



# Advanced Low Power Schottky Logic – 74ALS51

2-wide 3-Input, 2-wide 2-Input AND-OR-Invert Gate IC in bare die form

Rev 1.1  
24/01/24

## Description

The 74ALS51 is fabricated using a 2µm 40V Bipolar process. The device consists of two independent combinations of gates each performing the logic AND-OR-INVERT function. The IC integrates one 2-wide 3-input gates and one 2-wide 2-input gates each performing Boolean functions  $1Y = (1A \cdot 1B \cdot 1C) + (1D \cdot 1E \cdot 1F)$  and  $2Y = (2A \cdot 2B) + (2C \cdot 2D)$  respectively. All inputs are protected against ESD and excess voltage transients.

## Features:

- High speed – 14ns (Max) propagation delay
- Industrial Temperature Range
- Direct drop-in replacement for obsolete components in long term programs.

## Ordering Information

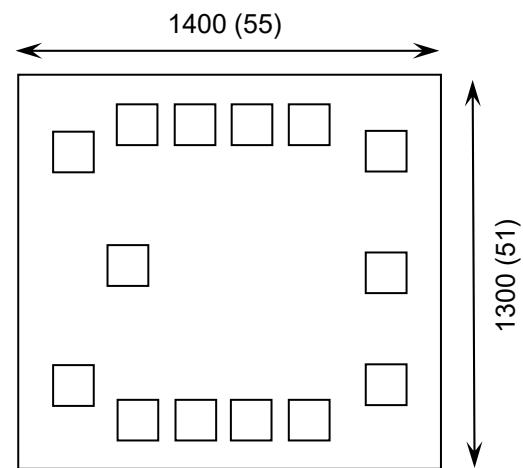
The following part suffixes apply:

- No suffix - MIL-STD-883 /2010B Visual Inspection

For High Reliability versions of this product please see

[54ALS51](#)

## Die Dimensions in µm (mils)



## Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – On request
- Unsawn Wafer – On request
- Die Thickness <> 350µm(14 Mils) – On request
- Assembled into Ceramic Package – On request

## Mechanical Specification

Die Size (Unsawn)	1400 x1300 55 x 51	µm mils
Minimum Bond Pad Size	130 x 130 5.12 x 5.12	µm mils
Die Thickness	350 (±20) 13.78 (±0.79)	µm mils
Top Metal Composition	Al 1%Si 1.1µm	
Back Metal Composition	N/A – Bare Si	



