

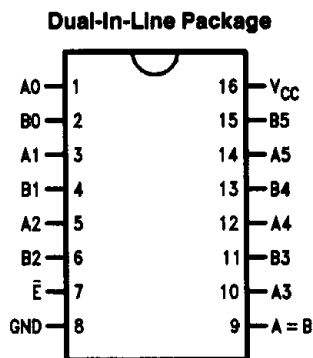
## DM93S47 High Speed 6-Bit Identity Comparator

### General Description

The DM93S47 is a very high speed 6-bit identity comparator. The device features an open-collector output for wired-OR expansion and active LOW enable. The DM93S47 is fabricated with the Schottky barrier diode process for high speed, and is completely compatible with all TTL families.

This device is recommended for applications where wired-OR expansion is desired and the speed of an active pull-up is not required. The DM93S47 is a pin-for-pin replacement for the DM7160/8160.

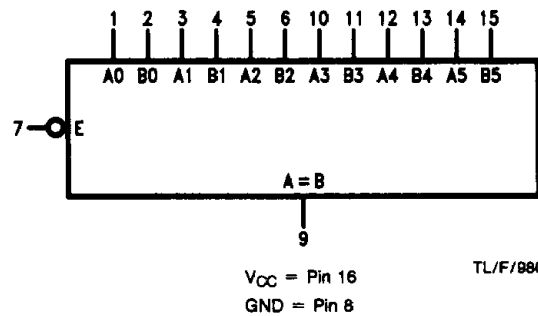
### Connection Diagram



TL/F/9808-1

Order Number **DM93S47N**  
See NS Package Number **N16E**

### Logic Symbol



TL/F/9808-2

### Truth Table

Inputs		Output
Ē	A <sub>n</sub> , B <sub>n</sub>	A = B
L	A <sub>n</sub> = B <sub>n</sub>	H
L	A <sub>n</sub> ≠ B <sub>n</sub>	L
H	A <sub>n</sub> ≠ B <sub>n</sub>	H
H	A <sub>n</sub> = B <sub>n</sub>	H

H = HIGH Voltage Level  
L = LOW Voltage Level

**Absolute Maximum Ratings** (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range (DM93S)	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

Note: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

**Recommended Operating Conditions**

Symbol	Parameter	DM93S47			Units
		Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Current	2			V
V <sub>IL</sub>	Low Level Input Current			0.8	V
I <sub>OH</sub>	High Level Output Current			-1	mA
I <sub>OL</sub>	Low Level Output Current			20	mA
T <sub>A</sub>	Free Air Operating Temperature	0		70	°C

**Electrical Characteristics** over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.2	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max, V <sub>IL</sub> = Max	2.7	3.4		V
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max, V <sub>IH</sub> = Min		0.35	0.5	V
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 5.5V			1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			50	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.5V			-2.0	mA
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 2)	-40		-100	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = Max			65	mA

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

## Switching Characteristics

$V_{CC} = +5.0V$ ,  $T_A = +25^{\circ}C$  (See Section 1 for Waveforms and Load Configurations)

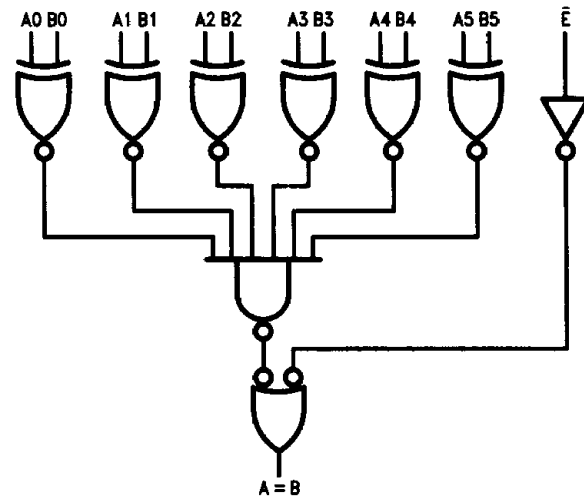
Symbol	Parameter	Conditions	$C_L = 15 \text{ pF}$ , $R_L = 280\Omega$		Units
			Min	Max	
$t_{PLH}$ $t_{PHL}$	Propagation Delay $A_n$ or $B_n$ to $A = B$	$\bar{E} = \text{GND}$ , Other Inputs = 4.5V, Test Each Input Individually	5.0 5.0	17 17	ns
$t_{PLH}$ $t_{PHL}$	Propagation Delay $A_n$ or $B_n$ to $A = B$	$\bar{E} = \text{GND}$ , Other Inputs = GND, Test Each Input Individually	4.0 4.0	14 15	ns
$t_{PLH}$ $t_{PHL}$	Propagation Delay $\bar{E}$ to $A = B$	$A_n \neq B_n$	3.0 3.0	10 10	ns

## Functional Description

The DM93S47 is a very high speed 6-bit identity comparator. When enabled ( $\bar{E}$  input LOW), the  $A = B$  output is HIGH if the two 6-bit words are equal. When disabled ( $\bar{E}$  input HIGH), the  $A = B$  output is forced HIGH. Equality is determined by Exclusive-NOR circuits which individually compare the equivalent bits from each word. Since the  $A = B$  output state is determined by the equality of each pair of inputs, the equivalent  $A_n$  and  $B_n$  pins can be interchanged to facilitate board layout or wiring. The active LOW Enable ( $\bar{E}$ ) can be used as a high speed strobe. When the Enable is HIGH, the  $A = B$  output is forced HIGH. This allows devices tied to a common wired-OR (actually wired-AND) node to be strobed individually or in groups. Only the enabled devices will determine the state of the output node.

$$(A = B) = \bar{E} + (A_0 \oplus B_0) \cdot (A_1 \oplus B_1) \cdot (A_2 \oplus B_2) \cdot (A_3 \oplus B_3) \cdot (A_4 \oplus B_4) \cdot (A_5 \oplus B_5)$$

## Logic Diagram



TL/F/9808-3