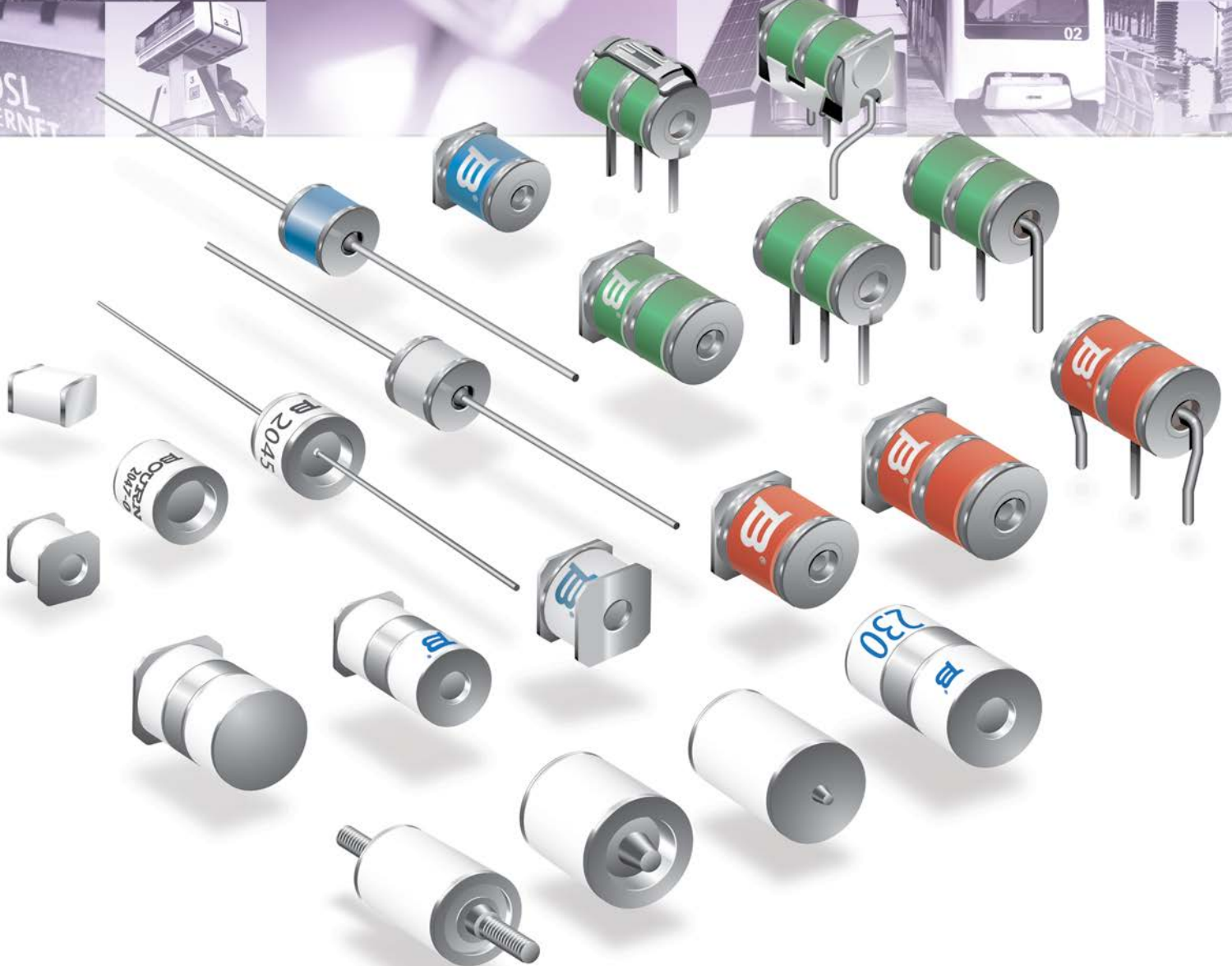


Bourns® Gas Discharge Tubes

Short Form Brochure



BOURNS®

Bourns® GDT Product Overview

Introduction

Customers in many different industries rely on Bourns® Gas Discharge Tubes (GDTs) to protect an ever increasing array of electronic equipment. Bourns engineers have innovated and improved GDT technology by designing devices with faster response times, low capacitance, and smaller sizes while at the same time increasing impulse life performance.

