

## CD4007C Dual Complementary Pair Plus Inverter

### General Description

The CD4007C consists of three complementary pairs of N- and P-channel enhancement mode MOS transistors suitable for series/shunt applications. All inputs are protected from static discharge by diode clamps to  $V_{DD}$  and  $V_{SS}$ .

For proper operation the voltages at all pins must be constrained to be between  $V_{SS} - 0.3V$  and  $V_{DD} + 0.3V$  at all times.

### Features

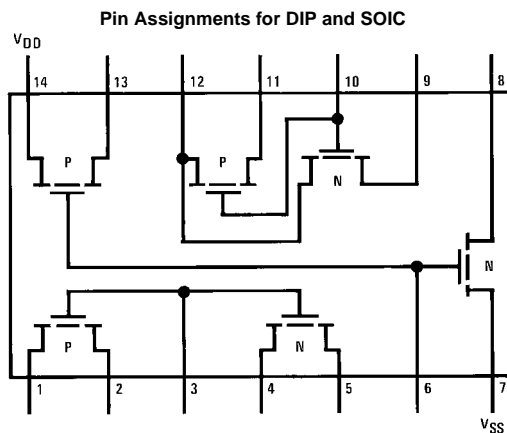
- Wide supply voltage range: 3.0V to 15V
- High noise immunity: 0.45  $V_{CC}$  (typ.)

### Ordering Code:

Order Number	Package Number	Package Description
CD4007CM	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150" Narrow
CD4007CN	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

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

### Connection Diagram



**Note:** All P-channel substrates are connected to  $V_{DD}$  and all N-channel substrates are connected to  $V_{SS}$ .

**Absolute Maximum Ratings** (Note 1)

Voltage at Any Pin	$V_{SS} - 0.3V$ to $V_{DD} + 0.3V$	Operating $V_{DD}$ Range	$V_{SS} + 3.0V$ to $V_{SS} + 15V$
Operating Temperature Range	$-40^{\circ}C$ to $+85^{\circ}C$	Lead Temperature	
Storage Temperature Range	$-65^{\circ}C$ to $+150^{\circ}C$	(Soldering, 10 seconds)	$260^{\circ}C$
Power Dissipation ( $P_D$ )			
Dual-In-Line	700 mW		
Small Outline	500 mW		

**Note 1:** This device should not be connected to circuits with the power on because high transient voltages may cause permanent damage.

**DC Electrical Characteristics**

Symbol	Parameter	Conditions	Limits									Units
			−40°C			+25°C			+85°C			
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I <sub>L</sub>	Quiescent Device Current	V <sub>DD</sub> = 5.0V			0.5		0.005	0.05			15	μA
		V <sub>DD</sub> = 10V			1.0		0.005	1.0			30	μA
P <sub>D</sub>	Quiescent Device Dissipation Package	V <sub>DD</sub> = 5.0V			2.5		0.025	2.5			75	μW
		V <sub>DD</sub> = 10V			10		0.05	10			300	μW
V <sub>OL</sub>	Output Voltage LOW Level	V <sub>DD</sub> = 5.0V			0.05		0	0.01			0.05	V
		V <sub>DD</sub> = 10V			0.05		0	0.01			0.05	V
V <sub>OH</sub>	Output Voltage HIGH Level	V <sub>DD</sub> = 5.0V	4.95			4.95	5.0		4.95			V
		V <sub>DD</sub> = 10V	9.95			9.95	10		9.95			V
V <sub>NL</sub>	Noise Immunity (All inputs)	V <sub>DD</sub> = 5.0V, V <sub>O</sub> = 3.6V			1.5		2.25	1.5			1.4	V
		V <sub>DD</sub> = 10V, V <sub>O</sub> = 7.2V			3.0		4.5	3.0			2.9	V
V <sub>NH</sub>	Noise Immunity (All Inputs)	V <sub>DD</sub> = 5.0V, V <sub>O</sub> = 0.95V	3.6			3.5	2.25		3.5			V
		V <sub>DD</sub> = 10V, V <sub>O</sub> = 2.9V	7.1			7.0	4.5		7.0			V
I <sub>DN</sub>	Output Drive Current N-Channel	V <sub>DD</sub> = 5.0V, V <sub>O</sub> = 0.4V, V <sub>I</sub> = V <sub>DD</sub>	0.35			0.3	1.0		0.24			mA
		V <sub>DD</sub> = 10V, V <sub>O</sub> = 0.5V, V <sub>I</sub> = V <sub>DD</sub>	1.2			1.0	2.5		0.8			mA
I <sub>DP</sub>	Output Drive Current P-Channel	V <sub>DD</sub> = 5.0V, V <sub>O</sub> = 2.5V, V <sub>I</sub> = V <sub>SS</sub>	−1.3			−1.1	−4.0		−0.9			mA
		V <sub>DD</sub> = 10V, V <sub>O</sub> = 9.5V, V <sub>I</sub> = V <sub>SS</sub>	−0.65			−0.55	−2.5		−0.45			mA
I <sub>I</sub>	Input Current						10					pA

