

Design of a Gate-Turn-Off (GTO) Switch for Pulsed Power Application*, O. DESPE, J. WANG, ANL - This paper presents the design and some test results of a GTO switch for the positron converter solenoid lens power supply at the Advanced Photon Source (APS). An EEV thyatron, CX1174, has been used in the power supply to provide a current pulse to the solenoid lens. Due to the resonant nature of the circuit, the thyatron experiences a large negative voltage at the end of each pulse, which sometimes causes the thyatron to backfire and reduces the thyatron's lifetime. To stop thyatron backfiring, the maximum current has to be reduced; but this is not desirable for operation. The current pulse peaks at 6000 A with a 2-kA/us rise rate. The maximum power supply voltage is 15 kV. These moderate requirements make it possible to use solid state devices as a replacement for the thyatron. A GTO, WG10045R36, is recommended by the manufacturer, Westcode. It is rated at 4.5 kV forward voltage and 3.6 kV reverse voltage. Several GTOs are used in series to handle the maximum possible forward and reverse voltages. The design of the GTO gate drive is critical for achieving both fast turn-on and turn-off; details are discussed.

* Work supported by the U. S. Department of Energy, Office of Basic Energy Sciences, under Contract No. W-31-109-ENG-38.