



# SPXXHC80 SPXXHC82 SPXXHC298

## Features

- Utilizes SPI's Selective Oxidation, Silicon-Gate CMOS Process.
- Speed, function and pin-out compatible to 74LS series Logic.
- High Noise Immunity.
- Low quiescent power consumption.
- Wide power supply range.
- Operates over  $V_{CC}$  range of 2.0 to 6.0 Volts.
- Symmetric current drive.
- All Inputs are fully buffered.
- All devices have Input Protection diodes to  $V_{CC}$  and ground.
- All devices have Logic Input voltage levels consistent with CMOS.

All devices contain diodes to protect inputs against damage due to high static voltages or electric fields; however, it is advised that precautions be taken not to exceed the maximum recommended input voltages. All unused inputs must be connected to an appropriate logic voltage level (either  $V_{CC}$  or GND).

# 54/74 Series Adders/Registers

## Ordering Information

Plastic DIP, Industrial Temp Range	Ceramic DIP, Industrial Temp Range	Ceramic DIP, Military Temp Range
SP74HCXXXN	SP74HCXXXJ	SP54HCXXXJ

## Absolute Maximum Ratings

Parameter	Min	Max	Units
$V_{CC}$ DC Supply Voltage	-0.5	+7.0	V
$V_I, V_O$ Input or Output Voltage	-0.5	$V_{CC} + 0.5$	V
$I_L$ DC Current Per Pin Any Input or Output	—	25	mA
$I_{CC}$ DC Current Drain, $V_{CC}$ or GND	—	50	mA
$T_S$ Storage Temperature	-65	+150	°C
$P_D$ Power Dissipation (Note 1)	—	500	mW
$T_L$ Lead Temperature (1/16" from mounting surface for 10 sec)	—	+300	°C

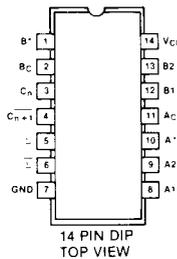
Note 1: Derate at 12mW/°C over +45 to +85°C for Plastic "N" Package.

## Recommended Operating Conditions

Parameter	SP74HCXXX		SP54HCXXX		Units
	Min	Max	Min	Max	
$V_{CC}$ DC Supply Voltage Range	2.0	6.0	2.0	6.0	V
$V_I, V_O$ Input Voltage, Output Voltage	0	$V_{CC}$	0	$V_{CC}$	V
$T_A$ Operating Temperature Range	-40	+85	-55	+125	°C

