54AC14 Hex Inverter with Schmitt Trigger Input

Check for Samples: 54AC14

FEATURES

- **I_{CC} Reduced by 50%**
- **Outputs Source/Sink 24 mA**
- **Standard Military Drawing (SMD)**
  - **54AC14: 5962-87624**
- **54AC14 now Qualified to 300Krad RHA Designation, Refer to the SMD for More Information**

DESCRIPTION

The 'AC14 contains six inverter gates each with a Schmitt trigger input. The 'AC14 contains six logic inverters which accept standard CMOS input signals and provide standard CMOS output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. In addition, they have a greater noise margin than conventional inverters.

The 'AC14 has hysteresis between the positive-going and negative-going input thresholds (typically 1.0V) which is determined internally by transistor ratios and is essentially insensitive to temperature and supply voltage variations.

Logic Symbol

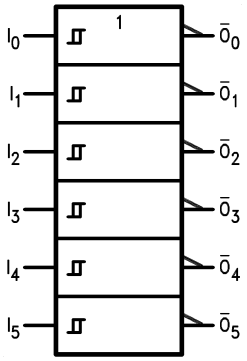

Figure 1. IEEE/IEC

Table 1. Function Table

Input	Output
A	**$\overline{O}$**
L	H
H	L

Connection Diagrams

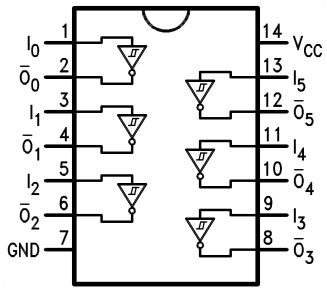

Figure 2. 14-Pin CDIP or CLGA
See J or NAD0014B Package

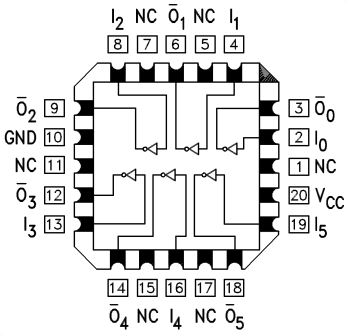

Figure 3. 20-Pin LCCC
See NAJ0020A Package

Pin Names	Description
I_n	Inputs
$\overline{O}_n$	Outputs

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Absolute Maximum Ratings(1)(2)

Supply Voltage (V_{CC})		−0.5V to +7.0V
DC Input Diode Current (I_{IK})	V_I = −0.5V	−20 mA
	V_I = V_{CC} + 0.5V	+20 mA
DC Input Voltage (V_I)		−0.5V to V_{CC} + 0.5V
DC Output Diode Current (I_{OK})	V_O = −0.5V	−20 mA
	V_O = V_{CC} + 0.5V	+20 mA
DC Output Voltage (V_O)		−0.5V to V_{CC} + 0.5V
DC Output Source or Sink Current (I_O)		±50 mA
DC V_{CC} or Ground Current per Output Pin (I_{CC} or I_{GND})		±50 mA
Storage Temperature (T_{STG})		−65°C to +150°C
Junction Temperature (T_J)	CDIP	175°C

(1) Absolute Maximum Ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. TI does not recommend operation of FACT™ circuits outside databook specifications.
(2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/Distributors for availability and specifications.

Recommended Operating Conditions

Supply Voltage (V_{CC})	'AC	2.0V to 6.0V
Input Voltage (V_I)		0V to V_{CC}
Output Voltage (V_O)		0V to V_{CC}
Operating Temperature (T_A)	54AC	−55°C to +125°C

DC Characteristics for 'AC Family Devices

Symbol	Parameter	V_{CC} (V)	54AC T_A = −55°C to +125°C Ensured Limits	Units	Conditions
V_{OH}	Minimum High Level Output Voltage	3.0	2.9		I_{OUT} = −50 µA
		4.5	4.4	V	
		5.5	5.4		
					V_{IN} = V_{IL} or V_{IH} (1)
		3.0	2.4		−12 mA
		4.5	3.7	V	I_{OH} −24 mA
		5.5	4.7		−24 mA
V_{OL}	Maximum Low Level Output Voltage	3.0	0.1		I_{OUT} = 50 µA
		4.5	0.1	V	
		5.5	0.1		
					V_{IN} = V_{IL} or V_{IH} (1)
		3.0	0.5		12 mA
		4.5	0.5	V	I_{OL} 24 mA
		5.5	0.5		24 mA
I_{IN}	Maximum Input Leakage Current	5.5	±1.0	µA	V_I = V_{CC}, GND
V_{t+}	Maximum Positive Threshold	3.0	2.2		T_A = Worst Case
		4.5	3.2	V	
		5.5	3.9		
V_{t-}	Minimum Negative Threshold	3.0	0.5		T_A = Worst Case
		4.5	0.9	V	
		5.5	1.1		
$V_{h(max)}$	Maximum Hysteresis	3.0	1.2		T_A = Worst Case
		4.5	1.4	V	
		5.5	1.6		
$V_{h(min)}$	Minimum Hysteresis	3.0	0.3		T_A = Worst Case
		4.5	0.4	V	
		5.5	0.5		
I_{OLD}	Minimum Dynamic Output Current (2)	5.5	50	mA	V_{OLD} = 1.65V Max
I_{OHD}		5.5	−50	mA	V_{OHD} = 3.85V Min
I_{CC}	Maximum Quiescent Supply Current	5.5	40.0	µA	V_{IN} = V_{CC} or GND

(1) All outputs loaded; thresholds on input associated with output under test.
(2) Maximum test duration 2.0 ms, one output loaded at a time.

AC Electrical Characteristics

See for waveforms

Symbol	Parameter	V_{CC} (V)[1]	54AC		Units	Fig. No.
			T_A = −55°C to +125°C, C_L = 50 pF			
			Min	Max		
t_{PLH}	Propagation Delay	3.3	1.0	16.0	ns	
		5.0	1.0	12.0		
t_{PHL}	Propagation Delay	3.3	1.0	14.0	ns	
		5.0	1.5	10.0		

(1) Voltage Range 3.3 is 3.3V ±0.3V.
Voltage Range 5.0 is 5.0V ±0.5V.

Table 2. Capacitance

Symbol	Parameter	Typ	Units	Conditions
C_{IN}	Input Capacitance	4.5	pF	V_{CC} = OPEN
C_{PD}	Power Dissipation Capacitance	25.0	pF	V_{CC} = 5.0V

REVISION HISTORY

Changes from Revision B (April 2013) to Revision C	Page
• Changed layout of National Data Sheet to TI format	4

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265