PERICOM

PI74STX2G79

SOTiny™ Logic STX
Dual Positive-Edge-Triggered
D-Type Flip-Flop

Features

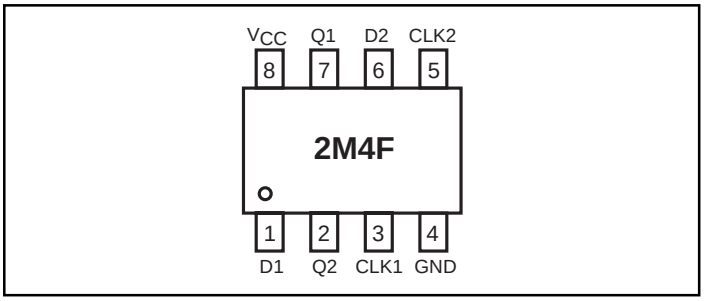
- High-Speed: t_{PD} = 2.4ns typical into 50pF @ 5V V_{CC}
- Broad Operating Range: V_{CC} = 1.65V–5.5V
- Power down high-impedance inputs/outputs
- High Output Drive: ±24mA at 3V V_{CC}
- Package: 8-pin space saving MSOP (U)

Description

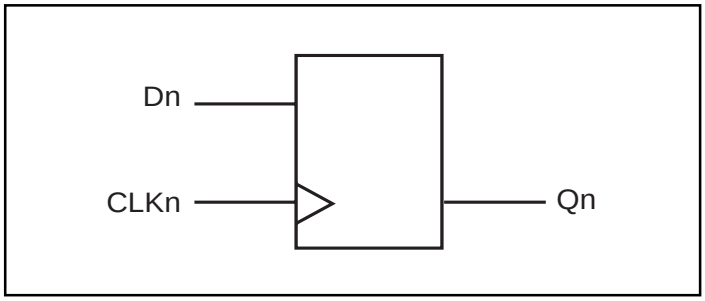
The PI74STX2G79 is a Dual Positive-Edge-Triggered D-Type Flip-Flop that operates over the 1.65V to 5.5V V_{CC} operating range.

Pericom's PI74STX series of products are produced using the Company's advanced submicron technology.

Pinout



Block Diagram



Pin Description

Pin Names	Description
CLKn	Clocks
Dn	Inputs
Qn	Outputs

Function Table

Inputs		Output
CLK	**D**	**Q**
↑	H	H
↑	L	L
L	X	Q_0

Note:

H = HIGH Voltage Level
L = LOW Voltage Level
X = Don't Care
↑ = LOW-to-HIGH Transition
Q_0 = Level of Q before the indicated steady-state input conditions were established

Recommended Operating Conditions(1)

Parameter	Condition	Min.	Max.	Units
Supply Voltage (V_{CC})		1.65	5.5	V
Input Voltage (V_{IN})		0	5.5	
Output Voltage (V_{OUT})		0	V_{CC}	
Operating Temperature		–40	85	°C
Input Rise and Fall Time (t_r,t_f)	V_{CC} = 1.8V, 2.5V±0.2V	0	20	ns/V
	V_{CC} = 3.3V, ±0.3V	0	10	
	V_{CC} =5.0V, ±0.5V	0	5	

Note:

1. Unused inputs must be held HIGH or LOW. They may not float.

Absolute Maximum Ratings

Supply Voltage (V_{CC}) ..... –0.5V to +6V	DC Output Current (I_{OUT}) ..... ±50mA
DC Input Voltage (V_{IN}) ..... –0.5V to +6V	DC V_{CC}/GND Current (I_{CC}/I_{GND}) ..... ±50mA
DC Output Voltage (V_{OUT}) ..... –0.5V to +6V	Storage Temperature (T_{STG}) ..... –65°C to +150°C
DC Input Diode Current (I_{IK}) ..... –50mA to 20mA	Junction Lead Temperature (IOS) ..... 260°C
DC Output Diode Current (I_{OK}) ..... –50mA to 20mA	Power Dissipation 300mW

Note:
Absolute maximum ratings are DC values beyond which the device may be damaged or have its useful life impaired. The datasheet specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Pericom does not recommend operation outside datasheet specifications.

