TRIPLE 3-INPUT "NAND" GATE

MC5410L *
MC7410P,L*

1/3 OF CIRCUIT SHOWN
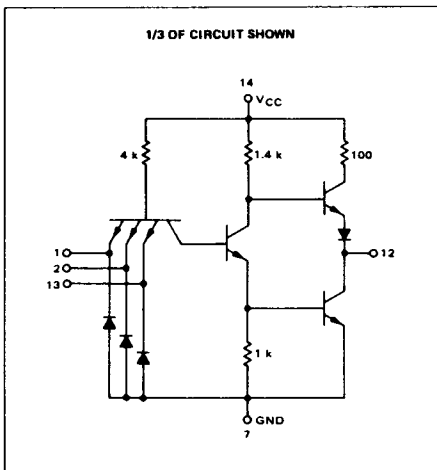
This package consists of three 3-input NAND gates. Each gate may be used as an inverter, or two gates may be cross-coupled to form bistable circuits.
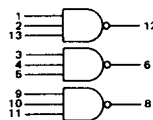
Positive Logic: $12 = \overline{1 \cdot 2 \cdot 13}$
Negative Logic: $12 = \overline{1 + 2 + 13}$
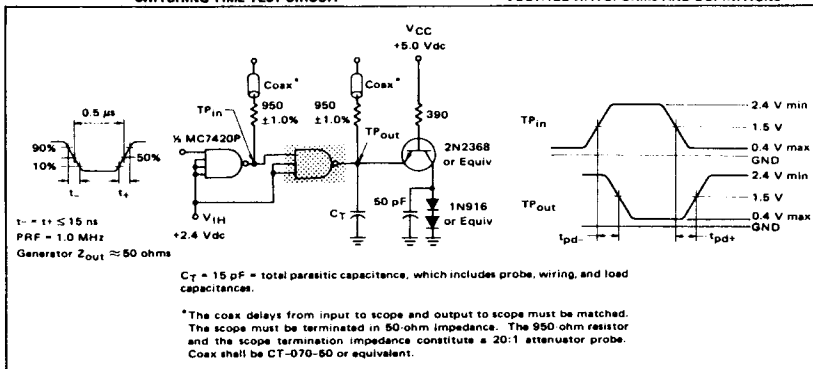
Input Loading Factor = 1
Output Loading Factor = 10

Total Power Dissipation = 30 mW typ/pkg
Propagation Delay Time = 13 ns typ

*L suffix = TO-116 ceramic package (Case 632)
P suffix = TO-116 plastic package (Case 605)
See General Information section for package outline dimensions.
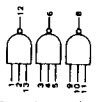
SWITCHING TIME TEST CIRCUIT

VOLTAGE WAVEFORMS AND DEFINITIONS

C_T = 15 pF = total parasitic capacitance, which includes probe, wiring, and load capacitances.

*The coax delays from input to scope and output to scope must be matched. The scope must be terminated in 50-ohm impedance. The 950-ohm resistor and the scope termination impedance constitute a 20:1 attenuator probe. Coax shall be CT-070-50 or equivalent.

375

375

MC5410L, MC7410P, L (continued)

ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one gate. The other gates are tested in the same manner. Further, test procedures are shown for only one input of the gate under test. To complete testing, sequence through remaining inputs.

Characteristic	Symbol	Pin Under Test	MC5410 Test Limits −55 to +125°C Min	Max	Unit	MC7410 Test Limits 0 to +70°C Min	Max	Unit
Input								
Forward Current	I_F	1	−	−1.6	mAdc	−	−1.6	mAdc
Leakage Current	I_{R1}	1	−	40	µAdc	−	40	µAdc
	I_{R2}	1	−	1.0	mAdc	−	1.0	mAdc
Output								
Output Voltage	V_{OL}	12	−	0.4	Vdc	−	0.4	Vdc
	V_{OH}	12	2.4	−	Vdc	2.4	−	Vdc
Short-Circuit Current	I_{SC}	12	−20	−55	mAdc	−18	−55	mAdc
Power Requirements (Total Device)								
Power Supply Drain	I_{PDH}	14	−	15.3	mAdc	−	15.3	mAdc
	I_{PDL}	14	−	5.4	mAdc	−	5.4	mAdc
Switching Parameters								
Turn-On Delay	t_{pd+}	1,12	−	15**	ns	−	15**	ns
Turn-Off Delay	t_{pd-}	1,12	−	29**	ns	−	29**	ns

TEST CURRENT/VOLTAGE VALUES (All Temperatures)

	mA		Volts											Gnd
	I_{oL}	I_{oH}	V_{IL}	V_{IH}	V_{HH}	V_{R1}	V_{R2}	V_{H1}	V_{H0}	V_{cc}	V_{CCL}	V_{CCH}		
MC5410	16	−0.4	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.5	5.5		7*
MC7410	16	−0.4	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.75	5.25		7*

TEST CURRENT/VOLTAGE APPLIED TO PINS LISTED BELOW:

Characteristic	Symbol	I_{ox}	V_{IL}	V_{IH}	V_{HH}	V_{R1}	V_{R2}	V_{H1}	V_{H0}	V_{cc}	V_{CCL}	V_{CCH}	Gnd
Forward Current	I_F	−	1	−	−	−	−	−	−	−	−	−	7*
Leakage Current	I_{R1}	−	−	1	−	2,13	−	−	−	−	−	−	2,7,13*
	I_{R2}	−	−	−	1	−	−	−	−	−	−	−	2,7,13*
Output Voltage	V_{OL}	12	−	−	−	−	−	1,2,13	−	−	14	14	7*
	V_{OH}	12	−	−	−	2,13	−	1	1	−	14	14	7*
Short-Circuit Current	I_{SC}	12	−	−	−	−	−	−	−	−	14	14	1,2,7,12,13*
Power Supply Drain	I_{PDH}	Pulse In 1	−	−	−	1,2,3,4,5, 9,10,11,13	−	−	−	14	−	−	
	I_{PDL}	Pulse Out 12	−	−	−	−	−	−	−	14	−	−	
Turn-On Delay	t_{pd+}	Pulse In 1 / Pulse Out 12	−	2,13	−	−	−	−	1	14	−	−	1,2,7,13*
Turn-Off Delay	t_{pd-}	Pulse In 1 / Pulse Out 12	−	2,13	−	−	−	−	−	14	−	−	7*

*Ground inputs to gates not under test.
**Tested only at 25°C.