54AC04 Hex Inverter

Check for Samples: 54AC04

FEATURES

- **I_{CC} reduced by 50% on 54AC only**
- **Outputs source/sink 24 mA**
- **'ACT04 has TTL-compatible inputs**
- **Standard Military Drawing (SMD)**
  - **'AC04: 5962–87609**
- **54AC04 now qualified to 300Krad RHA designation, refer to the SMD for more information**
- **For Military 54ACT04 device see 54ACTQ04**

DESCRIPTION

The AC04 contains six inverters.

Connection Diagram

Figure 1. IEEE/IEC

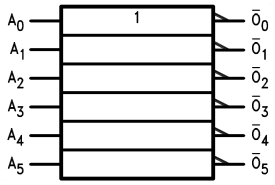


Figure 2. Pin Assignment for DIP and Flatpak

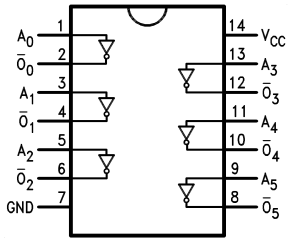
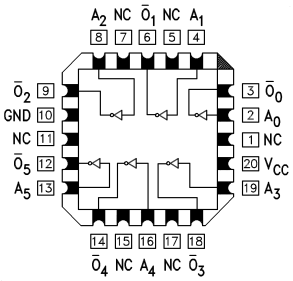


Figure 3. Pin Assignment for LCC



Pin Names	Description
A_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)

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 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. National does not recommend operation of FACT® circuits outside databook specifications.

Recommended OperatingConditions

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
Minimum Input Edge Rate (ΔV/Δt)	
'AC Devices	
V_{IN} from 30% to 70% of V_{CC}	
V_{CC} @ 3.3V, 4.5V, 5.5V	125 mV/ns

DC Characteristics for 'AC Family Devices

			54AC		
Symbol	**Parameter**	**V_{CC}**	**T_A = −55°C to +125°C**	**Units**	**Conditions**
		(V)			
			Guaranteed Limits		
V_{IH}	Minimum High Level	3.0	2.1		V_{OUT} = 0.1V
	Input Voltage	4.5	3.15	V	or V_{CC} − 0.1V
		5.5	3.85		
V_{IL}	Maximum Low Level	3.0	0.9		V_{OUT} = 0.1V
	Input Voltage	4.5	1.35	V	or V_{CC} − 0.1V
		5.5	1.65		
V_{OH}	Minimum High Level	3.0	2.9		I_{OUT} = −50 µA
	Output Voltage	4.5	4.4	V	
		5.5	5.4		
					(1)V_{IN} = V_{IL} or V_{IH}
		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	3.0	0.1		I_{OUT} = 50 µA
	Output Voltage	4.5	0.1	V	
		5.5	0.1		
					(1) V_{IN} = V_{IL} or V_{IH}
		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	5.5	±1.0	µA	V_I = V_{CC}, GND
	Leakage Current				
I_{OLD}	(2)Minimum Dynamic Output Current	5.5	50	mA	V_{OLD} = 1.65V Max
I_{OHD}		5.5	−50	mA	V_{OHD} = 3.85V Min
I_{CC}	Maximum Quiescent	5.5	40.0	µA	V_{IN} = V_{CC}
	Supply Current				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

			54AC			
		V_{CC}	**T_A = −55°C**			**Fig.**
Symbol	**Parameter**	**(V)**	**to +125°C**		**Units**	**No.**
		(1)	**C_L = 50 pF**			
			Min	**Max**		
t_{PLH}	Propagation Delay	3.3	1.0	11.0	ns	
		5.0	1.5	8.5		
t_{PHL}	Propagation Delay	3.3	1.0	10.0	ns	
		5.0	1.5	7.5		

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

Capacitance

Symbol	Parameter	Typ	Units	Conditions
C_{IN}	Input Capacitance	4.5	pF	V_{CC} = Open
C_{PD}	Power Dissipation	30.0	pF	V_{CC} = 5.0V

Capacitance (continued)

Symbol	Parameter	Typ	Units	Conditions
	Capacitance			

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