DC Electrical Characteristics (Over supply voltage and operating temperature ranges, unless otherwise specified)

Symbol	Parameter	V_{CC} (V)	Conditions		T_A = +25°C			T_A = –40 to +85°C		Units
					Min.	Typ.	Max.	Min.	Max.	
V_{IH}	HIGH Level Input Voltage	1.65-1.95 2.3-5.5			0.75V_{CC} 0.70V_{CC}			0.75V_{CC} 0.70V_{CC}		V
V_{IL}	LOW Level Input Voltage	1.65-1.95 2.3-5.5					0.25V_{CC} 0.30V_{CC}		0.25V_{CC} 0.30V_{CC}	
V_{OH}	HIGH Level Output Voltage	1.65 1.8 2.3 3.0 4.5	V_{IN} = V_{IL}	I_{OH} = –100µA	1.55 1.7 2.2 2. 4.4	1.65 1.79 2.29 2.99 4.5		1.55 1.9 2.4 2.3 4.4		
		1.65 2.3 3.0 3.0 4.5		I_{OH} = –4mA I_{OH} = –8mA I_{OH} = –16mA I_{OH} = –24mA I_{OH} = –32mA	1.29 1.9 2.4 2.3 3.8	1.52 2.13 2.71 2.55 4.20		1.29 1.9 2.4 2.3 3.8		
V_{OL}	LOW Level Output Voltage	1.65 1.8 2.3 3.0 4.5	V_{IN} = V_{IH}	I_{OL} = 100µA		0.01 0.01 0.01 0.00 0.00	0.1 0.1 0.1 0.1 0.1		0.1 0.1 0.1 0.1 0.1	
		1.65 2.3 3.0 3.0 4.5		I_{OL} = 4mA I_{OL} = 8mA I_{OL} = 16mA I_{OL} = 24mA I_{OL} = 32mA		0.08 0.10 0.18 0.28 0.28	0.24 0.3 0.4 0.55 0.55		0.24 0.3 0.4 0.55 0.55	
I_{IN}	Input Leakage Current	0-5.5	V_{IN} = 5.5V, GND		–1		1	–1	1	µA
I_{OFF}	Power Off Leakage Current	0.0	V_{IN} or V_{OUT} = 5.5V		–1		1	–1	1	
I_{CC}	Quiescent Supply Current	1.65-5.5	V_{IN} = 5.5V, GND				2.0		20	

AC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	Conditions	T_A = +25°C			T_A = –40°C to +85°C		Units	Fig. No.
				Min.	Typ.	Max.	Min.	Max.		
f_{MAX}	Maximum Clock Frequency	1.8 ±0.15 2.5 ±0.2 3.3 ±0.3 5.0 ±0.5	C_L = 50pF, R_L = 500Ω				100 125 150 150		MHz	1 3
t_{PLH}, t_{PHL}	Propagation Delay CLK to Q_{OUT}	1.8 ±0.15 2.5 ±0.2 3.3 ±0.3 5.0 ±0.5	C_L = 15pF, R_L = 1MΩ	3.0 1.8 1.5 1.0		9.0 6.0 4.0 3.0	3.0 1.8 1.5 1.0		ns	1 3
		3.3 ±0.3 5.0 ±0.5	C_L = 50pF, R_L = 500Ω	1.5 1.0		5.2 4.5	1.5 1.0			1 3
t_S	Setup Time, CLK to D_{IN}	1.8 ±0.15 2.5 ±0.2 3.3 ±0.3 5.0 ±0.5	C_L = 50pF, R_L = 500Ω	2.9 1.5 1.3 1.2						1 4
t_H	Hold Time, CLK to D_{IN}	1.8 ±0.15 2.5 ±0.2 3.3 ±0.3 5.0 ±0.5	C_L = 50pF, R_L = 500Ω	0.4 0.5 0.5 0.5						1 4
t_W	Pulse Width, CLK	1.8 ±0.15 2.5 ±0.2 3.3 ±0.3 5.0 ±0.5	C_L = 50pF, R_L = 500Ω	2.5 2.5 2.5 2.5						1 4

