

## OBJECTIVE SPECIFICATION

74S182/183-A,F,W

### DESCRIPTION

The "182" is a high speed Look-Ahead Carry Generator ordinarily used with the "181" 4-Bit ALU or other arithmetic processing elements. This combination provides high speed Look-Ahead over word lengths of more than 4 bits.

The "182" accepts up to 4 pairs of active Low Carry Propagate and Carry Generate signals, an active High Carry input, and provides anticipated active High carries across 4 groups of binary adders.

Logic equations provided at the outputs are:

$$C_{n+x} = G_0 + P_0 C_n$$

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

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

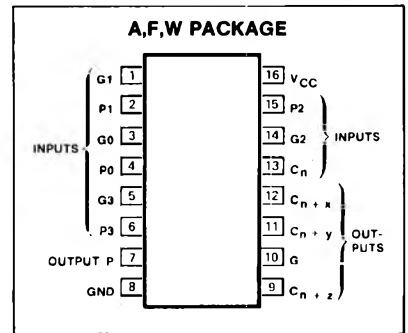
$$\bar{G} = \bar{G}_3 + P_3 G_2 + P_3 P_2 G_1 + P_3 P_2 P_1 G_0$$

$$\bar{P} = \bar{P}_3 P_2 P_1 P_0$$

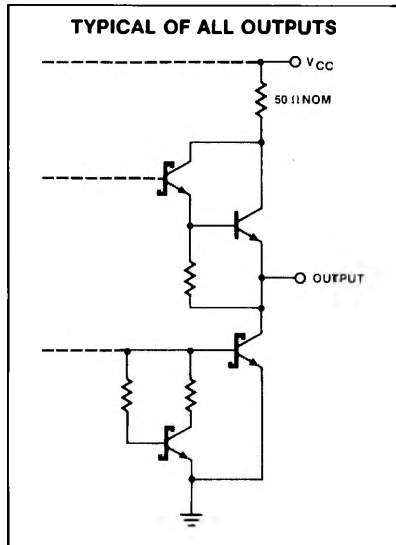
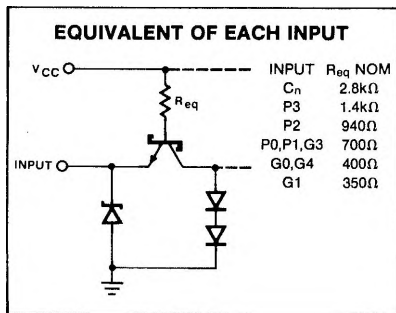
### FEATURES

- Provides look-ahead carries across a group of 4 ALU's
- Multi-level look-ahead for high speed arithmetic operation over long word lengths

### PIN CONFIGURATION



### INPUT/OUTPUT SCHEMATICS



### PIN DESIGNATION

PIN NOS.	DESIGNATION	FUNCTION
G0,G1,G2,G3	3,1,14,5	Active-Low Carry Generate Inputs
P0,P1,P2,P3	4,2,15,6	Active-Low Carry Propagate Inputs
C <sub>n</sub>	13	Carry Input
C <sub>n+x</sub> , C <sub>n+y</sub> , C <sub>n+z</sub>	12,11,9	Carry Outputs
G	10	Active-Low Carry Generate Output
P	7	Active-Low Carry Propagate Output
V <sub>cc</sub>	16	Supply Voltage
GND	8	Ground

**DC ELECTRICAL CHARACTERISTICS**

PARAMETER	TEST CONDITIONS	74S182			74S183			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>IL</sub>	Input Low voltage			0.8		0.8		V
V <sub>IH</sub>	Input High voltage							V
V <sub>CD</sub>	Input clamp diode voltage	V <sub>CC</sub> = Min, I <sub>IN</sub> = -12mA	2.0		-1.5	2.0	-1.2	V
V <sub>OL</sub>	Output Low voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = 16mA			0.4		0.5	V
V <sub>OH</sub>	Output High voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = -800μA	2.4			2.7		V
I <sub>IH</sub>	Input High current	V <sub>CC</sub> = Max, V <sub>IN</sub> = 2.4V						
	C <sub>n</sub> input			80			50	μA
	P <sub>2</sub> input			160			150	μA
	P <sub>3</sub> input			120			100	μA
	P <sub>0</sub> , P <sub>1</sub> , G <sub>3</sub> input			200			200	μA
	G <sub>0</sub> , G <sub>2</sub> input			360			350	μA
	G <sub>1</sub> input			400			400	μA
I <sub>IL</sub>	Input Low current	V <sub>CC</sub> = Max, V <sub>IN</sub> = 0.4V						
	C <sub>n</sub> input			-3.2			-2.0	mA
	P <sub>2</sub> input			-6.4			-6.0	mA
	P <sub>3</sub> input			-4.8			-4.0	mA
	P <sub>0</sub> , P <sub>1</sub> , G <sub>3</sub> input			-8.0			-8.0	mA
	G <sub>0</sub> , G <sub>2</sub> input			-14.4			-14	mA
	G <sub>1</sub> input			-16			-16	mA
I <sub>OS</sub>	Output short circuit current	V <sub>CC</sub> = Max	-40		-100	-40	-100	mA
I <sub>CC</sub>	Power supply current	V <sub>CC</sub> = Max, V <sub>IN</sub> = 5V			72		109	mA

**AC ELECTRICAL CHARACTERISTICS** T<sub>A</sub> = 25°C, V<sub>CC</sub> = +5V unless otherwise specified.

PARAMETER	TO	FROM	TEST CONDITIONS	54/74			54/74S			UNIT
				Min	Typ	Max	Min	Typ	Max	
Propagation delay time										
t <sub>PLH</sub>					11	17				ns
t <sub>PHL</sub>					15	22				
t <sub>PLH</sub>										
t <sub>PHL</sub>	G <sub>0</sub> , G <sub>1</sub> , G <sub>2</sub>	C <sub>n+x</sub> ,	C <sub>L</sub> = 15pF R <sub>L</sub> = 400Ω <sup>1</sup> R <sub>L</sub> = 280Ω <sup>2</sup>				4.5	7		
t <sub>PLH</sub>	G <sub>3</sub> , P <sub>0</sub> , P <sub>1</sub>	C <sub>n+y</sub>					4.5	7		
t <sub>PHL</sub>	P <sub>2</sub> , P <sub>3</sub>	C <sub>n+z</sub>					5	7.5		
t <sub>PLH</sub>	G <sub>0</sub> , G <sub>1</sub> , G <sub>2</sub> ,	G					7	10.5		
t <sub>PHL</sub>	G <sub>3</sub> , P <sub>1</sub> , P <sub>2</sub>									
t <sub>PHL</sub>	P <sub>3</sub>									
t <sub>PLH</sub>	P <sub>0</sub> , P <sub>1</sub> , P <sub>2</sub>	P					4.5	6.5		
t <sub>PHL</sub>	P <sub>3</sub>									
t <sub>PHL</sub>								6.5	10	
t <sub>PLH</sub>	C <sub>n</sub>	C <sub>n+x</sub> ,						6.5	10	
		C <sub>n+y</sub>								
t <sub>PHL</sub>		C <sub>n+z</sub>					7	10.5		

NOTES

Load circuit and typical waveforms are shown at the front of section.

1. R<sub>L</sub> = 400Ω for 54/74.
2. R<sub>L</sub> = 280Ω for 54/74S.

LOGIC DIAGRAM