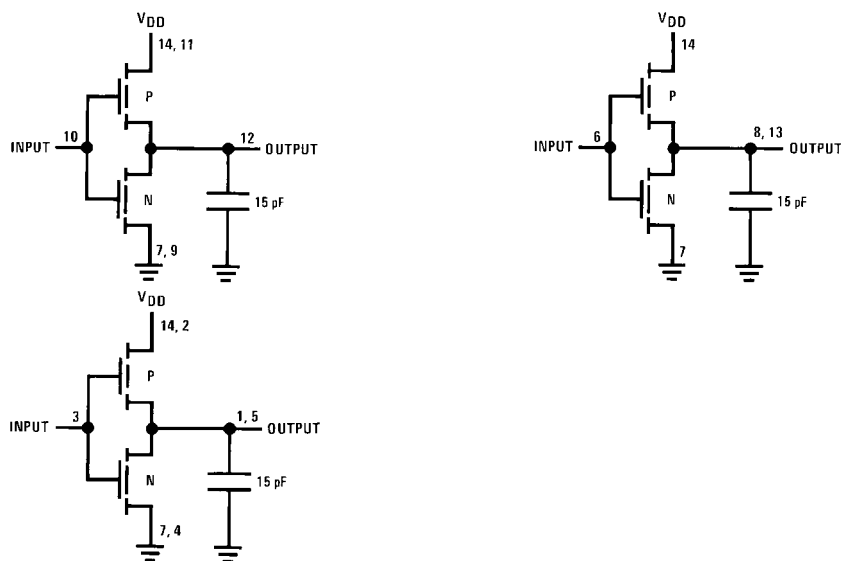
**AC Electrical Characteristics** (Note 2)

$T_A = 25^{\circ}C$  and  $C_L = 15$  pF and rise and fall times = 20 ns. Typical temperature coefficient for all values of  $V_{DD} = 0.3\%/^{\circ}C$

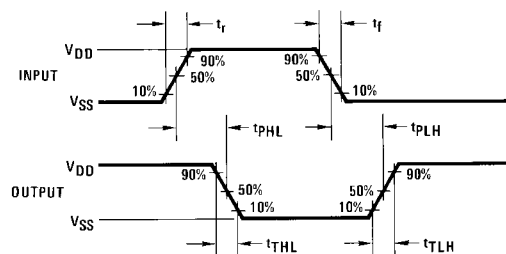
Symbol	Parameter	Conditions	Min	Typ	Max	Units
$t_{PLH} = t_{PHL}$	Propagation Delay Time	$V_{DD} = 5.0V$		35	75	ns
		$V_{DD} = 10V$		20	50	ns
$t_{TLH} = t_{THL}$	Transition Time	$V_{DD} = 5.0V$		50	100	ns
		$V_{DD} = 10V$		30	50	ns
$C_I$	Input Capacitance	Any Input		5		pF

