

PC Card (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

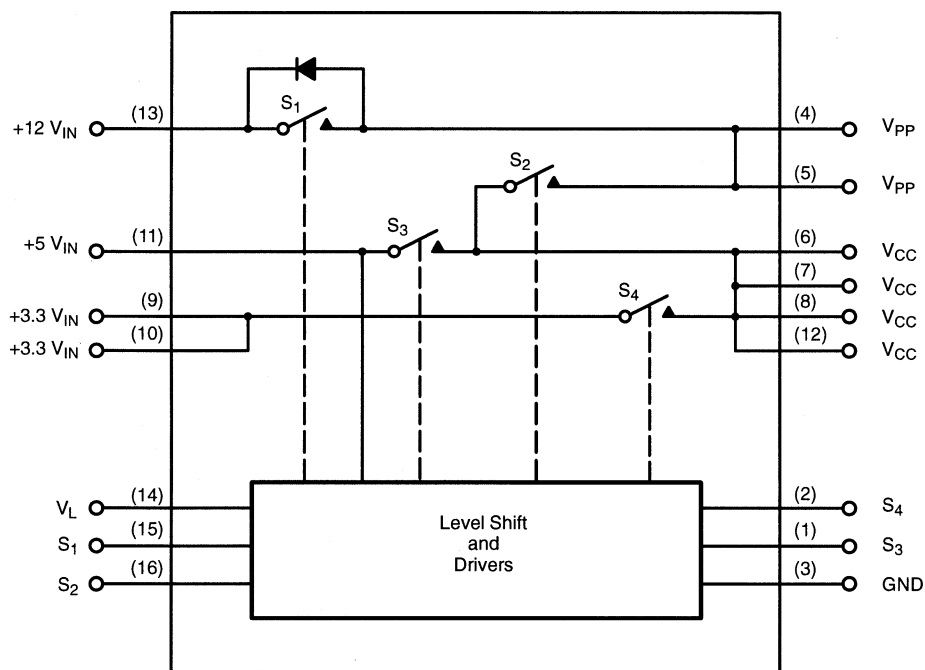
The Si9711CY is a monolithic switch designed to meet the needs of the PC Card interface. The inputs are fully CMOS compatible and incorporate all the level shift and interface required to be driven by any CMOS driver. The external inputs can be driven to 3.3-V or 5-V by setting V_L at the appropriate level. The switches are low R_{ON} and can carry the maximum currents found on the PC Card 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- V_{IN} input. All level shifting is built into the Si9711CY.

The Si9711CY is packaged in an SO-16 package and is rated over the commercial temperature range 0 to 70°C.

FUNCTIONAL BLOCK DIAGRAM



TRUTH TABLE: $S_1 - S_4$	
Logic	Switch
0	OFF
1	ON

ABSOLUTE MAXIMUM RATINGS

Voltages Referenced to Ground

V_L	7 V	V_{PP}	15 V
+12 V_{IN}	15 V	All Pins	-0.5 V
+5 V_{IN}	7 V	$I_{OUT} V_{CC}$	1.5 A
+3.3 V_{IN}	7 V	PD Max: ($T_A = 25^\circ\text{C}$)	710 mW
S_1 through S_4 (CMOS Inputs)	$V_L + 0.5 \text{ V}$	($T_A = 70^\circ\text{C}$)	390 mW
$I_{OUT} V_{PP}$	300 mA	Junction Temperature	125°C
V_{CC}	7 V	Thermal Ratings	
		$R_{\theta JA}$	140°C/W

RECOMMENDED OPERATING CONDITIONS

+12 V_{IN}	12 V $\pm$ 10%	$I_{OUT} V_{CC}$	1 A
+5 V_{IN} (must be present)	5 V $\pm$ 10%	$I_{OUT} V_{PP}$	150 mA
+3.3 V_{IN}	3.3 V $\pm$ 10%	V_L	5.0 V $\pm$ 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			Unit
				Min ^a	Typ	Max ^a	
Switch 1							
On-Resistance	R _{ON}	I = 120 mA, +12 V _{IN} = 10.8 V S ₁ = VL, 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 (+12 V _{IN} to V _{PP})	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 (+12 V _{IN} to V _{PP})	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 _{d(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.	1				μs
	t _{ramp(on)}		200				
	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			Unit
				Min ^a	Typ	Max ^a	
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 _{d(on)}	+3.3 V _{IN} = 3.3 V, C _L = 0.1 μF, S ₃ = GND R _L = 100 Ω, See Figure 2.		1			μs
	t _{ramp(on)}			200			
	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