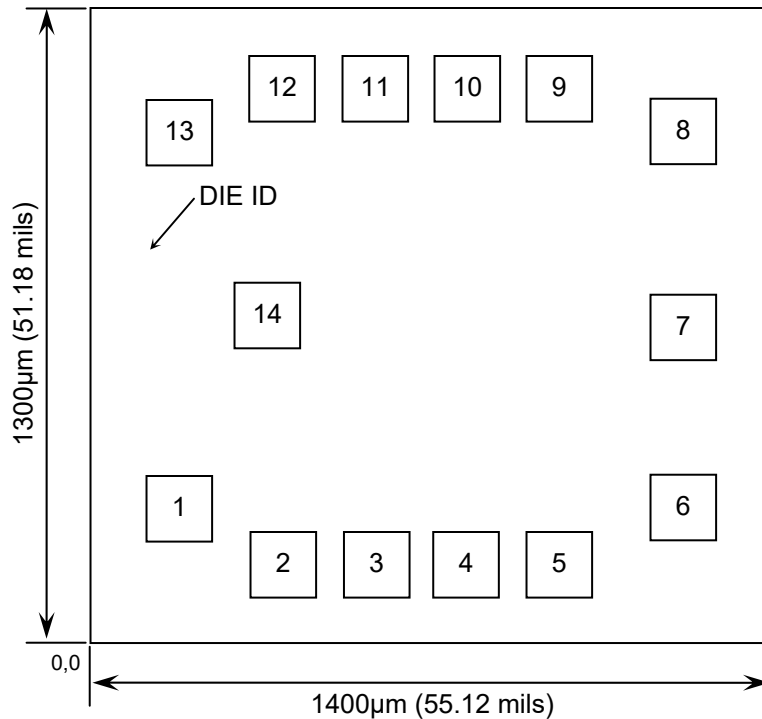


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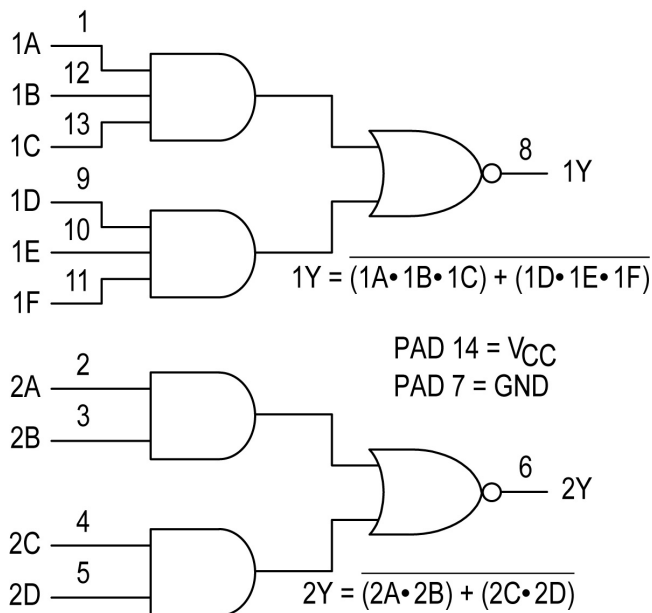
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## Pad Layout and Functions



PAD	FUNCTION	COORDINATES (mm)	
		X	Y
1	1A	0.110	0.215
2	2A	0.325	0.100
3	2B	0.515	0.100
4	2C	0.705	0.100
5	2D	0.895	0.100
6	2Y	1.150	0.215
7	GND	1.150	0.585
8	1Y	1.150	0.985
9	1D	0.895	1.070
10	1E	0.705	1.070
11	1F	0.515	1.070
12	1B	0.325	1.070
13	1C	0.110	0.985
14	V <sub>CC</sub>	0.295	0.610
CONNECT CHIP BACK TO GND			

## Logic Diagram



## Truth Table

INPUTS						OUTPUT
1A	1B	1C	1D	1E	1F	1Y
H	H	H	X	X	X	L
X	X	X	H	H	H	L
All other combinations						H

INPUTS				OUTPUT
2A	2B	2C	2D	2Y
H	H	X	X	L
X	X	H	H	L
All other combinations				H

H = High level (steady state)

L = Low level (steady state)

X = don't care





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## Absolute Maximum Ratings<sup>1</sup>

PARAMETER	SYMBOL	VALUE	UNIT
DC Supply Voltage	$V_{CC}$	7.0	V
DC Input Voltage	$V_{IN}$	7.0	V
Storage Temperature Range	$T_{STG}$	-65 to 150	°C

1. Operation above the absolute maximum rating may cause device failure. Operation at the absolute maximum ratings, for extended periods, may reduce device reliability.

## Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS
Supply Voltage	$V_{CC}$	4.5	5.5	V
High-Level Input Voltage	$V_{IH}$	2	-	V
Low-Level Input Voltage	$V_{IL}$	-	0.8	V
High-Level Output Current	$I_{OH}$	-	-0.4	mA
Low-Level Output Current	$I_{OL}$	-	8	mA
Operating Temperature Range	$T_J$	-40	+85	°C

μ

## DC Electrical Characteristics<sup>2</sup> $T_J = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ unless otherwise specified

