

**MOTOROLA  
SEMICONDUCTOR  
TECHNICAL DATA**

**MC8T97 (MC6887)  
MC8T98 (MC6888)**

**HEX THREE-STATE BUFFER INVERTERS**

This series of devices combines three features usually found desirable in bus-oriented systems: 1) High impedance logic inputs insure that these devices do not seriously load the bus; 2) Three-state logic configuration allows buffers not being utilized to be effectively removed from the bus; 3) Schottky technology allows high-speed operation.

The noninverting MC8T97/MC6887 and inverting MC8T98/MC6888 provide two Enable inputs — one controlling four buffers and the other controlling the remaining two buffers.

The units are well-suited for Address buffers on the MC6800 or similar microprocessor application.

- High Speed — 8.0 ns (Typ)
- Three-State Logic Configuration
- Single +5 V Power Supply Requirement
- Compatible with 74LS Logic or MC6800 Microprocessor Systems
- High Impedance PNP Inputs Assure Minimal Loading of the Bus

**HEX THREE-STATE  
BUFFER/INVERTERS**

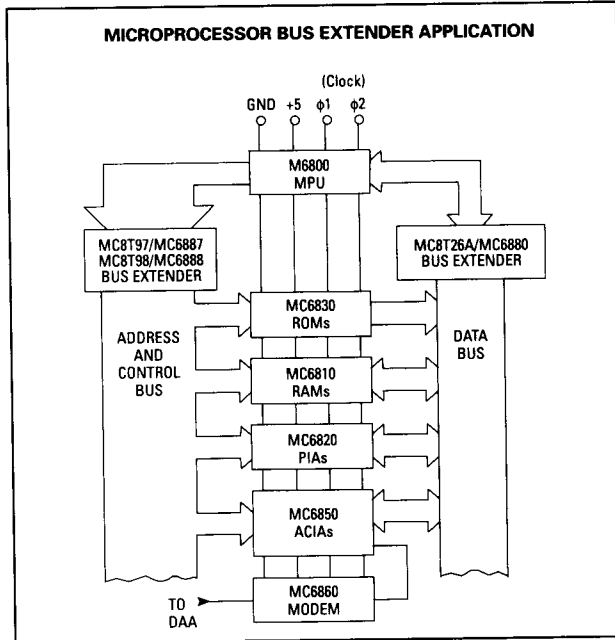
**MONOLITH SCHOTTKY  
INTEGRATED CIRCUITS**



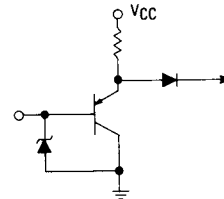
**L SUFFIX  
CERAMIC PACKAGE  
CASE 620**



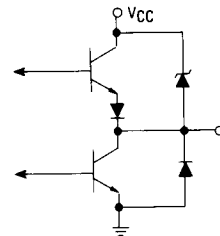
**P SUFFIX  
PLASTIC PACKAGE  
CASE 648**



**INPUT EQUIVALENT CIRCUIT**



**OUTPUT EQUIVALENT CIRCUIT**



**ORDERING INFORMATION**

(Temperature Range = 0 to + 75°C)

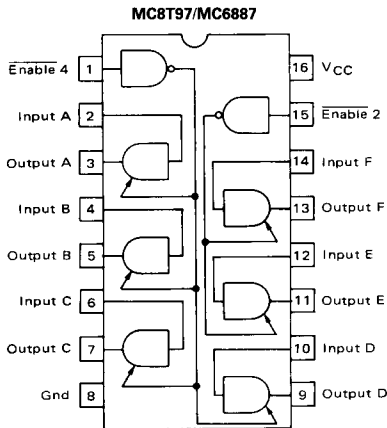
Device	Alternate	Package
MC8T97L	MC6887L	Ceramic DIP
MC8T98L	MC6888L	Ceramic DIP
MC8T97P	MC6887P	Plastic DIP
MC8T98P	MC6888P	Plastic DIP

