

### 5.1 Current in Strip Detector

A single sided silicon strip detector with 512 strips is  $300\text{ }\mu\text{m}$  thick and has an area of  $5 \times 5\text{ cm}^2$ . The strips are individually biased with  $1\text{ M}\Omega$  resistors.

1. What is the current in one strip for a volume leakage of  $500\text{ nA/cm}^3$ ?
2. Compare this to the average signal current, assuming that the device is operated at LHC where beam collisions occur at a rate of  $40\text{ MHz}$  and assuming that the sensor area is traversed by 2 MIP particles per collision.
3. By how much does the bias voltage of one strip change due to these currents?
4. Do you expect a problem from these voltage changes? Discuss how much you would tolerate.