

## 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

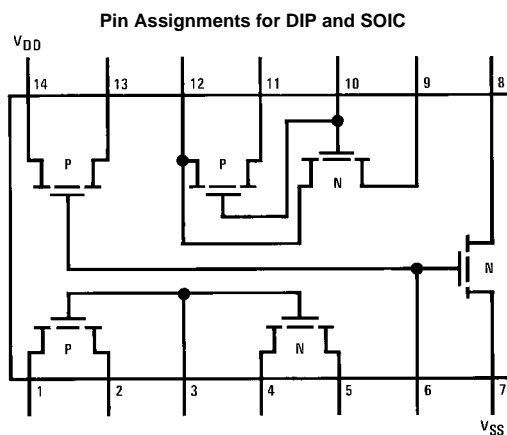
- Wide supply voltage range: 3.0V to 15V
- High noise immunity: 0.45  $V_{CC}$  (typ.)

### 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  $V_{SS}$ .

**Top View**

**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

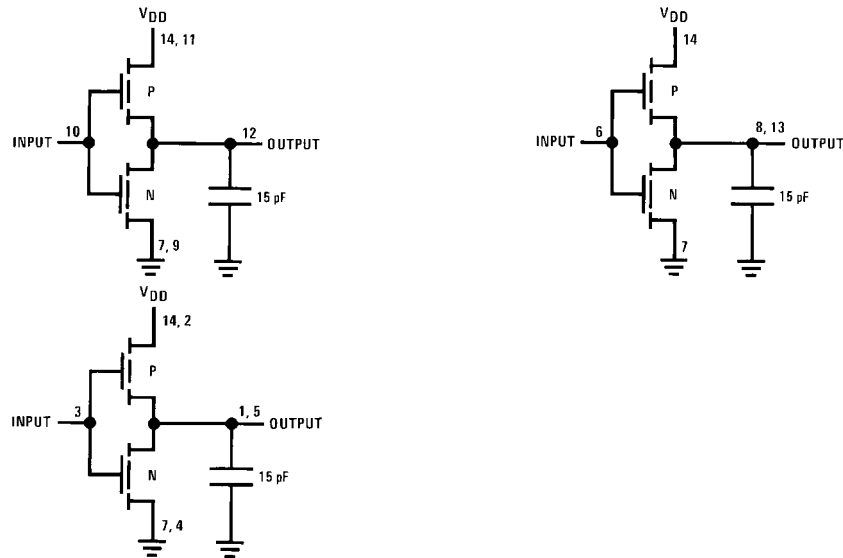
**AC Electrical Characteristics** (Note 2)

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

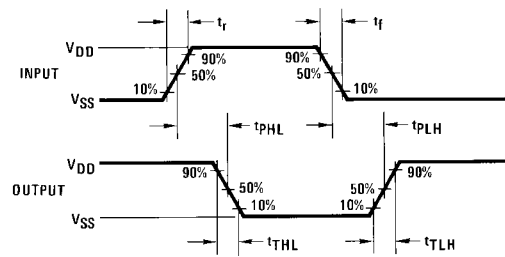
Symbol	Parameter	Conditions	Min	Typ	Max	Units
$t_{PLH} = t_{PHL}$	Propagation Delay Time	$V_{DD} = 5.0V$		35	75	ns
		$V_{DD} = 10V$		20	50	ns
$t_{TLH} = t_{THL}$	Transition Time	$V_{DD} = 5.0V$		50	100	ns
		$V_{DD} = 10V$		30	50	ns
$C_I$	Input Capacitance	Any Input		5		pF

