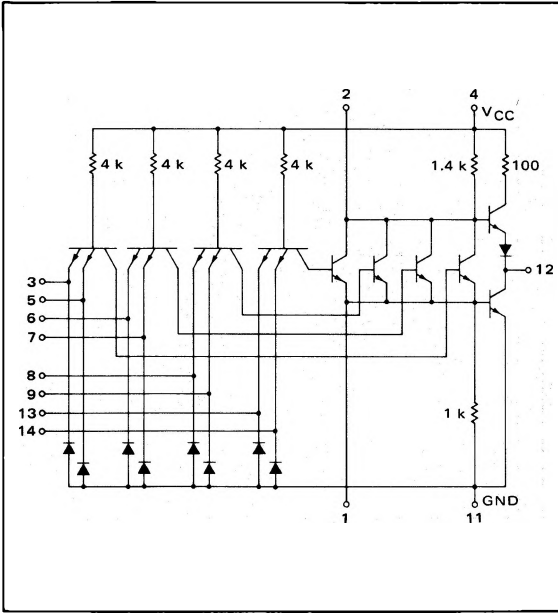


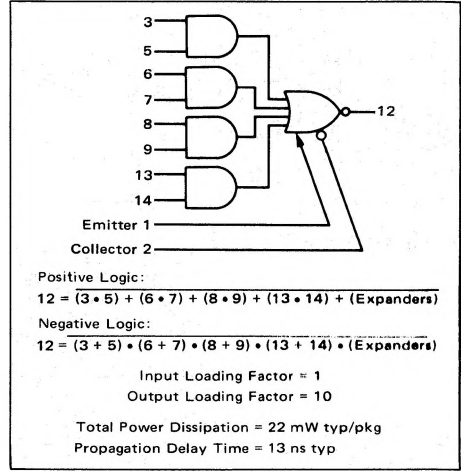
**EXPANDABLE 4-WIDE 2-INPUT  
"AND-OR-INVERT" GATE**

**MCBC5400/MCB5400F series**

**MCBC5453\*  
MCB5453F\***

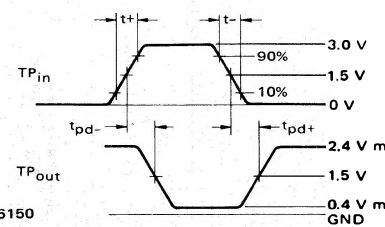
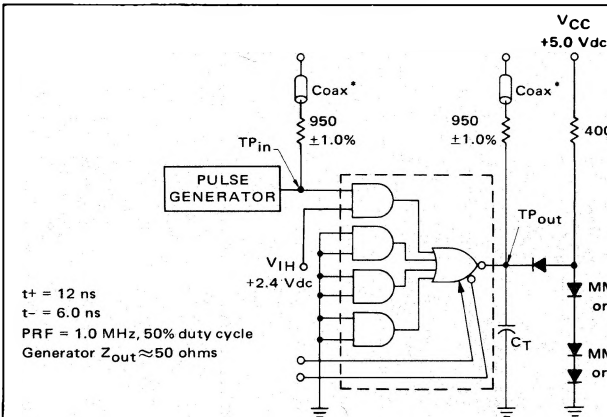


This device consists of four 2-input AND gates ORed together and inverted. Up to four MCB5460 expander gates may be ORed with the device at the expander points. Beam lead sealed junction technology is used to manufacture these devices. They are particularly useful in highly reliable systems using hybrid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



**SWITCHING TIME TEST CIRCUIT**

**VOLTAGE WAVEFORMS AND DEFINITIONS**



Expander pins should be left open when measuring switching times.

$C_T = 15 \text{ pF}$  = 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.

