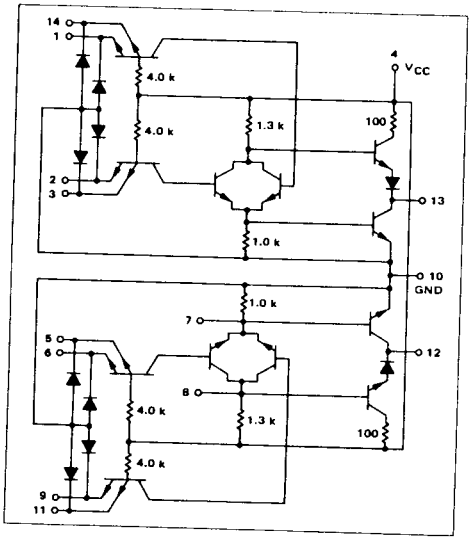
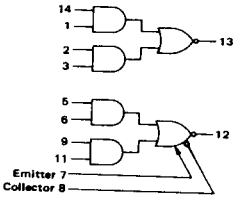
EXPANDABLE
DUAL 2-WIDE 2-INPUT
"AND-OR-INVERT" GATE

MC520 • MC570
MC420 • MC470



One side of this dual device consists of two 2-input AND gates ORed together and driving an output inverter. The other side consists of two 2-input gates ORed together and driving an output inverter with an output inverter with the ORing nodes made available for expansion. Up to 10 AND gates can be ORed together using the MC509 or MC510 expander series. Care should be taken to minimize the amount of capacitance on the expander terminals in order to maintain switching speeds.

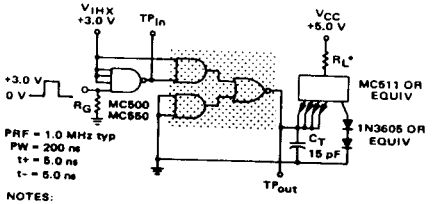


Positive Logic:
$13 = \overline{(1 \cdot 14) + (2 \cdot 3)}$
$12 = \overline{(5 \cdot 6) + (9 \cdot 11) + (\text{Expander})}$

Total Power Dissipation = 40 mW typ/pkg
Propagation Delay Time = 12 ns typ

TYPE NO.	INPUT LOADING FACTOR	(I_F)	OUTPUT DRIVE		(I_{OL})	TEMPERATURE RANGE
MC520	1	(−1.33 mA)	15	MC500 series Gates	(20 mA)	−55°C to +125°C
MC570			7	MC500 series Gates	(10 mA)	
MC420	1	(−1.66 mA)	12	MC400 series Gates	(20 mA)	0° to +75°C
MC470			6	MC400 series Gates	(10 mA)	

SWITCHING TIME TEST CIRCUIT

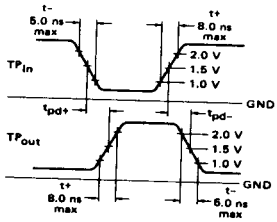


PRF = 1.0 MHz typ
PW = 200 ns
t+ = 5.0 ns
t− = 5.0 ns

NOTES:
R_G = 50 ohms
C_T = the total parasitic capacitance which includes probe, wiring, and load capacitances.
Scope rise time < 1.0 ns
Probe capacitance < 5.0 pF
When checking expander side, expander pins should be open.

*MC520 − 260 Ω
MC570 − 570 Ω
MC420 − 330 Ω
MC470 − 680 Ω

VOLTAGE WAVEFORMS AND DEFINITIONS



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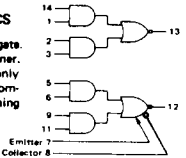
ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one gate. The other gate is 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.



@ Test Temperature		TEST CONDITIONS: I_{OL} mA	I_{OH} mA			Volts								
		Pr*	Std	Pr*	Std	I_{in}	V_{IL}	V_{IH}	V_R	V_{th1}	V_{th0}	V_{out}	V_{CC}	V_{CCH}	V_{IHX}
MC520*, MC570	−55°C	20	10	-1.5	-0.7	1.0	0.45	2.8	4.5	2.0	1.0	5.5	5.0	-	-
	+25°C	20	10	-1.5	-0.7	1.0	0.45	2.8	4.5	1.7	1.2	5.5	5.0	8.0	3.0
	+125°C	20	10	-1.5	-0.7	1.0	0.45	2.8	4.5	1.4	0.9	5.5	5.0	-	-
MC420*, MC470	0°C	20	10	-1.2	-0.6	1.0	0.45	3.0	4.5	1.9	1.1	5.5	5.0	-	-
	+25°C	20	10	-1.2	-0.6	1.0	0.45	3.0	4.5	1.8	1.2	5.5	5.0	7.0	3.0
	+75°C	20	10	-1.2	-0.6	1.0	0.45	3.0	4.5	1.7	1.1	5.5	5.0	-	-