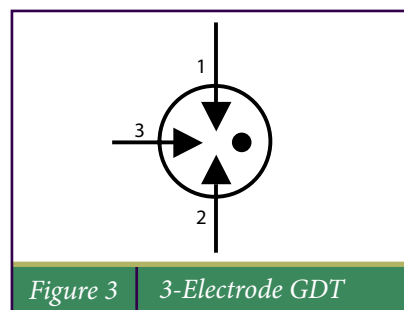
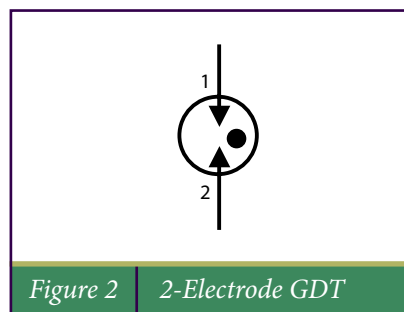
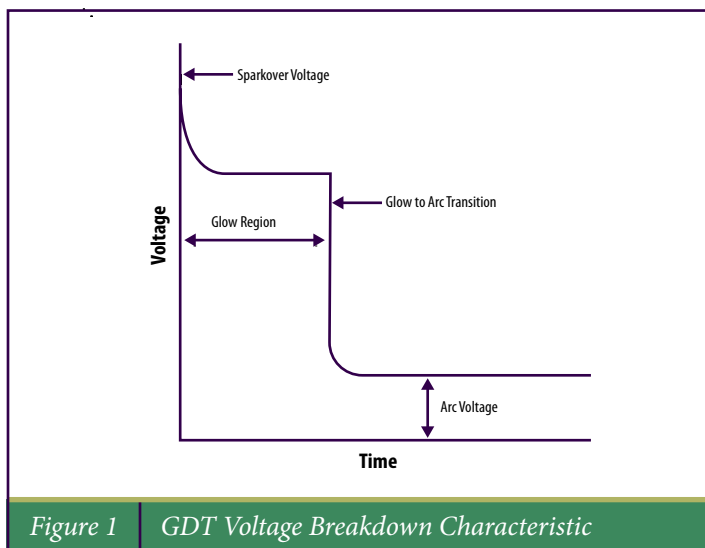
GDT Operation

GDT devices are designed to prevent damage from transient disturbances by acting as a “crowbar”, virtually a short circuit. When an electrical surge exceeds the GDT’s defined sparkover voltage, the GDT becomes ionized and conduction takes place within a fraction of a microsecond diverting surge current to ground. When the surge event subsides and the system voltage returns to normal levels, the GDT will reset to its high-impedance (off) state. The crowbar effect of the GDT effectively limits the overvoltage to a low level and shunts the associated surge current away from downstream components and circuitry.

Bourns offers GDTs in six unique families: Long Life, Premium, High-Voltage, High Current, Hybrid and Fast Acting. This broad offering of GDT devices addresses the diverse protection needs of next generation electronics.

GDT Types

Bourns offers a broad range of 2-electrode and 3-electrode GDT devices. 2-electrode GDTs are single chamber devices designed to provide protection to single lines referenced to another line or ground. 3-electrode GDTs provide dual line protection from either line to ground or line to line (L1-G; L2-G or L-L). Bourns® GDTs are available in a variety of DC breakdown voltages, current ratings, sizes and mechanical configurations.



Bourns® GDT Product Features

- RoHS compliant*
- Wide range of voltages available (75 V to 6000 V)
- Wide range of GDT sizes available
- Patented hybrid technology designs (MSP® GDT)
- Low arc (on-state) voltage
- Low capacitance and insertion loss
- Non-radioactive materials
- Devices are tested according to U.S.A. and International standards and recommendations
- Low work function designs that result in long and stable service life
- Patented Switch-Grade Fail-Short devices available on some models

Benefits of Partnering with Bourns for Your GDT Circuit Protection Needs

- Special leadform and voltage screening capabilities
- Performance and reliability backed up by 50+ years of designing and manufacturing GDTs
- Technical design support
- Technical committee participation and leadership
- Bourns lab facilities available for design verification of customer circuits as well as with testing capabilities for UL and Telcordia
- Bourns offers multiple circuit protection components for total design support including Thyristors, Diodes, Multifuse® PPTCs, CPTCs, TBU® High-Speed Protectors, Telefuse™ Telecom Protectors, MOVs and Inductors.



Switch-Grade Fail-Short Devices

Reduce the risk of thermal runaway with our Switch-Grade Fail-Short device available on selected Bourns® GDTs.

- The fail-short contacts are spring-loaded switch-grade electrical conductors with no insulating burn through media or solder pellets under compression.
- The fail-short mechanism is activated by a breakaway action, preventing solder residues from freezing the fail-short mechanism and diurnal temperature failures.
- Superior thermal coupling between the Switch-Grade Fail-Short device and suppression components allows rapid Fail-Short activation in both vented and non-vented GDTs, with one of the industry's lowest contact resistance.
- Available on Model 2026, 2036 and 2026 MSP® GDTs.

Bourns® GDT Application Overview

Applications by Market

Telecom/Datacom

Ethernet (Exposed)
 Ethernet (PoE)
 Primary Protection Modules
 MDF Modules
 Splitters
 Telecom CPE
 Telecom Line Cards
 ADSL Modems
 VDSL Modems
 Set-top Boxes
 Gateways
 IAD
 Base Station Antennas
 Voice Modes
 MDC/PCI Modems
 VoIP

Industrial/Consumer

RS-485
 RS-232
 Antenna Protection
 Railroad Protection
 Irrigation Systems
 Home Office Equipment
 Instrumentation
 TVS Protection Devices
 Power Supplies
 Solar Power
 Smart Grid
 Smart Power Security Equipment
 Transportation Signaling
 Industrial Process Controls
 Petro-Chemical Equipment

