DESCRIPTION

The AL1G32 single 2-input Positive-OR gate, designed for 1.65V to 5.5V V_{CC} operation.

The AL1G32 performs the Boolean function $Y=A+B$ or $Y=\overline{\overline{A}\times\overline{B}}$ in positive logic. The AL1G32 is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

AL1G32 operates over an ambient temperature range of -40°C to +125°C.

The AL1G32 is available in SOT-25 and SC70-5 packages.

ORDERING INFORMATION

Package Type		Part Number
SOT-25 SPQ: 3,000pcs/Reel	E5	AL1G32E5R
		AL1G32E5VR
SC70-5 SPQ:3,000pcs/Reel	C5	AL1G32C5R
		AL1G32C5VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

FEATURES

● Operating Range: 1.65V to 5.5V

● Low Power Consumption: 1μA (Max).

● Operating Temperature Range: -40°C to +125°C

● Input Accept Voltage to 5.5V

● High Output Drive: ±24mA at V_{CC}=3.0V

APPLICATION

● AV Receiver
● Portable Audio Docks
● Blu-ray Player and Home Theater
● MP3 Players and Recorders
● Personal Digital Assistants (PDAs)
● Power:
  -Telecom and Server ACDC Supply
  -Single Controllers
    . Analog
    . Digital
● Client and Enterprise Solid State Drives (SSDs)
● LCD and Digital TVs and High Definition TVs (HDTVs)
● Enterprises Tablets
● Video Analytics Servers
● Wireless Headsets, Keyboards and Mice
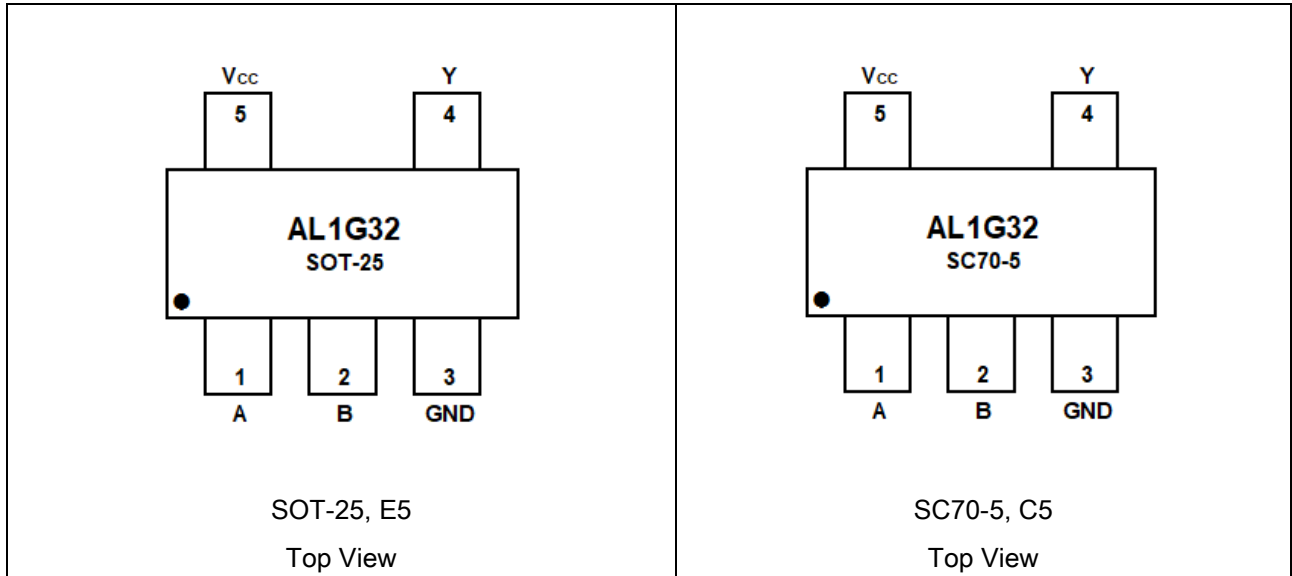
SIMPLIFIED SCHEMATIC

FUNCTION TABLE

Y=A+B
H=High Voltage Level
L=Low Voltage Level

Inputs		Output
A	**B**	**Y**
H	H	H
L	H	H
H	L	H
L	L	L

PIN DESCRIPTION

SOT-25, E5	SC70-5, C5
Top View	Top View

AL1G32 SOT-25 — Vcc (5), Y (4), A (1), B (2), GND (3)

AL1G32 SC70-5 — Vcc (5), Y (4), A (1), B (2), GND (3)

PIN#		Symbol	I/O	Function
SOT-25	SC70-5			
1	1	A	I	Input
2	2	B	I	Input
3	3	GND	P	Ground
4	4	Y	O	Output
5	5	V_{CC}	P	Power Pin

