

**DESCRIPTION**

The AL1G332 single 3-input positive-OR gate is designed for 1.65V to 5.5V VCC operation.

The AL1G332 device performs the Boolean function $Y = A + B + C$ or $Y = (\bar{A} \cdot \bar{B} \cdot \bar{C})$ in positive logic.

The AL1G332 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.

The AL1G332 is available in SOT-26 and SC70-6 packages.

FEATURES

- Operating Voltage Range: 1.65V to 5.5V
- Low Power Consumption: 1μA (Max)
- Operating Temperature Range: -40°C to +125°C
- Inputs Accept Voltage to 5.5V
- High Output Drive: ±24mA at VCC=3.0V

APPLICATION

- AV Receiver
- Blu-ray Player and Home Theater
- Digital Picture Frame (DPF)
- High-Speed Data Acquisition and Generation
- Personal Navigation Device (GPS)
- Portable Media Player

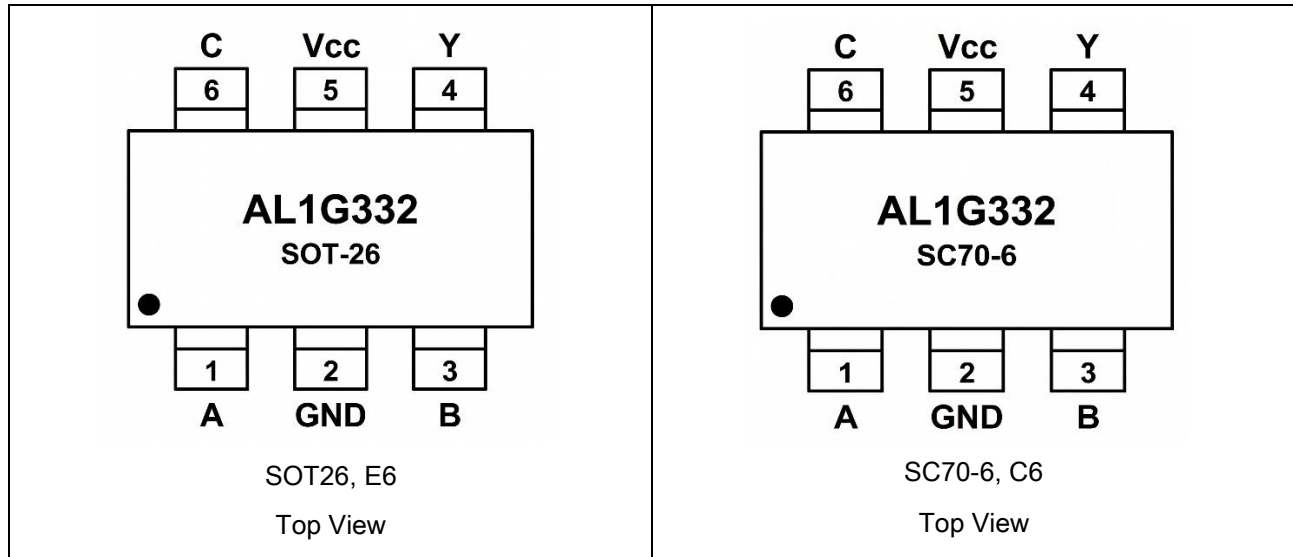
ORDERING INFORMATION

Package Type	Part Number	
SOT-26 SPQ: 3,000pcs/Reel	E6	AL1G332E6R
		AL1G332E6VR
SC70-6 SPQ: 3,000pcs/Reel	C6	AL1G332C6R
		AL1G332C6VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

SIMPLIFIED SCHEMATIC



PIN DESCRIPTION



Pin #		Symbol	I/O Type	Function
SOT26	SC70-6			
1	1	A	I	Input A
2	2	GND	P	Ground
3	3	B	I	Input B
4	4	Y	O	Output Y
5	5	Vcc	P	Power pin
6	6	C	I	Input C

(1) I=input, O=output, P=power.

