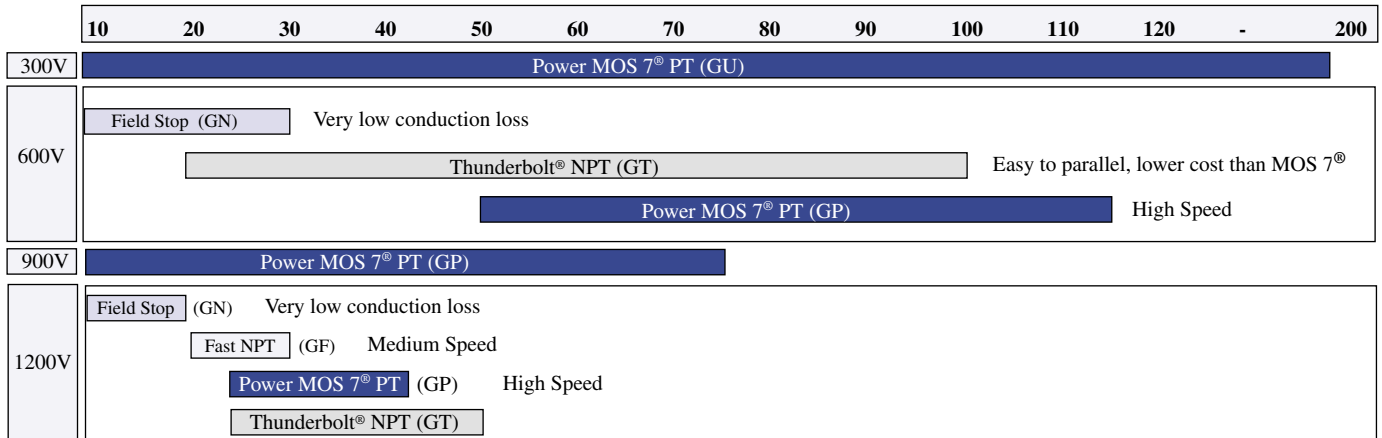


Insulated Gate Bipolar Transistors (IGBTs)

IGBT products from Microsemi provide high quality solutions for a wide range of high voltage, high power applications. The switching frequency range spans from over 100kHz for very high power density SMPS applications all the way down to a few kHz for minimal conduction loss in low frequency applications. The IGBT product recommended operating frequency ranges are shown in the graph below. Each IGBT product represents the latest in IGBT technology, providing the best possible performance/cost combination for the targeted application.

Recommended IGBT Switching Frequency Ranges (kHz, hard switched)



Microsemi offers four IGBT product families that utilize three IGBT technologies: Punch-Through (PT), Non-Punch-Through (NPT), and Field Stop (FS). Distinguishing features, technology used, and applications for each product family are listed below.

1) **Power MOS 7® PT IGBT Family** – designated by GU or GP in the part number. These devices are available in 300V, 600V, 900V, and 1200V ratings. Features of the Power MOS 7® family include:

- High speed... short tail current minimizes switching loss and enables high switching frequency
- Low gate charge... reduced gate drive power and fast switching
- Combi versions utilizing fast, softer recovery DQ series diodes

Note: Sorting on VCE(on) is required before paralleling Power MOS 7® PT IGBTs. Please contact the factory for details.

Applications for Power MOS 7® IGBTs include solar inverters, high performance (SMPS), and industrial equipment such as welders, battery chargers, and inductive heaters.

2) **Thunderbolt® NPT IGBT Family** – designated by GT in the part number. These devices are available in 600V and 1200V ratings. Features of the Thunderbolt® family include:

- Medium to high speed... fast turn-off style IGBT
- Easy to parallel... tight parameter distribution and positive $V_{CE(on)}$ temperature coefficient
- Short circuit and avalanche energy rated

Applications for Thunderbolt® IGBTs include solar inverters, SMPS, welders, battery chargers, and UPS.

3) **Fast NPT IGBT Family** – designated by GF in the part number. These devices are available in 1200V rating. Features of the Fast family include:

- Medium speed... good balance between switching and conduction losses
- Easy to parallel... tight parameter distribution and positive $V_{CE(on)}$ temperature coefficient
- Short circuit and avalanche energy rated

Applications for Fast IGBTs include industrial equipment such as welders and UPS, and motor drives.

4) **Field Stop IGBT Family** – designated by GN in the part number. These trench gate devices are available in 600V and 1200V ratings. Features of the Field Stop family include:

- Low conduction loss... for low frequency applications where minimal conduction loss is most important
- Easy to parallel... tight parameter distribution and positive $V_{CE(on)}$ temperature coefficient
- Short circuit rated

Applications for Field Stop IGBTs include solar inverters, welders, UPS, and motor drives.