

FAIRCHILD
SEMICONDUCTOR™

November 1988
Revised January 2000

74AC10 • 74ACT10 Triple 3-Input NAND Gate

General Description

The AC/ACT10 contains three, 3-input NAND gates.

Features

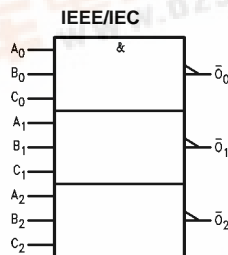
- I_{CC} reduced by 50% on 74AC only
- Outputs source/sink 24 mA

Ordering Code:

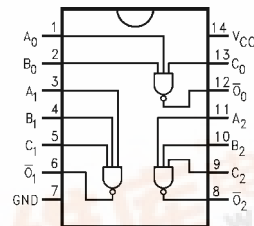
Order Number	Package Number	Package Description
74AC10SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150" Narrow Body
74AC10SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC10MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74AC10PC	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
74ACT10SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150" Narrow Body
74ACT10PC	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.

Logic Symbol



Connection Diagram



Pin Descriptions

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

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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		V_{CC} @ 3.3V, 4.5V, 5.5V	125 mV/ns
or Sink Current (I_O)	± 50 mA	Minimum Input Edge Rate ($\Delta V/\Delta t$)	
DC V_{CC} or Ground Current		ACT Devices	
per Output Pin (I_{CC} or I_{GND})	± 50 mA	V_{IN} from 0.8V to 2.0V	
Storage Temperature (T_{STG})	-65°C to +150°C	V_{CC} @ 4.5V, 5.5V	125 mV/ns
Junction Temperature (T_J)			
PDIP	140°C		

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, with-
out 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 circuits outside databook specifications.

DC Electrical Characteristics for AC

Symbol	Parameter	V_{CC} (V)	$T_A = +25^\circ C$		$T_A = -40^\circ C$ to $+85^\circ C$		Units	Conditions
			Typ	Guaranteed Limits	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	$I_{OUT} = -50 \mu A$	
		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)	
		4.5		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	$I_{OUT} = 50 \mu A$	
		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	$V_I = V_{CC}$ or GND	
I_{OLD}	Minimum Dynamic	5.5			75	mA	$V_{OLD} = 1.65V$ Max	
I_{OHD}	Output Current (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.

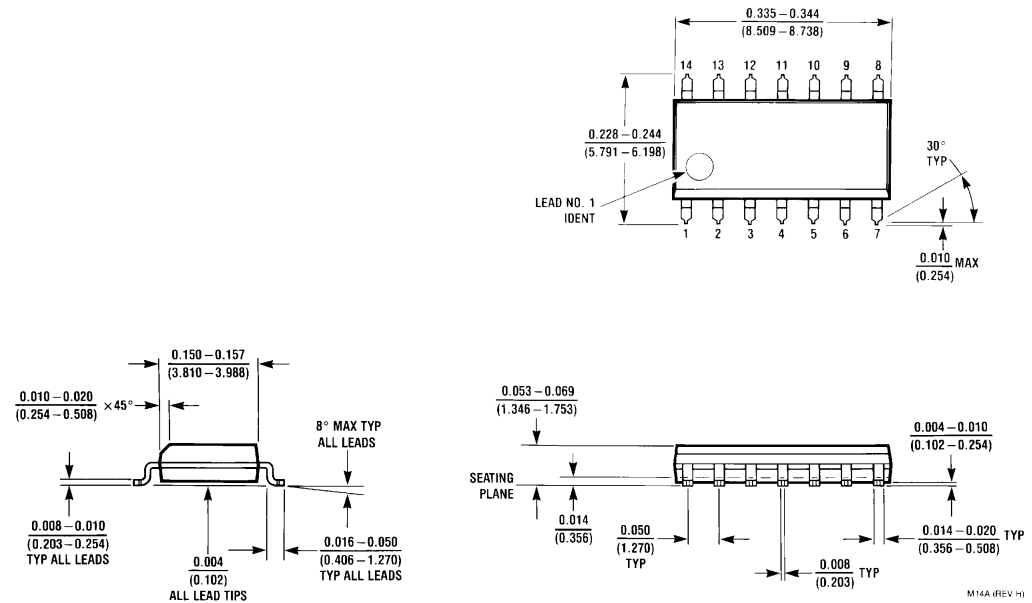
Note 3: Maximum test duration 2.0 ms, one output loaded at a time.