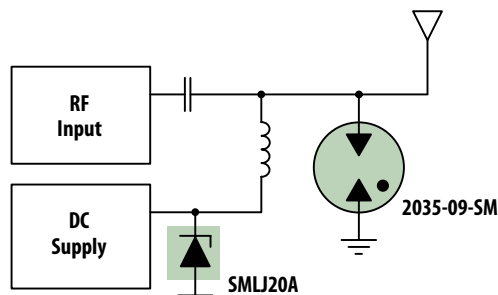


Figure 4 Satellite Receiver RF Input

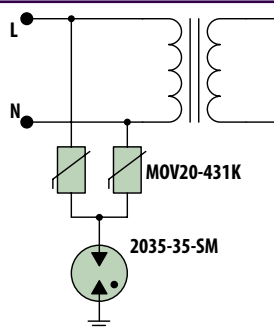


Figure 5 AC Input Surge Protection

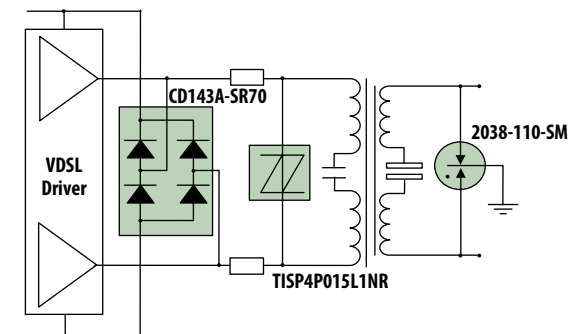


Figure 6 VDSL Driver Side Protection

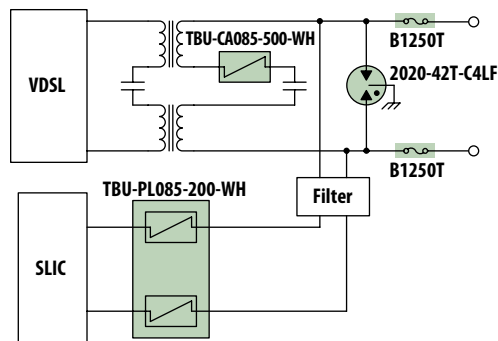
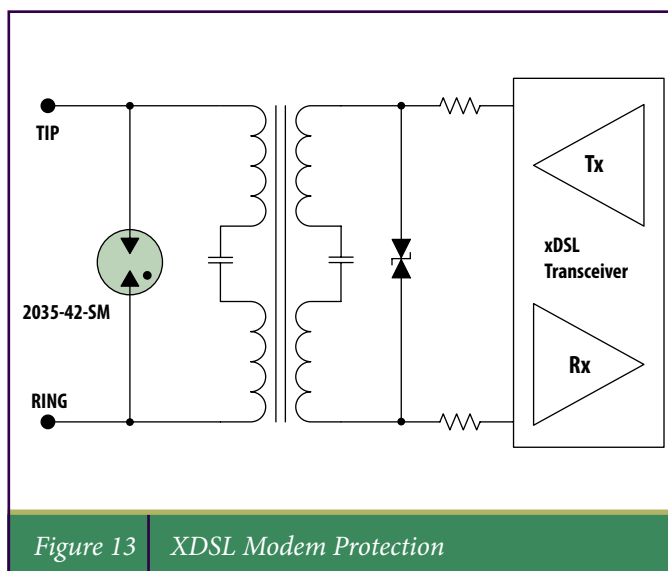
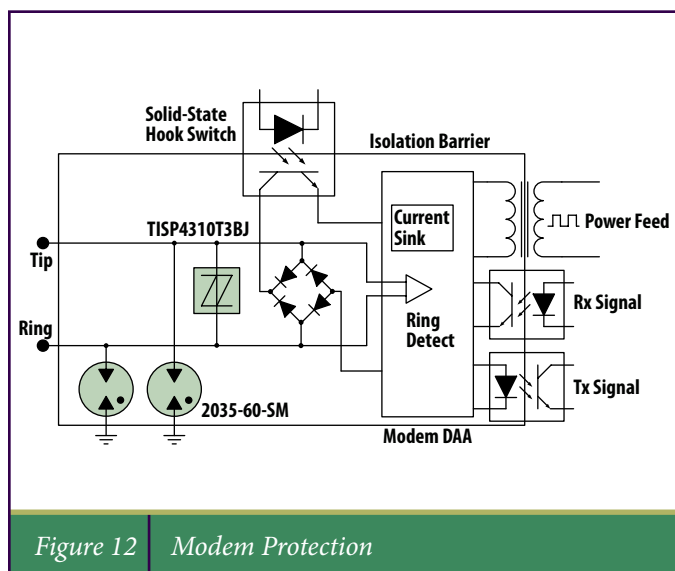
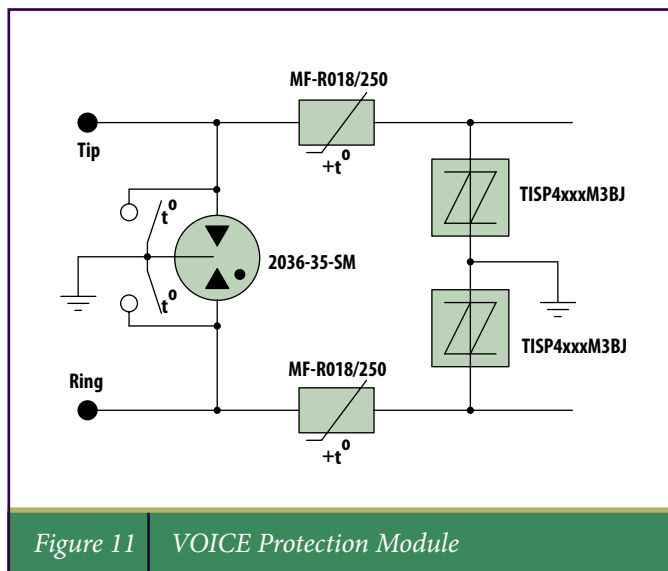
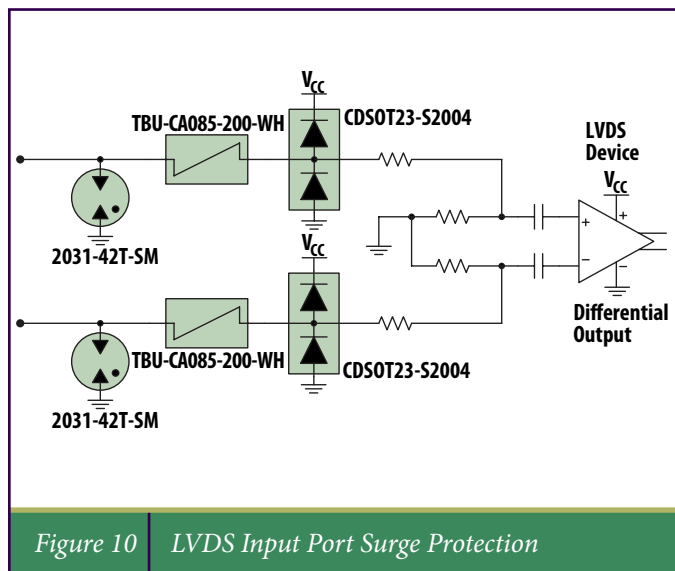
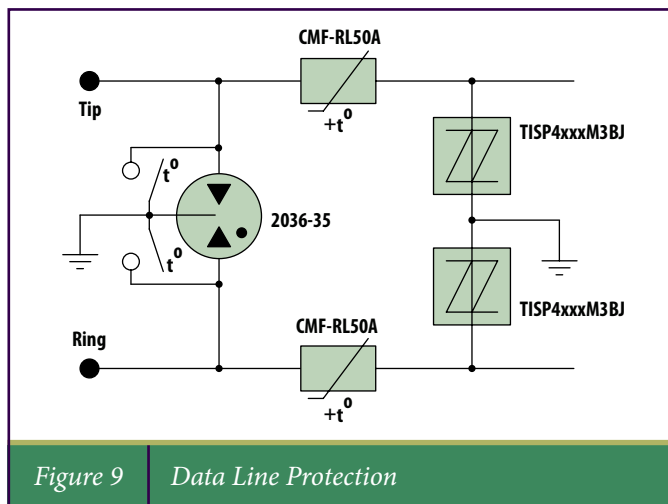
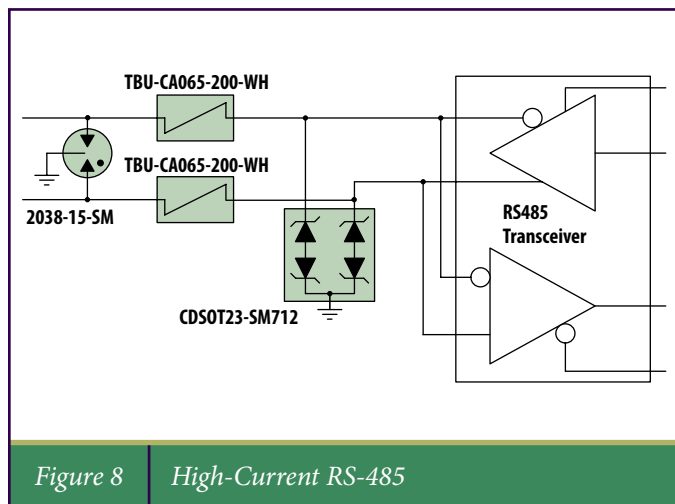


