

## PC Card (PCMCIA) Interface Switch

### FEATURES

- Single SO-8 Package
- CMOS-Logic Compatible Inputs
- Slow  $V_{CC}$  Ramp Time
- Smart Switching
- Extremely Low  $R_{ON}$
- Reverse Blocking Switches
- Low Power Consumption
- Safe Power Up

### DESCRIPTION

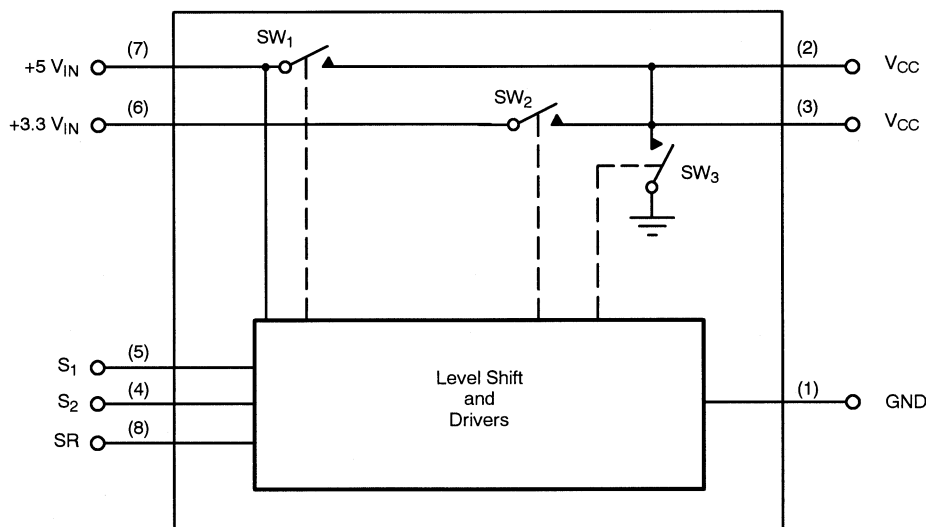
The Si9706DY offers an integrated solution for PC Card power interfaces that only require  $V_{CC}$  switching. This part is ideal for systems that operate at 5 V and provide  $V_{PP}$  from the main supply or from a dedicated Flash RAM 12-V supply.

The Si9706DY operates off the 5-V supply and has built-in level shifting for gate drive. Internal logic protects against a control logic error that would short 5 V to the 3.3-V supply. This protection logic also allows the Si9706DY 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 Si9706DY PC Card interface switch is packaged in a narrow body SO-8 package and is rated over the industrial temperature range -40 to 85°C.

### FUNCTIONAL BLOCK DIAGRAM



**ABSOLUTE MAXIMUM RATINGS**

Voltages Referenced to Ground

|   |        |   |         |
|---|--------|---|---------|
| +5 V <sub>IN</sub> .....                            | 7 V    | PD Max <sup>b</sup> (T <sub>A</sub> = 25°C) .....     | 1.59 W  |
| +3.3 V <sub>IN</sub> .....                          | 7 V    | (T <sub>A</sub> = 85°C) .....                         | 0.63 W  |
| S <sub>1</sub> , S <sub>2</sub> (CMOS Inputs) ..... | 7 V    | Junction Temperature .....                            | 125°C   |
| All Pins .....                                      | -0.5 V | Thermal Ratings <sup>b</sup> : R <sub>ΘJA</sub> ..... | 63 °C/W |
| I <sub>OUT</sub> V <sub>CC</sub> <sup>a</sup> ..... | 4 A    | Notes   |         |

a. Pins 2, 3 connected together externally.

b. Mounted on 1-IN<sup>2</sup>, FR4 PC Board.**RECOMMENDED OPERATING CONDITIONS**

|   |            |   |            |
|---|------------|---|------------|
| +5 V <sub>IN</sub> (must be present) .....          | 5 V ±10%   | V <sub>CC</sub> Load Capacitance .....      | 150 μF Max |
| +3.3 V <sub>IN</sub> .....                          | 3.3 V ±10% | Notes                                       |            |
| C <sub>SR</sub> .....                               | 33 nF      | a. Pins 2, 3 connected together externally. |            |
| I <sub>OUT</sub> V <sub>CC</sub> <sup>a</sup> ..... | 2 A        |   |            |

