Fundamentals of Nanoelectronics, II: Energy Band Model

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L2.9 Quiz

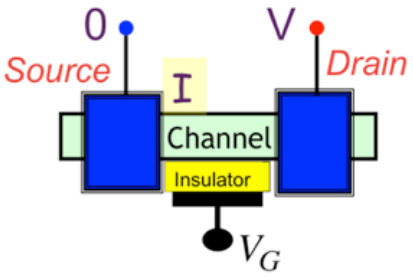
Answers

2.9. The nanotransistor

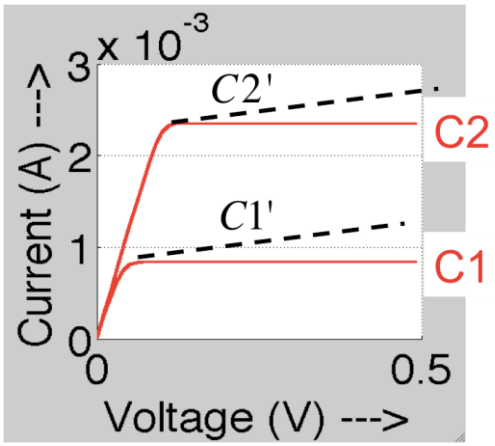
$$U = U_0(N - N_0) + b(-qV_G) + a(-qV) \qquad \textbf{(A)}$$

$$N = \int_{-\infty}^{+\infty} dE\, D(E-U)\, \frac{f_1(E)+f_2(E)}{2} \qquad \textbf{(B)}$$

$$I = \frac{1}{q}\int_{-\infty}^{+\infty} dE\, G(E-U)\,\big(f_1(E) - f_2(E)\big) \qquad \textbf{(C)}$$



The plots C1, C1', C2, C2' for current versus (drain) voltage were obtained by solving Eqs.(A,B,C), with all the same parameters, except possibly for U_0 and a.



2.9a. Compared to plot C1, plot C2 must have used

(a) a higher value of U_0

(b) a lower value of U_0

(c) a higher value of a

(d) a lower value of a

(e) none of the above options

2.9b. Compared to plot C1, plot C1' must have used

(a) a higher value of U_0

(b) a lower value of U_0

(c) a higher value of a

(d) a lower value of a

(e) none of the above options