



74AC10, 74ACT10 Triple 3-Input NAND Gate

Features

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

General Description

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

Ordering Information

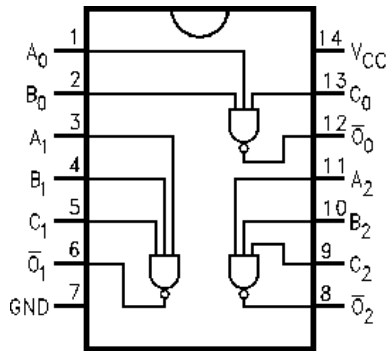
Order Number	Package Number	Package Description
74AC10SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74AC10SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC10MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74AC10PC	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
74AC10PC_NL ⁽¹⁾	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-012, 0.150" Narrow
74ACT10MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering number.
Pb-Free package per JEDEC J-STD-020B.

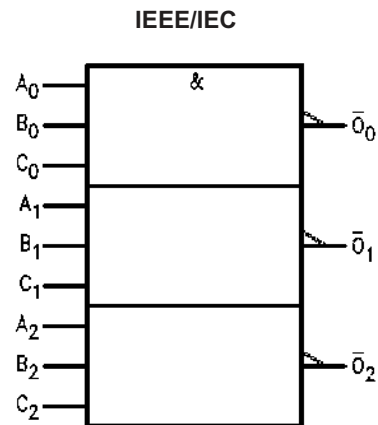
Note:

1. Use this number to order device.

Connection Diagram



Logic Symbol



Pin Description

Pin Names	Description
A _n , B _n , C _n	Inputs
\bar{O}_n	Outputs

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
V_{CC}	Supply Voltage	-0.5V to +7.0V
I_{IK}	DC Input Diode Current $V_I = -0.5V$ $V_I = V_{CC} + 0.5V$	-20mA +20mA
V_I	DC Input Voltage	-0.5V to $V_{CC} + 0.5V$
I_{OK}	DC Output Diode Current $V_O = -0.5V$ $V_O = V_{CC} + 0.5V$	-20mA +20mA
V_O	DC Output Voltage	-0.5V to $V_{CC} + 0.5V$
I_O	DC Output Source or Sink Current	$\pm 50mA$
I_{CC} or I_{GND}	DC V_{CC} or Ground Current per Output Pin	$\pm 50mA$
T_{STG}	Storage Temperature	-65°C to +150°C
T_J	Junction Temperature	140°C

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Rating
V_{CC}	Supply Voltage AC ACT	2.0V to 6.0V 4.5V to 5.5V
V_I	Input Voltage	0V to V_{CC}
V_O	Output Voltage	0V to V_{CC}
T_A	Operating Temperature	-40°C to +85°C
$\Delta V / \Delta t$	Minimum Input Edge Rate, AC Devices: V_{IN} from 30% to 70% of V_{CC} , V_{CC} @ 3.3V, 4.5V, 5.5V	125mV/ns
$\Delta V / \Delta t$	Minimum Input Edge Rate, ACT Devices: V_{IN} from 0.8V to 2.0V, V_{CC} @ 4.5V, 5.5V	125mV/ns

DC Electrical Characteristics for AC

Symbol	Parameter	V _{CC} (V)	Conditions	T _A = +25°C		T _A = -40°C to +85°C		Units	
				Typ.	Guaranteed Limits				
V _{IH}	Minimum HIGH Level Input Voltage	3.0	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	2.1	2.1		V	
		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	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	0.9	0.9		V	
		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	I _{OUT} = -50μA	2.99	2.9	2.9		V	
		4.5		4.49	4.4	4.4			
		5.5		5.49	5.4	5.4			
		3.0	V _{IN} = V _{IL} or V _{IH} : I _{OH} = -12mA			2.56	2.46		
		4.5	I _{OH} = -24mA			3.86	3.76		
		5.5	I _{OH} = -24mA ⁽²⁾			4.86	4.76		
V _{OL}	Maximum LOW Level Output Voltage	3.0	I _{OUT} = 50μA	0.002	0.1	0.1		V	
		4.5		0.001	0.1	0.1			
		5.5		0.001	0.1	0.1			
		3.0	V _{IN} = V _{IL} or V _{IH} : I _{OL} = 12mA			0.36	0.44		
		4.5	I _{OL} = 24mA			0.36	0.44		
		5.5	I _{OL} = 24mA ⁽²⁾			0.36	0.44		
I _{IN} ⁽⁴⁾	Maximum Input Leakage Current	5.5	V _I = V _{CC} or GND		±0.1	±1.0		μA	
I _{OLD}	Minimum Dynamic Output Current ⁽³⁾	5.5	V _{OLD} = 1.65V Max.			75		mA	
I _{OHD}		5.5	V _{OHD} = 3.85V Min.			-75		mA	
I _{CC} ⁽⁴⁾	Maximum Quiescent Supply Current	5.5	V _{IN} = V _{CC} or GND		2.0	20.0		μA	

