

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.

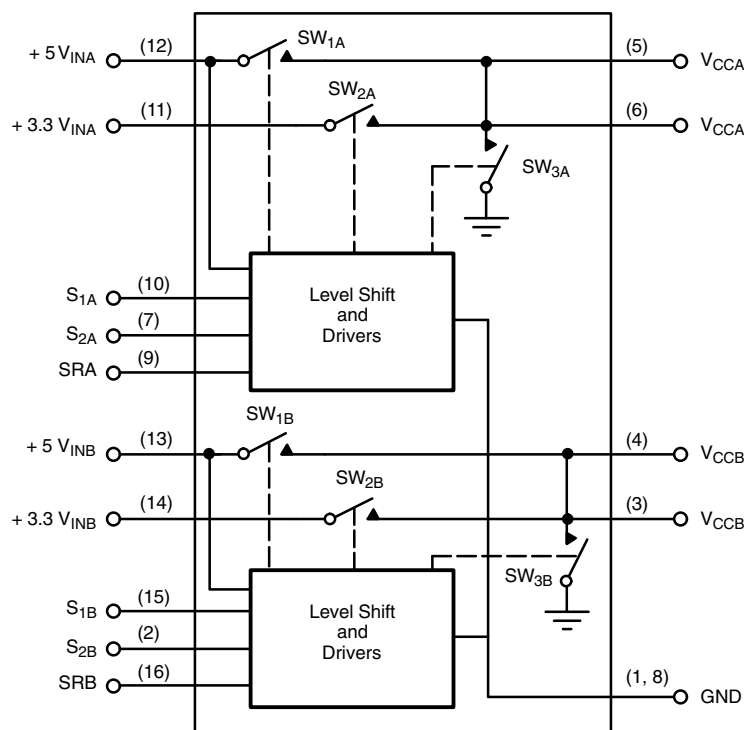
The PC Card Dual Interface Switch is available in a SO-16 narrow-body package and is rated over the industrial temperature range of - 40 to 85 °C.

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 :	$(T_A = 25\text{ }^\circ\text{C})$	1.65	W
	$(T_A = 85\text{ }^\circ\text{C})$	0.65	
Junction Temperature		125	$^\circ\text{C}$
Thermal Ratings:		$R_{\theta JA}^c$	$^\circ\text{C/W}$

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 rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS		
Parameter	Limit	Unit
$+5 V_{INA}, +5 V_{INB}$ (must be present)	$5\text{ V} \pm 10\%$	
$+3.3 V_{INA}, +3.3 V_{INB}$	$3.3\text{ V} \pm 10\%$	
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 $C_{SR} = 33\text{ nF}$, $+5\text{ V}_{IN} = 5\text{ V}$ $+3.3\text{ V}_{IN} = 3.3\text{ V}$, $\text{Low} \leq 0.8\text{ V}$, $\text{High} \geq 2.2\text{ V}$		Limits - 40 to 85 °C			Unit
				Min ^a	Typ	Max ^a	
Switch SW_{1A} , SW_{1B}							
On Resistance	R_{ON}	$I = 500\text{ mA}$, $S_1 = \text{High}$ $S_2 = \text{Low}$	$T_A = 25\text{ }^{\circ}\text{C}$		58	70	$\text{m}\Omega$
			$T_A = 85\text{ }^{\circ}\text{C}$		73	90	
Off Current (V_{CC})	I_{OFF}	$+5\text{ V}_{IN} = 5.5\text{ V}$, $V_{CC} = 0\text{ V}$ $S_1 = S_2 = \text{Low}$	$T_A = 25\text{ }^{\circ}\text{C}$			1	μA
			$T_A = 85\text{ }^{\circ}\text{C}$			10	
Rise Time	$t_{S1(\text{on})}$	$S_2 = \text{Low}$ See Figure 1		0.2	1.7	5	ms
Fall Time	$t_{S1(\text{off})}$			10	30	50	
Switch SW_{2A} , SW_{2B}							
On Resistance	R_{ON}	$I = 500\text{ mA}$, $S_2 = \text{High}$ $S_1 = \text{Low}$	$T_A = 25\text{ }^{\circ}\text{C}$		44	55	$\text{m}\Omega$
			$T_A = 85\text{ }^{\circ}\text{C}$		55	70	
Off Current ($+3.3\text{ V}_{IN}$)	I_{OFF}	$+3.3\text{ V}_{IN} = 3.6\text{ V}$, $V_{CC} = 0\text{ V}$ $S_1 = S_2 = \text{Low}$	$T_A = 25\text{ }^{\circ}\text{C}$			1	μA
			$T_A = 85\text{ }^{\circ}\text{C}$			10	
Rise Time	$t_{S2(\text{on})}$	$S_1 = \text{Low}$ See Figure 1		0.1	0.9	5	ms
Fall Time	$t_{S2(\text{off})}$			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}	$I = 2 \text{ mA}$, $S_1 = S_2 = \text{Low}$	$T_A = 25 \text{ }^{\circ}\text{C}$		140	400	Ω
			$T_A = 85 \text{ }^{\circ}\text{C}$		200	500	
Power Supply							
+ 5 V_{IN} Current Input (on)	$I_{+5VIN(1)}$	$S_1 = 0 \text{ V}$, $S_2 = 3 \text{ V}$			20	50	μA
	$I_{+5VIN(2)}$	$S_1 = 3 \text{ V}$, $S_2 = 0 \text{ V}$			20	50	
+ 5 V_{IN} Current Input (off)	$I_{+5VIN(3)}$	$S_1 = S_2 = 0 \text{ V}$			< 1	10	
Switch Control Inputs S_{1X} , S_{2X}							
Input Voltage High	$V_{I(H)}$	+ 5 $V_{INX} = 5.5 \text{ V}$	2.2	1.8			V
		+ 5 $V_{INX} = 4.5 \text{ V}$	2.2	1.6			
Input Voltage Low	$V_{I(L)}$	+ 5 $V_{INX} = 5.5 \text{ V}$		1.6	0.8		
		+ 5 $V_{INX} = 4.5 \text{ V}$		1.4	0.8		
Input Current High	$I_{I(H)}$	S_{1X} , $S_{2X} = 5 \text{ V}$			1.0		μA
Input Current Low	$I_{I(L)}$	S_{1X} , $S_{2X} = \text{GND}$	- 1.0				

