



3.3V CMOS QUADRUPLE 2-INPUT POSITIVE-NAND GATE

IDT74ALVC00

FEATURES:

- 0.5 MICRON CMOS Technology
- ESD > 2000V per MIL-STD-883, Method 3015;
> 200V using machine model (C = 200pF, R = 0)
- V_{CC} = 3.3V ± 0.3V, Normal Range
- V_{CC} = 2.7V to 3.6V, Extended Range
- V_{CC} = 2.5V ± 0.2V
- CMOS power levels (0.4μW typ. static)
- Rail-to-Rail output swing for increased noise margin
- Available in SOIC, SSOP and TSSOP packages

Drive Features for ALVC00:

- High Output Drivers: ±24mA
- Suitable for heavy loads

DESCRIPTION:

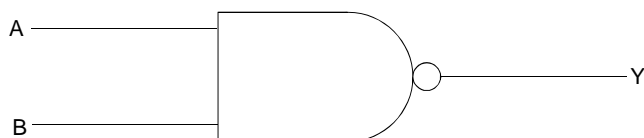
This quadruple 2-input positive-NAND gate is built using advanced dual metal CMOS technology. The ALVC00 performs the Boolean function $Y = \overline{A \cdot B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.

The ALVC00 has been designed with a ±24mA output driver. This driver is capable of driving a moderate to heavy load while maintaining speed performance.

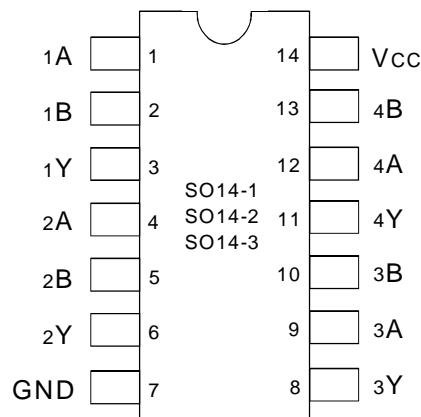
APPLICATIONS:

- 3.3V High Speed Systems
- 3.3V and lower voltage computing systems

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



SOIC/ SSOP/ TSSOP
TOP VIEW

PIN DESCRIPTION

Pin Names	Description
xA, xB	Data Inputs
xY	Data Outputs

FUNCTION TABLE (each gate)⁽¹⁾

Inputs		Output
xA	xB	xY
H	H	L
L	X	H
X	L	H

NOTE:

1. H = HIGH Voltage Level
L = LOW Voltage Level
X = Don't Care

ABSOLUTE MAXIMUM RATINGS (1)

Symbol	Description	Max.	Unit
V _{TERM} (2)	Terminal Voltage with Respect to GND	- 0.5 to + 4.6	V
V _{TERM} (3)	Terminal Voltage with Respect to GND	- 0.5 to V _{CC} + 0.5	V
T _{STG}	Storage Temperature	- 65 to + 150	°C
I _{OUT}	DC Output Current	- 50 to + 50	mA
I _{IK}	Continuous Clamp Current, V _i < 0 or V _i > V _{CC}	± 50	mA
I _{OK}	Continuous Clamp Current, V _o < 0	- 50	mA
I _{CC}	Continuous Current through each V _{CC} or GND	± 100	mA

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NOTES:

1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS 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.
2. V_{CC} terminals.
3. All terminals except V_{CC}.

CAPACITANCE (TA = +25°C, f = 1.0MHz)

Symbol	Parameter(1)	Conditions	Typ.	Max.	Unit
C _{IN}	Input Capacitance	V _{IN} = 0V	5	7	pF
C _{OUT}	Output Capacitance	V _{OUT} = 0V	7	9	pF
C _{I/O}	I/O Port Capacitance	V _{IN} = 0V	7	9	pF

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NOTE:

1. As applicable to the device type.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

Operating Condition: TA = -40°C to +85°C

Symbol	Parameter	Test Conditions	Min.	Typ.(1)	Max.	Unit
V _{IH}	Input HIGH Voltage Level	V _{CC} = 2.3V to 2.7V	1.7	—	—	V
		V _{CC} = 2.7V to 3.6V	2	—	—	
V _{IL}	Input LOW Voltage Level	V _{CC} = 2.3V to 2.7V	—	—	0.7	V
		V _{CC} = 2.7V to 3.6V	—	—	0.8	
I _{IH}	Input HIGH Current	V _{CC} = 3.6V, V _i = V _{CC}	—	—	± 5	µA
I _{IL}	Input LOW Current	V _{CC} = 3.6V, V _i = GND	—	—	± 5	
V _{IK}	Clamp Diode Voltage	V _{CC} = 2.3V, I _{IN} = - 18mA	—	- 0.7	- 1.2	V
V _H	Input Hysteresis	V _{CC} = 3.3V	—	100	—	mV
I _{CC} I _{CC} H	Quiescent Power Supply Current	V _{CC} = 3.6V V _{IN} = GND or V _{CC}	—	0.1	10	µA
ΔI _{CC}	Quiescent Power Supply Current Variation	One input at V _{CC} - 0.6V, other inputs at V _{CC} or GND	—	—	750	

