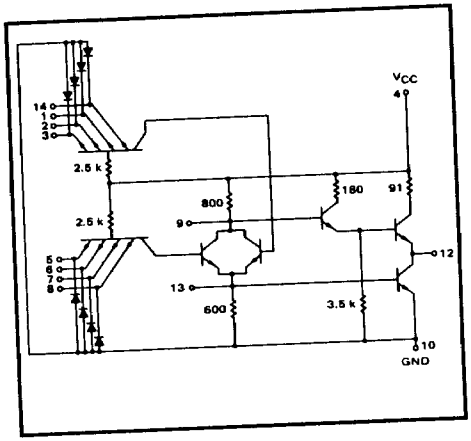
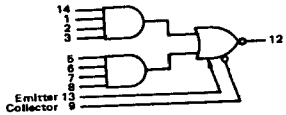
MC2100 • MC2150
MC2000 • MC2050



This device consists of two 4-input AND gates ORed together and driving an output inverter. The ORing nodes are 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. This gate is usable for construction of half adders and other applications where the exclusive OR function is required.



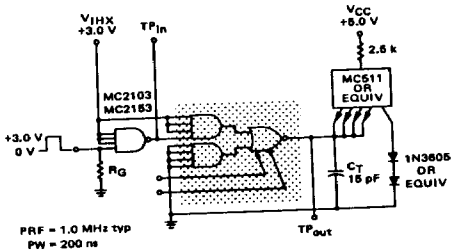
Positive Logic:
$12 = \overline{(1 + 2 + 3 + 14)} + \overline{(5 + 6 + 7 + 8)} + (\text{Expanders})$

Negative Logic:
$12 = \overline{(1 + 2 + 3 + 14)} \cdot \overline{(5 + 6 + 7 + 8)} \cdot (\text{Expanders})$

Total Power Dissipation = 27 mW typ/Pkg
Propagation Delay Time = 7.0 ns typ

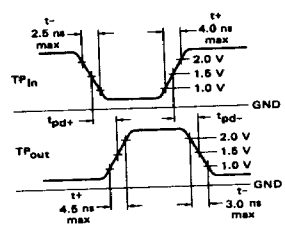
SERIES	INPUT LOADING FACTOR (I_F)		OUTPUT DRIVE		(I_{OL})	TEMPERATURE RANGE
MC2100 MC2150	1	−2.0 mA	11 6	MC2100 series Gates MC2100 series Gates	22 mA 12 mA	−55°C to +125°C
MC2000 MC2050	1	−2.5 mA	9 5	MC2000 series Gates MC2000 series Gates	22.5 mA 12.5 mA	0°C to +75°C

SWITCHING TIME TEST CIRCUIT



PRF = 1.0 MHz typ
PW = 200 ns
t+ = 5.0 ns max
t− = 5.0 ns max

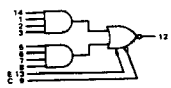
VOLTAGE WAVEFORMS AND DEFINITIONS



NOTES:
R_G = 50 ohms
C_T = the total parasitic capacitance which includes probe, wiring, and load capacitances.
Scope rise time < 1.0 ns
Probe capacitance < 5.0 pF
Expander pins should be left open when measuring switching times.

ELECTRICAL CHARACTERISTICS

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



@ Test Temperature		I_{OL} mA Pr°	I_{OL} mA Std	I_{OH} mA Pr°	I_{OH} mA Std	I_{in} mA	V_{IL} Volts	V_{IH} Volts	V_R Volts	$V_{th\,1}$ Volts	$V_{th\,0}$ Volts	V_{out} Volts	V_{CC} Volts	V_{CCH} Volts	V_{HX} Volts
MC2100, MC2150	−55°C	22.0	12.0	-2.2	-1.2	1.0	0.45	2.7	4.5	2.0	0.9	5.5	5.0	-	-
	+25°C	22.0	12.0	-2.2	-1.2	1.0	0.45	2.7	4.5	1.7	1.1	5.5	5.0	8.0	3.0
	+125°C	22.0	12.0	-2.2	-1.2	1.0	0.45	2.7	4.5	1.4	0.9	5.5	5.0	-	-
MC2000, MC2050	0°C	22.5	12.5	-1.8	-1.0	1.0	0.45	2.9	4.5	1.9	1.0	5.5	5.0	-	-
	+25°C	22.5	12.5	-1.8	-1.0	1.0	0.45	2.9	4.5	1.8	1.1	5.5	5.0	7.0	3.0
	+75°C	22.5	12.5	-1.8	-1.0	1.0	0.45	2.9	4.5	1.7	1.0	5.5	5.0	-	-

