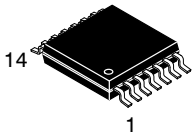
Low Voltage Quad 2-Input AND Gate with 3.6 V Tolerant Inputs and Outputs

74ALVC08



TSSOP−14 WB
CASE 948G

General Description

The ALVC08 contains four 2−input AND gates. This product is designed for low voltage (1.65 V to 3.6 V) V_{CC} applications with I/O compatibility up to 3.6 V.

The ALVC08 is fabricated with an advanced CMOS technology to achieve high−speed operation while maintaining low CMOS power dissipation.

Features

- 1.65 V to 3.6 V V_{CC} Supply Operation
- 3.6 V Tolerant Inputs and Outputs
- t_{PD}
  - 2.9 ns Max for 3.0 V to 3.6 V V_{CC}
  - 3.2 ns Max for 2.3 V to 2.7 V V_{CC}
  - 5.3 ns Max for 1.65 V to 1.95 V V_{CC}
- Power−off High Impedance Inputs and Outputs
- Uses Quiet Series Noise/EMI Reduction Circuitry
- Latchup Conforms to JEDEC JED78
- ESD Performance:
  - Human Body Model > 2000 V
  - Machine Model > 250 V
- These Devices are Pb−Free and Halide Free

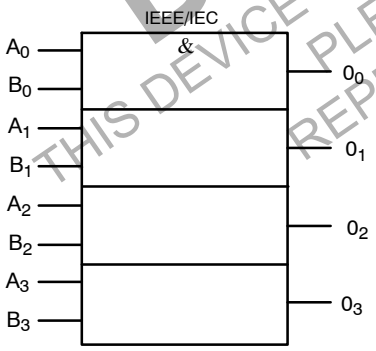
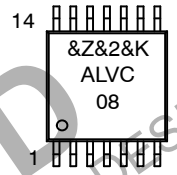


Figure 1. Logic Diagram

PIN DESCRIPTION

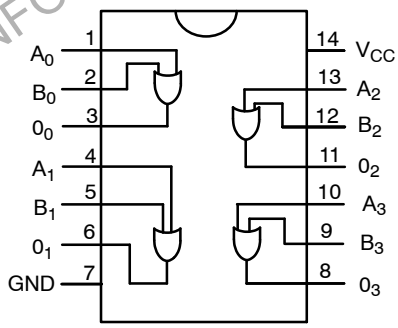
Pin	Description
$A_{n,Bn}$	Inputs
O_n	Outputs

MARKING DIAGRAM



&Z = Assembly Location
&2 = 2−Digit Date Code (Year & Week)
&K = Lot Run Traceability Code
ALVC08 = Specific Device Code

CONNECTION DIAGRAM



ORDERING INFORMATION

Device	Package	Shipping†
74ALVC08MTCX	TSSOP−14 (Pb-Free)	2500 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

ABSOLUTE MAXIMUM RATINGS

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

RECOMMENDED OPERATING CONDITIONS (Note 2)

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

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

1. I_O Absolute Maximum Rating must be observed, limited to 4.6 V.
2. Floating or unused control inputs must be held HIGH or LOW.

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC}(V)	Min	Max	Unit
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 2.7 3.0	1.7 2.2 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 2.7	– –	0.7 0.4	
		I_{OL} = 24 mA	3.0	–	0.55	
I_I	Input Leakage Current	0 ≤ V_I ≤ 3.6 V	3.6	–	±5.0	μA
I_{CC}	Quiescent Supply Current	V_I = V_{CC} or GND, I_O = 0	3.6	–	40	μA
ΔI_{CC}	Increase in I_{CC} per Input	V_{IH} = V_{CC} – 0.6 V	3 – 3.6	–	750	μA

AC ELECTRICAL CHARACTERISTICS

		T_A = –40°C to +85°C, R_L = 500 Ω								
		C_L = 50 pF				C_L = 30 pF				
		V_{CC} = 3.3 V ±0.3 V		V_{CC} = 2.7 V		V_{CC} = 2.5 V ±0.2 V		V_{CC} = 1.8 V ±0.15 V		
Symbol	Parameter	Min.	Max.	Min.	Max	Min	Max	Min	Max	Unit
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°C		Unit
			V_{CC}	Typ	
C_{IN}	Input Capacitance	V_I = 0 V or V_{CC}	3.3	4.5	pF
C_{PD}	Power Dissipation Capacitance	f = 10 MHz, C_L = 50 pF	3.3	26	pF
			2.5	25	
			1.8	24	