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NOTE:

1. Typical values are at V_{CC} = 3.3V, +25°C ambient.

OUTPUT DRIVE CHARACTERISTICS

Symbol	Parameter	Test Conditions ⁽¹⁾		Min.	Max.	Unit
VOH	Output HIGH Voltage	V _{CC} = 2.3V to 3.6V	I _{OH} = - 0.1mA	V _{CC} - 0.2	—	V
		V _{CC} = 2.3V	I _{OH} = - 6mA	2	—	
		V _{CC} = 2.3V	I _{OH} = - 12mA	1.7	—	
		V _{CC} = 2.7V		2.2	—	
		V _{CC} = 3.0V		2.4	—	
		V _{CC} = 3.0V	I _{OH} = - 24mA	2	—	
VOL	Output LOW Voltage	V _{CC} = 2.3V to 3.6V	I _{OL} = 0.1mA	—	0.2	V
		V _{CC} = 2.3V	I _{OL} = 6mA	—	0.4	
			I _{OL} = 12mA	—	0.7	
		V _{CC} = 2.7V	I _{OL} = 12mA	—	0.4	
		V _{CC} = 3.0V	I _{OL} = 24mA	—	0.55	

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NOTE:

- V_{IH} and V_{IL} must be within the min. or max. range shown in the DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE table for the appropriate V_{CC} range. T_A = - 40°C to + 85°C.

OPERATING CHARACTERISTICS, T_A = 25°C

Symbol	Parameter	Test Conditions	V _{CC} = 2.5V ± 0.2V	V _{CC} = 3.3V ± 0.3V	Unit
			Typical	Typical	
CPD	Power Dissipation Capacitance per gate	C _L = 0pF, f = 10Mhz	21	23	pF

SWITCHING CHARACTERISTICS ⁽¹⁾

Symbol	Parameter	V _{CC} = 2.5V ± 0.2V		V _{CC} = 2.7V		V _{CC} = 3.3V ± 0.3V		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
t _{PLH}	Propagation Delay xA or xB to xY	1	3.8	1	3.4	1	3.2	ns
t _{PHL}								

NOTE:

- See test circuits and waveforms. T_A = - 40°C to + 85°C.

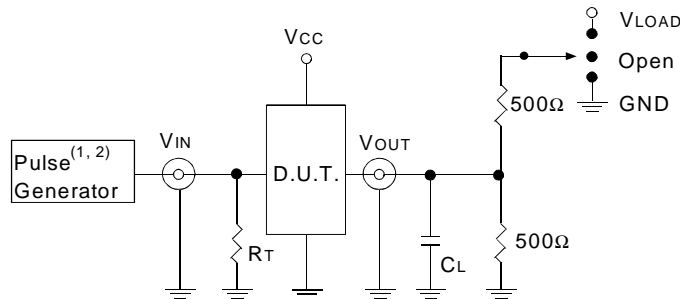
TEST CIRCUITS AND WAVEFORMS:

TEST CONDITIONS

Symbol	V _{cc} (1)= 3.3V ± 0.3V	V _{cc} (1)= 2.7V	V _{cc} (2)= 2.5V ± 0.2V	Unit
V _{LOAD}	6	6	2 x V _{cc}	V
V _{IH}	2.7	2.7	V _{cc}	V
V _T	1.5	1.5	V _{cc} / 2	V
V _{LZ}	300	300	150	mV
V _{HZ}	300	300	150	mV
C _L	50	50	30	pF

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TEST CIRCUITS FOR ALL OUTPUTS



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DEFINITIONS:

C_L= Load capacitance: includes jig and probe capacitance.

R_T= Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

NOTES:

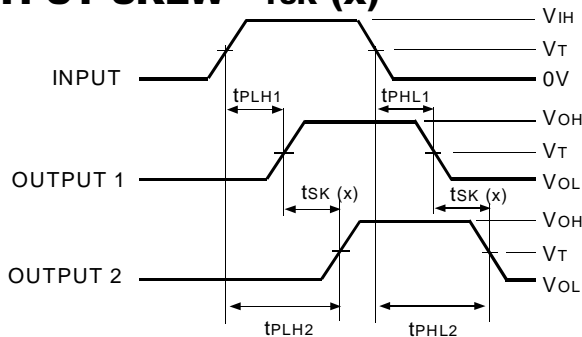
1. Pulse Generator for All Pulses: Rate ≤ 10MHz; t_F ≤ 2.5ns; t_R ≤ 2.5ns.
2. Pulse Generator for All Pulses: Rate ≤ 10MHz; t_F ≤ 2ns; t_R ≤ 2ns.

