

# HD14531B

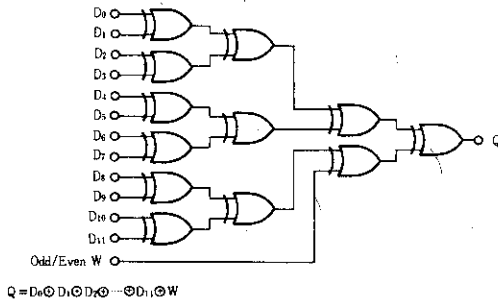
## 12-bit Parity Tree

The HD14531B 12-bit parity tree consists of 12 data-bit inputs (D0 thru D11), and even or odd parity selection input (W) and an output (Q). The parity selection input can be considered as an additional bit. Words of less than 13 bits can generate an even or odd parity output if the remaining inputs are selected to contain an even or odd number of ones, respectively. Words of greater than 12-bits can be accommodated by cascading other HD14531B devices by using the W input. Applications include checking or including a redundant (parity) bit to a word for error detection/correction systems, controller for remote digital sensors or switches (digital event detection/correction), or as a multiple input summer without carries.

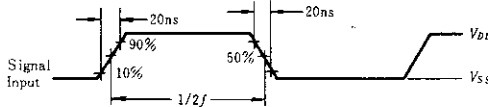
### FEATURES

- Noise Immunity = 45% of  $V_{DD}$  typ.
- Supply Voltage Range = 3 to 18V
- All Outputs Buffered
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range
- Quiescent Current = 5nA/pkg typ. @5V
- Variable Word Length

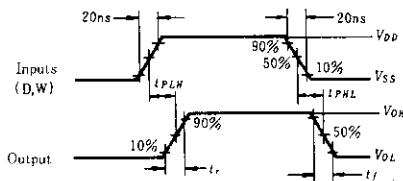
### LOGIC DIAGRAM



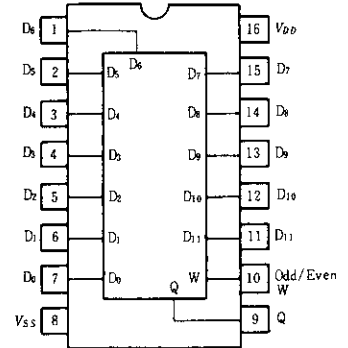
### POWER DISSIPATION SIGNAL WAVEFORM



### DYNAMIC SIGNAL WAVEFORMS



### PIN ARRANGEMENT



(Top View)

### TRUTH TABLE

Inputs								Output
W	D <sub>11</sub>	D <sub>10</sub>	.....	D <sub>2</sub>	D <sub>1</sub>	D <sub>0</sub>	Decimal (Octal) Equivalent	Q*
0	0	0	.....	0	0	0	0 (0)	0
0	0	0	.....	0	0	1	1 (1)	1
0	0	0	.....	0	1	0	2 (2)	1
0	0	0	.....	0	1	1	3 (3)	0
0	0	0	.....	1	0	0	4 (4)	1
0	0	0	.....	1	0	1	5 (5)	0
0	0	0	.....	1	1	0	6 (6)	0
0	0	0	.....	1	1	1	7 (7)	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
1	1	1	.....	0	0	0	8184(17770)	0
1	1	1	.....	0	0	1	8185(17771)	1
1	1	1	.....	0	1	0	8186(17772)	1
1	1	1	.....	0	1	1	8187(17773)	0
1	1	1	.....	1	0	0	8188(17774)	1
1	1	1	.....	1	0	1	8189(17775)	0
1	1	1	.....	1	1	0	8190(17776)	0
1	1	1	.....	1	1	1	8191(17777)	1

