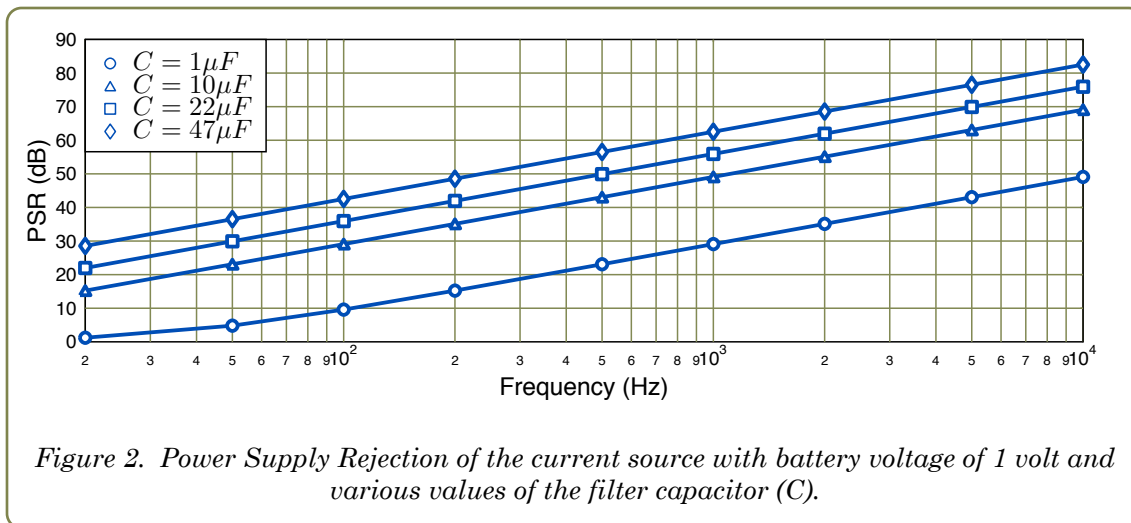


Many Knowles microphones require three terminal connections, one each for supply voltage and ground, and a third for the output signal from the microphone. A Knowles two-wire microphone has only two terminal connections, where the supply and signal are on the same pin. The microphone is powered by a current source, and the output signal is separated from the current source through a coupling capacitor ( $C_c$ ).

For optimum performance, an active current source (*i.e.*, composed of matched bipolar or MOS transistors) should be used. However,

satisfactory performance for many applications can be obtained with passive components using the circuit in Figure 1.

The Knowles two-wire microphone requires 20  $\mu\text{A}$  (nominal), and the recommended minimum compliance of the current source driving it is 0.9 V to insure maximum peak-to-peak output voltage. Power Supply Rejection (PSR) is a factor since the passive current source is connected directly to the hearing instrument battery. Figure 2 shows the PSR for various values of filter capacitor ( $C$ ). The maximum capacitance values for a given form factor and



dielectric type are in Table 1. As an example, for a PSR of 40 dB at 200 Hz, choose a 22  $\mu\text{F}$  capacitor; this value is available in a 0805 for ceramic or a 0603 for tantalum.

The graphs in Figure 2 were generated from simulations. It is recommended that prototype circuits be evaluated prior to incorporation into a hearing instrument. Knowles Electronics can provide assistance if desired in the design and component selection for a particular application.

Capacitor Size	Ceramic	Tantalum
0402	1 $\mu\text{F}$	not available
0603	10 $\mu\text{F}$	22 $\mu\text{F}$
0805	22 $\mu\text{F}$	not available
1206	22 $\mu\text{F}$	47 $\mu\text{F}$

*Table 1. Maximum capacitor values for different package sizes and dielectric types.*

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Note: All data and performance specifications in this document are for reference only.