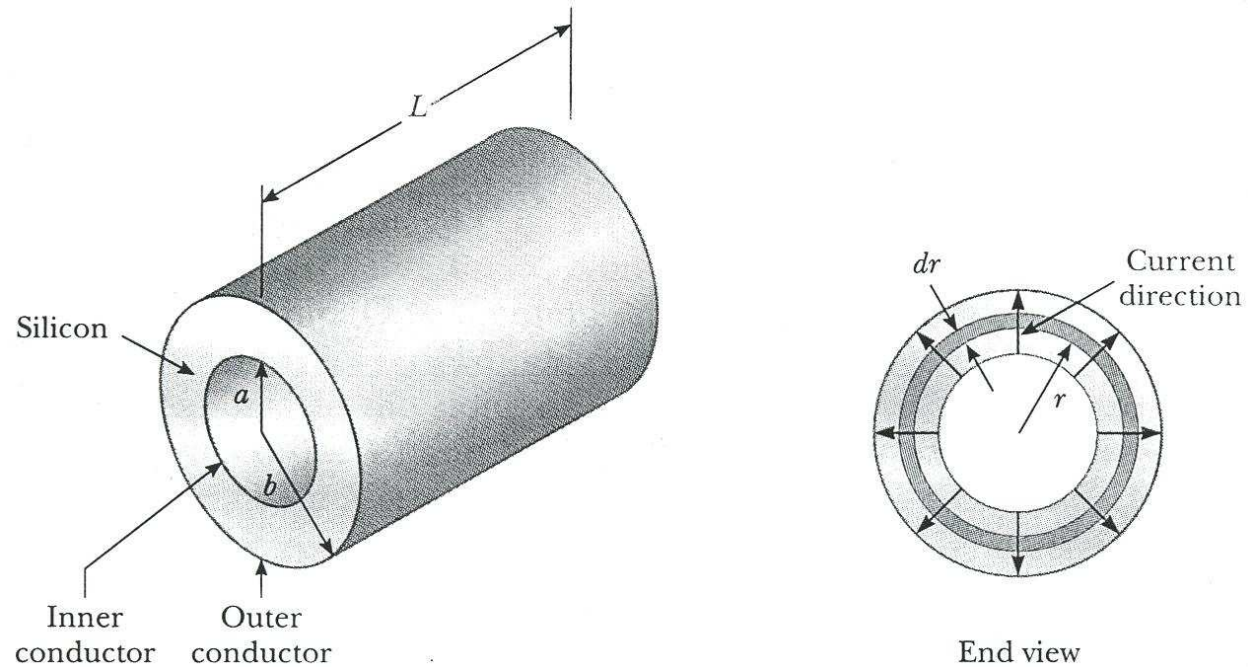$$dR = \frac{\rho dr}{A}, \quad A = 2\pi r L$$

$$R = \frac{\rho}{2\pi L} \int_a^b \frac{dr}{r} = \frac{\rho}{2\pi L} \ln \frac{b}{a}$$