

SOTiny™ Gate ST Buffer with 3-State Output

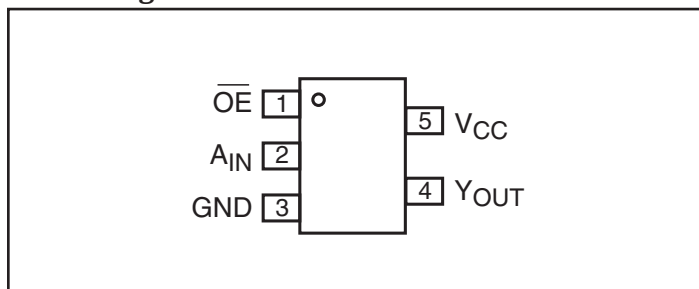
Features

- High-speed: $t_{PD} = 1.8\text{ns}$ typical
- Broad operating range: $V_{CC} = 1.8\text{V} - 3.6\text{V}$
- Power down high-impedance inputs/outputs
- High output drive: $\pm 24\text{mA}$ at $3\text{V } V_{CC}$
- Packaging (Pb-free & Green available):
— 5-pin SC70 (C)

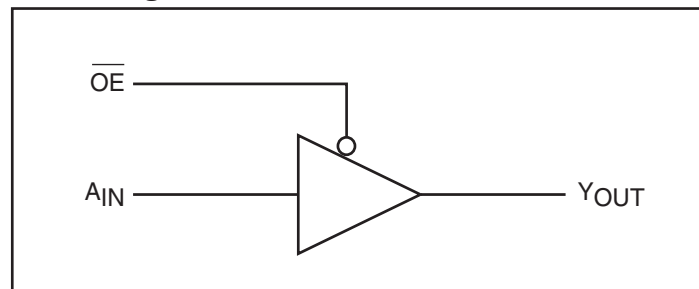
Description

The PI74ST1G125 is a buffer with 3-state output that operates over the 1.8V to $3.6\text{V } V_{CC}$ operating range.

Pin Configuration



Block Diagram



Pin Description

Pin Name	Description
A_{IN}	Input
$\overline{OE}$	Input
Y_{OUT}	Output

Recommended Operating Conditions⁽¹⁾

Parameter	Condition	Min.	Max.	Units
Supply Voltage (V_{CC})		1.8	3.6	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)	$V_{CC} = 1.8\text{V}, 2.5\text{V} \pm 0.2\text{V}$	0	20	ns/V
	$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$	0	10	

Function Table⁽¹⁾

Inputs		Outputs
$\overline{OE}$	A_{IN}	Y_{OUT}
L	L	L
L	H	H
H	X	X

Notes:

- H = HIGH Logic Level
- L = LOW Logic Level
- X = Don't Care
- Z = HIGH Impedance State

Notes:

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

Absolute Maximum Ratings

Supply Voltage (V_{CC})		-0.5V to +4V
DC Input Voltage (V_{IN})		-0.5V to +6V
DC Output Voltage (V_{OUT})		-0.5V to +6V
DC Input Diode Current (I_{IK})		-50mA to 20mA
DC Output Diode Current (I_{OK})		-50mA to 20mA
DC Output Current (I_{OUT})		±50mA
DC V_{CC}/GND Current (I_{CC}/I_{GND})		±50mA
Storage Temperature (T_{STG})		-65°C to +150°C
Junction Lead Temperature (I_{OS})		200°C
Power Dissipation	SOT23	200mW
	SC70	150mW

