



## MM54C30/MM74C30 8-Input NAND Gate

### General Description

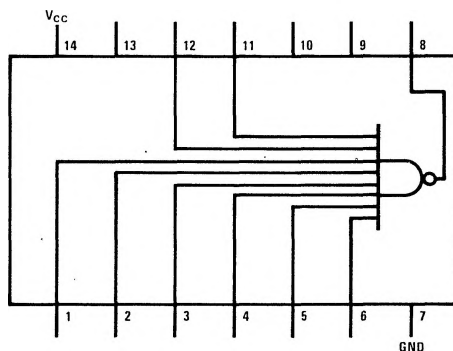
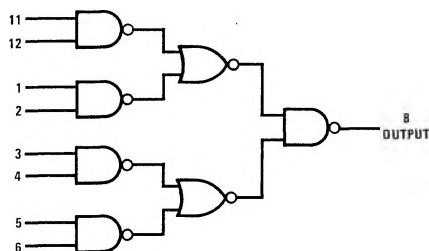
The logic gate employs complementary MOS (CMOS) to achieve wide power supply operating range, low power consumption and high noise immunity. Function and pin out compatibility with series 54/74 devices minimizes design time for those designers familiar with the standard 54/74 logic family.

All inputs are protected from damage due to static discharge by diode clamps to  $V_{CC}$  and GND.

### Features

- Wide supply voltage range 3.0V to 15V
- Guaranteed noise margin 1.0V
- High noise immunity 0.45  $V_{CC}$  (typ.)
- Low power TTL compatibility fan out of 2 driving 74L

### Logic and Connection Diagrams



TOP VIEW

**Absolute Maximum Ratings** (Note 1)

Voltage at Any Pin	-0.3V to $V_{CC} + 0.3V$
Operating Temperature Range	
MM54C30	-55°C to +125°C
MM74C30	-40°C to +85°C
Storage Temperature Range	-65°C to +150°C
Package Dissipation	500 mW
Operating $V_{CC}$ Range	3.0V to 15V
Absolute Maximum $V_{CC}$	18V
Lead Temperature (Soldering, 10 seconds)	300°C

**DC Electrical Characteristics**

Min/max limits apply across temperature range unless otherwise noted.

Parameter		Conditions	Min.	Typ.	Max.	Units
<b>CMOS to CMOS</b>						
$V_{IN(1)}$	Logical "1" Input Voltage	$V_{CC} = 5.0V$ $V_{CC} = 10V$	3.5 8.0			V V
$V_{IN(0)}$	Logical "0" Input Voltage	$V_{CC} = 5.0V$ $V_{CC} = 10V$			1.5 2.0	V V
$V_{OUT(1)}$	Logical "1" Output Voltage	$V_{CC} = 5.0V, I_O = -10\mu A$ $V_{CC} = 10V, I_O = -10\mu A$	4.5 9.0			V V
$V_{OUT(0)}$	Logical "0" Output Voltage	$V_{CC} = 5.0V, I_O = +10\mu A$ $V_{CC} = 10V, I_O = +10\mu A$			0.5 1.0	V V
$I_{IN(1)}$	Logical "1" Input Current	$V_{CC} = 15V, V_{IN} = 15V$		0.005	1.0	$\mu A$
$I_{IN(0)}$	Logical "0" Input Current	$V_{CC} = 15V, V_{IN} = 0V$	-1.0	-0.005		$\mu A$
$I_{CC}$	Supply Current	$V_{CC} = 15V$		0.01	15	$\mu A$
<b>CMOS/LPTTL Interface</b>						
$V_{IN(1)}$	Logical "1" Input Voltage	54C, $V_{CC} = 4.5V$ 74C, $V_{CC} = 4.75V$	$V_{CC} - 1.5$ $V_{CC} - 1.5$			V V
$V_{IN(0)}$	Logical "0" Input Voltage	54C, $V_{CC} = 4.5V$ 74C, $V_{CC} = 4.75V$			0.8 0.8	V V
$V_{OUT(1)}$	Logical "1" Output Voltage	54C, $V_{CC} = 4.5V, I_O = -360\mu A$ 74C, $V_{CC} = 4.75V, I_O = -360\mu A$	2.4 2.4			V V
$V_{OUT(0)}$	Logical "0" Output Voltage	54C, $V_{CC} = 4.5V, I_O = 360\mu A$ 74C, $V_{CC} = 4.75V, I_O = 360\mu A$			0.4 0.4	V V
<b>Output Drive (See 54C/74C Family Characteristics Data Sheet) (short circuit current)</b>						
$I_{SOURCE}$	Output Source Current (P-Channel)	$V_{CC} = 5.0V, V_{OUT} = 0V$ $T_A = 25^\circ C$	-1.75	-3.3		mA
$I_{SOURCE}$	Output Source Current (P-Channel)	$V_{CC} = 10V, V_{OUT} = 0V$ $T_A = 25^\circ C$	-8.0	-15		mA
$I_{SINK}$	Output Sink Current (N-Channel)	$V_{CC} = 5.0V, V_{OUT} = V_{CC}$ $T_A = 25^\circ C$	1.75	3.6		mA
$I_{SINK}$	Output Sink Current (N-Channel)	$V_{CC} = 10V, V_{OUT} = V_{CC}$ $T_A = 25^\circ C$	8.0	16		mA

## AC Electrical Characteristics

$T_A = 25^\circ\text{C}$ ,  $C_L = 50\text{ pF}$ , unless otherwise specified.

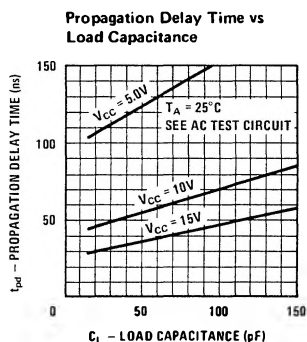
Parameter	Conditions	Min.	Typ.	Max.	Units
$t_{pd}$	Propagation Delay Time to Logical "1" or "0"		125	180	ns
			55	90	ns
$C_{IN}$	Input Capacitance (Note 2)		4.0		pF
$C_{PD}$	Power Dissipation Capacitance (Note 3) Per Gate		26		pF

**Note 1:** "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

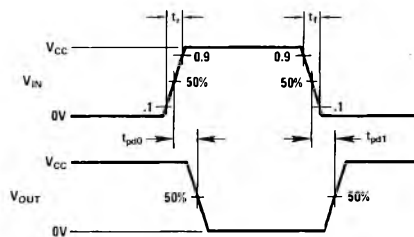
**Note 2:** Capacitance is guaranteed by periodic testing.

**Note 3:**  $C_{PD}$  determines the no load ac power consumption of any CMOS device. For complete explanation see 54C/74C Family Characteristics application note — AN-90.

## Typical Performance Characteristics



## Switching Time Waveforms



NOTE: DELAYS MEASURED WITH INPUT  $t_r$ ,  $t_f = 20\text{ ns}$ .

## AC Test Circuit