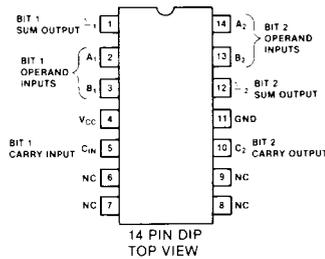
### SPXXHC80

Gated Full Adder



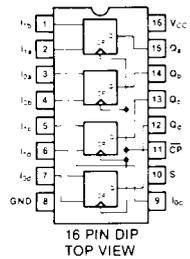
### SPXXHC82

2-Bit Full Adder



### SPXXHC298

Quad 2-Port Register





### DC Electrical Characteristics

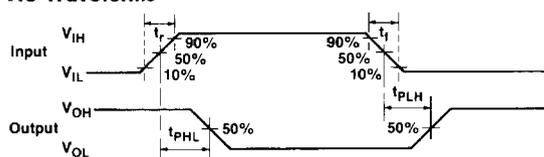
Symbol	Parameter	Conditions	V <sub>CC</sub>	Typ T = 25 °C	Guaranteed Limits		Units	
					SP74HC -40 to +85 °C	SP54HC -55 to +125 °C		
V <sub>IH</sub>	Minimum High Level Input Voltage	V <sub>O</sub> = 0.1V or V <sub>CC</sub> - 0.1V I <sub>O</sub> ≤ 20 μA	2.0V		1.5	1.5	V	
			4.5V		3.15	3.15		
			6.0V		4.2	4.2		
V <sub>IL</sub>	Maximum Low Level Input Voltage	V <sub>O</sub> = 0.1V or V <sub>CC</sub> - 0.1V I <sub>O</sub> ≤ 20 μA	2.0V		0.3	0.3	V	
			4.5V		0.9	0.9		
			6.0V		1.2	1.2		
V <sub>OH</sub>	Minimum High Level Output Voltage	I <sub>OH</sub> = 20 μA V <sub>I</sub> = V <sub>CC</sub> or GND	2.0V	2.0	1.9	1.9	V	
			4.5V	4.5	4.4	4.4		
			6.0V	6.0	5.9	5.9		
V <sub>OL</sub>	Maximum Low Level Output Voltage	I <sub>OL</sub> = 20 μA V <sub>I</sub> = V <sub>CC</sub> or GND	2.0V	0	0.1	0.1	V	
			4.5V	0	0.1	0.1		
			6.0V	0	0.1	0.1		
V <sub>OL</sub>	Maximum Low Level Output Voltage	I <sub>OL</sub> = * V <sub>I</sub> = V <sub>CC</sub> or GND	4.5V	0.1	0.3	0.4	V	
			6.0V	0.1	0.3	0.4		
			6.0V	0.1	0.3	0.4		
I <sub>IN</sub>	Input Leakage Current	V <sub>I</sub> = V <sub>CC</sub> or GND V <sub>CC</sub> = 2.0 to 6.0V			±1.0	±1.0	μA	
I <sub>CC</sub>	Maximum Quiescent Supply Current	V <sub>I</sub> = V <sub>CC</sub> or GND I <sub>O</sub> = 0 μA	T <sub>A</sub> = 25 °C	5.0V	0.1	2.0	2.0	μA
			T <sub>A</sub> = 85 °C	5.0V		20.0	20.0	
			T <sub>A</sub> = 125 °C	5.0V		5.0V	40.0	

\* 4ma STD outputs 6ma Bus-Drivers

### AC Electrical Characteristics (V<sub>CC</sub> = 5.0V, t<sub>r</sub> = t<sub>f</sub> = 6ns, T<sub>A</sub> = 25 °C, unless otherwise specified)

Device Typ	Symbol	Parameter	Conditions	Typ	Guaranteed Limit	Units
80	t <sub>PHL</sub> , t <sub>PLH</sub>	A <sub>C</sub> to Σ	C <sub>L</sub> = 15pF	23		ns
			C <sub>L</sub> = 50pF	25		
	t <sub>PHL</sub> , t <sub>PLH</sub>	B <sub>C</sub> to Σ	C <sub>L</sub> = 15pF	33		ns
			C <sub>L</sub> = 50pF	35		
	t <sub>PHL</sub> , t <sub>PLH</sub>	B <sub>C</sub> to C <sub>N</sub> + 1	C <sub>L</sub> = 15pF	22		ns
		C <sub>L</sub> = 50pF	25			
82	t <sub>PHL</sub> , t <sub>PLH</sub>	C <sub>N</sub> to C <sub>N</sub> + 1	C <sub>L</sub> = 15pF	19		ns
			C <sub>L</sub> = 50pF	21		
	C <sub>IN</sub>	Input Capacitance		2		pF
				2		pF
	82	t <sub>PHL</sub> , t <sub>PLH</sub>	I <sub>C0</sub> to Σ <sub>1</sub>	C <sub>L</sub> = 15pF	17	
C <sub>L</sub> = 50pF				19		
t <sub>PHL</sub> , t <sub>PLH</sub>		C <sub>0</sub> to Σ <sub>2</sub>	C <sub>L</sub> = 15pF	32		ns
			C <sub>L</sub> = 50pF	35		
t <sub>PHL</sub> , t <sub>PLH</sub>		C <sub>0</sub> to C <sub>2</sub>	C <sub>L</sub> = 15pF	30		ns
		C <sub>L</sub> = 50pF	33			
298	t <sub>PHL</sub> , t <sub>PLH</sub>	B <sub>2</sub> to Σ <sub>2</sub>	C <sub>L</sub> = 15pF	21		ns
			C <sub>L</sub> = 50pF	23		
	C <sub>IN</sub>	Input Capacitance		2		pF
				2		pF
	298	t <sub>PHL</sub> , t <sub>PLH</sub>	Clock to Q <sub>n</sub>	C <sub>L</sub> = 15pF	20	
C <sub>L</sub> = 50pF				23		
298	C <sub>IN</sub>	Input Capacitance		2		pF
				2		pF

### AC Waveforms



### Propagation Time Test Circuit