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	
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	
V _{OL}	Maximum LOW Level Output Voltage	5.5		0.36	0.44	V	I _{OL} = 24 mA (Note 5)	
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 (Note 6)	5.5			75	mA	V _{OLD} = 1.65V Max	
I _{OHD}	Output Current (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	
<p>Note 5: All outputs loaded; thresholds on input associated with output under test.</p> <p>Note 6: Maximum test duration 2.0 ms, one output loaded at a time.</p>								
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 5.0	1.5	6.0	9.5	1.0	10.5	ns
t _{PHL}	Propagation Delay	3.3 5.0	1.5	5.5	8.5	1.0	10.0	
<p>Note 7: Voltage Range 3.3 is 3.3V ± 0.3V Voltage Range 5.0 is 5.0V ± 0.5V</p>								
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	6.5	9.0	1.0	10.0	ns
t _{PHL}	Propagation Delay	5.0	1.0	6.5	9.0	1.0	9.5	ns
<p>Note 8: Voltage Range 5.0 is 5.0V ± 0.5V</p>								
Capacitance								
Symbol	Parameter	Typ	Units	Conditions				
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = OPEN				
C _{PD}	Power Dissipation Capacitance	25.0	pF	V _{CC} = 5.0V				

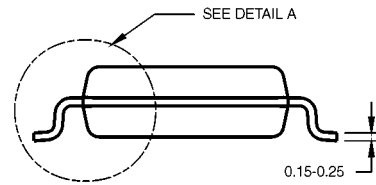
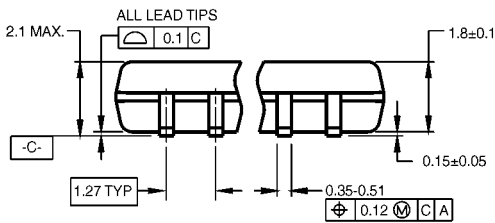
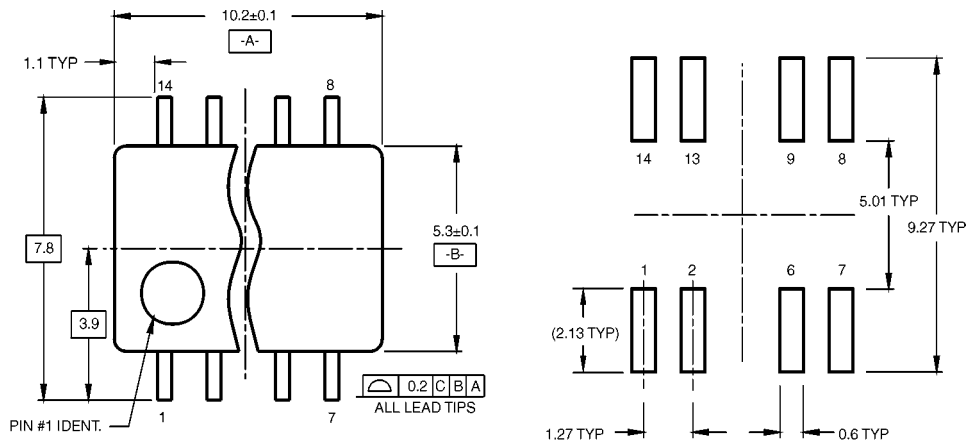
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Physical Dimensions inches (millimeters) unless otherwise noted



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

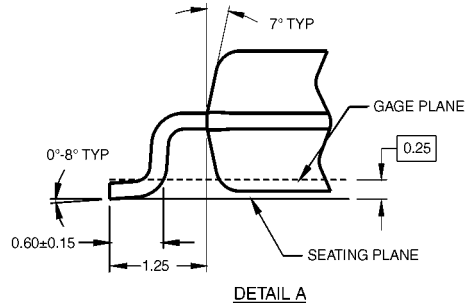
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



