

$$I_D = q\mu_n N_d d \frac{W}{L} \left[V_D - \frac{2}{3} \left(\frac{(\phi_i - V_G + V_D)^{3/2}}{\sqrt{V_P}} - \frac{(\phi_i - V_G)^{3/2}}{\sqrt{V_P}} \right) \right]$$