DESCRIPTION

This bus buffer gate is designed for 1.65V to 5.5V V_{CC} operation. The AL1G125 is a single line driver with 3-state output. The output is disabled when the output-enable ($\overline{OE}$) input is high.

The CMOS AL1G125 has high output drive while maintaining low static power dissipation over a broad Vcc operating range.

The AL1G125 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.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor, the minimum value of the resistor is determined by the current-sinking capability of the driver.

The AL1G125 is available in SOT-25 and SC70-5 packages.

ORDERING INFORMATION

Package Type	Part Number	
SOT-25 SPQ: 3,000pcs/Reel	E5	AL1G125E5R
		AL1G125E5VR
SC70-5 SPQ: 3,000pcs/Reel	C5	AL1G125C5R
		AL1G125C5VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

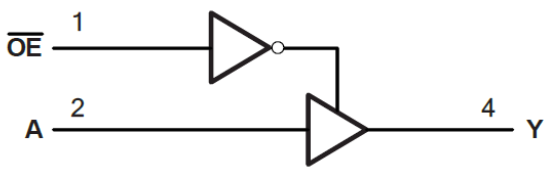
FEATURES

- Support 5V Vcc Operation
- Inputs Accept Voltages to 5.5V
- Provide Down Traslation to Vcc
- Low Power Consumption:1μA (Max)
- ±24mA Output Drive at V_{CC}=3.0V
- Latch-up Performance Exceeds 100mA
- Operating Temperature Range:
  -40°C to +125°C
- Available in SOT-25 and SC70-5 packages

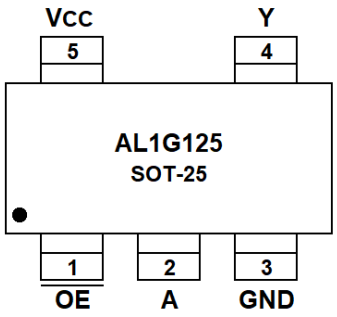
APPLICATION

- Cable Modem Termination System
- High-Speed Data Acquisition and Generation
- Military: Radar and Sonar
- Motor Control: High-Voltage
- Power Line Communication Modem
- SSD: Internal or External
- Video Broadcasting and Infrastructure: Scalable Platform
- Video Broadcasting: IP-Based Multi-Format
- Transcoder
- Video Communication System
- AV Receiver, Portable Media Player
- Digital Picture Frame (DPF)
- Personal Navigation Device (GPS)

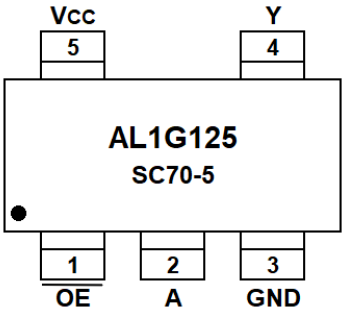
SIMPLIFIED SCHEMATIC



PIN DESCRIPTION



Top View



Top View

Pin #		Symbol	I/O	Function
SOT-25	SC70-5			
1	1	$\overline{OE}$	I	$\overline{OE}$ Enable/Input
2	2	A	I	A Input
3	2	GND	-	Ground Pin
4	4	Y	O	Y Output
5	5	V_{CC}	-	Power Pin

FUNCTION TABLE

Inputs		Output
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

H=HIGH Logic Level
L =LOW Logic Level
X=Don't Care
Z=High-impedance OFF-state

ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range, unless otherwise noted[NOTE1]

V_{CC}, Supply Voltage Range		-0.5V ~ 6.5V
V_I, Input Voltage Range[NOTE1]		-0.5V ~ 6.5V
V_O, Voltage range applied to any output in the high-impedance or power-off state[NOTE1]		-0.5V ~ 6.5V
V_O, Voltage range applied to any output in the high or low state[NOTE1, 2]		-0.5V ~ V_{CC}+0.5V
I_{IK}, Input Clamp Current	V_I<0	-50mA
I_{OK}, Output Clamp Current	V_O<0	-50mA
I_O, Continuous Output Current		±50mA
Continuous Current Through V_{CC} or GND		±100mA
T_J, Junction Temperature		-65℃ ~ 150℃
T_{STG}, Storage Temperature		-65℃ ~ 150℃
ESD Ratings		
$V_{(ESD)}$, Electrostatic Discharge	Human-body model (HBM)	±8000V
	Machine model (MM)	±500V

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

NOTE2: The value of V_{CC} is provided in the Recommended Operating Conditions table.

