MM54C30, MM74C30

8-Input NAND Gate

The logical 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.

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
  - Class Q Military
  - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
  - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

National Semiconductor

MM54C30/MM74C30 8-Input NAND Gate

General Description

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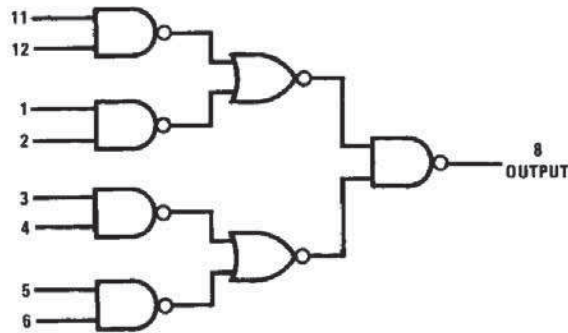
All inputs are protected from damage due to static discharge by diode clamps to V_{CC} and GND.

Features

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

Logic and Connection Diagrams

TL/F/5880–1

Dual-In-Line Package
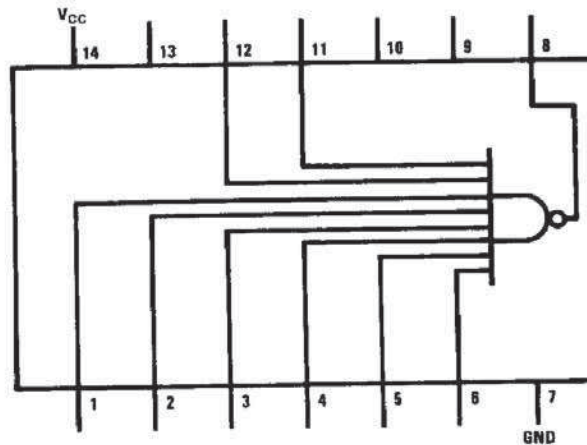
Top View

TL/F/5880–2

Order Number MM54C30* or MM74C30*

*Please look into Section 8, Appendix D for availability of various package types.

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Voltage at any Pin $-0.3V$ to $V_{CC} + 0.3V$

Operating Temperature Range (T_A)
MM54C30 $-55°C$ to $+125°C$
MM74C30 $-40°C$ to $+85°C$

