

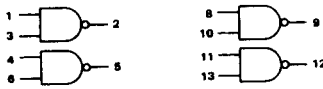
QUAD 2-INPUT  
"NAND" GATES

MECL II MC1000/1200 series

MC1048  
MC1248

Four 2-input gates designed to provide four NAND functions. The output is low if and only if the two inputs are at a high logic level.

POSITIVE LOGIC



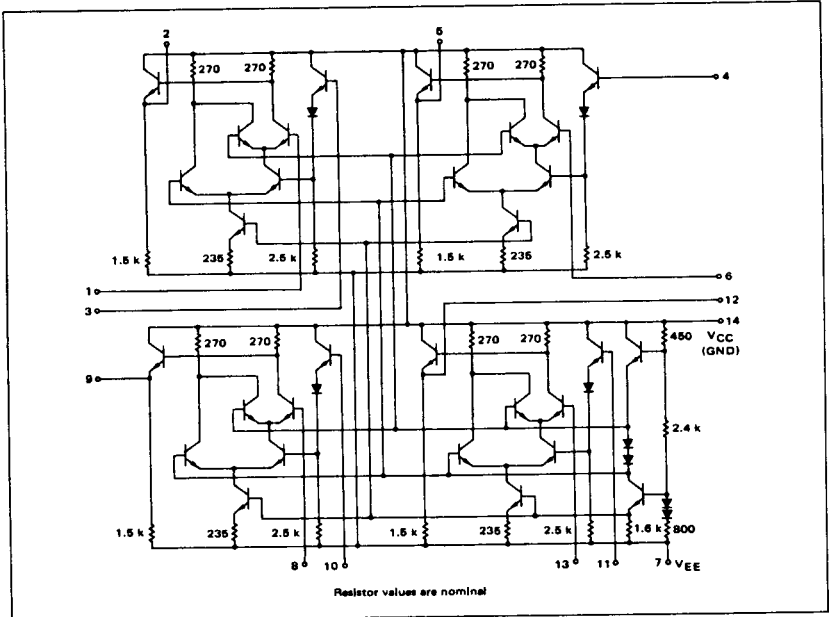
$$2 = \overline{1 \cdot 3}$$

DC Input Loading Factor: Pins 1, 6, 8, 13 = 1.5  
Pins 3, 4, 10, 11 = 1  
DC Output Loading Factor = 25  
Power Dissipation = 130 mW typical

NAND GATE  
SAMPLE TRUTH TABLE

Pin No.	Inputs		Output
	1	3	2
	0	0	1
	0	1	1
	1	0	1
	1	1	0

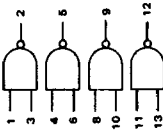
CIRCUIT SCHEMATIC



Resistor values are nominal

**ELECTRICAL CHARACTERISTICS**

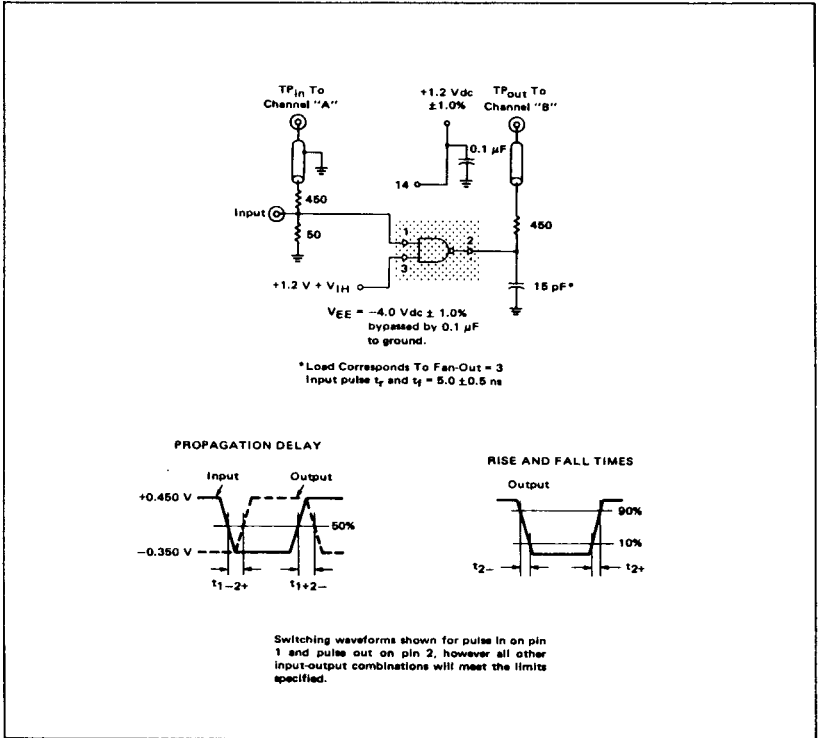
Test procedures are shown for only one gate. The other gates are tested in the same manner.