SWITCH POSITION

Test	Switch
Open Drain Disable Low Enable Low	V _{LOAD}
Disable High Enable High	GND
All Other tests	Open

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OUTPUT SKEW - TSK (x)



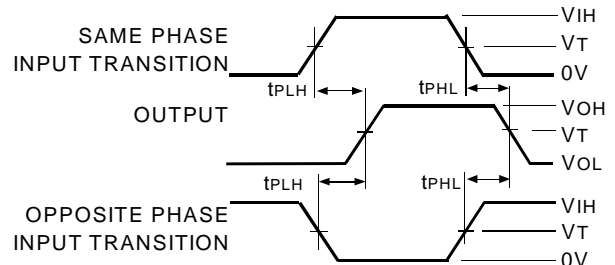
$$tsk(x) = |t_{PLH2} - t_{PLH1}| \text{ or } |t_{PHL2} - t_{PHL1}|$$

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NOTES:

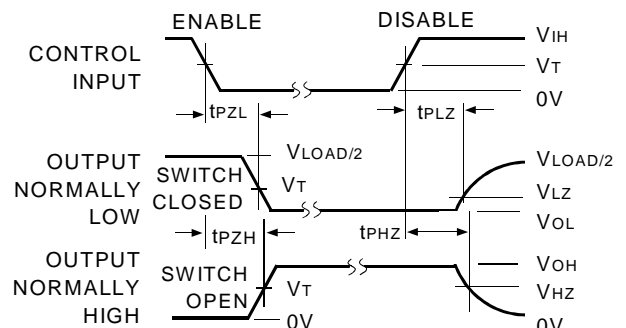
1. For tsk(o) OUTPUT1 and OUTPUT2 are any two outputs.
2. For tsk(b) OUTPUT1 and OUTPUT2 are in the same bank.

PROPAGATION DELAY



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ENABLE AND DISABLE TIMES

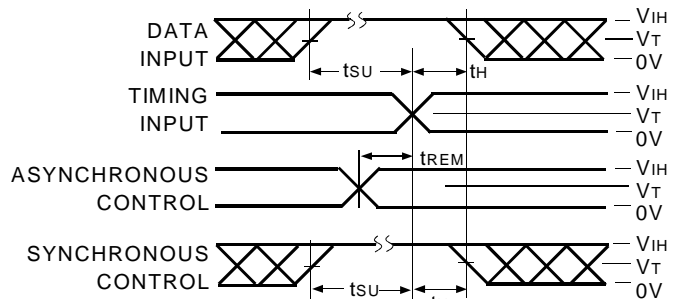


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NOTE:

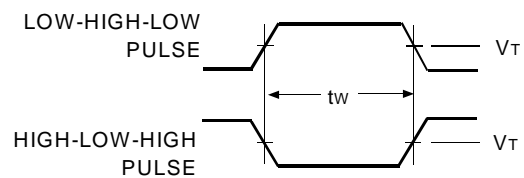
1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH.

SET-UP, HOLD, AND RELEASE TIMES



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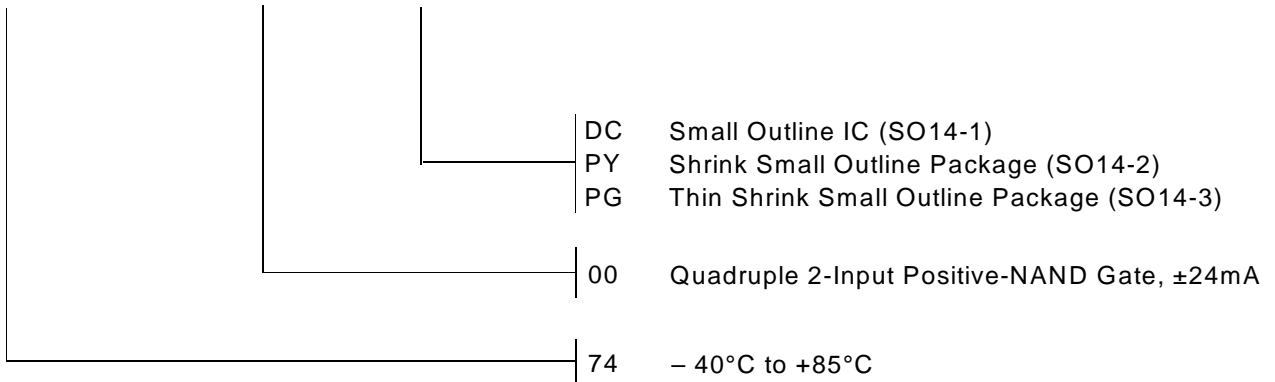
PULSE WIDTH



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ORDERING INFORMATION

IDT XX ALVC XXX XX
Temp. Range Device Type Package



CORPORATE HEADQUARTERS
2975 Stender Way
Santa Clara, CA 95054

for SALES:
800-345-7015 or 408-727-6116
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