Si9710CY

Siliconix

PCMCIA Interface Switch

Features

- Single SO-16 Package
- CMOS Inputs with Hysteresis
- Extremely Low R_{ON}
- Reverse Blocking Switches
- HiZ Outputs in the Off-State
- Low Power Consumption
- Safe Power-Up

Description

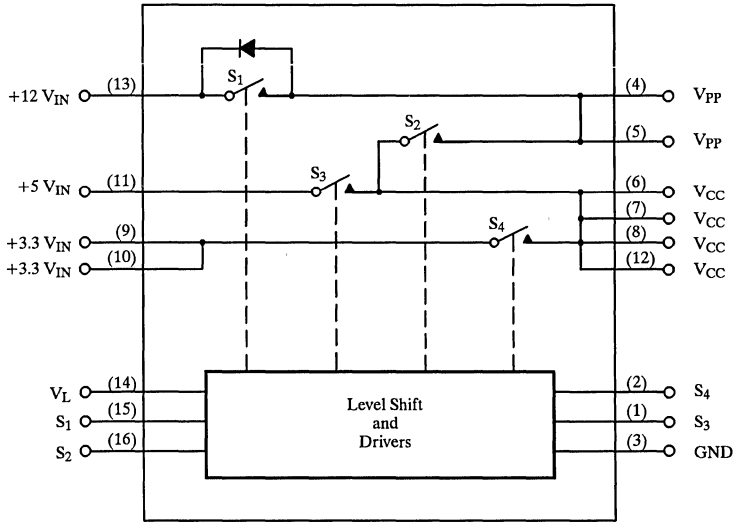
The Si9710CY switch is a monolithic switch designed to meet the needs of the PCMCIA interface. The inputs are fully CMOS compatible and incorporate all the level shift and interface required to be driven by any CMOS driver. The external inputs can be driven to 3.3-V or 5-V by setting V_L at the appropriate level. The switches are low R_{ON} and can carry the maximum currents found on the PCMCIA interface.

The 5-V and 3.3-V switches do not have the parasitic diode found in vertical DMOS power switches.

Low R_{ON} is achieved by using MOSFETs driven off the $+12\text{-}V_{IN}$ input. All level shifting is built into the PCMCIA switch.

The Si9710CY is available in an SO-16 package and is rated over the commercial temperature range 0 to 70°C.

Functional Block Diagram



Truth Table – S_1 through S_4

Logic	Switch
0	OFF
1	ON

Absolute Maximum Ratings

Voltages Referenced to Ground

V_L ..... 7 V
+12 V_{IN} ..... 15 V
+5 V_{IN} ..... 7 V
+3.3 V_{IN} ..... 7 V
S_1 through S_4 (CMOS Inputs) ..... V_L + 0.5 V
I_{OUT} V_{PP} ..... 300 mA
V_{CC} ..... 7 V
V_{PP} ..... 15 V
All Pins ..... −0.5 V
I_{OUT} V_{CC} ..... 1500 mA
PD Max: (T_A = 25°C) ..... 710 mW
(T_A = 70°C) ..... 390 mW
Junction Temperature ..... 125°C

Thermal Ratings

$R_{\Theta JA}$ ..... 140 °C/W

Recommended Operating Conditions

+12 V_{IN} ..... 12 V ± 10%
+5 V_{IN} ..... 5 V ± 10%
+3.3 V_{IN} ..... 3.3 V ± 10%
I_{OUT} V_{CC} ..... 1000 mA
I_{OUT} V_{PP} ..... 150 mA
V_L ..... 5.0 V ± 10%

Specifications

Parameter	Symbol	Test Conditions Unless Otherwise Specified +5 V_{IN} = 5 V, +3.3 V_{IN} = 3.3 V +12 V_{IN} = 12 V, V_L = 5.0 V, GND = 0 V		Limits C Suffix, 0 to 70°C Min[a]	Typ	Max[a]	Unit
Switch 1							
On-Resistance	R_{ON}	I = 120 mA, +12 V_{IN} = 10.8 V S_1 = V_L, S_2 = GND	T_A = 25°C			200	mΩ
			T_A = 70°C			250	
Off Current (+12 V_{IN} to V_{PP})	I_{OFF}	+12 V_{IN} = 13.2 V, V_{PP} = 0 V S_1 = GND	T_A = 25°C			1	µA
			T_A = 70°C			10	
Switching Time	$t_{S1(on)}$	C_L = 0.1 µF, S_2 = Low, R_L = 100 Ω, See Figure 1		0.1		1	µs
	$t_{S1(off)}$			0.5		4	
Switch 2							
On-Resistance	R_{ON}	I = 120 mA, +12 V_{IN} = 10.8 V S_2 = S_3 = V_L	T_A = 25°C			300	mΩ
			T_A = 70°C			350	
Off Current	I_{OFF}	V_{PP} = 13.2 V, V_{CC} = 0 V +12 V_{IN} = 13.2 V	T_A = 25°C			1	µA
			T_A = 70°C			10	
Switching Time	$t_{S2(on)}$	C_L = 0.1 µF, R_L = 100 Ω, S_1 = S_4 = GND S_3 = V_L, See Figure 1		0.1		1	µs
	$t_{S2(off)}$			0.5		4	
Switch 3							
On-Resistance	R_{ON}	I = 500 mA, +12 V_{IN} = 10.8 V S_3 = V_L	T_A = 25°C			200	mΩ
			T_A = 70°C			250	
Off Current	I_{OFF}	+5 V_{IN} = 5.5 V, V_{CC} = 0 V	T_A = 25°C			1	µA
			T_A = 70°C			10	
Switching Time	$t_{S3(on)}$	+5 V_{IN} = 5 V, C_L = 0.1 µF, V_{CC} to GND R_L = 100 Ω, V_{CC} to GND, See Figure 2		0.1		1	µs
	$t_{S3(off)}$			0.5		4	

