



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-SN74AHCT1G14

Single Schmitt-Trigger Inverter

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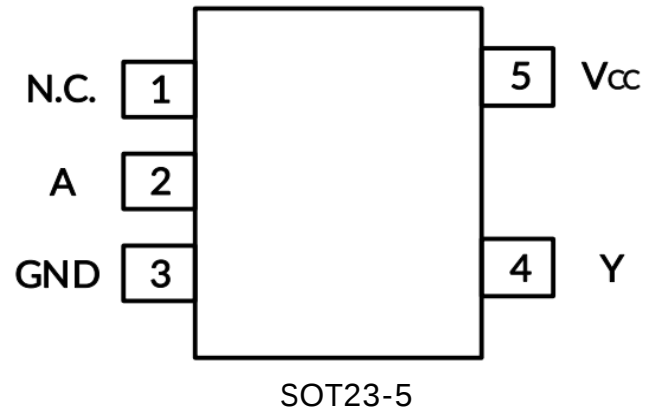
**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



FEATURES

- Operating Voltage Range: 2.0V to 5.5V
- Low Power Consumption: 0.1 μ A (TYP)
- Operating Temperature Range:
-40°C to 125°C
- TTL Input are Compatible
- Input Accept Voltage to 5.5V
- Output Drive: ± 32 mA at $V_{CC}=5.0$ V
- I_{off} Supports Partial-Power-Down Mode Operation
- Micro SIZE PACKAGES: SOT23-5



APPLICATIONS

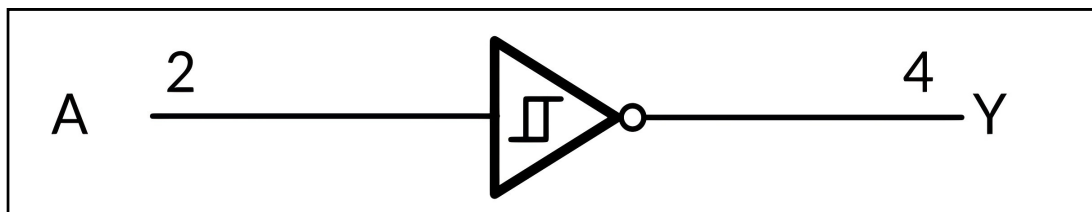
- AC Receiver
- Blu-ray Players and Home Theaters
- Desktops or Notebook PCs
- Digital Video Cameras (DVC)
- Mobile Phones
- Personal Navigation Device (GPS)
- Portable Media Player

DESCRIPTIONS

The SN74AHCT1G14 Single Schmitt-trigger inverter is designed for 2.0V to 5.5V V_{CC} operation. The SN74AHCT1G14 device contains one inverter and performs the Boolean function $Y=A$. The device functions as an independent inverter 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 I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down. The SN74AHCT1G14 is available in Green SOT23-5 packages. It operates over an ambient temperature range of -40°C to 125°C.



Functional Block Diagram



FUNCTION TABLE

INPUT	OUTPUT
A	Y
H	L
L	H

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

PIN CONFIGURATION AND FUNCTIONS

PIN	NAME	I/O	DESCRIPTION
1	N.C.	-	Not connected
2	A	I	Input
3	GND	-	Ground
4	Y	O	Output
5	V _{CC}	P	Power Pin



Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted) (1) (2)

		MIN	MAX	UNIT
V _{CC}	Supply voltage range	-0.5	6.5	V
V _I	Input voltage range (2)	-0.5	6.5	V
V _O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾	-0.5	6.5	V
V _O	Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾	-0.5	V _{CC} +0.5	V
I _{IK}	Input clamp current V _I < 0		-50	mA
I _{OK}	Output clamp current V _O < 0		-50	mA
I _O	Continuous output current		±50	mA
	Continuous current through V _{CC} or GND		±100	mA

Package Thermal Impedance

	PARAMETER		MIN	MAX	UNIT
θ _{JA}	Package thermal impedance ⁽⁴⁾	SOT23-5		208	/W

Temperature

	PARAMETER	MIN	MAX	UNIT
Temperature	Junction temperature, T _J (5)	-65	150	
	Storage temperature, T _{stg}		150	



ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

	VALUE	UNIT
Human-Body Model(HBM)	± 2000	V
Charged-Device Model(CDM)	±1000	
Machine Model(MM)	±200	

ESD SENSITIVITY CAUTION



ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

NOTE:

- (1) Stresses beyond those listed under Absolute Maximum Ratings 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 under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The value of V_{CC} is provided in the Recommended Operating Conditions table.
- (4) The package thermal impedance is calculated in accordance with JESD-51.
- (5) The maximum power dissipation is a function of $T_{J(MAX)}$, $R_{\theta JA}$, 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.



