

PC Card (PCMCIA) Dual Interface Switch

DESCRIPTION

The Si9707 offers an integrated solution for dual PC Card power interfaces that require only V_{CC} switching. This part is ideal for systems that operate at 5 V and provide V_{PP} from the main supply, or from a dedicated Flash RAM 12 V supply.

The Si9707 operates off the 5 V supply with built-in level shifting. The V_{CC} outputs function independently and internal logic protects each slot against a control logic error that would short 5 V to the 3.3 V supply. This protection logic also allows the Si9707 to be configured for positive or negative control logic for compatibility with a variety of PC Card controllers. These control inputs are CMOS logic compatible and can be driven to 3.3 V or 5 V.

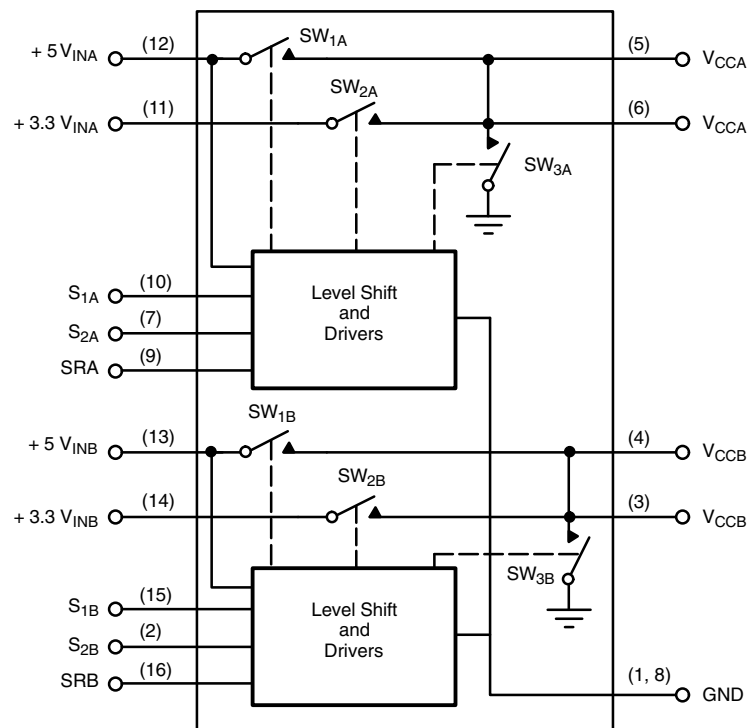
The PC Card Dual Interface Switch is available in a SO-16 narrow-body package and is rated over the industrial temperature range of - 40 to 85 °C.

The Si9707 is available in both standard and lead (Pb)-free packages.

FEATURES

- Single SO-16 Package
- CMOS Logic Compatible Inputs
- Smart Switching
- Slow V_{CC} Ramp Times
- Extremely Low R_{ON}
- Supports Dual PC Card Slots
- Reverse Blocking Switches
- Low Power Consumption
- Safe Power-Up

FUNCTIONAL BLOCK DIAGRAM





ABSOLUTE MAXIMUM RATINGS			
Parameter		Limit	Unit
Voltages Referenced to Ground			
+ 5 V _{INA} , + 5 V _{INB}		7	V
+ 3.3 V _{INA} , + 3.3 V _{INB}		7	
S _{1A} and S _{2A} , S _{1B} , S _{2B} (CMOS Inputs)		7	
All Pins		- 0.5	
I _{OUT} V _{CCA} ^a , I _{OUT} V _{CCB} ^b		4	A
PD Max ^c :	(T _A = 25 °C)	1.65	W
	(T _A = 85 °C)	0.65	
Junction Temperature		125	°C
Thermal Ratings:	R _{θJA} ^c	60	°C/W

Notes:

- a. Pins 5, 6 connected together externally.
 b. Pins 3, 4 connected together externally.
 c. Mounted on 1-IN², FR4 PC Board.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS			
Parameter		Limit	Unit
+ 5 V _{INA} , + 5 V _{INB} (must be present)		5 V ± 10 %	
+ 3.3 V _{INA} , + 3.3 V _{INB}		3.3 V ± 10 %	
C _{SRA} , C _{SRB}		33	nF
I _{OUT} V _{CCA} ^a , I _{OUT} V _{CCB} ^b		2	A
V _{CC} Load Capacitance		150 μF Max	

Notes:

- a. Pins 5, 6 connected together externally.
 b. Pins 3, 4 connected together externally.

