

## 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

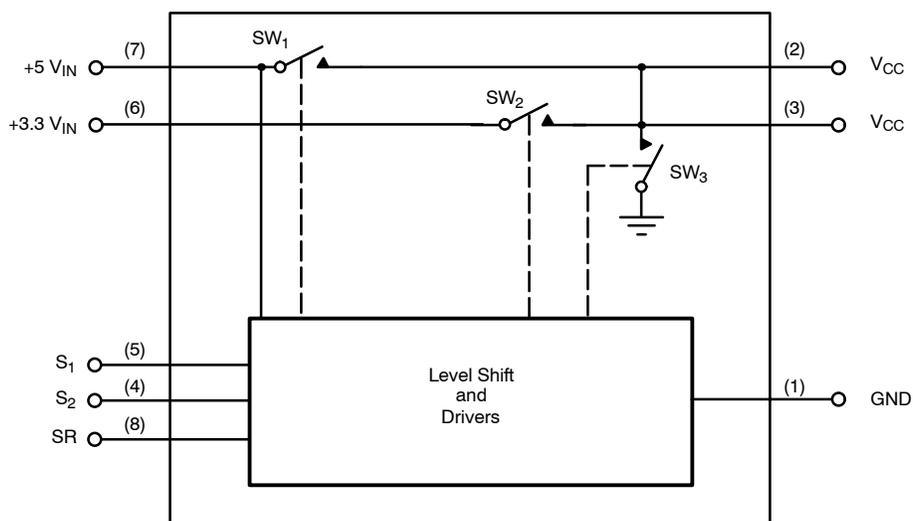
The Si9706DY offers an integrated solution for PC Card power interfaces that only require  $V_{CC}$  switching. This part is ideal for systems that operate at 5 V and provide  $V_{PP}$  from the main supply or from a dedicated Flash RAM 12-V supply.

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  $85^{\circ}\text{C}$ . The Si9706DY is available in lead free.

### FUNCTIONAL BLOCK DIAGRAM





### ABSOLUTE MAXIMUM RATINGS

|   |        |
|---|--------|
| Voltages Referenced to Ground                       |        |
| +5 V <sub>IN</sub> .....                            | 7 V    |
| +3.3 V <sub>IN</sub> .....                          | 7 V    |
| S <sub>1</sub> , S <sub>2</sub> (CMOS Inputs) ..... | 7 V    |
| All Pins .....                                      | -0.5 V |
| I <sub>OUT</sub> V <sub>CC</sub> <sup>a</sup> ..... | 4 A    |

|   |         |
|---|---------|
| PD Max <sup>b</sup> : (T <sub>A</sub> = 25°C) .....   | 1.59 W  |
| (T <sub>A</sub> = 85°C) .....                         | 0.63 W  |
| Junction Temperature .....                            | 125°C   |
| Thermal Ratings <sup>b</sup> : R <sub>θJA</sub> ..... | 63 °C/W |

#### Notes

- Pins 2, 3 connected together externally.
- Mounted on 1-IN<sup>2</sup>, FR4 PC Board.

### RECOMMENDED OPERATING CONDITIONS

|   |             |
|---|-------------|
| +5 V <sub>IN</sub> (must be present) .....          | 5 V ± 10%   |
| +3.3 V <sub>IN</sub> .....                          | 3.3 V ± 10% |
| C <sub>SR</sub> .....                               | 33 nF       |
| I <sub>OUT</sub> V <sub>CC</sub> <sup>a</sup> ..... | 2 A         |

|  |            |
|--|------------|
| V <sub>CC</sub> Load Capacitance ..... | 150 μF Max |
|--|------------|

#### Notes

- Pins 2, 3 connected together externally.

| 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           |                  |                  | 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> = 0 V  |                       | 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               |                  |      |
| Input Voltage High                     | V <sub>I(H)</sub>     | +5 V <sub>IN</sub> = 5.5 V  | 2.2                   | 1.8              | V                |                  |      |
|  |                       | +5 V <sub>IN</sub> = 4.5 V  | 2.2                   | 1.6              |                  |                  |      |
| Input Voltage Low                      | V <sub>I(L)</sub>     | +5 V <sub>IN</sub> = 5.5 V  |                       | 1.6              | 0.8              |                  |      |
|  |                       | +5 V <sub>IN</sub> = 4.5 V  |                       | 1.4              | 0.8              |                  |      |
| Input Current High                     | I <sub>I(H)</sub>     | S <sub>1</sub> , S <sub>2</sub> = 5 V   |                       |                  | 1.0              | μA               |      |
| Input Current Low                      | I <sub>I(L)</sub>     | S <sub>1</sub> , S <sub>2</sub> = GND   | -1.0                  |                  |                  |                  |      |

