- optimum if

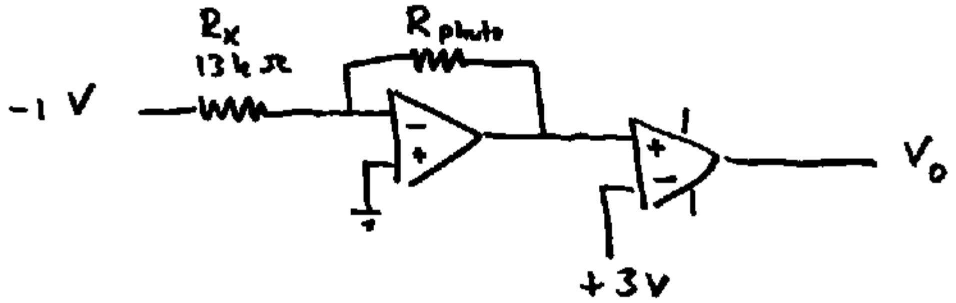
$$h\nu = E_g \quad , \quad \lambda = c/\nu \quad \left(\begin{array}{l} \text{note:} \\ [m] = \frac{[m/s]}{[1/s]} \end{array} \right)$$

$$\lambda_{opt} \approx \frac{hc}{E_g} \quad . \text{ note: } 1 \text{ eV} = q \text{ J} \quad , \quad \frac{hc}{q} = 1.24 \times 10^{-6} \left[\frac{m}{eV}\right]$$

material	band gap	λ_{opt}	
Si	1.12 eV	1107 nm	IR
Ge	0.66 eV	1879 nm	FIR
Ga As	1.42 eV	873 nm	red
C	5.47 eV	227 nm	UV

- $$R(t) = \underbrace{R_f}_{100\ k\Omega} + \underbrace{(R_i - R_f)}_{-70\ k\Omega} \exp\left(-t/\underbrace{\tau}_{72\ ms}\right)$$

$$R(10\ ms) = 39.077\ k\Omega$$

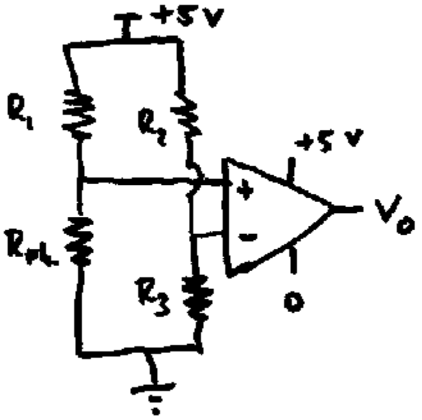


$$-1\ V \cdot x \left(-\frac{R_{photo}}{R_x} \right) = +3\ V$$

$R_{photo} = 39.077\ k\Omega \rightarrow R_x = 13\ k\Omega$

(solution Curtis Johnson, p. 247)

Alternative circuit (1 power supply):



$V_n = 3\ V$

$R_3 = 3\,k\Omega$, $R_2 = 2\,k\Omega$

R_1 :

$$V_p = \frac{R_{ph}}{R_{ph} + R_1} \times 5 \Rightarrow$$

$$3 = \frac{39.077}{39.077 + R_1} \times 5 \Rightarrow R_1 = 26.05\,k\Omega$$