

74AC04 • 74ACT04 Hex Inverter

General Description

The AC/ACT04 contains six inverters.

Features

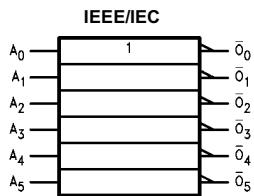
- I_{CC} reduced by 50% on 74AC only
- Outputs source/sink 24 mA
- ACT04 has TTL-compatible inputs

Ordering Code:

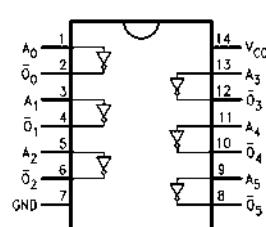
Order Number	Package Number	Package Description
74AC04SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150" Narrow Body
74AC04SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC04MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74AC04PC	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
74ACT04SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150" Narrow Body
74ACT04MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74ACT04PC	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code. (PC not available in Tape and Reel.)

Logic Symbol



Connection Diagram



Pin Descriptions

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

FACT™ is a trademark of Fairchild Semiconductor Corporation.

Absolute Maximum Ratings ^(Note 1)				Recommended Operating Conditions			
Supply Voltage (V_{CC})		–0.5V to +7.0V		Supply Voltage (V_{CC})			
DC Input Diode Current (I_{IK})				AC	2.0V to 6.0V		
$V_I = -0.5V$		–20 mA		ACT	4.5V to 5.5V		
$V_I = V_{CC} + 0.5V$		+20 mA		Input Voltage (V_I)	0V to V_{CC}		
DC Input Voltage (V_I)		–0.5V to $V_{CC} + 0.5V$		Output Voltage (V_O)	0V to V_{CC}		
DC Output Diode Current (I_{OK})				Operating Temperature (T_A)	–40°C to +85°C		
$V_O = -0.5V$		–20 mA		Minimum Input Edge Rate ($\Delta V/\Delta t$)			
$V_O = V_{CC} + 0.5V$		+20 mA		AC Devices			
DC Output Voltage (V_O)		–0.5V to $V_{CC} + 0.5V$		V_{IN} from 30% to 70% of V_{CC}			
DC Output Source or Sink Current (I_O)		±50 mA		V_{CC} @ 3.3V, 4.5V, 5.5V	125 mV/ns		
DC V_{CC} or Ground Current per Output Pin (I_{CC} or I_{GND})		±50 mA		Minimum Input Edge Rate ($\Delta V/\Delta t$)			
Storage Temperature (T_{STG})		–65°C to +150°C		ACT Devices			
Junction Temperature (T_J)				V_{IN} from 0.8V to 2.0V			
PDIP		140°C		V_{CC} @ 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 for AC							
Symbol	Parameter	V_{CC} (V)	$T_A = +25^\circ C$		Units	Conditions	
			Typ	Guaranteed Limits			
V_{IH}	Minimum HIGH Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	2.1 3.15 3.85	V	$V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$	
	Maximum LOW Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	0.9 1.35 1.65			$V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$
	V_{OH}	Minimum HIGH Level Output Voltage	3.0 4.5 5.5	2.99 4.49 5.49		2.9 4.4 5.4	
		3.0 4.5 5.5		2.56 3.86 4.86	V	$V_{IN} = V_{IL}$ or V_{IH} $I_{OH} = -12 mA$ $I_{OH} = -24 mA$ $I_{OH} = -24 mA$ (Note 2)	
		3.0 4.5 5.5		2.46 3.76 4.76			
		3.0 4.5 5.5					
V_{OL}		Maximum LOW Level Output Voltage	3.0 4.5 5.5	0.002 0.001 0.001	0.1 0.1 0.1	V	$I_{OUT} = 50 \mu A$
			3.0 4.5 5.5		0.36 0.36 0.36		
		3.0 4.5 5.5		0.44 0.44 0.44			
	I_{IN} (Note 4)	Maximum Input Leakage Current	5.5		±0.1	μA	$V_I = V_{CC}, GND$
					±1.0		
	I_{OLD}	Minimum Dynamic Output Current	5.5		75	mA	$V_{OLD} = 1.65V$ Max
I_{OHD} (Note 3)		5.5		–75	mA	$V_{OHD} = 3.85V$ Min	
I_{CC} (Note 4)	Maximum Quiescent Supply Current	5.5		2.0	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} .							

