

74ALVC00

Low Voltage Quad 2-Input NAND Gate with 3.6V Tolerant Inputs and Outputs

General Description

The ALVC00 contains four 2-input NAND gates. This product is designed for low voltage (1.65V to 3.6V) V_{CC} applications with I/O compatibility up to 3.6V.

The ALVC00 is fabricated with an advanced CMOS technology to achieve high-speed operation while maintaining low CMOS power dissipation.

Features

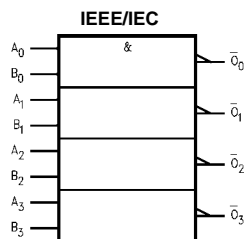
- 1.65V to 3.6V V_{CC} supply operation
- 3.6V tolerant inputs and outputs
- t_{PD}
 - 3 ns max for 3.0V to 3.6V V_{CC}
 - 3.5 ns max for 2.3V to 2.7V V_{CC}
 - 4.4 ns max for 1.65V to 1.95V V_{CC}
- Power-off high impedance inputs and outputs
- Uses patented Quiet Series™ noise/EMI reduction circuitry
- Latchup conforms to JEDEC JED78
- ESD performance:
 - Human body model > 2000V
 - Machine model > 250V

Ordering Code:

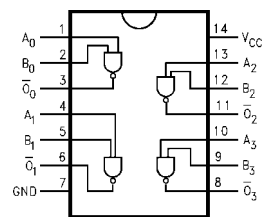
Order Number	Package Number	Package Description
74ALVC00M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74ALVC00MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbol



Connection Diagram



Pin Descriptions

Pin Names	Description
A_n, B_n	Inputs
\bar{O}_n	Outputs

Quiet Series™ is a trademark of Fairchild Semiconductor Corporation.

Absolute Maximum Ratings (Note 1)		Recommended Operating Conditions (Note 3)	
Supply Voltage (V_{CC})	-0.5V to +4.6V	Power Supply	
DC Input Voltage (V_I)	-0.5V to 4.6V	Operating	1.65V to 3.6V
Output Voltage (V_O) (Note 2)	-0.5V to $V_{CC} + 0.5V$	Input Voltage (V_I)	0V to V_{CC}
DC Input Diode Current (I_{IK})		Output Voltage (V_O)	0V to V_{CC}
$V_I < 0V$	-50 mA	Free Air Operating Temperature (T_A)	-40°C to +85°C
DC Output Diode Current (I_{OK})		Minimum Input Edge Rate ($\Delta t/\Delta V$)	
$V_O < 0V$	-50 mA	$V_{IN} = 0.8V$ to $2.0V$, $V_{CC} = 3.0V$	5 ns/V
DC Output Source/Sink Current (I_{OH}/I_{OL})	± 50 mA	Note 1: The Absolute Maximum Ratings are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the Absolute Maximum Ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.	
DC V_{CC} or GND Current per Supply Pin (I_{CC} or GND)	± 100 mA	Note 2: I_O Absolute Maximum Rating must be observed, limited to 4.6V.	
Storage Temperature Range (T_{STG})	-65°C to +150°C	Note 3: Floating or unused control inputs must be held HIGH or LOW.	

DC Electrical Characteristics

Symbol	Parameter	Conditions	V_{CC} (V)	Min	Max	Units
V_{IH}	HIGH Level Input Voltage		1.65 - 1.95 2.3 - 2.7 2.7 - 3.6	$0.65 \times V_{CC}$ 1.7 2.0		V
V_{IL}	LOW Level Input Voltage		1.65 - 1.95 2.3 - 2.7 2.7 - 3.6		$0.35 \times V_{CC}$ 0.7 0.8	V
V_{OH}	HIGH Level Output Voltage	$I_{OH} = -100 \mu A$ $I_{OH} = -4 \text{ mA}$ $I_{OH} = -6 \text{ mA}$ $I_{OH} = -12 \text{ mA}$ $I_{OH} = -24 \text{ mA}$	1.65 - 3.6 1.65 2.3 2.3 2.7 3.0 3.0	$V_{CC} - 0.2$ 1.2 2.0 1.7 2.2 2.4 2		V
V_{OL}	LOW Level Output Voltage	$I_{OL} = 100 \mu A$ $I_{OL} = 4 \text{ mA}$ $I_{OL} = 6 \text{ mA}$ $I_{OL} = 12 \text{ mA}$ $I_{OL} = 24 \text{ mA}$	1.65 - 3.6 1.65 2.3 2.3 2.7 3.0		0.2 0.45 0.4 0.7 0.4	V
I_I	Input Leakage Current	$0 \leq V_I \leq 3.6V$	3.6		± 5.0	μA
I_{CC}	Quiescent Supply Current	$V_I = V_{CC}$ or GND, $I_O = 0$	3.6		10	μA
ΔI_{CC}	Increase in I_{CC} per Input	$V_{IH} = V_{CC} - 0.6V$	3 - 3.6		750	μA