#### Notes

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

### TIMING WAVEFORMS

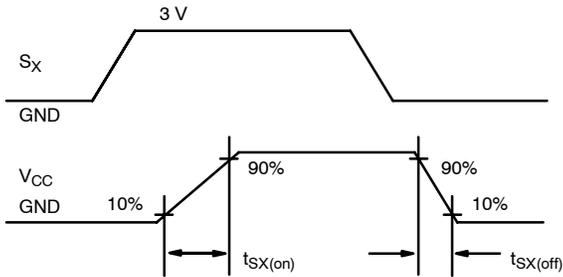


FIGURE 1. Switch Ramp

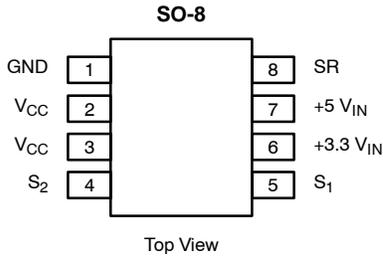
### TRUTH TABLE

| 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

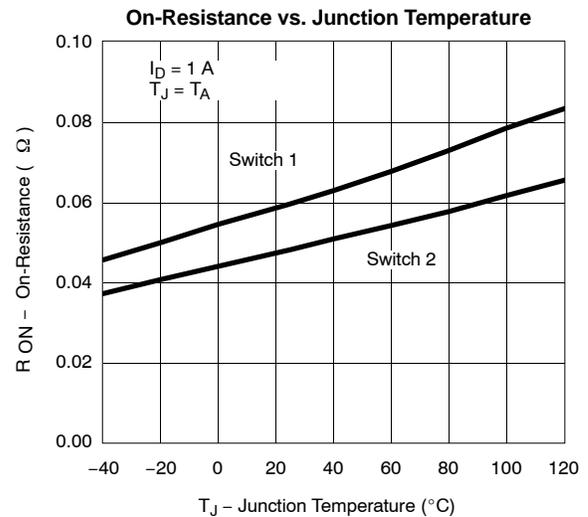
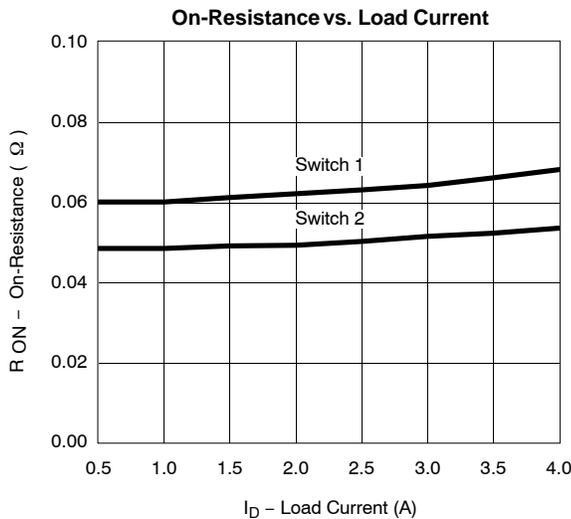


| Pin  | Function             | Description   |
|------|----------------------|---|
| 1    | GND                  | Ground connection.  |
| 2, 3 | V <sub>CC</sub>      | Supply voltage to slot.   |
| 4    | S <sub>2</sub>       | Control input for selecting +3.3 V <sub>IN</sub> to V <sub>CC</sub> . |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

