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ANALOG MODULES, INC.

Specialists in Analog and Laser Electronics

MODELS 861A, 862A, 867 FLASHLAMP SIMMER SUPPLIES APPLICATION NOTES

DESCRIPTION OF SIMMER OPERATION

Simmering of pulsed flashlamps is a term used to describe the maintenance of a low current (typically less than an amp) discharge through the flashlamp between the main, high current discharge (PFN) pulses. When pulsed flashlamps are used for solid-state laser pumping applications, simmering provides several advantages. These include: 1) longer flashlamp lifetime, 2) decreased EMI, 3) up to 25% more laser output per pulse, and 4) better pulse-to-pulse stability.

Simmering a flashlamp involves three steps. During the initial ignition phase, a high voltage (typically 1 to 1.5kV) is applied across the flashlamp while a trigger capacitor is repeatedly discharged (typically at a 30Hz rate) into a trigger transformer to produce very high voltage (typically 10 to 20kV) pulses. The combination of the voltage impressed across the flashlamp and the high voltage pulses generated by the trigger transformer cause the flashlamp lamp to ionize and begin conducting current. During the second, simmered phase, the simmer supply acts as a current source to supply regulated flashlamp current (typically 50 to 400mA) at a level set by a potentiometer. The third, or boost stage, occurs at the end of each high current discharge pulse. During this time, a flashlamp will often blow out or extinguish and have to be re-ignited. If re-ignition does not occur before the next expected PFN pulse, no electrical energy will be delivered to the flashlamp and no laser pulse will be generated. To prevent this, AMI simmer supplies sense when the PFN pulses occur and automatically go into a boost mode where they supply up to 300% more simmer current through the flashlamp for several milliseconds after the end of the PFN pulse.

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