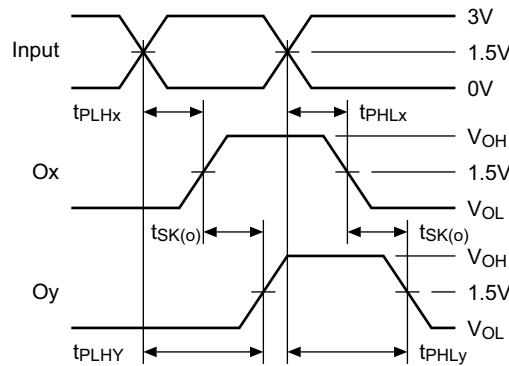
$t_{SK(o)} = |\ t_{PLHv} - t_{PLHx}\ |\ \text{or}\ |\ t_{PHLv} - t_{PHLx}\ |$

Output Skew – $t_{SK(O)}$
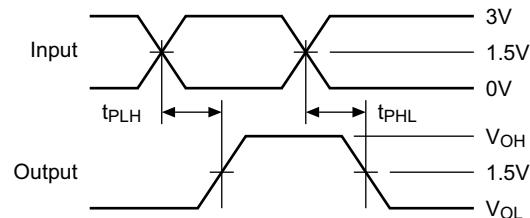
$t_{SK(p)} = |\ t_{PHL} - t_{PLH}\ |$

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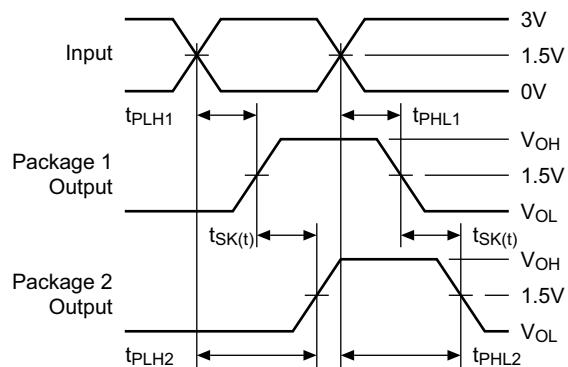
$t_{SK(t)} = |\ t_{PLH2} - t_{PLH1}\ |\ \text{or}\ |\ t_{PHL2} - t_{PHL1}\ |$

Package Skew – $t_{SK(t)}$

Packaging Mechanical: 20-pin SSOP (H20)

SYMBOL	COMMON DIMENSION MILLIMETERS		
	MIN.	NOM.	MAX.
A	––	––	2.0
A1	0.05	––	––
A2	1.65	1.75	1.85
b	0.22	––	0.38
b1	0.22	0.30	0.33
c	0.09	––	0.25
c1	0.09	0.15	0.21
E	7.40	7.80	8.20
E1	5.00	5.30	5.60
D	6.90	7.20	7.50
e	0.65 BSC		
L	0.55	0.75	0.95
L1	1.25 REF.		
R1	0.09	––	––
θ	0°	4°	8°

NOTE:
1. Controlling dimensions in millimeters
2. Ref.: JEDEC MS–150B/AE
3. Package Outline Exclusive of Mold Flash and Metal Burr

PERICOM® Semiconductor Corporation	**DATE: 04/10/08**
DESCRIPTION: 20-Pin, 209-Mil Wide, SSOP	
PACKAGE CODE: H20	
DOCUMENT CONTROL #: PD-1240	**REVISION: E**

08-0140

Note:

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

Packaging Mechanical: 20-pin SOIC (S)

DOCUMENT CONTROL NO.
PD - 1006

REVISION: D
DATE: 03/09/05

.2914 / .2992 | 7.40 / 7.60

.496 / .511 | 12.60 / 12.99

.020 / .030 | 0.508 / 0.762 REF

.0926 / .1043 | 2.35 / 2.65

SEATING PLANE

.0040 / .0118 | 0.10 / 0.30

.050 BSC | 1.27

.013 / .020 | 0.33 / 0.51

.010 / .029 | 0.254 / 0.737 x 45°

0-8°

.0091 / .0125 | 0.23 / 0.32

0.41 / 1.27 | .016 / .050

.394 / .419 | 10.00 / 10.65

X.XX / X.XX DENOTES CONTROLLING DIMENSIONS IN MILLIMETERS

Notes:
1) Controlling dimensions in millimeters.
2) Ref: JEDEC MS-013D/AC

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

DESCRIPTION: 20-Pin, 300-Mil Wide, SOIC

PACKAGE CODE: S

Note:

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

Packaging Mechanical: 20-contact SSOP (H20)

DOCUMENT CONTROL NO.
PD - 1202

REVISION: H
DATE: 10/22/07

20

.150 / .157 | 3.81 / 3.99

1

.337 / .344 | 8.56 / 8.74

15°
MAX.

.008 / 0.20 MIN.

.008 / .013 | 0.20 / 0.33

Guage Plane

.010 | 0.254

15°
MAX.

Detail A

.016 / .035 | 0.41 / 0.89

0°-6°

.041 | 1.04 REF

.058 REF | 1.47

.053 / .069 | 1.35 / 1.75

SEATING PLANE

.025 BSC | 0.635

.008 / .012 | 0.203 / 0.305

.004 / .010 | 0.101 / 0.254

.015 x 45° | 0.38

Detail A

.007 / .010 | 0.178 / 0.254

.228 / .244

5.79 / 6.19

| X.XX / X.XX | DENOTES DIMENSIONS 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®

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
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