SPECIFICATIONS							
Parameter	Symbol	Test Conditions Unless Otherwise Specified C _{SR} = 33 nF, + 5 V _{IN} = 5 V + 3.3 V _{IN} = 3.3 V, Low ≤ 0.8 V, High ≥ 2.2 V	Limits - 40 to 85 °C			Unit	
			Min ^a	Typ	Max ^a		
Switch SW_{1A}, SW_{1B}							
On Resistance	R _{ON}	I = 500 mA, S ₁ = High S ₂ = Low	T _A = 25 °C	58	70	mΩ	
			T _A = 85 °C	73	90		
Off Current (V _{CC})	I _{OFF}	+ 5 V _{IN} = 5.5 V, V _{CC} = 0 V S ₁ = S ₂ = Low	T _A = 25 °C		1	μA	
			T _A = 85 °C		10		
Rise Time	t _{S1(on)}	S ₂ = Low See Figure 1	0.2	1.7	5	ms	
Fall Time	t _{S1(off)}		10	30	50		
Switch SW_{2A}, SW_{2B}							
On Resistance	R _{ON}	I = 500 mA, S ₂ = High S ₁ = Low	T _A = 25 °C	44	55	mΩ	
			T _A = 85 °C	55	70		
Off Current (+ 3.3 V _{IN})	I _{OFF}	+ 3.3 V _{IN} = 3.6 V, V _{CC} = 0 V S ₁ = S ₂ = Low	T _A = 25 °C		1	μA	
			T _A = 85 °C		10		
Rise Time	t _{S2(on)}	S ₁ = Low See Figure 1	0.1	0.9	5	ms	
Fall Time	t _{S2(off)}		5	20	40		



SPECIFICATIONS						
Parameter	Symbol	Test Conditions Unless Otherwise Specified $C_{SR} = 33 \text{ nF}$, $+5 \text{ V}_{IN} = 5 \text{ V}$ $+3.3 \text{ V}_{IN} = 3.3 \text{ V}$, Low $\leq 0.8 \text{ V}$, High $\geq 2.2 \text{ V}$	Limits - 40 to 85 °C			Unit
			Min ^a	Typ	Max ^a	
Switch SW_{3A}, SW_{3B}						
On Resistance	R _{ON}	I = 2 mA, S ₁ = S ₂ = Low	T _A = 25 °C	140	400	Ω
			T _A = 85 °C	200	500	
Power Supply						
+ 5 V _{IN} Current Input (on)	I _{+5VIN(1)}	S ₁ = 0 V, S ₂ = 3 V		20	50	μA
	I _{+5VIN(2)}	S ₁ = 3 V, S ₂ = 0 V		20	50	
+ 5 V _{IN} Current Input (off)	I _{+5VIN(3)}	S ₁ = S ₂ = 0 V		< 1	10	
Switch Control Inputs S_{1X}, S_{2X}						
Input Voltage High	V _{I(H)}	+ 5 V _{INX} = 5.5 V	2.2	1.8		V
		+ 5 V _{INX} = 4.5 V	2.2	1.6		
Input Voltage Low	V _{I(L)}	+ 5 V _{INX} = 5.5 V		1.6	0.8	
		+ 5 V _{INX} = 4.5 V		1.4	0.8	
Input Current High	I _{I(H)}	S _{1X} , S _{2X} = 5 V			1.0	μA
Input Current Low	I _{I(L)}	S _{1X} , S _{2X} = GND	- 1.0			

Notes:

- a. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum.

TIMING WAVEFORMS

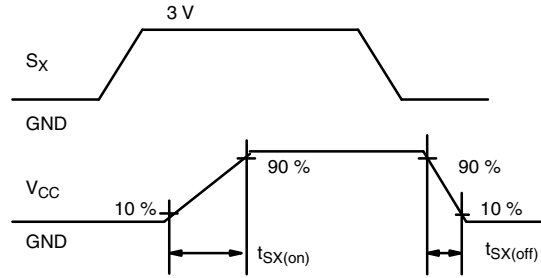
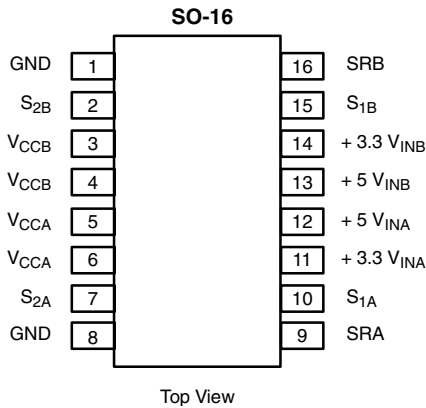


