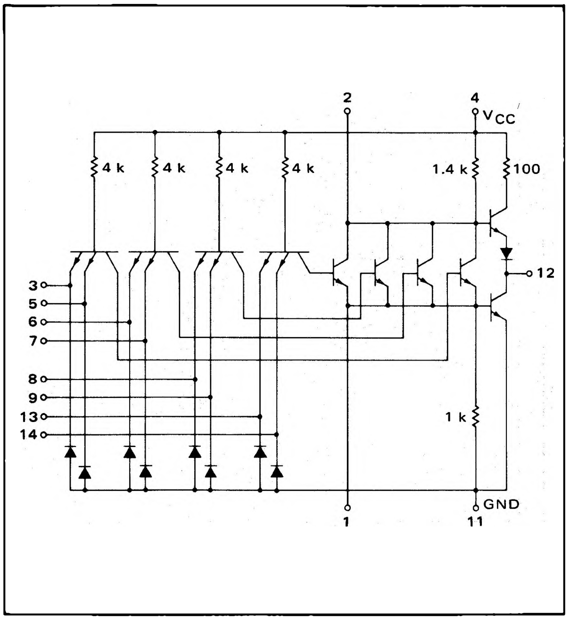
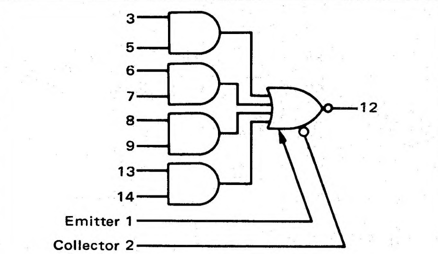
EXPANDABLE 4-WIDE 2-INPUT "AND-OR-INVERT" GATE

MCBC5453*
MCB5453F*



This device consists of four 2-input AND gates ORed together and inverted. Up to four MCB5460 expander gates may be ORed with the device at the expander points. Beam lead sealed junction technology is used to manufacture these devices. They are particularly useful in highly reliable systems using hybrid beam lead assembly techniques or standard flat package assembly techniques.



Positive Logic:

$$12 = \overline{(3 \bullet 5) + (6 \bullet 7) + (8 \bullet 9) + (13 \bullet 14) + (\text{Expanders})}$$

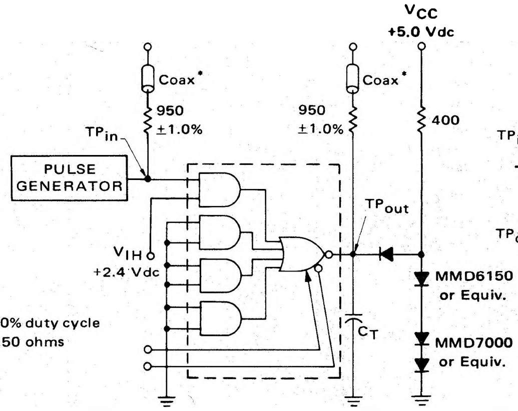
Negative Logic:

$$12 = \overline{(3 + 5) \bullet (6 + 7) \bullet (8 + 9) \bullet (13 + 14) \bullet (\text{Expanders})}$$

Input Loading Factor = 1
Output Loading Factor = 10

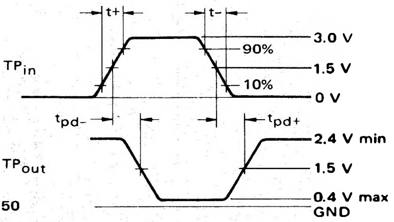
Total Power Dissipation = 22 mW typ/pkg
Propagation Delay Time = 13 ns typ

SWITCHING TIME TEST CIRCUIT



t+ = 12 ns
t− = 6.0 ns
PRF = 1.0 MHz, 50% duty cycle
Generator $Z_{out} \approx 50$ ohms

VOLTAGE WAVEFORMS AND DEFINITIONS



Expander pins should be left open when measuring switching times.

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.

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*F suffix = 1/4" x 1/4" ceramic package (Case 651). MCBC-prefixed devices are unencapsulated. Beam numbers are the same as the pin numbers for flat-packaged devices. See General Information section for package and chip details.

