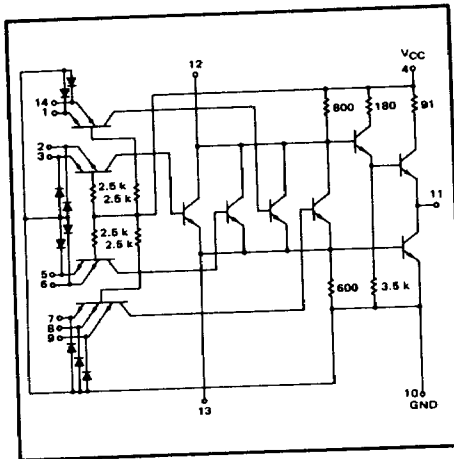


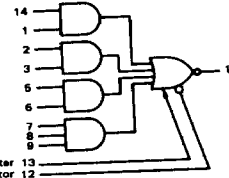
EXPANDABLE  
4-WIDE 2-2-2-3 INPUT  
"AND-OR-INVERT" GATE

MTTL II MC2100/2000 series

MC2104 · MC2154  
MC2004 · MC2054



This device consists of three 2-input and one 3-input AND gates ORed together and driving an output inverter. The ORing nodes are made available for expansion, and up to 10 AND gates can be ORed together using the MC2102 or the MC2106 series expanders. Since switching speed is affected by the amount of capacitance on the expander nodes, care should be taken to minimize this capacitance to maintain switching speeds.



Emitter 13  
Collector 12

Positive Logic:  
 $11 = (14 + 1) + (2 + 3) + (5 + 6) + (7 + 8 + 9) + (\text{Expanders})$

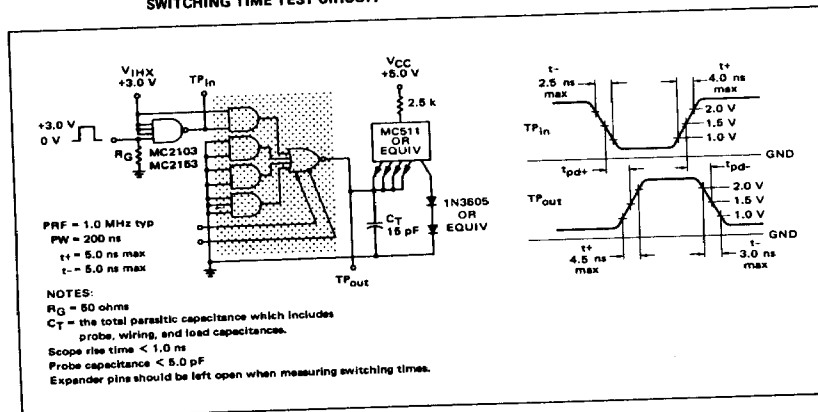
Negative Logic:  
 $11 = (14 + 1) + (2 + 3) + (5 + 6) + (7 + 8 + 9) + (\text{Expanders})$

Total Power Dissipation = 36 mW typ/Pkg  
 Propagation Delay Time = 7.0 ns typ

TYPE NO.	INPUT LOADING FACTOR (IF)	OUTPUT DRIVE (IOL)	TEMPERATURE RANGE
MC2104 MC2154	1 -2.0 mA	11 MC2100 series Gates 6 MC2100 series Gates	-55°C to +125°C
MC2004 MC2054	1 -2.5 mA	9 MC2000 series Gates 5 MC2000 series Gates	0°C to +75°C

