

10110B,F: -30 to +85°C

DIGITAL 10,000 SERIES ECL

## DESCRIPTION

The 10110 is a dual high speed 3-input 3-output OR gate. The 10110 is designed to drive up to three transmission lines simultaneously. The multiple outputs of this device also allow the wire-"OR"-ing of several levels of gating for minimization of gate and package count.

The ability to control three parallel lines from a single point makes the 10110 particularly useful in clock distribution applications where minimum clock skew is desired.

## FEATURES

- FAST PROPAGATION DELAY = 2.4 ns TYP (ALL OUTPUTS LOADED)
- POWER DISSIPATION = 150 mW/PACKAGE TYP (NO LOAD)
- VERY HIGH FANOUT CAPABILITY  
- CAN DRIVE SIX 50 Ω LINES
- HIGH Z INPUTS - INTERNAL 50 kΩ PULLDOWNS
- HIGH IMMUNITY FROM POWER SUPPLY VARIATIONS:  $V_{EE} = -5.2 \text{ V} \pm 5\%$  RECOMMENDED
- OPEN EMITTERS FOR BUSSING AND LOGIC CAPABILITY

## TEMPERATURE RANGE

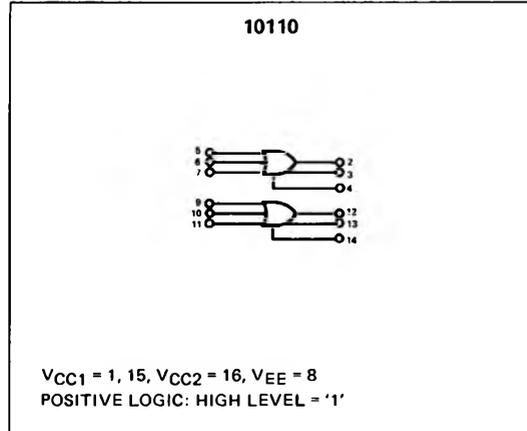
- -30 to +85°C Operating Ambient

## PACKAGE TYPE

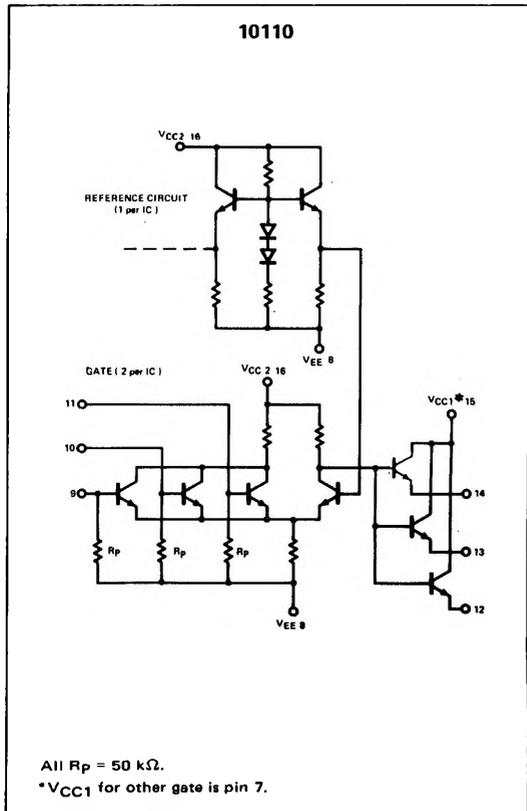
- B: 16-Pin Silicone DIP
- F: 16-Pin Cerdip