DC Electrical Characteristics for ACT

Symbol	Parameter	V _{CC} (V)	T _A = +25°C		T _A = -40°C to +85°C Guaranteed Limits	Units	Conditions
			Typ	Guaranteed Limits			
V _{IH}	Minimum HIGH Level Input Voltage	4.5	1.5	2.0	2.0	V	V _{OUT} = 0.1V or V _{CC} - 0.1V
		5.5	1.5	2.0	2.0		
V _{IL}	Maximum LOW Level Input Voltage	4.5	1.5	0.8	0.8	V	V _{OUT} = 0.1V or V _{CC} - 0.1V
		5.5	1.5	0.8	0.8		
V _{OH}	Minimum HIGH Level Output Voltage	4.5	4.49	4.4	4.4	V	I _{OUT} = -50 μA
		5.5	5.49	5.4	5.4		
		4.5		3.86	3.76	V	V _{IN} = V _{IL} or V _{IH} I _{OH} = -24 mA I _{OH} = -24 mA (Note 5)
		5.5		4.86	4.76		
V _{OL}	Maximum LOW Level Output Voltage	4.5	0.001	0.1	0.1	V	I _{OUT} = 50 μA
		5.5	0.001	0.1	0.1		
		4.5		0.36	0.44	V	V _{IN} = V _{IL} or V _{IH} I _{OL0} = 24 mA I _{OL} = 24 mA (Note 5)
		5.5		0.36	0.44		
I _{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V _I = V _{CC} , GND
I _{CCT}	Maximum I _{CC} /Input	5.5	0.6		1.5	mA	V _I = V _{CC} - 2.1V
I _{OLD} (Note 6)	Minimum Dynamic Output Current	5.5			75	mA	V _{OLD} = 1.65V Max
		5.5			-75	mA	V _{OLD} = 3.85V Min
I _{CC}	Maximum Quiescent Supply Current	5.5		4.0	40.0	μA	V _{IN} = V _{CC} or GND

Note 5: All outputs loaded; thresholds on input associated with output under test.

Note 6: Maximum test duration 2.0 ms, one output loaded at a time.

AC Electrical Characteristics for AC

Symbol	Parameter	V_{CC} (V) (Note 7)	$T_A = +25^\circ C$			$T_A = -40^\circ C \text{ to } +85^\circ C$			Units
			Min	Typ	Max	Min	Max		
t_{PLH}	Propagation Delay	3.3	1.5	4.5	9.0	1.0	10.0	ns	
		5.0	1.5	4.0	7.0	1.0	7.5		
t_{PHL}	Propagation Delay	3.3	1.5	4.5	8.5	1.0	9.5	ns	
		5.0	1.5	3.5	6.5	1.0	7.0		

Note 7: Voltage Range 3.3 is $3.3V \pm 0.3V$

Voltage Range 5.0 is $5.0V \pm 0.5V$

AC Electrical Characteristics for ACT

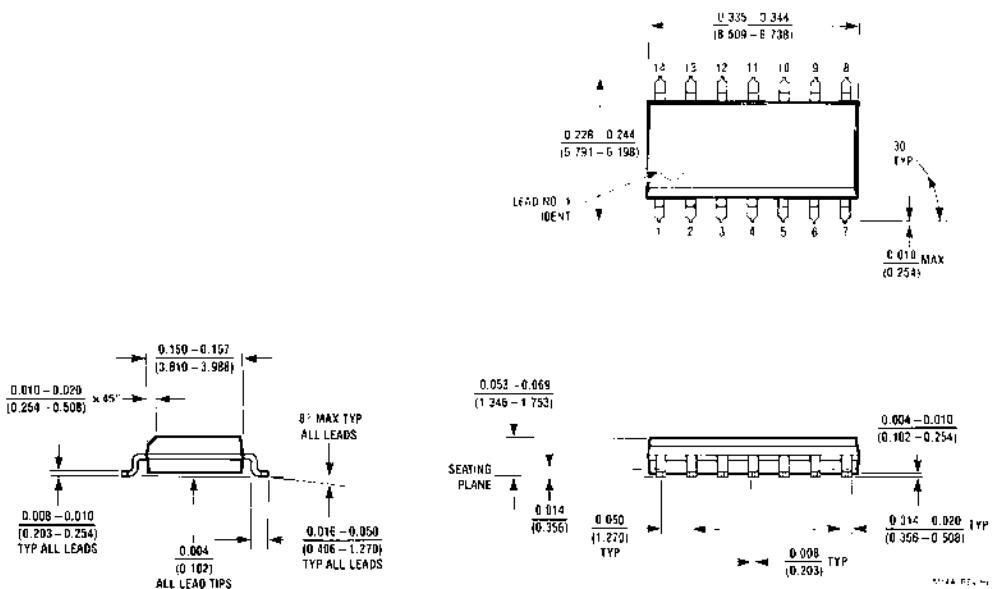
Symbol	Parameter	V_{CC} (V) (Note 8)	$T_A = +25^\circ C$			$T_A = -40^\circ C \text{ to } +85^\circ C$			Units
			Min	Typ	Max	Min	Max		
t_{PLH}	Propagation Delay	5.0	1.0	6.0	8.5	1.0	9.0	ns	
		5.0	1.0	5.5	8.0	1.0	8.5		

