CL74AUP1G126 Single Bus Buffer Gate With 3-State Output

General Description

The single buffer is designed for 1.65-V to 5.5-V VCC operation.

The CL74AUP1G126 device is a single line driver with a 3-state output. The output is disabled when the output-enable input is low.

The CL74AUP1G126 device is available in a variety of packages, including the ultra-small DFN body size of 1 mm × 1 mm.

Ordering Information

Part Number	Package	
CL74AUP1G126	SOT-23-5 SOT-25 SOT-353 SOT-553 DFN1X1-4L	

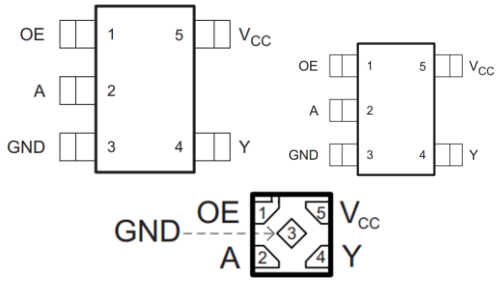
Features

- Available in the Ultra Small DFN1X1
- Inputs Accept Voltages 0.8V to 3.6 V
- Max Tpd of 4.7 ns at 3.3 V
- Low Static-Consumption, 0.9-μA Max I_{CC}
- Low Noise Overshoot and Undershoot<10% of V_{CC}
- Input-Disable Feature Allows Floating Input Conditions
- Ioff Supports Live Insertion, Partial-Power-Down Mode, and Back-Drive Protection
- Input Hysteresis Allows Slow Input Transition and Better Switching Noise Immunity at Input(V_{hys}= 250mV Typical 3.3V)
- 3.6V I/O Tolerant to Support Mixed-Mode Signal Operation
- Suitable for Point-to-Point Applications
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 1000-V Charged-Device Model (C101)

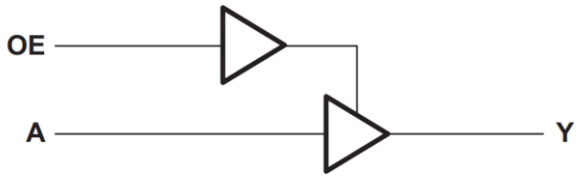
Applications

- udio Dock: Portable
- BluRay™ Players and Home Theaters
- Personal Digital Assistant (PDA)
- Power: Telecom/Server AC/DC Supply: Single Controller: Analog and Digital
- Solid-State Drive (SSD): Client and Enterprise
- TV: LCD/Digital and High-Definition (HDTV)
- Tablet: Enterprise
- Wireless Headsets, Keyboards and Mice

Pin Configuration



Simplified Schematic



Pin Assignment

Pin Name	Pin No.	Pin Function
$\overline{OE}$	1	Input
A	2	Input
GND	3	Ground
Y	4	Output
VCC	5	Power pin

Absolute Maximum Ratings (Note1)

- V_{CC} ---------- -0.5V to +4.6V
- V_I ---------- -0.5V to +4.6V
- V_O(Voltage range applied to any output in the high-impedance or power-off state) ---------- -0.3V to V_{CC}+0.3V
- V_O(Voltage range applied to any output in the high or slow state) ---------- -0.3V to V_{CC}+0.3V
- Input clamp current ---------- -50mA
- Output clamp current ---------- -50mA
- Continuous output current ---------- ±20mA
- Storage Temperature ---------- –65°C to 150°C

Recommended Operating Conditions

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply voltage	V_{CC}	Operating	0.8		3.6	V
Input voltage	V_I		0		3.6	V
Output voltage	V_O		0		VCC	V
High- level input voltage	V_{IH}	V_{CC} = 0.8V	V_{CC}			V
		V_{CC} = 1.1V to 1.95V	0.65 xV_{CC}			
		V_{CC} = 2.3V to 2.7V	1.6			
		V_{CC} = 3V to 3.6V	2			
Low- level input voltage	V_{IL}	V_{CC} = 0.8V			0	V
		V_{CC} = 1.1V to 1.95V			0.35 x V_{CC}	
		V_{CC} = 2.3V to 2.7V			0.7	
		V_{CC} = 3V to 3.6V			0.9	

High- level output current	I_{OH}	V_{CC} = 0.8V			-20	uA
		V_{CC} = 1.1V			-1.1	mA
		V_{CC} = 1.4V			-1.7	
		V_{CC} = 1.65V			-1.9	
		V_{CC} = 2.3V			-3.1	
		V_{CC} = 3V			-4	
Low- level output current	I_{OL}	V_{CC} = 0.8V			20	uA
		V_{CC} = 1.1V			1.1	mA
		V_{CC} = 1.4V			1.7	
		V_{CC} = 1.65V			1.9	
		V_{CC} = 2.3V			3.1	
		V_{CC} = 3V			4	
Input transition rise or fall rate	△T/△V	V_{CC} = 0.8V to 3.6V			200	ns/V
Operating temperature	T_A		-40		85	℃

