SCiSwitchDrive11 is a MOSFET & IGBT firing board which implements the usual gate driver functions. It has been designed for making DC solid state relays (thanks to the connection of a power MOSFET in the output). It provides a galvanic isolation up to 3000VAc between input and output.

SCiSwitchDrive11 is capable of generating enough output peak current to switch the MOSFET in a few microseconds, it allows firing the MOSFET in parallel configuration.

The switching time of the MOSFET can be set by changing inner resistors (R1 & R2).

SCiSwitchDrive11 turns on the MOSFET at a constant voltage of 13V, regardless of the supply voltage level. For easier using, the triggering can be done by switching the power supply of the board (supply mode control), as well, with logic inhibition signal and permanent input supplied (inhibition mode control). Includes a LED that monitors the MOSFET status.

**HIGHLIGHTS**
- For driving up to 1200V IGBT or MOSFET
- 2 control modes
- Trigger-schmidt logic inhibition input for high noise immunity
- Wide spread of supply voltage: 7-20V
- Configurable rise and fall times
- Electrical isolation of 3000Vac
- Easy to use

**TYPICAL APPLICATIONS**

SCiSwitchDrive11 is a MOSFET & IGBT firing board which implements the usual gate driver functions. It has been designed for making DC solid state relays (thanks to the connection of a power MOSFET in the output). It provides a galvanic isolation up to 3000VAc between input and output.

SCiSwitchDrive11 is capable of generating enough output peak current to switch the MOSFET in a few microseconds, it allows firing the MOSFET in parallel configuration.

The switching time of the MOSFET can be set by changing inner resistors (R1 & R2).

SCiSwitchDrive11 turns on the MOSFET at a constant voltage of 13V, regardless of the supply voltage level. For easier using, the triggering can be done by switching the power supply of the board (supply mode control), as well, with logic inhibition signal and permanent input supplied (inhibition mode control). Includes a LED that monitors the MOSFET status.
TRIGGER MODE

There are 2 ways to switch the output voltage: the supply mode control and the inhibition mode control. In the supply mode control, only 1 signal (VCC) is required to control the entire SSR. This signal supplies the circuit board and turns the output to high state (13V) while the voltage level (VCC) is over 7V, otherwise the output remains to low state (0V). In this mode the INH input must remain no connected. In the inhibition mode control, a permanent supply is required (VCC>7V) and the INH signal (TTL compatible and low sanked current) controls the output. In this mode some SSRs could be controlled directly by digital master system. In each mode the output state is monitored by the on state LED.

<table>
<thead>
<tr>
<th>Description</th>
<th>symbol</th>
<th>notes/test conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>VCC</td>
<td></td>
<td>7</td>
<td>12</td>
<td>20</td>
<td>V</td>
</tr>
<tr>
<td>Current consumption</td>
<td>ICC</td>
<td></td>
<td>120</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhibition input high logic state</td>
<td>V\text{INH_HIGH}</td>
<td></td>
<td>5</td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Inhibition input low logic state</td>
<td>V\text{INH_LOW}</td>
<td></td>
<td>0</td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Inhibition high-going treshold voltage</td>
<td>V\text{INH_H\rightarrow L}</td>
<td></td>
<td>3,3</td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Inhibition low-going treshold voltage</td>
<td>V\text{INH_L\rightarrow H}</td>
<td></td>
<td>1,8</td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Gate-source output voltage</td>
<td>V\text{GS}</td>
<td></td>
<td>12,2</td>
<td>13</td>
<td>13,5</td>
<td>V</td>
</tr>
<tr>
<td>Gate-source voltage ripple</td>
<td></td>
<td>5</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Peak current</td>
<td>I_{\text{PEAK}}</td>
<td>250</td>
<td>mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistor R1 value</td>
<td>R1</td>
<td>note 1</td>
<td>50</td>
<td></td>
<td>470</td>
<td>Ω</td>
</tr>
<tr>
<td>Resistor R2 value</td>
<td>R2</td>
<td>note 1</td>
<td>2,2</td>
<td></td>
<td>100</td>
<td>kΩ</td>
</tr>
<tr>
<td>Input-to-output isolation</td>
<td>V_{\text{ISO}}</td>
<td>1 min @ 50Hz</td>
<td>3000</td>
<td></td>
<td>KV_{\text{AC}}</td>
<td></td>
</tr>
<tr>
<td>Supply-to-output delay</td>
<td>t_{\text{ON_VCC}}</td>
<td>supply mode control</td>
<td>6</td>
<td></td>
<td>µs</td>
<td></td>
</tr>
<tr>
<td>Supply-to-output delay</td>
<td>t_{\text{OFF_VCC}}</td>
<td>supply mode control</td>
<td>10</td>
<td></td>
<td>µs</td>
<td></td>
</tr>
<tr>
<td>Inhibition-to-output delay</td>
<td>t_{\text{ON_INH}}</td>
<td>inhibition mode control</td>
<td>1</td>
<td></td>
<td>µs</td>
<td></td>
</tr>
<tr>
<td>Inhibition-to-output delay</td>
<td>t_{\text{OFF_INH}}</td>
<td>inhibition mode control</td>
<td>1</td>
<td></td>
<td>µs</td>
<td></td>
</tr>
<tr>
<td>Output voltage rise time</td>
<td>t_{\text{rise}}</td>
<td>10% to 90% V_{\text{GS}}</td>
<td>note 2</td>
<td></td>
<td>µs</td>
<td></td>
</tr>
<tr>
<td>Output voltage fall time</td>
<td>t_{\text{fall}}</td>
<td>10% to 90% V_{\text{GS}}</td>
<td>note 2</td>
<td></td>
<td>µs</td>
<td></td>
</tr>
</tbody>
</table>

