

1 Basics

1.1 Application fields and today's application limits of IGBT and MOSFET power modules

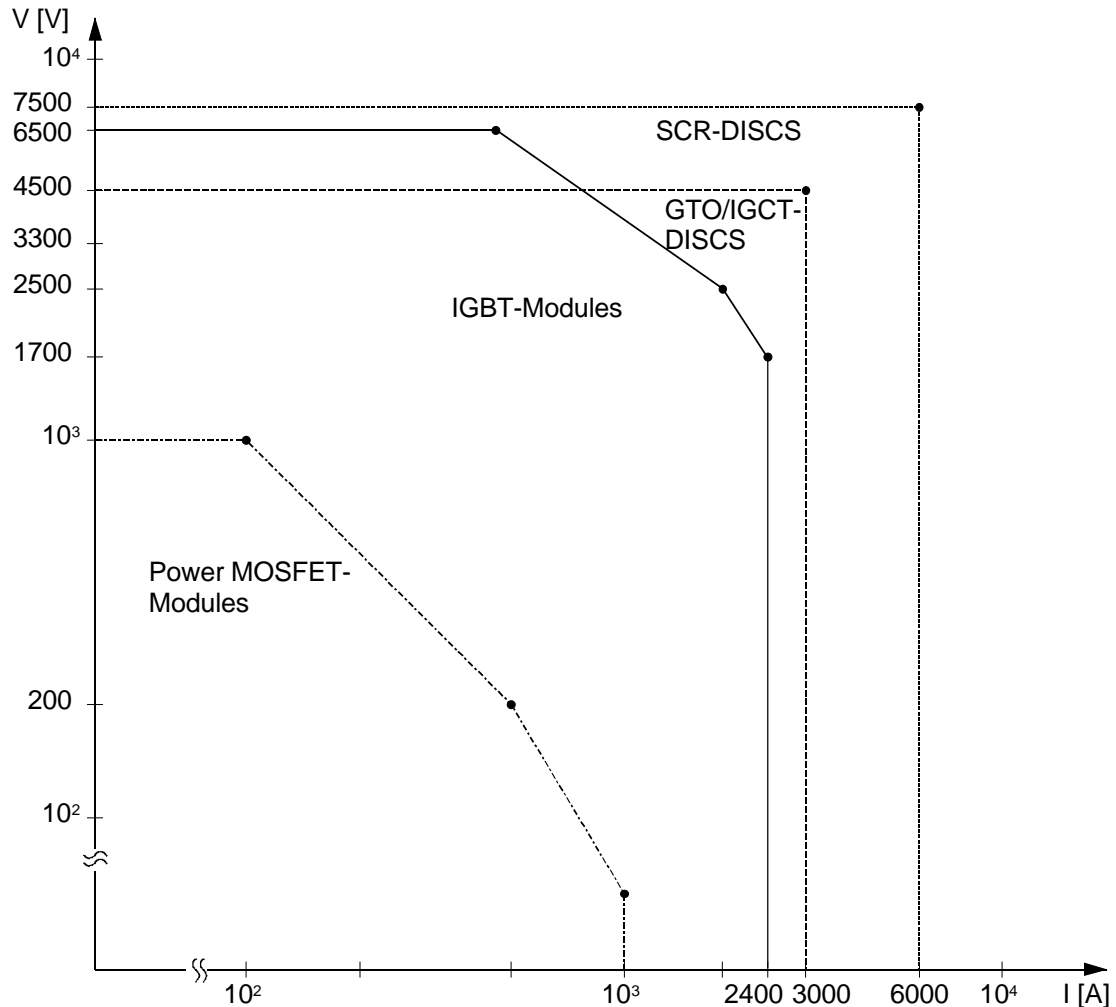


Figure 1.1 Application fields of the latest power semiconductors

As shown in Figure 1.1, a variety of circuitries in power electronics can be produced today with MOSFETs (**M**etal **O**xide **S**emiconductor **F**ield **E**ffect **T**ransistors) or IGBTs (**I**nsulated **G**ate **B**ipolar **T**ransistors), which were introduced into the market one by one in the mid 80's.

Compared to other switchable power semiconductors, such as conventional GTO-thyristors, these types of transistors have a number of application advantages, such as *active turn-off* even in case of *short-circuit*, *operation without snubbers*, *simple control unit*, *short switching times* and, therefore, relatively low switching losses.

The production of MOSFETs and IGBTs is comparatively simple and favourable and can easily be managed by today's technologies in microelectronics.

It was mainly due to the rapid development of IGBTs and power MOSFETs that power electronics continued open up new markets, and that their fields of application increased tremendously at the same time. Bipolar high-voltage power transistors that were still very common a few years ago, have been almost completely replaced by IGBTs.