Characteristic	Symbol	Pin Under Test	MC2100, MC2150 Test Limits −55°C Min	−55°C Max	+25°C Min	+25°C Max	+125°C Min	+125°C Max	MC2000, MC2050 Test Limits 0°C Min	0°C Max	+25°C Min	+25°C Max	+75°C Min	+75°C Max	Unit	TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW: I_{OL}	I_{OH}	I_{in}	V_{IL}	V_{IH}	V_R	$V_{th\,1}$	$V_{th\,0}$	V_{out}	V_{CC}	V_{CCH}	V_{HX}	Gnd
Input																												
Forward Current	I_F	1	-	-2.0	-	-2.0	-	-2.0	-	-2.5	-	-2.5	-	-2.5	mAdc	-	-	-	-	-	2,3,14	-	-	-	4	-	-	1,5,6,7,8,10
Leakage Current	I_R	1	-	100	-	100	-	100	-	100	-	100	-	100	µAdc	-	-	-	-	-	1	-	-	-	4	-	-	2,3,5,6,7,8,10,14
Inverse Beta Current	I_L	1	-	100	-	100	-	100	-	100	-	100	-	100	µAdc	-	-	-	-	-	1	-	-	-	4	-	-	5,6,7,8,10
Breakdown Voltage	BV_{in} "0"	1	5.5	-	5.5	-	5.5	-	5.5	-	5.5	-	5.5	-	Vdc	-	-	1	-	-	-	-	-	-	4	-	-	5,6,7,8,10
	BV_{in} "1"	1	5.5	-	5.5	-	5.5	-	5.5	-	5.5	-	5.5	-	Vdc	-	-	1	-	-	-	-	-	-	4	-	-	2,3,5,6,7,8,10,14,
Output																												
Output Voltage	V_{out} "0"	12	-	0.45	-	0.45	-	0.45	-	0.45	-	0.45	-	0.45	Vdc	12	-	-	-	-	-	1	-	-	4	-	-	5,6,7,8,10
	V_{out} "1"	12	2.5	-	2.4	-	2.5	-	2.5	-	2.4	-	2.5	-	Vdc	-	12	-	-	-	-	-	1	-	4	-	-	5,6,7,8,10
Leakage Current	I_{OLK}	12	-	250	-	250	-	250	-	250	-	250	-	250	µAdc	-	-	-	-	-	-	-	-	12	4	-	-	1,2,3,5,6,7,8,10,14
Short-Circuit Current	I_{SC}	12	-25	-100	-25	-100	-25	-100	-25	-100	-25	-100	-25	-100	mAdc	-	-	-	-	-	-	-	-	-	4	-	-	1,2,3,5,6,7,8,10,12,14
Output Voltage	V_{OL}	12	-	0.40	-	0.40	-	0.45	-	0.40	-	0.40	-	0.45	Vdc	12	-	-	-	1	-	-	-	-	4	-	-	5,6,7,8,10
	V_{OH}	12	2.70	-	3.10	-	3.15	-	2.9	-	3.0	-	3.0	-	Vdc	-	12	-	1	-	-	-	-	-	4	-	-	5,6,7,8,10
Power Requirements (Total Device)																												
Maximum Power Supply Current	I_{max}	4	-	-	-	10	-	-	-	-	-	11	-	-	mAdc	-	-	-	-	-	-	-	-	-	-	4	-	1,2,3,5,6,7,8,10,14
Power Supply Drain	I_{PDH}	4	-	9.0	-	9.0	-	9.0	-	12	-	12	-	12	mAdc	-	-	-	-	-	-	-	-	-	4	-	-	10
	I_{PDL}	4	-	8.0	-	6.0	-	6.0	-	7.5	-	7.5	-	7.5	mAdc	-	-	-	-	-	-	-	-	-	4	-	-	1,2,3,5,6,7,8,10,14
Switching Parameters																Pulse In	Pulse Out											
Turn-On Delay	t_{pd-}	1,12	-	-	-	11	-	-	-	-	-	11	-	-	ns	1	12	-	-	-	-	-	-	-	4	-	2,3,14	5,6,7,8,10
Turn-Off Delay	t_{pd-}	1,12	-	-	-	11	-	-	-	-	-	11	-	-	ns	1	12	-	-	-	-	-	-	-	4	-	2,3,14	5,6,7,8,10
Rise Time	t_+	1,12	-	-	-	4.5	-	-	-	-	-	4.5	-	-	ns	1	12	-	-	-	-	-	-	-	4	-	2,3,14	5,6,7,8,10
Fall Time	t_-	1,12	-	-	-	3.0	-	-	-	-	-	3.0	-	-	ns	1	12	-	-	-	-	-	-	-	4	-	2,3,14	5,6,7,8,10

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.
$\overline{WT}$	45	L13	nc	103	
X/$\overline{Y}$	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	V_{CCN}	Address Bus Buffers
64			
55	L6	GNDN	
56	L9		
73			
74			