\* 0—Even Parity, 1—Odd Parity

**■ ELECTRICAL CHARACTERISTICS**

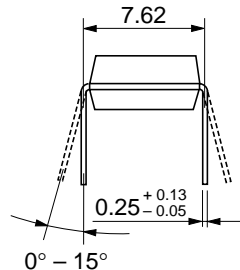
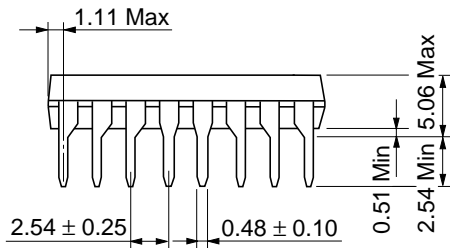
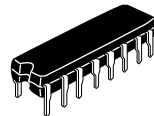
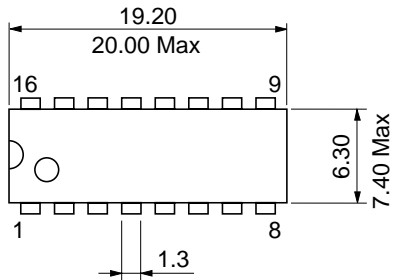
Characteristic	Symbol	V <sub>DD</sub> (V)	Test Conditions	-40°C		25°C			85°C		Unit
				min	max	min	typ	max	min	max	
Output Voltage	V <sub>OL</sub>	5.0	V <sub>in</sub> = V <sub>DD</sub> or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V <sub>OH</sub>	5.0	V <sub>in</sub> = 0 or V <sub>DD</sub>	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 <sub>IL</sub>	5.0	V <sub>out</sub> = 4.5 or 0.5V	—	1.5	—	2.25	1.5	—	1.5	V
		10	V <sub>out</sub> = 9.0 or 1.0V	—	3.0	—	4.50	3.0	—	3.0	
		15	V <sub>out</sub> = 13.5 or 1.5V	—	4.0	—	6.75	4.0	—	4.0	
	V <sub>IH</sub>	5.0	V <sub>out</sub> = 0.5 or 4.5V	3.5	—	3.5	2.75	—	3.5	—	V
		10	V <sub>out</sub> = 1.0 or 9.0V	7.0	—	7.0	5.50	—	7.0	—	
		15	V <sub>out</sub> = 1.5 or 13.5V	11.0	—	11.0	8.25	—	11.0	—	
Output Drive Current	I <sub>OH</sub>	5.0	V <sub>OH</sub> = 2.5V	-1.0	—	-0.8	-1.7	—	-0.6	—	mA
		5.0	V <sub>OH</sub> = 4.6V	-0.2	—	-0.16	-0.36	—	-0.12	—	
		10	V <sub>OH</sub> = 9.5V	-0.5	—	-0.4	-0.9	—	-0.3	—	
	I <sub>OL</sub>	5.0	V <sub>OL</sub> = 0.4V	0.52	—	0.44	0.88	—	0.36	—	mA
		10	V <sub>OL</sub> = 0.5V	1.3	—	1.1	2.25	—	0.9	—	
		15	V <sub>OL</sub> = 1.5V	3.6	—	3.0	8.8	—	2.4	—	
Input Current	I <sub>in</sub>	15		—	±0.3	—	±0.0001	±0.3	—	±1.0	μA
Input Capacitance	C <sub>in</sub>	—	V <sub>in</sub> = 0	—	—	—	5.0	7.5	—	—	pF
Quiescent Current	I <sub>DD</sub>	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 <sub>T</sub>	5.0	Dynamic + I <sub>DD</sub> , per Gate C <sub>L</sub> = 50pF, f = 1kHz	—	—	—	0.25	—	—	—	μA
		10		—	—	—	0.50	—	—	—	
		15		—	—	—	0.75	—	—	—	

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

@V<sub>DD</sub> = 5.0V I<sub>T</sub> = (0.25 μA/kHz)f + I<sub>DD</sub>, @V<sub>DD</sub> = 10V I<sub>T</sub> = (0.50 μA/kHz)f + I<sub>DD</sub>, @V<sub>DD</sub> = 15V I<sub>T</sub> = (0.75 μA/kHz)f + I<sub>DD</sub>

**■ SWITCHING CHARACTERISTICS (C<sub>L</sub> = 50pF, T<sub>a</sub> = 25°C)**

Characteristic	Symbol	V <sub>DD</sub> (V)	min	typ	max	Unit	
Output Rise Time	t <sub>r</sub>	5.0	—	180	400	ns	
		10	—	90	200		
		15	—	65	160		
Output Fall Time	t <sub>f</sub>	5.0	—	100	200	ns	
		10	—	50	100		
		15	—	37	80		
Propagation Delay Time	t <sub>PLH</sub>	Data to Q	5.0	—	440	1320	ns
			10	—	175	525	
			15	—	120	360	
	t <sub>PHL</sub>	Odd/Even to Q	5.0	—	250	750	
			10	—	100	300	
			15	—	70	210	



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

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