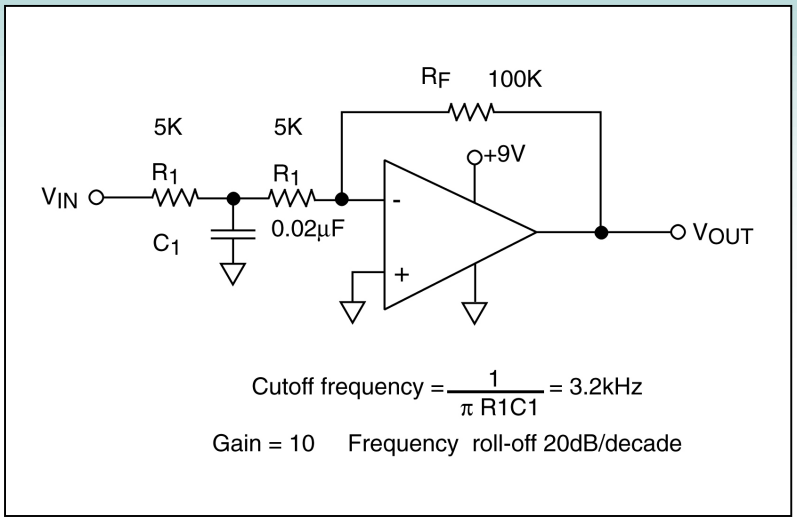
Category: Waveforms & Filters **CIRCUIT IDEAS FOR DESIGNERS** Schematic no. wf_47004.0

Low-Pass Filter (RFI Filter)



Description

This circuit utilizes an operational amplifier to produce a low-pass filter. The input of the low-pass filter has an input resistance of 10K ohm and an input cutoff frequency depending on the product of R1C1 (see equation inside the schematic). The operational amplifier is configured as an inverting amplifier. The gain of the inverting amplifier is determined by the ratio of the feedback resistor R_F to that of the input resistor (R1+ R1), which, in this case, is equal to 10X (100k/10k). Start the operational amplifier selection process by determining a) the voltage supplies available, b) the high frequency response time required and c) the offset voltages required. An operational amplifier with very high input impedance (a few pA input currents) and an output settling time specification, such as the ALD1706, would help to implement the filter without other unexpected surprises, such as ringing within the band. If the power consumption of the operational amplifier is important, then select an operational amplifier with the maximum slew rate per unit current consumed, such as the ALD1706. Next, work out if the necessary gain and bandwidth of the operational amplifier would be adequate for the gain and band-pass range required. It should be noted that limiting the bandwidth of the operational amplifier not only minimizes power consumption, but also tend to limit broadband noise. This fact can be more important in situations when the cutoff frequency desired is much lower than indicated in this circuit.

Recommended Components

ALD1706, ALD1701, ALD1702, ALD1704

Other Related Circuit Ideas

Schematic no. wf_47001.0 Micro-power Band-pass Network
Schematic no. wf_47002.0 Band-pass Network
Schematic no. wf_47003.0 Function Generator