Figure 7 VDSL Over Pots





GDT General Information

Quality Systems

Bourns® GDTs are produced in ISO 9001 certified facilities.

Quality Monitoring

Bourns® GDTs are 100 % production tested to ensure compliance of key product parameters.

Quality Sampling Inspections

Bourns® GDTs are inspected to AQL 0.65, DIN ISO 2859 specifications.

Operating and Storage Conditions

Bourns® GDT devices comply with the general operating and storage conditions as detailed in relevant IEC standards, or ITU K.12 unless otherwise specified in the product series data sheets.

Operating temperature range: -40 °C to +85 °C.

GDTs are assigned climatic category 40/90/21 in accordance with IEC 60068-1.

Performance by Design

Bourns® GDT device designs are based on standard ITU-T K.12, as well as key considerations of RUS-PE80/IEEE C62.31, GR-1361, GR-974, GR-1089, ITU-T K.20/21, IEC61643-311 (EN61643-311), and DIN VDE 0845 part 2.

UL Listing

Bourns® GDT devices are recognized to UL 497B under UL file E153537.

Regulated Substances

Bourns® GDTs with an “LF” designator are RoHS compliant as defined in the Annex to 2002/95/EC. By definition, Bourns® GDTs and Switch-Grade Fail-Short option with an “LF” suffix are below maximum concentration values (no exemptions used) for:

- Lead
- Cadmium
- Hexavalent Chromium
- Mercury and Mercury Compounds
- PBBs and PBDEs

Hybrid GDTs



Hybrid GDT Devices

A hybrid GDT is a device that integrates two or more protection technologies into its design to provide an enhanced circuit protection solution.

