

HD100180

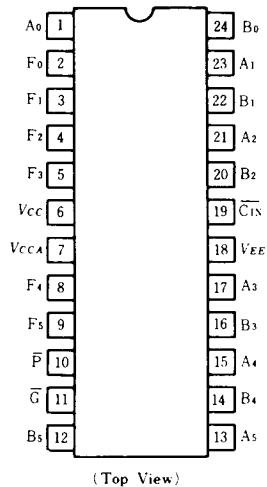
Fast 6-bit Adder

The HD100180 is a High Speed 6-bit Adder capable of performing as full 6-bit addition of 2 operands in 2ns.

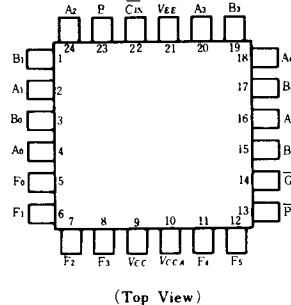
Inputs for the adder are active low Carry-In, Operand A, and Operand B; outputs are Function, Propagate, and active low Carry Generate, and active low Carry Propagate. When used with the HD100179, Full Carry Lookahead, as a second order Lookahead Block. HD100180 provides high speed addition of very long words.

PIN ARRANGEMENT

● HD100180



● HD100180F



LOGIC FUNCTION

$$F_0 = P_0 \oplus C_{1N}$$

$$F_1 = P_1 \oplus (G_0 + P_0 C_{1N})$$

$$F_2 = P_2 \oplus (G_1 + P_1 G_0 + P_1 P_0 C_{1N})$$

$$F_3 = P_3 \oplus (G_2 + P_2 G_1 + P_2 P_1 G_0 + P_2 P_1 P_0 C_{1N})$$

$$F_4 = P_4 \oplus (G_3 + P_3 G_2 + P_3 P_2 G_1 + P_3 P_2 P_1 G_0 + P_3 P_2 P_1 P_0 C_{1N})$$

$$F_5 = P_5 \oplus (G_4 + P_4 G_3 + P_4 P_3 G_2 + P_4 P_3 P_2 G_1 + P_4 P_3 P_2 P_1 G_0 + P_4 P_3 P_2 P_1 P_0 C_{1N})$$

$$\bar{P} = P_0 P_1 P_2 P_3 P_4 P_5$$

$$\bar{G} = \bar{G}_5 + P_5 G_4 + P_5 P_4 G_3 + P_5 P_4 P_3 G_2 + P_5 P_4 P_3 P_2 G_1 + P_5 P_4 P_3 P_2 P_1 G_0$$

$$P_0 = A_0 \oplus B_0 \quad G_0 = A_0 \cdot B_0$$

$$P_1 = A_1 \oplus B_1 \quad G_1 = A_1 \cdot B_1$$

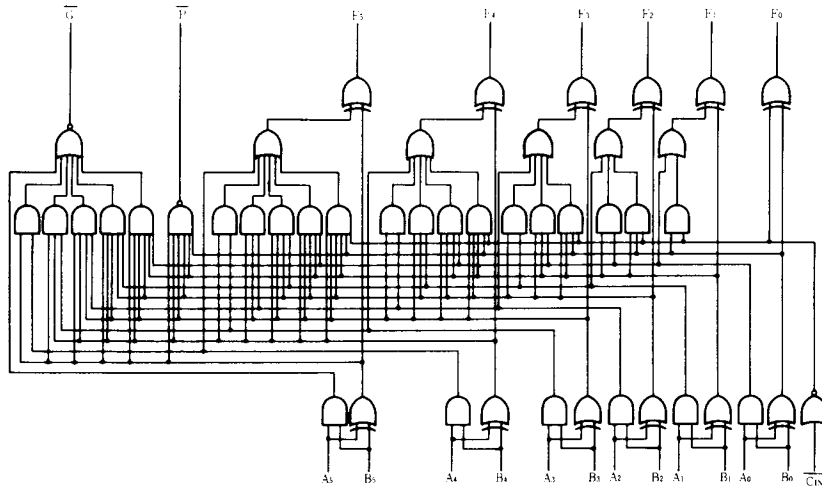
$$P_2 = A_2 \oplus B_2 \quad G_2 = A_2 \cdot B_2$$

$$P_3 = A_3 \oplus B_3 \quad G_3 = A_3 \cdot B_3$$

$$P_4 = A_4 \oplus B_4 \quad G_4 = A_4 \cdot B_4$$

$$P_5 = A_5 \oplus B_5 \quad G_5 = A_5 \cdot B_5$$

■ LOGIC DIAGRAM



■ DC CHARACTERISTICS ($V_{EE} = -4.2$ to $-4.8V$, $V_{CC} = V_{CCA} = GND$, $T_a = 0$ to $+85^\circ C$)

Item	Symbol	Test Condition	min	typ	max	Unit
Supply Current	I_{EE}	All input open	137	195	255	mA
Input Current	I_{IH}	$V_{IX} = V_{IH \text{ max}}$	—	—	220	μA

Note) As for other items, refer to the "Common DC Characteristics".

■ AC CHARACTERISTICS ($V_{EE} = -2.2$ to $-2.8V$, $V_{CC} = V_{CCA} = 2.0V$)

● HD100180

Item	Symbol	Test Condition	0°C		25°C			85°C		Unit
			min	max	min	typ	max	min	max	
Propagation Delay Time	t_{PLH}, t_{PHL}	See test circuit and waveform	A _n , B _n input to F _n		1.10	3.40	1.20	2.25	3.55	ns
			A _n , B _n input to $\bar{P}$		0.85	2.60	1.00	1.70	2.75	
			A _n , B _n input to $\bar{G}$		1.40	3.00	1.40	2.30	3.20	
			$\bar{C}_{IX}$ input to F _n		0.90	3.10	1.00	2.10	3.25	
Transition Time	t_{TLH}, t_{THL}		0.45	2.30	0.45	1.30	2.30	0.45	2.40	ns

● HD100180F

Item	Symbol	Test Condition	0°C		25°C			85°C		Unit
			min	max	min	typ	max	min	max	
Propagation Delay Time	t_{PLH}, t_{PHL}	See test circuit and waveform	A _n , B _n input to F _n		1.20	3.40	1.20	2.25	3.55	ns
			A _n , B _n input to $\bar{P}$		0.85	2.60	0.90	1.70	2.70	
			A _n , B _n input to $\bar{G}$		1.40	3.10	1.40	2.10	3.20	
			$\bar{C}_{IX}$ input to F _n		0.90	3.25	1.00	2.10	3.25	
Transition Time	t_{TLH}, t_{THL}		0.45	2.20	0.45	1.30	2.20	0.45	2.20	ns

Note) The circuit in a test socket or mounted on a printed circuit board and transverse air flow greater than 2.5 m/s (500 linear fpm) is maintained.