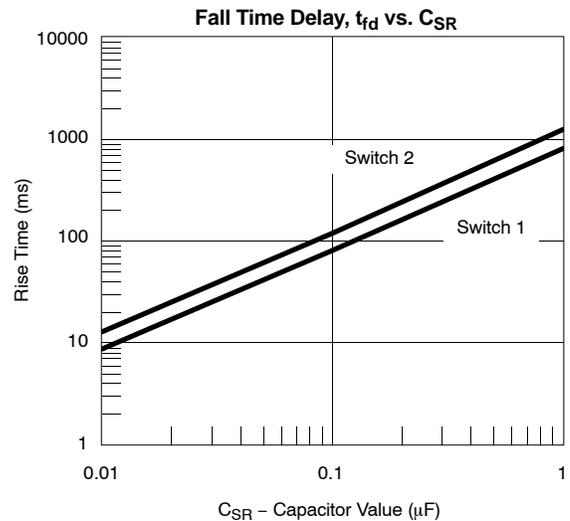
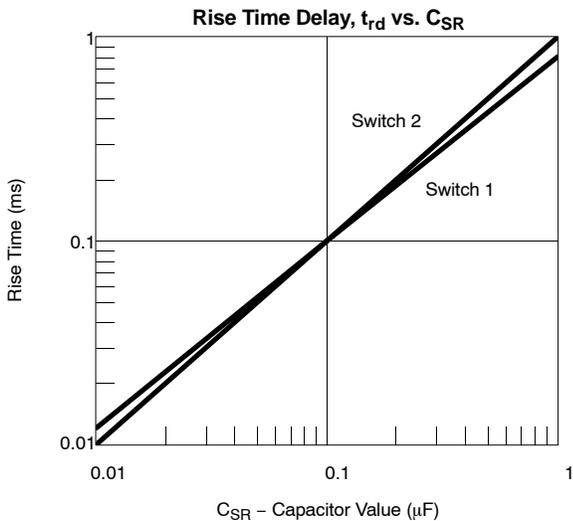
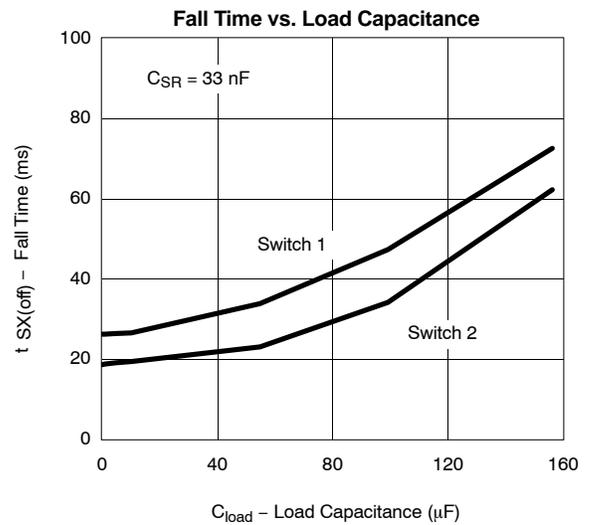
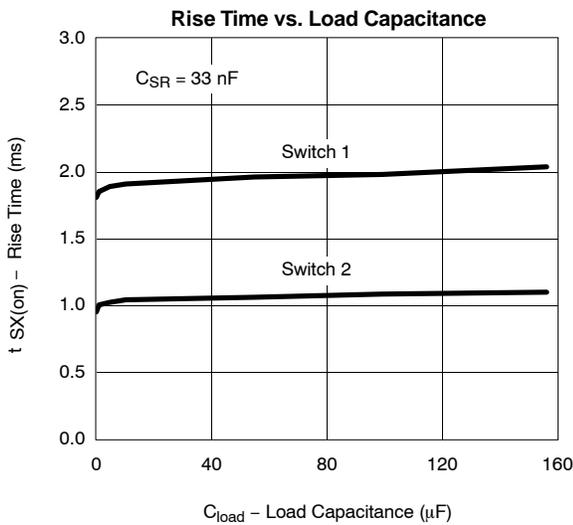
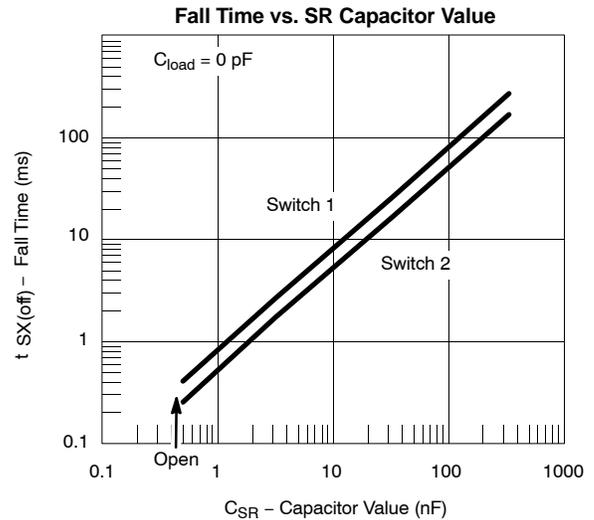
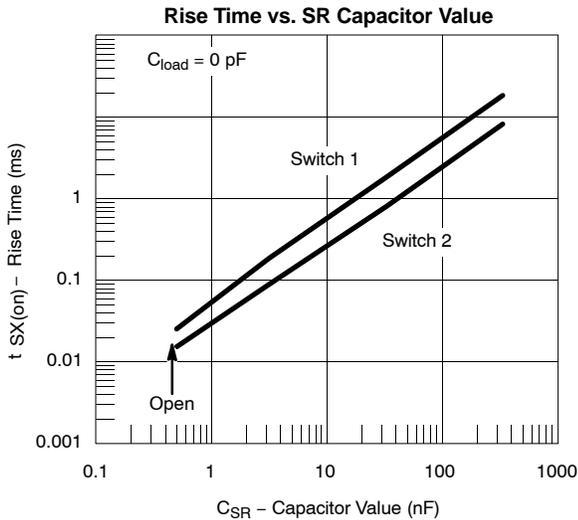
### ORDERING INFORMATION

| Part Number                | Temperature Range |
|----------------------------|-------------------|
| Si9706DY-T1                | -40 to 85 °C      |
| Si9706DY-T1-E3 (Lead Free) |                   |

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



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





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