Characteristic	Symbol	Pin Under Test	MC520, MC570 Test Limits −55°C Min	−55°C Max	+25°C Min	+25°C Max	+125°C Min	+125°C Max	MC420, MC470 Test Limits 0°C Min	0°C Max	+25°C Min	+25°C Max	+75°C Min	+75°C Max	Unit	TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW: I_{OL}	I_{OH}	I_{in}	V_{IL}	V_{IH}	V_R	V_{th1}	V_{th0}	V_{out}	V_{CC}	V_{CCH}	V_{IHX}	Gnd†
Input																											
Forward Current	I_F	1	-	-1.33	-	-1.33	-	-1.33	-	-1.66	-	-1.66	-	-1.66	mAdc	-	-	-	-	-	14	-	-	-	4	-	-	1,2,3,10
Leakage Current	I_R	1	-	100	-	100	-	100	-	100	-	100	-	100	μAdc	-	-	-	-	-	1	-	-	-	4	-	-	2,3,10,14
Inverse Beta Current	I_L	1	-	100	-	100	-	100	-	100	-	100	-	100	μAdc	-	-	-	-	-	1	-	-	-	4	-	-	2,3,10
Breakdown Voltage	BV_{in} "0"	1	5.5	-	5.5	-	5.5	-	5.5	-	5.5	-	5.5	-	Vdc	-	-	1	-	-	-	-	-	-	4	-	-	2,3,10
	BV_{in} "1"	1	5.5	-	5.5	-	5.5	-	5.5	-	5.5	-	5.5	-	Vdc	-	-	1	-	-	-	-	-	-	4	-	-	2,3,10,14
Output																											
Output Voltage	V_{out} "0"	13	-	0.45	-	0.45	-	0.45	-	0.45	-	0.45	-	0.45	Vdc	13	-	-	-	-	-	1	-	-	4	-	-	2,3,10
	V_{out} "1"	13	2.5	-	2.4	-	2.7	-	2.5	-	2.4	-	2.5	-	Vdc	-	13	-	-	-	-	-	1	-	4	-	-	2,3,10
Leakage Current	I_{OLK}	13	-	250	-	250	-	250	-	250	-	250	-	250	μAdc	-	-	-	-	-	-	-	-	13	4	-	-	1,2,3,10,14
Short-Circuit Current	I_{SC}	13	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	mAdc	-	-	-	-	-	-	-	-	-	4	-	-	1,2,3,10,13,14
Output Voltage	V_{OL}	13	-	0.40	-	0.40	-	0.45	-	0.40	-	0.40	-	0.45	Vdc	13	-	-	-	1	-	-	-	-	4	-	-	2,3,10
	V_{OH}	13	2.6	-	3.2	-	3.35	-	3.0	-	3.1	-	3.15	-	Vdc	-	13	-	1	-	-	-	-	-	4	-	-	2,3,10
Power Requirements (Total Device)																											
Maximum Power Supply Current	I_{max}	4	-	-	-	10	-	-	-	-	-	10	-	-	mAdc	-	-	-	-	-	-	-	-	-	-	4	-	1,2,3,10,14
Power Supply Drain	I_{PDH}	4	-	14	-	14	-	14	-	18	-	18	-	18	mAdc	-	-	-	-	-	-	-	-	-	4	-	-	10†
	I_{PDL}	4	-	7.0	-	7.0	-	7.0	-	8.0	-	8.0	-	8.0	mAdc	-	-	-	-	-	-	-	-	-	4	-	-	1,2,3,10,14
Switching Parameters																Pulse In	Pulse Out										
Turn-On Delay	t_{pd-}	1,13	-	-	-	22	-	-	-	-	-	22	-	-	ns	1	13	-	-	-	-	-	-	-	4	-	14	2,3,10
Turn-Off Delay	t_{pd-}	1,13	-	-	-	22	-	-	-	-	-	22	-	-	ns	1	13	-	-	-	-	-	-	-	4	-	14	2,3,10
Rise Time	t_-	1,13	-	-	-	8.0	-	-	-	-	-	8.0	-	-	ns	1	13	-	-	-	-	-	-	-	4	-	14	2,3,10
Fall Time	t_-	1,13	-	-	-	6.0	-	-	-	-	-	6.0	-	-	ns	1	13	-	-	-	-	-	-	-	4	-	14	2,3,10

* Prime Fan-Out

† Ground inputs to gates not under test during ALL tests unless otherwise noted.

‡ The inputs to all gates must be ungrounded.