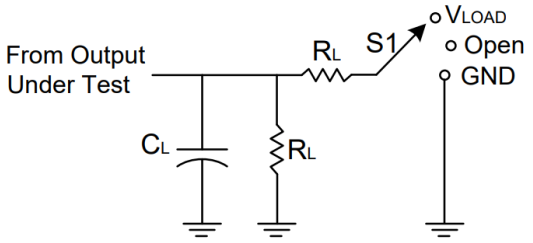
Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
High- level output voltage	V_{OH}	V_{CC} = 0.8~3.6V, I_{OH}= -20uA	V_{CC}-0.1			V
		V_{CC} = 1.1V, I_{OH}= -1.1mA	0.75 xV_{CC}			
		V_{CC} = 1.4V, I_{OH}= -1.7mA	1.11			
		V_{CC} = 1.65V, I_{OH}= -1.9mA	1.32			
		V_{CC} = 2.3V, I_{OH}= -2.3mA	2.05			
		V_{CC} = 2.3V, I_{OH}= -3.1mA	1.9			
		V_{CC} = 3V, I_{OH}= -2.7mA	2.72			
		V_{CC} = 3V, I_{OH}= -4mA	2.6			
Low- level output voltage	V_{OL}	V_{CC} = 0.8~3.6V, I_{OL}= 20uA			0.1	V
		V_{CC} = 1.1V, I_{OL}= 1.1mA			0.3 xV_{CC}	
		V_{CC} = 1.4V, I_{OL}= 1.7mA			0.31	
		V_{CC} = 1.65V, I_{OL}= 1.9mA			0.31	
		V_{CC} = 2.3V, I_{OL}= 2.3mA			0.31	
		V_{CC} = 2.3V, I_{OL}= 3.1mA			0.44	
		V_{CC} = 3V, I_{OL}= 2.7mA			0.31	
		V_{CC} = 3V, I_{OL}= 4mA			0.44	
Input leakage current	I_I	V_{IN}= 3.6V or GND, V_{CC}= 0~3.6V			0.1	uA
Power off leakage current	I_{OFF}	V_I or V_O=0V to 3.6V, V_{CC}=0V			0.2	uA
Supply current	I_{CC}	V_I= GND or (V_{CC} to 3.6V), I_{OUT}=0, V_{CC}=0.8~3.6V			0.5	uA
Additional supply current per input pin	△I_{CC}	V_I= V_{CC}-0.6V, I_{OUT}=0			40	uA

Switching Characteristics

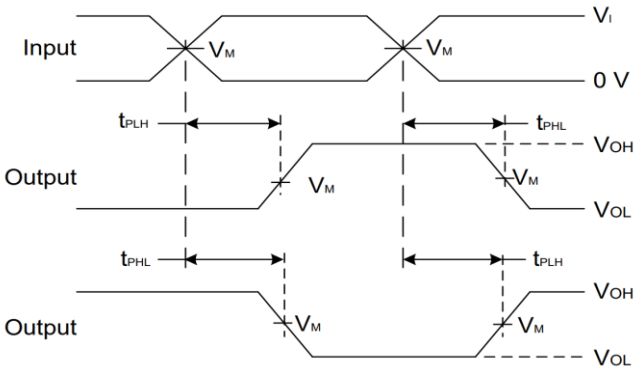
Parameter	From Input	To Output	Test Conditions	Min	Typ	Max	Units
T_{PD}	A	Y	V_{CC} = 0.8V		22.5		ns
			V_{CC} = 1.2V±0.1V,	5.8	9.3	15.1	
			V_{CC} = 1.5V±0.1V,	4.4	6.6	10.2	
			V_{CC} = 1.8V±0.15V	3.5	5.3	8.3	
			V_{CC} = 2.5V±0.2V	2.7	3.9	5.8	
			V_{CC} = 3.3V±0.3V	2.4	3.2	4.7	
T_{en}	OE	Y	V_{CC} = 0.8V		25.2		ns
			V_{CC} = 1.2V±0.1V,	7	11.3	18.1	
			V_{CC} = 1.5V±0.1V,	5.5	8.1	12.2	
			V_{CC} = 1.8V±0.15V	4.3	6.5	10.1	
			V_{CC} = 2.5V±0.2V	3.4	4.8	7.1	
			V_{CC} = 3.3V±0.3V	2.9	4.1	5.9	
T_{dis}	OE	Y	V_{CC} = 0.8V		14		ns
			V_{CC} = 1.2V±0.1V,	3.7	5.8	8.2	
			V_{CC} = 1.5V±0.1V,	5.5	3.9	5.9	
			V_{CC} = 1.8V±0.15V	3.3	4.5	6.6	
			V_{CC} = 2.5V±0.2V	2.3	3.2	4.3	
			V_{CC} = 3.3V±0.3V	2.4	4.8	6.2	

