

Protection for Exposed 240 VAC Power Ports in 5G Infrastructure

Up to IEC 61000-4-5 Level 4 Solution

Solution Products



[PTVS3-380C-TH](#)



[GDT25-60-S1-RP](#)

Situation

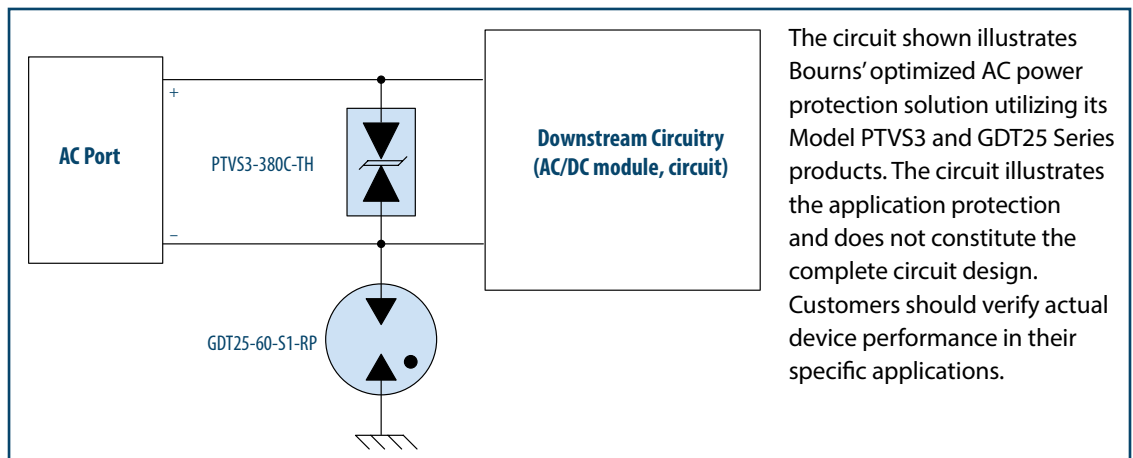
Exposed equipment with 240 VAC power ports requires surge protection to avoid damage and help maximize system uptime. A good example of this type of exposed equipment is the currently evolving 5G wireless infrastructure, which needs to meet low latency and high efficiency specifications while complying with strict protection standards. In addition, because of the anticipated high-volume of 5G equipment deployments, any protection solution must be economically scalable.

Bourns® Power Play Solution™

There are multiple ways to implement exposed port protection to minimize system downtime and prevent costly service visits. To protect 240 VAC 5G infrastructure and similar application power ports from damage, it is necessary to limit the peak surge voltage to an acceptable level without short-circuiting the line for an extended period of time. The challenge for designers is that the majority of MOV or similar protection solutions feature clamping voltages that are too high and provide slower surge protection performance than what is demanded for 5G infrastructure.

This Bourns® Power Play Solution™ outlines an advanced Power TVS (PTVS) diode protection solution for exposed 240 VAC power ports. The recommended solution provides fast-reacting surge protection and low clamping voltage advantages. It also shows how the combination of PTVS Diodes and Gas Discharge Tubes (GDTs) meet IEC 61000-4-5 Level 4 regulatory compliance requirements for low clamping voltage (520 V @ 3 kA, 8/20 μs). Enhanced performance alternatives are also listed for applications that require a higher rating.

Because it is a semiconductor device, the faster surge protection performance features and lower clamping voltage capabilities designed into Bourns® PTVS Diodes are optimized to fulfill these requirements. Offering faster performance to transient threats, the Bourns® Model PTVS3-380C-TH is able to withstand a 3 kA surge under 8/20 μs conditions with a maximum working voltage of 265 V_{rms}.



The circuit shown illustrates Bourns' optimized AC power protection solution utilizing its Model PTVS3 and GDT25 Series products. The circuit illustrates the application protection and does not constitute the complete circuit design. Customers should verify actual device performance in their specific applications.

Qty.	Component Description	Part Number & Data Sheet Link	Distributor Inventory
1	Next-Generation Fast Acting GDT	GDT25-60-S1-RP	Check Stock
1	Power TVS Diode	PTVS3-380C-TH	Check Stock

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Summary

Industry: 5G Wireless Infrastructure

Application: 240 VAC Power Port Surge Protection

Product: Power TVS Diode:

[Bourns® Model PTVS3-380C-TH](#)

and Gas Discharge Tube:

[Bourns® Model GDT25-60-S1-RP](#)

Benefits: Very fast surge protection coupled with fast-acting protection isolation

Compliance

Both components mentioned in this Bourns® Power Play Solution™ are UL recognized. The solution provided in above also helps designers meet IEC 61000-4-5 Level 4 regulatory compliance for low clamping voltage.

Benefits

In addition to what has been described previously, one benefit of this Bourns® Power Play Solution™ for 240 VAC power ports is that it combines the superior clamping voltage of the PTVS Diode and the tighter voltage limiting features of its GDT25 device to help minimize stress in the downstream AC/DC circuit.

Alternate Recommendations

For applications that require protection for higher voltages or higher surge current, the Bourns® PTVS diode models below offer enhanced features:

3 kA Protection

• [PTVS3-430C-TH](#)

6 kA Protection

• [PTVS6-380C-TH](#)

• [PTVS6-430C-TH](#)

10 kA Protection

• [PTVS10-380C-TH](#)

• [PTVS10-430C-TH](#)

• [PTVS10-470C-TH](#)

Additional Resources

The following related resources are also available from Bourns:

- [Bourns® Power Play Solution™: Universal AC Power \(UACP\) Protection](#)
- [Application Note: Why PTVS Diodes are Optimal Solutions for User System and Power Supply Circuit Protection](#)
- [Application Note: Surface Mount Power TVS Diodes Deliver Optimal Protection for Power Supplies](#)
- [White Paper: Advancing GDT Technology to Meet Higher Surge and Multi-level Protection Requirements](#)
- [Design Note: Histogram Comparison Between Next-Generation Bourns® Model GDT25 Series and Legacy Bourns® Model 2035 Series Gas Discharge Tubes \(GDTs\)](#)
- [Application Note: Procedure for Obtaining Accurate GDT Capacitance Values for High Frequency Circuits](#)

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