

$$n_p(x) = n_{p0} + n_{p0} (e^{V_a/V_t} - 1) \left[\cosh \frac{x + x_p}{L_n} + \coth \frac{w_p}{L_n} \sinh \frac{x + x_p}{L_n} \right], \text{ for } -w_p \leq x \leq -x_p$$