FAIRCHILD
SEMICONDUCTOR™

September 2001
Revised February 2002

74ALVC32
Low Voltage Quad 2-Input OR Gate with 3.6V Tolerant Inputs and Outputs

General Description

The ALVC32 contains four 2-input OR 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 ALVC32 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}
    - 2.8 ns max for 3.0V to 3.6V V_{CC}
    - 3.1 ns max for 2.3V to 2.7V V_{CC}
    - 4.7 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
74ALVC32M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74ALVC32MTC	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

IEEC/IEC
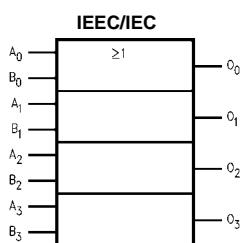
Connection Diagram
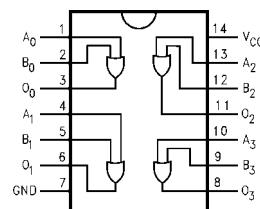
Pin Descriptions

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)

Supply Voltage (V_{CC})	$-0.5V$ to $+4.6V$
DC Input Voltage (V_I)	$-0.5V$ to $4.6V$
Output Voltage (V_O) (Note 2)	$-0.5V$ to $V_{CC} +0.5V$
DC Input Diode Current (I_{IK})	
$V_I < 0V$	-50 mA
DC Output Diode Current (I_{OK})	
$V_O < 0V$	-50 mA
DC Output Source/Sink Current	
(I_{OH}/I_{OL})	±50 mA
DC V_{CC} or GND Current per	
Supply Pin (I_{CC} or GND)	±100 mA
Storage Temperature Range (T_{STG})	$-65°C$ to $+150°C$

Recommended Operating Conditions (Note 3)

Power Supply	
Operating	1.65V to 3.6V
Input Voltage (V_I)	0V to V_{CC}
Output Voltage (V_O)	0V to V_{CC}
Free Air Operating Temperature (T_A)	$-40°C$ to $+85°C$
Minimum Input Edge Rate ($\Delta t/\Delta V$)	
$V_{IN} = 0.8V$ to 2.0V, $V_{CC} = 3.0V$	5 ns/V

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.

Note 2: I_O Absolute Maximum Rating must be observed, limited to 4.6V.

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	0.65 x V_{CC}		V
			2.3 - 2.7	1.7		
			2.7 - 3.6	2.0		
V_{IL}	LOW Level Input Voltage		1.65 - 1.95		0.35 x V_{CC}	V
			2.3 - 2.7		0.7	
			2.7 - 3.6		0.8	
V_{OH}	HIGH Level Output Voltage	$I_{OH} = -100$ µA	1.65 - 3.6	V_{CC} - 0.2		V
		$I_{OH} = -4$ mA	1.65	1.2		
		$I_{OH} = -6$ mA	2.3	2.0		
		$I_{OH} = -12$ mA	2.3	1.7		
			2.7	2.2		
			3.0	2.4		
		$I_{OH} = -24$ mA	3.0	2		
V_{OL}	LOW Level Output Voltage	$I_{OL} = 100$ µA	1.65 - 3.6		0.2	V
		$I_{OL} = 4$ mA	1.65		0.45	
		$I_{OL} = 6$ mA	2.3		0.4	
		$I_{OL} = 12$ mA	2.3		0.7	
			2.7		0.4	
		$I_{OL} = 24$ mA	3.0		0.55	
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	$T_A = -40°C$ to $+85°C$, $R_L = 500\Omega$								Units
		$C_L = 50$ pF				$C_L = 30$ pF				
		$V_{CC} = 3.3V \pm 0.3V$		$V_{CC} = 2.7V$		$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 1.8V \pm 0.15V$		
		Min	Max	Min	Max	Min	Max	Min	Max	
t_{PHL}, t_{PLH}	Propagation Delay	1.0	2.8		2.9	1.0	3.1	1.0	4.7	ns

Capacitance

Symbol	Parameter	Conditions	$T_A = +25°C$		Units
			V_{CC}	Typical	
C_{IN}	Input Capacitance	$V_I = 0V$ or V_{CC}	3.3	4	pF
C_{PD}	Power Dissipation Capacitance	$f = 10$ MHz, $C_L = 50$ pF	3.3	26	
			2.5	24	pF
			1.8	23	

AC Loading and Waveforms

FIGURE 1. AC Test Circuit
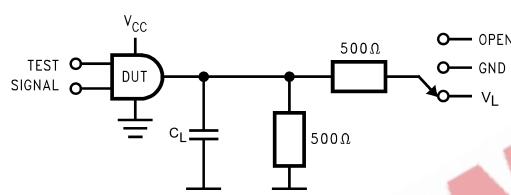
TABLE 1. Values for Figure 1

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

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

Symbol	V_{CC}			
	$3.3V \pm 0.3V$	$2.7V$	$2.5V \pm 0.2V$	$1.8V \pm 0.15V$
V_{mi}	1.5V	1.5V	$V_{CC}/2$	$V_{CC}/2$
V_{mo}	1.5V	1.5V	$V_{CC}/2$	$V_{CC}/2$
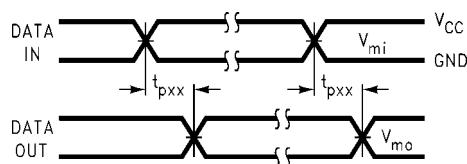
**FIGURE 2. Waveform for Inverting and Non-inverting Functions**