| SPECIFICATIONS                         |                       |   |                       |                  |                  |      |    |
|--|-----------------------|---|-----------------------|------------------|------------------|------|----|
| Parameter                              | Symbol                | Test Conditions<br>Unless Otherwise Specified<br>C <sub>SR</sub> = 33 nF, +5 V <sub>IN</sub> = 5 V<br>+3.3 V <sub>IN</sub> = 3.3 V, Low ≤ 0.8 V, High ≥ 2.2 V | Limits<br>-40 to 85°C |                  |                  | unit |    |
|  |                       |   | Min <sup>a</sup>      | Typ <sup>b</sup> | Max <sup>a</sup> |      |    |
| <b>Switch SW<sub>1</sub></b>           |                       |   |                       |                  |                  |      |    |
| On-Resistance                          | R <sub>ON</sub>       | I = 500 mA, S <sub>1</sub> = High<br>S <sub>2</sub> = Low   | T <sub>A</sub> = 25°C | 58               | 70               | mΩ   |    |
|  |                       |   | T <sub>A</sub> = 85°C | 73               | 90               |      |    |
| Off Current (V <sub>CC</sub> )         | I <sub>OFF</sub>      | +5 V <sub>IN</sub> = 5.5 V, V <sub>CC</sub> = 0 V<br>S <sub>1</sub> = S <sub>2</sub> = Low  | T <sub>A</sub> = 25°C |                  | 1                | μA   |    |
|  |                       |   | T <sub>A</sub> = 85°C |                  | 10               |      |    |
| Rise Time                              | t <sub>S1(on)</sub>   | S <sub>2</sub> = Low, See Figure 1.   |                       | 0.2              | 1.7              | ms   |    |
| Fall Time                              | t <sub>S1(off)</sub>  |   |                       | 10               | 30               |      | 50 |
| <b>Switch SW<sub>2</sub></b>           |                       |   |                       |                  |                  |      |    |
| On-Resistance                          | R <sub>ON</sub>       | I = 500 mA, S <sub>2</sub> = High<br>S <sub>1</sub> = Low   | T <sub>A</sub> = 25°C | 44               | 55               | mΩ   |    |
|  |                       |   | T <sub>A</sub> = 85°C | 55               | 70               |      |    |
| Off Current (+3.3 V <sub>IN</sub> )    | I <sub>OFF</sub>      | +3.3 V <sub>IN</sub> = 3.6 V, V <sub>CC</sub> = 0 V<br>S <sub>1</sub> = S <sub>2</sub> = Low  | T <sub>A</sub> = 25°C |                  | 1                | μA   |    |
|  |                       |   | T <sub>A</sub> = 85°C |                  | 10               |      |    |
| Rise Time                              | t <sub>S2(on)</sub>   | S <sub>1</sub> = Low, See Figure 1.   |                       | 0.1              | 0.9              | ms   |    |
| Fall Time                              | t <sub>S2(off)</sub>  |   |                       | 5                | 20               |      | 40 |
| <b>Switch SW<sub>3</sub></b>           |                       |   |                       |                  |                  |      |    |
| On-Resistance                          | R <sub>ON</sub>       | I = 2 mA, S <sub>1</sub> = S <sub>2</sub> = Low   | T <sub>A</sub> = 25°C | 140              | 400              | Ω    |    |
|  |                       |   | T <sub>A</sub> = 85°C | 200              | 500              |      |    |
| <b>Power Supply</b>                    |                       |   |                       |                  |                  |      |    |
| +5 V <sub>IN</sub> Current Input (on)  | I <sub>+5VIN(1)</sub> | S <sub>1</sub> = 0 V, S <sub>2</sub> = 3 V  |                       | 20               | 50               | μA   |    |
|  | I <sub>+5VIN(2)</sub> | S <sub>1</sub> = 3 V, S <sub>2</sub> = 0V   |                       | 20               | 50               |      |    |
| +5 V <sub>IN</sub> Current Input (off) | I <sub>+5VIN(3)</sub> | S <sub>1</sub> = S <sub>2</sub> = 0 V   |                       | <1               | 10               |      |    |

| <b>SPECIFICATIONS</b>                                     |            |   |                       |                  |                  |               |
|---|------------|---|-----------------------|------------------|------------------|---------------|
| Parameter   | Symbol     | Test Conditions<br>Unless Otherwise Specified<br>$C_{SR} = 33 \text{ nF}$ , $+5 V_{IN} = 5 \text{ V}$<br>$+3.3 V_{IN} = 3.3 \text{ V}$ , Low $\leq 0.8 \text{ V}$ , High $\geq 2.2 \text{ V}$ | Limits<br>-40 to 85°C |                  |                  | unit          |
|   |            |   | Min <sup>a</sup>      | Typ <sup>b</sup> | Max <sup>a</sup> |               |
| <b>Switch Control Inputs S<sub>1</sub>, S<sub>2</sub></b> |            |   |                       |                  |                  |               |
| Input Voltage High  | $V_{I(H)}$ | $+5 V_{IN} = 5.5 \text{ V}$   | 2.2                   | 1.8              |                  | V             |
|   |            | $+5 V_{IN} = 4.5 \text{ V}$   | 2.2                   | 1.6              |                  |               |
| Input Voltage Low   | $V_{I(L)}$ | $+5 V_{IN} = 5.5 \text{ V}$   |                       | 1.6              | 0.8              |               |
|   |            | $+5 V_{IN} = 4.5 \text{ V}$   |                       | 1.4              | 0.8              |               |
| Input Current High  | $I_{I(H)}$ | $S_1, S_2 = 5 \text{ V}$  |                       |                  | 1.0              | $\mu\text{A}$ |
| Input Current Low   | $I_{I(L)}$ | $S_1, S_2 = \text{GND}$   | -1.0                  |                  |                  |               |