Capacitance[2]

Symbol	Parameter	Typ.	Max.	Units	Conditions
C_{IN}	Input Capacitance	3		pF	V_{CC} = Open, V_{IN} = 0V or V_{CC}
C_{OUT}	Output Capacitance	4			V_{CC} = 3.3V, V_{IN} = 0V or V_{CC}
C_{PD}	Power Dissipation Capacitance[3]	8 10 12 14			V_{CC} = 1.8V V_{CC} = 2.5V V_{CC} = 3.3V V_{CC} = 5.0V

Notes:

2. T_A = +25°C, f = 1 MHz
3. C_{PD} is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle (see Figure 2). C_{PD} is related to I_{CCD} dynamic operating current by the expression: $I_{CCD} = (C_{PD})(V_{CC})(f_{IN}) + (I_{CC}$ static).

AC Loading and Waveforms

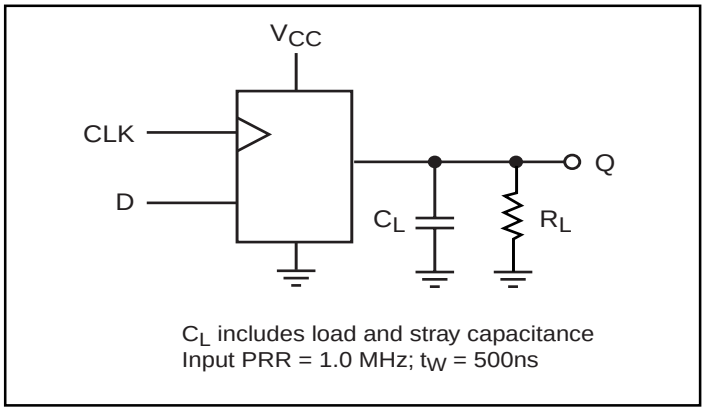


Figure 1. AC Test Circuit

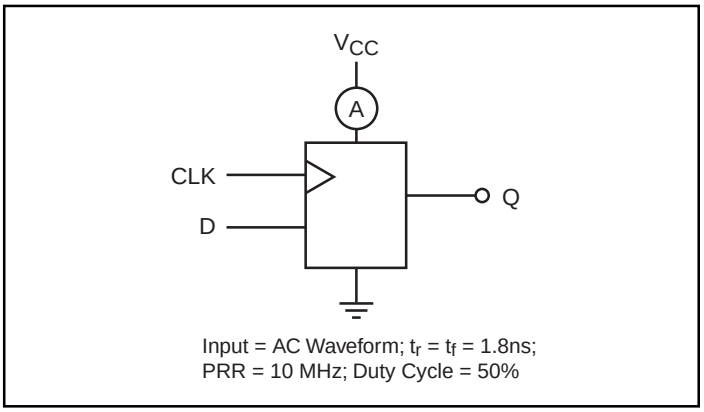


