

RS-485 Port Protection Evaluation Board 2

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.

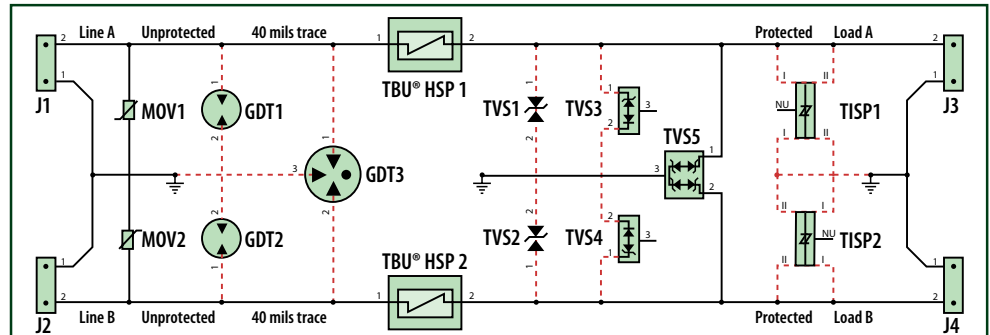


Figure 1 RS-485 Evaluation Board 2 Schematic

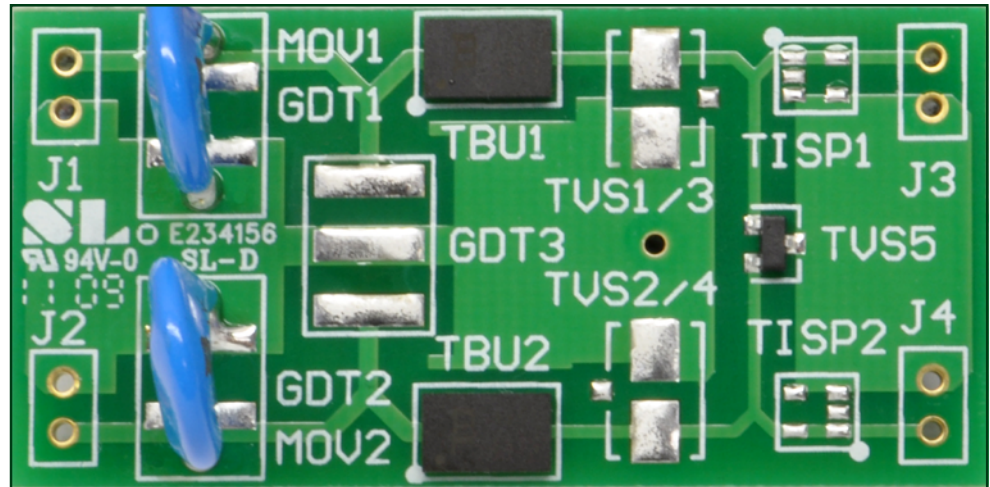


Figure 2 RS-485 Evaluation Board 2 Top Side Layout*

* 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, not yet released)
- 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)

Table 1 RS-485 Evaluation Board 2 Bill of Materials

| No. | Part Number | Qty. | Description | Reference |
|-----|------------------|------|---|------------------------|
| 1 | TBU-CA065-300-WH | 2 | TBU® Single Bidirectional Line 650 V 300 mA | TBU® HSP 1, TBU® HSP 2 |
| 2 | MOV-10D201K | 2 | Single Line 10 mm MOV 200 V | MOV1, MOV2 |
| 3 | CDSOT23-SM712 | 2 | Dual Bidirectional Line 7 V / 12 V | TVS5 |

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Performance Graphs

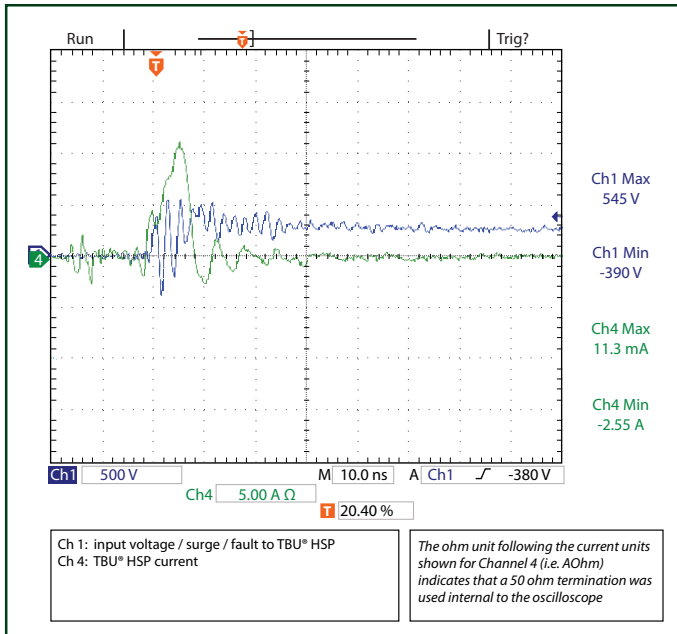


Figure 3 ESD +8 KV Contact Discharge (IEC-61000-4-2)