2026-xx-XX-MSP Heavy Duty, 3-Electrode Multi-Stage Protector MSP® GDT



Size (mm)	Max. Surge (10/350 μ s) 1 Operation	AC Discharge Life (20 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Packaging	Form Factor	Advantages
8 x 14	5 kA	10 A	500 A, >1000 Operations	230 - 330	Bulk	Radial leaded	<ul style="list-style-type: none">• Long service life• Hybrid solid-state design• Solid-state response combined with robust GDT• Drop-in primary protection solution for all paired communications lines• GR-974 tested• UL Listed

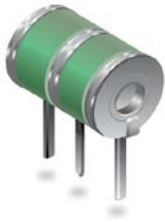
Long Life GDTs

Long Life GDT Devices

Long Life GDT devices are designed to meet or exceed GDT performance as specified in ITU K.12. These GDTs are available in heavy duty, medium duty and light duty versions and are targeted to customers requiring superior performance of end products over a longer service life.

In addition to ITU K.12, some heavy duty long life GDT series are based on key considerations of RUS-80/IEEE 465.1, GR-1361/GR-974/1089 as well as ITU K.20/21.

2026-xx-XX



Heavy Duty, 3-Electrode Balanced TRIGARD® GDT

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
8 x 11	40 kA	20 A	1000 A, >400 Operations	75 - 600	<2	Bulk	Core, Radial leaded	<ul style="list-style-type: none"> Long and stable service life Balanced Trigard® design Heavy duty AC & surge current ratings Switch-Grade Fail-Short available Low capacitance UL Listed and RoHS compliant*

2027-xx-XX



Heavy Duty, 2-Electrode GDT

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
8 x 6	25 kA	10 A	500 A, >400 Operations	75 - 600	<1	Bulk, Tape & Reel	Core, Axial leaded	<ul style="list-style-type: none"> Long and stable service life Heavy duty AC & surge current ratings Precision $\pm 15\%$ tolerance on 150-600 V devices Low capacitance and insertion loss Custom leadforms available UL Listed and RoHS compliant*

2027-xx-SM



Heavy Duty, 2-Electrode Surface Mount GDT

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
8 x 6	25 kA	10 A	500 A, >400 Operations	75 - 600	<1	Bulk, Tape & Reel	Surface mount	<ul style="list-style-type: none"> Long and stable service life Heavy duty AC & surge current ratings Precision $\pm 15\%$ tolerance on 150-600 V devices Low capacitance and insertion loss UL Listed and RoHS compliant*

2035-xx-XX



Light Duty, 2-Electrode Miniature GDT

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5 x 5.4	10 kA	5 A	100 A, >300 Operations	90 - 600	<1	Bulk, Tape & Reel	Core, Axial leaded	<ul style="list-style-type: none"> Long and stable service life Light duty AC & surge current ratings Compact size ideal for board level protection Low capacitance and insertion loss UL Listed and RoHS compliant*

2035-xx-SM**Light Duty, 2-Electrode Miniature Precision Surface Mount GDT**

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
4.4 x 5	10 kA	5 A	100 A, >300 Operations	90 - 600	<1	Bulk, Tape and Reel	Surface mount	<ul style="list-style-type: none"> Long and stable service life Light duty AC & surge current ratings Compact size ideal for board level protection Low capacitance and insertion loss UL Listed and RoHS compliant*

2036-xx-XX**Medium Duty, 3-Electrode Mini TRIGARD™ GDT**

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5 x 7.5	20 kA	10 A	200 A, >300 Operations	75 - 600	<2	Bulk	Core, Radial leaded	<ul style="list-style-type: none"> Long and stable service life Balanced Mini TRIGARD™ design Medium duty AC & surge current rating Low capacitance and insertion loss Switch-Grade Fail-Short available UL Listed and RoHS compliant*

2036-xx-SM**Medium Duty, 3-Electrode Surface Mount Mini TRIGARD™ GDT**

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5 x 7.3	20 kA	10 A	200 A, >300 Operations	75 - 600	<2	Bulk, Tape & Reel	Surface mount	<ul style="list-style-type: none"> Long and stable service life Balanced Mini TRIGARD™ design Medium duty AC & surge current rating Low capacitance and insertion loss Switch-Grade Fail-Short available UL Listed and RoHS compliant*

2037-xx-XX**Light Duty, 2-Electrode Miniature GDT**

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5 x 5	10 kA	5 A	100 A, >300 Operations	90 - 600	<1	Bulk, Tape & Reel	Core, Axial leaded	<ul style="list-style-type: none"> Long and stable service life Light duty AC & surge current ratings Compact size ideal for board level protection Low capacitance and insertion loss UL Listed and RoHS compliant*

2038-xx-SM**Light Duty, Symmetrical 3-Electrode Surface Mount Mini TRIGARD™ GDT**


Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (10 operations)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5 x 7.3	10 kA	5 A	200 A, >300 Operations	150 - 1100	<1	Bulk, Tape & Reel	Surface mount	<ul style="list-style-type: none"> Long and stable service life Light duty AC & surge current ratings Symmetric breakdown voltage (L-L & L-G) Compact size ideal for board level protection Low capacitance and insertion loss UL Listed and RoHS compliant*


Premium GDTs


Premium GDT Devices


Premium GDT devices are designed to meet selected performance requirements as specified in ITU K.12. These GDTs are available in heavy duty, medium duty


and light duty versions and are targeted to customers that require a cost-effective protection solution for end products with short to medium service life requirements.