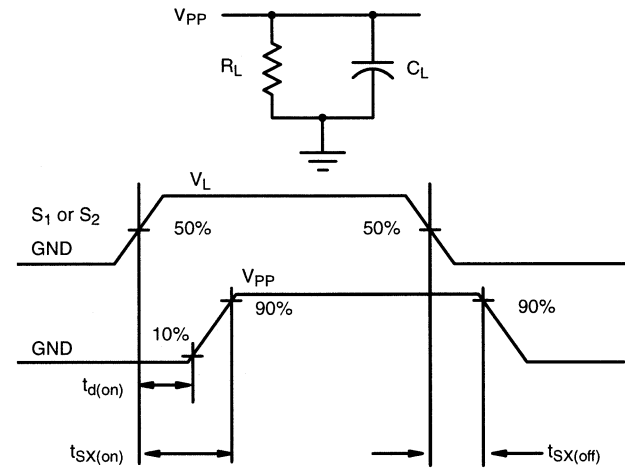


FIGURE 1. $t_{d(on)}$ and $t_{SX(on)}$

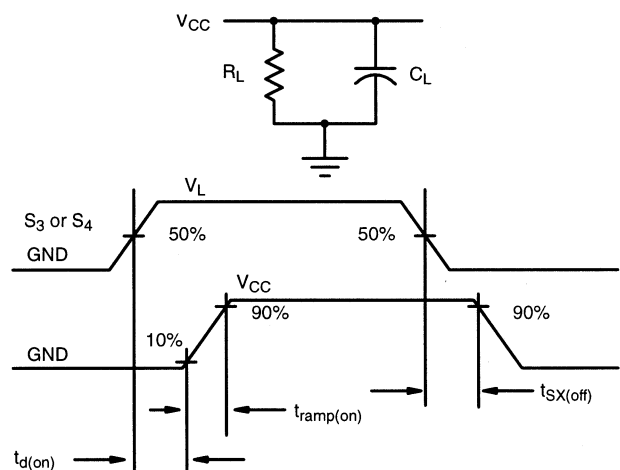
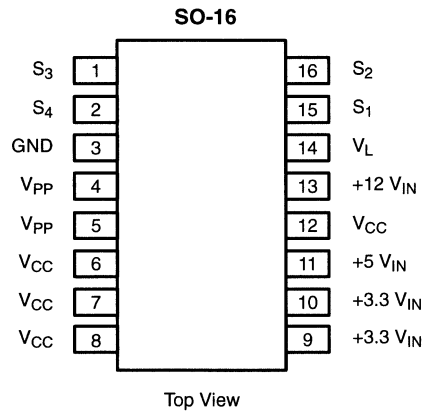


