

## High Voltage Protection 8-Channel T/R Switch Demoboard

### General Description

The Supertex MD0100DB1 demo board contains four MD0100DK6-G dual packages providing 8 T/R switches in the system. There are no other external components on the board.

This demo board replaces 8 discrete diode bridge protection circuits. The input of the MD0100DB1 is called  $T_x$  which is connected to the output of the transmitter, and the output is called  $R_x$  which is connected to the input of the receiver. The  $T_x$  and  $R_x$  are interchangeable.

The MD0100DB is especially laid out so that all the inputs are on one side and all the outputs are on other side of the board. It provides for easy replacement on the system for testing.

This demo board can be put into the system directly by removing the diode bridge connections between the transmitter and receiver (please see Figure 1), and it can then be connected up to 8 pairs of transmitters/receivers as shown in the connection diagram in Figure 2.

### Specifications

| Parameter                             | Value            |
|---------------------------------------|------------------|
| $V_{A-B}$ , differential voltage drop | 0V to $\pm 100V$ |
| $I_{PEAK}$                            | $\pm 60mA$       |
| $T_{ON}$                              | $\leq 20ns$      |
| $T_{OFF}$                             | $\leq 20ns$      |

### Board Layout

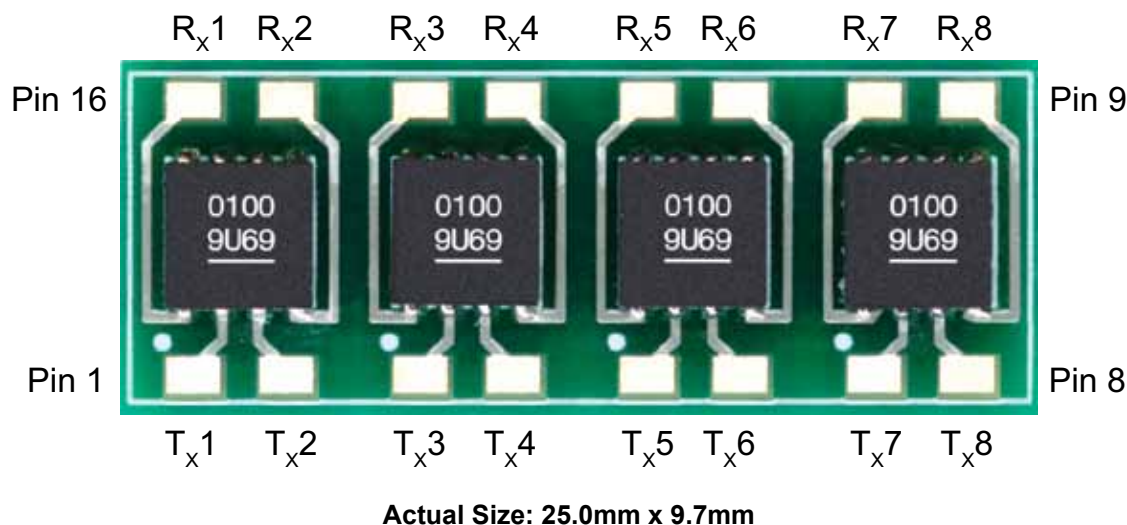


Figure 1: Conventional discrete T/R switch with Diode Bridge

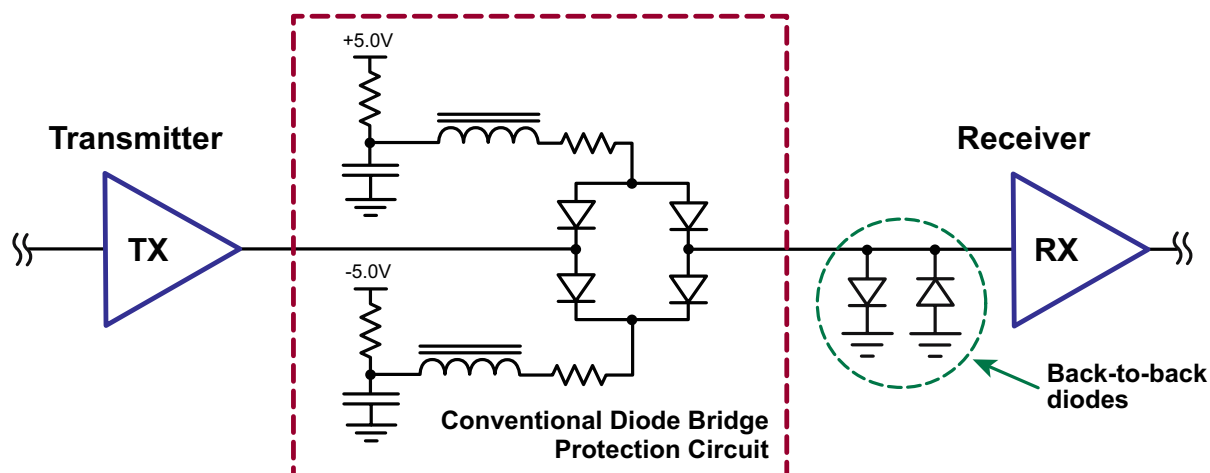
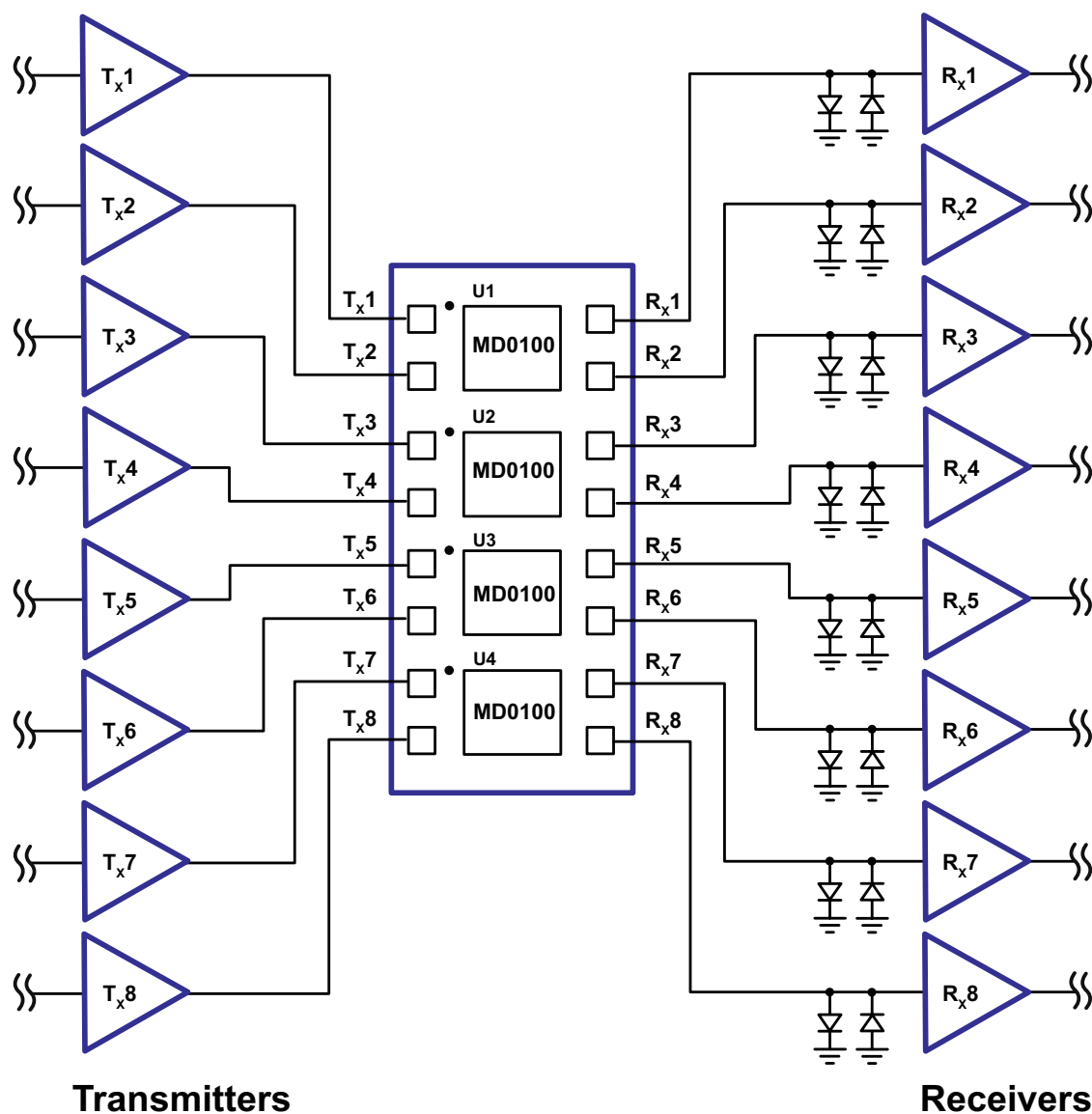