2045-xx-XX	Medium Duty, 2-Electrode GDT								
	Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
	8 x 6	15 kA	5 A	100 A, 500 Operations	75 - 470	<1.5	Bulk, Tape and Reel	Axial leaded	<ul style="list-style-type: none"> • Medium service life • Medium duty surge rating • Low capacitance and insertion loss • UL Listed and RoHS compliant*

2049-xx-XX	Medium Duty, 2-Electrode GDT								
	Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
	8 x 6	20 kA	20 A	100 A, 500 Operations	75 - 600	<1.5	Bulk, Tape and Reel	Axial leaded	<ul style="list-style-type: none"> • Medium service life • Medium duty surge rating • Low capacitance and insertion loss • UL Listed and RoHS compliant*

2051-xx-SM	Light Duty, 2-Electrode Surface Mount μ GDT								
	Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
	2.7 x 3.2 x 4.5	2 kA	Not Rated	10 A, 100 Operations	90 - 600	<1	Tape and Reel	Surface Mount	<ul style="list-style-type: none"> • Medium service life • Compact low profile footprint • μSurface mount • Low capacitance and insertion loss • Light duty surge rating • UL Listed and RoHS compliant*

2052-xx-SM	Light Duty, Symmetrical 3-Electrode Miniature GDT								
	Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
	5 x 7.2	10 kA	5 A	200 A, 150 Operations	230 - 800	<2	Tape and Reel	Surface Mount	<ul style="list-style-type: none"> • Medium service life • Light duty surge rating • Mini-surface mount • Low capacitance and insertion loss • UL Listed and RoHS compliant*

2053-xx-SM	Light Duty, 2-Electrode Miniature GDT								
	Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
	4 x 4.2	5 kA	3 A	100 A, 300 Operations	75 - 600	<1	Tape and Reel	Surface Mount	<ul style="list-style-type: none"> • Medium service life • Light duty surge rating • Mini-surface mount • Low capacitance and insertion loss • UL Listed and RoHS compliant*

2054-xx-SM**Light Duty, 3-Electrode Miniature Surface Mount GDT**

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5 x 7.2	10 kA	5 A	200 A, 5 Operations	230 - 470	<2	Tape and Reel	Surface Mount	<ul style="list-style-type: none"> • Medium service life • Light duty surge rating • Mini-surface mount • Low capacitance and insertion loss • UL Listed and RoHS compliant*

2055-xx-SM**Light Duty, 2-Electrode Miniature Surface Mount GDT**

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
6 x 4.2	N/A	10 A	100 A, 300 Operations	230 - 600	<1	Tape and Reel	Surface Mount	<ul style="list-style-type: none"> • Medium service life • Light duty surge rating • Mini-surface mount • Low capacitance and insertion loss • UL Listed and RoHS compliant*

2056-xx-XX**Light Duty, 3-Electrode GDT**

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
6 x 8.5	10 kA	5 A	200 A, 100 Operations	90 - 600	<2	Bulk	Radial leaded	<ul style="list-style-type: none"> • Medium service life • Light duty surge rating • Compact mini size • Fail-Short available • Low capacitance and insertion loss • UL Listed and RoHS compliant*

2057-xx-XX**Light Duty, 2-Electrode Miniature GDT**

Size (mm)	Max. Surge (8/20 μ s) 1 operation	AC Discharge Life (1 operation)	Surge Life (10/1000 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5.5 x 6	10 kA	5 A	100 A, 300 Operations	75 - 470	<1	Bulk, Tape and Reel	Axial leaded	<ul style="list-style-type: none"> • Medium service life • Light duty surge rating • Compact mini size • Low capacitance and insertion loss • UL Listed and RoHS compliant*

High-Current GDTs

High-Current GDT Devices

High-current GDT devices are designed to handle very large impulse discharge currents. Typically utilized in surge protection devices (SPDs), these GDTs have 8/20 μ s impulse current ratings of 40-100 kA.

2047-xx-XX

Heavy Duty, 2-Electrode GDT



Size (mm)	Max. Surge (8/20 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
12.7 x 12.7	>40 kA	90 - 350	<5	Bulk	Core, radial leaded	<ul style="list-style-type: none"> Heavy duty >40 kA 8/20 μs surge current rating 8 kA 10/350 μs surge current rating High isolation resistance Long life and stability over service life Terminals available Low capacitance and insertion loss UL Listed and RoHS compliant*

2061-xx-A

2-Electrode Power GDT



Size (mm)	Max. Surge (8/20 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
11.8 x 12	60 kA	230 - 800	<10	Bulk	Core	<ul style="list-style-type: none"> Heavy duty 60 kA 8/20 μs surge current rating High isolation resistance Low capacitance and insertion loss UL Listed and RoHS compliant*

2063-xx-A

2-Electrode Power GDT



Size (mm)	Max. Surge (8/20 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
11.8 x 17	100 kA	230 - 800	<10	Bulk	Core	<ul style="list-style-type: none"> Heavy duty 100 kA 8/20 μs surge current rating High isolation resistance Low capacitance and insertion loss UL Listed and RoHS compliant*

2097-xx-D

Heavy Duty, 2-Electrode GDT



Size (mm)	Max. Surge (8/20 μ s)	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
11.8 x 32	25 kA	1000 - 2200	<10	Bulk	Core with lugs	<ul style="list-style-type: none"> High-voltage DC breakdown voltages up to 2.2 kV High isolation resistance 25 kA 8/20 μs surge current rating Low capacitance and insertion loss UL Listed and RoHS compliant*

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

High-Voltage GDTs

High-Voltage GDT Devices

High-voltage GDT devices are designed specifically for those customers and applications requiring a high level

of isolation. This family of GDT is available with DC breakdown voltages ranging from 800 V to 6000 V.

