

Unit Name: Power Electronics 1 Simulation 2

Title

JFET Characteristics

Details

The purpose of this experiment is to determine and sketch the characteristics of the JFET and to find its parameters.

The Junction Field Effect Transistor (JFET) is a three-terminal device with one terminal (called the gate) capable of controlling the current between the other two terminals (drain and source). The primary difference between FET and BJT transistors is the fact that the BJT transistor is a current-controlled device, while the JFET transistor is a voltage-controlled device.

The FET transistor is a unipolar device depending on either electron conduction (Nchannel JFET) or hole conduction (P-channel JFET). In contrast, the BJT transistor is a bipolar device, meaning that the conduction depends on two charge carriers (electrons and holes) in the same time. Another difference between two devices is the high input impedance of the JFET when compared with the BJT. The input impedance is usually larger than $1\text{ M}\Omega$.

However, typical AC voltage gains for BJT amplifiers are greater than those for FET amplifiers. Furthermore, FETs are more temperature stable than BJTs and are usually smaller in size, making them particularly useful in integrated circuit chips. The basic construction of an N-channel JFET is shown in Fig.1 together with its symbol.