Signetics

LOOK-AHEAD CARRY GENERATOR

S54182
N74182

S54182–B,F,W • N74182–B,F

## DIGITAL 54/74 TTL SERIES

DESCRIPTION

The S54182, N74182 is a high-speed, look-ahead carry generator capable of anticipating a carry across four binary adders or group of adders. It is cascadable to perform full look-ahead across n-bit adders, with only 13 nanoseconds delay for each level of look-ahead. Carry, generate-carry, and propagate-carry functions are provided as enumerated in the pin designation table above.

The S54182 or N74182, when used in conjunction with the S54181 or N74181 arithmetic logic unit (ALU), provides full high-speed carry look-ahead capability for up to n-bit words. Each S54182/N74182 generates the look-ahead (anticipated carry) across a group of four ALUs and, in addition, other carry look-ahead circuits may be employed to anticipate carry across sections of four look-ahead packages up to n-bits. Applications data for the S54181/N74181 illustrates cascading of S54182/N74182 circuits to perform multi-level look-ahead.

PIN CONFIGURATIONS

B,F,W PACKAGE
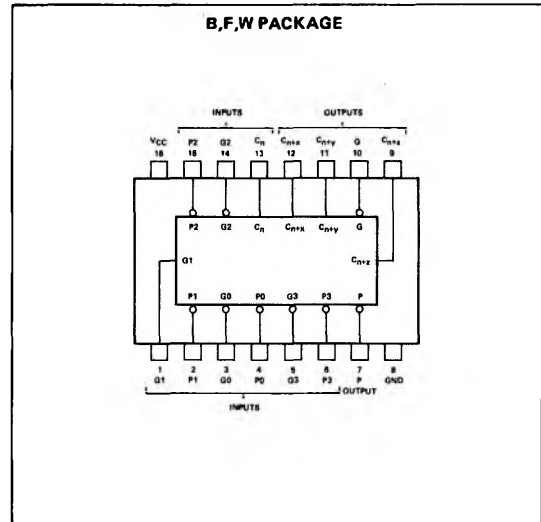
LOGIC DIAGRAM
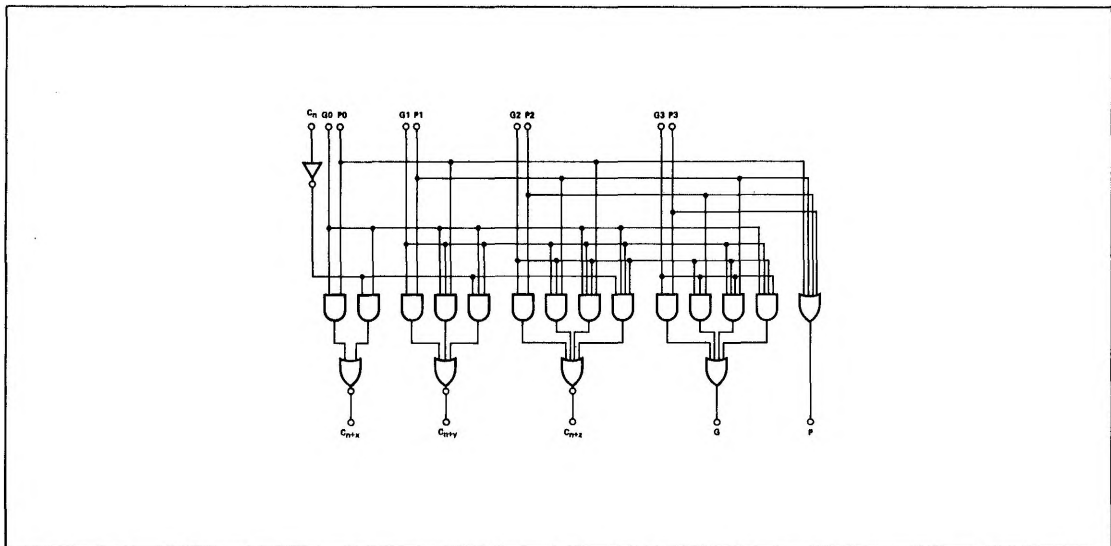
RECOMMENDED OPERATING CONDITIONS

	S54182			N74182			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply Voltage V_{CC}	4.5	5	5.5	4.75	5	5.25	V
Normalized Fan-Out from each Output, N: High logic level			20			20	
Low logic level			10			10	
Operating Free-Air Temperature Range, T_A	-55	25	125	0	25	70	°C

ELECTRICAL CHARACTERISTICS (over recommended operating free-air temperature range unless otherwise noted)

	PARAMETER	TEST CONDITIONS*		MIN	TYP**	MAX	UNIT
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					0.8	V
V_{OH}	High-level output voltage	V_{CC} = MIN, V_{IL} = 0.8V,	V_{IH} = 2V, I_{OH} = -800μA	2.4			V
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IL} = 0.8V,	V_{IH} = 2V, I_{OL} = 16mA			0.4	V
I_{IH}	High-level input current (C_n input)					80	μA
I_{IH}	High-level input current (P3 input)					120	μA
I_{IH}	High-level input current (P2 input)					160	μA
I_{IH}	High-level input current (P0, P1, or G3 input)	V_{CC} = MAX,	V_I = 2.4V			200	μA
I_{IH}	High-level input current (G0 or G2 input)					360	μA
I_{IH}	High-level input current (G1 input)					400	μA
I_{IH}	High-level input current (any input)	V_{CC} = MAX,	V_I = 5.5V			1	mA
I_{IL}	Low-level input current (C_n input)					-3.2	mA
I_{IL}	Low-level input current (P3 input)					-4.8	mA
I_{IL}	Low-level input current (P2 input)					-6.4	mA
I_{IL}	Low-level input current (P0, P1, or G3 input)	V_{CC} = MAX,	V_I = 0.4V			-8	mA
I_{IL}	Low-level input current (G0 or G2 input)					-14.4	mA
I_{IL}	Low-level input current (G1 input)					-16	mA
I_{OS}	Short-circuit output current †	V_{CC} = MAX		-40		-100	mA
I_{CCH}	Supply current, all outputs high	V_{CC} = MAX	S54182		27		mA
			N74182		27		
I_{CCL}	Supply current, all outputs low	V_{CC} = MAX	S54182		45	65	mA
			N74182		45	72	

SWITCHING CHARACTERISTICS, V_{CC} = 5V, T_A = 25°C, N = 10

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L = 15pF, R_L = 400Ω		11	17	ns
t_{PHL}	Propagation delay time, high-to-low-level output			15	22	ns

* For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.
** All typical values are at V_{CC} = 5V, T_A = 25°C.
† Not more than one output should be shorted at a time and duration of the short-circuit test should not exceed one second.