



## DESCRIPTION

This Dual Schmitt-trigger Inverter AL2G14 is designed for 1.65V to 5.5V Vcc operation.

The AL2G14 device contains two inverter and performs the Boolean function  $Y = \bar{A}$ . The device functions as two independent inverters with Schmitt-trigger inputs, so the device has different input threshold levels for positive-going ( $V_{T+}$ ) and negative going ( $V_{T-}$ ) signals to provide hysteresis ( $\Delta V_T$ ) which makes the device tolerant to slow or noisy input signals.

This AL2G14 is fully specified for partial-power-down applications using  $I_{off}$ . The  $I_{off}$  circuitry disables the outputs, preventing damaging current backflow through the AL2G14 when it is powered down.

The AL2G14 is available in SOT-26 and SC70-6 packages.

## ORDERING INFORMATION

Package Type	Part Number	
SOT-26 SPQ: 3,000pcs/Reel	E6	AL2G14E6R
		AL2G14E6VR
SC70-6 SPQ: 3,000pcs/Reel	C6	AL2G14C6R
		AL2G14C6VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

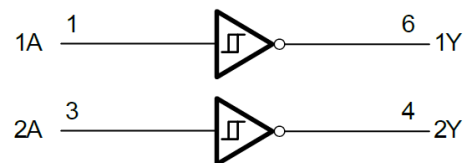
## FEATURES

- Supports 5V Vcc Operation
- Inputs Accept Voltages from 1.65V to 5.5V
- Low Power Consumption: 1µA (Max)
- ±24mA High Output Drive at  $V_{CC}=3.0V$
- Input Accept Voltage to 5.5V
- $I_{off}$  Supports Partial-Power-Down Mode
- Operation Operating Temperature Range: -40°C to +125°C
- Available in SOT-26 and SC70-6 packages

## APPLICATION

- Body Control Modules
- Engine Control Modules
- Arcade, Casino, and Gambling Machines
- Servers and High-Performance Computing
- EPOS, ECR, and Cash Drawer
- Routers
- Desktop PC
- AC Receiver and Home Theaters
- Blu-ray Players and Home Theaters
- Digital Video Cameras (DVC)
- Mobile Phones
- Personal Navigation Device (GPS)
- Portable Media Player

## FUNCTIONAL BLOCK DIAGRAM





## PIN DESCRIPTION

<p>Top View</p>		<p>Top View</p>		
Pin #		Symbol	I/O	Function
SOT-26	SC70-6			
1	1	1A	I	Input 1
2	2	GND	P	Ground
3	3	2A	I	Input 2
4	4	2Y	O	Output 2
5	5	V <sub>cc</sub>	P	Power Pin
6	6	1Y	O	Output 1

## FUNCTION TABLE

Inputs	Output
A	Y
H	L
L	H

Y= $\bar{A}$

H=High Voltage Level

L=Low Voltage Level



## ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range, unless otherwise noted<sup>NOTE1</sup>

V <sub>CC</sub> , Supply Voltage Range		-0.5V ~ 6.5V
V <sub>I</sub> , Input Voltage Range <sup>NOTE1</sup>		-0.5V ~ 6.5V
V <sub>O</sub> , Voltage range applied to any output in the high-impedance or power-off state <sup>NOTE1</sup>		-0.5V ~ 6.5V
V <sub>O</sub> , Voltage range applied to any output in the high or low state <sup>NOTE1, 2</sup>		-0.5V ~ V <sub>CC</sub> +0.5V
I <sub>IK</sub> , Input Clamp Current	V <sub>I</sub> <0	-50mA
I <sub>OK</sub> , Output Clamp Current	V <sub>O</sub> <0	-50mA
I <sub>O</sub> , Continuous Output Current		±50mA
Continuous Current Through V <sub>CC</sub> or GND		±100mA
T <sub>J</sub> , Junction Temperature		150°C
T <sub>STG</sub> , Storage Temperature		-65°C ~ 150°C
<b>ESD Ratings</b>		
V <sub>(ESD)</sub> , 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<sub>CC</sub> is provided in the Recommended Operating Conditions table.