5-38

## LOGIC DIAGRAM



## CIRCUIT SCHEMATIC

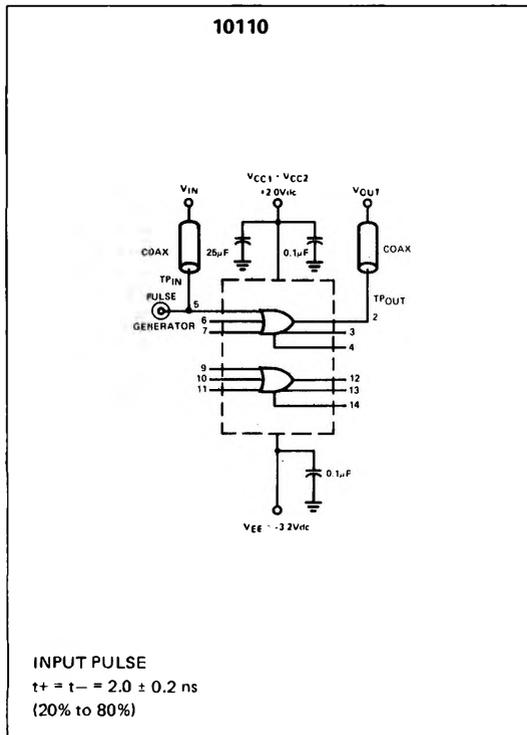


**ELECTRICAL CHARACTERISTICS**  
(At Listed Voltages and Ambient Temperatures).

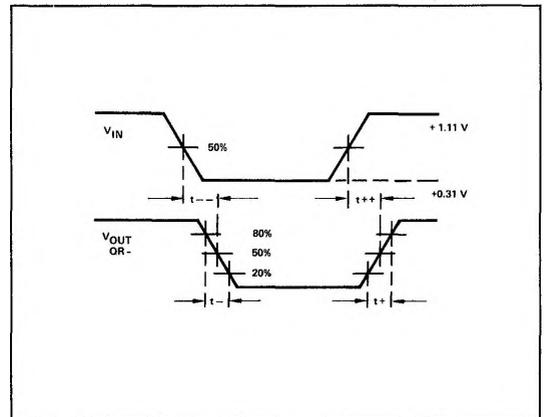
Characteristic	Symbol	Pin Under Test	10110 Test Limits						Unit	TEST VOLTAGE APPLIED TO PINS LISTED BELOW:					(V <sub>CC</sub> ) Gnd																				
			-30°C		+25°C		+85°C			TEST VOLTAGE VALUES (Volts)																									
			Min	Max	Min	Typ	Max	Min		Max	V <sub>IH</sub> max	V <sub>IL</sub> min	V <sub>IHA</sub> min	V <sub>IHA</sub> max		V <sub>EE</sub>																			
			<table border="1"> <tr> <th>Temperature</th> <th>V<sub>IH</sub> max</th> <th>V<sub>IL</sub> min</th> <th>V<sub>IHA</sub> min</th> <th>V<sub>IHA</sub> max</th> <th>V<sub>EE</sub></th> </tr> <tr> <td>-30°C</td> <td>-0.890</td> <td>-1.890</td> <td>-1.205</td> <td>-1.500</td> <td>-5.2</td> </tr> <tr> <td>+25°C</td> <td>-0.810</td> <td>-1.850</td> <td>-1.105</td> <td>-1.475</td> <td>-5.2</td> </tr> <tr> <td>+85°C</td> <td>-0.700</td> <td>-1.825</td> <td>-1.035</td> <td>-1.440</td> <td>-5.2</td> </tr> </table>													Temperature	V <sub>IH</sub> max	V <sub>IL</sub> min	V <sub>IHA</sub> min	V <sub>IHA</sub> max	V <sub>EE</sub>	-30°C	-0.890	-1.890	-1.205	-1.500	-5.2	+25°C	-0.810	-1.850	-1.105	-1.475	-5.2	+85°C	-0.700
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Power Supply Drain Current	I <sub>E</sub>	8	—	—	—	—	38	—	—	—	—	—	—	—	8	1,15,16																			
Input Current	I <sub>inH</sub>	5,6,7	—	—	—	—	435	—	—	—	—	—	—	—	8	1,15,16																			
	I <sub>inL</sub>	5,6,7	—	—	0.5	—	—	—	—	—	—	—	—	—	8	1,15,16																			
Logic "1" Output Voltage	V <sub>O<sub>H</sub></sub>	2	-1.080	-0.890	-0.960	—	-0.810	-0.890	-0.700	V <sub>cc</sub>	5	—	—	—	8	1,15,16																			
		3	-1.060	-0.890	-0.980	—	-0.810	-0.890	-0.700	V <sub>cc</sub>	6	—	—	—	8	1,15,16																			
		4	-1.060	-0.890	-0.960	—	-0.810	-0.890	0.700	V <sub>cc</sub>	7	—	—	—	8	1,15,16																			
Logic "0" Output Voltage	V <sub>O<sub>L</sub></sub>	2	-1.890	-1.675	-1.850	—	-1.650	-1.825	-1.615	V <sub>dc</sub>	—	5	—	—	8	1,15,16																			
		3	-1.890	-1.675	-1.850	—	-1.650	-1.825	-1.615	V <sub>dc</sub>	—	6	—	—	8	1,15,16																			
		4	-1.890	-1.675	-1.850	—	-1.650	-1.825	-1.615	V <sub>dc</sub>	—	7	—	—	8	1,15,16																			