Figure 1. Switch Ramp Time

PIN CONFIGURATION, DESCRIPTION AND ORDERING INFORMATION



Function	Pin Number	Description
S _{1A}	10	Control input for selecting + 5 V _{INA} to V _{CCA} .
S _{1B}	15	Control input for selecting + 5 V _{INB} to V _{CCB} .
S _{2A}	7	Control input for selecting + 3.3 V _{INA} to V _{CCA} .
S _{2B}	2	Control input for selecting + 3.3 V _{INB} to V _{CCB} .
GND	1, 8	Ground connection.
V _{CCA}	5, 6	Supply voltage to slot.
V _{CCB}	3, 4	Supply voltage to slot.
+ 3.3 V _{INA}	11	+ 3.3 V supply.
+ 3.3 V _{INB}	14	+ 3.3 V supply.
+ 5 V _{INA}	12	+ 5 V supply.
+ 5 V _{INB}	13	+ 5 V supply.
SRA	9	Slew rate control pin.
SRB	16	Slew rate control pin.

ORDERING INFORMATION		
Part Number	Temperature Range	Package
Si9707DY	- 40 to 85 °C	SOIC-16
Si9707DY-T1		
Si9707DY-T1-E3		

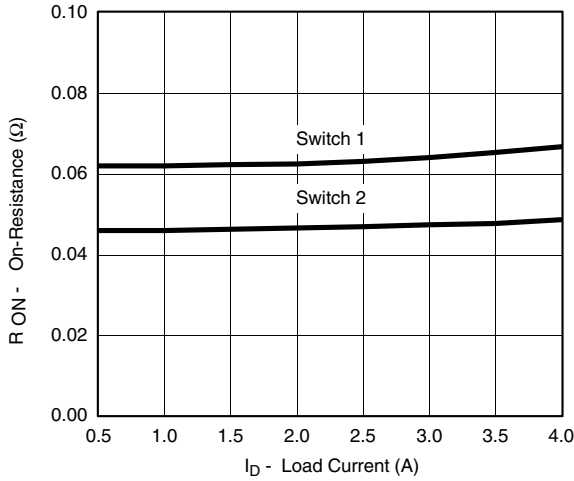
TRUTH TABLE				
S _{1X}	S _{2X}	Switch 1X	Switch 2X	Switch 3X
0	0	Off	Off	On
0	1	Off	On	Off
1	0	On	Off	Off
1	1	Off	Off	On

Notes:

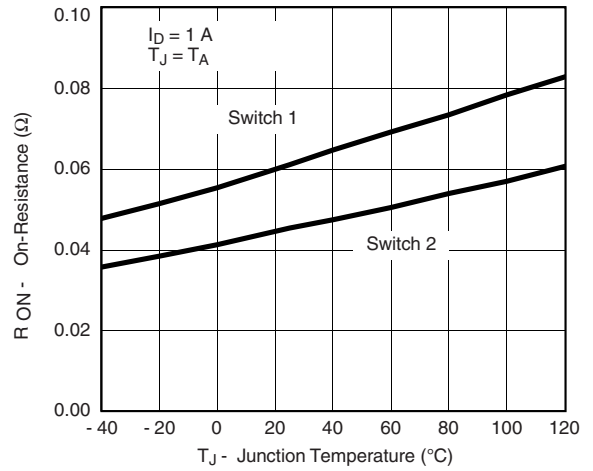
a. The smart switching of the Si9707 avoids potential host damage by defaulting to off during error conditions.



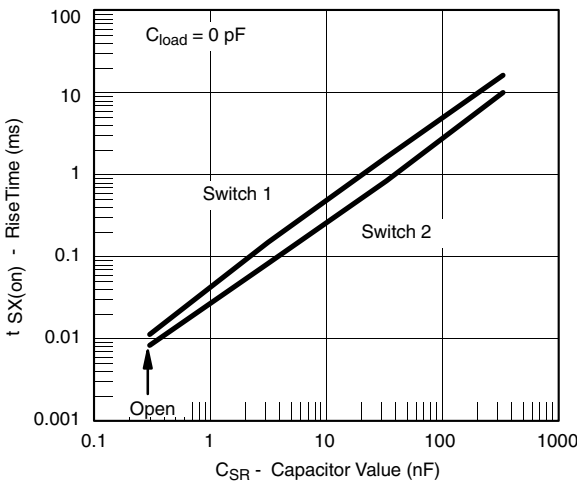
TYPICAL CHARACTERISTICS 25 °C unless noted



