

AIP Conference Proceedings -- August 26, 2003 -- Volume 680, Issue 1, pp. 351-354

Carriers Lifetime Measurement in Power Silicon Devices by TRIBICC

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TRIBICC (Time Resolved Ion Beam Induced Charge Collection) represents a further improvement with respect to more traditional IBICC, since it can supply not only the charge collection efficiency (and consequently data on mobility and trapping time of carriers in drift regions), but also its time behaviour. At long collection times, it can supply informations about diffusion lengths and lifetimes of carriers in the diffusion regions, which are always present in undepleted devices such as power devices. These data are of paramount importance as inputs for device simulation codes. A more general and more powerful TRIBICC method is presented in this work by using Gunn's theorem and a particular formulation of the generation function in order to solve the adjoint of the continuity equation. This method represents a strong improvement with respect to a previous one, in which lateral IBIC was used. An application of this method to a commercial power device is presented and discussed. By using microbeams, lifetime mapping by this method could be also possible. ©2003 American Institute of Physics

[doi:10.1063/1.1619733](https://doi.org/10.1063/1.1619733)

PACS: 79.20.Rf, 81.70.-q, 72.20.Jv