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A SIMPLE SEMI-ANALYTICAL MODEL FOR THE KINK EFFECT FOR THE INTRINSIC N-CHANNEL POLYSILICON THIN FILM TRANSISTORS

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ABSTRACT

In order to improve the modeling of Polysilicon thin film transistors (Poly-Si-TFTs) a precise evaluation of the excess current due to impact ionization is needed. In this paper we have proposed a simple model for the excess current resulting from the impact ionization occurring at high drain biases. Model is based on the estimation of the electric field in the saturated part of the channel. The electric field in the saturated region is obtained by the solution of the two--dimensional Poisson's equation. The model is semi-analytical and uses only one fitting parameter which is desirable for circuit simulation. The simulation results with the developed impact ionization current model are in excellent agreement with the available experimental output characteristics of the intrinsic n-channel Poly-Si-TFTs.