Figure 2: MD0100DB1 Connection Diagram



## Operation

The MD0100 can be considered a normally closed switch controlled by a switch control. The switch control monitors the voltage drop across terminals  $T_x$  and  $R_x$ . If the voltage difference is greater than  $\pm 2.0V$ , the T/R switch will start to open. Once in the open state, there is a small amount of current flowing through the T/R switch, 200 $\mu A$ , to detect if the high voltage is still present or not. The T/R switch will not close until the voltage across terminal  $T_x$  and  $R_x$  drops back within  $\pm 2.0V$ .

It is important to make sure that the back-to-back diodes are connected from the output of this demoboard to ground (please refer to Figure 1). This is to allow the initial peak current to flow through the switch so it can drop  $\pm 2.0V$  and operate correctly. If the diodes are absent, there will be no path current and if the voltage drop across the two terminals is less than  $\pm 2.0V$ , then the switch will remain in the closed position.

## Pin Description

| Pin # | Pin Name | Function                                                           |
|-------|----------|--------------------------------------------------------------------|
| 1     | $T_x1$   | Input of the switch #1, connects to the output of the transmitter. |
| 2     | $T_x2$   | Input of the switch #2, connects to the output of the transmitter. |
| 3     | $T_x3$   | Input of the switch #3, connects to the output of the transmitter. |
| 4     | $T_x4$   | Input of the switch #4, connects to the output of the transmitter. |
| 5     | $T_x5$   | Input of the switch #5, connects to the output of the transmitter. |
| 6     | $T_x6$   | Input of the switch #6, connects to the output of the transmitter. |
| 7     | $T_x7$   | Input of the switch #7, connects to the output of the transmitter. |
| 8     | $T_x8$   | Input of the switch #8, connects to the output of the transmitter. |
| 9     | $R_x8$   | Output of the switch #8, connects to the input of the receiver.    |
| 10    | $R_x7$   | Output of the switch #7, connects to the input of the receiver.    |
| 11    | $R_x6$   | Output of the switch #6, connects to the input of the receiver.    |
| 12    | $R_x5$   | Output of the switch #5, connects to the input of the receiver.    |
| 13    | $R_x4$   | Output of the switch #4, connects to the input of the receiver.    |
| 14    | $R_x3$   | Output of the switch #3, connects to the input of the receiver.    |
| 15    | $R_x2$   | Output of the switch #2, connects to the input of the receiver.    |
| 16    | $R_x1$   | Output of the switch #1, connects to the input of the receiver.    |

## Bill Of Materials

| Part    | Description | Value      | Package        | Manufacturer | Part Number |
|---------|-------------|------------|----------------|--------------|-------------|
| U1 - U4 | T/R switch  | $\pm 100V$ | 4x4 8-Lead DFN | Supertex     | MD0100DK6-G |

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