Specifications

Parameter	Symbol	Test Conditions Unless Otherwise Specified +5 V_{IN} = 5 V, +3.3 V_{IN} = 3.3 V +12 V_{IN} = 12 V, V_L = 5.0 V, GND = 0 V		Limits C Suffix, 0 to 70°C Min[a]	Typ	Max[a]	Unit
Switch 4							
On-Resistance	R_{ON}	I = 500 mA, +12 V_{IN} = 10.8 V S_4 = V_L	T_A = 25°C			150	mΩ
			T_A = 70°C			185	
Off Current	I_{OFF}	+3.3 V_{IN} = 3.6 V, V_{CC} = 0 V S_2 = S_3 = S_4 = GND	T_A = 25°C			1	µA
			T_A = 70°C			10	
Switching Time	$t_{S4(on)}$	+3.3 V_{IN} = 3.3 V, C_L = 0.1 µF, S_3 = GND R_L = 100 Ω, See Figure 2		0.1		1	µs
	$t_{S4(off)}$			0.5		4	
Power Supply							
+12 V_{IN} Current	$I_{+12VIN(1)}$	S_1 = S_4 = GND, S_2 = S_3 = V_L				10	µA
	$I_{+12VIN(2)}$	S_1 = S_4 = V_L, S_2 = S_3 = GND				10	
V_L Current	$I_{VL(1)}$	S_1 = S_4 = GND, S_2 = S_3 = V_L				10	
	$I_{VL(2)}$	S_1 = S_4 = V_L, S_2 = S_3 = GND				10	
Switch Control Inputs							
Input Voltage High	$V_{I(H)}$		V_L = 3.3 V	2.8	2.4		V
			V_L = 5 V	4.0	3.3		
Input Voltage Low	$V_{I(L)}$		V_L = 3.3 V		1.1	0.4	
			V_L = 5 V		1.5	0.8	
Input Hysteresis[b]	$V_{I(H)}-V_{I(L)}$		V_L = 3.3 V	0.5	1.3		
			V_L = 5 V	0.8	1.8		
Input Current High	$I_{I(H)}$	S_1 through S_4 = V_L, V_L = 5 V				1.0	µA
Input Current Low	$I_{I(L)}$	S_1 through S_4 = GND, V_L = 5 V		−1.0			

Notes
a. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
b. Guaranteed by design, not subject to production testing.

Timing Waveforms

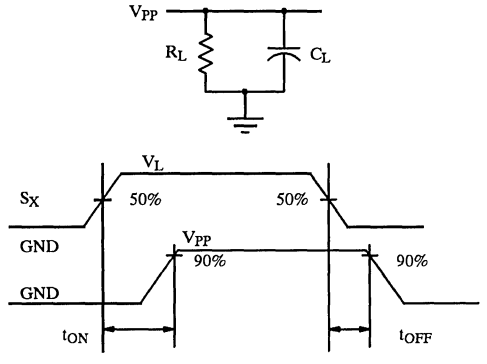


Figure 1.

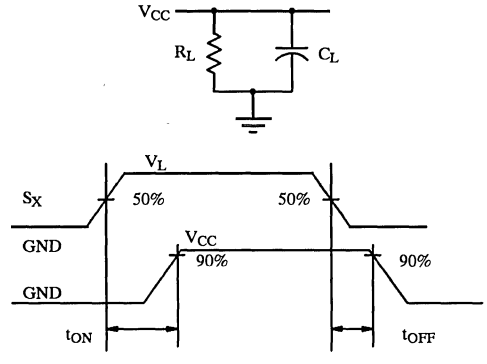
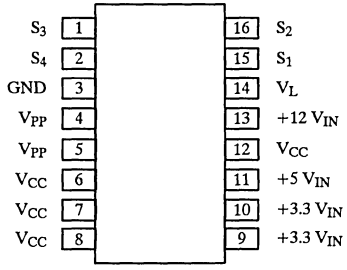


Figure 2.

Pin Configuration

SOIC-16



Top View

Order Number Si9710CY

Pin Description

Pin Number	Symbol	Description
1	S_3	Control input for selecting +5 V_{IN} to V_{CC}. The PCMCIA terminology for this pin is $V_{CC}\_EN_1$.
2	S_4	Control input for selecting +3.3 V_{IN} to V_{CC}. The PCMCIA terminology for this pin is $V_{CC}\_EN_0$.
3	GND	Ground connection.
4, 5	V_{PP}	Program and peripheral voltage to PCMCIA slot.
6, 7, 8, 12	V_{CC}	Supply voltage to slot.
9, 10	+3.3 V_{IN}	+3.3-V supply.
11	+5 V_{IN}	+5-V supply.
13	+12 V_{IN}	+12-V supply.
14	V_L	Rail voltage for switch control inputs, selectable to 5-V or 3.3-V.
15	S_1	Control input for selecting +12 V_{IN} to V_{PP}. The PCMCIA terminology for this pin is $V_{PP}\_EN_1$.
16	S_2	Control input for selecting V_{CC} to V_{PP}. The PCMCIA terminology for this pin is $V_{PP}\_EN_0$.