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° C to +85°C		Units
					Min.	Typ.	Max.	Min.	Max	
V _{IH}	HIGH Level Input Voltage	1.8 2.3-3.6			0.75V _{CC} 0.70V _{CC}			0.75V _{CC} 0.70V _{CC}		V
V _{IL}	LOW Level Input Voltage	1.8 2.3-3.6					0.25V _{CC} 0.30V _{CC}		0.25V _{CC} 0.30V _{CC}	
V _{OH}	HIGH Level Output Voltage	1.8	V _{IN} = V _{IH}	I _{OH} = -100μA	1.7	1.79		1.7		
		2.3			2.2	2.29		2.2		
		3.0			2.9	2.99		2.9		
		2.3		I _{OH} = -8mA	1.9	2.13		1.9		
3.0		I _{OH} = -16mA	2.4	2.71		2.4				
3.0		I _{OH} = -24mA	2.3	2.55		2.3				
V _{OL}	LOW Level Out-put Voltage	1.8	V _{IN} = V _{IL}	I _{OL} = 100μA		0.01	0.1		0.1	
		2.3				0.01	0.1		0.1	
		3.0				0.00	0.1		0.1	
		2.3		I _{OH} = 8mA		0.10	0.3		0.3	
3.0		I _{OH} = 16mA		0.18	0.4		0.4			
3.0		I _{OH} = 24mA		0.28	0.55		0.55			
I _{IN}	Input Leakage Current	0-3.6	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 Sup- ply Current	1.8-3.6	V _{IN} = 5.5V, GND				2.0		20	
I _{OZ}	3-State Output Leakage	1.8-3.6	V _{IN} = V _{IH} or V _{IL} V _O = V _{CC} or GND				±1		±10	

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		
t _{PLH} t _{PHL}	Propagation Delay	1.8 2.5±0.2 3.3±0.3	C _L = 15pF, R _L = 1MΩ	2.0 0.8 0.5	2.8 1.8 1.3	3.7 2.5 2.0	2.0 0.8 0.5	4.1 2.8 2.2	ns	1 3
t _{PLH} t _{PHL}	Propagation Delay	3.3±0.3	C _L = 50pF, R _L = 500Ω	1.5	2.6	3.4	1.5	3.7		1 3
t _{PZL} t _{PZH}	Output Enable Time	1.8 2.5±0.2 3.3±0.3	C _L = 50pF, R _D = 500Ω, R _U = 500Ω, S ₁ = GND for t _{PZH} S ₁ = V _{IN} for t _{PZL} V _{IN} = 2 x V _{CC}	2 1.5 1.5	5.8 4.1 3.1	7.5 5.4 4.1	2 1.5 1.5	8.3 5.9 4.5		1 3
t _{PLZ} t _{PHZ}	Output Disable Time	1.8 2.5±0.2 3.3±0.3	C _L = 50pF, R _D = 500Ω, R _U = 500Ω, S ₁ = GND for t _{PHZ} S ₁ = V _{IN} for t _{PLZ} V _{IN} = 2 x V _{CC}	2 1.5 1.5	4.9 3.6 2.8	5.9 4.8 3.4	2 1.5 1.0	6.5 5.3 3.7		1 3
C _{IN}	Input Capacitance	V _{IN} = 0			4				pF	
C _{OUT}	Output Capacitance	V _{IN} = 0			8					
C _{PD} ⁽¹⁾	Power Dissipation Capacitance	3.3			17					2

Notes:

- 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:

$$I_{CCD} = (C_{PD})(V_{CC})(f_{IN}) + (I_{CC} \text{ static}).$$

C_L includes load and stray capacitance
 Input PRR = 1.0 MHz; $t_W = 500\text{ns}$