2039-xxx-XX 2-Electrode Miniature GDT



Size (mm)	Max. Surge (8/20 μ s)- 1 operation	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5 x 4.1	5 kA	800 - 1100	<1	Bulk, Tape and Reel	Core, axial leaded	<ul style="list-style-type: none"> High-voltage DC breakdown voltages up to 1.1 kV High surge current rating Compact mini size Low capacitance and insertion loss UL Listed and RoHS compliant*

2039-xxx-SM 2-Electrode Surface Mount Miniature GDT



Size (mm)	Max. Surge (8/20 μ s)- 1 operation	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5 x 4.4	5 kA	800 - 1100	<1	Tape and Reel	Surface mount	<ul style="list-style-type: none"> High-voltage DC breakdown voltages up to 1.1 kV High surge current rating Mini surface mount device Low capacitance and insertion loss UL Listed and RoHS compliant*

2087-xxx-SM 2-Electrode Miniature GDT



Size (mm)	Max. Surge (8/20 μ s)- 1 operation	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
4 x 4	3 kA	800 - 2000	<0.5	Tape and Reel	Surface mount	<ul style="list-style-type: none"> High-voltage DC breakdown voltages up to 2 kV Mini surface mount device Low capacitance and insertion loss UL Listed and RoHS compliant*

2089-xxx-XX 2-Electrode Miniature GDT



Size (mm)	Max. Surge (8/20 μ s)- 1 operation	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
5.5 x 6	3 kA	1000 - 4000	<1.5	Bulk, Tape and Reel	Axial leaded	<ul style="list-style-type: none"> High-voltage DC breakdown voltages up to 4 kV Mini axial device Low capacitance and insertion loss UL Listed and RoHS compliant*

2093-xxx-SM 2-Electrode GDT



Size (mm)	Max. Surge (8/20 μ s)- 1 operation	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
6.2 x 4.2	5 kA	1000 - 3000	<1.5	Tape and Reel	Surface mount	<ul style="list-style-type: none"> High-voltage DC breakdown voltages up to 3 kV Surface mount device Low capacitance and insertion loss UL Listed and RoHS compliant*

2095-xxx-XX 2-Electrode GDT



Size (mm)	Max. Surge (8/20 μ s)- 1 operation	DC Breakdown Range (V)	Capacitance (pF)	Packaging	Form Factor	Advantages
8 x 8	3 kA and 8 kA	800 - 6000	<1.5	Bulk, Tape and Reel	Axial leaded	<ul style="list-style-type: none"> High-voltage DC breakdown voltages up to 6kV High surge current rating Low capacitance and insertion loss UL Listed and RoHS compliant*

Fast Acting GDTs


T-Series Fast Acting GDT Devices


Bourns has developed a line of fast acting GDTs designed specifically for use with the Bourns® TBU® High-Speed Protector (HSP). The T-Series GDTs are designed to limit high-speed impulse voltages to levels below the TBU® HSP peak voltage impulse rating (V_{imp}). Voltages exceeding the TBU® HSP V_{imp} rating may cause damage to the TBU® HSP.


The T-Series GDT and TBU® HSP provide an extremely fast, low voltage let-through protection solution that is well-suited to sensitive electronics susceptible to damage from voltage and current transients.

T-Series Fast Acting GDT Advantages

- Designed specifically for the TBU® HSP
- Simplifies designing with the TBU® HSP
- Extremely fast overvoltage protection limiting surges below the V_{imp} of the TBU® HSP
- Low capacitance, making it ideal for high-speed applications
- 2-electrode and 3-electrode designs available
- Optional Switch-Grade Fail-Short available for Model 2020

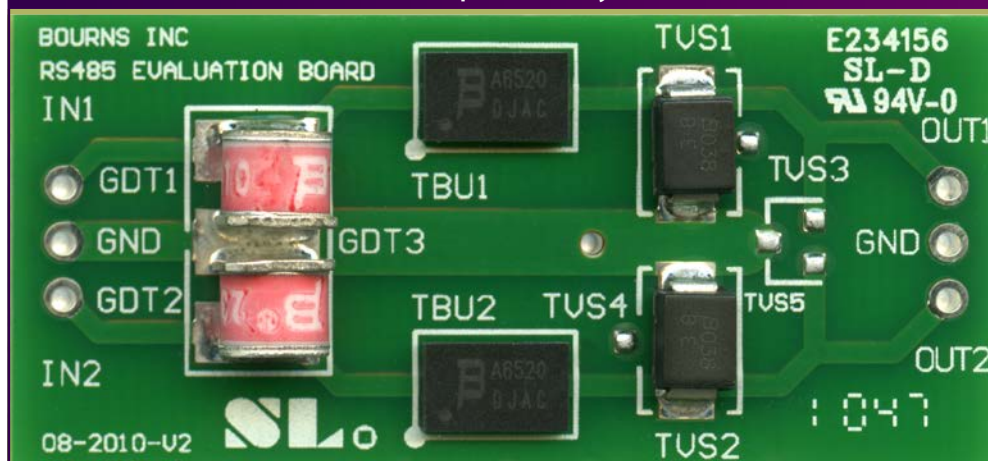
2020-xxT	3-Electrode T-Series Fast Acting GDT							
	Size (ø x L)	Max. 8/20 µs Impulse Discharge Current	Min. DC Breakdown*	Max. Impulse Breakdown Voltage @ 5 kV 1.2 x 50 µs	Capacitance @ 1 MHz	Packaging	Form Factor	Optional Switch-Grade Fail-Short
	7.9 x 11.2 mm	5 kA	60 V, 185 V, 360 V	500, 650, 850 V	< 1 pF	Bulk	Radial leaded	Yes