\* 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

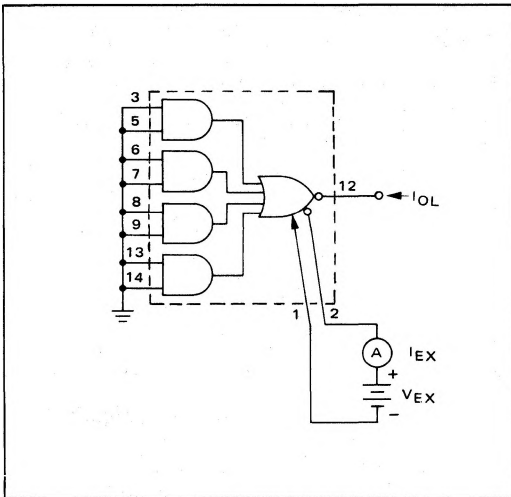


FIGURE 2 -  $V_{BE}$  TEST CIRCUIT

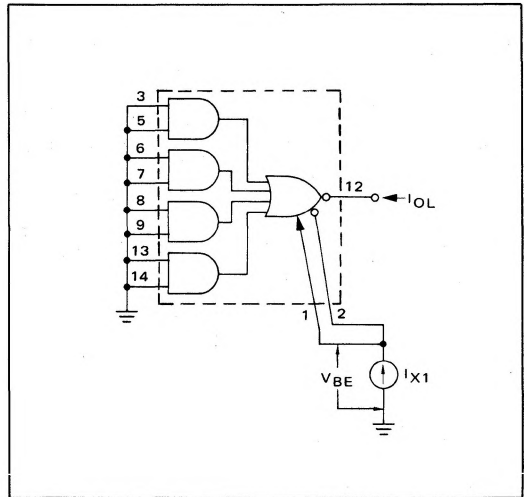
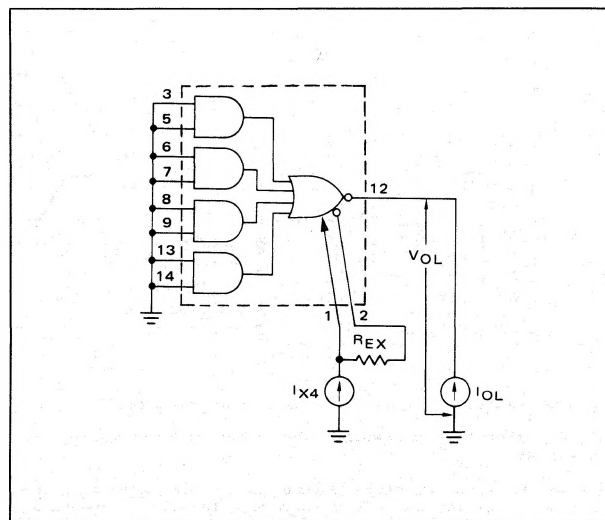


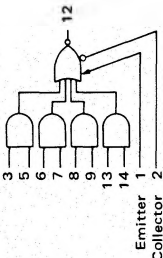
FIGURE 3 -  $V_{OL}$  TEST CIRCUIT



# MCBC5453, MCB5453F (continued)

## ELECTRICAL CHARACTERISTICS

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



Characteristic	Symbol	Pin Under Test	Test Limits -55 to +125°C		TEST CURRENT/VOLTAGE VALUES (All Temperatures)																		
			Min	Max	mA							Volts											
			Min	Max	$I_{X1}$	$I_{X2}$	$I_{X3}$	$I_{X4}$	$R_{EX}$ ③	$V_{EX}$ ①	$V_{IL}$	$V_{IH}$	$V_{HH}$	$V_{R1}$	$V_{R2}$	$V_{th1}$	$V_{th0}$	$V_{CC}$	$V_{CCH}$				
Input					$I_{OH}$	$I_{OL}$	$I_{X1}$	$I_{X2}$	$I_{X3}$	$I_{X4}$	$R_{EX}$ ③	$V_{EX}$ ①	$V_{IL}$	$V_{IH}$	$V_{HH}$	$V_{R1}$	$V_{R2}$	$V_{th1}$	$V_{th0}$	$V_{CC}$	$V_{CCH}$		
Forward Current	$I_F$	3	-	-1.6	mAdc	-	-	-	-	-	-	3	-	-	-	5	-	-	-	-	4	11	
Leakage Current	$I_{R1}$	3	-	40	$\mu$ Adc	-	-	-	-	-	-	-	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	-	-	-	-	-	1.2	-	-	-	-	-	-	-	-	-	4	3,5,6,7,8,9,11,13,14
Base-Emitter Voltage	$V_{BE}$	1 ②	-	1.0	Vdc	12	12	1.2	-	-	-	-	-	-	-	-	-	-	-	-	4	3,5,6,7,8,9,11,13,14	
Output	Output Voltage	$V_{OL}$	12	-	0.4	Vdc	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6,7,8,9,11,13,14
		$V_{OH}$	12	2.4	-	Vdc	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3,5,6,7,8,9,11,13,14
	Short-Circuit Current	$I_{SC}$	12	-20	-55	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3,5,6,7,8,9,11,13,14
Power Requirements	Power Supply Drain	$I_{PDH}$	4	-	9.5	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	11
	$I_{PDL}$	4	-	8.0	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3,5,6,7,8,9,11,13,14
Switching Parameters	Turn-On Delay	$t_{pd-}$	3,12	-	15**	ns	3	12	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6,7,8,9,11,13,14
		$t_{pd+}$	3,12	-	22**	ns	3	12	-	-	-	-	-	-	-	-	-	-	-	-	-	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.