DESCRIPTION

The AL1G17 Single Schmitt-trigger buffer is designed for 1.65V to 5.5V V_{CC} operation.

The AL1G17 device contains one buffer and performs the Boolean function Y=A. The device functions as an independent buffer with Schmitt-trigger inputs, so the device has different input threshold levels for positivegoing (V_{T+}) and negative going (V_{T-}) signals to provide hysteresis(ΔV_T) which makes the device tolerant to slow or noisy input signals.

This device 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 AL1G17 is available in Green SOT-25 and SC70-5 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 V_{CC}=3.0V
- I_{off} Supports Partial-Power-Down Mode Operation

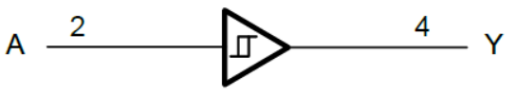
APPLICATION

- AC Receiver and
- Home Theaters
- Blu-ray Players and Home Theaters
- Desktops or Notebook PCs
- Digital Video Cameras (DVC)
- Mobile Phones
- Personal Navigation Device (GPS)
- Portable Media Player

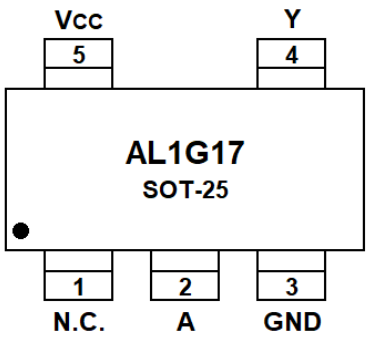
ORDERING INFORMATION

Package Type	Part Number	
SOT-25 SPQ: 3,000pcs/Reel	E5	AL1G17E5R
		AL1G17E5VR
SC70-5 SPQ: 3,000pcs/Reel	C5	AL1G17C5R
		AL1G17C5VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

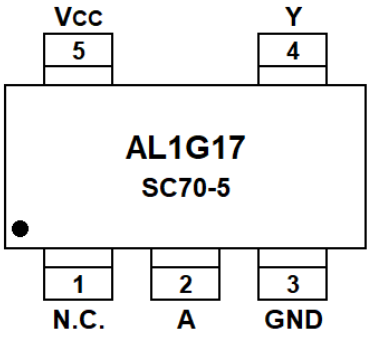
FUNCTIONAL BLOCK DIAGRAM



PIN DESCIPTION



Top View



Top View

Pin #		Symbol	I/O	Function
SOT-25	SC70-5			
1	1	N.C.	-	Not connected
2	2	A	I	Input
3	2	GND	P	Ground
4	4	Y	O	Output
5	5	V_{CC}	P	Power Pin

FUNCTION TABLE

Input	Output
A	Y
H	H
L	L

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

ABSOLUTE MAXIMUM RATINGS

T_A = +25°C, unless otherwise noted. (1)

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-impedance or power-off state (1)		-0.5V ~ +6.5V
V_O, Voltage range applied to any output in the high or low state (1)(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		+150℃
T_{STG}, Storage Temperature		-65℃ ~ +150℃
ESD Ratings		
$V_{(ESD)}$, Electrostatic Discharge	Human-Body Model (HBM)	±8000V
	Machine Model (MM)	±500V
Thermal Information		
$R_{\theta JA}$, Junction-to-Ambient Thermal Resistance	SOT-25	273.8℃/W
	SC70-5	214.7℃/W
$R_{\theta JC(top)}$,Junction-to-Case(Top) Thermal Resistance	SOT-25	126.8℃/W
	SC70-5	127.1℃/W
$R_{\theta JB}$, Junction-to-Board Thermal Resistance	SOT-25	85.9℃/W
	SC70-5	60.0℃/W
Ψ_{JT}, Junction-to-Top Characterization Parameter	SOT-25	10.9℃/W
	SC70-5	33.4℃/W
Ψ_{JB},Junction-to-Board Characterization Parameter	SOT-25	84.9℃/W
	SC70-5	59.8℃/W

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.

RECOMMENDED OPERATING CONDITIONS

At T_A = +25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	Operating	1.65	-	5.5	V
		Data retention only	1.50	-	-	
Input Voltage	V_I		0	-	5.5	V
Output Voltage	V_O		0	-	V_{CC}	V
Operating Temperature	T_A		-40	-	+125	℃

AC ELECTRICAL CHARACTERISTICS

At T_A = +25°C, unless otherwise noted.