ELECTRICAL CHARACTERISTICS

Over recommended operating free-air temperature range (Full=-40°C to +125°C, typical values are at $T_A = +25^\circ\text{C}$, unless otherwise noted.)⁽¹⁾

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Supply voltage	V_{CC}	Operating	2	5.5	V
Input voltage	V_I		0	5.5	V
Output voltage	V_O		0	5.5	V
Operating temperature	T_A		-40	125	

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

DC Characteristics

PARAMETER	TEST CONDITIONS	V_{CC}	TEMP	MIN(2)	TYP(3)	MAX(2)	UNIT
V_{T+}	Positive going input threshold voltage	2.0V	Full	0.7		1.2	V
		3.3V		1		1.5	
		4.5V to 5.5V		1.2		2	
V_{T-}	Negative going input threshold voltage	2.0V	Full	0.3		0.6	V
		3.3V		0.5		0.9	
		4.5V to 5.5V		0.6		1.2	
V_T	Hysteresis($V_{T+}-V_{T-}$)	2.0V	Full	0.3		0.8	V
		3.3V		0.3		1	
		4.5V to 5.5V		0.3		1.2	
V_{OH}	$I_{OH} = -100\mu\text{A}$	2.0V to 5.5V	Full	$V_{CC}-0.1$			V
	$I_{OH} = -8\text{mA}$	2.0V		1.6			
	$I_{OH} = -24\text{mA}$	3.3V		2.5			
		4.5V		3.8			
	$I_{OH} = -32\text{mA}$	5.0V		4.2			
		5.5V		4.8			



V _{OL}	I _{OL} =100μA	2.0V to 5.5V				0.1	V
	I _{OL} =8mA	2.0V				0.45	
	I _{OL} =24mA	3.3V	Full			0.55	
		4.5V				0.55	
	I _{OL} =32mA	5.0V				0.5	
		5.5V				0.45	
I _I Ainput	V _I =5.5V or GND	0V to 5.5V	+25		± 0.1		uA
			Full			±10	
I _{off}	V _I or V _O =5.5V	0V	+25		± 0.1		uA
			Full			±10	
I _{CC}	V _I =5.5V or GND, I _O =0	2.0V to 5.5V	+25		0.1		uA
			Full			10	
I _{CC} T	One input at 3.4V, Other inputs at V _{CC} or GND	5.5V	Full			500	uA

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

(2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.

(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.