Notes:

- All outputs loaded; thresholds on input associated with output under test.
- Maximum test duration 2.0ms, one output loaded at a time.
- 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)	Conditions	T _A = +25°C		T _A = -40°C to +85°C		Units
				Typ.	Guaranteed Limits			
V _{IH}	Minimum HIGH Level Input Voltage	4.5	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	2.0	2.0		V
		5.5		1.5	2.0	2.0		
V _{IL}	Maximum LOW Level Input Voltage	4.5	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	0.8	0.8		V
		5.5		1.5	0.8	0.8		
V _{OH}	Minimum HIGH Level Output Voltage	4.5	I _{OUT} = -50μA	4.49	4.4	4.4		V
		5.5		5.49	5.4	5.4		
		4.5	V _{IN} = V _{IL} or V _{IH} : I _{OH} = -24mA		3.86	3.76		
		5.5	I _{OH} = -24mA ⁽⁵⁾		4.86	4.76		
V _{OL}	Maximum LOW Level Output Voltage	4.5	I _{OUT} = 50μA	0.001	0.1	0.1		V
		5.5		0.001	0.1	0.1		
		4.5	V _{IN} = V _{IL} or V _{IH} : I _{OL} = 24mA		0.36	0.44		
		5.5	I _{OL} = 24mA ⁽⁵⁾		0.36	0.44		
I _{IN}	Maximum Input Leakage Current	5.5	V _I = V _{CC} , GND		±0.1	±1.0		μA
I _{CCT}	Maximum I _{CC} /Input	5.5	V _I = V _{CC} - 2.1V	0.6		1.5		mA
I _{OLD}	Minimum Dynamic Output Current ⁽⁶⁾	5.5	V _{OLD} = 1.65V Max.			75		mA
		5.5	V _{OHD} = 3.85V Min.			-75		mA
I _{CC}	Maximum Quiescent Supply Current	5.5	V _{IN} = V _{CC} or GND		4.0	40.0		μA

Notes:

5. All outputs loaded; thresholds on input associated with output under test.
6. Maximum test duration 2.0ms, one output loaded at a time.

AC Electrical Characteristics for AC

Symbol	Parameter	V_{CC} (V) ⁽⁷⁾	$T_A = +25^\circ\text{C}$, $C_L = 50\text{pF}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$, $C_L = 50\text{pF}$		Units
			Min.	Typ.	Max.	Min.	Max.	
t_{PLH}	Propagation Delay	3.3	1.5	6.0	9.5	1.0	10.5	ns
		5.0	1.5	4.5	7.0	1.0	8.0	
t_{PHL}	Propagation Delay	3.3	1.5	5.5	8.5	1.0	10.0	ns
		5.0	1.5	4.0	6.0	1.0	6.5	

Note:

7. Voltage range 3.3 is $3.3\text{V} \pm 0.3\text{V}$. Voltage range 5.0 is $5.0\text{V} \pm 0.5\text{V}$.

AC Electrical Characteristics for ACT

Symbol	Parameter	V_{CC} (V) ⁽⁸⁾	$T_A = +25^\circ\text{C}$, $C_L = 50\text{pF}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$, $C_L = 50\text{pF}$		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

Note:

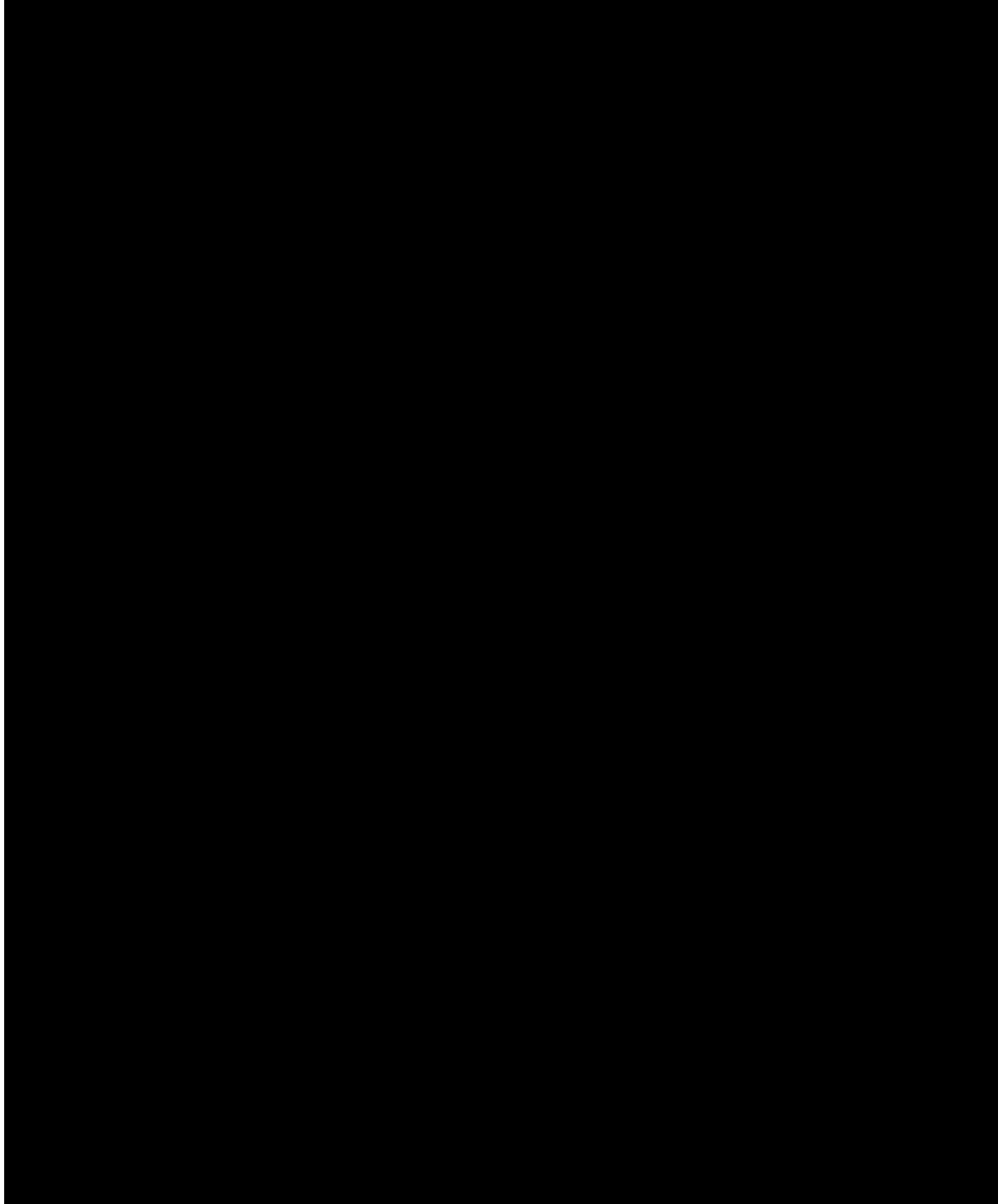
8. Voltage Range 5.0 is $5.0\text{V} \pm 0.5\text{V}$.

