

THERMAL EFFECT ON THE DC CHARACTERISTICS IN $\text{Al}_{0.3}\text{Ga}_{0.7}\text{N}/\text{GaN}$ HIGH ELECTRON MOBILITY TRANSISTOR

HAMIDA DJELTI

STIC Laboratory, Department of Telecommunication, University Abou Bekr Belkaid of Tlemcen,
Chetouane, Tlemcen, Algeria

ABSTRACT

In this work, we study the temperature-dependent DC characteristics of an $\text{Al}_{0.3}\text{Ga}_{0.7}\text{N}/\text{GaN}$ High Electron Mobility Transistors (HEMT's). This study is achieved by using a drift diffusion transport model of a commercial device simulator. Two dimensional numerical simulations is used to describe significant physics in the characteristics for $\text{Al}_{0.3}\text{Ga}_{0.7}\text{N}/\text{GaN}$ HEMT with gate length and source to drain spacing of $0.6\ \mu\text{m}$ and $3.4\ \mu\text{m}$ respectively. The numerical model is also used to determine the global device temperature with the drain-source voltage. For $V_{gs} = 0\ \text{V}$, a large global device temperature is observed when V_{ds} is greater than $1\ \text{V}$.

KEYWORDS: $\text{Al}_{0.3}\text{Ga}_{0.7}\text{N}/\text{GaN}$, HEMT, Thermal, Temperature, Finite Element