



DESCRIPTION

The AL6G14 6-channel Schmitt-trigger inverter is designed for 1.65V to 5.5V VCC operation.

The AL6G14 device contains six inverters and performs the Boolean function $Y=\bar{A}$. The device functions as six 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(ΔV_T) which makes the device tolerant to slow or noisy input signals.

This device is fully specified for partial-power-down applications using Ioff. The Ioff circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

The AL6G14 is available in Green SOP14 and TSSOP14 packages.

FEATURES

- Operating Voltage 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 Vcc=3.0V
- Ioff Supports Partial-Power-Down Mode Operation

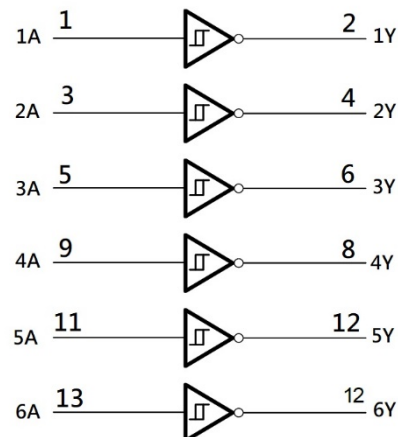
APPLICATION

- 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

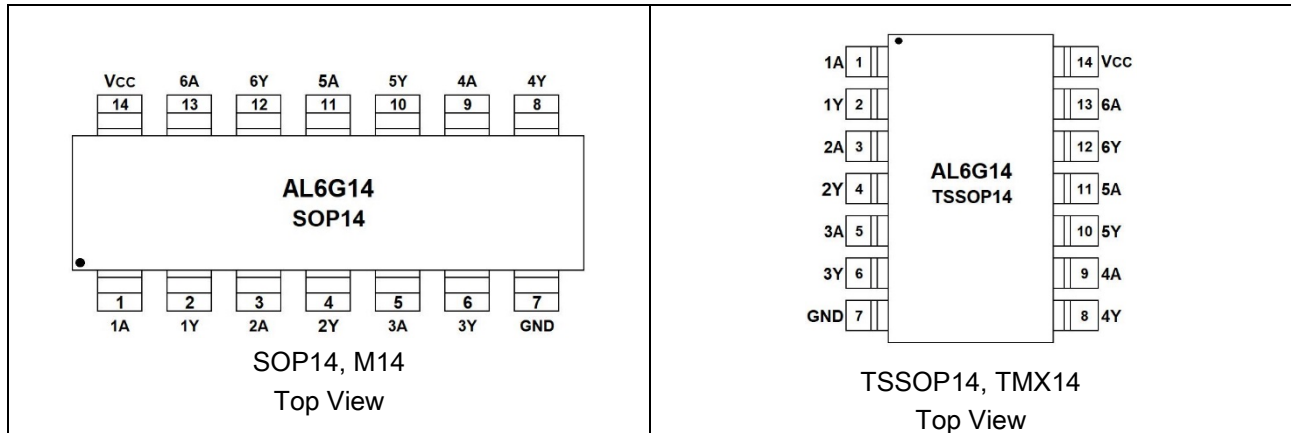
Package Type	Part Number	
SOP14 SPQ: 4,000/Reel	M14	AL6G14M14R
		AL6G14M14VR
TSSOP14 SPQ: 4,000/Reel	TMX14	AL6G14TMX14R
		AL6G14TMX14VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

FUNCTIONAL BLOCK DIAGRAM





PIN DESCRIPTION



Pin #		Symbol	I/O	Function
SOP14	TSSOP14			
1	1	1A	I	Input 1
2	2	1Y	O	Output 1
3	3	2A	I	Input 2
4	4	2Y	O	Output 2
5	5	3A	I	Input 3
6	6	3Y	O	Output 3
7	7	GND	P	Ground
8	8	4Y	O	Output 4
9	9	4A	I	Input 4
10	10	5Y	O	Output 5
11	11	5A	I	Input 5
12	12	6Y	O	Output 6
13	13	6A	I	Input 6
14	14	Vcc	P	Power Pin