FUNCTION TABLE

INPUTS			OUTPUT
A	B	C	Y
H	X	X	H
X	H	X	H
X	X	H	H
L	L	L	L

- $Y=A+B+C$
- H=High Voltage Level
- L=Low Voltage Level

**ABSOLUTE MAXIMUM RATINGS**

DC supply voltage, V _{CC}		-0.5V~6.5V
Input voltage range, V _I ⁽²⁾		-0.5V~6.5V
Voltage range applied to any output in the high-impedance or power-off state, V _O ⁽¹⁾		-0.5V~6.5V
Voltage range applied to any output in the high or low state, V _O ⁽¹⁾⁽²⁾		-0.5V~V _{CC} +0.5V
Input clamp current, I _{IK}	V _I <0	-50mA
Output clamp current, I _{OK}	V _O <0	-50mA
Continuous output current, I _O		±50mA
Continuous current through V _{CC} or GND		±100mA
Package thermal impedance, θ _{JA} ⁽³⁾	SOT-26	230°C/W
	SC70-6	265°C/W
Junction temperature, T _J ⁽⁴⁾		-65~150°C
Storage temperature, T _{STG}		-65~150°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.

(3)The package thermal impedance is calculated in accordance with JESD-51.

(4)The maximum power dissipation is a function of T_J(MAX), Rθ_{JA}, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{\theta JA}$. All numbers apply for packages soldered directly onto a PCB.

ESD RATINGS

Electrostatic Discharge	V _(ESD) Human-body model (HBM), MIL-STD-883K METHOD 3015.9	±2000V
	Charged-device model (CDM), ANSI/ESDA/JEDEC JS-002-2018	±1000V
	Machine Model (MM), JESD22-A115C (2010)	±200V



ELECTRICAL CHARACTERISTICS

TA = +25°C, unless otherwise noted

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Supply voltage	VCC	Operating	1.65	5.5	V
High-level input voltage	VIH	VCC=1.65V to 1.95V	0.75 x VCC	-	V
		VCC=2.3V to 2.7V	1.7	-	
		VCC=3V to 3.6V	2	-	
		VCC=4.5V to 5.5V	0.7 x VCC	-	
Low-level input voltage	VIL	VCC=1.65V to 1.95V	-	0.25 x VCC	V
		VCC=2.3V to 2.7V	-	0.7	
		VCC=3V to 3.6V	-	0.8	
		VCC=4.5V to 5.5V	-	0.3 x VCC	
Input voltage	VI	-	0	5.5	V
Output voltage	VO	-	0	VCC	V
High-level output current	IOH	VCC = 1.65 V	-	-4	mA
		VCC = 2.3 V	-	-8	
		VCC = 3 V	-	-16	
			-	-24	
		VCC = 4.5 V	-	-32	
Low-level output current	IOL	VCC = 1.65 V	-	4	mA
		VCC = 2.3 V	-	8	
		VCC = 3 V	-	16	
			-	24	
		VCC = 4.5 V	-	32	
Input transition rise or fall	$\Delta t/\Delta v$	VCC=1.8V± 0.15V, 2.5V ±0.2V	-	20	ns/V
		VCC=3.3V± 0.3V	-	10	
		VCC=5V± 0.5V	-	10	
Operating temperature	TA	-	-40	125	°C