Parameter Measurement Information

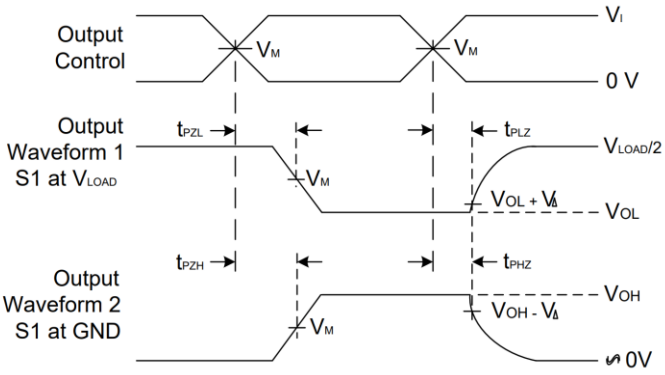


TEST	S1	R_L
t_{PLH}/t_{PHL}	Open	1MΩ
t_{PLZ}/t_{PZL}	V_{LOAD}	5KΩ
t_{PHZ}/t_{PZH}	GND	5KΩ

VCC	INPUTS		V_M	V_{LOAD}	C_L	V△
	V_I	t_r/t_f				
0.8V	V_{CC}	≦3ns	$V_{CC}/2$	2 X V_{CC}	15pF	0.1V
1.2V±0.1V,	V_{CC}	≦3ns	$V_{CC}/2$	2 X V_{CC}	15pF	0.1V
1.5V±0.1V,	V_{CC}	≦3ns	$V_{CC}/2$	2 X V_{CC}	15pF	0.1V
1.8V±0.15V	V_{CC}	≦3ns	$V_{CC}/2$	2 X V_{CC}	15pF	0.15V
2.5V±0.2V	V_{CC}	≦3ns	$V_{CC}/2$	2 X V_{CC}	15pF	0.15V
3.3V±0.3V	V_{CC}	≦3ns s	$V_{CC}/2$	2 X V_{CC}	15pF	0.3V



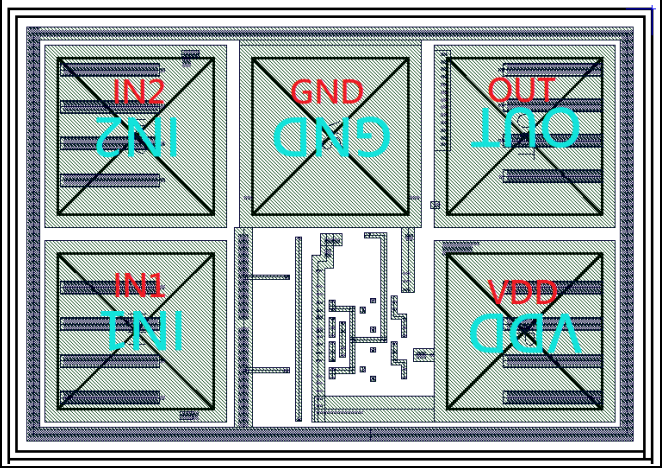
Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs



Voltage Waveform Enable and DisableTimes Low- and High-Level Enabling

Notes:
A. C_L includes probe and jig capacitance
B. All pulses and supplied at pulse repetition rate≦10MHz
C. The Inputs are measured separately one transition per measurement
D. t_{PLZ} and t_{PHZ} are the same as t_{dis}
E. t_{PZL} and t_{PZH} are the same as t_{en}
F. t_{PLH} and t_{PHL} are the same as t_{PD}

PAD Location and Coordinates

PHYSICAL CHARACTERISTICS		UNIT	CHIP DRAWING
Wafer Size	200	mm	
Die Size (with S/L)	0.308 * 0.233	mm^2	
Scribe line width	60	um	
TOP Metal thickness	3	µm	
Top Metallization	Al-Cu		
Wafer Thickness	726	µm	
CUP (circuit under PAD) or not	YES		
Bonding Wire Diameter	20	um	

PAD NAME	PAD SIZE (µm²)	Coordinate
IN 1	60*60	(49,49)
IN 2	60*60	(49,124)
GND	60*60	(124,124)
OUT (Y)	60*60	(199,124)
VDD	60*60	(199,49)

Bonding Diagram Example