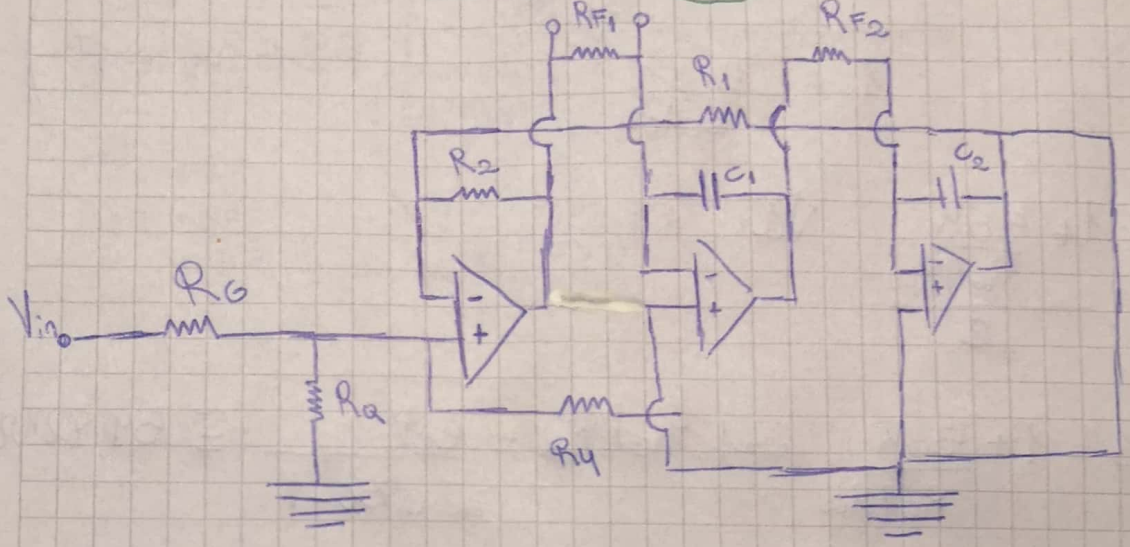
HOJA Nº

FECHA

TP LAB



$R_1 = R_2 = R_4 = 50K\Omega$

$C_1 = C_2 = 1000pF$

$A_{HP} = k = 0,89$

$Q = 0,956$

$\omega_1 = 2\pi \cdot 4,6KHz \cdot 0,952$

De la hoja de datos

$$\omega_n^2 = \frac{R_2}{R_1 R_{F_1} R_{F_2} C_1 C_2}$$

$$A_{HP} = \frac{1 + R_2/R_1}{R_G\left[\frac{1}{R_G} + \frac{1}{R_a} + \frac{1}{R_4}\right]}$$

$$Q = \frac{1 + \frac{R_4(R_G + R_a)}{R_G R_a}}{1 + \frac{R_2}{R_1}} \left[\frac{R_2 R_{F_1} C_1}{R_1 R_{F_2} C_2}\right]^{1/2}$$

NOTA

Adoptamos $R_{F1} = R_{F2}$

$$Q = 0{,}956 = \frac{1 + 50K\Omega \left(\frac{R_G + R_a}{R_G \cdot R_a}\right)}{1 + \frac{50K\Omega}{50K\Omega}} \cdot \left[\frac{50K\Omega \; R_{F1} \; 1000pF}{50K\Omega \; R_{F2} \; 1000pF}\right]^{1/2}$$

$$0{,}956 = \frac{1 + \frac{50K}{R_G \| R_a}}{2} \cdot \sqrt{1}$$

$$2 \cdot 0{,}956 = 1 + \frac{50K}{R_G \| R_a} \Rightarrow R_G \| R_a = \frac{50K}{2 \cdot 0{,}956 - 1} \cong 54{,}82K\Omega$$

$$k = \frac{1 + \frac{50K\Omega}{50K\Omega}}{R_G\left[\frac{1}{R_G} + \frac{1}{R_a} + \frac{1}{50K\Omega}\right]}$$

$$k = \frac{2}{R_G\left[\frac{1}{R_G \| R_a} + \frac{1}{50K\Omega}\right]} \Rightarrow R_G = \frac{2}{0{,}89\left[\frac{1}{R_G \| R_a} + \frac{1}{50K\Omega}\right]} = \frac{2}{\left[\frac{1}{54{,}82K\Omega} + \frac{1}{50K\Omega}\right]0{,}89}$$

$$\boxed{R_G = 58{,}76K\Omega}$$

$$R_G \| R_a = 54{,}82K\Omega \Rightarrow$$

$$R_a = \frac{R_G \cdot 54{,}82K\Omega}{R_G - 54{,}82K\Omega} = \frac{58{,}76K\Omega \cdot 54{,}82K\Omega}{58{,}76K\Omega - 54{,}82K\Omega}$$

$$\boxed{R_a = 817{,}57K\Omega}$$

NOTA

$$\omega_n^2 = (2\pi \cdot 4{,}6\,KHz \cdot 0{,}952)^2 = \frac{50K\Omega}{50K\Omega} \cdot \frac{1}{R_{F_1}^2 (1000pF)^2}$$

$$2\pi \cdot 4{,}6\,KHz \cdot 0{,}952 = \frac{1}{\sqrt{R_{F_1}^2 \cdot (1000pF)^2}}$$

$$R_{F_1} = \frac{1}{2\pi \cdot 4{,}6\,KHz \cdot 0{,}952 \cdot 1000pF} = \boxed{36{,}34\,K\Omega = R_{F_1} = R_{F_2}}$$