

74AC04 • 74ACT04 Hex Inverter

General Description

The AC/ACT04 contains six inverters.

Features

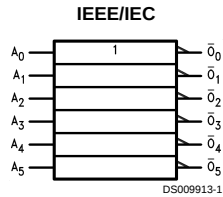
- I_{CC} reduced by 50% on 74AC only
- Outputs source/sink 24 mA
- ACT04 has TTL-compatible inputs

Ordering Code:

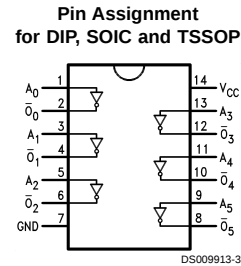
Order Number	Package Number	Package Description
74AC04SC	M14B	14-Lead (0.300" Wide) Molded Small Outline Package, JEDEC
74AC04SJ	M14D	14-Lead Molded Small Outline , EIAJ. SOIC Type II
74AC04MTC	MTC14	14-Lead Thin Shrink Small Outline Package, JEDEC
74AC04PC	N14A	14-Lead (0.300" Wide) Molded Dual-In-Line Package, PDIP
74ACT04SC	M14B	14-Lead (0.300" Wide) Molded Small Outline Package, JEDEC
74ACT04MTC	MTC14	14-Lead Thin Shrink Small Outline Package, JEDEC
74ACT04PC	N14A	14-Lead (0.300" Wide) Molded Dual-In-Line Package, PDIP

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

Logic Symbol



Connection Diagrams



Pin Descriptions

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

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 $V_{CC} + 0.5V$
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)	
PDIP	140°C

Recommended Operating Conditions

Supply Voltage (V_{CC})	
AC	2.0V to 6.0V
ACT	4.5V to 5.5V
Input Voltage (V_I)	0V to V_{CC}
Output Voltage (V_O)	0V to V_{CC}
Operating Temperature (T_A)	-40°C to +85°C
Minimum Input Edge Rate ($\Delta V/\Delta t$)	
AC Devices	
V_{IN} from 30% to 70% of V_{CC}	
V_{CC} @ 3.3V, 4.5V, 5.5V	125 mV/ns
Minimum Input Edge Rate ($\Delta V/\Delta t$)	
ACT Devices	
V_{IN} from 0.8V to 2.0V	
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°C		T _A = -40°C to+85°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 _{OH}	Minimum High Level Output Voltage	3.0	2.99	2.9	2.9	V	I _{OUT} = -50 µA	
		4.5	4.49	4.4	4.4			
		5.5	5.49	5.4	5.4			
			3.0		2.56	2.46	V	V _{IN} = V _{IL} or V _{IH} I _{OH} = -12 mA I _{OH} = -24 mA I _{OH} = -24 mA (Note 2)
			4.1		3.86	3.76		
			5.5		4.86	4.76		
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			
		3.0		0.36	0.44	V	V _{IN} = V _{IL} or V _{IH} I _{OL} = 12 mA I _{OL} = 24 mA I _{OL} = 24 mA (Note 2)	
4.5		0.36	0.44					
5.5		0.36	0.44					
I _{IN} (Note 4)	Maximum Input Leakage Current	5.5		±0.1	±1.0	µA	V _I = V _{CC} , GND	
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	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 _{OL} = 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}	Minimum Dynamic Output Current	5.5			75	mA	V _{OLD} = 1.65V Max
I _{OHD}	(Note 6)	5.5			-75	mA	V _{OHD} = 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°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF		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 ±0.3V

