

## 74ALVC08

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

#### General Description

The ALVC08 contains four 2-input AND 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 ALVC08 is fabricated with an advanced CMOS technology to achieve high-speed operation while maintaining low CMOS power dissipation.

#### Features

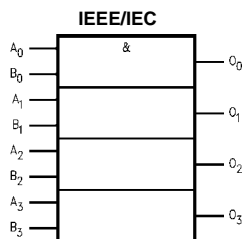
- 1.65V to 3.6V  $V_{CC}$  supply operation
- 3.6V tolerant inputs and outputs
- $t_{PD}$ 
  - 2.9 ns max for 3.0V to 3.6V  $V_{CC}$
  - 3.2 ns max for 2.3V to 2.7V  $V_{CC}$
  - 5.3 ns max for 1.65V to 1.95V  $V_{CC}$
- Power-off high impedance inputs and outputs
- Uses patented Quiet Series™ noise/EMI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

#### Ordering Code:

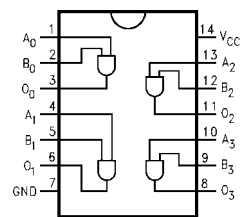
Order Number	Package Number	Package Description
74ALVC08M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74ALVC08MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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
$O_n$	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 ( $I_{OH}/I_{OL}$ )	$\pm 50$ mA	<b>Note 1:</b> 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)	$\pm 100$ mA	<b>Note 2:</b> $I_O$ Absolute Maximum Rating must be observed, limited to 4.6V.	
Storage Temperature Range ( $T_{STG}$ )	-65°C to +150°C	<b>Note 3:</b> 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 2.7 3.0 3.0	$V_{CC} - 0.2$ 1.2 2.0 1.7 2.2 2.4		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 2.7 3.0		0.2 0.45 0.4 0.7 0.4 0.55	V
$I_I$	Input Leakage Current	$0 \leq V_I \leq 3.6V$	3.6		$\pm 5.0$	$\mu A$
$I_{CC}$	Quiescent Supply Current	$V_I = V_{CC}$ or GND, $I_O = 0$	3.6		40	$\mu A$
$\Delta I_{CC}$	Increase in $I_{CC}$ per Input	$V_{IH} = V_{CC} - 0.6V$	3 - 3.6		750	$\mu A$

### AC Electrical Characteristics

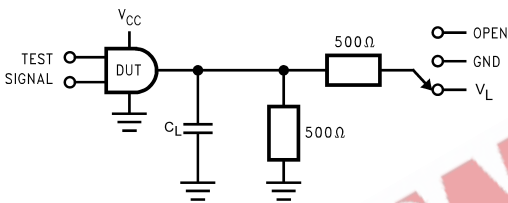
Symbol	Parameter	$T_A = -40^\circ\text{C to } +85^\circ\text{C}, R_L = 500\Omega$								Units
		$C_L = 50\text{ pF}$				$C_L = 30\text{ pF}$				
		$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$		$V_{CC} = 2.7\text{V}$		$V_{CC} = 2.5\text{V} \pm 0.2\text{V}$		$V_{CC} = 1.8\text{V} \pm 0.15\text{V}$		
		Min	Max	Min	Max	Min	Max	Min	Max	
$t_{PHL}, t_{PLH}$	Propagation Delay	1.2	2.9		3.0	1.0	3.2	1.2	5.3	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	26	pF
			2.5	25	
			1.8	24	

### AC Loading and Waveforms

TABLE 1. Values for Figure 1



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

FIGURE 1. AC Test Circuit

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

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

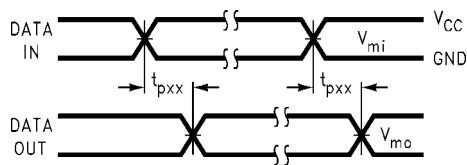


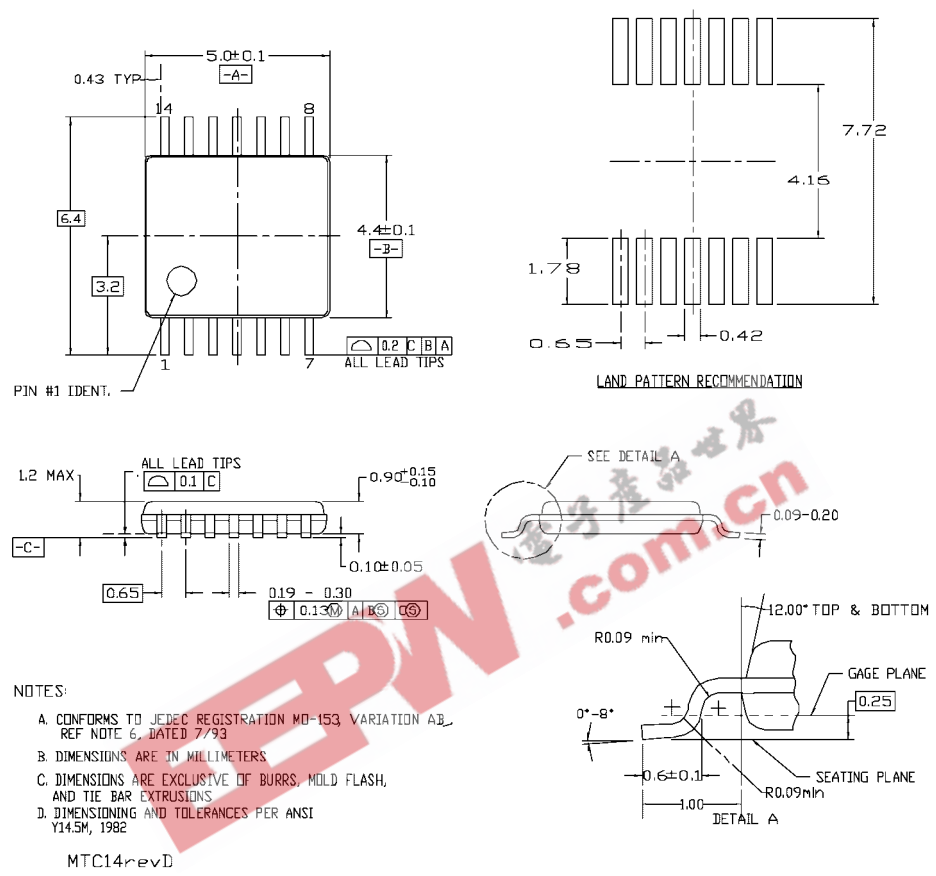
FIGURE 2. Waveform for Inverting and Non-inverting Functions

**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)



- NOTES:
- A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6, DATED 7/93
  - B. DIMENSIONS ARE IN MILLIMETERS
  - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
  - D. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 1982
- MTC14revD

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

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