



Surge Protection Challenges For 10 GbE PoE++ Networks And a SASD Solution

White Paper

As the demand increases for fast, 10 GbE/PoE++ protocol data networks, so does the need for such networks to be protected from destructive [power surges](#) caused by lightning strikes and other sources of power transients.

Below we discuss some of the qualities of 10 GbE PoE++ data networks, the surge protection challenges they present, and how one surge protection technology, SASD, is meeting those challenges. We conclude with information about a new Transtector SPD that is designed to protect 10 GbE PoE++ networks.

Qualities of 10 GbE PoE++ Networks

A 10 Gigabit Ethernet Power over Ethernet++ network refers to a high-speed network that supports 10 GbE and PoE++ protocols. It supports data transfer rates of 10 gigabits per second (Gbps), which is ten times faster than the previous standard. This high-speed connectivity is ideal for applications that require large amounts of data to be transferred quickly, such as data centers, cloud computing, and multimedia streaming.

PoE++ (also known as [IEEE 802.3bt](#)) is a standard for [Power over Ethernet](#) that enables devices to receive power and data over the same Ethernet cable. PoE++ supports up to 100 watts of DC power over Ethernet cables with multi-pair power delivery. That is enough to power high-performance devices such as IP cameras, wireless access points, videoconferencing equipment, and pan-tilt zoom (PTZ) cameras. In contrast, the older PoE standard (without ++) delivers up to 15.4 watts of DC power.

Advantages of being able to transmit both power and data on one cable include reduced installation costs, increased flexibility, and improved reliability. Also:

- There is no need to install separate power cables, power outlets, or power supplies for each device. This simplifies the installation and reduces the overall cost of the system.
- PoE provides greater flexibility in device placement, as devices can be installed in locations where power outlets are not available.
- PoE improves reliability by eliminating the need for multiple power sources, reducing the potential for power-related failures.

Combining 10 GbE and PoE++ technologies allows for high-speed data transfer and power delivery over a single cable, making it an efficient and cost-effective solution for many enterprise applications.

Surge Protection Challenges for 10 GbE PoE++

Surge protection is an important consideration for any network, but it can be particularly challenging for a 10 GbE PoE++ protocol data network due to the high speeds and power involved. Challenges can include:

- **Voltage spikes:** Voltage spikes can occur due to lightning strikes, power surges, or other electrical disturbances. These spikes can damage the sensitive electronics in the network equipment, leading to costly downtime and repairs. The intensity of voltage spikes can be much higher outdoors, where high-speed Ethernet links are now frequently deployed.

- **Power surges:** Power surges can occur when there is a sudden increase in the electrical power flowing through the network equipment. These surges can cause damage to the network equipment, particularly the PoE++ switches and injectors.
- **Grounding issues:** Proper grounding is essential for effective surge protection in a network. 10 GbE SPDs must provide a dedicated low-impedance connection to the grounding system, while maintaining the characteristic impedance of the system to maintain signal integrity.
- **Cable damage:** The high power delivery of PoE++ can lead to cable damage if the cable is not rated for the high power levels. This can result in a loss of connectivity or even equipment damage.

SASD to the Rescue

Silicon avalanche suppression diode (SASD) technology is widely used to protect GbE PoE++ data networks from power surges. Silicon avalanche diodes are designed to trigger and conduct current when the voltage exceeds a certain threshold. When a surge of excess voltage and current enters the surge protector, the silicon avalanche diode conducts the current and creates a short circuit, which diverts the excess voltage and current away from the protected equipment and towards ground. This process of diverting excess voltage and current away from the equipment helps to prevent damage to sensitive electronic components.

SASD offers several benefits over other surge protection technologies:

- **Low let-through voltage:** SASD surge protectors allow very little voltage to pass through to the protected equipment. This helps to prevent equipment damage and downtime due to power surges.
- **Fast response time:** SASD surge protectors can detect and respond to surges quickly. This helps to prevent damage to the protected equipment.
- **Long lifespan:** SASD surge protectors can provide protection for many years. They are also designed to be maintenance-free, which reduces the need for costly and time-consuming repairs or replacements.
- **Compact design:** SASD surge protectors are typically very compact and can be installed in tight spaces. This makes them ideal for use in environments where space is at a premium, such as data centers and industrial settings..

A Transtector Solution

Transtector recently began offering a surge protector that is designed for use with 10 GbE PoE++ networks. Our [ALPU-M150 outdoor data surge protector](#) uses SASD technology to protect critical equipment while remaining transparent to data throughput. It will guard your 10 GbE PoE++ network from electrical transient surges that are generated by lightning strikes and by internal switching events. It supports long-term system reliability by absorbing high amounts of transient energy while maintaining a very low clamping voltage.

Key Features:

- **Protects** 10 GbE PoE++ data networks
- **Versatile:** Works with Cat6, Cat6a, and Cat7 cable types
- **Rugged:** [IP65](#), [NEMA 3R](#), weatherized wiring grommet, dielectric lube to protect RJ-45 connections, conformal coated PCBA circuit board
- **Powerful:** Max. PoE++ power 100 watts
- **Mountable:** Mount to walls or poles

Some Applications:

- Telecom base stations
- WISP/ISP
- IT and data centers
- Point-to-point links
- Control lines and sense loops
- Oil and gas industry

Summary

Fast, reliable 10 GbE/PoE++ data networks also need fast, reliable protection from lightning strikes and other causes of power transients. Surge protectors with SASD technology are ideal for 10 GbE/PoE++ applications, because they respond quickly, last long, and can handle high current with low let-through. One such product is Transtector's ALPU-M150 outdoor data surge protector, which employs SASD protection, manages high network speeds, and is housed in a weatherproof enclosure.

We invite you to check out our [ALPU-M150 outdoor SPD](#) or browse [our entire line of PoE products](#). The vast majority of our inventory is in stock and available for [same-day shipping](#) if ordered weekdays before 6 p.m. CT.

We are eager to answer any questions you might have about our products. Please contact us directly through our [customer service request form](#) or call our U.S.-based team at +1 (208) 635-6400. Our website is [Transtector.com](#).