

Temperature-Dependent Barrier Characteristics of Inhomogeneous Pd/n-GaN Schottky Barrier Diodes Surface

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Abstract : The current-voltage (I-V) characteristics of Pd/n-GaN Schottky barrier were studied at temperatures over room temperature (300-470K). The values of ideality factor (n), zero-bias barrier height (ϕ_{B0}), flat barrier height (ϕ_{BF}) and series resistance (Rs) obtained from I-V-T measurements were found to be strongly temperature dependent while (ϕ_{B0}) increase, (n), (ϕ_{BF}) and (Rs) decrease with increasing temperature. The apparent Richardson constant was found to be $2.1 \times 10^{-9} \text{ Acm}^{-2}\text{K}^{-2}$ and mean barrier height of 0.19 eV. After barrier height inhomogeneities correction, by assuming a Gaussian distribution (GD) of the barrier heights, the Richardson constant and the mean barrier height were obtained as $23 \text{ Acm}^{-2}\text{K}^{-2}$ and 1.78eV, respectively. The corrected Richardson constant was very closer to theoretical value of $26 \text{ Acm}^{-2}\text{K}^{-2}$.

Keywords : electrical properties, Gaussian distribution, Pd-GaN Schottky diodes, thermionic emission

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