ABSTRACT
This design note presents the reference design of an isolated CAN node using the isolated CAN transceiver and a transformer driver, SN6505A, to generate the isolated power. Table 1 lists the family of isolated CAN transceivers from Texas Instruments.

Table 1. Isolated CAN Transceivers

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
<th>Data Rate</th>
<th>Primary-Supply Voltage Range</th>
<th>Secondary-Supply Voltage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO1042</td>
<td>Isolated CAN Transceiver With 70V Bus Fault Protection and Flexible Data Rate (Industrial and Automotive)</td>
<td>5 Mbps</td>
<td>1.71V to 5.5V</td>
<td>4.5V to 5.5V</td>
</tr>
<tr>
<td>ISO1050</td>
<td>Isolated CAN Transceiver (Industrial)</td>
<td>1 Mbps</td>
<td>3V to 5.5V</td>
<td>4.75V to 5.25V</td>
</tr>
</tbody>
</table>
1 Design

The ISO1042 possesses 7kV peak isolation voltage and has a typical transient immunity of 100kV/µs. The device operates from a 1.8V to 5V nominal supply on the primary side and a 5V nominal supply on the secondary side. This is of particular advantage for applications operating in harsh industrial environments. The wide range of supply voltages on the primary side enables the connection to low-voltage microcontrollers for power preservation, whereas the 5V on the secondary side maintains a high signal-to-noise ratio of the bus signals.

The push-pull transformer driver SN6505A in conjunction with an external transformer, rectifier and regulator converts a 2.5V to 5V inputs into a 5V output while providing up to 5kV of isolation depending on the transformers used.

The ISO1042 has excellent transient protection. To further enhance the transient protection, a low-capacitive transient voltage suppressor (TVS), such as ESDCAN05, is optional. The device provides a 250W maximum pulse power capability, 30pF of capacitance, while its standoff voltages of ±30V cover the CAN common-mode range of ISO1042. If using the ISO1050, the CPDT-12V TVS diode or a TVS diode with similar specifications should be used. See the How to Design Isolated CAN Systems With Correct Bus Protection TI TechNote for more information.

Figure 1 shows the final system diagram including transceiver, power supply, and transient suppressor.

![Figure 1. 5-kV RMS Isolated CAN Node](image)

2 References

Refer to these references for more information on the devices listed in this application report:

- TI’s isolated CAN portfolio
- Texas Instruments, SN6505 Low-Noise 1-A Transformer Drivers for Isolated Power Supplies data sheet
- Texas Instruments, How to Isolate Signal and Power in Isolated CAN Systems TI TechNote
- Texas Instruments, Isolate your CAN systems without compromising on performance or space TI TechNote
## Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

<table>
<thead>
<tr>
<th>Changes from B Revision (June 2010) to C Revision</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Added the ISO1042 device to the reference design</td>
<td>1</td>
</tr>
</tbody>
</table>
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