I=Input, O=Output, P=Power

ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range (unless otherwise noted)

V_{CC}, Supply Voltage Range		-0.5V ~ + 6.5V
V_I, Input Voltage Range [1]		-0.5V ~ + 6.5V
V_O, Voltage Range Applied to any Output in the High or Low State [1]		-0.5V~V_{CC}+0.5V
V_O, Voltage Range Applied to any Output in the High-Impedance or Power-Off State [1][2]		-0.5V ~ + 6.5V
I_{IK}, Input Clamp Current	V_I<0	-50mA
I_{OK}, Output Clamp Current	V_O<0	-50mA
I_O, Continuous Output Current		±50mA
I_O, Continuous Current through V_{CC} or GND		±100mA
$R_{\theta JA}$, Junction-to-Ambient Thermal Resistance	SOT-25	273.8°C/W
	SC70-5	214.7°C/W
T_J, Junction Temperature [4]		-65°C ~ +150°C
T_{STG}, Storage Temperature		-65°C ~ +150°C

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

(1)   The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(2)   The value of V_{CC} is provided in the Recommended Operating Conditions table.

ESD RATINGS

Parameter	Symbol	Min	Unit
Human-Body Model (HBM)	$V_{(ESD)}$ Electrostatic Discharge	±8000	V
Machine Model (MM)		±500	

RECOMMENDED OPERATING CONDITIONS

T_A=+25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Max	Unit
Supply Voltage	V_{CC}	Operating	1.65	5.5	V
		Data Retention only	1.5	5.5	
High-Level Input Voltage	V_{IH}	V_{CC} = 1.65V ~ 1.95V	0.65xV_{CC}	-	V
		V_{CC} = 2.3V ~ 2.7V	1.7	-	
		V_{CC} = 3V ~ 3.6V	2.2	-	
		V_{CC} = 4.5V ~ 5.5V	0.7xV_{CC}	-	
Low-Level Input Voltage	V_{IL}	V_{CC} = 1.65V ~ 1.95V	-	0.15x V_{CC}	V
		V_{CC} = 2.3V ~ 2.7V	-	0.3	
		V_{CC} = 3V ~ 3.6V	-	0.4	
		V_{CC} = 4.5V ~ 5.5V	-	0.15xV_{CC}	
Input Voltage	V_I	-	0	5.5	V
Output Voltage	V_O	-	0	V_{CC}	V
Input Transition Rise or Fall	t_r, t_f	V_{CC} = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V	-	20	ns/V
		V_{CC} = 3.3 V ± 0.3 V	-	10	
		V_{CC} = 5 V ± 0.5V	-	5	
Operating Temperature	T_A	-	-40	+125	°C

TYPICAL APPLICATION
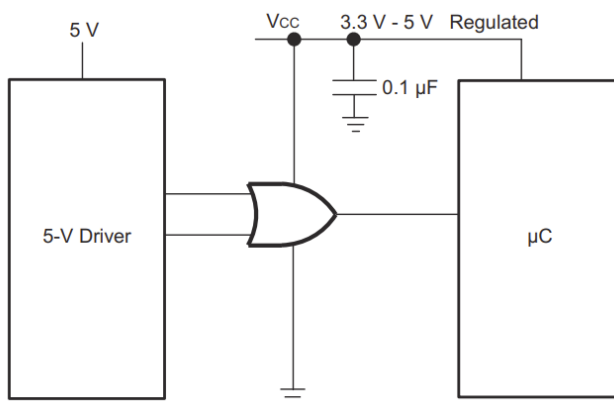
ELECTRICAL CHARACTERISTIC