AC Characteristics

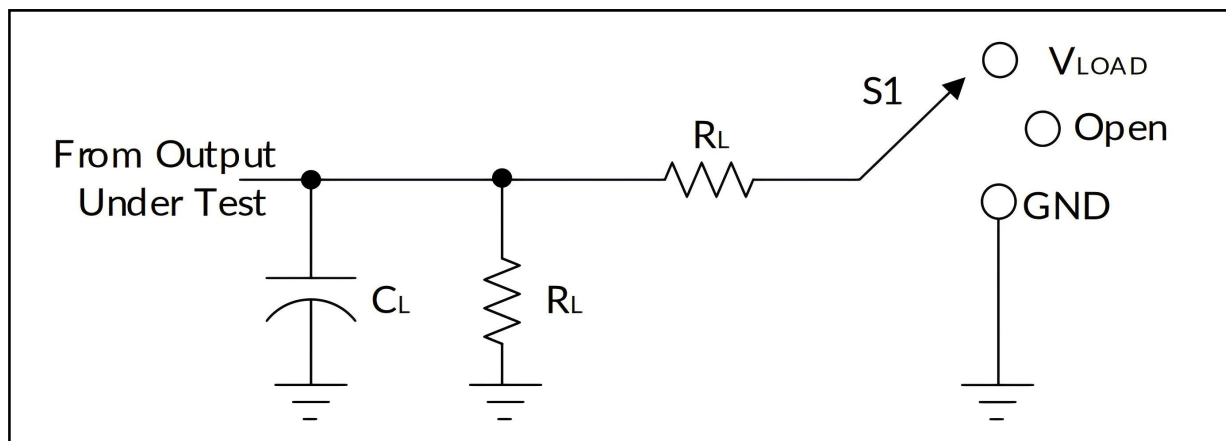
PARAMETER	SYMBOL	TEST CONDITIONS	TEMP	MIN(2)	TYP(3)	MAX(2)	UNIT
Propagation Delay	t _{pd}	V _{CC} =2.0V±0.2V C _L =30pF, R _L =500Ω	+25		29		ns
		V _{CC} =3.3V±0.3V C _L =50pF, R _L =500Ω			10.4		
		V _{CC} =5V±0.5V C _L =50pF, R _L =500Ω			7.6		
Input Capacitance	C _i	V _{CC} =5V V _I =V _{CC} or GND	+25		4.2		pF
Power dissipation capacitance	C _{pd}	V _{CC} =5V f=10MHz	+25		16.6		pF

(1) All unused inputs of the device must be held at V_{CC} 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
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

	INPUTS						
V_{CC}	V_I	t_r/t_f	V_M	V_{LOAD}	C_L	R_L	V
$2.0V \pm 0.2V$	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