AC LOADING AND WAVEFORMS

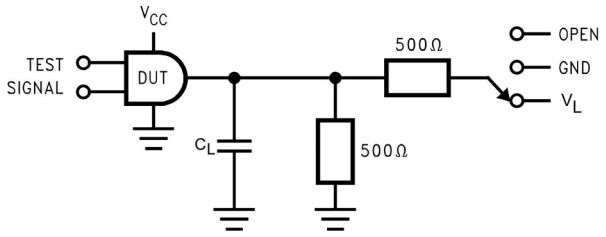


Figure 2. AC Test Circuit

Table 1. VALUES FOR FIGURE 2

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

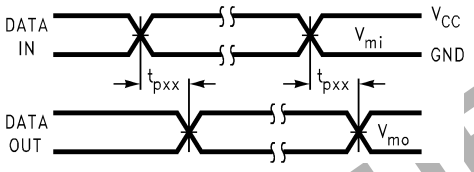
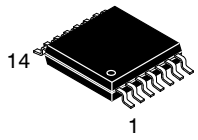


Figure 3. Waveform for Inverting and Non−Inverting Functions

Table 2. VARIABLE MATRIX (Input Characteristics; f = 1 MHz, $t_r = t_f$ = 2 ns; Z_0 = 5 Ω)

Symbol	V_{CC}			
	3.3 V ±0.3 V	**2.7 V**	**2.5 V ±0.2 V**	**1.8 V ± 0.15 V**
V_{mi}	1.5 V	1.5 V	$V_{CC}/2$	$V_{CC}/2$
V_{mo}	1.5 V	1.5 V	$V_{CC}/2$	$V_{CC}/2$



SCALE 2:1

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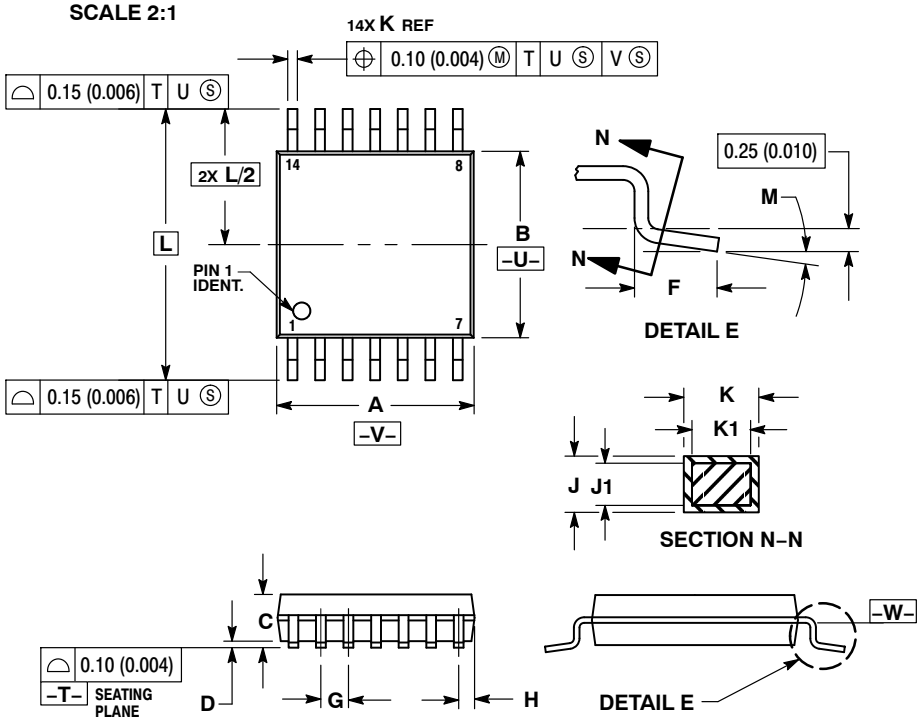
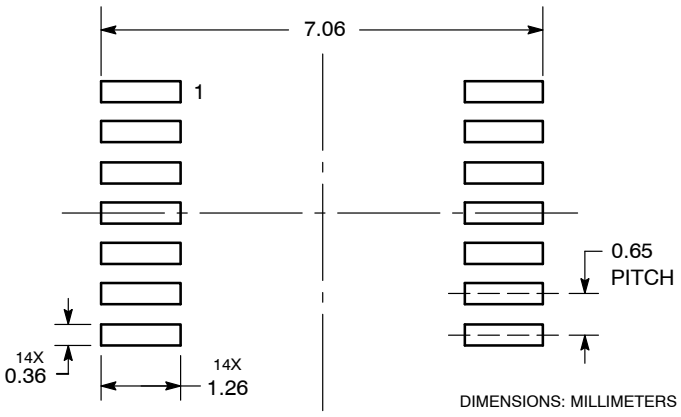
DATE 17 FEB 2016



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE −W−.

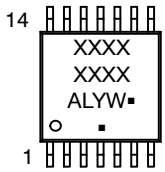
	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.90	5.10	0.193	0.200
B	4.30	4.50	0.169	0.177
C	−−−	1.20	−−−	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.50	0.60	0.020	0.024
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0 °	8 °	0 °	8 °

RECOMMENDED SOLDERING FOOTPRINT*



*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



A	= Assembly Location
L	= Wafer Lot
Y	= Year
W	= Work Week
▪	= Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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