FAIRCHILD SEMICONDUCTOR™

August 1991
Revised September 2001

74AC05
Hex Inverter with Open Drain Outputs

General Description

The AC05 contains six inverters.

Features

- Outputs sink 24 mA
- Open drain for wired NOR function
- Radiation tolerant FACT™ process

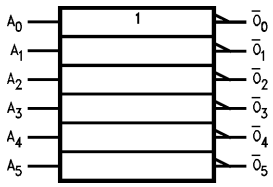
Ordering Code:

Order Number	Package Number	Package Description
74AC05SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow

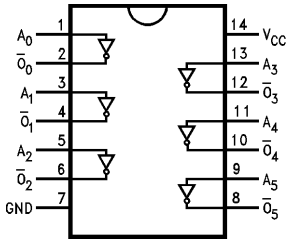
Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.

Logic Symbol

IEEE/IEC



Connection Diagram



Pin Descriptions

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

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Absolute Maximum Ratings(Note 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 +7.0V
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

Recommended Operating Conditions

Supply Voltage (V_{CC})	2.0V to 6.0V
Input Voltage (V_I)	0V to V_{CC}
Output Voltage (V_O)	0V to 6.0V
Operating Temperature (T_A)	−40°C to +85°C
Minimum Input Edge Rate (ΔV/Δt)	
V_{IN} from 30% to 70% of V_{CC}	
V_{CC} @ 3.3V, 4.5V, 5.5V	125 mV/ns

Note 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. Fairchild does not recommend operation of FACT™ circuits outside databook specifications.

DC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	T_A = +25°C Typ	T_A = −40°C to +85°C Guaranteed Limits		Units	Conditions
V_{IH}	Minimum HIGH Level Input Voltage	3.0	1.5	2.1	2.1	V	V_{OUT} = 0.1V or V_{CC} − 0.1V
		4.5	2.25	3.15	3.15		
		5.5	2.75	3.85	3.85		
V_{IL}	Maximum LOW Level Input Voltage	3.0	1.5	0.9	0.9	V	V_{OUT} = 0.1V or V_{CC} − 0.1V
		4.5	2.25	1.35	1.35		
		5.5	2.75	1.65	1.65		
V_{OL}	Maximum LOW Level Output Voltage	3.0	0.002	0.1	0.1	V	I_{OUT} = 50 µA
		4.5	0.001	0.1	0.1		
		5.5	0.001	0.1	0.1		
							V_{IN} = V_{IL} or V_{IH}
		3.0		0.32	0.44		I_{OL} = 12 mA
		4.5		0.36	0.44	V	I_{OL} = 24 mA
		5.5		0.36	0.44		I_{OL} = 24 mA (Note 2)
I_{IN} (Note 4)	Maximum Input Leakage Current	5.5		±0.1	±1.0	µA	V_I = V_{CC}, GND
I_{OHZ}	Off-State Current	6		+0.5	+10.0	µA	V_{IN} = GND, V_O = 6V
I_{OLD}	Minimum Dynamic Output Current (Note 3)	5.5		50	75	mA	V_{OLD} = 1.65V Max
I_{CC} (Note 4)	Maximum Quiescent Supply Current	5.5		4.0	20.0	µA	V_{IN} = V_{CC} or GND

Note 2: All outputs loaded; thresholds on input associated with output under test.

Note 3: Maximum test duration 2.0 ms, one output loaded at a time.

Note 4: I_{IN} and I_{CC} @ 3.0V are guaranteed to be less than or equal to the respective limit @ 5.5V V_{CC}.

AC Electrical Characteristics

Symbol	Parameter	V_{CC} (V) (Note 5)	$T_A = +25°C$, $C_L = 50$ pF		$T_A = -40°C$ to $+85°C$		Units
			Min	Max	Min	Min	
t_{PLZ}	Propagation Delay	3.3	2.0	14.5	2.0	14.5	ns
	(Note 6)	5.0	2.0	14.0	2.0	14.0	
t_{PZL}	Propagation Delay	3.3	2.0	6.5	2.0	6.5	ns
		5.0	2.0	5.0	2.0	5.0	

Note 5: Voltage Range 3.3 is 3.3V ± 0.3V

Voltage Range 5.0 is 5.0V ± 0.5V

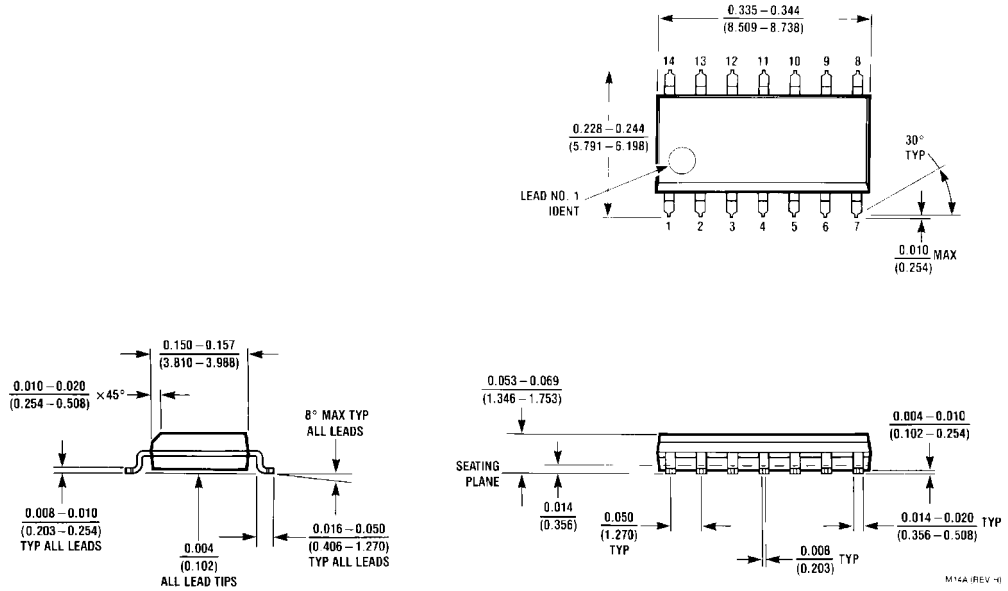
Note 6: AC Load is V_{CC} x 2, $R_L = 1$ kΩ

$C_L = 50$ pF

Capacitance

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

Physical Dimensions inches (millimeters) unless otherwise noted



14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M14A

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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