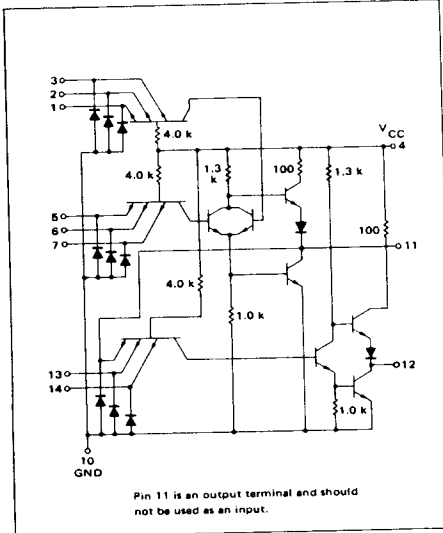


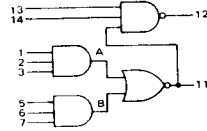
2-WIDE 3-INPUT
"AND-OR-INVERT" GATE
WITH GATED COMPLEMENT

MTTL I MC500/400 series

MC503 · MC553
MC403 · MC453



This device is the only gate of the basic positive AND-OR-INVERT series that includes an additional 3-input AND-INVERT function on the output. This configuration provides the output and a gated complement in a single package. This device is useful in the design of adders, subtractors and one-shot multivibrators.



Positive Logic

$$11 = (1 \cdot 2 \cdot 3) + (5 \cdot 6 \cdot 7)$$

$$12 = 11 \cdot 13 \cdot 14$$

$$12 = (1 \cdot 2 \cdot 3) + (5 \cdot 6 \cdot 7) + \bar{13} + \bar{14}$$

Total Power Dissipation - 35 mW typ/pkg

Propagation Delay Times - 11 ns typ (Pin 1 to Pin 11)
10 ns typ (Pin 11 to Pin 12)

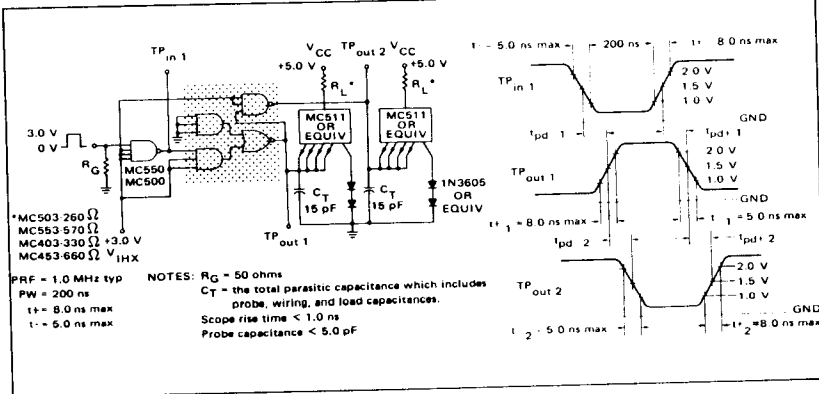
TRUTH TABLE

A	B	OUTPUT PIN # 11	PIN # 13	PIN # 14	OUTPUT PIN # 12
0	1	0	0	0	1
1	0	0	0	1	1
0	1	0	1	0	1
1	0	0	1	1	1
0	0	1	0	0	1
0	0	1	0	1	1
0	0	1	1	0	1
0	0	1	1	1	0

TYPE NO	INPUT LOADING FACTOR (I _I)	OUTPUT DRIVE (I _{OL})	TEMPERATURE RANGE
MC503 MC553	1 (-1.33 mA)	15 MC500 Series Gates (20 mA) 7 MC500 Series Gates (10 mA)	-55°C to +125°C
MC403 MC453	1 (-1.66 mA)	12 MC400 Series Gates (20 mA) 6 MC400 Series Gates (10 mA)	0°C to +75°C

SWITCHING TIME TEST CIRCUIT

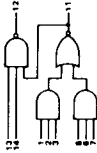
VOLTAGE WAVEFORMS AND DEFINITIONS



MC503, MC553/MC403, MC453 (continued)

ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one input of the AND-OR-INVERT gate, plus one input of the gated complement. To complete testing, sequence through remaining inputs in the same manner.



