

$$\phi(x) = 0 \qquad x \leq 0$$

$$\phi(x) = \frac{qN_d}{2\varepsilon_s} [x_d^2 - (x_d - x)^2] \qquad 0 \leq x \leq x_d$$

$$\phi(x) = \frac{qN_d x_d^2}{2\varepsilon_s} \qquad x_d \leq x$$