AC Electrical Characteristics

Symbol	Parameter	$T_A = -40^\circ\text{C to } +85^\circ\text{C}, R_L = 500\Omega$								Units
		$C_L = 50\text{ pF}$				$C_L = 30\text{ pF}$				
		$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$		$V_{CC} = 2.7\text{V}$		$V_{CC} = 2.5\text{V} \pm 0.2\text{V}$		$V_{CC} = 1.8\text{V} \pm 0.15\text{V}$		
Min	Max	Min	Max	Min	Max	Min	Max			
t_{PHL}, t_{PLH}	Propagation Delay	1.0	3.0		3.5	1.0	3	1.0	4.4	ns

Capacitance

Symbol	Parameter	Conditions	$T_A = +25^\circ\text{C}$		Units
			V_{CC}	Typical	
C_{IN}	Input Capacitance	$V_i = 0\text{V or } V_{CC}$	3.3	4.5	pF
C_{PD}	Power Dissipation Capacitance	$f = 10\text{ MHz}, C_L = 50\text{ pF}$	3.3	23	pF
			2.5	21	
			1.8	20	

AC Loading and Waveforms

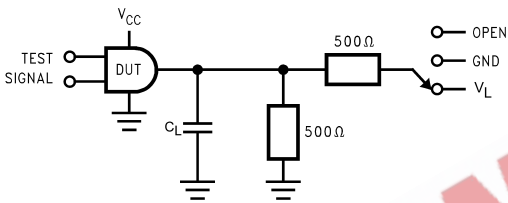


FIGURE 1. AC Test Circuit

TABLE 1. Values for Figure 1

TEST	SWITCH
t_{PLH}, t_{PHL}	Open

TABLE 2. Variable Matrix
(Input Characteristics: $f = 1\text{ MHz}; t_r = t_f = 2\text{ ns}; Z_0 = 50\Omega$)

Symbol	V_{CC}			
	$3.3\text{V} \pm 0.3\text{V}$	2.7V	$2.5\text{V} \pm 0.2\text{V}$	$1.8\text{V} \pm 0.15\text{V}$
V_{mi}	1.5V	1.5V	$V_{CC}/2$	$V_{CC}/2$
V_{mo}	1.5V	1.5V	$V_{CC}/2$	$V_{CC}/2$

