Isolated CAN Reference Design

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This design note presents the reference design of an isolated CAN node using the isolated CAN transceiver ISO1050 and the isolated 3.3-V to 5-V, DC-to-DC converter RSZ-3.305HP.

The ISO1050 possesses 4-kV peak isolation voltage and has a typical transient immunity of 50 kV/µs. The device operates from a 3.3-V nominal supply on the primary side and a 5-V nominal supply on the secondary side. This is of particular advantage for applications operating in harsh industrial environments. This is because the 3.3 V on the primary side enables the connection to low-volt microcontrollers for power preservation, whereas the 5 V on the secondary side maintains a high signal-to-noise ratio of the bus signals.

The isolated DC-DC converter RSZ-3.305HP converts a 3.3-V input into a 5-V output while providing 2 kV of isolation. The SMD module comprises a transformer driver, the isolation transformer, and the rectifier network, followed by a linear regulator and its associated bypass and output capacitors.

For effective transient protection, a low-capacitive transient voltage suppressor (TVS), such as PSM712, is recommended. The device provides a 600-W surge capability, 75 pF of capacitance, and up to a 40-kV ESD protection, while its standoff voltages cover the CAN common-mode range of –7 V to +12 V.

Additional noise filtering of the signal paths between the node controller and the single-ended side of the transceiver is applied through simple R-C low-pass filters. The filter component values are calculated such that $R_F \times C_F = 0.032 / f_S$, with f_S being the highest signal frequency of interest.

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

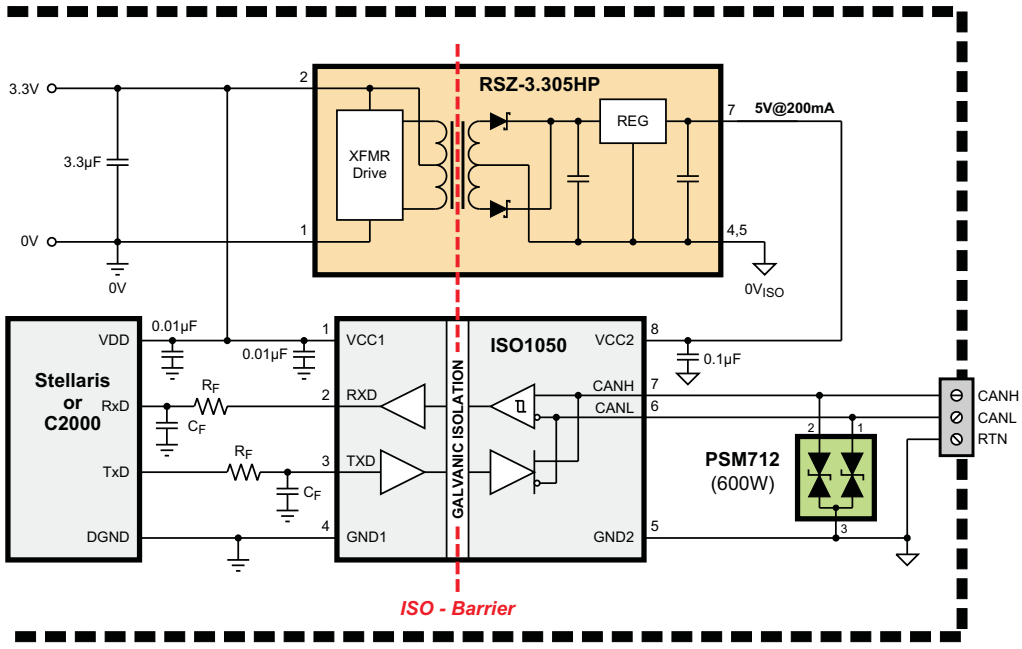

Figure 1. 2-kV Isolated CAN Node

References

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For more specific information on devices presented in this design note, refer to one of the following links:

- For the isolated CAN transceiver, see www.ti.com
- For isolated DC-to-DC modules, see www.recom-power.com, or www.recom-international.com.
- For transient voltage suppressors, see www.protekdevices.com.
- For the Stellaris™ ARM™ Cortex™-M3 microcontrollers, see www.ti.com/stellaris.
  For C2000™ microcontrollers, see www.ti.com/c2000

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