

HD14585B

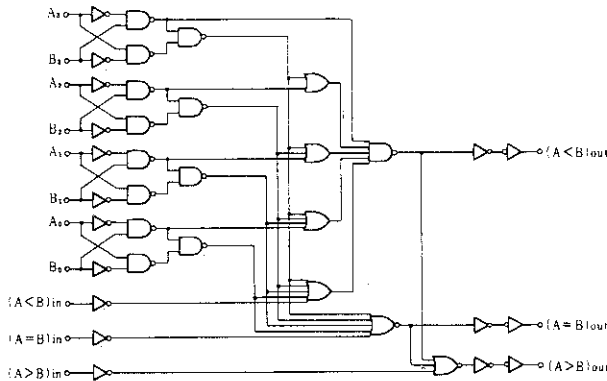
4-bit Magnitude Comparator

The HD14585B 4-bit Magnitude Comparator has eight comparing inputs ($A_3, B_3, A_2, B_2, A_1, B_1, A_0, B_0$), three cascading inputs ($A < B, A = B$ and $A > B$), and three outputs ($A < B, A = B, A > B$). This device compares two 4-bit words (A and B) and determines whether they are "less than", "equal to", or "greater than" by a high level on the appropriate output. For words greater than 4-bits, units can be cascaded by connecting outputs ($A < B$), and ($A = B$) to the corresponding inputs of the next significant comparator (input $A > B$ is connected to a high). Inputs ($A < B$), ($A = B$), and ($A > B$) on the least significant (first) comparator are connected to a low, a high, and a high, respectively. Applications include logic in CPU's, correction and/or detection of instrumentation conditions, comparator in testers, converters, and controls.

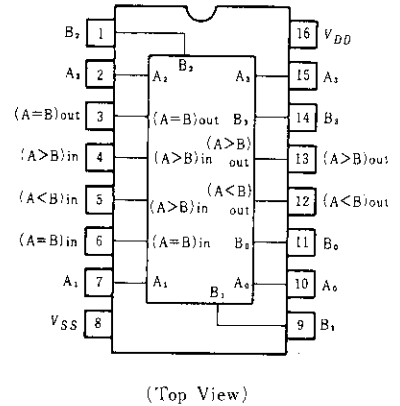
FEATURES

- Quiescent Current = 5nA/pkg typ. @5V
- Expandable
- Applicable to Binary or 8421-BCD Code
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range

LOGIC DIAGRAM



PIN ARRANGEMENT



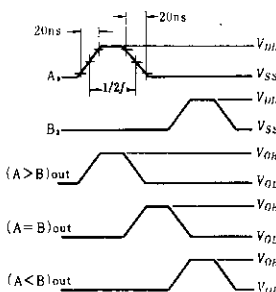
TRUTH TABLE

		Inputs			Outputs				
		Comparing		Cascading					
A_3, B_3	A_2, B_2	A_1, B_1	A_0, B_0	$A < B$	$A = B$	$A > B$	$A < B$	$A = B$	$A > B$
$A_3 > B_3$	x	x	x	x	x	1	0	0	1
$A_3 = B_3, A_2 > B_2$	x	x	x	x	x	1	0	0	1
$A_3 = B_3, A_2 = B_2, A_1 > B_1$	x	x	x	x	x	1	0	0	1
$A_3 = B_3, A_2 = B_2, A_1 = B_1, A_0 > B_0$	x	x	x	x	x	1	0	0	1
$A_3 = B_3, A_2 = B_2, A_1 = B_1, A_0 = B_0$	0	0	1	0	0	1	0	0	1
$A_3 = B_3, A_2 = B_2, A_1 = B_1, A_0 = B_0$	0	1	1	0	1	0	1	0	0
$A_3 = B_3, A_2 = B_2, A_1 = B_1, A_0 < B_0$	x	x	x	x	x	1	0	0	0
$A_3 = B_3, A_2 < B_2, A_1 < B_1$	x	x	x	x	x	1	0	0	0
$A_3 = B_3, A_2 < B_2, A_1 = B_1, A_0 < B_0$	x	x	x	x	x	1	0	0	0

x : Don't Care

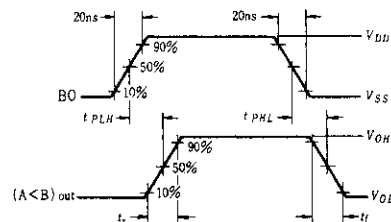
DYNAMIC SIGNAL WAVEFORMS

Power Dissipation Signal Waveform



- Notes) 1. Inputs ($A > B$) and ($A = B$) high, and inputs $B_2, A_2, B_1, A_1, B_0, A_0$ and ($A < B$) low.
2. f in respect to a system clock.