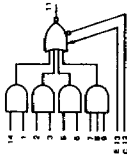
SWITCHING TIME TEST CIRCUIT

VOLTAGE WAVEFORMS AND DEFINITIONS



**ELECTRICAL CHARACTERISTICS**

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



Characteristic	Symbol	Pin Under Test	TEST CONDITIONS												Units	Typical Value	
			mA						Volts								
			I <sub>ox</sub>	I <sub>oh</sub>	I <sub>oh</sub>	P <sub>1</sub>	S <sub>1d</sub>	S <sub>1d</sub>	V <sub>ih</sub>	V <sub>ih</sub>	V <sub>ih</sub>	V <sub>ih</sub>	V <sub>ih</sub>	V <sub>ih</sub>			V <sub>oh</sub>
Input Forward Current	I <sub>f</sub>	1	-2.0	-2.0	-2.0	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	mA	2.2, 3.4, 4.7, 5.9, 10.1
Leakage Current	I <sub>R</sub>	1	100	100	100	100	100	100	100	100	100	100	100	100	100	μA	3.5, 9.6, 7.8, 9.10, 14
Increase Bias Current	I <sub>L</sub>	1	100	100	100	100	100	100	100	100	100	100	100	100	100	μA	23.5, 6.7
Breakdown Voltage	BV <sub>in</sub> "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	Vdc	23.5, 6.7
Output	BV <sub>in</sub> "1"	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	Vdc	23.5, 6.7
Output Voltage	V <sub>out</sub> "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	Vdc	11
Output Voltage	V <sub>out</sub> "1"	11	2.5	2.4	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.5	Vdc	2.3, 5.6, 7, 8.9, 10
Leakage Current	I <sub>OLK</sub>	11	250	250	250	250	250	250	250	250	250	250	250	250	250	μA	2.3, 5.6, 7, 8.9, 10, 14
Short-Circuit Current	I <sub>SC</sub>	11	-25	-100	-25	-100	-25	-100	-25	-100	-25	-100	-25	-100	-25	mA	2.3, 5.6, 7, 8.9, 10, 14
Output Voltage	V <sub>OL</sub>	11	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	Vdc	2.3, 5.6, 7, 8.9, 10, 14
Output Voltage	V <sub>OH</sub>	11	2.70	3.10	3.15	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	Vdc	2.3, 5.6, 7, 8.9, 10, 14
Power Requirements (Total Device)	I <sub>max</sub>	4	-	-	-	-	-	-	-	-	-	-	-	-	-	mA	2.3, 5.6, 7, 8.9, 10, 14
Maximum Power Supply Current	I <sub>PDH</sub>	4	12	12	12	16	16	16	16	16	16	16	16	16	16	mA	2.3, 5.6, 7, 8.9, 10, 14
Power Supply Drain	I <sub>PDL</sub>	4	10	10	10	13	13	13	13	13	13	13	13	13	13	mA	2.3, 5.6, 7, 8.9, 10, 14
Switching Parameters	t <sub>pd</sub>	1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	ns	2.3, 5.6, 7, 8.9, 10, 14
Turn-On Delay	t <sub>pd</sub>	1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	ns	2.3, 5.6, 7, 8.9, 10, 14
Turn-Off Delay	t <sub>pd</sub>	1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	ns	2.3, 5.6, 7, 8.9, 10, 14
Rise Time	t <sub>r</sub>	1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	ns	2.3, 5.6, 7, 8.9, 10, 14
Fall Time	t <sub>f</sub>	1, 11	-	-	-	-	-	-	-	-	-	-	-	-	-	ns	2.3, 5.6, 7, 8.9, 10, 14

\* Pulse Fan-Out.

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Pin-out and Package Information

Table 3-4 DSP56001A Identification by Signal Name (Continued)

Signal Name	132 pin "FC" PQFP or "FE" CQFP Pin No.	88 pin "RC" PGA Pin No.	Signal Name	132 pin "FC" PQFP or "FE" CQFP Pin No.	88 pin "RC" PGA Pin No.
WT	45	L13	nc	103	
X/Y	48	N13	nc	107	
XTAL	126	A6	nc	110	
nc	3		nc	116	
nc	4		nc	117	
nc	7		nc	122	
nc	17		nc	125	
nc	18		nc	132	
nc	21				

Power and ground pins have special considerations for noise immunity. See the section **Design Considerations**.

Table 3-5 DSP56001A Power Supply Pins

132 pin "FC" PQFP or "FE" CQFP Pin No.	88 pin "RC" PGA Pin No.	Power Supply	Circuit Supplied
63	L8	VCCN	Address Bus Buffers
64			
55	L6	GNDN	
56	L9		
73			
74			