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# MC8T97, MC8T98

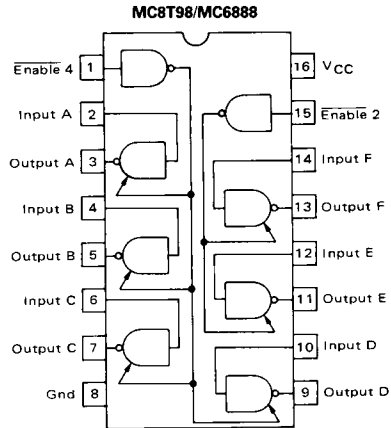
MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$  unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltage	$V_{CC}$	8.0	Vdc
Input Voltage	$V_I$	5.5	Vdc
Operating Ambient Temperature Range	$T_A$	0 to +75	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$
Operating Junction Temperature	$T_J$		$^\circ\text{C}$
Plastic Package		150	
Ceramic Package		175	



Enable	Input	Output
L	L	L
L	H	H
H	X	Z

L = Low Logic State  
H = High Logic State  
Z = Third (High Impedance) State  
X = Irrelevant



Enable	Input	Output
L	L	H
L	H	L
H	X	Z

# MC8T97, MC8T98

**ELECTRICAL CHARACTERISTICS** (Unless otherwise noted,  $0^{\circ}\text{C} \leq T_A \leq 75^{\circ}\text{C}$  and  $4.75\text{ V} \leq V_{CC} \leq 5.25\text{ V}$ )

Characteristics	Symbol	Min	Typ	Max	Unit
Input Voltage High Logic State ( $V_{CC} = 4.75\text{ V}$ , $T_A = 25^{\circ}\text{C}$ ) Low Logic State ( $V_{CC} = 4.75\text{ V}$ , $T_A = 25^{\circ}\text{C}$ )	$V_{IH}$ $V_{IL}$	2.0 —	— —	— 0.8	V
Input Current — High Logic State ( $V_{CC} = 5.25\text{ V}$ , $V_{IH} = 2.4\text{ V}$ ) Low Logic State ( $V_{CC} = 5.25\text{ V}$ , $V_{IL} = 0.5\text{ V}$ , $V_{IL(E)} = 0.5\text{ V}$ ) High Impedance State ( $V_{CC} = 5.25\text{ V}$ , $V_{IL} = 0.5\text{ V}$ , $V_{IH(E)} = 2.0\text{ V}$ )	$I_{IH}$ $I_{IL}$ $I_{IH(E)}$	— — —	— — —	40 -400 -40	$\mu\text{A}$
Output Voltage High Logic State ( $V_{CC} = 4.75\text{ V}$ , $I_{OH} = -5.2\text{ mA}$ ) Low Logic State ( $I_{OL} = 48\text{ mA}$ )	$V_{OH}$ $V_{OL}$	2.4 —	— —	— 0.5	V
Output Voltage — High Impedance State ( $V_{CC} = 5.25\text{ V}$ , $V_{OH} = 2.4\text{ V}$ ) ( $V_{CC} = 5.25\text{ V}$ , $V_{OL} = 0.5\text{ V}$ )	$I_{OZ}$	— —	— —	40 -40	$\mu\text{A}$
Output Short Circuit Current ( $V_{CC} = 5.25\text{ V}$ , $V_O = 0$ , only one output can be shorted at a time)	$I_{OS}$	-40	-80	-115	mA
Power Supply Current ( $V_{CC} = 5.25\text{ V}$ ) MC8T97, MC6887 MC8T98, MC6888	$I_{CC}$	— —	65 59	98 89	mA
Input Clamp Voltage ( $V_{CC} = 4.75\text{ V}$ , $I_{IC} = -12\text{ mA}$ )	$V_{IC}$	—	—	-1.5	V
Input Voltage ( $I_I = 1.0\text{ mA}$ )	$V_I$	5.5	—	—	V
Output $V_{CC}$ Clamp Voltage ( $V_{CC} = 0$ , $I_{OC} = 12\text{ mA}$ )	$V_{OC}$	—	—	1.5	V
Output Gnd Clamp Voltage ( $V_{CC} = 0$ , $I_{OC} = 12\text{ mA}$ )	$V_{OC}$	—	—	-1.5	V