## RECOMMENDED OPERATING CONDITIONS

T<sub>A</sub> = +25°C, unless otherwise noted.<sup>NOTE3</sup>

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V <sub>CC</sub>	Operating	1.65	-	5.5	V
		Data retention only	1.5	-	-	
Input Voltage	V <sub>I</sub>		0	-	5.5	V
Output Voltage	V <sub>O</sub>		0	-	V <sub>CC</sub>	V
Operating Temperature	T <sub>A</sub>		-40	-	+125	°C



## DC ELECTRICAL CHARACTERISTICS

T<sub>A</sub> = +25°C, unless otherwise noted.<sup>NOTE3</sup>

Parameter		Conditions	Temp	Min	Typ	Max	Unit
V <sub>T+</sub>	Positive Going Input Threshold Voltage	V <sub>CC</sub> =1.65V	-40°C to +125°C	0.75	-	1.05	V
		V <sub>CC</sub> =3V		1.25	-	1.55	
		V <sub>CC</sub> =3V		1.5	-	2.1	
		V <sub>CC</sub> =4.5V		2.3	-	3.0	
		V <sub>CC</sub> =5.5V		2.8	-	3.4	
V <sub>T-</sub>	Negative Going Input Threshold Voltage	V <sub>CC</sub> =1.65V	-40°C to +125°C	0.3	-	0.6	V
		V <sub>CC</sub> =2.3V		0.35	-	0.65	
		V <sub>CC</sub> =3V		0.45	-	0.75	
		V <sub>CC</sub> =4.5V		0.7	-	1.0	
		V <sub>CC</sub> =5.5V		0.85	-	1.15	
ΔV <sub>T</sub>	Hysteresis (V <sub>T+</sub> - V <sub>T-</sub> )	V <sub>CC</sub> =1.65V	-40°C to +125°C	0.35	-	0.6	V
		V <sub>CC</sub> =2.3V		0.6	-	1.2	
		V <sub>CC</sub> =3V		1.05	-	1.65	
		V <sub>CC</sub> =4.5V		1.6	-	2.0	
		V <sub>CC</sub> =5.5V		1.95	-	2.25	
V <sub>OH</sub>		I <sub>OH</sub> = -100μA, V <sub>CC</sub> =1.65V to 5.5V	-40°C to +125°C	V <sub>CC</sub> - 0.1	-	-	V
		I <sub>OH</sub> = -4mA, V <sub>CC</sub> =1.65V		1.2	-	-	
		I <sub>OH</sub> = -8mA, V <sub>CC</sub> =2.3V		1.9	-	-	
		I <sub>OH</sub> = -16mA, V <sub>CC</sub> =3V		2.4	-	-	
		I <sub>OH</sub> = -24mA, V <sub>CC</sub> =3V		2.3	-	-	
		I <sub>OH</sub> = -32mA, V <sub>CC</sub> =4.5V		3.8	-	-	
V <sub>OL</sub>		I <sub>OL</sub> = 100μA, V <sub>CC</sub> =1.65V to 5.5V	-40°C to +125°C	-	-	0.1	V
		I <sub>OL</sub> = 4mA, V <sub>CC</sub> =1.65V		-	-	0.45	
		I <sub>OL</sub> = 8mA, V <sub>CC</sub> =2.3V		-	-	0.3	
		I <sub>OL</sub> = 16mA, V <sub>CC</sub> =3V		-	-	0.4	
		I <sub>OL</sub> = 24mA, V <sub>CC</sub> =3V		-	-	0.55	
		I <sub>OL</sub> = 32mA, V <sub>CC</sub> =4.5V		-	-	0.55	
I <sub>I</sub>	A input	V <sub>I</sub> =5.5V or GND, V <sub>CC</sub> =0V to 5.5V	+25°C	-	±0.1	±1	μA
			-40°C to +125°C	-	-	±5	
I <sub>off</sub>		V <sub>I</sub> or V <sub>O</sub> =5.5V, V <sub>CC</sub> =0	+25°C	-	±0.1	±1	μA
			-40°C to +125°C	-	-	±10	
I <sub>CC</sub>		V <sub>I</sub> =5.5V or GND, I <sub>O</sub> =0, V <sub>CC</sub> =1.65V to 5.5V	+25°C	-	0.1	1	μA
			-40°C to +125°C	-	-	10	
ΔI <sub>CC</sub>		One input at V <sub>CC</sub> - 0.6V, Other inputs at V <sub>CC</sub> or GND, V <sub>CC</sub> =3V to 5.5V	-40°C to +125°C	-	-	500	μA