Logic "1" Threshold Voltage	V <sub>O<sub>HA</sub></sub>	2	-1.080	—	0.980	—	—	-0.910	—	V <sub>dc</sub>	—	—	5	—	8	1,15,16																			
		3	-1.080	—	0.980	—	—	-0.910	—	V <sub>dc</sub>	—	—	6	—	8	1,15,16																			
		4	-1.080	—	0.980	—	—	-0.910	—	V <sub>dc</sub>	—	—	7	—	8	1,15,16																			
Logic "0" Threshold Voltage	V <sub>O<sub>LA</sub></sub>	2	—	-1.655	—	—	-1.630	—	-1.595	V <sub>dc</sub>	—	—	—	5	8	1,15,16																			
		3	—	-1.655	—	—	-1.630	—	-1.595	V <sub>dc</sub>	—	—	—	6	8	1,15,16																			
		4	—	-1.655	—	—	-1.630	—	-1.595	V <sub>dc</sub>	—	—	—	7	8	1,15,16																			
Switching Times ** (50-ohm load)											Pulse In	Pulse Out	-3.2 V	+2.0 V																					
Propagation Delay	15+ 2+	2	1.4	3.5	1.4	2.4	3.5	1.5	3.8	ns	—	—	5	2	8	1,15,16																			
	15- 2-	2	—	—	—	—	—	—	—	—	—	—	2	2	—	—																			
	15+ 3+	3	—	—	—	—	—	—	—	—	—	—	3	3	—	—																			
	15- 3-	3	—	—	—	—	—	—	—	—	—	—	3	3	—	—																			
	15+ 4+	4	—	—	—	—	—	—	—	—	—	—	4	4	—	—																			
Rise Time (20% to 80%)	12+	2	1.0	—	1.1	2.2	—	1.2	—	—	—	—	—	2	—	—																			
	13+	3	—	—	—	—	—	—	—	—	—	—	—	3	—	—																			
	14+	4	—	—	—	—	—	—	—	—	—	—	—	4	—	—																			
	12-	2	—	—	—	—	—	—	—	—	—	—	—	2	—	—																			
Fall Time (20% to 80%)	13-	3	—	—	—	—	—	—	—	—	—	—	—	3	—	—																			
	14-	4	—	—	—	—	—	—	—	—	—	—	—	4	—	—																			

\* Individually test each input using the pin connections shown.  
\*\* Unused outputs connected to a 50-ohm resistor to ground.

**SWITCHING TIME TEST CIRCUIT**



**PROPAGATION DELAY WAVEFORMS @ 25°C**



**NOTES:**

- Each ECL 10,000 series device has been designed to meet the DC specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Voltage levels will shift approximately 5 mV with an air flow of 200 linear fpm. Outputs are terminated through a 50-ohm resistor to 2.0 volts.
- For AC tests, all input and output cables to the scope are equal lengths of 50-ohm coaxial cable. Wire length should be < 1/4 inch from TP<sub>in</sub> to input pin and TP<sub>out</sub> to output pin. A 50-ohm termination to ground is located in each scope input. Unused outputs are connected to a 50-ohm resistor to ground.
- Test procedures are shown for only one input or set of input conditions. Other inputs are tested in the same manner.
- All voltage measurements are referenced to the ground terminal. Terminals not specifically referenced are left electrically open.