(8.8) A 1 mm thick surface barrier detector of 10 mm diameter has a resistivity of 7000 Ω cm and a capacitance of 50 pF at 300 V reverse bias. Calculate the resolving time (time constant).

The following data are given:

$\rho := 7000 \cdot \Omega \cdot cm$ $\qquad$ $C := 50 \cdot pF$ $\qquad$ $length := 1 \cdot mm$ $\qquad$ $diam := 10 \cdot mm$

From these we can calculate the time constant as follows:

$area := \pi \cdot \left(\dfrac{diam}{2}\right)^2$ $\qquad$ $R := \rho \cdot \dfrac{length}{area}$ $\qquad$ $timeconst := R \cdot C$ $\qquad$ $timeconst = 4.5 \cdot 10^{-8} \cdot sec$

Answer: Resolving time is 45 ns

Note: *Remember to convert all units to the basic SI units before doing the numerical calculations. The code used here will do that automatically, but you will have to do it yourself.*