$$\phi(x) = 0 \qquad \text{, for } x \le -x_p$$

$$\phi(x) = \frac{qN_a(x + x_p)^2}{2\varepsilon_s} \qquad \text{, for } -x_p \le x \le 0$$

$$\phi(x) = (\phi_i - V_a) - \frac{qN_d(x - x_n)^2}{2\varepsilon_s} \qquad \text{, for } 0 \le x \le x_n$$

$$\phi(x) = \phi_i - V_a \qquad \text{, for } x_n \le x$$