

CL74AUP1G07 Low-Power Single Buffer/Driver With Open-Drain Output

General Description

This single buffer/driver is designed for 0.8-V to 3.6-V VCC operation.

The output of the CL74AUP1G07 device is open drain and can be connected to other open-drain outputs to implement active-low wired-OR or active-high wired-AND functions.

The CL74AUP1G07 is available in a variety of packages, including the ultra-small DFN package with a body size of 1 mm × 1 mm.

Ordering Information

Part Number	Package	
CL74AUP1G07	SOT-23-5	
	SOT-25	
	SOT-353	
	SOT-553	
	DFN1X1-4L	

Features

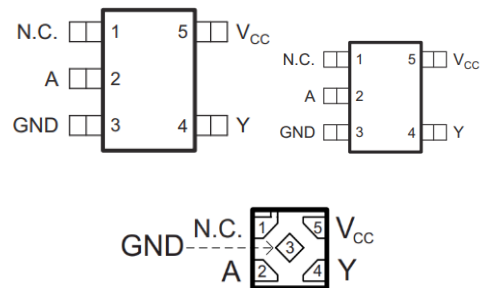
- Available in the Ultra Small DFN1X1
- Inputs Accept Voltages 0.8V to 3.6 V
- Max Tpd of 5.4 ns at 3.3 V
- Low Static-Consumption, 0.9- μ A Max I_{cc}
- Low Noise Overshoot and Undershoot < 10% of V_{CC}
- I_{off} Supports Live Insertion, Partial-Power-Down Mode, and Back-Drive Protection
- Input Hysteresis 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

- ATCA Solutions
- Active Noise Cancellation (ANC)
- Barcode Scanner
- Blood Pressure Monitor
- CPAP Machine
- Cable Solutions
- DLP 3DMachine Vision, Hyperspectral Imaging, Optical Networking, and Spectroscopy
- E-Book
- Embedded PC
- Field Transmitter: Temperature or Pressure Sensor
- Fingerprint Biometrics
- HVAC: Heating, Ventilating, and Air Conditioning

Pin Configuration



Simplified Schematic



Pin Assignment

Pin Name	Pin No.	Pin Function
NC	1	No Connect
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 +4.6V
- 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 ----- $\pm 20mA$
- Storage Temperature ----- $-65^{\circ}C$ to $150^{\circ}C$

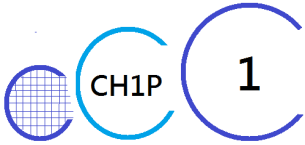
Recommended Operating Conditions

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		3.6	V
High- level input voltage	V_{IH}	$V_{CC} = 0.8V$	V_{CC}			V
		$V_{CC} = 1.1V$ to $1.95V$	$0.65 \times V_{CC}$			
		$V_{CC} = 2.3V$ 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 $1.95V$			$0.35 \times V_{CC}$	
		$V_{CC} = 2.3V$ to $2.7V$			0.7	
		$V_{CC} = 3V$ to $3.6V$			0.9	

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	$\Delta T/\Delta V$	$V_{CC} = 0.8V$ to 3.6V			200	ns/V
Operating temperature	T_A		-40		85	°C

Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Low- level output voltage	V_{OL}	$V_{CC} = 0.8\sim 3.6V, I_{OL} = 20\mu A$			0.1	V
		$V_{CC} = 1.1V, I_{OL} = 1.1mA$			0.3 $\times V_{CC}$	
		$V_{CC} = 1.4V, I_{OL} = 1.7mA$			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, $V_{CC} = 0\sim 3.6V$			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), $I_{OUT} = 0$, $V_{CC} = 0.8\sim 3.6V$			0.5	uA
Additional supply current per input pin	ΔI_{CC}	$V_I = V_{CC} - 0.6V, I_{OUT} = 0$			40	uA