Characteristic	Symbol	Pin Under Test	MC1248 Test Limits						MC1048 Test Limits						TEST VOLTAGE/CURRENT VALUES							
			-55°C		+25°C		+125°C		0°C		+25°C		+75°C		TEST VOLTAGE/CURRENT VALUES							
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Unit	V <sub>IL</sub>	V <sub>IH</sub>	V <sub>OH</sub>	I <sub>L</sub>	I <sub>H</sub>		
Power Supply Drain Current	I <sub>E</sub>	7	-	-	-	36	-	-	-	-	-	36	-	-	mA	-	-	-	-	-		
Input Current	I <sub>in</sub>	1	-	-	-	150	-	-	-	-	-	150	-	-	μA	-	-	-	-	-		
Input Leakage Current	I <sub>R</sub>	3	-	-	-	0.2	-	1.0	-	-	-	0.2	-	1.0	μA	-	-	-	-	-		
Logical '1' Output Voltage	V <sub>OH</sub> <sup>1</sup>	2	-0.390	-0.825	-0.850	-0.700	-0.700	-0.530	Vdc	-0.895	-0.740	-0.850	-0.700	-0.715	-0.615	Vdc	1.3	-	-	2	14	
Logical '0' Output Voltage	V <sub>OL</sub>	2	-1.890	-1.580	-1.900	-1.500	-1.720	-1.380	Vdc	-1.810	-1.525	-1.800	-1.500	-1.760	-1.435	Vdc	-	1.3	-	-	-	14
Switching Times (Fan-Out = 3) Propagation Delay	t <sub>1-2</sub> t <sub>2-1</sub> t <sub>3-2</sub> t <sub>3-1</sub> t <sub>2</sub> t <sub>1</sub>	2	5.0	8.5	5.0	8.5	6.0	10	ns	5.0	8.5	5.0	8.5	6.0	9.0	ns	-	-	-	-	-	14
Rise Time	t <sub>r</sub>	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Fall Time	t <sub>f</sub>	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

<sup>1</sup>V<sub>OH</sub> limits apply from no load (0 mA) to full load (-2.5 mA)

SWITCHING TIME TEST CIRCUIT AND  
WAVEFORMS @ 25°C

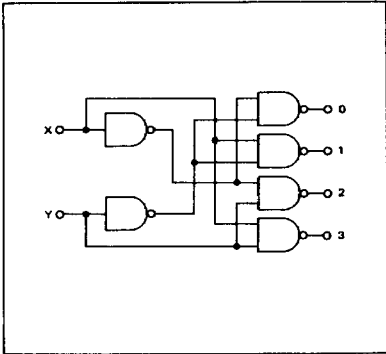


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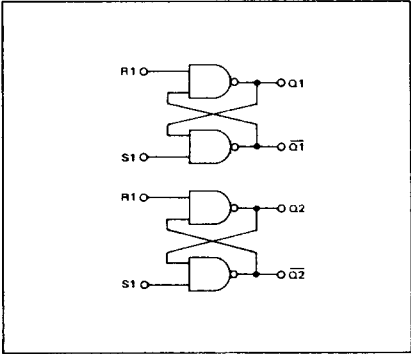
**APPLICATIONS INFORMATION**

The MC1048/1248 Quad 2-input NAND gate adds another logic function to the existing MECL II family. This gate uses series gating techniques to perform the NAND function in typically 5.0 ns. Two applications illustrating the usefulness of the NAND gate are shown below.

**BINARY TO ONE-OF-FOUR LINE DECODER**



**DUAL R-S FLIP-FLOP USING ONE MC1048/MC1248**



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