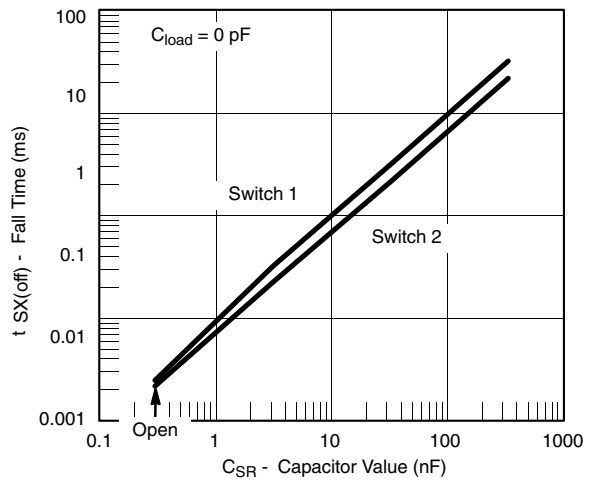
On-Resistance vs. Load Current



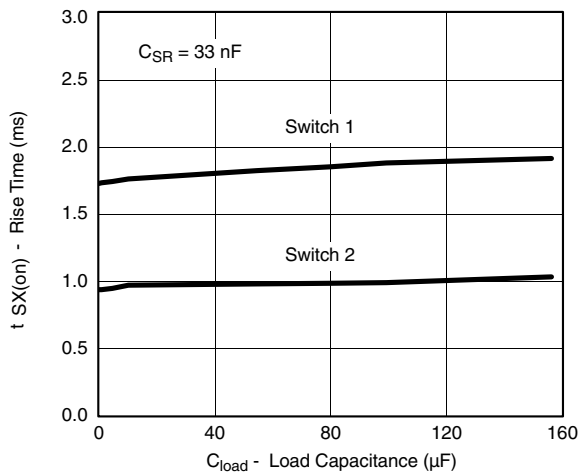
On-Resistance vs. Junction Temperature



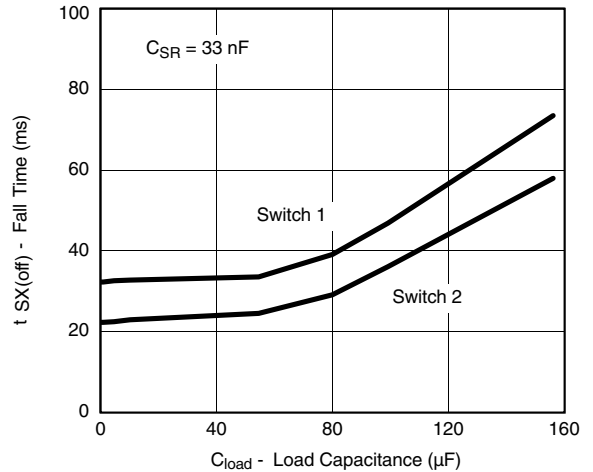
Rise Time vs. SR Capacitor Value



Fall Time vs. SR Capacitor Value



Rise Time vs. Load Capacitance

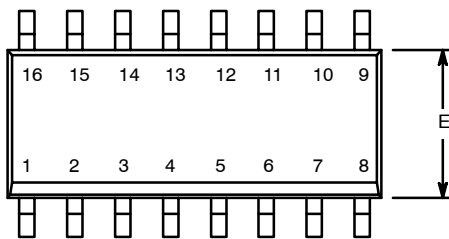


Fall Time vs. Load Capacitance

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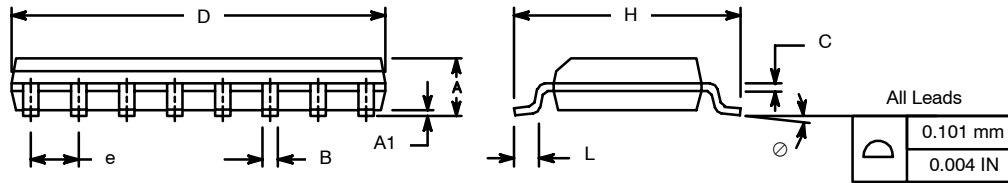


SOIC (NARROW): 16-LEAD (POWER IC ONLY)
JEDEC Part Number: MS-012



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.38	0.51	0.015	0.020
C	0.18	0.23	0.007	0.009
D	9.80	10.00	0.385	0.393
E	3.80	4.00	0.149	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
L	0.50	0.93	0.020	0.037
∅	0°	8°	0°	8°

ECN: S-40080—Rev. A, 02-Feb-04
DWG: 5912





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