

# RS-485 Port Protection Evaluation Board 3

## Introduction

This evaluation board serves as an aid in evaluating circuit protection on RS-485 serial device port solutions using Bourns® TBU® High-Speed Protectors (HSPs), FLAT® Gas Discharge Tube (GDT) Surge Arrestors and Transient Voltage Suppressor (TVS) products designed 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 and transient protection level on RS-485 ports, placing the entire circuit protection solution into a smaller PCB area. Bourns has developed an RS-485 evaluation board (measuring 53.5 mm x 25.3 mm x 0.85 mm) manufactured using an FR4 PCB with nickel gold plating on the top and bottom sides.

## How to Connect the Evaluation Board for Test Set-up

- Connect J1A and J1B to the exposed lines.
- Connect J2A and J2B to the RS-485 IC device.

\*The default configuration of this board uses two GDTs w/ FLAT® technology (GDT3 and GDT4) and one TVS diode (TVS3). The board allows different configurations:

- Two Model 2017 GDTs w/ FLAT® technology (GDT3 and GDT4) may be replaced by a) two MOVs (MOV1 and MOV2) or b) two Model 2031 GDTs (GDT1 and GDT2) or c) two SMD package TISP® devices (TISP1 and TISP2) or d) a dual line Model 2030 GDT (GDT5).
- One SOT23 TVS diode (TVS3) may be replaced with two SMB TVS diodes (TVS1, TVS2).

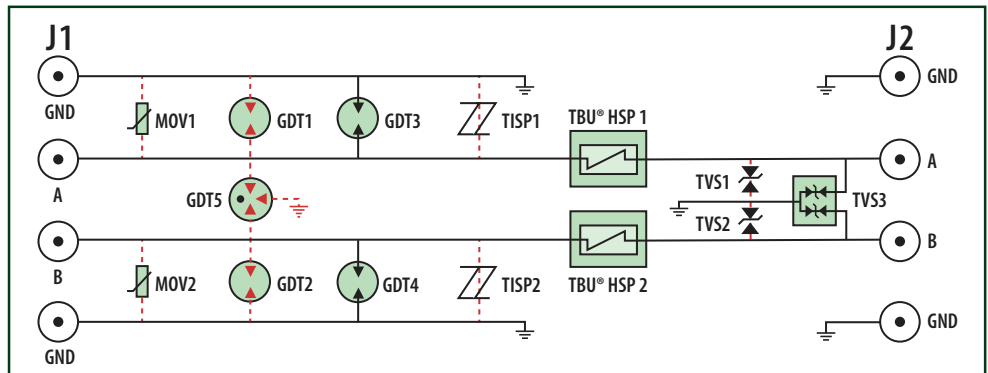


Figure 1 | RS-485 Evaluation Board 3 Schematic

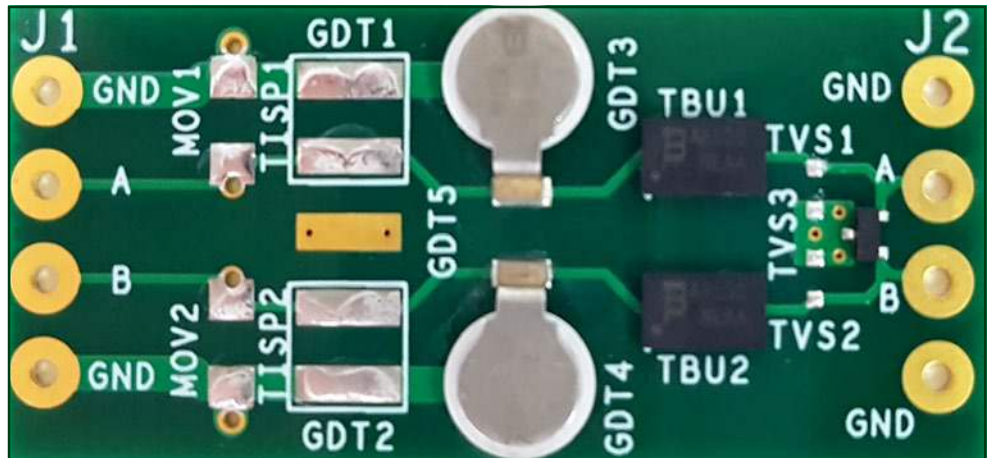


Figure 2 | RS-485 Evaluation Board 3 Top Side Layout\*

Table 1 | RS-485 Evaluation Board 3 Bill of Materials

No.	Part Number	Qty.	Description	Reference
1	TBU-CA085-300-WH	2	TBU® Single Bidirectional Line 850 V 300 mA	TBU® HSP 1, TBU® HSP 2
2	2017-09-SMH-RPLF	2	GDT w/ FLAT® Technology 90 V	GDT3, GDT4
3	CDSOT23-SM712	1	Dual Bidirectional Line TVS 12 V SOT23	TVS1, TVS2

