Introduction

This evaluation board serves as an aid in evaluating circuit protection on RS-485 serial device port solutions using Bourns® TBU® High-Speed Protector (HSP), MOV and TVS products to meet the required industry standards on RS-485 port interfaces. The recommended Bourns® TBU® HSP solution offers enhanced performance features over competing technologies, which can help the design engineer to increase the surge & transient protection level on RS-485 ports and place the entire circuit protection solution into a smaller PCB area. Bourns has developed a RS-485 evaluation board (measuring 50 mm x 25 mm x 1.2 mm) manufactured using FR4 PCB with nickel gold plating on top and bottom sides.

How to Connect the Evaluation Board for Test Set-up

• Connect J1 and J2 to the exposed lines.
• Connect J3 and J4 to the RS-485 IC device.

Note

Please note that RS-485 Port Protection Evaluation Board 2 was replaced by RS-485 Port Protection Evaluation Board 3 in order to extend the flat GDT configuration option.

* In addition to the two TBU® HSPs, the default configuration of this board uses two MOVs (MOV1, MOV2) and a single TVS diode array (TVS5). The board allows different configurations:
  • 2 MOVs (MOV1 and MOV2) may be replaced by a) 2 single 2031 GDTs (GDT1 and GDT2)
  or b) a dual 2030 GDT (GDT3)
  • 1 TVS diode array (TVS3) may be replaced with a) 2 SMB TVS diodes (TVS1, TVS2) or b) 2 SOT23 TVS diodes (TVS3, TVS4) or c) 2 SOT23-5 thyristor devices (TISP1, TISP2)
RS-485 Port Protection Evaluation Board 2

Performance Graphs

Ch 1: input voltage / surge / fault to TBU® HSP
Ch 4: TBU® HSP current

The ohm unit following the current units shown for Channel 4 (i.e. AOhm) indicates that a 50 ohm termination was used internal to the oscilloscope.

Figure 3 ESD +8 KV Contact Discharge (IEC-61000-4-2)

Figure 4 Surge 1.2/50 5 KV

Figure 5 120 V\textsubscript{rms}

Figure 6 28 V\textsubscript{rms}

Reference

For more information on implementing advanced circuit protection technologies for RS-485 ports, please review the Bourns RS-485 application note: http://www.bourns.com/data/global/pdfs/bourns_cpk1114_rs485_circuit_protection_appnote.pdf

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