Abstracts

Unified model for collector charge in heterojunction bipolar transistors

M. Rudolph, R. Doerner, K. Beilenhoff and P. Heymann. "Unified model for collector charge in heterojunction bipolar transistors." 2002 Transactions on Microwave Theory and Techniques 50.7 (Jul. 2002 [T-MTT]): 1747-1751.

The base-collector capacitance and the collector transit-time in GaAs-based heterojunction bipolar transistors depend not only on base-collector voltage, but also on collector current. This has to be taken into account in a large-signal model. However, since collector transit-time and capacitance are both caused by the charge stored in the collector space-charge region, it is not possible to model them independently of each other. This paper investigates the interrelation between collector capacitance and transit-time due to transcapacitance effects, and presents an analytical unified description for both quantities, that is derived from measurement-extracted small-signal equivalent circuits. The model is verified by comparison of simulation and measurement data.

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