Dynamic Signal Waveforms



Note) Inputs ($A > B$) and ($A = B$) high, and inputs $B_2, A_2, B_1, A_1, B_0, A_0$ and ($A < B$) low.

ELECTRICAL CHARACTERISTICS

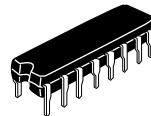
Characteristic	Symbol	$V_{DD}(V)$	Test Conditions	-40°C		25°C			85°C		Unit
				min	max	min	typ	max	min	max	
Output Voltage	V_{OL}	5.0	$V_{in}=V_{DD}$ or 0	-	0.05	-	0	0.05	-	0.05	V
		10		-	0.05	-	0	0.05	-	0.05	
		15		-	0.05	-	0	0.05	-	0.05	
	V_{OH}	5.0	$V_{in}=0$ or V_{DD}	4.95	-	4.95	5.0	-	4.95	-	V
		10		9.95	-	9.95	10	-	9.95	-	
		15		14.95	-	14.95	15	-	14.95	-	
Input Voltage	V_{IL}	5.0	$V_{out}=4.5$ or $0.5V$	-	1.5	-	2.25	1.5	-	1.5	V
		10	$V_{out}=9.0$ or $1.0V$	-	3.0	-	4.50	3.0	-	3.0	
		15	$V_{out}=13.5$ or $1.5V$	-	4.0	-	6.75	4.0	-	4.0	
	V_{IH}	5.0	$V_{out}=0.5$ or $4.5V$	3.5	-	3.5	2.75	-	3.5	-	V
		10	$V_{out}=1.0$ or $9.0V$	7.0	-	7.0	5.50	-	7.0	-	
		15	$V_{out}=1.5$ or $13.5V$	11.0	-	11.0	8.25	-	11.0	-	
Output Drive Current	I_{OH}	5.0	$V_{OH}=2.5V$	-1.0	-	-0.8	-1.7	-	-0.6	-	mA
		5.0	$V_{OH}=4.6V$	-0.2	-	-0.16	-0.36	-	-0.12	-	
		10	$V_{OH}=9.5V$	-0.5	-	-0.4	-0.9	-	-0.3	-	
		15	$V_{OH}=13.5V$	-1.4	-	-1.2	-3.5	-	-1.0	-	
	I_{OL}	5.0	$V_{OL}=0.4V$	0.52	-	0.44	0.88	-	0.36	-	mA
		10	$V_{OL}=0.5V$	1.3	-	1.1	2.25	-	0.9	-	
15		$V_{OL}=1.5V$	3.6	-	3.0	8.8	-	2.4	-		
Input Current	I_{in}	15		-	± 0.3	-	± 0.00001	± 0.3	-	± 1.0	μA
Input Capacitance	C_{in}		$V_{in}=0$	-	-	-	5.0	7.5	-	-	pF
Quiescent Current	I_{DD}	5.0	Zero Signal, per Package	-	20	-	0.005	20	-	150	μA
		10		-	40	-	0.010	40	-	300	
		15		-	80	-	0.015	80	-	600	
Total Supply Current*	I_T	5.0	Dynamic + I_{DD} ,	-	-	-	0.6	-	-	-	μA
		10	$C_L=50pF$, $f=1$ kHz,	-	-	-	1.2	-	-	-	
		15	per Gate	-	-	-	1.8	-	-	-	

* To calculate total supply current at frequency other than 1kHz.

@ $V_{DD}=5.0V$ $I_T=(0.6\mu A/kHz)f+I_{DD}$ @ $V_{DD}=10V$ $I_T=(1.2\mu A/kHz)f+I_{DD}$ @ $V_{DD}=15V$ $I_T=(1.8\mu A/kHz)f+I_{DD}$

SWITCHING CHARACTERISTICS ($C_L=50pF$, $T_a=25^\circ C$)

Characteristic	Symbol	$V_{DD}(V)$	min	typ	max	Unit
Output Rise Time	t_r	5.0	-	180	400	ns
		10	-	90	200	
		15	-	65	160	
Output Fall Time	t_f	5.0	-	100	200	ns
		10	-	50	100	
		15	-	37	80	
Propagation Delay Time	t_{PLH} , t_{PHL}	5.0	-	430	1125	ns
		10	-	180	450	
		15	-	130	330	



Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g

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