Figure 2. I_{CCD} Test Circuit

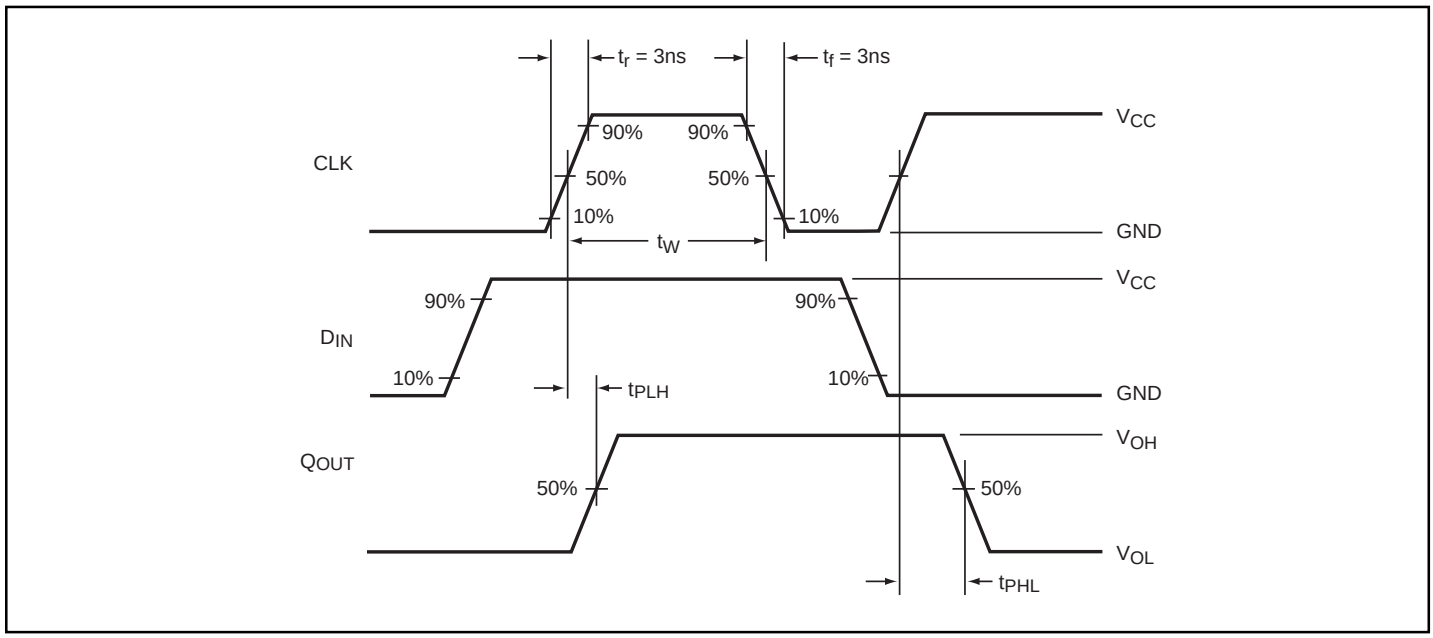


Figure 3. AC Waveforms

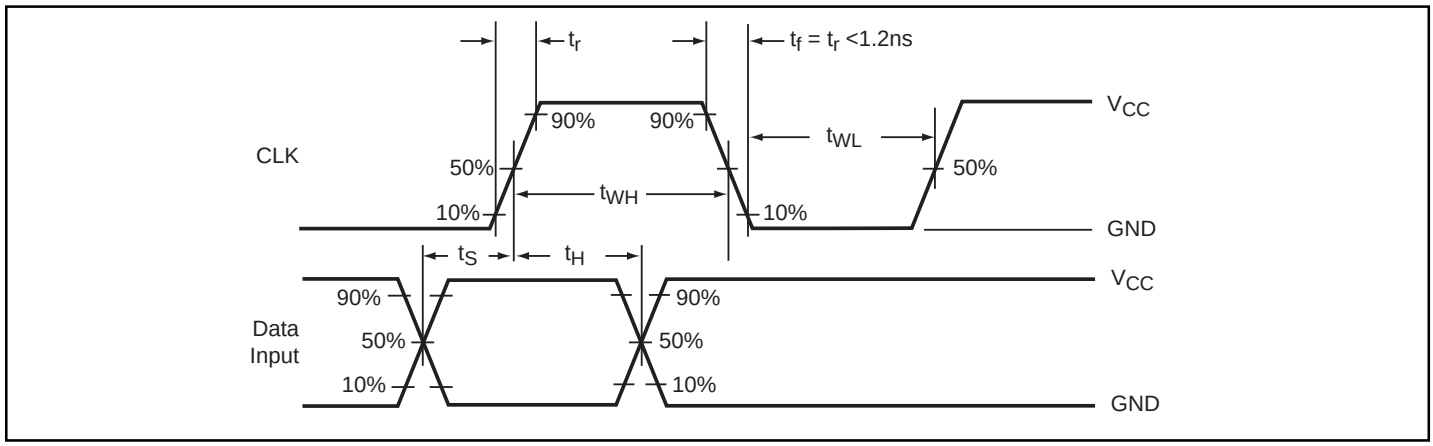
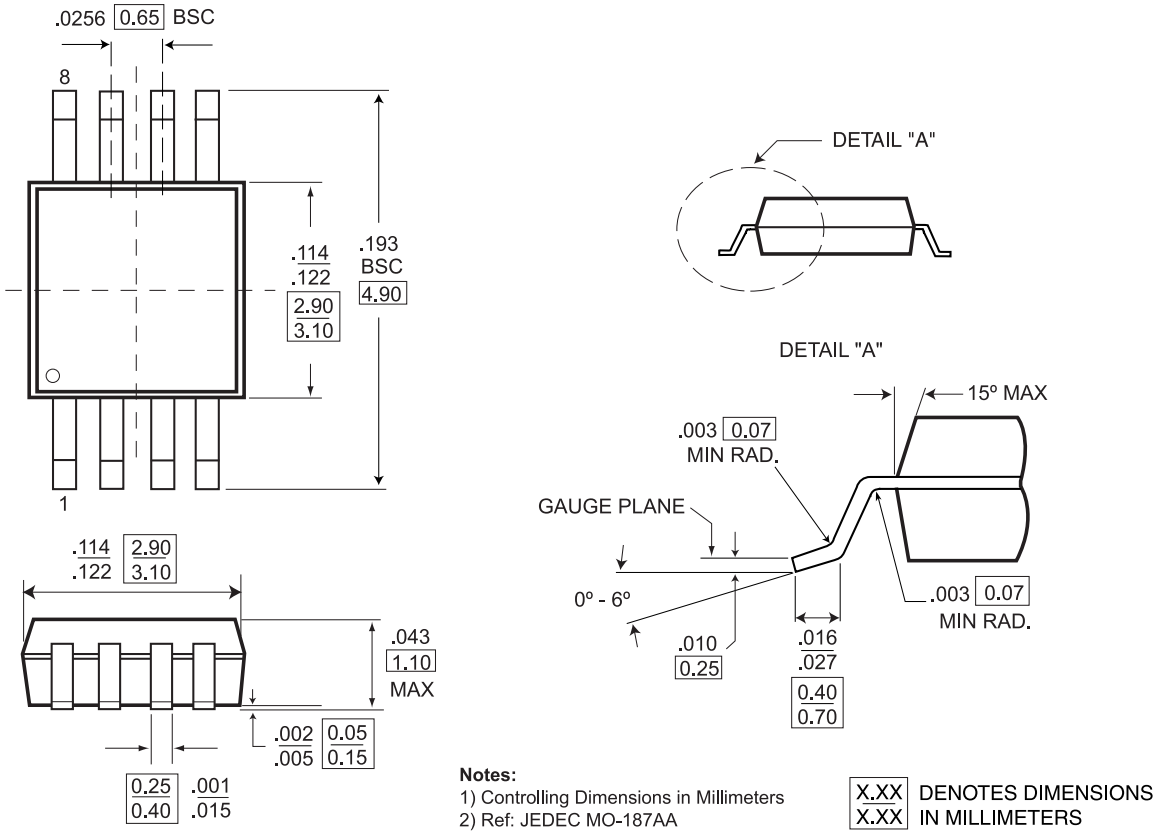


Figure 4. AC Waverforms

8-Pin MSOP (U) Package



Ordering Information

Part	Pin-Package	Top Markting	Operating Range
PI74STX2G79UX	8-Pin - MSOP	2M4F	–40°C to 85°C