FAIRCHILD SEMICONDUCTOR®

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

Features

- 1.65V to 3.6V V_{CC} supply operation
- 3.6V tolerant inputs and outputs
- t_{PD}:
  - 2.8ns max for 3.0V to 3.6V V_{CC}
  - 3.1ns max for 2.3V to 2.7V V_{CC}
  - 4.7ns 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

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.

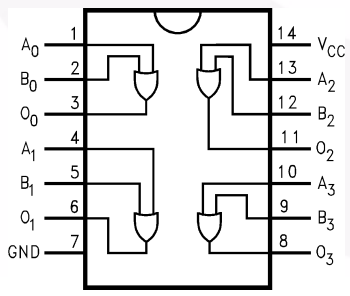
Ordering Information

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

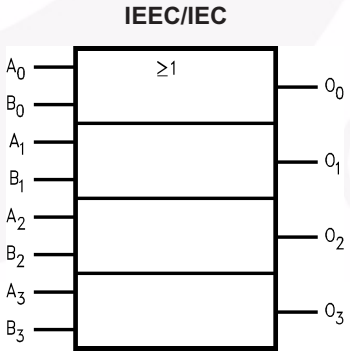
Device also available in Tape and Reel. Specify by appending suffix letter “X” to the ordering number.

All packages are lead free per JEDEC: J-STD-020B standard.

Connection Diagram



Logic Symbol



Pin Description

Pin Names	Description
A_n, B_n	Inputs
O_n	Outputs

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
V_{CC}	Supply Voltage	–0.5V to +4.6V
V_I	DC Input Voltage	–0.5V to 4.6V
V_O	Output Voltage(1)	–0.5V to V_{CC} +0.5V
I_{IK}	DC Input Diode Current, $V_I < 0V$	–50mA
I_{OK}	DC Output Diode Current, $V_O < 0V$	–50mA
I_{OH}/I_{OL}	DC Output Source/Sink Current	±50mA
I_{CC} or GND	DC V_{CC} or GND Current per Supply Pin	±100mA
T_{STG}	Storage Temperature Range	–65°C to +150°C

Note:

1. I_O Absolute Maximum Rating must be observed, limited to 4.6V.

Recommended Operating Conditions(2)

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

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

Note:

2. Floating or unused control inputs must be held HIGH or LOW.

DC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	Conditions	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	1.65–3.6	I_{OH} = –100µA	V_{CC} – 0.2		V
		1.65	I_{OH} = –4mA	1.2		
		2.3	I_{OH} = –6mA	2.0		
		2.3	I_{OH} = –12mA	1.7		
		2.7		2.2		
		3.0		2.4		
		3.0	I_{OH} = –24mA	2		
V_{OL}	LOW Level Output Voltage	1.65–3.6	I_{OL} = 100µA		0.2	V
		1.65	I_{OL} = 4mA		0.45	
		2.3	I_{OL} = 6mA		0.4	
		2.3	I_{OL} = 12mA		0.7	
		2.7			0.4	
		3.0	I_{OL} = 24mA		0.55	
I_I	Input Leakage Current	3.6	0 ≤ V_I ≤ 3.6V		±5.0	µA
I_{CC}	Quiescent Supply Current	3.6	V_I = V_{CC} or GND, I_O = 0		10	µA
ΔI_{CC}	Increase in I_{CC} per Input	3–3.6	V_{IH} = V_{CC} – 0.6V		750	µA

AC Electrical Characteristics

		T_A = –40°C to +85°C, R_L = 500Ω								
		C_L = 50pF				C_L = 30pF				
		V_{CC} = 3.3V ± 0.3V		V_{CC} = 2.7V		V_{CC} = 2.5V ± 0.2V		V_{CC} = 1.8V ± 0.15V		
Symbol	Parameter	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Units
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 = 10MHz, C_L = 50pF	3.3	26	pF
			2.5	24	
			1.8	23	

AC Loading and Waveforms

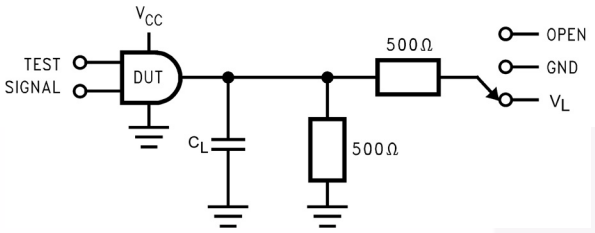


Figure 1. AC Test Circuit

Table 1. Values for Figure 1

Test	Switch
t_{PLH}, t_{PHL}	Open

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

Symbol	V_{CC}			
	3.3V ± 0.3V	**2.7V**	**2.5V ± 0.2V**	**1.8V ± 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