PARAMETER		SYMBOL	TEST CONDITIONS		MIN	MAX	UNIT			
DC CHARACTERISTICS										
VOH		IOH = -100μA	1.65V to 5.5V	Full	Vcc-0.1	-	-	V		
		IOH = -4mA	1.65V		1.2	-	-			
		IOH = -8mA	2.3V		1.9	-	-			
		IOH = -16mA	3V		2.4	-	-			
		IOH = -24mA			2.3	-	-			
		IOH = -32mA	4.5V		3.8	-	-			
VOL		IOL = 100μA	1.65V to 5.5V	Full	-	-	0.1	V		
		IOL = 4mA	1.65V		-	-	0.45			
		IOL = 8mA	2.3V		-	-	0.3			
		IOL = 16mA	3V		-	-	0.4			
		IOL = 24mA			-	-	0.55			
		IOL = 32mA	4.5V		-	-	0.55			
II	All inputs	VI=5.5V or GND	0V to 5.5V	+25°C	-	±0.1	±1	μA		
				Full	-	-	±5			
Ioff		VI or VO=5.5V	0V	+25°C	-	±0.1	±1	μA		
				Full	-	-	±10			
Icc		VI=5.5V or GND, Io=0	1.65V to 5.5V	+25°C	-	0.1	1	μA		
				Full	-	-	10			
ΔIcc		One input at VCC-0.6V, Other inputs at VCC or GND	3V to 5.5V	Full	-	-	500	μA		
Ci		VI = VCC or GND	3.3V	+25°C	-	4	-	pF		
AC CHARACTERISTICS										
Propagation Delay		tpd	VCC=1.8V±0.15V	CL=30pF,RL=1kΩ	Full	6	16	26.5	ns	
			VCC=2.5V±0.2V	CL=30pF,RL=500Ω	Full	3	8	13.5		
			VCC=3.3V±0.3V	CL=50pF,RL=500Ω	Full	2.6	7	11.5		
			VCC=5V±0.5V	CL=50pF,RL=500Ω	Full	1.6	6	10		
Power Dissipation Capacitance		Cpd	VCC=1.8V	f=10MHz	+25°C	-	11	-	pF	
						VCC=2.5V	-	13		-
						VCC=3.3V	-	16		-
						VCC=5V	-	20		-

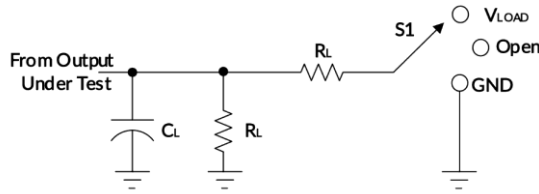
1. All unused inputs of the device must be held at VCC or GND to ensure proper device operation.

2. This parameter is ensured by design and/or characterization and is not tested in production.

3. Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.



PARAMETER MEASUREMENT INFORMATION



TEST	S1
tPLH/Tphl	Open
tPLZ/tPZL	V _{LOAD}
tPHZ/tPZH	GND

V _{CC}	INPUTS		V _M	V _{LOAD}	C _L	R _L	V _Δ
	V _I	tr/tf					
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	2 x V _{CC}	30pF	1kΩ	0.15V
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	2 x V _{CC}	30pF	500Ω	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V _{CC}	≤2.5ns	V _{CC} /2	2 x V _{CC}	50pF	500Ω	0.3V

Load Circuit and Voltage Waveforms

Fig.1 Large-Signal Step Response

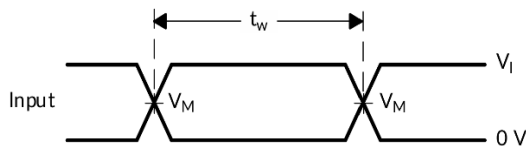


Fig.2 Volt. Waveforms Setup and Hold Times

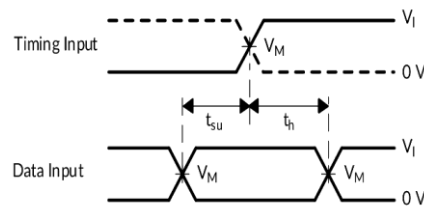


Fig.3 Volt. Waveforms Propagation Delay Times
Inversion and Non Inverting Outputs

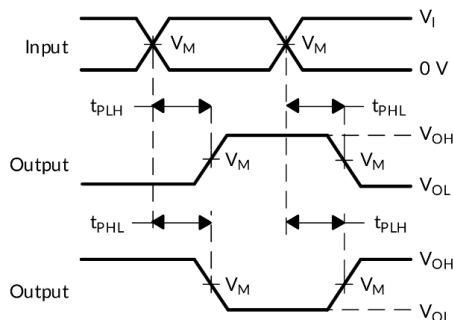
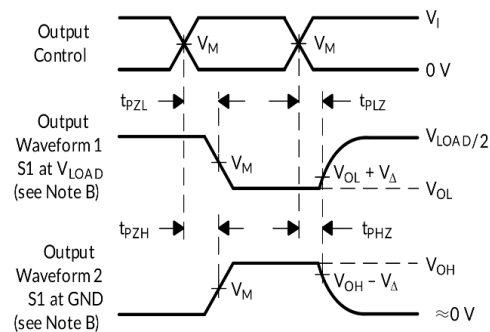


