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).

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

<table>
<thead>
<tr>
<th>No.</th>
<th>Part Number</th>
<th>Qty.</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TBU-CA085-300-WH</td>
<td>2</td>
<td>TBU® Single Bidirectional Line 850 V 300 mA</td>
<td>TBU® HSP 1, TBU® HSP 2</td>
</tr>
<tr>
<td>2</td>
<td>2017-09-SMH-RPLF</td>
<td>2</td>
<td>GDT w/FLAT® Technology 90 V</td>
<td>GDT3, GDT4</td>
</tr>
<tr>
<td>3</td>
<td>CD5OT23-SM712</td>
<td>1</td>
<td>Dual Bidirectional Line TVS 12 V SOT23</td>
<td>TVS1, TVS2</td>
</tr>
</tbody>
</table>
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Performance Graphs

Figure 3

RS-485 Port Protection Evaluation Board 3

Surge Generator 1.2/50 µs, 2 kV

TBU-CA085-300-WH

2017-09-SMH-RPLF

2017-09-SMH-RPLF

Line 1

Line 2

CDSOT23-SM712

RS-485 Interface

Figure 4

Surge Test 2 kV (1.2/50 µs, R_{EXT} = 80 Ohms)

CH1: Line 2 GDT Voltage  CH2: Total Surge Current
CH3: Line 2 Diode Voltage  CH4: TBU Current

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

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