PARAMETER	SYMBOL	CONDITIONS	LIMITS			UNITS
			MIN	TYP	MAX	
Minimum High-Level Input Voltage	$V_{IH}$	-	2	-	-	V
Maximum Low-Level Input Voltage	$V_{IL}$	-	-	-	0.7	V
Input Clamp Diode Voltage	$V_{IK}$	$V_{CC} = \text{MIN}$ $I_{IN} = -18\text{mA}$	-	-	-1.5	V
Output Voltage High	$V_{OH}$	$V_{CC} = \text{MIN}, I_{OH} = \text{MAX}$ $V_{IN} = V_{IL}$ or $V_{IH}$ per Truth Table	$V_{CC}-2$	-	-	V
Output Voltage Low	$V_{OL}$	$V_{CC} = V_{CC} \text{ MIN}$ $I_{OH} = \text{MAX}$ $V_{IN} = V_{IL}$ or $V_{IH}$ per Truth Table $I_{OL} = 8\text{mA}$	-	0.35	0.5	V
Input Current	$I_{IN}$	$V_{CC} = \text{MAX}, V_{IN} = 7.0\text{V}$	-	-	0.1	mA
Input High Current	$I_{IH}$	$V_{CC} = \text{MAX}, V_{IN} = 2.7\text{V}$	-	-	20	μA
Input Low Current	$I_{IL}$	$V_{CC} = \text{MAX}, V_{IN} = 0.4\text{V}$	-	-	-0.1	mA
Short Circuit Current <sup>3</sup>	$I_{OS}$	$V_{CC} = \text{MAX}$	-30	-	-112	mA
Power Supply Current (Total)	$I_{CC}$	$V_{CC} = \text{MAX}$ , Output High	-	-	1.2	mA
		$V_{CC} = \text{MAX}$ , Output Low	-	-	1.5	

2. All typical values @  $V_{CC} = 5\text{V}$ ,  $T_J = 25^{\circ}\text{C}$ . 3. Not more than one output should be shorted at a time, nor for more than 1 second.



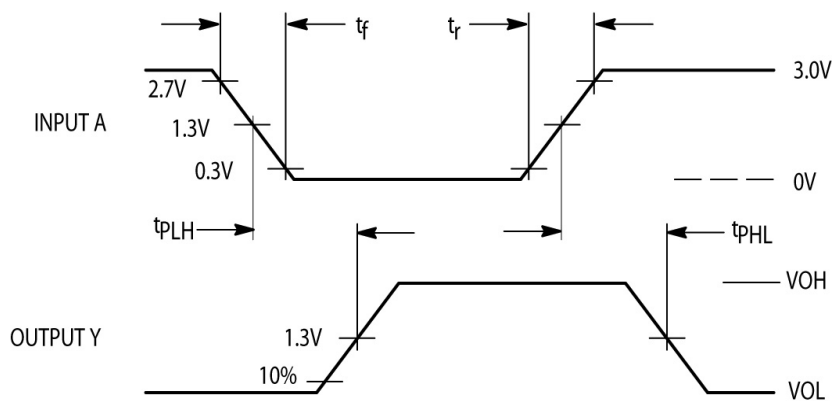


## AC Electrical Characteristics<sup>4</sup>

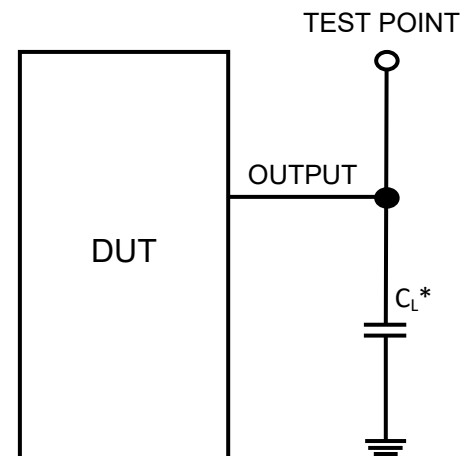
PARAMETER	SYMBOL	CONDITIONS	LIMITS			UNITS
			MIN	TYP	MAX	
Turn-Off Delay, Input to Output	$t_{PLH}$	$V_{CC} = 5V, C_L = 50pF,$ $R_L = 500\Omega$	2	-	14	ns
Turn-On Delay, Input to Output	$t_{PHL}$	$V_{CC} = 5V, C_L = 50pF,$ $R_L = 500\Omega$	3	-	12	

4. Not production tested in die form, characterized by chip design and tested in package.

## Switching Waveform



## Test Circuit



\* Includes all probe and jig capacitance

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