2030-xxT-SM	3-Electrode Surface Mount T-Series Fast Acting GDT							
	Size (ø x L)	Max. 8/20 µs Impulse Discharge Current	Min. DC Breakdown*	Max. Impulse Breakdown Voltage @ 5 kV 1.2 x 50 µs	Capacitance @ 1 MHz	Packaging	Form Factor	Optional Switch-Grade Fail-Short
	5 x 7.5 mm	4 kA	185 V, 360 V	650, 850 V	<1 pF	Bulk, Tape and Reel	Surface mount	No

2031-xxT-SM	2-Electrode Surface Mount T-Series Fast Acting GDT							
	Size (ø x L)	Max. 8/20 µs Impulse Discharge Current	Min. DC Breakdown*	Max. Impulse Breakdown Voltage @ 5 kV 1.2 x 50 µs	Capacitance @ 1 MHz	Packaging	Form Factor	Optional Switch-Grade Fail-Short
	5 x 4.4 mm	2 kA	60 V, 185 V, 360 V	500, 650, 850 V	<1 pF	Bulk, Tape and Reel	Surface mount	No

* End of life value for DC Breakdown. Fresh devices will have significantly higher DC breakdown when measured.

RS-485 Evaluation Board Top Side Layout*



GDTs in Evaluation Boards

This Evaluation Board serves as an aid in evaluating circuit protection on RS-485 serial device ports using two Bourns® TBU® High-Speed Protectors (HSPs), two fast acting GDTs and two TVS diodes to meet the required industry standards on RS-485 port interfaces. The recommended Bourns® TBU® HSP solution with a low capacitance GDT offers enhanced high-speed performance features over competing technologies, which can help the design engineer increase the surge and transient protection level on RS-485 ports and place the entire circuit protection solution into a smaller reduced PCB area. Bourns has developed an RS-485 Evaluation Board (measuring 45 mm x 21 mm x 1.2 mm), manufactured using FR4 PCB with nickel gold plating on the top and bottom sides.

* The default configuration of this board uses 2 GDTs (GDT1, GDT2) and discrete SMB TVS diodes (TVS1, TVS2). The board allows different configurations:

- 2 single 2031 GDTs (GDT1 and GDT2) may be replaced by a 2030 GDT (GDT3).
- 2 SMB TVS diodes (TVS1 and TVS2) may be replaced with a) Two SOT23 TVS diodes (TVS3, TVS4) or b) a single TVS diode array (TVS5).

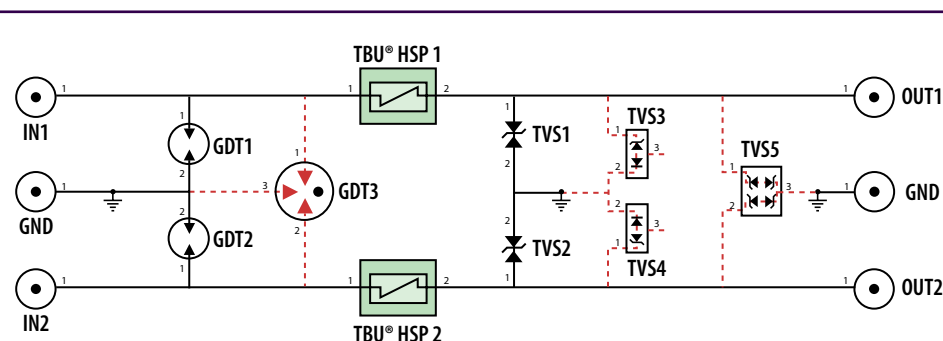


Figure 16 RS-485 Evaluation Board Schematic

Applications

Port Protection	2020 GDT Part Number	2030 GDT Part Number	2031 GDT Part Number	TBU® HSP Part Number
CAN-bus	2020-23T-xxxLF	2030-23T-RPLF	2031-23T-SM-RPLF	TBU-CA065-100-WH
RS-232	2020-23T-xxxLF	2030-23T-SM-RPLF	2031-23T-SM-RPLF	TBU-CA065-200-WH
RS-422	2020-23T-xxxLF	2030-23T-SM-RPLF	2031-23T-SM-RPLF	TBU-CA065-200-WH
RS-485	2020-23T-xxxLF	2030-23T-SM-RPLF	2031-23T-SM-RPLF	TBU-CA065-200-WH
SDI	2020-23T-xxxLF	2030-23T-SM-RPLF	2031-23T-SM-RPLF	TBU-CA065-100-WH
VDSL	2020-15T-xxxLF	2030-15T-SM-RPLF	2031-15T-SM-RPLF	TBU-CA050-500-WH

See data sheet for lead form options

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