FUNCTION TABLE

Input	Output
A	Y
H	H
L	L

Y= \bar{A} , H=High Voltage Level, L=Low Voltage Level

**ABSOLUTE MAXIMUM RATINGS**over operating free-air temperature range ,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°C
T _{STG} , Storage Temperature		-65°C ~ +150°C
ESD Ratings		
V _(ESD) , Electrostatic Discharge	Human-Body Model (HBM)	±8000V
	Machine Model (MM)	±500V
Thermal Information		
R _{θJA} , Junction-to-Ambient Thermal Resistance	SOP14	122.2°C/W
	TSSOP14	141.2°C/W
R _{θJC(top)} , Junction-to-Case(Top) Thermal Resistance	SOP14	80.9°C/W
	TSSOP14	78.8°C/W
R _{θJB} , Junction-to-Board Thermal Resistance	SOP14	80.6°C/W
	TSSOP14	85.8°C/W
Ψ _{JT} , Junction-to-Top Characterization Parameter	SOP14	40.4°C/W
	TSSOP14	27.7°C/W
Ψ _{JB} , Junction-to-Board Characterization Parameter	SOP14	80.3°C/W
	TSSOP14	85.5°C/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 $T_A = +25^\circ\text{C}$, 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	$^\circ\text{C}$

AC ELECTRICAL CHARACTERISTICS

At $T_A = +25^\circ\text{C}$, unless otherwise noted.

Parameter	Symbol	Conditions	Temp	Min.	Typ.	Max.	Unit	
Propagation Delay	t_{pd}	$V_{CC}=1.8\text{V}\pm 0.15\text{V}$ $C_L=30\text{pF}$, $R_L=500\Omega$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	-	7.5	-	ns	
		$V_{CC}=2.5\text{V}\pm 0.2\text{V}$ $C_L=30\text{pF}$, $R_L=500\Omega$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	-	3.6	-		
		$V_{CC}=3.3\text{V}\pm 0.3\text{V}$ $C_L=50\text{pF}$, $R_L=500\Omega$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	-	3.1	-		
		$V_{CC}=5\text{V}\pm 0.5\text{V}$ $C_L=50\text{pF}$, $R_L=500\Omega$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	-	2.7	-		
Input Capacitance	C_i	$V_{CC}=3.3\text{V}$ $V_I=V_{CC}$ or GND	$+25^\circ\text{C}$	-	4	-	pF	
Power Dissipation Capacitance	C_{pd}	$f=10\text{MHz}$	$+25^\circ\text{C}$	$V_{CC}=1.8\text{V}$	-	20	-	pF
				$V_{CC}=2.5\text{V}$	-	21	-	
				$V_{CC}=3.3\text{V}$	-	22	-	
				$V_{CC}=5\text{V}$	-	25	-	



DC ELECTRICAL CHARACTERISTICS

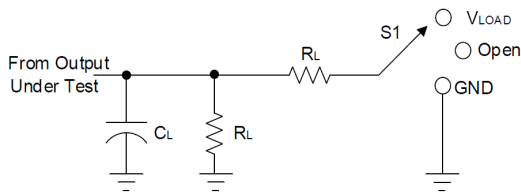
At $T_A = +25^\circ\text{C}$, unless otherwise noted.