Notes

- a. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum.
- b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

**TIMING WAVEFORMS**

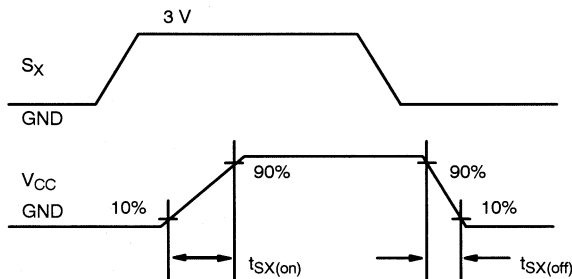


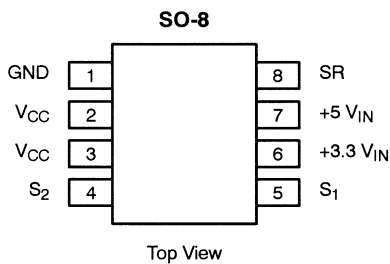
FIGURE 1. Switch Ramp

| <b>TRUTH TABLE</b> |                |          |          |          |
|--------------------|----------------|----------|----------|----------|
| S <sub>1</sub>     | S <sub>2</sub> | Switch 1 | Switch 2 | Switch 3 |
| 0                  | 0              | Off      | Off      | On       |
| 0                  | 1              | Off      | On       | Off      |
| 1                  | 0              | On       | Off      | Off      |
| 1                  | 1              | Off      | Off      | On       |