Note 8: Voltage Range 5.0 is $5.0V \pm 0.5V$

Capacitance

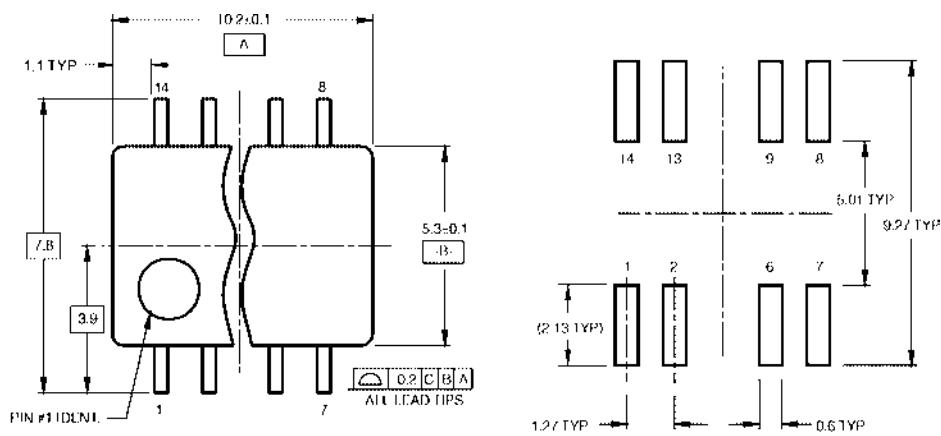
Symbol	Parameter	Typ	Units	Conditions
C_{IN}	Input Capacitance	4.5	pF	$V_{CC} = \text{OPEN}$
V_{CC}	Power Dissipation Capacitance	30.0	pF	$V_{CC} = 5.0V$

Physical Dimensions inches (millimeters) unless otherwise noted

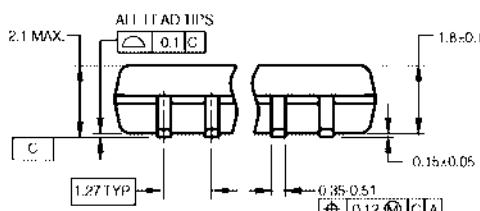


14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150" Narrow Body
Package Number M14A