Notes:

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

TIMING WAVEFORMS

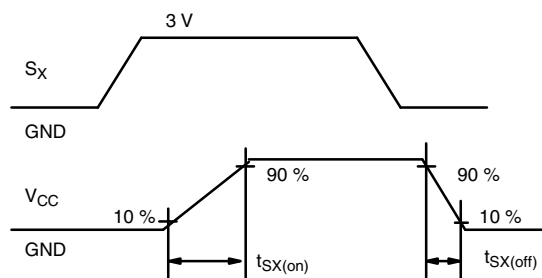
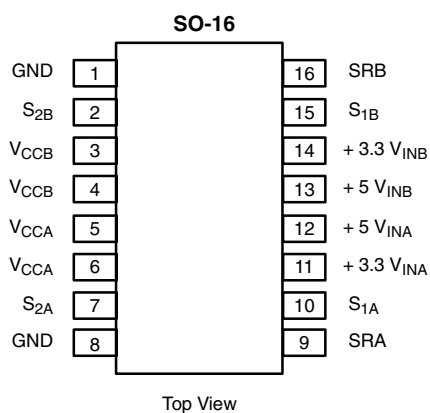


Figure 1. Switch Ramp Time

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

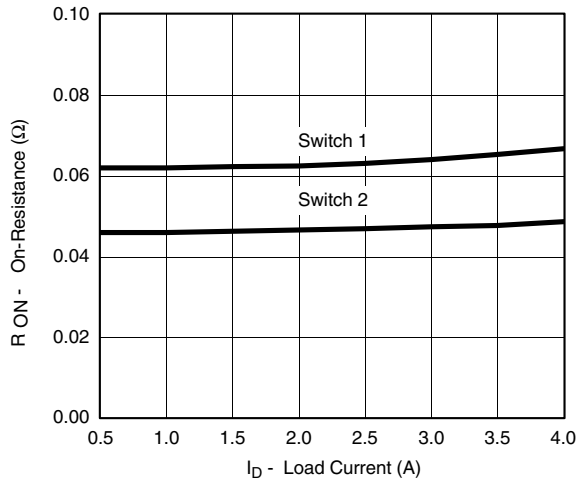
S _{1X}	S _{2X}	Switch 1X	Switch 2X	Switch 3X
0	0	Off	Off	On
0	1	Off	On	Off
1	0	On	Off	Off
1	1	Off	Off	On

Notes:

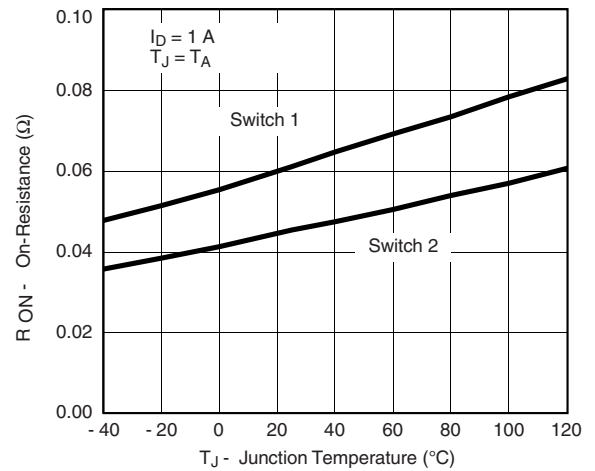
a. The smart switching of the Si9707 avoids potential host damage by defaulting to off during error conditions.



