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1200 VOLT AND 5000 AMP PEAK REVERSE
BLOCKING DIODE THYRISTOR

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Abstract

The Reverse Blocking Diode Thyristor (RBDT) is a PNP two-terminal solid state device which is capable of blocking forward voltage until rapidly switched to a forward conducting state. This paper describes a new high power device of about one inch crystal diameter which is called the T62R RBDT and is suitable for radar modulator switching duty. Processing is described and explanation given for a unique diffusion profile, which was required to be other than a simple scale-up of a successful smaller T40R device. Capability of repetitively switching 5000 volts and 5000 amperes is shown, while electrical power measurements are given interpretation in terms of rating utility. The presentation of actual high power switching evidence, with loss data is intended to provide firm evidence of the suitability of the T62R RBDT for modulator-type duty.

Summary and Conclusions

This paper described the successful development of a large high power all solid state modulator switch. A diffusion process capable of handling batch quantities of several hundred wafers was described and confirms the manufacturable nature of the design. High yield from each of three pilot runs established reproducibility of production technique. A new solid state switch assembly with six T62R's in series capable of repetitively switching 5000V and 5000A was developed and tested. Electrical test results and power measurements have resulted in a sample rating technique for pulse operation, which although limited to a particular pulse width and rise time, provides an example for similar handling of any other pulse duty. Secondly, the actual testing of the T62R RBDT under high current, rate of rise, and pulse rate conditions provided final evidence of the suitability of the T62R switch for modulator type duty. For this application, the RBDT will offer solid state life and reliability features, zero warm-up time, and the physical attributes of solid state equipment.