TRANSTECTOR
an INFINITE brand

White Paper

Silicon is Silicon is Silicon...Not!

Silicon is Silicon is Silicon...Not!

Concrete is a fair conductor and can be used safely and effectively to augment the tower Silicon avalanche suppressor diode (SASD) based surge protection devices (SPDs) provide better performance and longer life than the typical MOV (metal oxide varistor) SPDs. However, significant improvements in performance are available through attention to details of proper design and testing by the manufacturer. This article will explore the difference between standard off- the-shelf SASD and discreet silicon avalanche diode cells.

Design Matters.

SASD are used in series and parallel arrays. Several low voltage SASD will be used in series to obtain the relevant MCOV (Maximum Continuous Operating Voltage) and VPL (Voltage Protection Level) for the system voltage it will be operating on. The MCOV must be high enough to allow for nominal increases (15 to 20%) in the operating voltage yet the VPL must be kept low enough to protect the sensitive load. Typically, low voltage cells are used for their higher current ratings. For example, a 5000 watt SASD rated at 200 volts may have a 10x1000(s surge current rating of only 16 amps whereas a SASD rated at 13 volts has a 230 amp rating. Therefore, several 13 volt SASDs would be used in series to get the specific MCOV and VPL while maintaining high surge current levels. Depending on what type of surge environment the SPD will be installed in, the amount of surge current the SPD may see could vary from a few hundred amps to 20,000 amps. The amount of surge current the SPD will divert is based upon how many parallel rows of SASD strings are used. By adding more parallel rows, higher current values can be obtained. Referring to the previous example, if the surge environment required the SPD to handle 1000 amps of surge current, 63 parallel 200 volt SASDs or 5 parallel rows of 13 volt SASDs must be used. Not all diodes are created equal. Now that the basic design of a SASD SPD has been described, we can discuss how the off the shelf and discreet SASDs affect the overall performance. Whether using multiple MOVs or SASDs in a SPD design, the matching of these components is critical to the overall performance. When Thinking About Silicon Suppressors, Be Discreet. Discreet SASDs are custom specified, designed, built and controlled to meet specific performance criteria. Because there is more control over the design of these components, tolerances of 2% or better can be specified along with higher surge current capabilities. This allows for tightly matched high current series/parallel components within the SPD. Further performance advantage can be obtained from lead attachment methodology and is discussed in another earlier paper titled: Silicon SPDs: Commodity Connections versus

Custom Design.

If the manufacturer does not perform due diligence when designing and building the SPD problems will arise, no matter which type of SPD component is used. Stringent testing procedures must be in place to verify all suppressor components are matched and meet required voltage and surge current levels. If not, the SPD may not work properly, fail prematurely, or worse yet, allow damage to the protected equipment. Since 1967, Transtector has been developing higher performance specifications and control processes that are used to provide the highest quality, highest performance, tightly-matched suppressor diodes. The use of customized components and design assures maximum SPD performance and can mean improvements of up to 35% in protection versus commodity silicon diode construction.

Please contact us for questions or further information on this topic.

Contact:

Tel: +1 (208) 635-6400
Email: sales@transtector.com

www.transtector.com