Notes

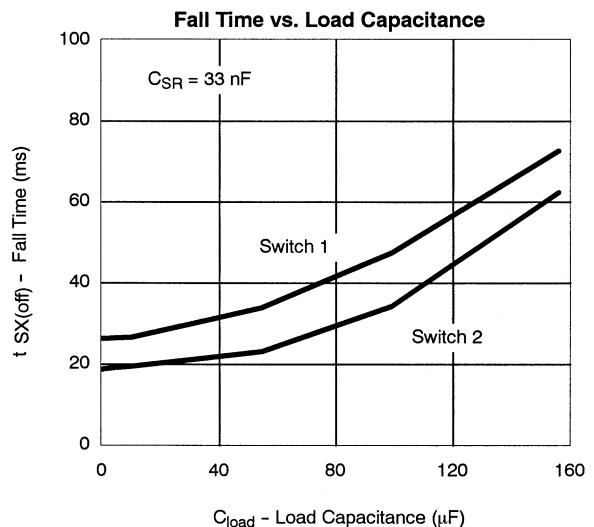
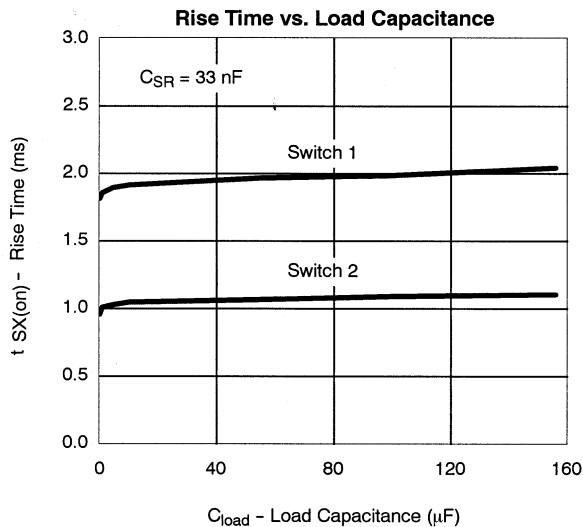
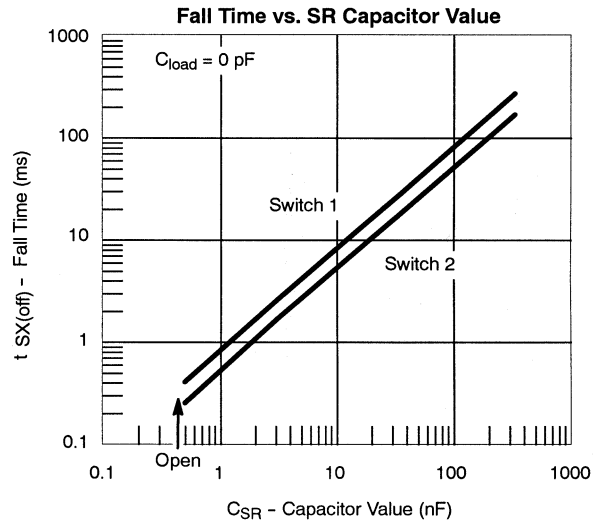
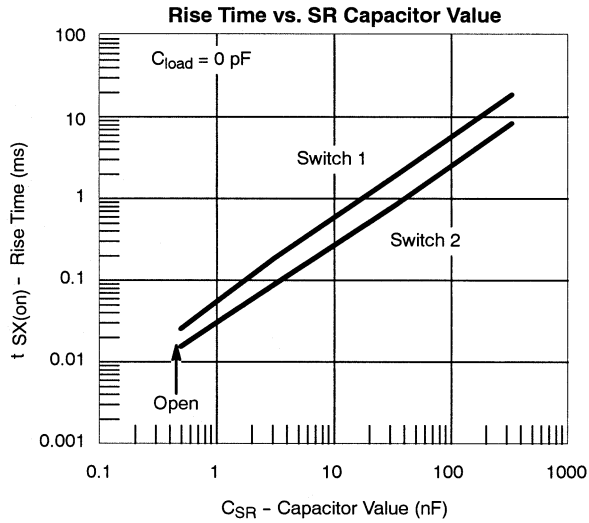
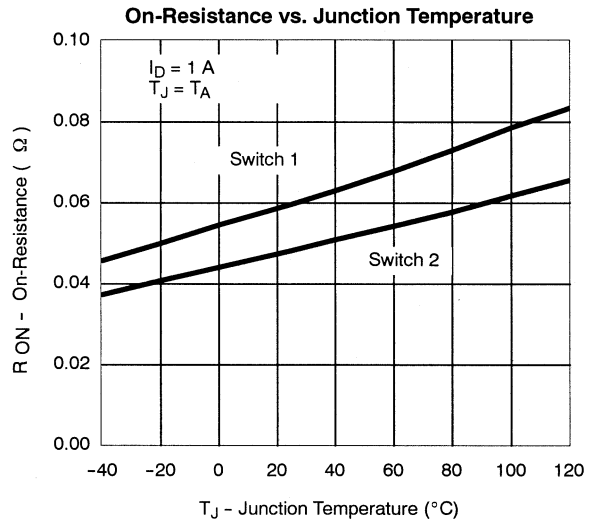
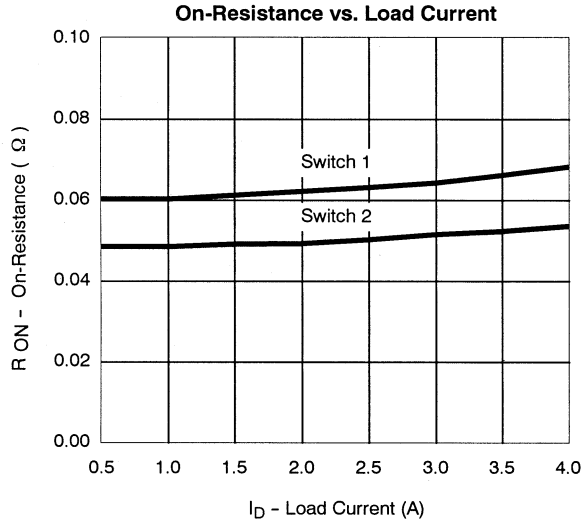
- a. The smart switching of the Si9706DY avoids potential host damage by defaulting to off during error conditions.

**PIN CONFIGURATION AND DESCRIPTION**



| <b>PIN DESCRIPTION</b> |            |   |
|------------------------|------------|---|
| Function               | Pin Number | Description   |
| S <sub>1</sub>         | 5          | Control input for selecting $+5 V_{IN}$ to $V_{CC}$ .   |
| S <sub>2</sub>         | 4          | Control input for selecting $+3.3 V_{IN}$ to $V_{CC}$ . |
| GND                    | 1          | Ground connection.                                      |
| $V_{CC}$               | 2, 3       | Supply voltage to slot.                                 |
| $+3.3 V_{IN}$          | 6          | $+3.3\text{-V}$ supply.                                 |
| $+5 V_{IN}$            | 7          | $+5\text{-V}$ supply.                                   |
| SR                     | 8          | Slew rate control pin.                                  |

**TYPICAL CHARACTERISTICS (25°C UNLESS OTHERWISE NOTED)**



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