Low frequency analysis of FET amplifier:

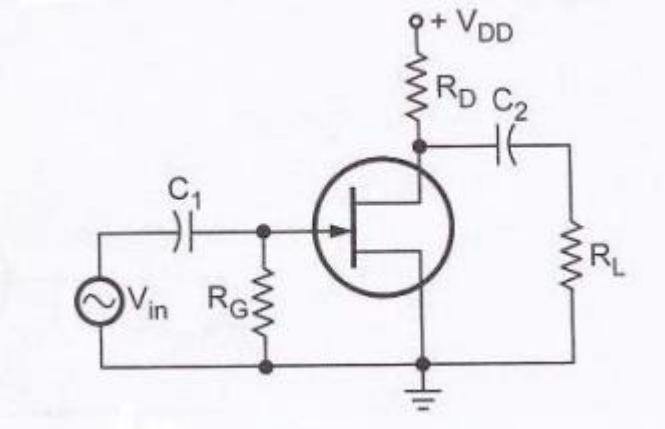

Figure 4.5.1 Typical RC Coupled common source amplifier

Diagram Source Brain Kart

From above figure 4.5.1, it has two RC networks that affect its gain as the frequency is reduced below midrange. These are,

1. RC network formed by the input coupling capacitor C_1 and input impedance of the amplifier.
2. RC network formed by the output coupling capacitor and the output impedance looking in at the drain.

Input RC network:

Lower critical frequency of this network is given as,

$$f_c = \frac{1}{2\pi R_{in} C_1}$$

where $R_{in} = R_G \,||\, R_{in\,(gate)}$

The value of R_{in}(gate) can be determined from the data sheet as follows:

$$R_{in\,(gate)} = \left| \frac{V_{GS}}{I_{GSS}} \right|$$

where I_{GSS} is the gate reverse current.

The phase shift in low frequency input RC circuit is

$$\theta = \tan^{-1} (X_{C1} / R_{in})$$

Output RC network:

Lower critical frequency of this network is given as,

$$f_c = \frac{1}{2\pi(R_D + R_L)C_2}$$

The phase shift in low frequency output RC circuit is $\theta = \tan^{-1} (X_{C2} / R_D + R_L)$