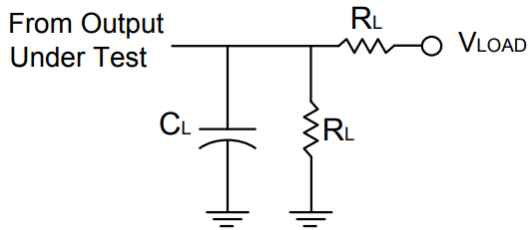


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Switching Characteristics

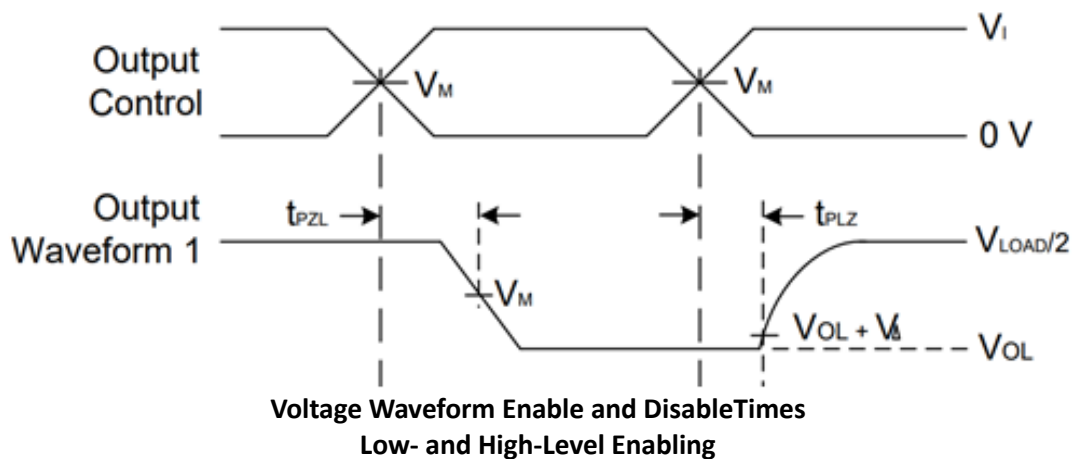
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Propagation delay from input(A or B) to output(Y)	T _{PD}	V _{CC} = 0.8V		18.2		ns
		V _{CC} = 1.2V±0.1V,	4.9	7.3	10.4	
		V _{CC} = 1.5V±0.1V,	3.8	5.2	6.8	
		V _{CC} = 1.8V±0.15V	3.4	4.8	6.7	
		V _{CC} = 2.5V±0.2V	2.4	3.4	4.5	
		V _{CC} = 3.3V±0.3V	2.2	3.7	5.4	

Parameter Measurement Information



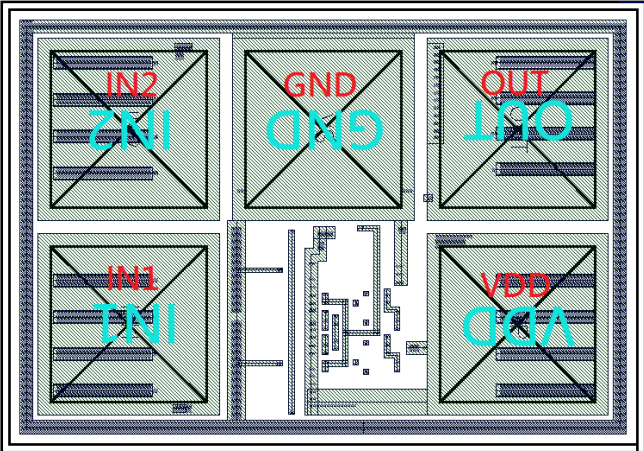
TEST	Condition
t_{PLZ}	V_{LOAD}
t_{PZL}	V_{LOAD}

VCC	INPUTS		V_M	C_L	R_L
	V_I	t_r/t_f			
0.8V	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	15pF	5K Ω
$1.2\text{V} \pm 0.1\text{V}$	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	15pF	5K Ω
$1.5\text{V} \pm 0.1\text{V}$	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	15pF	5K Ω
$1.8\text{V} \pm 0.15\text{V}$	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	15pF	5K Ω
$2.5\text{V} \pm 0.2\text{V}$	3V	$\leq 2.5\text{ns}$	1.5V	15pF	5K Ω
$3.3\text{V} \pm 0.3\text{V}$	V_{CC}	$\leq 2.5\text{ns}$	$V_{CC}/2$	15pF	5K Ω



- Notes:
- A. C_L includes probe and jig capacitance
 - B. All pulses and supplied at pulse repetition rate $\leq 10\text{MHz}$
 - C. The Inputs are measured one at a time with one transition per measurement
 - D. For the open drain device t_{PLZ} and t_{PZL} are the same as t_{PD}
 - E. t_{PZL} is measured at V_M
 - F. t_{PLZ} is measured at $V_{OL} + V_{\Delta}$

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	um	
Top Metallization	Al-Cu		
Wafer Thickness	726	um	
CUP (circuit under PAD) or not	YES		
Bonding Wire Diameter	20	um	

PAD NAME	PAD SIZE (μm ²)	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

