

HIGH VOLTAGE TRANSISTOR INVERTERS FOR AC TRACTION DRIVES

Traditionally the bipolar transistor has been considered as a low voltage device, for use mainly in low power applications. With the advent of devices manufactured using new techniques, operating voltages of 1000V and upwards are now feasible, and the power transistor is beginning to be used in applications that previously were restricted to thyristors.

This report is mainly concerned with the use of power transistors in three-phase drives (inverters) for AC traction motors, and illustrates how circuits can be designed to make drives of several hundred kVA output practical with presently available devices. It reviews the breakdown mechanisms occurring within transistors when operating at high voltage and power, and describes circuit techniques for reliably using devices at the extremes of their ratings.

Circuits are also discussed for driving and protecting transistors operating at high power levels, with particular reference to the 5kVA inverter recently built.