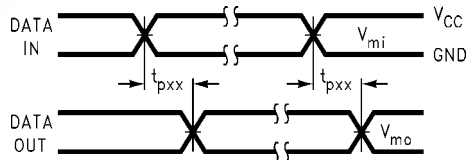
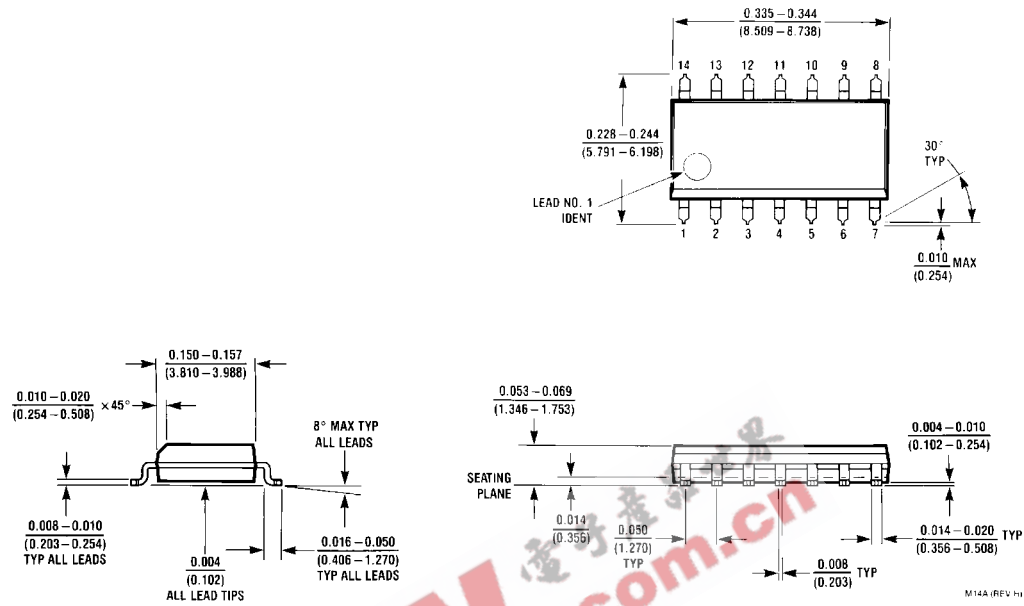


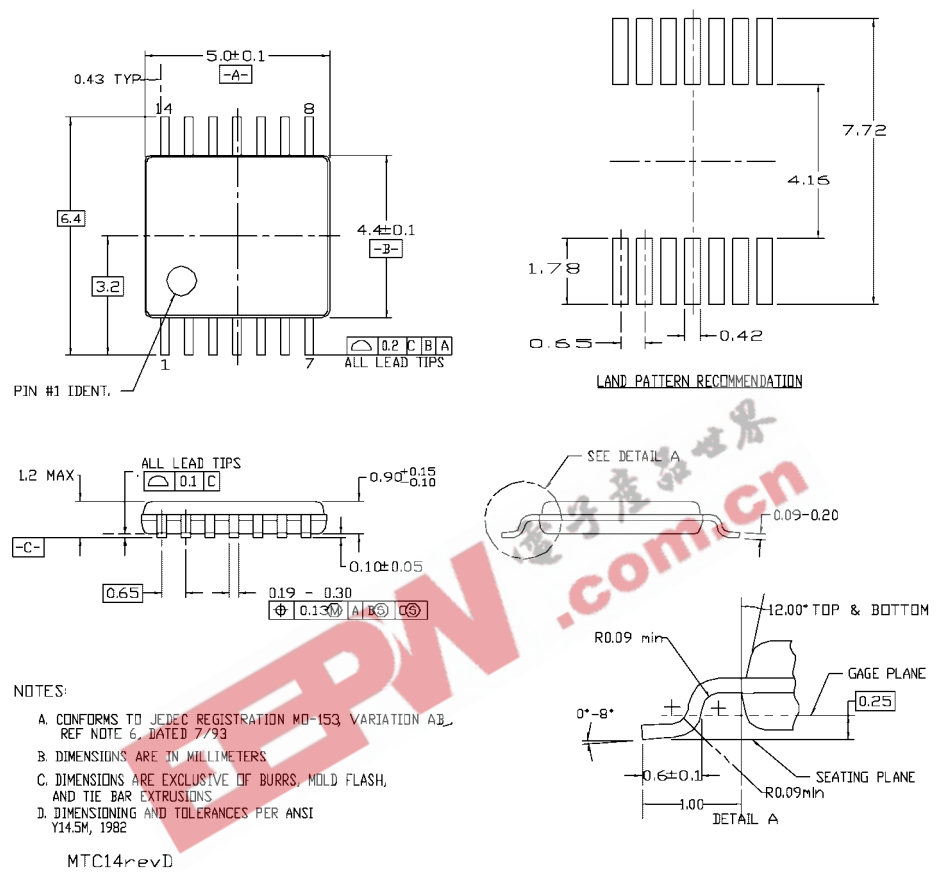
FIGURE 2. Waveform for Inverting and Non-inverting Functions

Physical Dimensions inches (millimeters) unless otherwise noted



14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M14A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide Package Number MTC14

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