## AC ELECTRICAL CHARACTERISTICS

T<sub>A</sub> = +25°C, unless otherwise noted.<sup>NOTE3</sup>

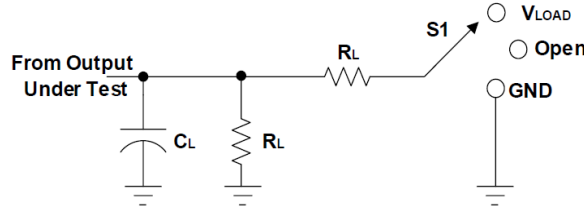
Parameter	Symbol	Conditions		Temp	Min	Typ	Max	Unit
Propagation Delay	t <sub>pd</sub>	V <sub>CC</sub> =1.8V±0.15V	C <sub>L</sub> =30pF, R <sub>L</sub> =500Ω	-40°C to +125°C	-	7.5	-	ns
		V <sub>CC</sub> =2.5V±0.2V	C <sub>L</sub> =30pF, R <sub>L</sub> =500Ω		-	3.6	-	
		V <sub>CC</sub> =3.3V±0.3V	C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω		-	3.1	-	
		V <sub>CC</sub> =5V±0.5V	C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω		-	2.7	-	
Input Capacitance	C <sub>i</sub>	V <sub>CC</sub> =3.3V	V <sub>I</sub> =V <sub>CC</sub> or GND	+25°C	-	4	-	pF
Power dissipation capacitance	C <sub>pd</sub>	V <sub>CC</sub> =1.8V	f=10MHz	+25°C	-	20	-	pF
		V <sub>CC</sub> =2.5V			-	21	-	
		V <sub>CC</sub> =3.3V			-	22	-	
		V <sub>CC</sub> =5V			-	25	-	

NOTE3: All unused inputs of the device must be held at VCC or GND to ensure proper device operation.



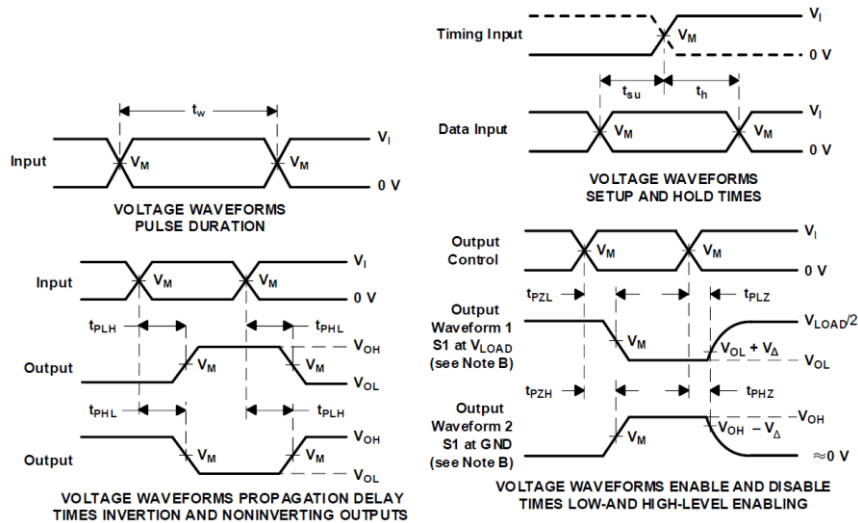
**DETAILED INFORMATION**

**Parameter Measurement Information**



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

$V_{CC}$	Inputs		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_I$	$t_r/t_f$					
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 $\Omega$	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 $\Omega$	0.3V
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 $\Omega$	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  $\leq$  10 MHz,  $Z_o = 50\Omega$ .