Parameter	Symbol	Conditions		Temp	Min.	Typ.	Max.	Unit
Propagation Delay	t_{pd}	V_{CC}=1.8V±0.15V	C_L=30pF, R_L=500Ω	-40℃ ~ +125℃	-	21	-	ns
		V_{CC}=2.5V±0.2V	C_L=30pF, R_L=500Ω	-40℃ ~ +125℃	-	7.8	-	
		V_{CC}=3.3V±0.3V	C_L=50pF, R_L=500Ω	-40℃ ~ +125℃	-	5.7	-	
		V_{CC}=5V±0.5V	C_L=50pF, R_L=500Ω	-40℃ ~ +125℃	-	4.2	-	
Input Capacitance	C_i	V_{CC}=3.3V	V_I=V_{CC} or GND	+25℃	-	4	-	pF
Power Dissipation Capacitance	C_{pd}	V_{CC}=1.8V	f=10MHz	+25℃	-	21	-	pF
		V_{CC}=2.5V			-	22	-	
		V_{CC}=3.3V			-	22	-	
		V_{CC}=5V			-	25	-	

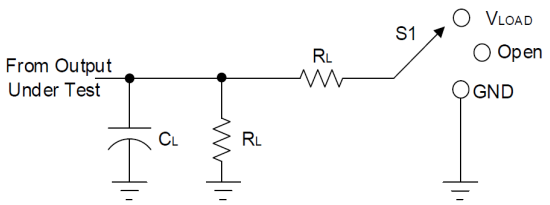
DC ELECTRICAL CHARACTERISTICS

At T_A = +25°C, unless otherwise noted.

Parameter		Conditions	Temp	Min.	Typ.	Max.	Unit
V_{T+}	Positive Going Input Threshold Voltage	V_{CC}=1.65V	-40℃ ~ +125℃	0.75	-	1.05	V
		V_{CC}=2.3V		1.25	-	1.55	
		V_{CC}=3V		1.50	-	2.10	
		V_{CC}=4.5V		2.30	-	3.00	
		V_{CC}=5.5V		2.80	-	3.40	
V_{T-}	Negative Going Input Threshold Voltage	V_{CC}=1.65V	-40℃ ~ +125℃	0.30	-	0.60	V
		V_{CC}=2.3V		0.35	-	0.65	
		V_{CC}=3V		0.45	-	0.75	
		V_{CC}=4.5V		0.70	-	1.00	
		V_{CC}=5.5V		0.85	-	1.15	
ΔV_T	Hysteresis (V_{T+}- V_{T-})	V_{CC}=1.65V	-40℃ ~ +125℃	0.35	-	0.60	V
		V_{CC}=2.3V		0.60	-	1.20	
		V_{CC}=3V		1.05	-	1.65	
		V_{CC}=4.5V		1.60	-	2.00	
		V_{CC}=5.5V		1.95	-	2.25	
V_{OH}		I_{OH}=-100μA, V_{CC}=1.65V to 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}=100μA, V_{CC}=1.65V to 5.5V	-40℃ ~ +125℃	-	-	0.10	V
		I_{OH}=4mA, V_{CC}=1.65V		-	-	0.45	
		I_{OH}=8mA, V_{CC}=2.3V		-	-	0.30	
		I_{OH}=16mA, V_{CC}=3V		-	-	0.40	
		I_{OH}=24mA, V_{CC}=3V		-	-	0.55	
		I_{OH}=32mA, V_{CC}=4.5V		-	-	0.55	
I_I	A input	V_I=5.5V or GND, V_{CC}= 0V to 5.5V	+25℃	-	±0.1	±1	μA
			-40℃ ~ +125℃	-	-	±5	
I_{off}		V_I or V_O=5.5V, V_{CC}=0V	+25℃		±0.1	±1	μA
			-40℃ ~ +125℃			±10	
I_{CC}		V_I=5.5V or GND, I_O=0, V_{CC}=1.65V to 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 to 5.5V	-40℃ ~ +125℃	-	-	500	μA

DETAILED INFORMATION

Parameter Measurement Information



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

V_{CC}	Inputs V_I	t_r/t_f	V_M	V_{LOAD}	C_L		R_L		V_Δ
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