**SWITCHING CHARACTERISTICS** ( $V_{CC} = 5.0\text{ V}$ ,  $T_A = 25^{\circ}\text{C}$  unless otherwise noted.)

Characteristic	Symbol	MC8T97 MC6887			MC8T98 MC6888			Unit
		Min	Typ	Max	Min	Typ	Max	
Propagation Delay Time — High-to-Low State ( $C_L = 50\text{ pF}$ ) ( $C_L = 250\text{ pF}$ ) ( $C_L = 375\text{ pF}$ ) ( $C_L = 500\text{ pF}$ )	$t_{PHL}$	3.0 — — —	— 16 20 23	12 — — —	4.0 — — —	— 15 18 22	11 — — —	ns
Propagation Delay Time — Low-to-High State ( $C_L = 50\text{ pF}$ ) ( $C_L = 250\text{ pF}$ ) ( $C_L = 375\text{ pF}$ ) ( $C_L = 500\text{ pF}$ )	$t_{PLH}$	3.0 — — —	— 25 33 42	13 — — —	3.0 — — —	— 22 28 35	10 — — —	ns
Transition Time — High-to-Low State ( $C_L = 250\text{ pF}$ ) ( $C_L = 375\text{ pF}$ ) ( $C_L = 500\text{ pF}$ )	$t_{THL}$	— — —	10 11 14	— — —	— — —	10 13 15	— — —	ns
Transition Time — Low-to-High State ( $C_L = 250\text{ pF}$ ) ( $C_L = 375\text{ pF}$ ) ( $C_L = 500\text{ pF}$ )	$t_{TLH}$	— — —	32 42 60	— — —	— — —	28 38 53	— — —	ns
Propagation Delay Time — High State-to-Third State ( $C_L = 5.0\text{ pF}$ )	$t_{PHZ(E)}$	—	—	10	—	—	10	ns
Propagation Delay Time — Low State-to-Third State ( $C_L = 5.0\text{ pF}$ )	$t_{PLZ(E)}$	—	—	12	—	—	16	
Propagation Delay Time — Third State-to-High State ( $C_L = 50\text{ pF}$ )	$t_{PZH(E)}$	—	—	25	—	—	22	ns
Propagation Delay Time — Third State-to-Low State ( $C_L = 50\text{ pF}$ )	$t_{PZL(E)}$	—	—	25	—	—	24	

# MC8T97, MC8T98

FIGURE 1 – TEST CIRCUIT FOR SWITCHING CHARACTERISTICS

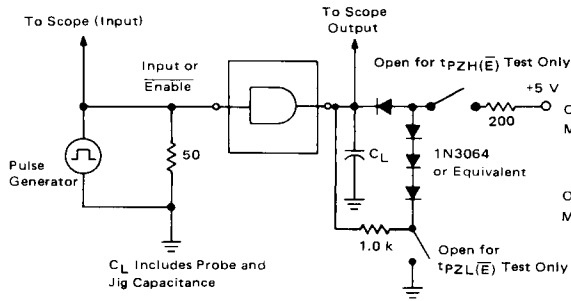


FIGURE 2 – WAVEFORMS FOR PROPAGATION DELAY TIMES INPUT TO OUTPUT

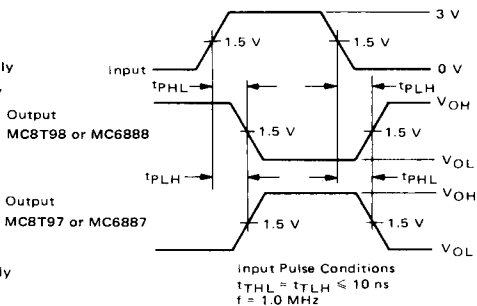
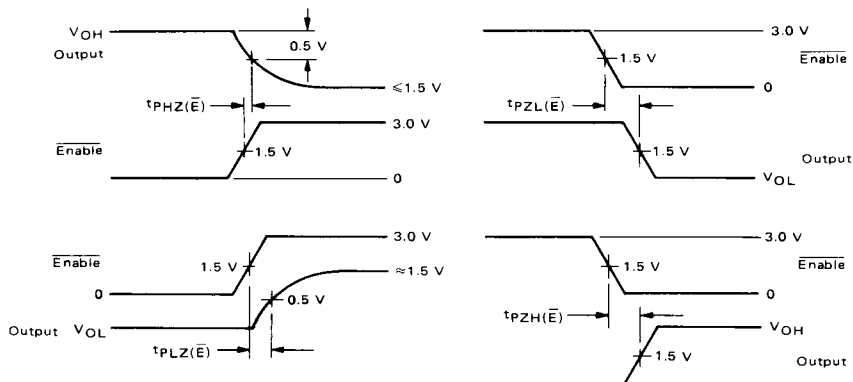


FIGURE 3 – WAVEFORMS FOR PROPAGATION DELAY TIMES –  $\overline{\text{ENABLE}}$  TO OUTPUT



H = High-Logic State, L = Low-Logic State, Z = High Impedance State

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