DC CHARACTERISTICS

Symbol		Conditions		Min	Typ.	Max	Unit
V_{OH}		I_{OH} = -100 µA, V_{CC} = 1.65V ~ 5.5V	-40℃ ~ +125℃	V_{CC} ~ 0.1	-	-	V
		I_{OH} = -4mA, V_{CC} = 1.65V		1..2	-	-	
		I_{OH} = -8mA, V_{CC} = 2.3V		1.9	-	-	
		I_{OH} = -16mA, V_{CC} = 3V		2.4	-	-	
		I_{OH} = -24mA, V_{CC} = 3V		2.3	-	-	
		I_{OH} = -32mA, V_{CC} = 4.5V		3.8	-	-	
V_{OL}		I_{OH} = 100 µA, V_{CC} = 1.65V ~ 5.5V	-40℃ ~ +125℃	-	-	0.1	V
		I_{OH} = 4mA, V_{CC} = 1.65V		-	-	0.45	
		I_{OH} = 8mA, V_{CC} = 2.3V		-	-	0.3	
		I_{OH} = 16mA, V_{CC} = 3V		-	-	0.4	
		I_{OH} = 24mA, V_{CC} = 3V		-	-	0.55	
		I_{OH} = 32mA, V_{CC} = 4.5V		-	-	0.55	
I_I	A or B Inputs	V_I = 5.5V or GND, V_{CC} = 0V ~ 5.5V	+25℃		±0.1	±1	µA
			-40℃ ~ +125℃		-	±5	
I_{off}		V_I or V_O = 5.5V, V_{CC} =0	+25℃	-	±0.1	±1	µA
			-40℃ ~ +125℃	-	-	±10	
I_{CC}		V_I = 5.5V or GND, I_O = 0, V_{CC} = 1.65V ~ 5.5V	+25℃	-	0.1	1	µA
			-40℃ ~ +125℃	-	-	10	
ΔI_{CC}		One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND, V_{CC} = 3V ~ 5.5V	-40℃ ~ +125℃	-	-	500	µA

AC CHARACTERISTICS

-40℃ ~ +125℃, unless otherwise noted.

Parameter	Symbol	Conditions		Typ.	Unit
Input Capacitance	C_i	V_{CC} = 3.3V	V_I = V_{CC} or GND	4	ns
Propagation Delay	t_{pd}	V_{CC} = 1.8V±0.15V	C_L = 30pF, R_L = 1KΩ	8	ns
		V_{CC} = 2.5V±0.2V	C_L = 30pF, R_L = 500Ω	3.7	
		V_{CC} = 3.3V±0.3V	C_L = 50pF, R_L = 500Ω	2.5	
		V_{CC} = 5V±0.5V	C_L = 50pF, R_L = 500Ω	2.7	
Power Dissipation Capacitance	C_{pd}	V_{CC} = 1.8V	f=10MHz, +25℃	20	pF
		V_{CC} = 2.5V		21	
		V_{CC} = 3.3V		22	
		V_{CC} = 5V		25	

All unused inputs of the device must be held at Vcc or GND to ensure proper device operation

PARAMETER MEASUREMENT INFORMATION
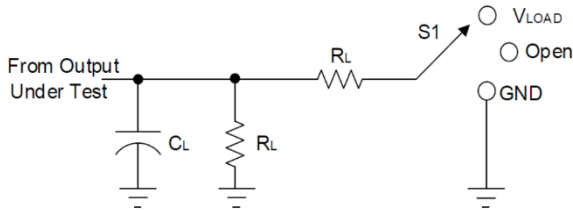
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PIZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	Inputs		VM	V_{LOAD}	C_L		R_L		$V\Delta$
	VI	tr/tf							
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	2 x V_{CC}	15pF	30pF	1MΩ	1kΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	2 x V_{CC}	15pF	30pF	1MΩ	500Ω	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	15pF	50pF	1MΩ	500Ω	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	2 x V_{CC}	15pF	50pF	1MΩ	500Ω	0.3V
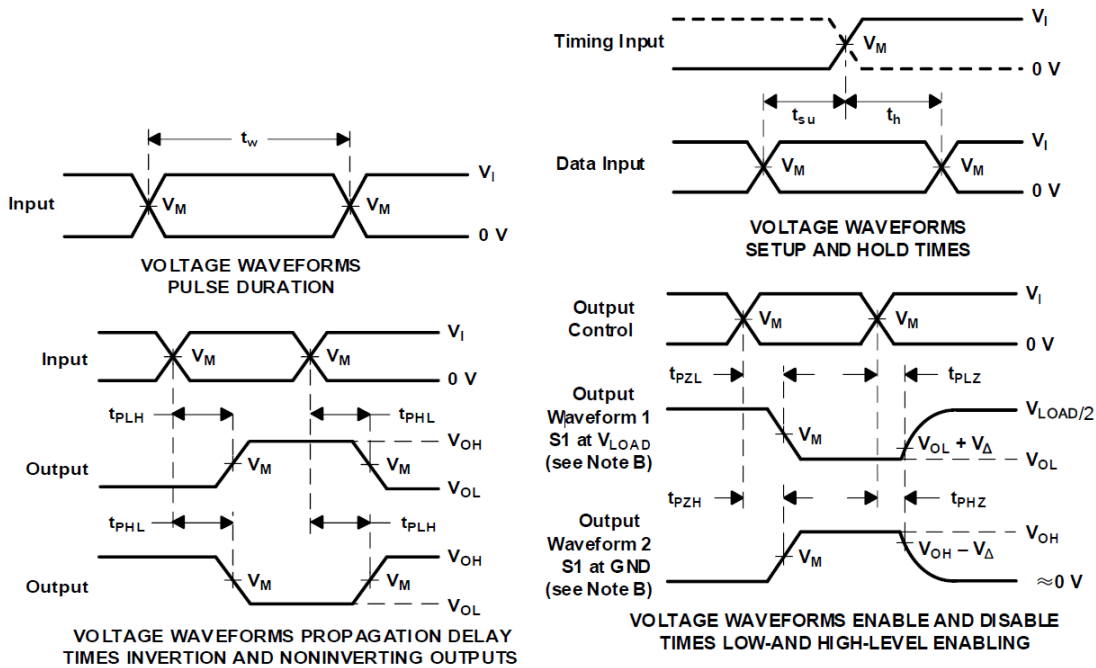
Fig 1. Load Circuit and Voltage Waveforms