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## Performance Graphs

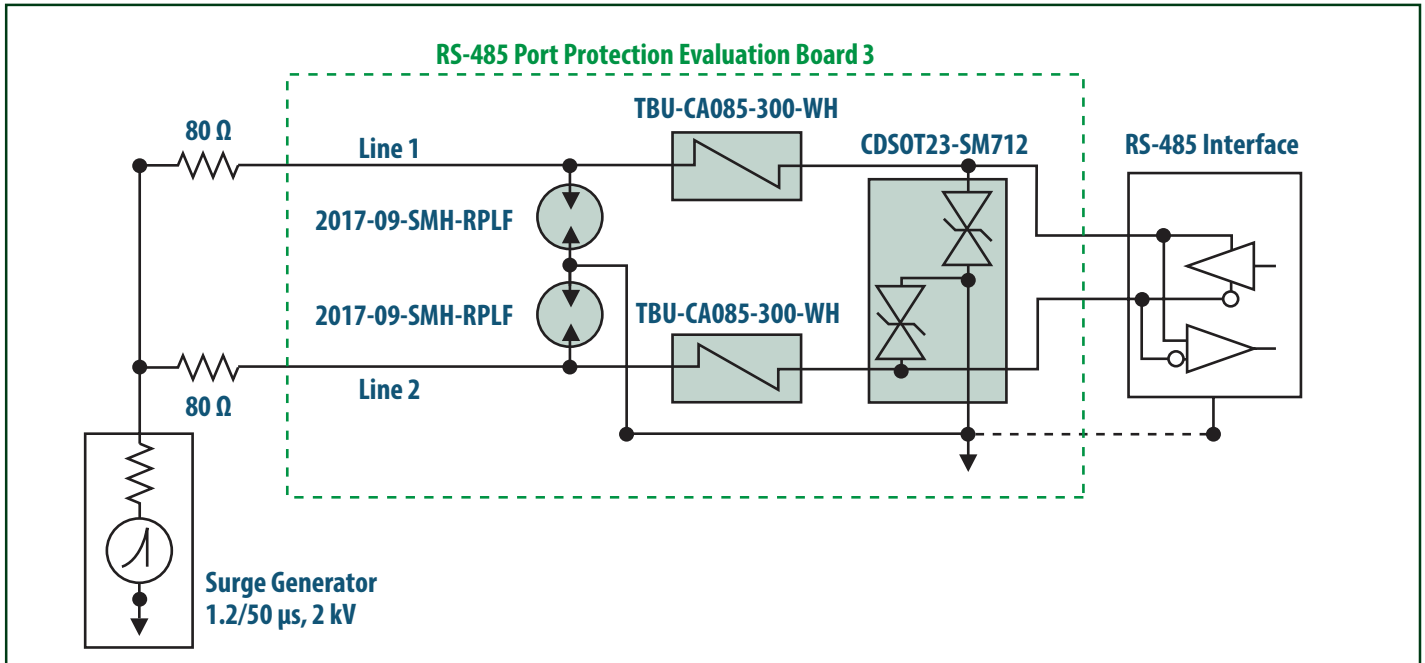


Figure 3 RS-485 Port Protection

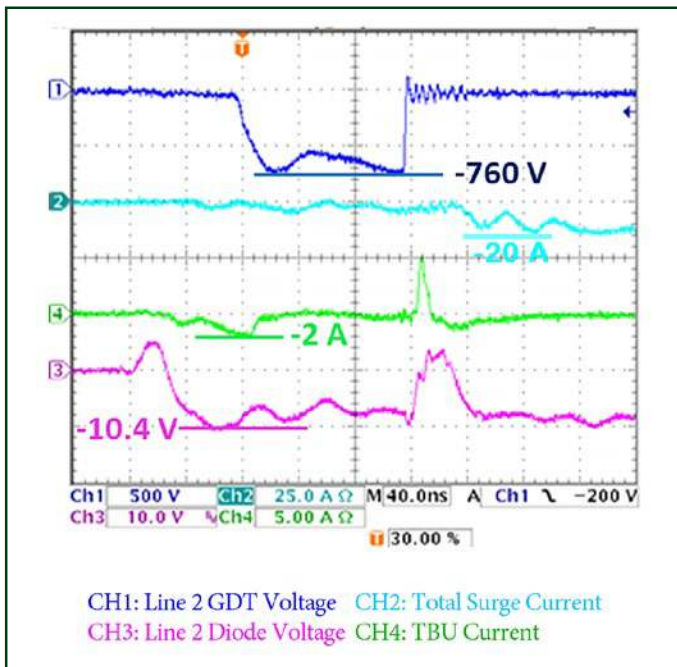


Figure 4 Surge Test 2 kV (1.2/50  $\mu$ s,  $R_{EXT} = 80$  Ohms)

### Reference

For more information on implementing advanced circuit protection technologies for RS-485 ports, please review Bourns' RS-485 Protection Solution:  
<http://www.bourns.com/rs485>

For further technical support and for complete circuit protection solutions, please visit  
[www.bourns.com](http://www.bourns.com)

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