1.0 Introduction

The introduction of MOS Technology into the process arena of Power Semiconductors has created revolutionary device and application advantages. Of particular interest is the Insulated Gate Bipolar Transistor (IGBT) which is now beginning to have a major impact on the Power Electronic Systems designed for industrial, consumer and military applications.

A review of Figure 1.1 indicates that IGBT Modules are expected to take applications away from both MOSFET Modules and Bipolar Darlington Modules as they will operate in hard switching applications upwards of 20kHz and higher in soft switching applications. Also they serve the lower 1 - 10kHz range previously dominated by Bipolar Transistor modules, up to 1MW applications.

The development of the IGBT has allowed a long desire for the peripheral circuits to be built into power modules to be realized in a cost effective manner through the development of the Intelligent Power Module (Intellimod™) as depicted by Figure 1.2.

IGBT and Intelligent Power Modules have been developed to satisfy particular customer needs for higher frequency operation to provide a “noiseless” inverter, operating above the audible range. Additional requirements include more precise servo motor controllers, higher efficiency, compact, low noise UPS systems, etc.

The Intelligent Power Module family provides the user with the additional benefits of equipment miniaturization and reduced time to market as they include gate drive circuit and protection circuits for short circuit, over current, over temperature and gate drive under voltage lock out.

The Powerex/Mitsubishi Electric IGBT and Intelligent Power Modules have been designed to exacting standards for the key ratings and characteristics required to provide optimum performance for switching operation. These key parameters have been determined and understood well by the technical experts at Powerex/Mitsubishi Electric, the recognized world leader in Power Transistor Modules.

We have committed our Technical team to continuously develop more ‘user friendly’ IGBT modules providing more efficient operation, greater application ruggedness, and longer life. Our Marketing team is constantly in the field to assess new customer needs and application trends, and with this combination Powerex/Mitsubishi Electric will continue to advance the state of the art for more advanced Power Semiconductors for future applications.

Figure 1.1 Application for Power Devices

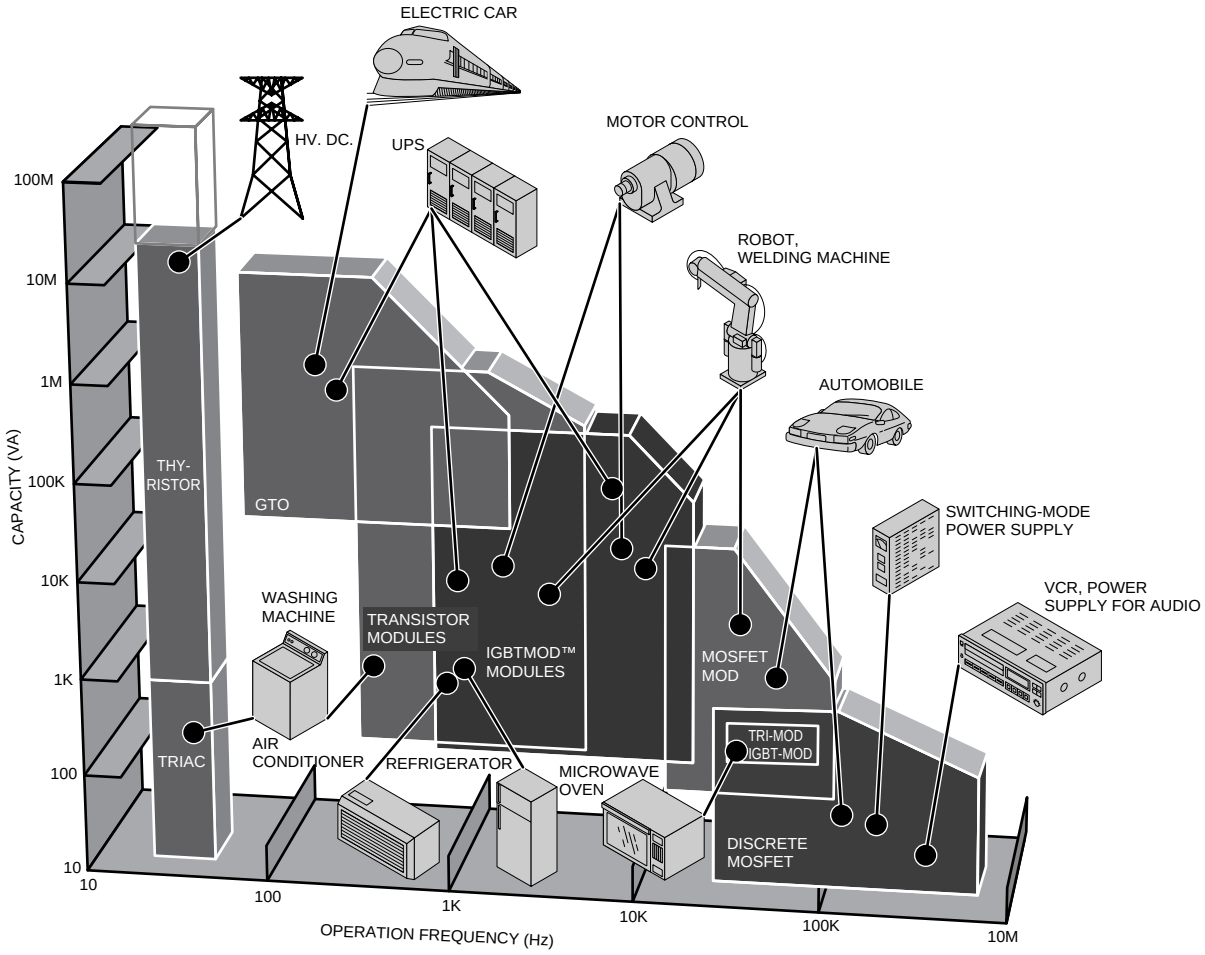

Figure 1.2 Market Technical Trend and Intelligent Power Devices