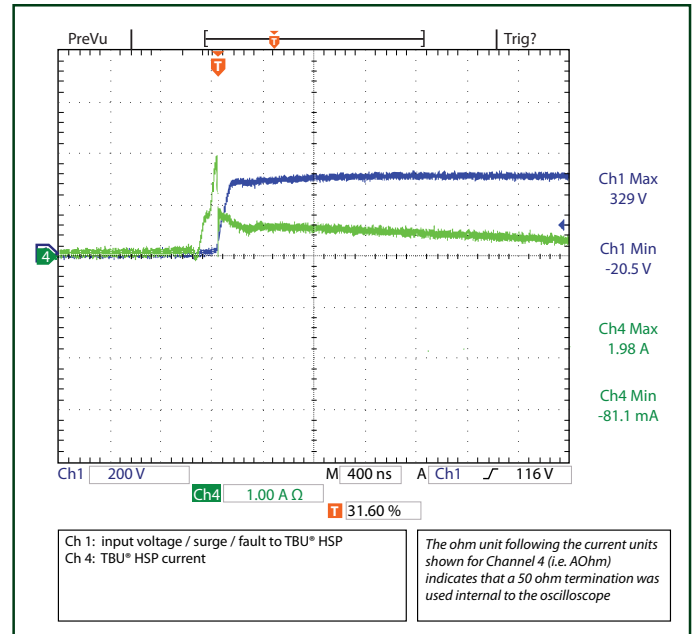


Figure 4 Surge 1.2/50 5 KV

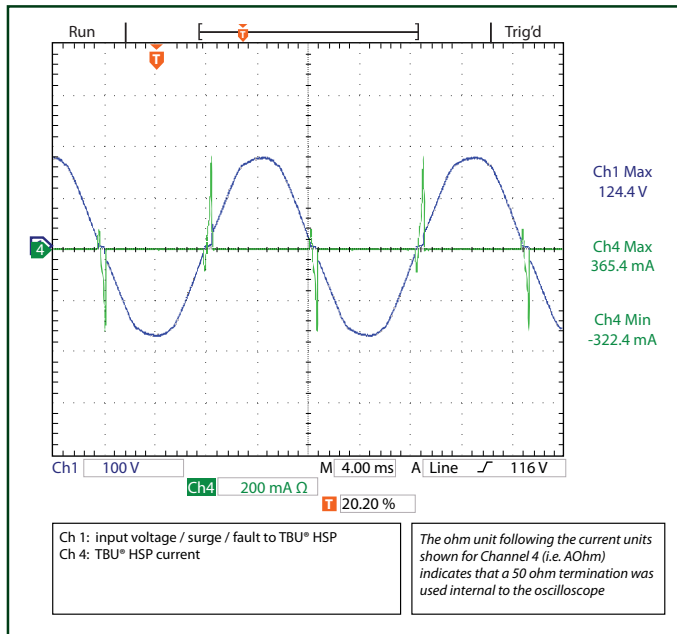


Figure 5 120 V_{rms}

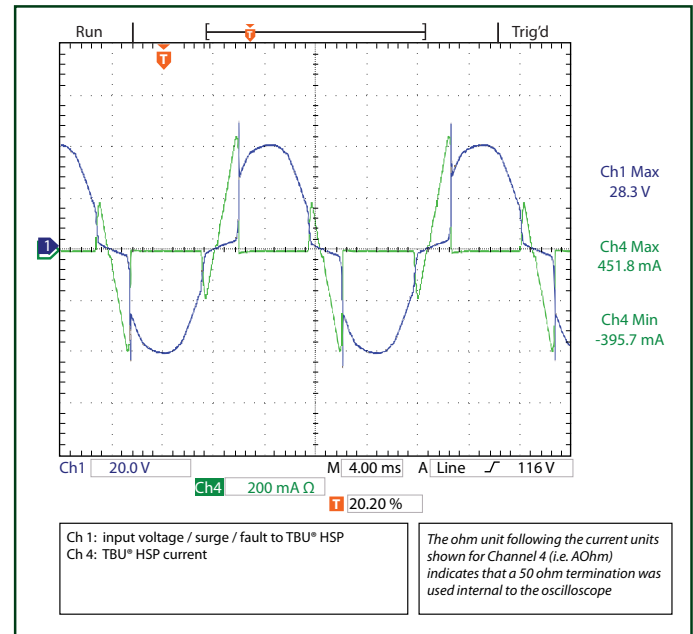


Figure 6 28 V_{rms}

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_RS-485_AppNote.pdf

For further technical support and for complete circuit protection solutions, please visit www.bourns.com

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