RECOMMENDED OPERATING CONDITIONS

over recommended operating free-air temperature range (TYP values are at T_A = +25℃, unless otherwise noted.)[NOTE3]

Parameter	Symbol	Conditions	Min.	Typ.	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 to 1.95V	0.65xV_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V	1.7	-	-	
		V_{CC}=3V to 3.6V	2.2	-	-	
		V_{CC}=4.5V to 5.5V	0.7xV_{CC}	-	-	
Low-Level Input Voltage	V_{IL}	V_{CC}=1.65V to 1.95V	-	-	0.15xV_{CC}	V
		V_{CC}=2.3V to 2.7V	-	-	0.3	
		V_{CC}=3V to 3.6V	-	-	0.4	
		V_{CC}=4.5V to 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}=1.8V±0.15V, 2.5V±0.2V	-	-	20	ns/V
		V_{CC}=3.3V±0.3V	-	-	10	
		V_{CC}=5V±0.5V	-	-	5	
Operating Temperature	T_A		-40	-	+125	℃

DC CHARACTERISTICS

over recommended operating free-air temperature range (TYP values are at T_A = +25℃, unless otherwise noted.)[NOTE3]

Parameter		Conditions	Temp	Min.	Typ.	Max.	Unit
V_{OH}		I_{OH}=-100μA, V_{CC}=1.65V to 5.5V	-40°C to +125°C	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}=100μA, V_{CC}=1.65V to 5.5V	-40°C to +125°C	-	-	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 $\overline{OE}$ Inputs	V_I=5.5V or GND, V_{CC}=0V to 5.5V	+25℃	-	±0.1	±1	μA
			-40°C to +125°C	-	-	±5	
I_{off}		V_I or V_O=5.5V, V_{CC}=0V	+25℃		±0.1	±1	μA
			-40°C to +125°C			±10	
I_{OZ}		V_O=0V to 5.5V, V_{CC}=3.6V	-40°C to +125°C	-	-	10	μA
I_{CC}		V_I=5.5V or GND, I_O=0, V_{CC}=1.65V to 5.5V	+25℃	-	0.1	1	μA
			-40°C to +125°C	-	-	10	
ΔI_{CC}		One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND, V_{CC}=3V to 5.5V	-40°C to +125°C	-	-	500	μA

Switching Characteristics, C_L=15pF

over recommended operating free-air temperature range (-40°C to 125°C, unless otherwise noted.)NOTE3

Parameter	From (Input)	To (Output)	V_{CC}=1.8V ±0.15V	V_{CC}=2.5V ±0.2V	V_{CC}=3.3V ±0.3V	V_{CC}=5V ±0.5V	Unit
			Typ.	Typ.	Typ.	Typ.	
t_{pd}	A	Y	6.1	3.7	3.9	2.1	ns

Switching Characteristics, C_L=30pF or 50pF

over recommended operating free-air temperature range (-40°C to 125°C, unless otherwise noted.)NOTE3

Parameter	From (Input)	To (Output)	V_{CC}=1.8V ±0.15V	V_{CC}=2.5V ±0.2V	V_{CC}=3.3V ±0.3V	V_{CC}=5V ±0.5V	Unit
			Typ.	Typ.	Typ.	Typ.	
t_{pd}	A	Y	8.6	5.3	4.0	2.9	ns
t_{en}	$\overline{OE}$	Y	9.5	5.8	5.0	3.3	ns
t_{dis}	$\overline{OE}$	Y	7.4	4.3	4.4	3.0	ns

Operating Characteristics

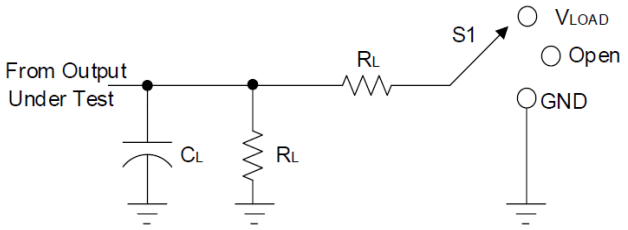
T_A=25°C

Parameter			Test Conditions	V_{CC}=1.8V	V_{CC}=2.5V	V_{CC}=3.3V	V_{CC}=5V	Unit
				Typ.	Typ.	Typ.	Typ.	
C_{pd}	Power Dissipation	Output Enabled	f=10MHZ	18	18	19	21	pF
		Output Disabled		2	2	2	4	

