

SPXXHC42 SPXXHC138 SPXXHC139

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 Decoders/Demultiplexers

Ordering Information

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

Absolute Maximum Ratings

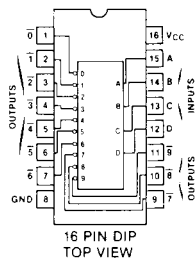
Parameter	Min	Max	Units
V_{CC} DC Supply Voltage	-0.5	+7.0	V
V_I, V_O Input or Output Voltage	-0.5	$V_{CC} + 0.5$	V
I_L DC Current Per Pin Any Input or Output	—	25	mA
I_{CC} DC Current Drain, V_{CC} or GND	—	50	mA
T_S Storage Temperature	-65	+150	°C
P_D Power Dissipation (Note 1)	—	500	mW
T_L Lead Temperature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

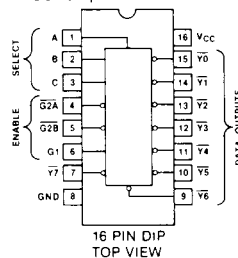
Recommended Operating Conditions

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

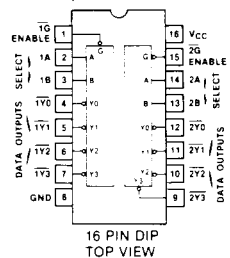
SPXXHC42
1-of-10 BCD-to-Decimal
Decoder



SPXXHC138
1-of-8 Decoder/
Demultiplexer



SPXXHC139
Dual 1-of-4 Decoder/
Demultiplexer



DC Electrical Characteristics

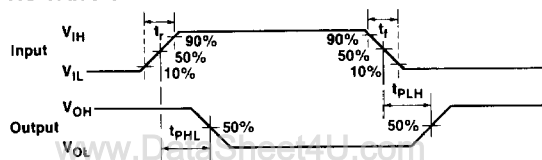
Symbol	Parameter	Conditions	Guaranteed Limits				Units	
			V _{CC}	Typ T = 25 °C	SP74HC -40 to +85 °C	SP54HC -55 to +125 °C		
V _{IH}	Minimum High Level Input Voltage	V _O = 0.1V or V _{CC} - 0.1V I _O ≤ 20 μA	2.0V		1.5	1.5	V	
			4.5V		3.15	3.15		
			6.0V		4.2	4.2		
V _{IL}	Maximum Low Level Input Voltage	V _O = 0.1V or V _{CC} - 0.1V I _O ≤ 20 μA	2.0V		0.3	0.3	V	
			4.5V		0.9	0.9		
			6.0V		1.2	1.2		
V _{OH}	Minimum High Level Output Voltage	I _{OH} = 20 μA V _I = V _{CC} 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		
			4.5V	*	3.7	3.7	V	
6.0V	*	5.2	5.2					
V _{OL}	Maximum Low Level Output Voltage	I _{OL} = 20 μA V _I = V _{CC} or GND	2.0V	0	0.1	0.1	V	
			4.5V	0	0.1	0.1		
			6.0V	0	0.1	0.1		
			4.5V	*	0.3	0.4	V	
6.0V	*	0.3	0.4					
I _{IN}	Input Leakage Current	V _I = V _{CC} or GND V _{CC} = 2.0 to 6.0V			±1.0	±1.0	μA	
I _{CC}	Maximum Quiescent Supply Current	V _I = V _{CC} or GND I _O = 0 μA	T _A = 25 °C	5.0V	0.1	2.0	2.0	μA
			T _A = 85 °C	5.0V		20.0	20.0	
			T _A = 125 °C	5.0V			40.0	
			5.0V			40.0		

* 4ma STD outputs 6ma Bus-Drivers

AC Electrical Characteristics (V_{CC} = 5.0V, t_r = t_f = 6ns, T_A = 25 °C, unless otherwise specified)

Device Type	Symbol	Parameter	Conditions	Typ	Guaranteed Limit	Units
42	t _{PHL} , t _{PLH}	Input to Output 2-Level	C _L = 15pF	21		ns
			C _L = 50pF	23		
	t _{PHL} , t _{PLH}	Input to Output 3-Level	C _L = 15pF C _L = 50pF	25 27		ns
	C _{IN}	Input Capacitance		2		pF
138	t _{PHL} , t _{PLH}	Input to O ₀ , O ₆	C _L = 15pF	23		ns
			C _L = 50pF	25		
	t _{PHL} , t _{PLH}	Input to O ₁	C _L = 15pF C _L = 50pF	18 20		ns
	t _{PHL} , t _{PLH}	Enable to Output	C _L = 15pF C _L = 50pF	23 25		ns
	C _{IN}	Input Capacitance		2		pF
139	t _{PHL} , t _{PLH}	A to Q	C _L = 15pF	15		ns
			C _L = 50pF	17		
	t _{PHL} , t _{PLH}	Enable to Q	C _L = 15pF C _L = 50pF	11 13		ns
	f _{max}	Max Frequency		30		MHz
	C _{IN}	Input Capacitance		2		pF

AC Waveforms



Propagation Time Test Circuit

