Abstract

In this paper, an improved approach for the modeling of power thyristors is presented. A modified two-transistor configuration based on the Gummel-Poon model is applied. This model takes into account the conductivity modulation and carrier-carrier scattering by using nonlinear current sources. The current gain of the transistor is studied relating it to the injection level in order to provide a more insight of some SPICE parameters. The design parameters of the thyristor are related to circuit parameters using some analytical expressions. Then, the SPICE model parameters are extracted using Silvaco. The simulation results are compared with measurements showing good agreement indicating that the developed model could efficiently describe the performance of the thyristor under various practical operating conditions.
References

- www.mathworks.com
- M. Kallala, "Représentation distribuée de la dynamique des charges dans la base large des thyristors Gate-Turn-off; application à un modèle de GTO pour la CA0 des circuits," Thèse de Doctorat de l'INSA de Toulouse, France, no dapos;ordre 317, 1994.

**Index Terms**

Computer Science  
Power Electronics

**Keywords**

Modeling  
Gummel-Poon  
Conductivity Modulation  
Design Parameters  
Parameter extraction