

PULSED SWITCH MODULATOR TECHNOLOGY FOR FAST PULSE GENERATION

R. J. Adler, B. Ashcraft, and R. J. Richter-Sand
North Star Research Corporation

Abstract

PSM (Pulsed Switch Modulation) was invented at Harris Corporation in the late 1970s as a means of controlling large high voltage and RF systems. The topology is uniquely useful in creating pulses. It consists of a number of individual pulse generator stages in series in contrast to systems which simply have switches in series. The reason for its utility is that when one switch (IGBT) fails to turn on or off, the built-in bypass diode prevents damage to all other sections. The PSM technology can therefore be used to directly drive a very fast pulse. In our first 10 board, test at 200 A nominal output, the current pulse shown in Figure 2 was produced.

The pulse shown used 54 devices to produce a nominal 1.5 MW pulse. The device and board cost of this approach is approximately \$150/kV at the prototype stage, and perhaps as low as \$75/kV at the mass production stage. The independent power supply for the individual stages is being developed as part of this project. This work was supported by the US DOE SBIR program.