

q	$1,6 \cdot 10^{-19}$
Bolzmans constant k	$1,38 \cdot 10^{-23}$
V_t	kT/q
V_t T=300 (27 degrees C)	25,87mV
V_t T=320 (47 degrees C)	27,60mV

$A_{eff} = 4$
 $A_{eff} = e^{(V_b/V_t)}$
 $V_t \cdot \ln 4 = V_b$
 $A_{eff} = 4 \quad T=300$
 gives $V_b = 35,86\text{mV}$
 $V_b = I_b \cdot R_b / 2$
 $I_b \quad T=300 = 2\text{mA}$
 That gives $R_b = 35,86\Omega$

$A_{eff} = 4 \quad T=320$
 $R_b = 35,86\Omega$
 This gives $I_b \quad T=320 = 2,134\text{mA}$