Characteristic	Symbol	Pin Under Test	TEST CONDITIONS										mA	Volts										mA	V _{OH}	V _{OL}	V _{CC}	V _{CEX}	V _{max}	V _{max}						
			-55°C		+25°C		+125°C		0°C		+75°C			I _{CC}	I _{OH}	I _{OL}	V _{IL}	V _{IH}	V _{OL}	V _{OH}	V _{IL}	V _{IH}	V _{OL}								V _{IH}	V _{OL}	V _{CEX}	V _{max}	V _{max}	V _{max}
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max																								
Input Forward Current	I _F	1	-1.33	-1.33	-1.33	-1.33	-1.66	-1.66	-1.66	-1.66	-1.66	-1.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		14	-1.33	-1.33	-1.33	-1.33	-1.66	-1.66	-1.66	-1.66	-1.66	-1.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Leakage Current	I _R	1	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	
		14	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	
Inverse Beta Current	I _L	1	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	
		14	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	100	-	
Breakdown Voltage	BV _{in '0'}	1	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5			
		14	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5		
Output Output Voltage	V _{out '0'}	11	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45			
		12	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45		
Leakage Current	I _{OLK}	11	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5			
		12	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5	2.4	2.7	2.5			
Short-Circuit Current	I _{SC}	11	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10			
		12	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10	-45	-10			
Output Voltage	V _{OH}	11	2.8	3.2	3.35	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15				
		12	2.8	3.2	3.35	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15	3.0	3.1	3.15				
Output Voltage	V _{OL}	11	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45				
		12	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45	0.40	0.40	0.45				

TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW:

ELECTRICAL CHARACTERISTICS (continued)

Characteristic		mA		TEST CONDITIONS																Unit			
		I_{OX}	I_{OY}	Volts																			
Symbol	Pin	Test		Temperature				V_{in}	V_{th}	V_{E}	V_{B}	V_{H}	V_{L}	I_{in}	V_{in1}	V_{in0}	V_{swt1}	V_{swt0}	V_{CC}	V_{CCH}	V_{max}		
		Under	Over	-55°C	+25°C	+125°C	+75°C	MC503, MC553	MC403, MC453	MC503 ^a , MC553	MC403 ^a , MC453	MC503 ^a , MC553	MC403 ^a , MC453	MC503 ^a , MC553	MC403 ^a , MC453	MC503 ^a , MC553	MC403 ^a , MC453	MC503 ^a , MC553	MC403 ^a , MC453	MC503 ^a , MC553	MC403 ^a , MC453		
Power Requirements (Total Device) Maximum Power Supply Current Power Supply Drain	I_{max}		4	-	34	-	34	-	24	-	24	-	24	-	24	-	24	-	4	-	4	-	1.2, 5.6, 7.10, 13.14
	I_{PDH}		4	-	10	-	10	-	12	-	12	-	12	-	12	-	12	-	4	-	4	-	10
Switching Parameters Turn-On Delay	t_{pd-1}		1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2, 3.8, 6, 1.2, 3.8, 6, 1.2, 3.8
	t_{pd-2}		11, 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.10, 13.14
Turn-Off Delay	t_{pd-1}		1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2, 3.8, 6, 1.2, 3.8, 6, 1.2, 3.8
	t_{pd-2}		11, 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.10, 13.14
Rise Time	t_r-1		1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3, 5.6, 7.10, 13.14
	t_r-2		11, 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3, 5.6, 7.10, 13.14
Fall Time	t_f-1		1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3, 5.6, 7.10, 13.14
	t_f-2		11, 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3, 5.6, 7.10, 13.14

^a Pulse: Fair-Out