Fig.4 Volt. Waveforms Enable and Disable Times
Low and High-Level Enabling

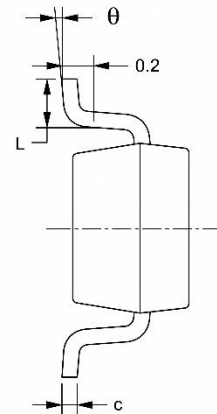
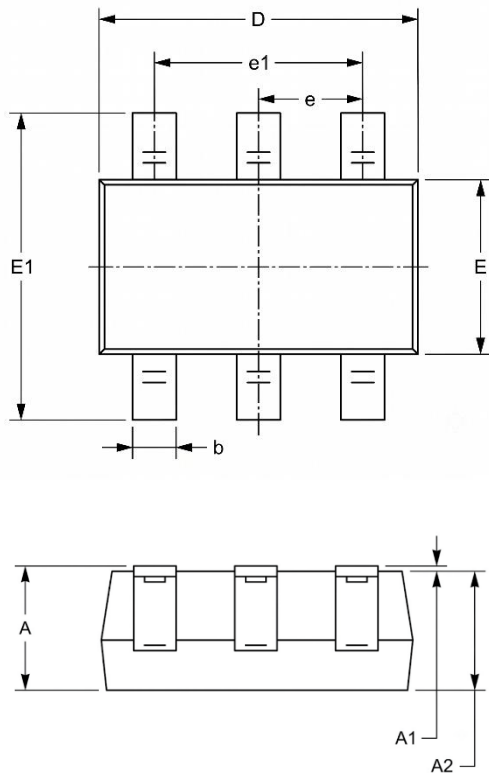


- A. C_L includes probe and jig capacitance.
- B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. 1.Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
- 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. t_{PLZ} and t_{PHZ} are the same as t_{dis}.
- F. t_{PZL} and t_{PZH} are the same as t_{en}.
- G. t_{PLH} and t_{PHL} are the same as t_{pd}.
- H. All parameters and waveforms are not applicable to all devices.



PACKAGE INFORMATION

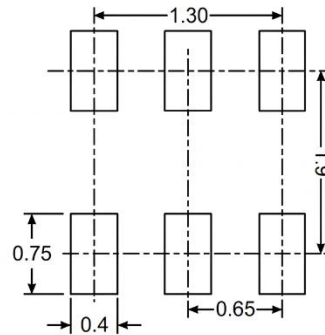
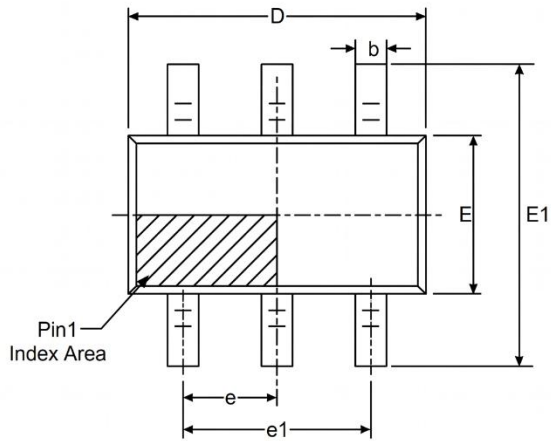
Dimension in SOT-26 (Unit: mm):



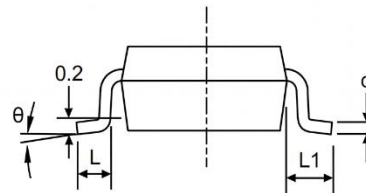
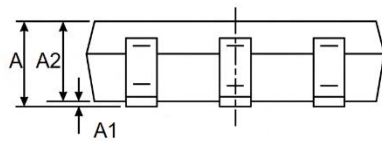
Symbol	MILLIMETERS	
	Min.	Max.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950 BSC	
e1	1.900 BSC	
L	0.300	0.600
θ	0°	8°



Dimension in SC70-6 (Unit: mm)



RECOMMENDED LAND PATTERN (Unit:mm)



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	0.650 BSC	
e1	1.300 BSC	
L	0.260	0.460
L1	0.525	
θ	0°	8°



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