Voltage Range 5.0 is 5.0V ±0.5V

AC Electrical Characteristics for ACT

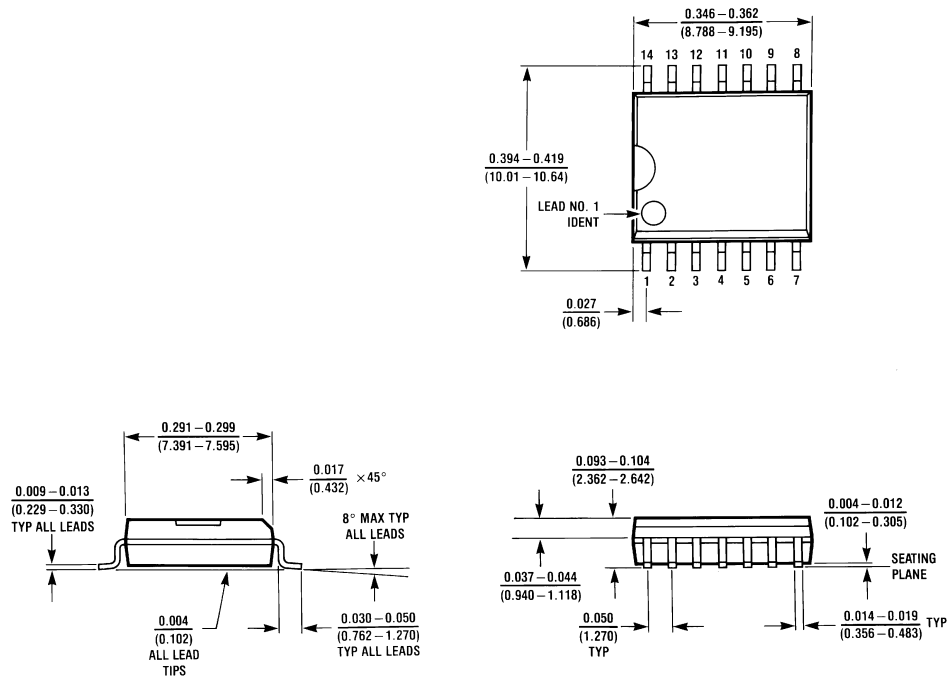
Symbol	Parameter	V _{CC} (V) (Note 8)	T _A = +25°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF		Units
			Min	Typ	Max	Min	Max	
t _{PLH}	Propagation Delay	5.0	1.0	6.0	8.5	1.0	9.0	ns
t _{PHL}	Propagation Delay	5.0	1.0	5.5	8.0	1.0	8.5	ns

Note 8: Voltage Range 5.0 is 5.0V ±0.5V

Capacitance

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

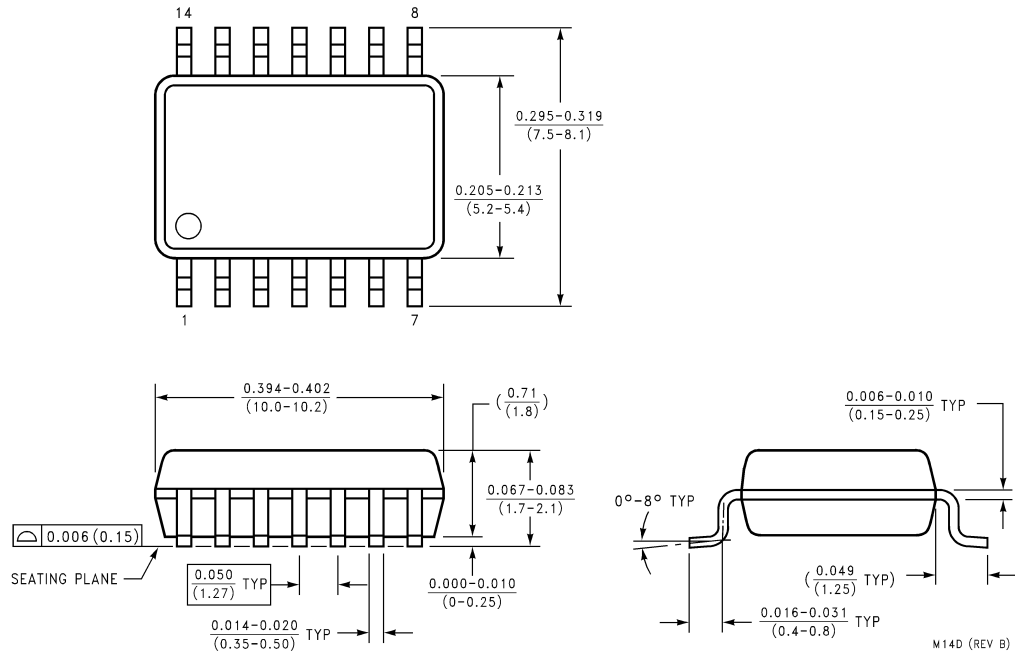
Physical Dimensions inches (millimeters) unless otherwise noted



M14B (REV D)

