

(1)

Metal-Semiconductor Contact

There are two types:

1-M-S rectifying contact (Schottky barrier)

$$\phi_M > \phi_S$$

2-M-S non-rectifying contact (Ohmic contact)

$$\phi_M < \phi_S$$

For M-S Schottky barrier:

$$\phi_B = \phi_M - \chi$$

$$V_{bi} = \phi_B - \phi_n$$

$$\phi_n = \frac{E_C - E_F}{e} = \frac{kT}{e} \ln\left(\frac{N_C}{N_D}\right)$$

$$W = x_d = \left\{ \frac{2 \epsilon_s (V_{bi} + V_R)}{e N_D} \right\}^{1/2} \quad \text{For reverse bias}$$

$$E_{max} = \frac{e N_D x_d}{\epsilon_s}$$

(2)

M-S Schottky Contact Forward bias

$$I = I_s \left(e^{\frac{eV}{\eta kT}} - 1 \right) \leftarrow \text{نفس قانون (p-n junction)}$$

$$I_s = A A^* T^2 e^{-e\phi_B/kT}$$

تاعا اذا تم اخطا في قيمة η (بقي السؤال) $(\eta = 1)$

ideality Factor.