

CD54HC182/3A

CD54HCT182/3A

Carry Generator

The RCA CD54HC182 and CD54HCT182 carry lookahead generators are high-speed silicon-gate CMOS devices and are pin compatible with low-power Schottky TTL (LSTTL).

The CD54HC/HCT182 accept up to four pairs of active LOW carry propagate ($\bar{P}_0, \bar{P}_1, \bar{P}_2, \bar{P}_3$) and carry generate ($\bar{G}_0, \bar{G}_1, \bar{G}_2, \bar{G}_3$) signals and an active HIGH carry input (C_n). The devices provide anticipated active HIGH carries ($C_{n+x}, C_{n+y}, C_{n+z}$) across four groups of binary adders. The HC/HCT182 also has active LOW carry propagation ($\bar{P}$) and carry generate ($\bar{G}$) outputs which may be used for further levels of look ahead.

The logic equations provided at the outputs are:

$$C_{n+x} = P_0 C_n$$

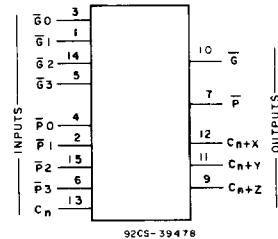
$$C_{n+y} = G_1 + P_1 G_0 + P_1 P_0 C_n$$

$$C_{n+z} = G_2 + P_2 G_1 + P_2 P_1 G_0 + P_2 P_1 P_0 C_n$$

$$\bar{G} = \bar{G}_3 + P_3 \bar{G}_2 + P_3 P_2 \bar{G}_1 + P_3 P_2 P_1 \bar{G}_0$$

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

The CD54HCT182 can also be used with binary ALUs in an active LOW or active HIGH input operand mode. The connections to and from the ALU to the carry look ahead generator are identical in both cases.



FUNCTIONAL DIAGRAM

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Package Specifications

See Section 11, Fig. 11

Static Electrical Characteristics (Limits with black dots (•) are tested 100%)

CHARACTERISTICS		TEST CONDITIONS								
		HC/HCT				V _{IN}		LIMITS		UNITS
						HC	HCT			
		V _{DD}	V _O	I _O	V _{CC} or GND	V _{IL} or V _{IH}	V _{IL} or V _{IH}	MIN.	MAX.	
Quiescent Device Current I _{CC}	25°C	6	—	—	6, 0	—	—	—	8•	μA
	-55°C	6	—	—	6, 0	—	—	—	160•	
	+125°C	6	—	—	6, 0	—	—	—	160•	

The complete static electrical test specification consists of the above by-type static tests combined with the standard static tests in the beginning of this section.

HCT INPUT LOADING TABLE

INPUT	UNIT LOAD*
P ₀ , P ₁ , P ₂ , G ₀ , G ₁	1.5
P ₃ , G ₂ , C _n	1.25
G ₃	0.3

*Unit load is ΔI_{CC} limit specified in Static Characteristics Chart, e.g., 360 μA max. @ 25°C.

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Switching Speed

(Limits with black dots (•) are tested 100%.)

SWITCHING CHARACTERISTICS ($C_L = 50 \text{ pF}$, Input $t_r, t_f = 6 \text{ ns}$)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS V _{CC} V	LIMITS								UNITS
			25°C				-55°C to +125°C				
			HC		HCT		54HC		54HCT		
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Propagation Delay	t _{PHL} t _{PHL} G _n to any output	2	—	120	—	—	—	180	—	—	ns
P _n to P		4.5	—	24•	—	28•	—	36•	—	42•	
		6	—	20	—	—	—	31	—	—	
C _n to any output		2	—	150	—	—	—	225	—	—	
		4.5	—	30•	—	40•	—	45•	—	60•	
		6	—	26	—	—	—	38	—	—	
P _n to any output		2	—	145	—	—	—	220	—	—	
		4.5	—	29	—	33	—	36	—	50	
		6	—	25	—	—	—	31	—	—	
G _n to any output		2	—	135	—	—	—	205	—	—	
		4.5	—	27•	—	32•	—	41•	—	48•	
		6	—	23	—	—	—	35	—	—	
Transition Time	t _{TLH} t _{THL}	2	—	75	—	—	—	110	—	—	
		4.5	—	15	—	15	—	22	—	22	
		6	—	13	—	—	—	19	—	—	
Input Capacitance	C _i	—	—	10	—	10	—	10	—	10	pF

Burn-In Test-Circuit Connections

(Use Static II for /3A burn-in and Dynamic for Life Test.)

Static	STATIC BURN-IN I			STATIC BURN-IN II		
	OPEN	GROUND	V_{CC} (6V)	OPEN	GROUND	V_{CC} (6V)
CD54HC/HCT182	7,9-12	1-6,8,13-15	16	7,9-12	8	1-6,13-16
Dynamic	OPEN	GROUND	$1/2 V_{CC}$ (3V)	V_{CC} (6V)	OSCILLATOR	
	—	8	7,9-12	16	50 kHz	25 kHz
CD54HC/HCT182	—	8	7,9-12	16	1-6,14,15	13

NOTE: Each pin except V_{CC} and Gnd will have a resistor of 2k-47k ohms.