DIMENSIONS ARE IN MILLIMETERS

- NOTES:
 A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
 B. DIMENSIONS ARE IN MILLIMETERS.
 C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

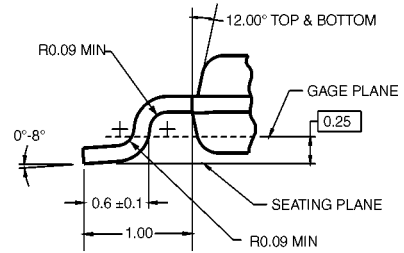
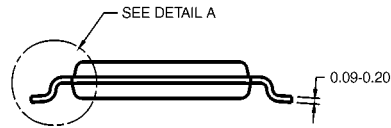
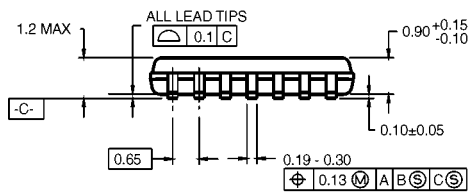
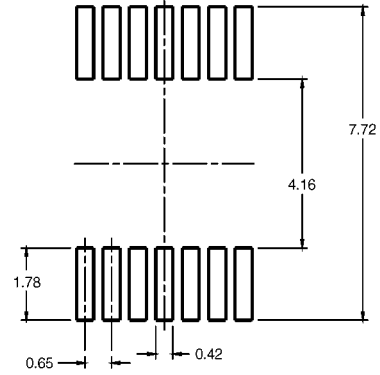
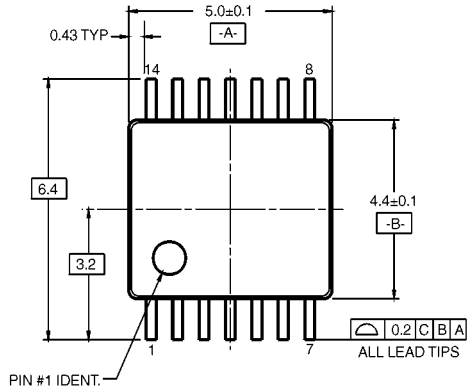
M14DRevB1



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

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



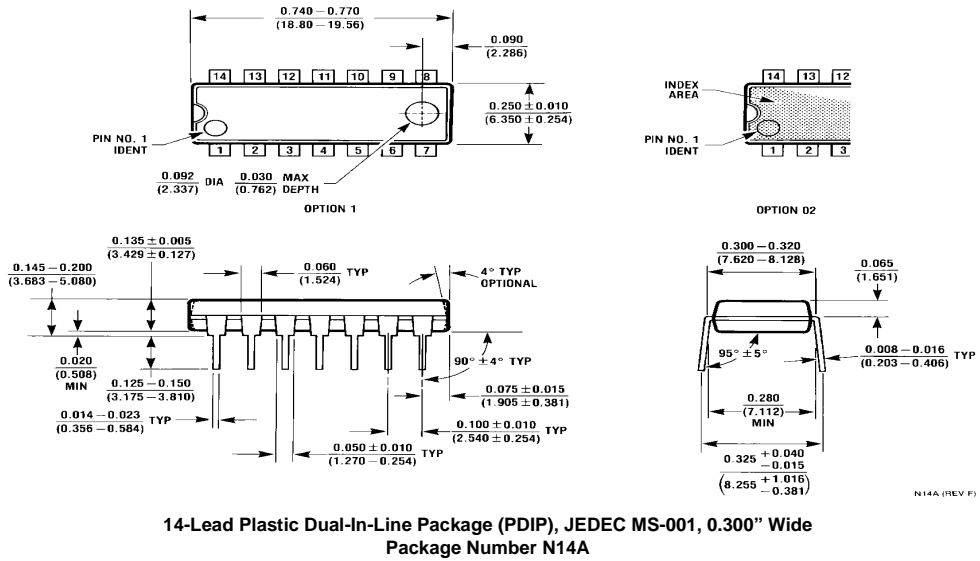
- NOTES:
- A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6, DATE 7/93.
 - B. DIMENSIONS ARE IN MILLIMETERS.
 - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
 - D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.

MTC14RevC3

DETAIL A

**14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
Package Number MTC14**

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



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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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