Physical Dimensions inches (millimeters) unless otherwise noted

$$\frac{0.335 - 0.344}{(8.509 - 8.738)}$$

$$\frac{0.228 - 0.244}{(5.791 - 6.198)}$$

LEAD NO. 1
IDENT

30° TYP

$$\frac{0.010}{(0.254)} \text{ MAX}$$

$$\frac{0.150 - 0.157}{(3.810 - 3.988)}$$

$$\frac{0.010 - 0.020}{(0.254 - 0.508)} \times 45°$$

8° MAX TYP
ALL LEADS

$$\frac{0.008 - 0.010}{(0.203 - 0.254)} \text{ TYP ALL LEADS}$$

$$\frac{0.004}{(0.102)} \text{ ALL LEAD TIPS}$$

$$\frac{0.016 - 0.050}{(0.406 - 1.270)} \text{ TYP ALL LEADS}$$

$$\frac{0.053 - 0.069}{(1.346 - 1.753)}$$

$$\frac{0.004 - 0.010}{(0.102 - 0.254)}$$

SEATING
PLANE

$$\frac{0.014}{(0.356)}$$

$$\frac{0.050}{(1.270)} \text{ TYP}$$

$$\frac{0.008}{(0.203)} \text{ TYP}$$

$$\frac{0.014 - 0.020}{(0.356 - 0.508)} \text{ TYP}$$

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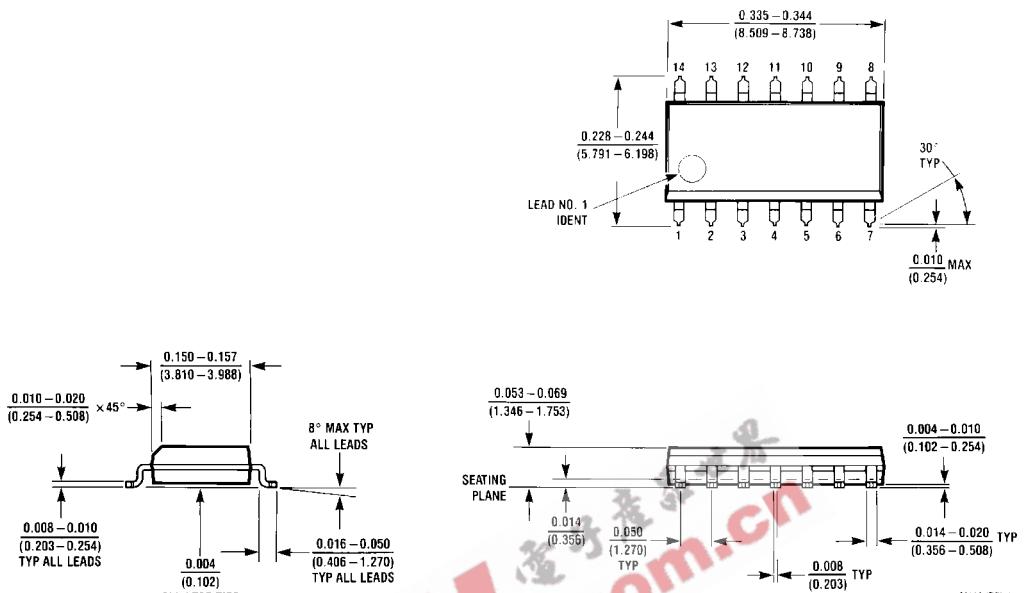
14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M14A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)
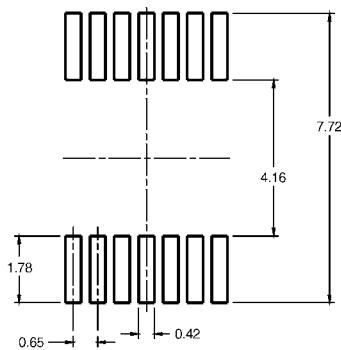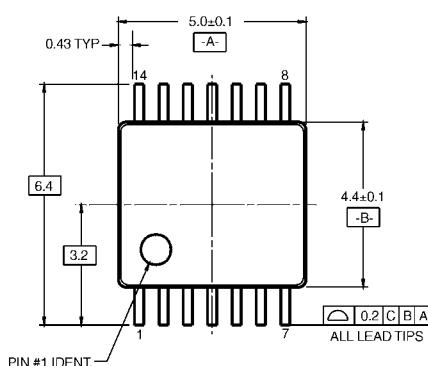
LAND PATTERN RECOMMENDATION

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

MTC14RevC3

DETAIL A

14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
Package Number MTC14
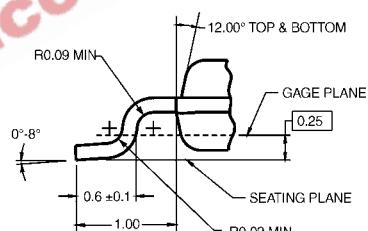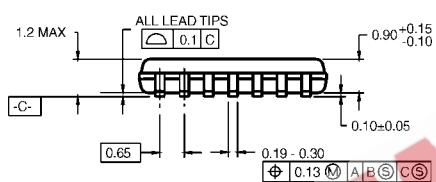
Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.

2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

www.fairchildsemi.com