Capacitance

Symbol	Parameter	Conditions	Typ.	Units
C_{IN}	Input Capacitance	$V_{CC} = \text{OPEN}$	4.5	pF
C_{PD}	Power Dissipation Capacitance	$V_{CC} = 5.0\text{V}$	25.0	pF

Physical Dimensions

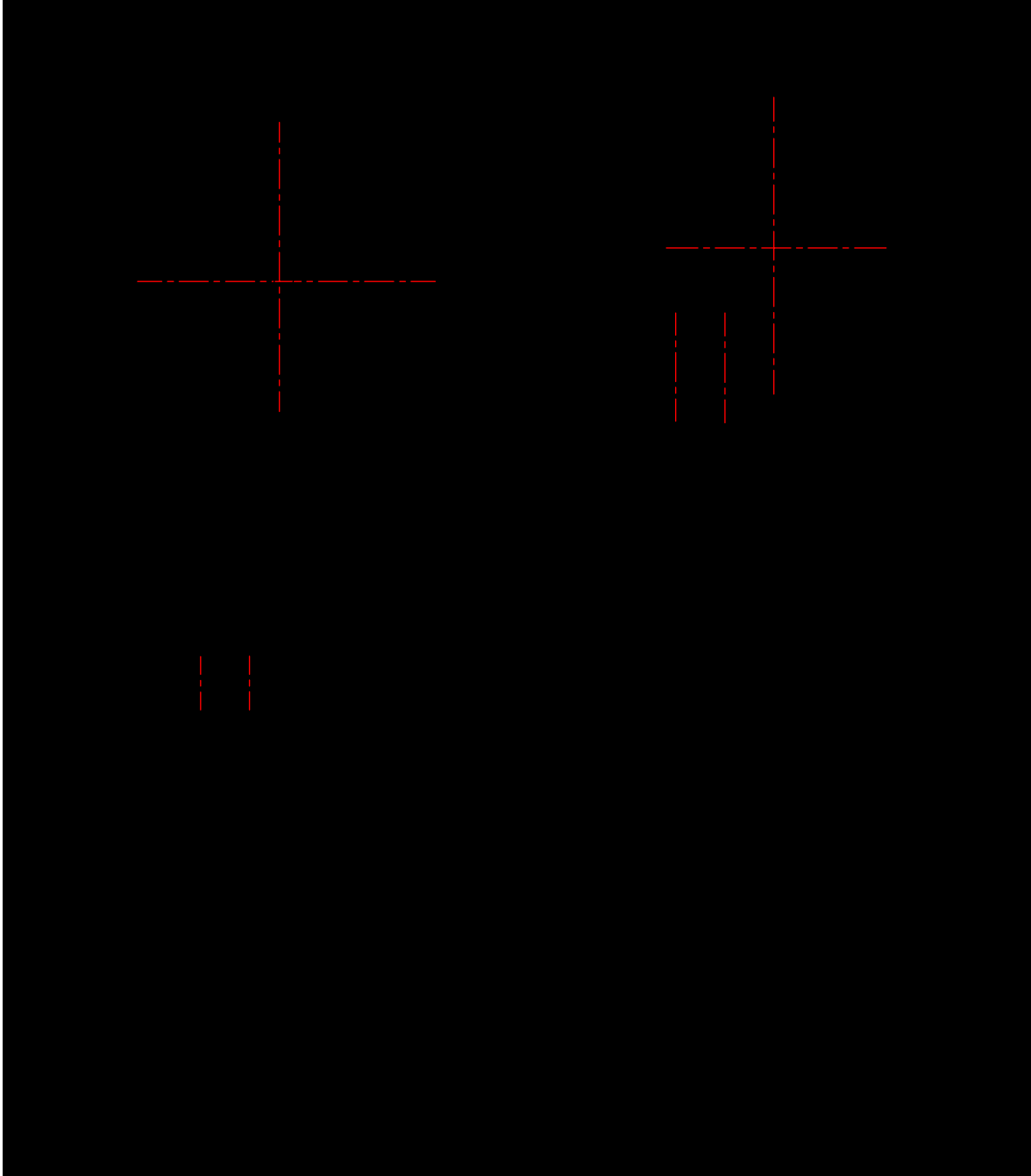
Dimensions are in inches (millimeters) unless otherwise noted.



