**Drift Diffusion – Temperature Sensor**

**(** <http://nanohub.org/tools/fermi> )

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**Problem Background**

In this test we will design a temperature sensor for measuring ambient outside temperature for the range of -30 oC < T< 40 oC. The apparatus is designed as a variable resistor (made up of a semiconductor) with an attached voltage source and an Ammeter in series. Assume the semiconductor resistor is a Silicon (Si) bar of 10 µm length and cross-section 1 µm x 1 µm.

1. Decide on a n-type doping level such that resistance range is between 100Ω<R<1000Ω.
2. Estimate the sensitivity (Ω/K) of this sensor for the given temperature range of -30 oC < T< 40 oC.