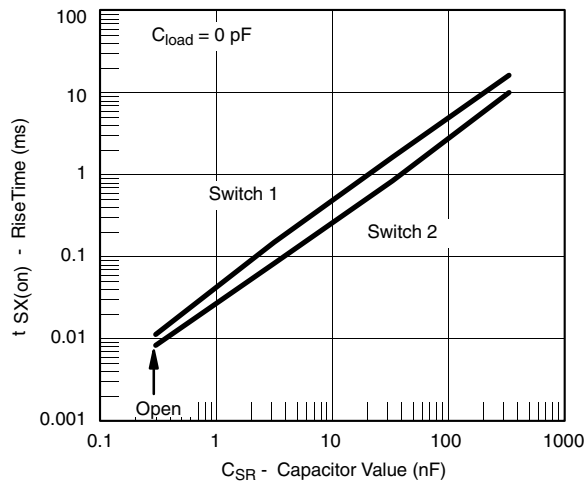
TYPICAL CHARACTERISTICS 25 °C unless noted



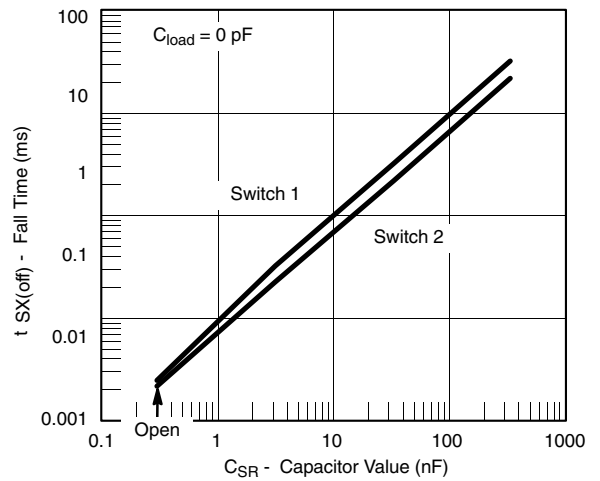
On-Resistance vs. Load Current



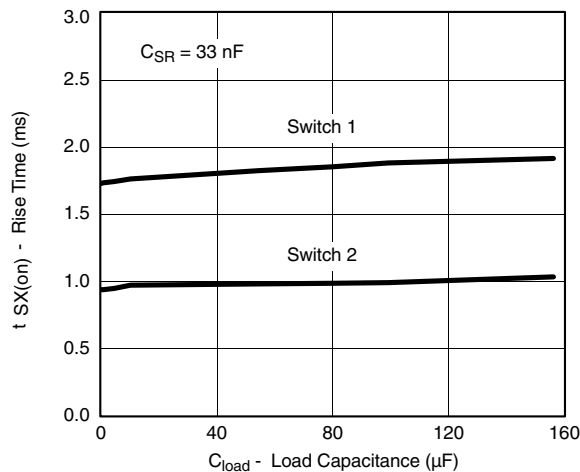
On-Resistance vs. Junction Temperature



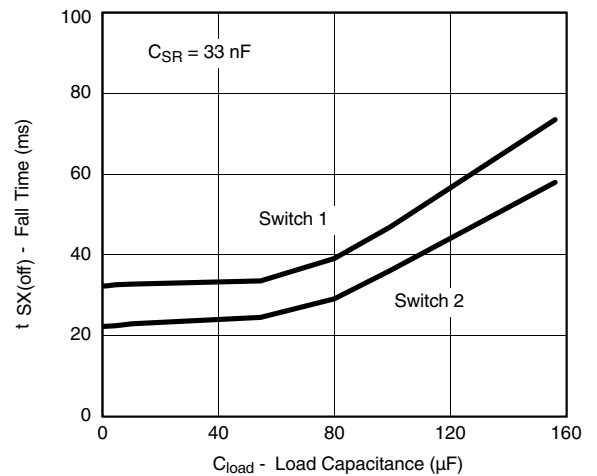
Rise Time vs. SR Capacitor Value



Fall Time vs. SR Capacitor Value



Rise Time vs. Load Capacitance



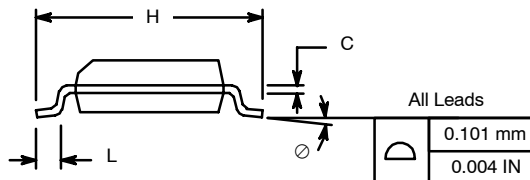
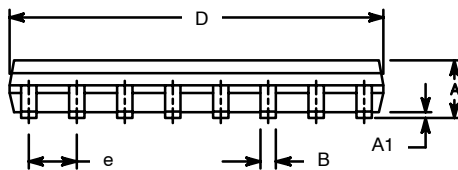
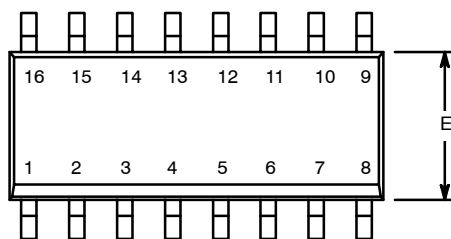
Fall Time vs. Load Capacitance

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?70018>.



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



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.