

# 74AC05

## Hex Inverter with Open Drain Outputs

### General Description

The AC05 contains six inverters.

### Features

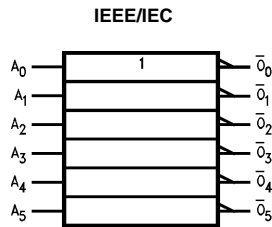
- Outputs sink 24 mA
- Open drain for wired NOR function
- Radiation tolerant FACT™ process

### Ordering Code:

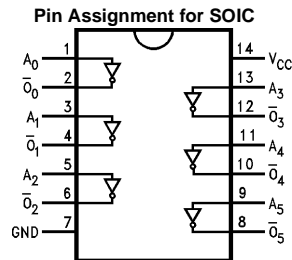
Order Number	Package Number	Package Description
74AC05SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150" Narrow Body

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

### Logic Symbol



### Connection Diagram



### Pin Descriptions

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

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74AC05 Hex Inverter with Open Drain Outputs

Absolute Maximum Ratings (Note 1)		Storage Temperature ( $T_{STG}$ )	-65°C to +150°C
Supply Voltage ( $V_{CC}$ )	-0.5V to +7.0V	<b>Recommended Operating Conditions</b>	
DC Input Diode Current ( $I_{IK}$ )		Supply Voltage ( $V_{CC}$ )	2.0V to 6.0V
$V_I = -0.5V$	-20 mA	Input Voltage ( $V_I$ )	0V to $V_{CC}$
$V_I = V_{CC} + 0.5V$	+20 mA	Output Voltage ( $V_O$ )	0V to $V_{CC}$
DC Input Voltage ( $V_I$ )	-0.5V to $V_{CC} + 0.5V$	Operating Temperature ( $T_A$ )	-55°C to +125°C
DC Output Diode Current ( $I_{OK}$ )		Minimum Input Edge Rate ( $\Delta V/\Delta t$ )	
$V_O = -0.5V$	-20 mA	$V_{IN}$ from 30% to 70% of $V_{CC}$	
$V_O = V_{CC} + 0.5V$	+20 mA	$V_{CC}$ @ 3.3V, 4.5V, 5.5V	125 mV/ns
DC Output Voltage ( $V_O$ )	-0.5V to $V_{CC} + 0.5V$	<b>Note 1:</b> 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 Output Source or Sink Current ( $I_O$ )	$\pm 50$ mA		
DC $V_{CC}$ or Ground Current per Output Pin ( $I_{CC}$ or $I_{GND}$ )	$\pm 50$ mA		

### DC Electrical Characteristics

Symbol	Parameter	$V_{CC}$ (V)	$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		Units	Conditions
			Typ	Guaranteed Limits				
$V_{IH}$	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	$I_{OUT} = 50 \mu\text{A}$
		4.5	0.001	0.1	0.1			
		5.5	0.001	0.1	0.1			
		3.0		0.32	0.44		V	$V_{IN} = V_{IL}$ or $V_{IH}$ $I_{OL} = 12 \text{ mA}$ $I_{OL} = 24 \text{ mA}$
		4.5		0.36	0.44			
	5.5		0.36	0.44			$I_{OL} = 24 \text{ mA}$ (Note 2)	
$I_{IN}$ (Note 4)	Maximum Input Leakage Current	5.5		$\pm 0.1$	$\pm 1.0$		$\mu\text{A}$	$V_I = V_{CC}, \text{ GND}$
$I_{OHD}$	Off-State Current	5.5		+0.5	+10.0		$\mu\text{A}$	$V_{IN} = V_{CC}$
$I_{OLD}$	Minimum Dynamic Output Current (Note 3)	5.5		50	75		mA	$V_{OLD} = 1.65V \text{ Max}$
$I_{CC}$ (Note 4)	Maximum Quiescent Supply Current	5.5		4.0	20.0		$\mu\text{A}$	$V_{IN} = V_{CC}$ 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 <sub>CC</sub> (V) (Note 5)	T <sub>A</sub> = +25°C		T <sub>A</sub> = -40°C to +85°C		Units
			C <sub>L</sub> = 50 pF		Min	Min	
			Min	Max			
t <sub>PLZ</sub>	Propagation Delay (Note 6)	3.3	2.0	14.5	2.0	14.5	ns
		5.0	2.0	14.0	2.0	14.0	
t <sub>PZL</sub>	Propagation Delay	3.3	2.0	6.5	2.0	6.5	ns
		5.0	2.0	5.0	2.0	5.0	

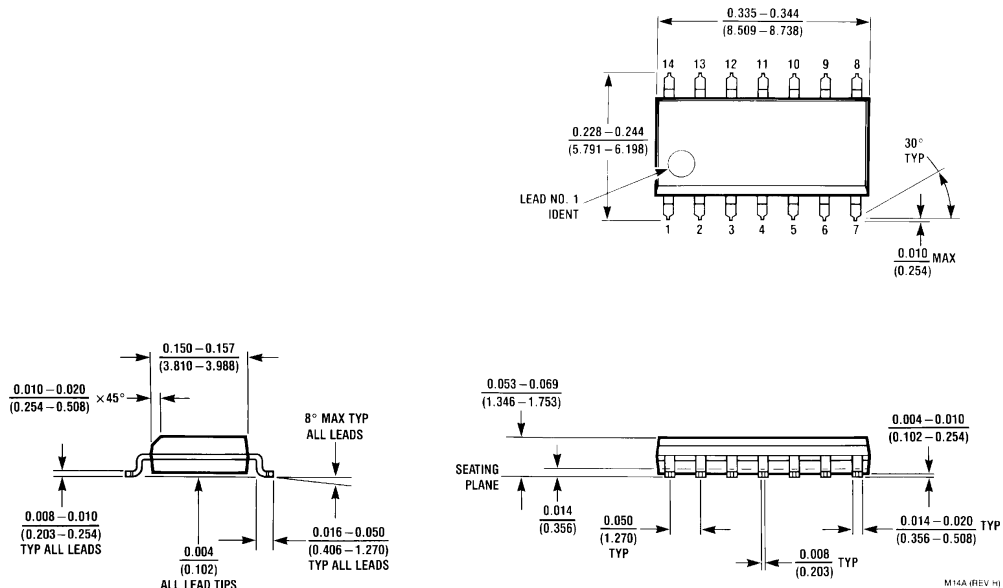
**Note 5:** Voltage Range 3.3 is 3.3V ±0.3V  
Voltage Range 5.0 is 5.0V ±0.5V

**Note 6:** AC Load is V<sub>CC</sub> × 2, R<sub>L</sub> = 1 kΩ  
C<sub>L</sub> = 50 pF

## Capacitance

Symbol	Parameter	Typ	Units	Conditions
C <sub>IN</sub>	Input Capacitance	4.5	pF	V <sub>CC</sub> = 5.0V
C <sub>PD</sub>	Power Dissipation Capacitance	30.0	pF	V <sub>CC</sub> = 5.0V

**Physical Dimensions** inches (millimeters) unless otherwise noted



14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150" Narrow Body  
Package Number M14A

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