**Figure 1. 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M14A**

Physical Dimensions (Continued)

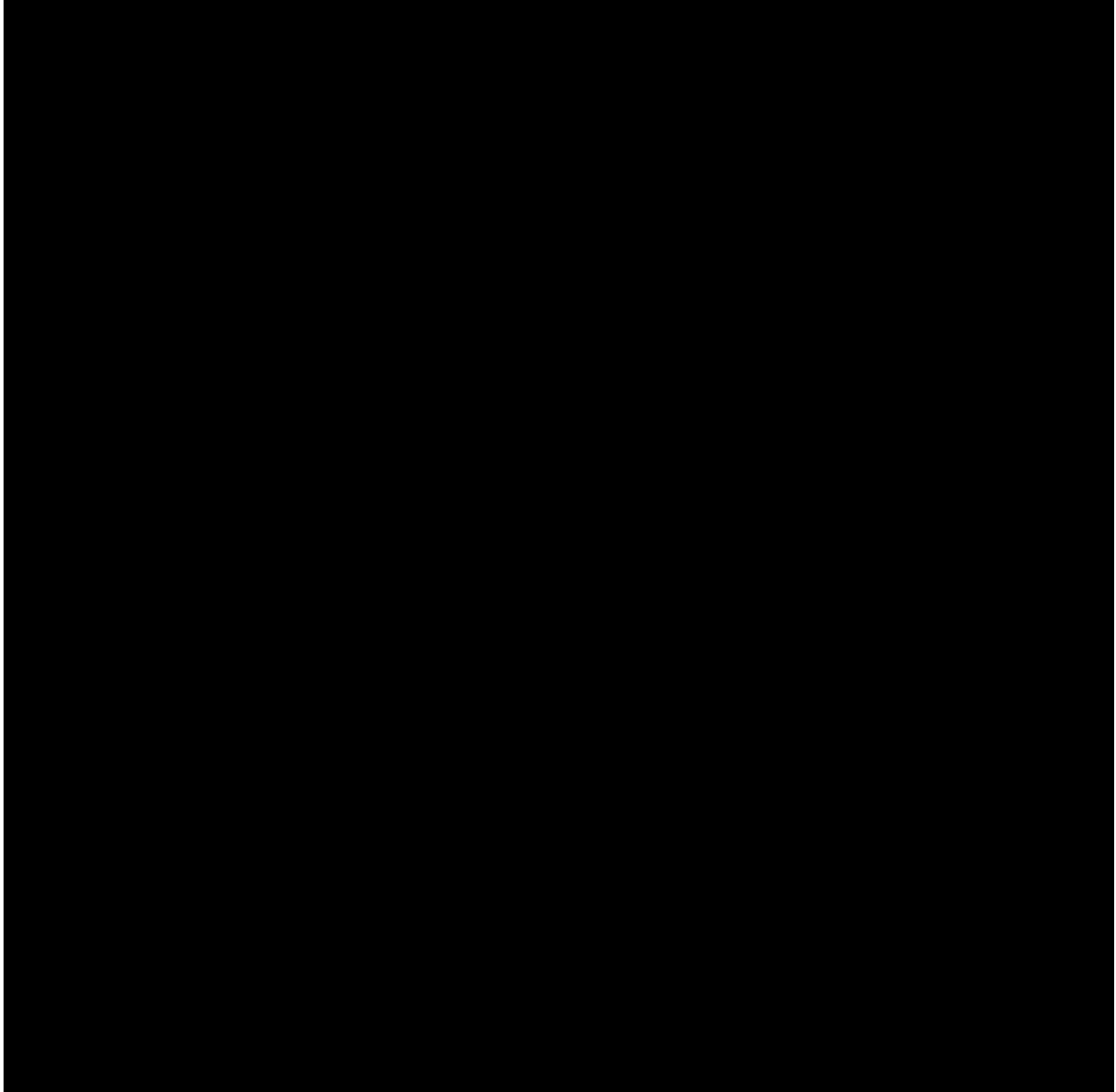
Dimensions are in millimeters unless otherwise noted.



**Figure 2. 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M14D**

Physical Dimensions (Continued)

Dimensions are in millimeters unless otherwise noted.