FIGURE 2. $t_{ramp(on)}$

PIN CONFIGURATION



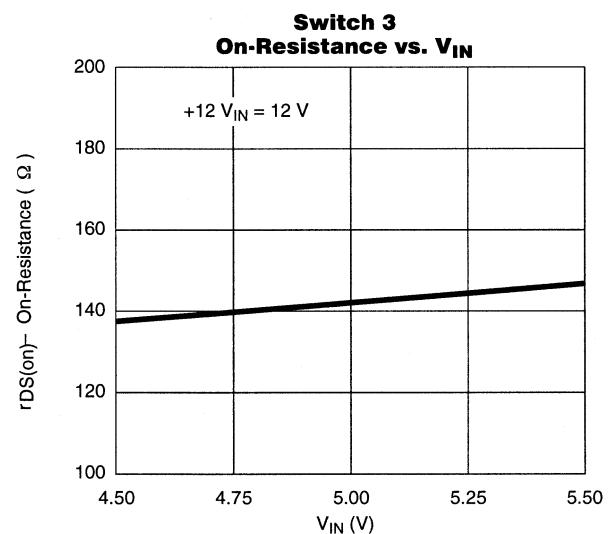
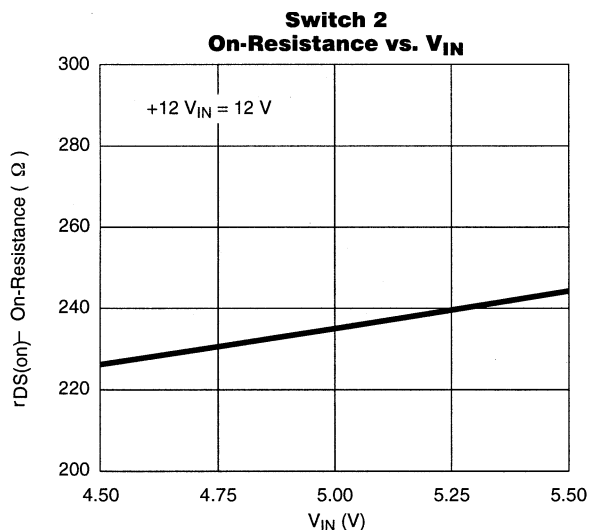
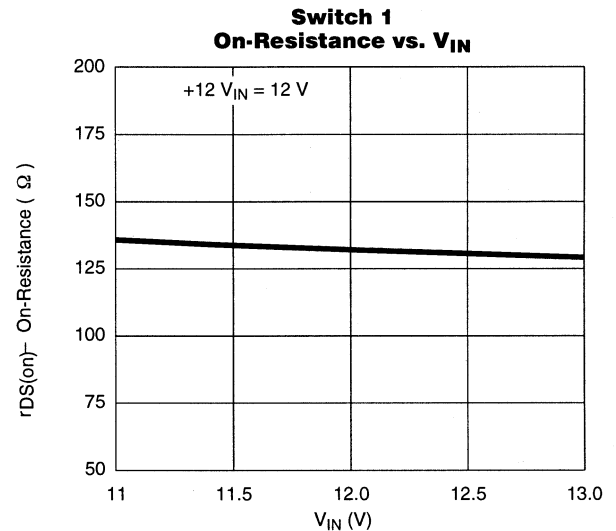
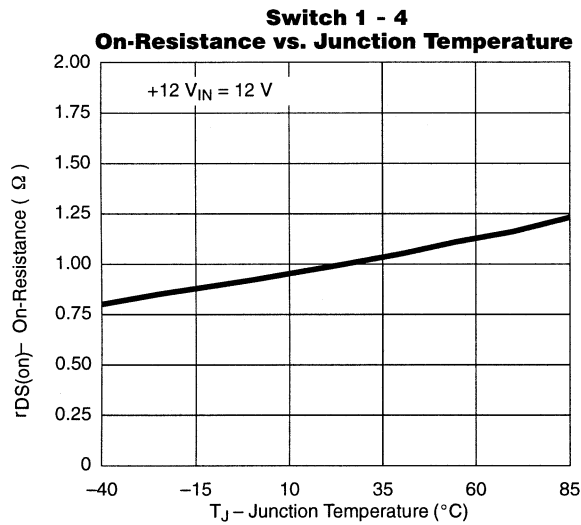
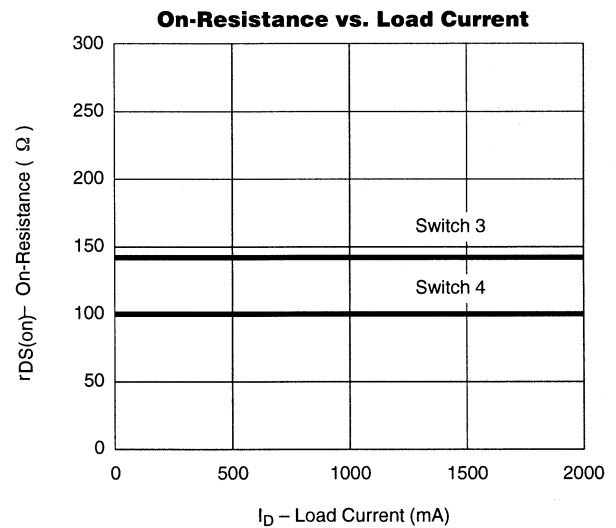
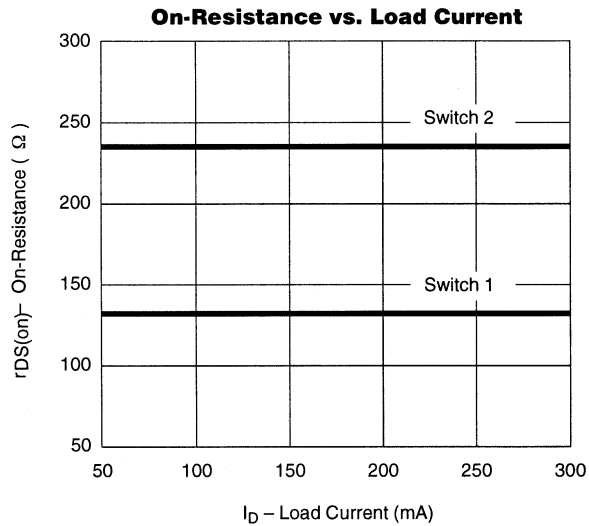
Top View

Order Number: Si9711CY

PIN DESCRIPTION		
Pin Number	Symbol	Description
1	S_3	Control input for selecting +5 V_{IN} to V_{CC} . The PC Card terminology for this pin is V_{CC_EN1} .
2	S_4	Control input for selecting +3.3 V_{IN} to V_{CC} . The PC Card terminology for this pin is V_{CC_EN0} .
3	GND	Ground connection.
4, 5	V_{PP}	Program and peripheral voltage to PC Card 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 PC Card terminology for this pin is V_{PP_EN1} .
16	S_2	Control input for selecting V_{CC} to V_{PP} . The PC Card terminology for this pin is V_{PP_EN0} .



TYPICAL CHARACTERISTICS (25°C UNLESS OTHERWISE NOTED)



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