



# Sense Amplifiers

DM7802/DM8802, DM7806/DM8806

## DM7802/DM8802, DM7806/DM8806 high speed MOS to TTL level converters

### general description\*

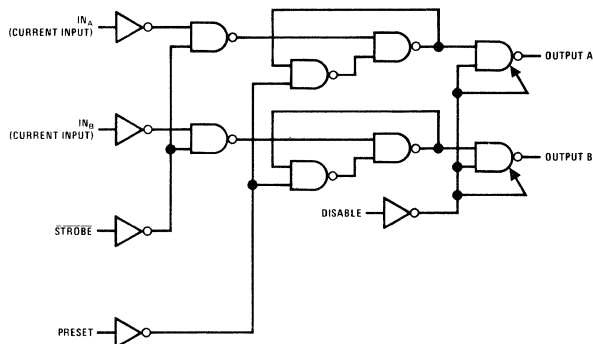
The DM7802/DM8802, DM7806/DM8806 are high speed MOS to TTL level converters. These circuits act as an interface level converter between MOS and TTL logic devices. It consists of two 1-input converters with common strobe input to inhibit "0" entry when strobe is high. It allows parallel entry when strobe is low and the internal latch is preset by the common preset input. TRI-STATE® output logic is implemented in this circuit to facilitate high speed time sharing of decoder-drivers, fast random-access (or sequential) memory arrays, etc.

\*Also see LM3625.

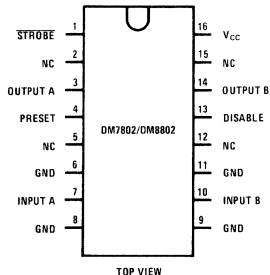
### features

- Very low output impedance — high drive ability
- High impedance output state which allows many outputs to be connected to a common bus line
- Average power dissipation 110 mW per converter

### logic and connection diagrams

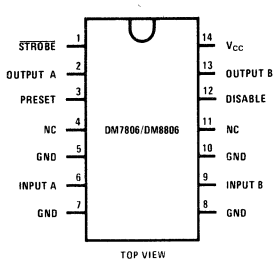


Dual-In-Line Package



Order Number DM7802J or DM8802J  
See Package 17  
Order Number DM8802N  
See Package 23

Dual-In-Line and Flat Package



Order Number DM7806J or DM8806J  
See Package 16  
Order Number DM8806N  
See Package 22  
Order Number DM7806W or DM8806W  
See Package 27

7

**absolute maximum ratings** (Note 1)**operating conditions**

			MIN	MAX	UNITS
Supply Voltage	7.0V	Supply Voltage ( $V_{CC}$ )			
Input Voltage	5.5V	DM7802, DM7806	4.5	5.5	V
Output Voltage	5.5V	DM8802, DM8806	4.75	5.25	V
Storage Temperature Range	-65°C to 150°C	Temperature ( $T_A$ )			
Lead Temperature (Soldering, 10 seconds)	300°C	DM7802, DM7806	-55	+125	°C
		DM8802, DM8806	0	+70	°C

**electrical characteristics** (Note 2)

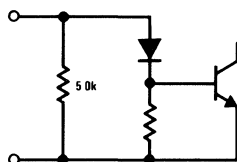
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Logical "1" Input Current ( $I_{INA}, I_{INB}$ )	$V_{CC} = \text{Min}$	500			$\mu\text{A}$
Logical "0" Input Current ( $I_{INA}, I_{INB}$ )	$V_{CC} = \text{Min}$			200	$\mu\text{A}$
Logical "1" Input Voltage, Strobe, Preset, Disable	$V_{CC} = \text{Min}$	2.0			V
Logical "0" Input Voltage, Strobe, Preset, Disable	$V_{CC} = \text{Min}$			0.8	V
Logical "1" Output Voltage	$V_{CC} = \text{Min}, I_{OUT} = 15 \text{ mA}$	2.4			V
Logical "0" Output Voltage	$V_{CC} = \text{Min}, I_{OUT} = 16 \text{ mA}$			0.4	V
Third State Output Current	$V_{CC} = \text{Max}, V_O = 2.4 \text{ V}$			40	$\mu\text{A}$
	$V_{CC} = \text{Max}, V_O = 0.4 \text{ V}$			-40	$\mu\text{A}$
Logical "1" Input Current	$V_{CC} = \text{Max}, V_{IN} = 2.4 \text{ V}$			40	$\mu\text{A}$
	$V_{CC} = \text{Max}, V_{IN} = 5.5 \text{ V}$			1.0	mA
Logical "0" Input Current	$V_{CC} = \text{Max}, V_{IN} = 0.4 \text{ V}$			-1.6	mA
Supply Current	$V_{CC} = \text{Max}, V_{IN(DISABLE)} = 2$ Other Inputs = 0V			40	mA
Input Clamp Voltage	$V_{CC} = \text{Min}, I_{IN} = 12 \text{ mA}$			-1.5	V
Output Short Circuit Current (Note 3)	$V_{CC} = \text{Max}, V_O = 0 \text{ V}$			70	mA
	DM7802, DM7806	20		-70	mA
	DM8802, DM8806	-18			
Propagation Delay to a Logical "0" From STROBE to Output ( $t_{ds}$ )	$V_{CC} = 5.0 \text{ V}$ (See waveforms) $T_A = 25^\circ\text{C}$		17	25	ns
Propagation Delay to a Logical "1" From Preset to Output ( $t_{dp}$ )	$V_{CC} = 5.0 \text{ V}$ (See waveforms) $T_A = 25^\circ\text{C}$		22	32	ns
Delay From Disable Input to High Impedance State (From Logical "1" Level) ( $t_{1H}$ )	$V_{CC} = 5.0 \text{ V}$ (See ac test circuit) $T_A = 25^\circ\text{C}$		7.0	11	ns
Delay From Disable Input to High Impedance State (From Logical "0" Level) ( $t_{0H}$ )	$V_{CC} = 5.0 \text{ V}$ (See ac test circuit) $T_A = 25^\circ\text{C}$		17	25	ns
Delay From Disable Input to Logical "1" Level (From High Impedance State) ( $t_{H1}$ )	$V_{CC} = 5.0 \text{ V}$ (See ac test circuit) $T_A = 25^\circ\text{C}$		9.0	14	ns
Delay From Disable Input to Logical "0" Level (From High Impedance State) ( $t_{H0}$ )	$V_{CC} = 5.0 \text{ V}$ (See ac test circuit) $T_A = 25^\circ\text{C}$		13.5	16	ns

