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.

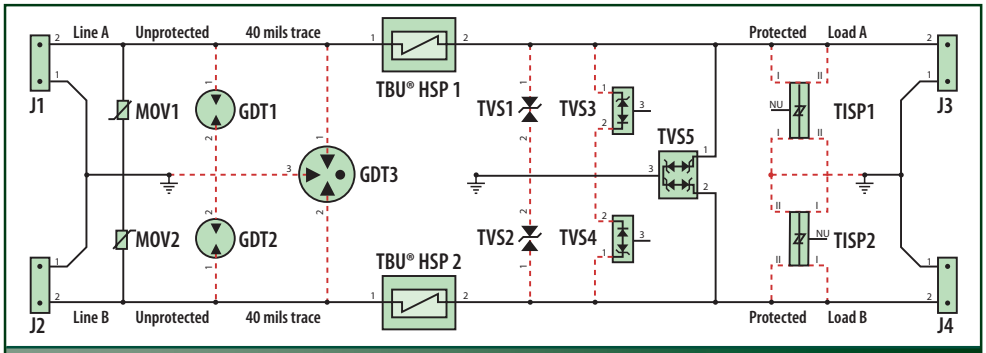

Figure 1 | *RS-485 Evaluation Board 2 Schematic*

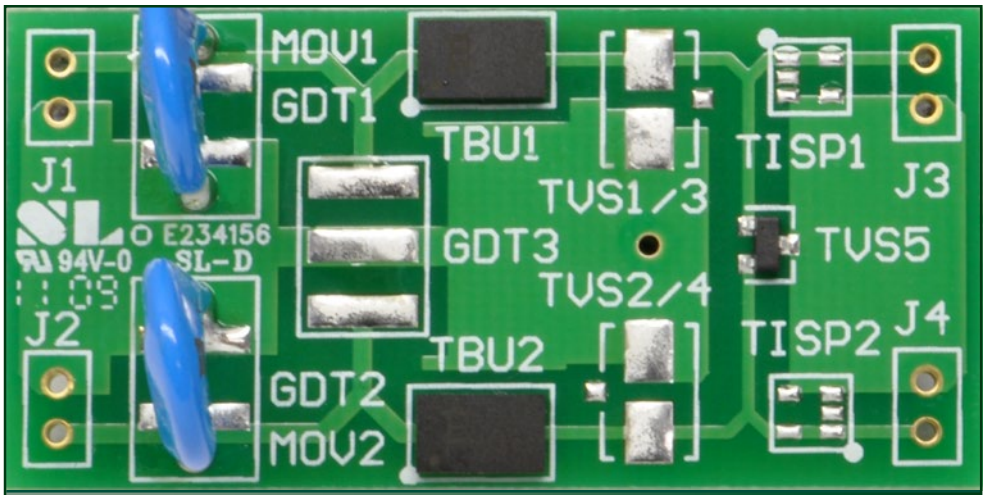

Figure 2 | *RS-485 Evaluation Board 2 Top Side Layout**

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.