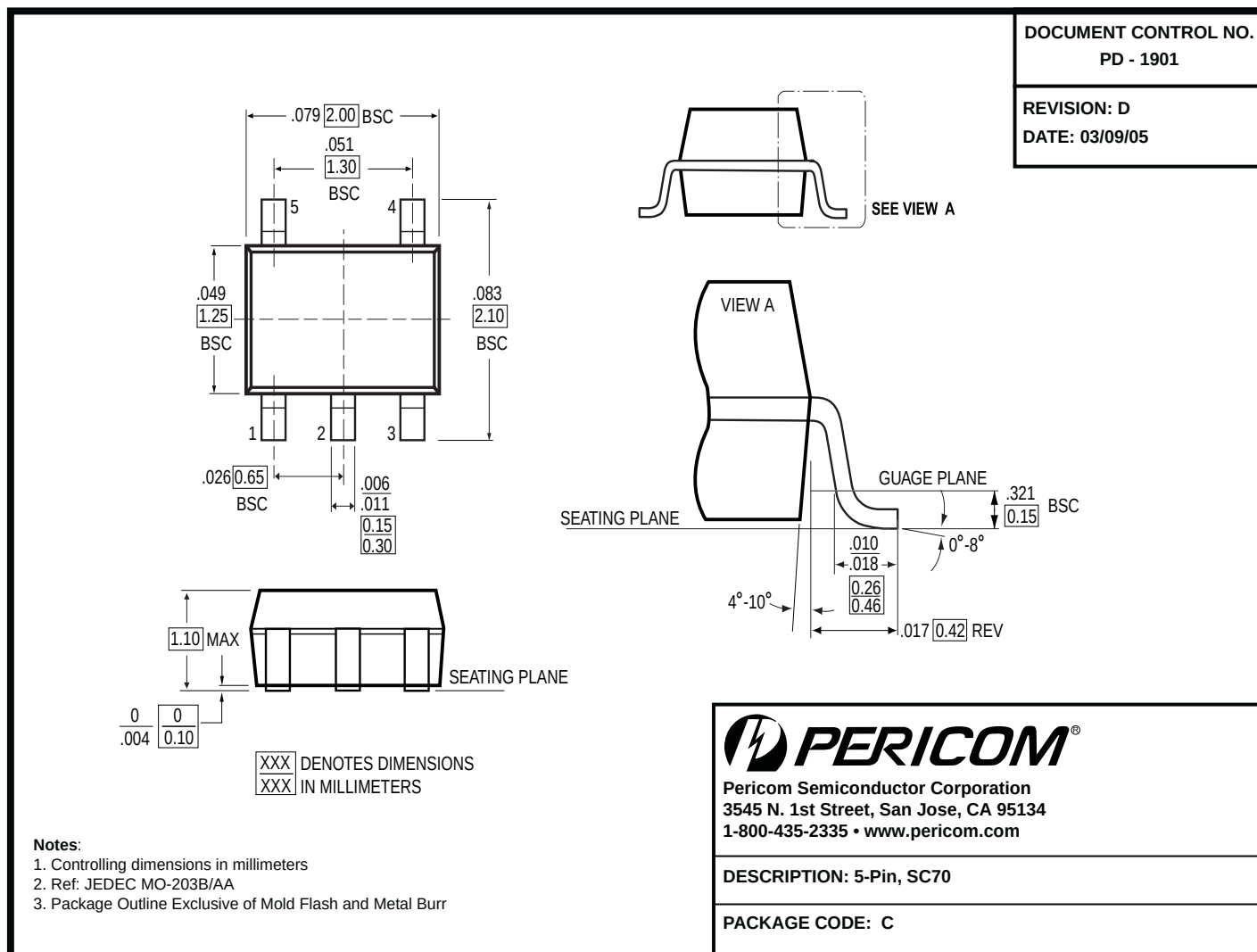
Input = AC Waveform; $t_r = t_f = 1.8\text{ns}$;
 PRR = 10 MHz; Duty Cycle = 50%

The figure displays two sets of timing diagrams for a 4-bit ripple-carry adder. Each set includes a carry-in signal, four carry signals (C1, C2, C3, C4), and four output signals (S0, S1, S2, S3). The diagrams illustrate the propagation of the carry signal through the stages of the adder and the resulting output signals.

Top Diagram: Shows a carry-in signal that is high for a duration of 10 units. The carry signals C1, C2, C3, and C4 are shown as pulses. The output signals S0, S1, S2, and S3 are shown as pulses. The carry-in signal is labeled with a value of 10. The carry signals C1, C2, C3, and C4 are labeled with values of 90, 50, 50, and 10 respectively. The output signals S0, S1, S2, and S3 are labeled with values of 10, 50, 50, and 10 respectively.

Bottom Diagram: Shows a carry-in signal that is high for a duration of 10 units. The carry signals C1, C2, C3, and C4 are shown as pulses. The output signals S0, S1, S2, and S3 are shown as pulses. The carry-in signal is labeled with a value of 10. The carry signals C1, C2, C3, and C4 are labeled with values of 90, 50, 50, and 10 respectively. The output signals S0, S1, S2, and S3 are labeled with values of 10, 50, 50, and 10 respectively.

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Note:

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

Ordering Information

Ordering Code	Packaging Code	Package Type	Package Top Marking
PI74ST1G125CEX	C	5-pin SC70, Pb-free & Green	AA

Notes:

- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- E = Pb-free and Green
- X suffix = Tape/Reel