

## Current-voltage temperature characteristics of Au/n-Ge (1 0 0) Schottky diodes

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### Abstract

The variation in electrical characteristics of Au/n-Ge (1 0 0) Schottky contacts have been systematically investigated as a function of temperature using current-voltage (I-V) measurements in the temperature range 140-300 K. The I-V characteristics of the diodes indicate very strong temperature dependence. While the ideality factor  $n$  decreases, the zero-bias Schottky barrier height (SBH) ( $\phi_B$ ) increases with the increasing temperature. The I-V characteristics are analysed using the thermionic emission (TE) model and the assumption of a Gaussian distribution of the barrier heights  $\phi_B$  vs.  $\frac{1}{2} kT$  plot has been used to show the evidence of a Gaussian distribution of barrier heights and values of  $\phi_B = 0.615$  eV and standard deviation  $\sigma_{\phi_0} = 0.00858$  eV for the mean barrier height and zero-bias standard deviation have been obtained from this plot, respectively. The Richardson constant and the mean barrier height from the modified Richardson plot were obtained as  $1.37$  A cm<sup>-2</sup> K<sup>-2</sup> and  $0.639$  eV, respectively. This Richardson constant is much smaller than the reported of  $50$  A cm<sup>-2</sup> K<sup>-2</sup>. This may be due to greater inhomogeneities at the interface.