**Note 1:** "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

**Note 2:** Unless otherwise specified min/max limits apply across the -55°C to +125°C temperature range for the DM7802, DM7806 and across the 0°C to +70°C range for the DM8802, DM8806. All typicals are given for  $V_{CC} = 5.0 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

**Note 3:** Only one output at a time should be shorted.

# typical input circuit

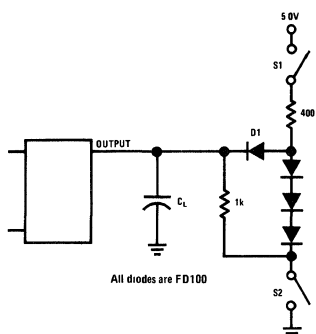


# truth table

IN A OR B	ST	P	D	Q <sub>A</sub> OR Q <sub>B</sub>
0	1	1	0	1
1	1	1	0	1
0	0	1	0	0
1	0	1	0	1
X	X	X	1	Hi-Z

X = Don't care

# ac test circuits

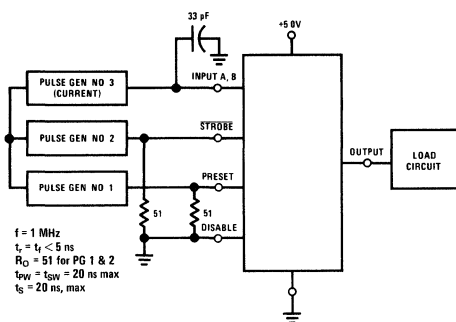


All diodes are FD100

	SWITCH S <sub>1</sub>	SWITCH S <sub>2</sub>	C <sub>L</sub>
t <sub>dp</sub>	Closed	Closed	50 pF
t <sub>ds</sub>	Closed	Closed	50 pF
t <sub>0H</sub>	Closed	Closed	*5 pF
t <sub>1H</sub>	Closed	Closed	*5 pF
t <sub>H0</sub>	Closed	Open	50 pF
t <sub>H1</sub>	Open	Closed	50 pF

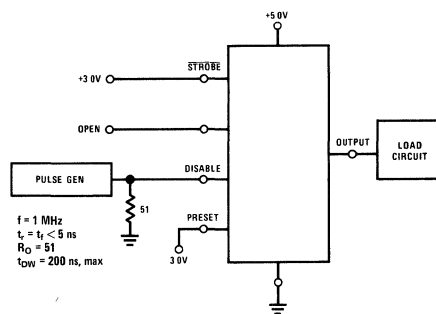
\*Jig capacitance

(a)



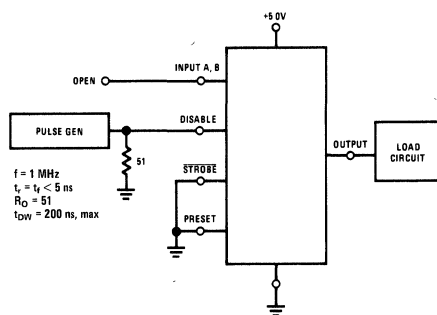
f = 1 MHz  
t<sub>r</sub> = t<sub>f</sub> < 5 ns  
R<sub>O</sub> = 51 for PG 1 & 2  
t<sub>0W</sub> = t<sub>0W</sub> = 20 ns max  
t<sub>0</sub> = 20 ns, max

(b)



f = 1 MHz  
t<sub>r</sub> = t<sub>f</sub> < 5 ns  
R<sub>O</sub> = 51  
t<sub>0W</sub> = 200 ns, max

(c)



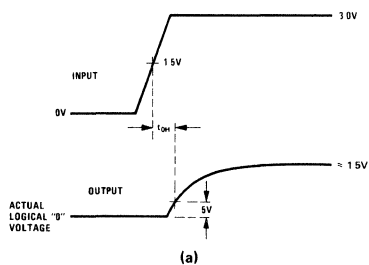
f = 1 MHz  
t<sub>r</sub> = t<sub>f</sub> < 5 ns  
R<sub>O</sub> = 51  
t<sub>0W</sub> = 200 ns, max

(d)

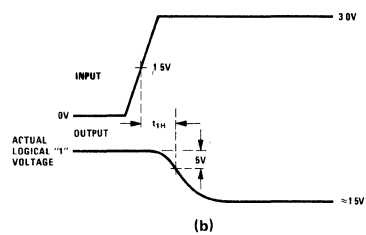
Test Circuit 20

# switching time waveforms

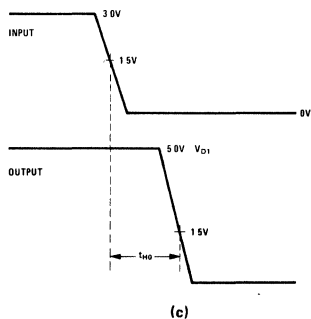
$t_{0H}$



$t_{1H}$



$t_{H0}$



$t_{H1}$