**Figure 3. 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
Package Number MTC14**

Physical Dimensions (Continued)

Dimensions are in inches (millimeters) unless otherwise noted.

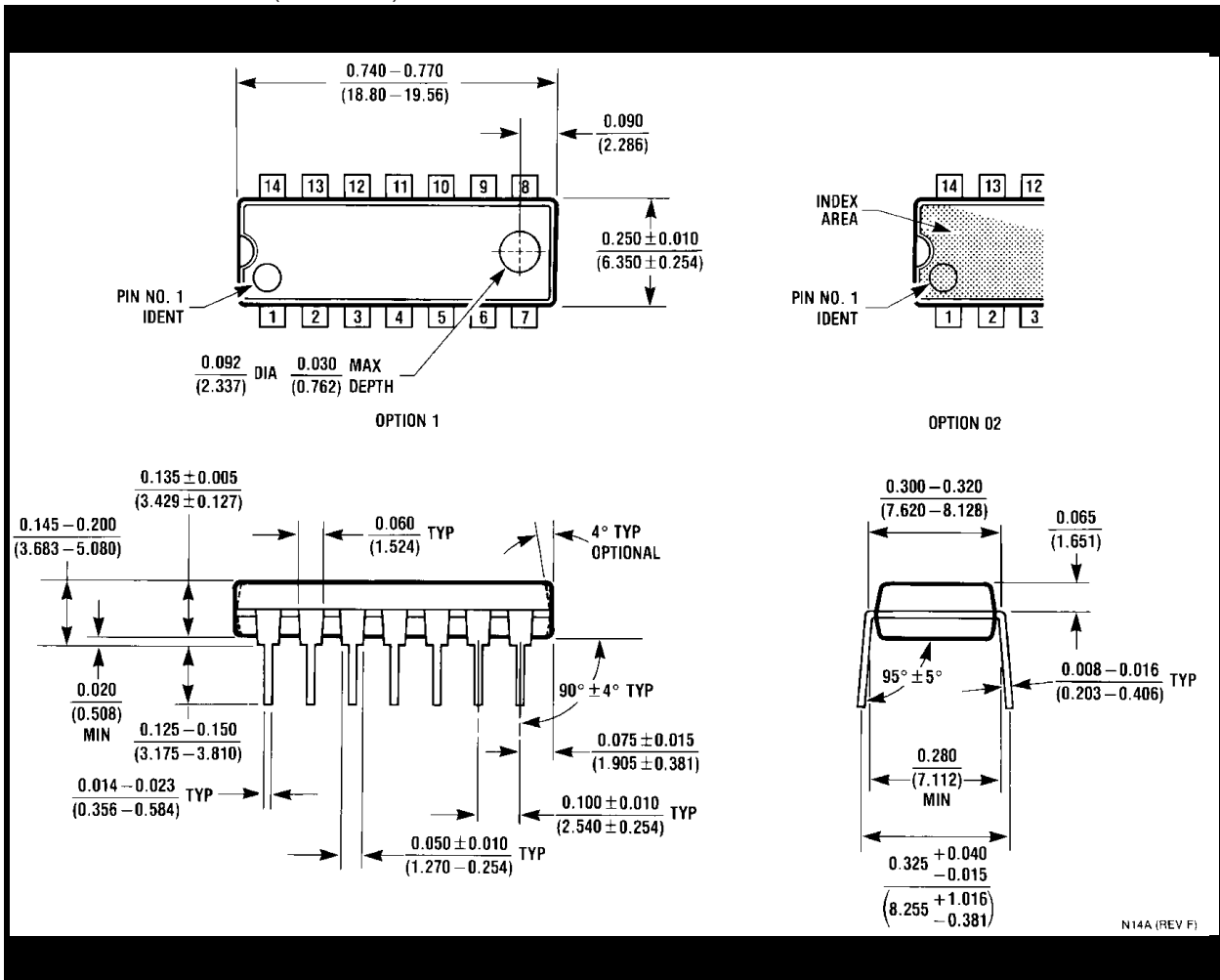


Figure 4. 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide Package Number N14A



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