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

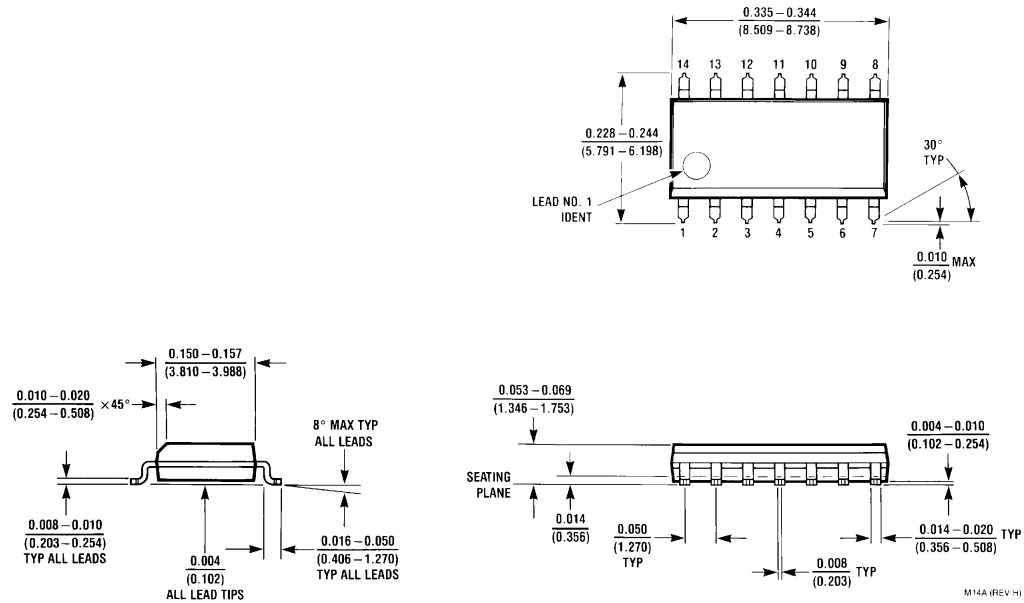
## AC Test Circuits



## Switching Time Waveforms

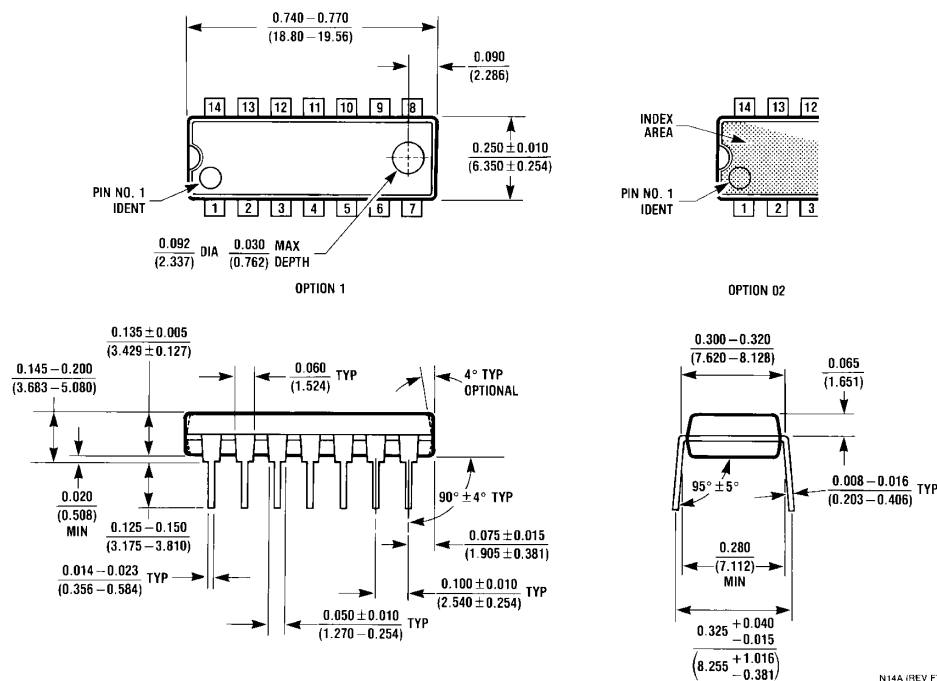


# Physical Dimensions inches (millimeters) unless otherwise noted



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

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



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

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