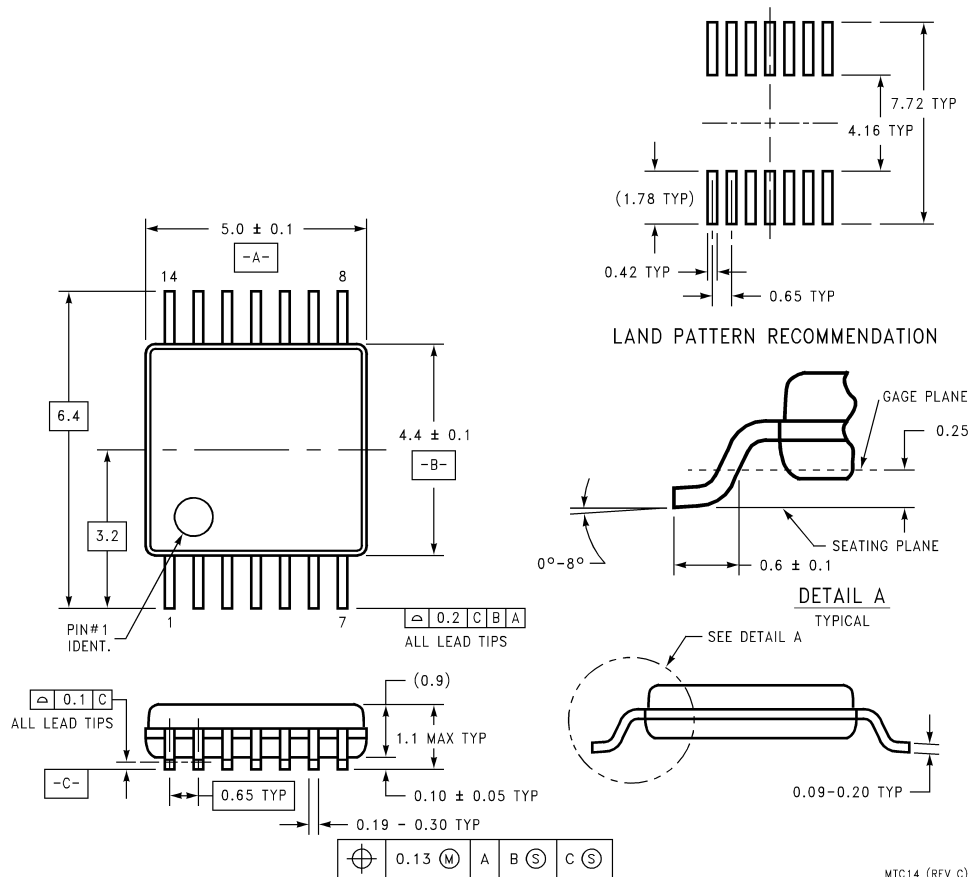
**14-Lead (0.300" Wide) Molded Small Outline Package, JEDEC
Package Number M14B**

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



**14-Lead Molded Small Outline, EIAJ, SOIC Type II
Package Number M14D**

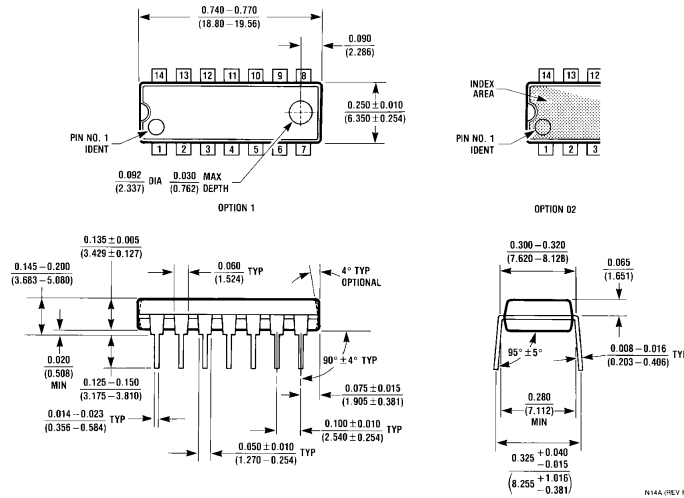
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



**14-Lead Thin Shrink Small Outline Package, JEDEC
Package Number MTC14**

MTC14 (REV C)

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



14-Lead (0.300" Wide) Molded Dual-In-Line Package, PDIP
Package Number N14A

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.

Fairchild Semiconductor Corporation Americas
Customer Response Center
Tel: 1-888-522-5372
Fax: 972-910-8036

Fairchild Semiconductor Europe
Fax: +49 (0) 1 80-530 85 86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 8 141-35-0
English Tel: +44 (0) 1 793-85-68-56
Italy Tel: +39 (0) 2 57 5631

Fairchild Semiconductor Hong Kong Ltd.
8/F Room 808 Empire Centre
68 Mody Road, Tsimshatsui East
Kowloon, Hong Kong
Tel: 852-2722-8338
Fax: 852-2722-8383

Fairchild Semiconductor Japan Ltd.
4F, Natsume Bldg,
2-18-6 Yushima, Bunkyo-ku,
Tokyo 113-0034, Japan
Tel: 81-3-3818-8840
Fax: 81-3-3818-8450

www.fairchildsemi.com

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.