

IGBT modelling using HSPICE curve-fitting optimisation method

ABSTRACT

This paper presents the development of the IGBT model using the HSPICE package running on a Sun Workstation. The two important characteristics of an IGBT, which were considered in modelling the device, are the conduction (static) and the switching (dynamic) characteristics. The IGBT model proposed is discussed briefly to give background before a detailed development of the model is presented. The steps in modelling the IGBT using the curve-fitting optimisation method available within HSPICE are explained. The simulation results of varying the model parameters are discussed. On the basis of these results appropriate parameters for the IGBT model are determined for use in the curve-fitting optimisation method. Further, the test circuit simulation is presented to validate the static and dynamic parameters of the model chosen. The results are compared with manufacturer's data sheet for the static parameter and laboratory test results for the dynamic parameters. The results are found to be in good agreement.

Keyword: IGBT model; HSPICE; Curve-fitting optimization technique