FIGURE 1 – I_{EX} TEST CIRCUIT

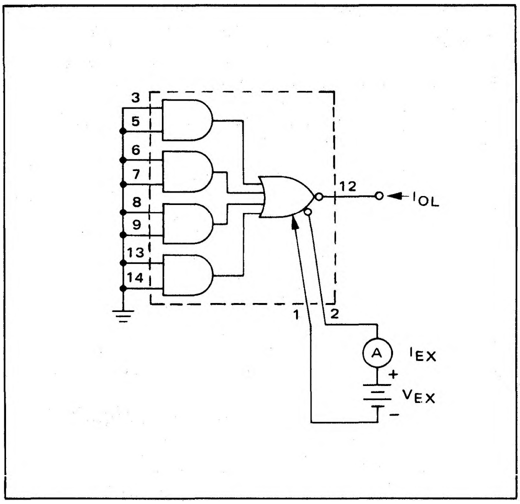


FIGURE 2 – V_{BE} TEST CIRCUIT

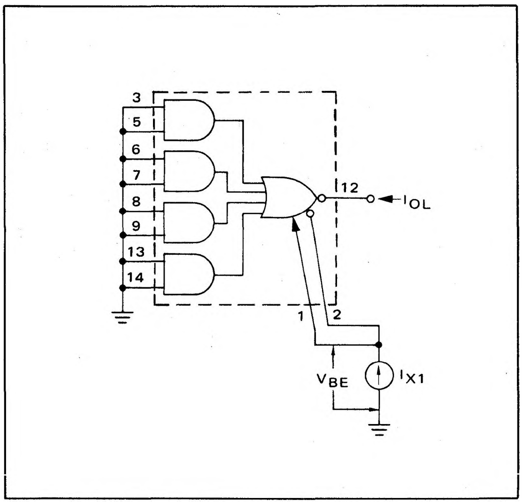
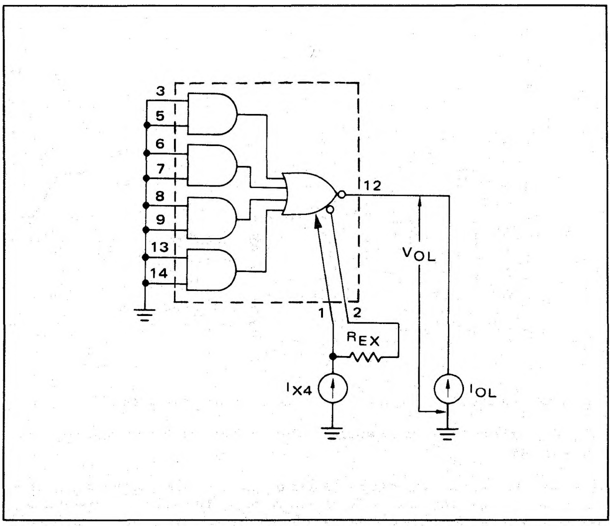
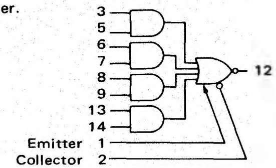


FIGURE 3 – V_{OL} TEST CIRCUIT



ELECTRICAL CHARACTERISTICS

Test procedures are shown for one input of the device. To complete testing, sequence through remaining inputs in a similar manner.



						TEST CURRENT/VOLTAGE VALUES (All Temperatures)																		
						mA						Ohms	Volts											
						I_{OL}	I_{OH}	I_{X1}	I_{X2}	I_{X3}	I_{X4}	R_{EX}③	V_{EX}①	V_{IL}	V_{IH}	V_{IHH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}	
						16	-0.4	0.41	0.27	-0.27	0.3	138	0.4	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.5	5.5	
		Pin Under Test	Test Limits MCBC5453/MCB5453F −55 to +125°C			TEST CURRENT/VOLTAGE APPLIED TO PINS LISTED BELOW:																		
Characteristic	Symbol		Min	Max	Unit	I_{OL}	I_{OH}	I_{X1}	I_{X2}	I_{X3}	I_{X4}	R_{EX}③	V_{EX}①	V_{IL}	V_{IH}	V_{IHH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}	Gnd
Input Forward Current	I_F	3	-	-1.6	mAdc	-	-	-	-	-	-	-	-	3	-	-	5	-	-	-	-	-	4	11
Leakage Current	I_{R1}	3	-	40	µAdc	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	4	3,6,7,8,9, 11,13,14
	I_{R2}	3	-	1.0	mAdc	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	4	3,6,7,8,9, 11,13,14
Expander Input Current	I_{EX}	2 ①	-	-2.9	mAdc	12	-	-	-	-	-	-	1,2	-	-	-	-	-	-	-	-	4	-	3,5,6,7,8,9, 11,13,14
Base-Emitter Voltage	V_{BE}	1 ②	-	1.0	Vdc	12	-	1,2	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	3,5,6,7,8,9, 11,13,14
Output Output Voltage	V_{OL}	12	-	0.4	Vdc	12	-	-	-	-	-	-	-	-	-	-	-	-	3,5	-	-	4	-	6,7,8,9, 11,13,14
		12③	-	0.4	Vdc	12	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	4	-	3,5,6,7,8,9, 11,13,14
	V_{OH}	12	2.4	-	Vdc	-	12	-	-	-	-	-	-	-	-	-	3,7, 9,14	-	-	5,6,8, 13	-	4	-	11
		12	2.4	-	Vdc	-	12	-	1	2	-	-	-	-	-	-	-	-	-	-	-	4	-	3,5,6,7,8,9, 11,13,14
Short-Circuit Current	I_{SC}	12	-20	-55	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3,5,6,7,8,9,11, 12,13,14
Power Requirements Power Supply Drain	I_{PDH}	4	-	9.5	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	3,5,6,7,8, 9,13,14	-	-	-	-	4	11
	I_{PDL}	4	-	8.0	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3,5,6,7,8,9, 11,13,14
Switching Parameters						Pulse In	Pulse Out																	
Turn-On Delay	t_{pd-}	3,12	-	15**	ns	3	12	-	-	-	-	-	-	-	5	-	-	-	-	-	4	-	-	6,7,8,9, 11,13,14
Turn-Off Delay	t_{pd+}	3,12	-	22**	ns	3	12	-	-	-	-	-	-	-	5	-	-	-	-	-	4	-	-	6,7,8,9, 11,13,14

** Tested only at 25°C.

① See Figure 1.

② See Figure 2.

③ See Figure 3.