Parameter		Conditions	Temp	Min.	Typ.	Max.	Unit
V_{T+}	Positive Going Input Threshold Voltage	$V_{CC}=1.65\text{V}$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	0.75	-	1.05	V
		$V_{CC}=2.3\text{V}$		1.25	-	1.55	
		$V_{CC}=3\text{V}$		1.50	-	2.10	
		$V_{CC}=4.5\text{V}$		2.30	-	3.00	
		$V_{CC}=5.5\text{V}$		2.80	-	3.40	
V_{T-}	Negative Going Input Threshold Voltage	$V_{CC}=1.65\text{V}$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	0.30	-	0.60	V
		$V_{CC}=2.3\text{V}$		0.35	-	0.65	
		$V_{CC}=3\text{V}$		0.45	-	0.75	
		$V_{CC}=4.5\text{V}$		0.70	-	1.00	
		$V_{CC}=5.5\text{V}$		0.85	-	1.15	
ΔV_T	Hysteresis ($V_{T+} - V_{T-}$)	$V_{CC}=1.65\text{V}$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	0.35	-	0.60	V
		$V_{CC}=2.3\text{V}$		0.60	-	1.20	
		$V_{CC}=3\text{V}$		1.05	-	1.65	
		$V_{CC}=4.5\text{V}$		1.60	-	2.00	
		$V_{CC}=5.5\text{V}$		1.95	-	2.25	
V_{OH}		$I_{OH}=-100\mu\text{A}$, $V_{CC}=1.65\text{V to }5.5\text{V}$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	V_{CC} - 0.1	-	-	V
		$I_{OH}=-4\text{mA}$, $V_{CC}=1.65\text{V}$		1.2	-	-	
		$I_{OH}=-8\text{mA}$, $V_{CC}=2.3\text{V}$		1.9	-	-	
		$I_{OH}=-16\text{mA}$, $V_{CC}=3\text{V}$		2.4	-	-	
		$I_{OH}=-24\text{mA}$, $V_{CC}=3\text{V}$		2.3	-	-	
		$I_{OH}=-32\text{mA}$, $V_{CC}=4.5\text{V}$		3.8	-	-	
V_{OL}		$I_{OH}=100\mu\text{A}$, $V_{CC}=1.65\text{V to }5.5\text{V}$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	-	-	0.10	V
		$I_{OH}=4\text{mA}$, $V_{CC}=1.65\text{V}$		-	-	0.45	
		$I_{OH}=8\text{mA}$, $V_{CC}=2.3\text{V}$		-	-	0.30	
		$I_{OH}=16\text{mA}$, $V_{CC}=3\text{V}$		-	-	0.40	
		$I_{OH}=24\text{mA}$, $V_{CC}=3\text{V}$		-	-	0.55	
		$I_{OH}=32\text{mA}$, $V_{CC}=4.5\text{V}$		-	-	0.55	
I_I	A input	$V_I=5.5\text{V or GND}$, $V_{CC}=0\text{V to }5.5\text{V}$	$+25^\circ\text{C}$	-	± 0.1	± 1	μA
			$-40^\circ\text{C} \sim +125^\circ\text{C}$	-	-	± 5	
I_{off}		$V_I \text{ or } V_O=5.5\text{V}$, $V_{CC}=0\text{V}$	$+25^\circ\text{C}$		± 0.1	± 1	μA
			$-40^\circ\text{C} \sim +125^\circ\text{C}$			± 10	
I_{CC}		$V_I=5.5\text{V or GND}$, $I_O=0$, $V_{CC}=1.65\text{V to }5.5\text{V}$	$+25^\circ\text{C}$	-	0.1	1	μA
			$-40^\circ\text{C} \sim +125^\circ\text{C}$	-	-	10	
ΔI_{CC}		One input at $V_{CC}-0.6\text{V}$, Other inputs at V_{CC} or GND $V_{CC}=3\text{V to }5.5\text{V}$	$-40^\circ\text{C} \sim +125^\circ\text{C}$	-	-	500	μA



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					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V

