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DM9324 5-Bit Comparator

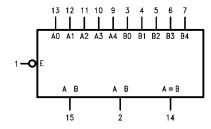
General Description

The DM9324 expandable comparators provide comparison between two 5-bit words and give three outputs—"less than", "greater than" and "equal to". A HIGH on the active LOW Enable Input forces all three outputs LOW.

Ordering Code:

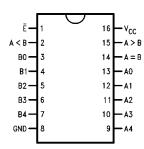
Order Number	Package Number	Package Description	
DM9324N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide	

Logic Symbol



V_{CC} = Pin 16 GND = Pin 6

Connection Diagram



Pin Descriptions

Pin Names	Description
Ē	Enable Input (Active LOW)
A0-A4	Word A Parallel Inputs
B0-B4	Word B Parallel Inputs
A < B	A Less than B Output (Active HIGH)
A > B	A Greater than B Output (Active HIGH)
A = B	A Equal to B Output (Active HIGH)

Truth Table

Inputs			Outputs			
Ē	A _n	B _n	A < B	$\mathbf{A} > \mathbf{B}$	$\mathbf{A} = \mathbf{B}$	
Н	Χ	Х	L	L	L	
L	Word $A = Word B$		L	L	Н	
L	Word A >	Word B	L	Н	L	
L	Word B >	Word A	Н	L	L	

H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

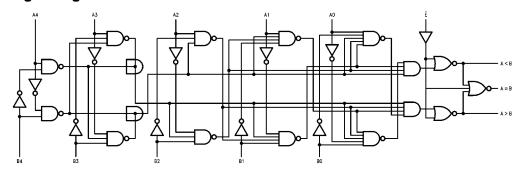
Functional Description

The '24 5-bit comparators use combinational circuitry to directly generate "A greater than B" and "A less than B" outputs. As evident from the logic diagram, these outputs are generated in only three gate delays. The "A equals B" output is generated in one additional gate delay by decoding the "A neither less than nor greater than B" condition with a NOR gate. All three outputs are activated by the active LOW Enable Input ($\overline{\rm E}$).

Tying the A>B output from one device into an A input on another device and the A<B output into the corresponding B input permits easy expansion.

The A4 and B4 inputs are the most significant inputs and A0, B0 the least significant. Thus if A4 is HIGH and B4 is LOW, the A > B output will be HIGH regardless of all other inputs except \overline{E} .

Logic Diagram



Absolute Maximum Ratings(Note 1)

Supply Voltage 7V Input Voltage 5.5V Operating Free Air Temperature Range 0° C to +70 $^{\circ}$ C Storage Temperature Range -65° C to +150 $^{\circ}$ C

Note 1: 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 tables 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	Min	Nom	Max	Units
V _{CC}	Supply Voltage	4.75	5	5.25	V
V _{IH}	HIGH Level Input Voltage	2			V
V _{IL}	LOW Level Input Voltage			0.8	V
Гон	HIGH Level Output Current			-0.8	mA
I _{OL}	LOW Level Output Current			16	mA
T _A	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 2)	Max	Units
VI	Input Clamp Voltage	$V_{CC} = Min, I_I = -12 \text{ mA}$			-1.5	V
V _{OH}	HIGH Level Output Voltage	$V_{CC} = Min, I_{OH} = Max$ $V_{IL} = Max$	2.4	3.4		V
V _{OL}	LOW Level Output Voltage	$V_{CC} = Min, I_{OL} = Max$ $V_{IH} = Min$		0.2	0.4	V
I _I	Input Current @ Max Input Voltage	$V_{CC} = Max, V_I = 5.5V$			1	mA
I _{IH}	HIGH Level Input Current	$V_{CC} = Max, V_I = 2.4V$			80	μΑ
I _{IL}	LOW Level Input Current	$V_{CC} = Max, V_I = 0.4V$			-3.2	mA
Ios	Short Circuit Output Current	V _{CC} = Max (Note 3)	-20		-70	mA
I _{CC}	Supply Current	V _{CC} = Max			81	mA

Note 2: All typicals are at $V_{CC} = 5V$, $T_A = 25^{\circ}C$.

Note 3: Not more than one output should be shorted at a time.

Switching Characteristics

 $V_{CC} = +5.0V, T_A = +25^{\circ}C$

Symbol	Parameter	C _L = 15 pF		Units	
	T arameter	Min	Max	Cilita	
t _{PLH}	Propagation Delay		14	ns	
t _{PHL}	\overline{E} to $A = B$		14	l lis	
t _{PLH}	Propagation Delay		25	ns	
t _{PHL}	A_n , B_n to $A > B$		22	115	
t _{PLH}	Propagation Delay		26	ns	
t _{PHL}	A_n , B_n to $A < B$		21	115	
t _{PLH}	Propagation Delay		30	ns	
t _{PHL}	A_n , B_n to $A = B$		32	115	

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Physical Dimensions inches (millimeters) unless otherwise noted 0.740 - 0.780 0.090 (18.80 - 19.81)(2.286)<u>16 15 14 13 12 11 10 9</u> **16 15 1** INDEX AREA 0.250 ± 0.010 (6.350 ± 0.254) PIN NO. 1 PIN NO. 1 2 3 4 5 6 7 8 1 2 _ IDENT IDENT OPTION 01 OPTION 02 0.065 0.130 ± 0.005 0.060 4° TYP 0.300 - 0.320 (1.651) (3.302 ± 0.127) (1.524)OPTIONAL (7.620 - 8.128) 0.145 - 0.200 $\overline{(3.683 - 5.080)}$ 95°±5° $\frac{0.008 - 0.016}{(0.203 - 0.406)}$ TYP 90° ± 4° TYP 0.020 0.280 (0.508)0.125 - 0.150 (3.175 - 3.810) (7.112) MIN (0.762 ± 0.381) 0.014 - 0.023 0.100 ± 0.010 (0.325 +0.040 -0.015 (0.356 - 0.584) (2.540 ± 0.254) $\frac{0.050 \pm 0.010}{(1.270 \pm 0.254)}$ N16E (REV F) TYP TYP

16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N16E

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