NOTE3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

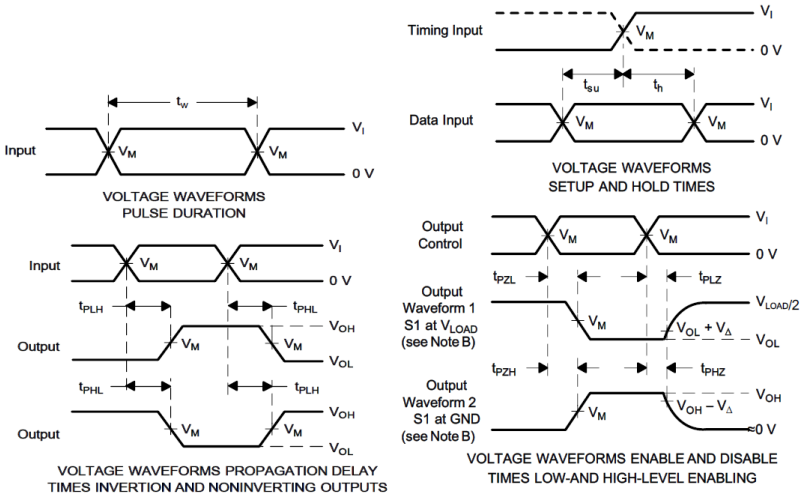
DETAILED INFORMATION

Parameter Measurement Information



TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_I	t_r/t_f					
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	2 x V_{CC}	15pF	1MΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	2 x V_{CC}	15pF	1MΩ	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	15pF	1MΩ	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	2 x V_{CC}	15pF	1MΩ	0.3V



NOTE A: C_L includes probe and jig capacitance.

NOTE 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.

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

NOTE D: The outputs are measured one at a time, with one transition per measurement.

NOTE E: t_{PLZ} and t_{PHZ} are the same as t_{dis}.

NOTE F: t_{PZL} and t_{PZH} are the same as t_{en}.

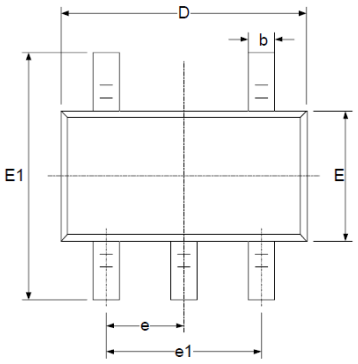
NOTE G: t_{PLH} and t_{PHL} are the same as t_{pd}.

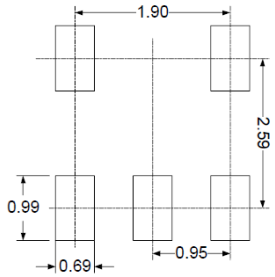
NOTE H: All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

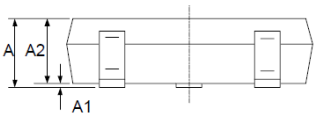
PACKAGE INFORMATION

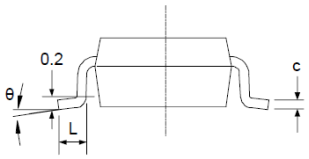
Dimension in SOT-25 (Unit: mm)





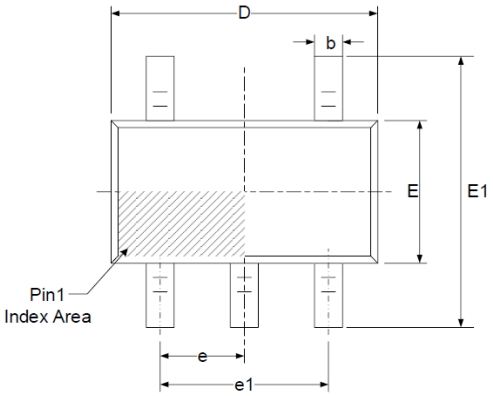
RECOMMENDED LAND PATTERN

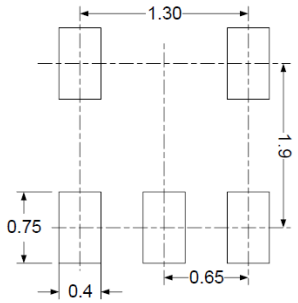




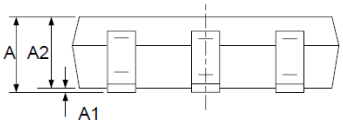
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

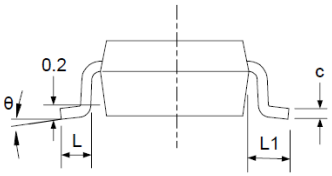
Dimension in SC70-5 (Unit: mm)





RECOMMENDED LAND PATTERN





Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 BSC		0.026 BSC	
e1	1.300 BSC		0.051 BSC	
L	0.260	0.460	0.010	0.018
L1	0.525		0.021	
θ	0°	8°	0°	8°

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