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HIGH CURRENT, HIGH VOLTAGE SOLID-STATE SWITCH PROGRESS AT AFRL

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A 50 kV solid-state switch has been developed using ThinpakTM Current Controlled SolidTRON® (CCS) thyristors from Silicon Power Corporation. A switch comprises thirty-six, series-connected thyristors and an internally powered, optically initiated trigger circuit. The trigger circuit drives the common primary winding of sixteen trigger transformer; each transformer has two output windings coupled to a pair of thyristor gates. This triggering arrangement provides simultaneous switching of all 36 thyristors. Because the only control signal is optical, these modules can be series-connected to switch higher voltages or floated to provide switching for Marx generators. Single switch modules have been operated at pulse widths from 300 ns up to 7 µs and pulsed currents from 250 A up to 2500 A with risetimes < 50 ns. The switching delay is approximately 100 ns with a pulse to pulse jitter of < 1.5 ns. This performance is achievable down to applied voltages as low as 2 kV. Testing at higher current is ongoing with a performance objective of 10 kA in a 300 ns pulse. A number of applications of these solid-state switch modules will be presented.

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