Storage Temperature Range (T_S) $-65°C$ to $+150°C$

Power Dissipation (P_D)
Dual-In-Line   700 mW
Small Outline   500 mW

Operating V_{CC} Range   3.0V to 15V

Absolute Maximum V_{CC} 18V

Lead Temperature (T_L)
(Soldering, 10 seconds)   260°C

DC Electrical Characteristics Min/Max limits apply across temperature range unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
CMOS TO CMOS						
$V_{IN(1)}$	Logical "1" Input Voltage	$V_{CC} = 5V$	3.5			V
		$V_{CC} = 10V$	8.0			V
$V_{IN(0)}$	Logical "0" Input Voltage	$V_{CC} = 5V$			1.5	V
		$V_{CC} = 10V$			2.0	V
$V_{OUT(1)}$	Logical "1" Output Voltage	$V_{CC} = 5V$, $I_O = -10 \mu A$	4.5			V
		$V_{CC} = 10V$, $I_O = -10 \mu A$	9.0			V
$V_{OUT(0)}$	Logical "0" Output Voltage	$V_{CC} = 5V$, $I_O = 10 \mu A$			0.5	V
		$V_{CC} = 10V$, $I_O = 10 \mu A$			1.0	V
$I_{IN(1)}$	Logical "1" Input Current	$V_{CC} = 15V$, $V_{IN} = 15V$		0.005	1.0	μA
$I_{IN(0)}$	Logical "0" Input Current	$V_{CC} = 15V$, $V_{IN} = 0V$	-1.0	-0.005		μA
I_{CC}	Supply Current	$V_{CC} = 15V$		0.01	15	μA
CMOS/LPTTL INTERFACE						
$V_{IN(1)}$	Logical "1" Input Voltage	54C, $V_{CC} = 4.5V$	$V_{CC} - 1.5$			V
		74C, $V_{CC} = 4.75V$	$V_{CC} - 1.5$			V
$V_{IN(0)}$	Logical "0" Input Voltage	54C, $V_{CC} = 4.5V$			0.8	V
		74C, $V_{CC} = 4.75V$			0.8	V
$V_{OUT(1)}$	Logical "1" Output Voltage	54C, $V_{CC} = 4.5V$, $I_O = -360 \mu A$	2.4			V
		74C, $V_{CC} = 4.75V$, $I_O = -360 \mu A$	2.4			V
$V_{OUT(0)}$	Logical "0" Output Voltage	54C, $V_{CC} = 4.5V$, $I_O = 360 \mu A$			0.4	V
		74C, $V_{CC} = 4.75V$, $I_O = 360 \mu A$			0.4	V
OUTPUT DRIVE (See 54C/74C Family Characteristics Data Sheet) (short circuit current)						
I_{SOURCE}	Output Source Current (P-Channel)	$V_{CC} = 5V$, $V_{OUT} = 0V$ $T_A = 25°C$	-1.75	-3.3		mA
I_{SOURCE}	Output Source Current (P-Channel)	$V_{CC} = 10V$, $V_{OUT} = 0V$ $T_A = 25°C$	-8.0	-15		mA
I_{SINK}	Output Sink Current (N-Channel)	$V_{CC} = 5V$, $V_{OUT} = V_{CC}$ $T_A = 25°C$	1.75	3.6		mA
I_{SINK}	Output Sink Current (N-Channel)	$V_{CC} = 10V$, $V_{OUT} = V_{CC}$ $T_A = 25°C$	8.0	16		mA

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.

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## AC Electrical Characteristics* $T_A = 25°C$, $C_L = 50$ pF, unless otherwise specified

| Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{pd}	Propagation Delay Time to Logical "1" or "0"	$V_{CC} = 5V$		125	180	ns
		$V_{CC} = 10V$		55	90	ns
C_{IN}	Input Capacitance	(Note 2)		4.0		pF
C_{PD}	Power Dissipation Capacitance	(Note 3) Per Gate		26		pF

*AC Parameters are guaranteed by DC correlated testing.

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

Propagation Delay Time vs Load Capacitance

TL/F/5880-3
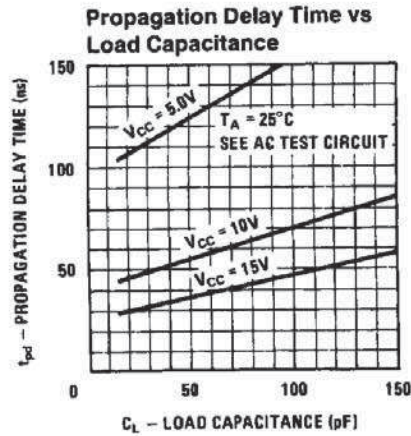
Switching Time Waveforms

TL/F/5880-4
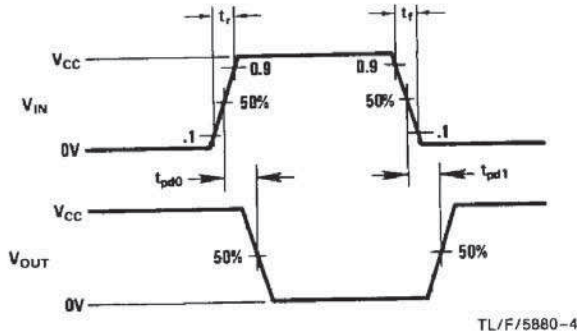
Note: Delays Measured with Input t_r, $t_f = 20$ ns.

AC Test Circuit

TL/F/5880-5