** 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)*

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

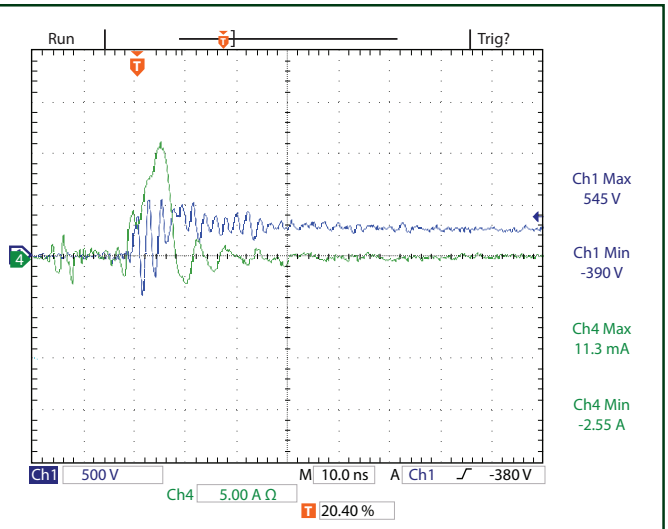

Figure 3 | *ESD +8 KV Contact Discharge (IEC-61000-4-2)*

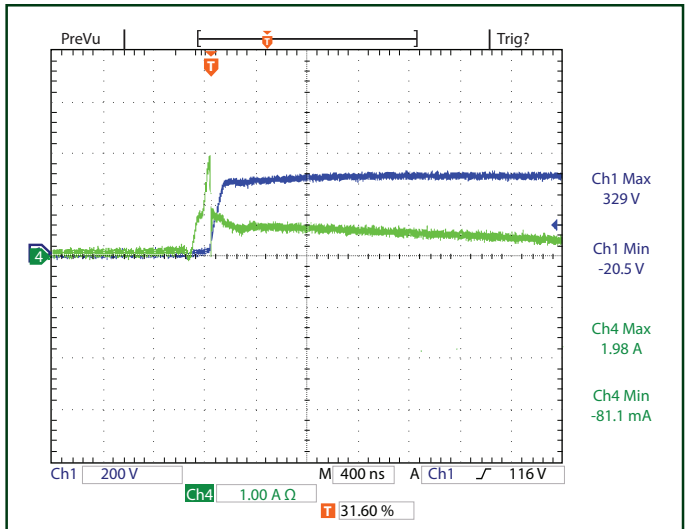

Figure 4 | *Surge 1.2/50 5 KV*

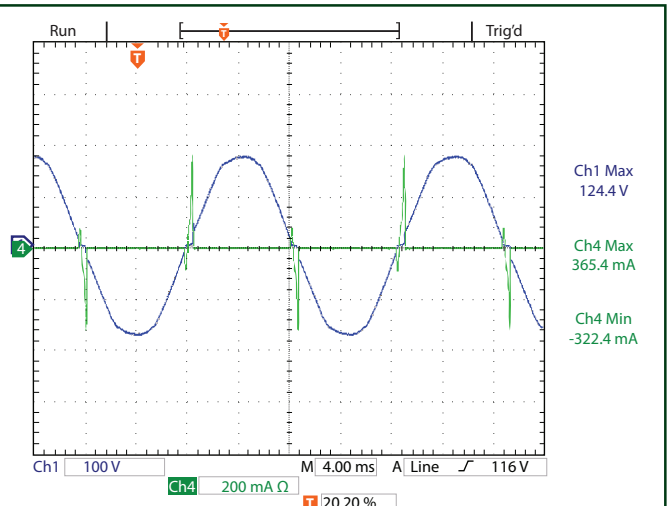

Figure 5 | *120 V_{rms}*

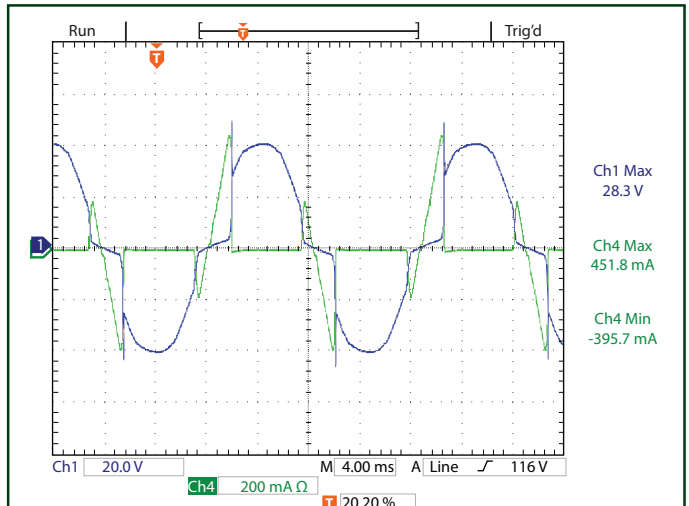

Figure 6 | *28 V_{rms}*

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_cpk1114_rs485_circuit_protection_appnote.pdf