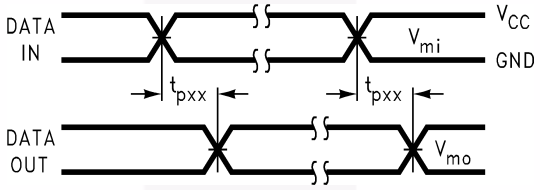


Figure 2. Waveform for Inverting and Non-inverting Functions

Physical Dimensions

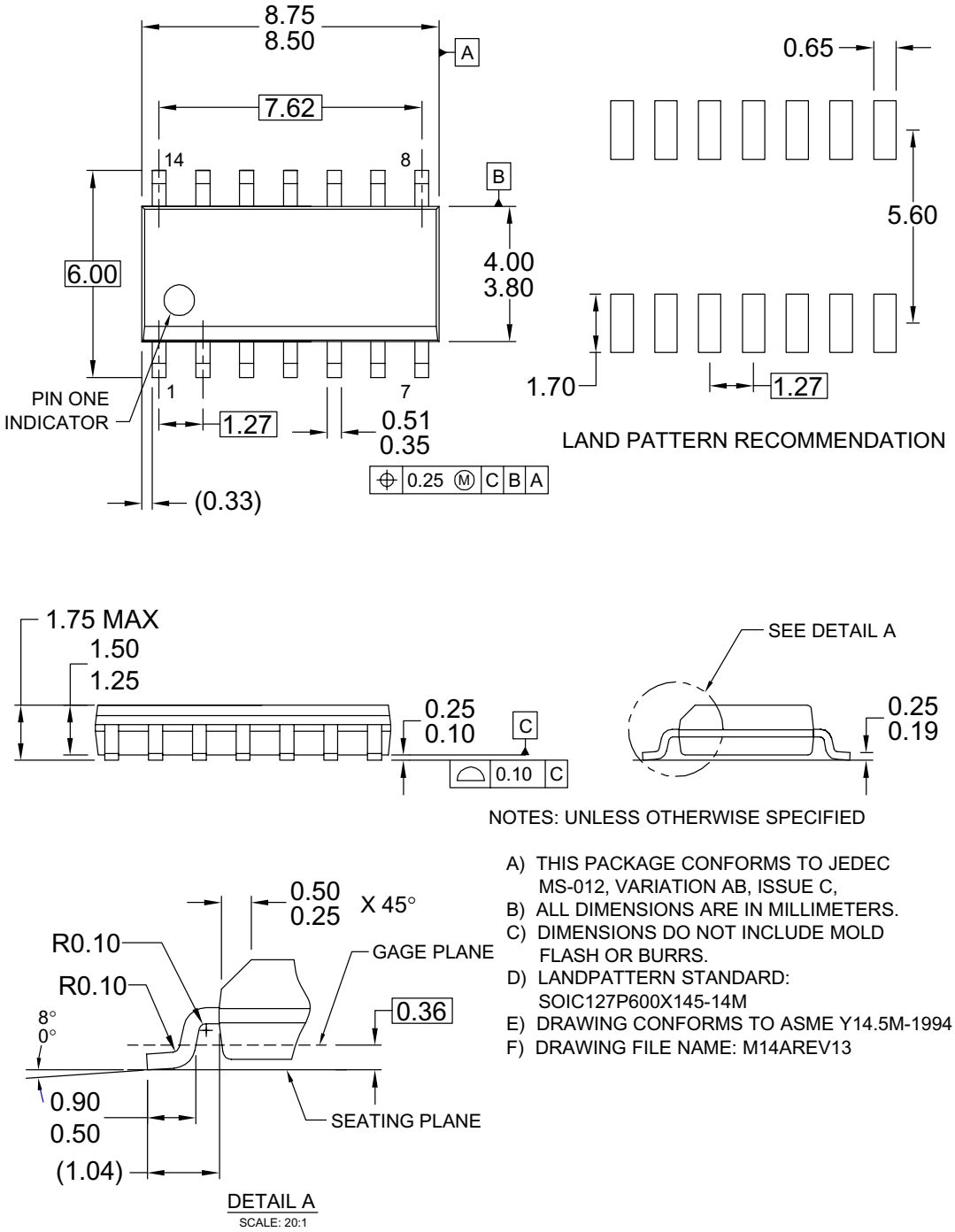


Figure 3. 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow

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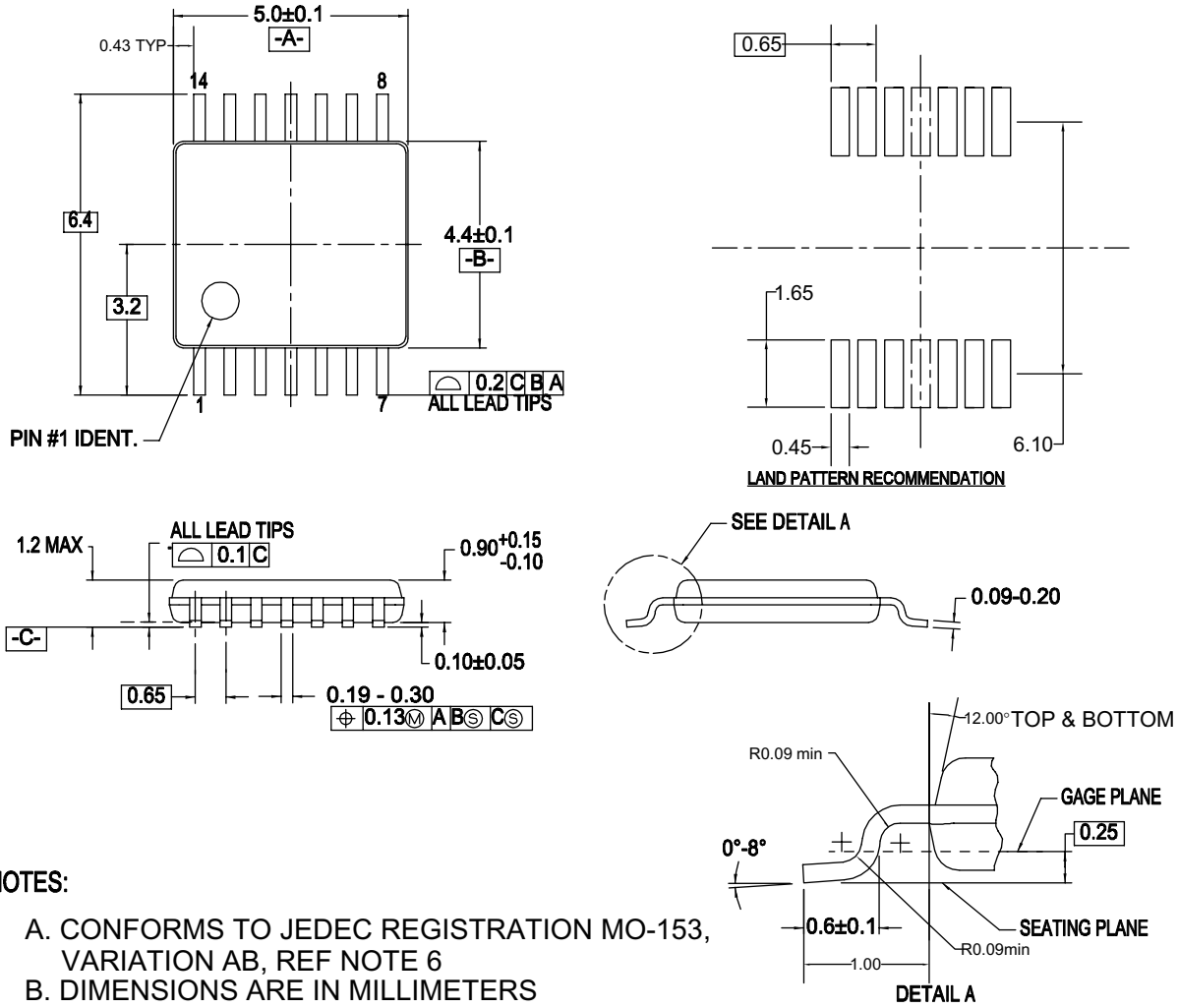
Physical Dimensions (Continued)



NOTES:

A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6

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

E. LANDPATTERN STANDARD: SOP65P640X110-14M

F. DRAWING FILE NAME: MTC14REV6

Figure 4. 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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