(A) C_L includes probe and jig capacitance.

(B) Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
   Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.

(C) All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω.

(D) The outputs are measured one at a time, with one transition per measurement.

(E) All parameters and waveforms are not applicable to all devices.
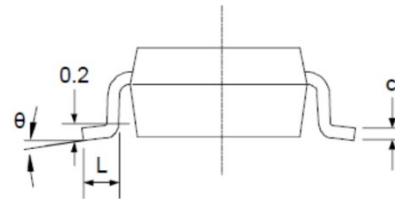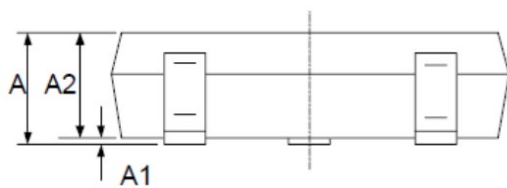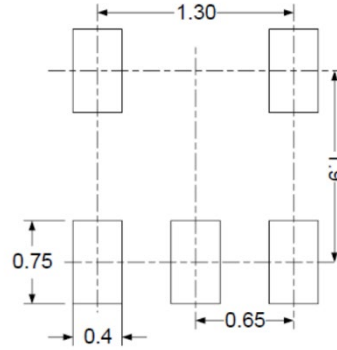
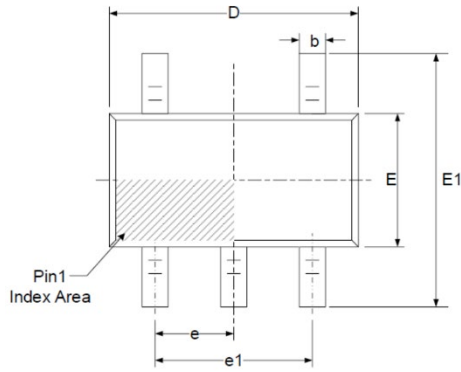## PACKAGE INFORMATION

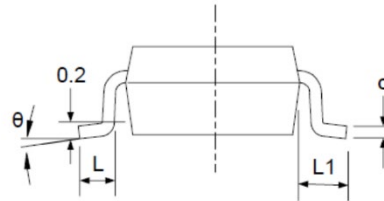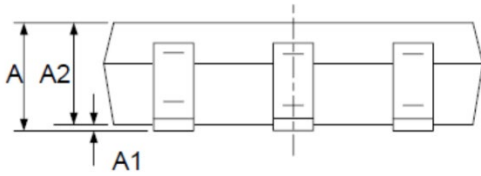Dimension in SOT-25 (Unit: mm)
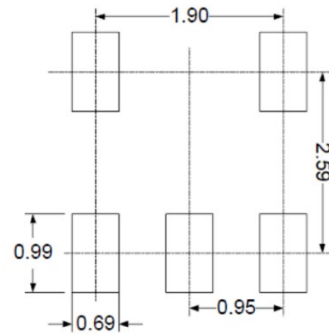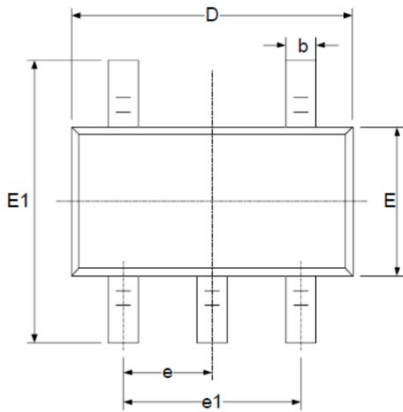
RECOMMENDED LAND PATTERN

Symbol	Millimeters	
	Min	Max
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950 BSC.	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

Dimension in SC70-5 (Unit: mm)

RECOMMENDED LAND PATTERN

Symbol	Millimeters	
	Min	**Max**
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.350
c	0.080	0.150
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.450
e	0.6950 BSC.	
e1	1.300 BSC.	
L	0.260	0.460
L1	0.525	
θ	0°	8°

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