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



LAND PATTERN RECOMMENDATION

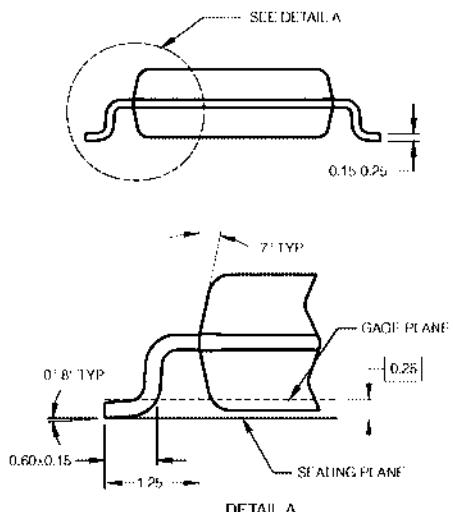


DIMENSIONS ARE IN MILLIMETERS

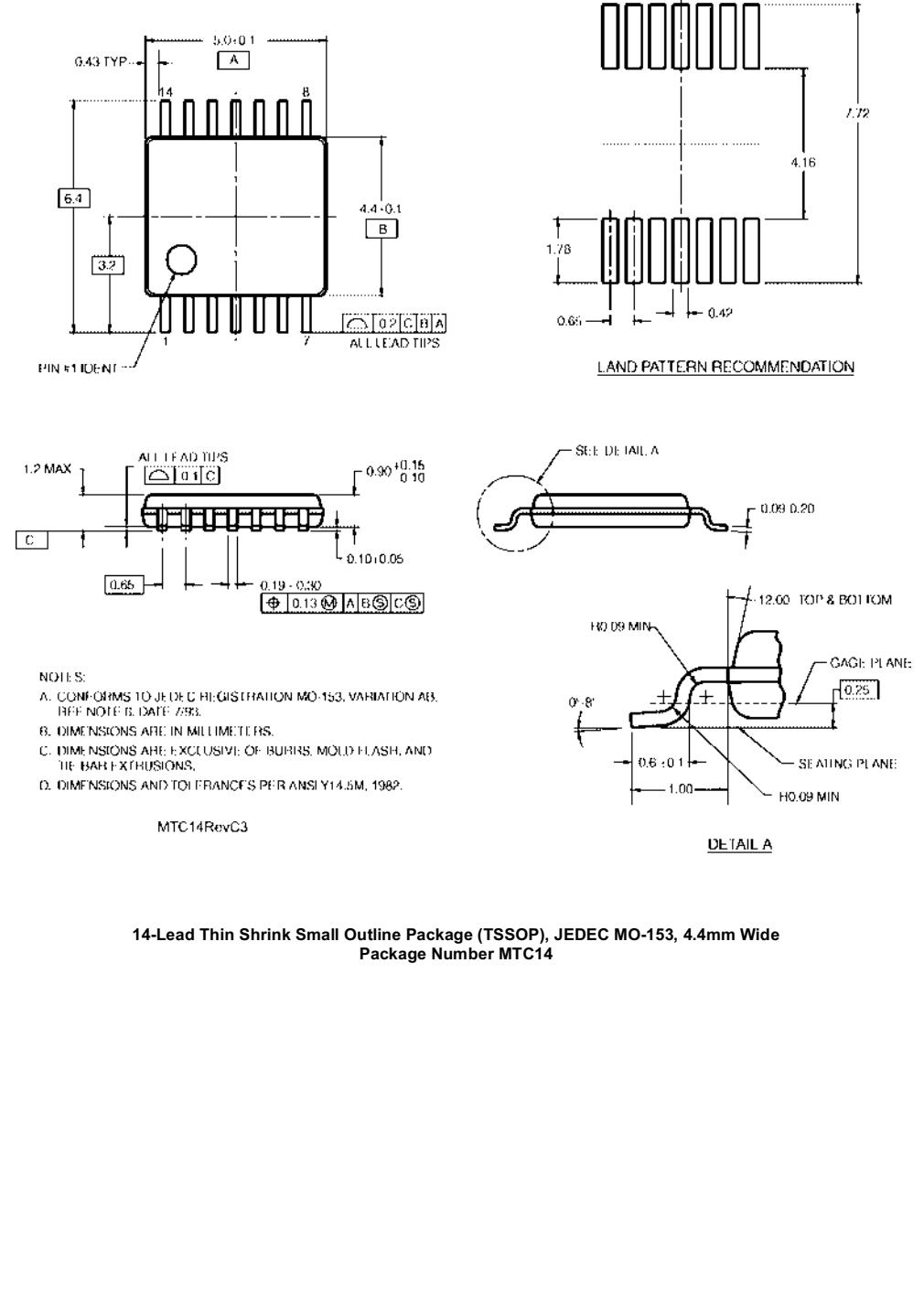
NOTES.

- A. CONFORMS TO EIAJ LDR 732D REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

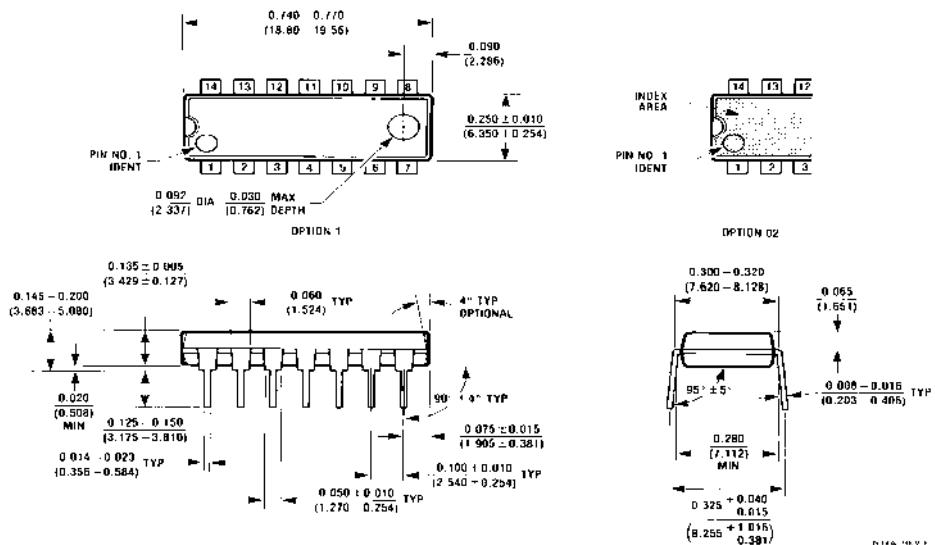
M14DRvB1

14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M14D

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



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



14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
Package Number N14A

Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

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.

www.fairchildsemi.com