HI-1590 Bus Pin Protection for Hot-Switching Applications

April 2018

REVISION HISTORY

Revision	Date	Description of Change
AN-1590-1 Rev. New	04-09-18	Initial Release

Introduction

The HI-1590 transmitter outputs are susceptible to damage if bus load connection or disconnection occurs while the device is transmitting. Damage can also occur if a test fixture (or the application) uses a relay to connect or disconnect the terminal isolation transformer from the bus, and such switching is permitted during transceiver transmission. The sudden current change causes L di/dt voltage transients on the isolation transformer primary winding and on the BUSA and /BUSA pins of the IC (see HI-1590 Datasheet for Absolute Maximum Rating of BUS pins), which can damage the transmitter output drivers; when damage occurs, high ICC current follows and the output voltage waveform is either distorted or absent. If hot-switching is required during device transmission, the bus pins should be protected using a suitable TVS device as outlined below.

Bus pin protection for hot-switching applications

- The VDD supply voltage should be regulated close to 3.3V to minimize the likelihood of damage. Higher supply voltages (up to the 3.45V maximum allowed in the data sheet) increase the likelihood of damage. The part should never be operated above 3.45V.
- Connect a high speed low capacitance bi-directional ESD diode across the primary BUSA/B and /BUSA/B pins to protect the HI-1590 device under load hot-switching conditions. Be sure to specify a low capacitance ESD type diode to avoid side effects that can potentially alter the transmitted signal.
- Two ***Diodes Incorporated*** diodes are recommended by Holt: D5V0L2B3SO (SOT-23) dual or D5V0L1B2LP single. When using the SOT-23 dual device optionally use the two internal diodes in parallel for a more robust protection.
- Note: In designs using a host-controlled relay for bus load switching, host programming or logic may be used to prevent load switching while transmission is underway.

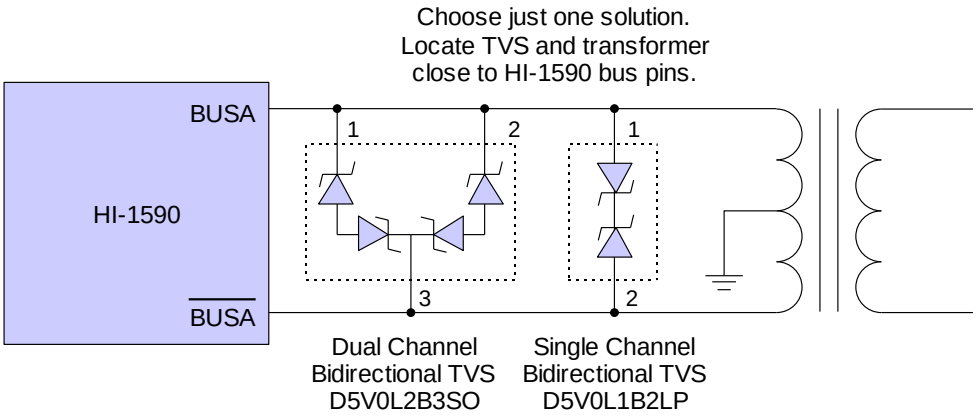

Fig 1 – HI-1590 Hot Switching Protection