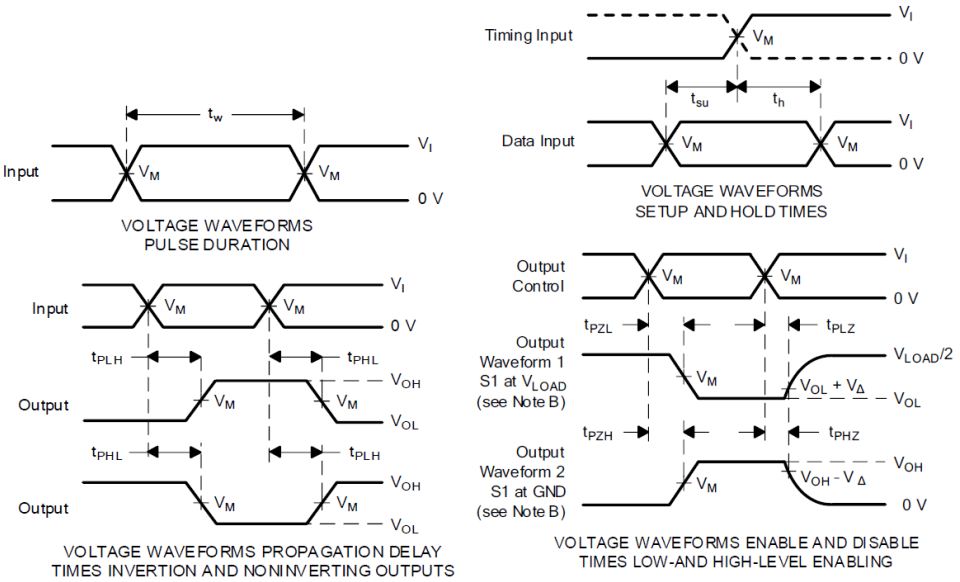
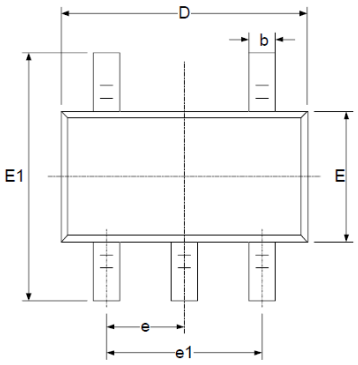


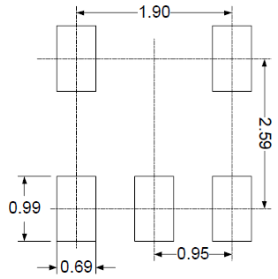
Figure 1. Load Circuit and Voltage Waveforms

(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) 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.

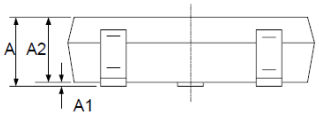
PACKAGE INFORMATION

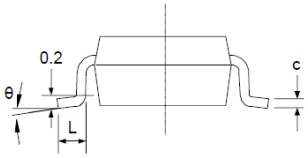
Dimension in SOT-25 (Unit: mm)





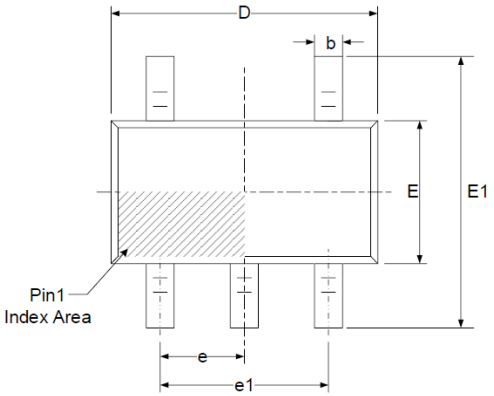
RECOMMENDED LAND PATTERN

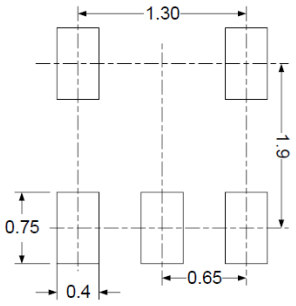




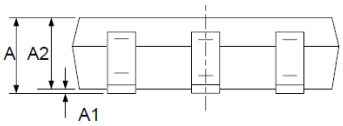
Symbol	Millimeters	
	Min	Max
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950 BSC	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

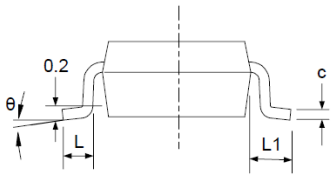
Dimension in SC70-5 (Unit: mm)





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

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