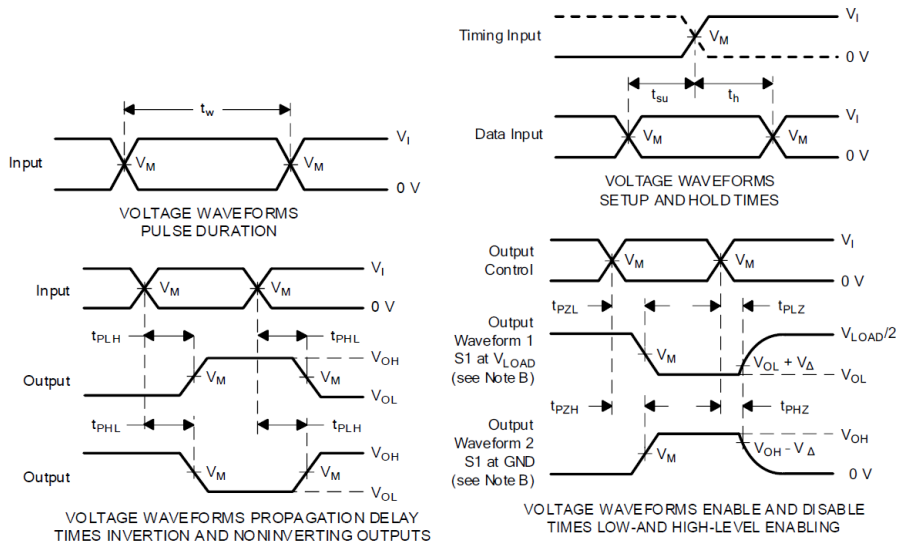


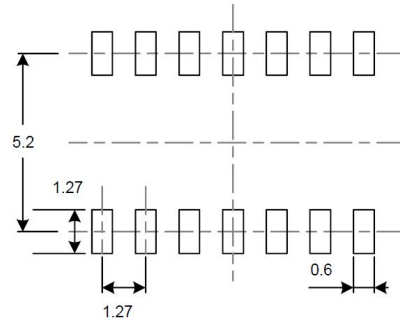
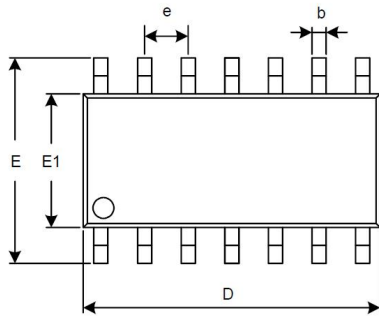
Figure 1. Load Circuit and Voltage Waveforms

- (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: $PRR \leq 10$ MHz, $Z_0 = 50 \Omega$.
- (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.

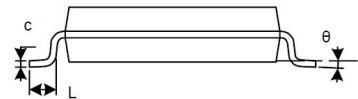
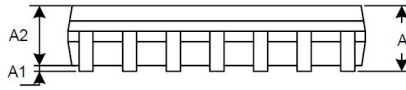


PACKAGE INFORMATION

Dimension in SOP14 (Unit: mm)



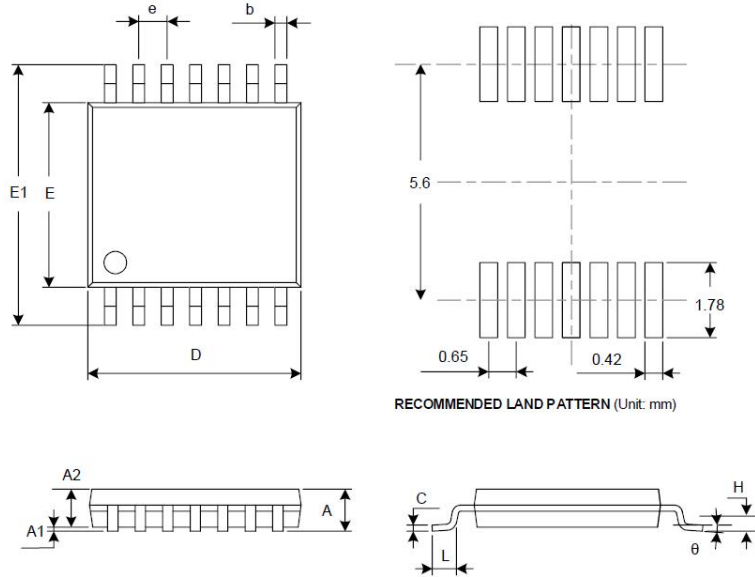
RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Millimeters	
	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
b	0.310	0.510
c	0.100	0.250
D	8.450	8.850
E	5.800	6.200
E1	3.800	4.000
e	1.270 BSC	
L	0.400	1.270
θ	0°	8°



Dimension in TSSOP14 (Unit: mm)



Symbol	Millimeters	
	Min	Max
A	-	1.200
A1	0.050	0.150
A2	0.800	1.050
b	0.190	0.300
c	0.090	0.200
D	4.860	5.100
E	4.300	4.500
E1	6.250	6.550
e	0.650 BSC	
L	0.500	0.700
H	0.250 TYP	
θ	0°	7°



IMPORTANT NOTICE

AiT Semiconductor Inc. (AiT) reserves the right to make changes to any its product, specifications, to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

AiT Semiconductor Inc.'s integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life support applications, devices or systems or other critical applications. Use of AiT products in such applications is understood to be fully at the risk of the customer. As used herein may involve potential risks of death, personal injury, or severe property, or environmental damage. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

AiT Semiconductor Inc. assumes to no liability to customer product design or application support. AiT warrants the performance of its products of the specifications applicable at the time of sale.