**Note 2:** AC Parameters are guaranteed by DC correlated testing.

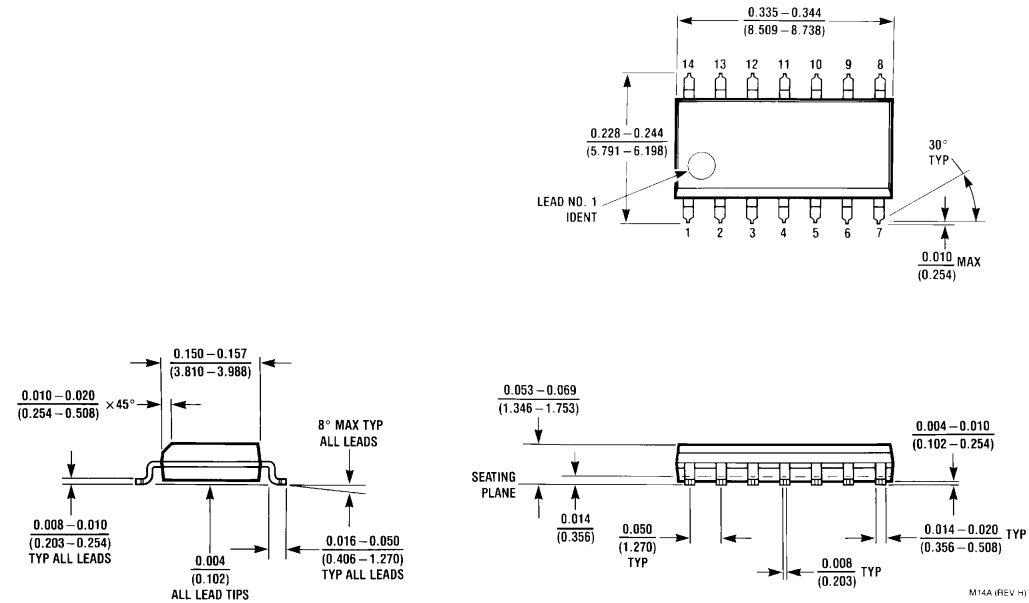
# AC Test Circuits



# Switching Time Waveforms

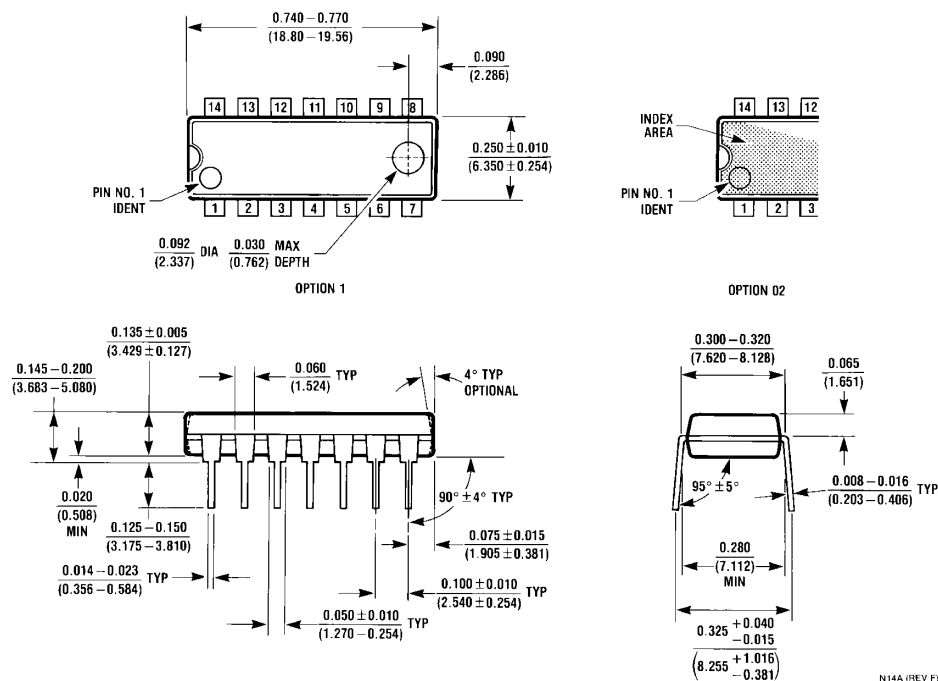


# Physical Dimensions inches (millimeters) unless otherwise noted



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

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



N14A (REV F)

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

[www.fairchildsemi.com](http://www.fairchildsemi.com)