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  $t_{pd}$ .

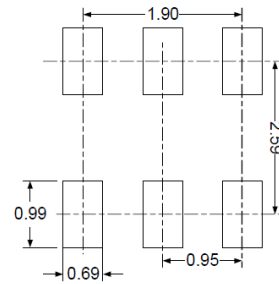
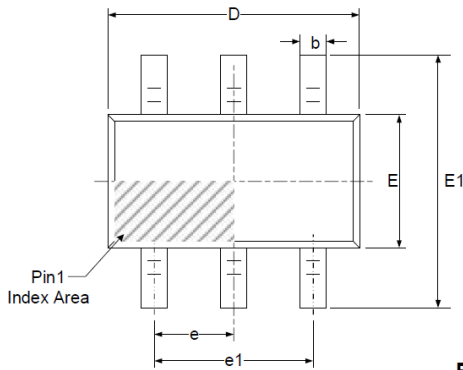
NOTE H: All parameters and waveforms are not applicable to all devices.

**Figure 1. Load Circuit and Voltage Waveforms**

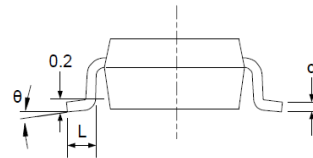
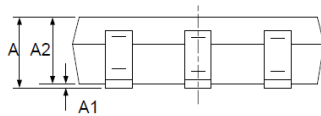


**PACKAGE INFORMATION**

Dimension in SOT-26 (Unit: mm)



**RECOMMENDED LAND PATTERN (Unit: mm)**

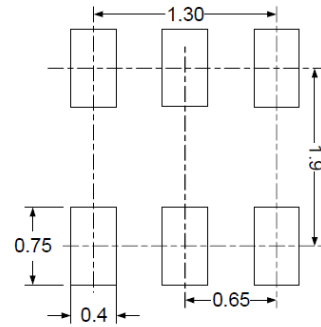
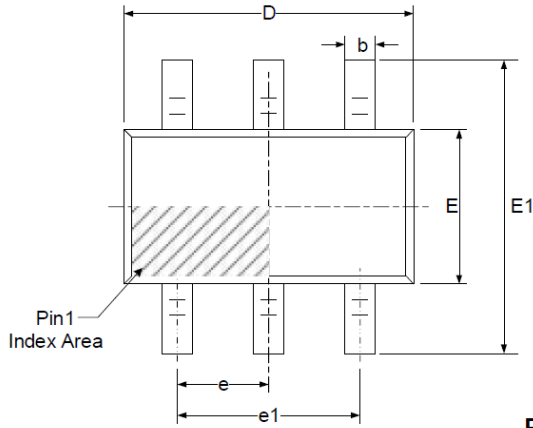


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.800	2.000	0.071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

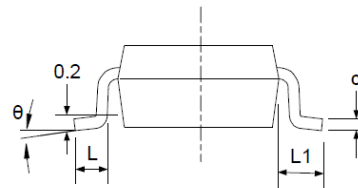
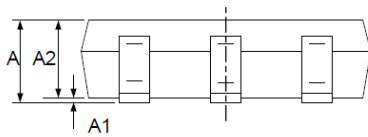




Dimension in SC70-6 (Unit: mm)



**RECOMMENDED LAND PATTERN (Unit: mm)**



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°



## IMPORTANT NOTICE

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