Electric Field Profile

Now we compute the electric field profile. By Poisson's equation, this is simply the integral of the charge density over the limits just established.

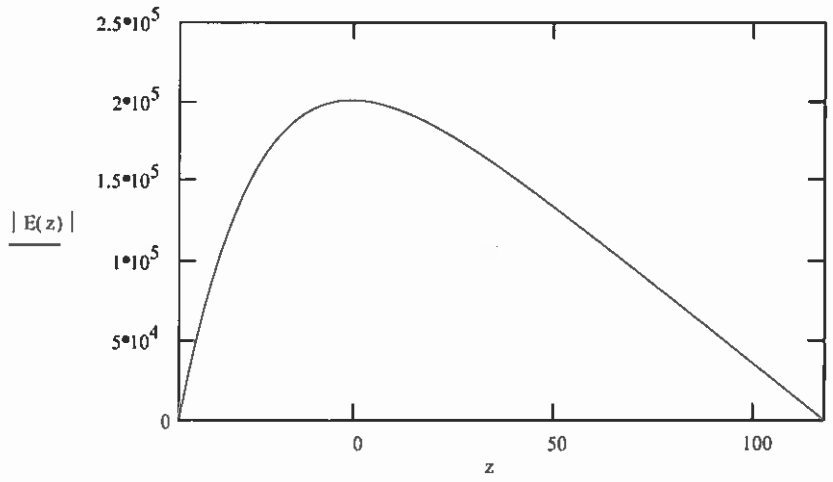
$q := 1.6 \cdot 10^{-19}$ Unit charge

$\varepsilon_0 := 8.86 \cdot 10^{-14}$ Permittivity of vacuum

$K := 11.7$ Dielectric constant for silicon

$$E(y) := \left(\frac{q \cdot c_f}{K \cdot \varepsilon_0}\right) \cdot \int_{z_p}^{y} N(s + MJ)\,ds$$ Electric field (V/cm)

$$V := c_f \int_{z_p}^{z_n} E(s)\,ds$$ $V = 1.957 \cdot 10^3$ Total potential difference across the depletion region (V)



$E(0) = 2.0056 \cdot 10^5$ Maximum field, in V/cm