Supply mode control

Inhibition mode control

VCC    INH  LED  V_{\text{GS}}
L  N.C.  OFF  L
H  N.C.  ON   H
H  L    OFF  L
H  H    ON   H

\textbf{note 1}: Always respecting the proportion: R2>20xR1 in order to maintain V_{\text{GS}} level and ripple into his margins.

\textbf{note 2}: Rise time and fall time depens on the value of the resistors R1 and R2

Reserves the right to change limits, test conditions and dimensions given in this data sheet at any time without previous notice.
RISE & FALL TIME CONFIGURATION

In order to obtain softer or harder switching of the outer MOSFET, rise and fall times can be set by changing the value of the resistors R1 and R2. The equivalent gate capacitance of the outer MOSFET ($C_g$) must be known. An approximated way to obtain the times is:

$$t_{\text{rise}} [\mu s] \approx 2 \cdot R1 [\Omega] \cdot (C_g [uF] + 0.22)$$
$$t_{\text{fall}} [\mu s] \approx 2 \cdot R2 [\Omega] \cdot (C_g [uF] + 0.22)$$

FIRING MOSFET IN PARALEL CONFIGURATION

SciSwitchDrive11 hasn’t limitation by MOSFET gate charge. It allows to connect more than one MOSFET at the SciSwitchDriveDrive11 output in order to get a larger drain current SSR. In that case $C_g$ for rise and fall time calculations must be the sum of each individual gate capacitance.
RESERVES THE RIGHT TO CHANGE LIMITS, TEST CONDITIONS AND DIMENSIONS GIVEN IN THIS DATA SHEET AT ANY TIME WITHOUT PREVIOUS NOTICE.
MECHANICAL DIMENSIONS & PINOUT

Cost Effective Products

SEMICODE ELECTRONICA

offers to the market a comprehensive range of products from recognized manufacturers at the best price/quality relationship, this products are provided with a basic reference code that allows maintaining the same product reference even if the original device manufacturer is replaced. SEMICODE product reference has to be considered as a generic brand.

Seeking the market needs and trends, we are constantly increasing the product portfolio with new products and suppliers, please ask for the updated information available to our local contacts.

SEMICODE products include semiconductors, passive components and accessories focused in power electronics market.

Datasheet Annotations:

SEMICODE ELECTRONICA annotate datasheets in the top left hard corner of the front page, to indicate product status. The annotations are as follows:

Tentative Information: This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

Preliminary Information: The product is in design and development. The datasheet represents the product as it is understood but details may change.

Advance Information: The product design is complete and final characterisation for volume production is well in hand.

No Annotation: The product parameters are fixed and the product is available to datasheet specification.

NOTICE: The technical data are to specify components, not to guarantee their properties. No warranty or guarantee expressed or implied is made regarding delivery or performance. The Company reserves the right to alter without prior notice the specification of any product. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user’s responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date.

All brand names and product names used in this publication are trademarks, registered trademarks or trade names of their respective owners.

© SEMICODE ELECTRONICA 2008. TECHNICAL DOCUMENTATION – NOT FOR RESALE