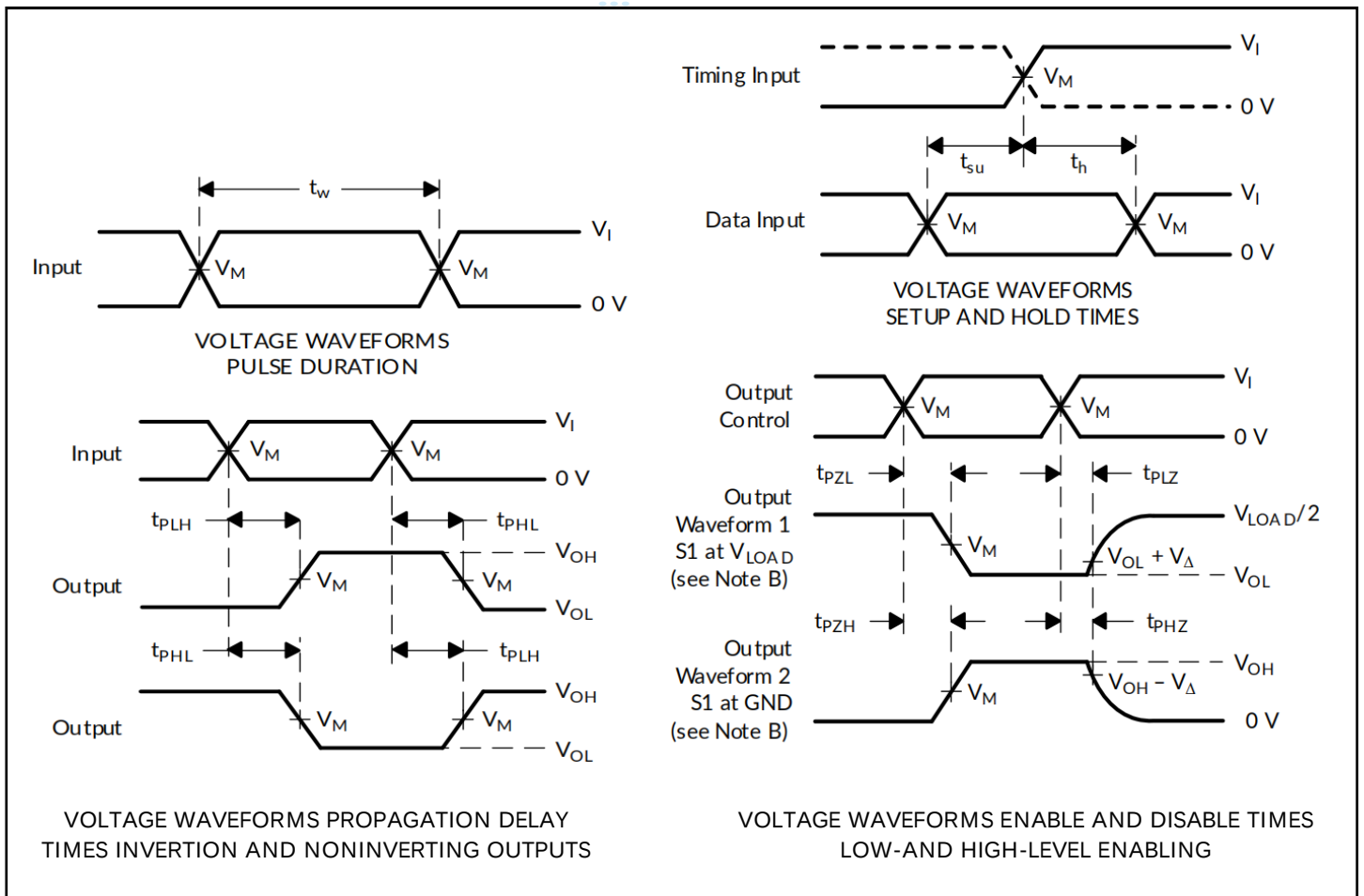


Figure 1. Load Circuit and Voltage Waveforms

NOTES: A. CL 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: $PRR \leq 10\text{ MHz}$, $Z_o = 50\Omega$.

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.



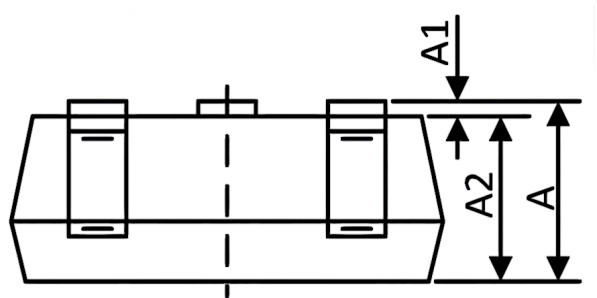
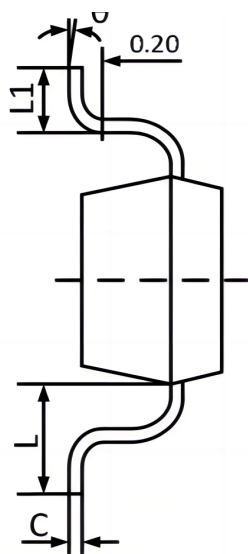
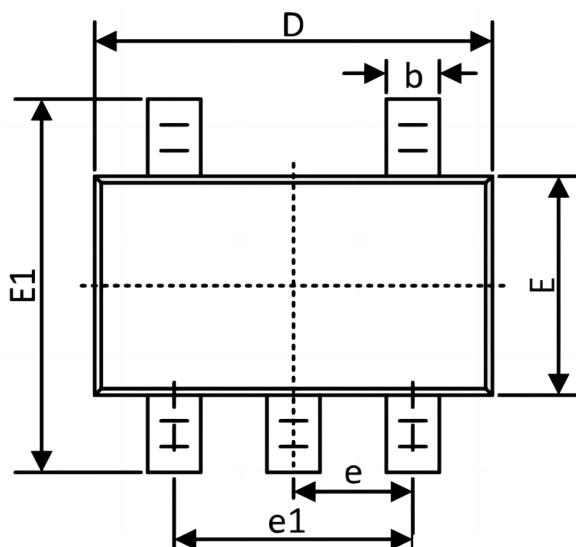
ORDERING INFORMATION

Order Number	Package	Package Quantity	Marking On The park	Temperature
SN74AHCT1G14DBVR-TUDI	SOT23-5	Tape,Reel,3000	B14S	-40°C~125°C

Revision history

Revision Number	Date	Revision	Page
V1.0	2018/7/11	New	1-12

Package SOT23-5



Symbol	Dimensions In Millimeters		Dimensions In 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	0.400	0.012	0.016
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	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



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