



Contribution ID: 74

Type: Oral

Solid State Spark Gap and Ignitron Replacements

Tuesday 20 June 2017 15:00 (30 minutes)

RoHS regulations (i.e. prohibition of Mercury) have created a need for suitable replacements of legacy tube-based high power discharge switches like Spark Gaps and Ignitrons. Silicon Power now introduces solid state discharge solutions with: favorable performance to legacy products, longer usable lifetime and the ability to comply with RoHS.

Silicon Power's underlying technology, Solidtron, is fundamentally designed to outperform currently available thyristor and IGBT based solid state discharge switches. Being a vertically integrated company with extensive success in the pulse power field Silicon Power designs solid state discharge assemblies from the semiconductor up to the final deliverable. This approach yields more compact solid state switches compared to our competitors'; simplifying the adaptation of solid state technology into legacy tube dependent discharge applications.

Replacing the gas plasma utilized in tubes with a solid state plasma offers orders of magnitude improvement in power density, unmatched repeatability from unit to unit and pulse to pulse, higher achievable frequency capability, RoHS compatibility and eliminates performance degradation due to electrode erosion.

Despite replacing a single unit gas discharge switch with an assembly of several semiconductors reliability is improved and simple low power Galvanically isolated gating is provided (high accuracy self-triggered designs are also achievable). The jitter of Solidtron technology is less than 1ns, combined with our unique package and assembly designs current sharing through the constituent components is greatly improved. To date, preliminary designs have demonstrated reliable discharges of over 1MA at 20kV with a smaller assembly volume, higher efficiency and simpler gating compared to press pack thyristor based switches.

Silicon Power's improvements over its preliminary designs offer true solutions to the challenges facing engineers in the design of pulse power applications where high reliability and exceptional performance is required.

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Session Classification: Oral session 12 - Semiconductor components, Pulse Forming Networks and Alternate Technologies (part II) - Session Chair : Luis Redondo

Track Classification: High Power Electronics