Measuring LDO PSRR

Power Supply Rejection Ratio (PSRR)

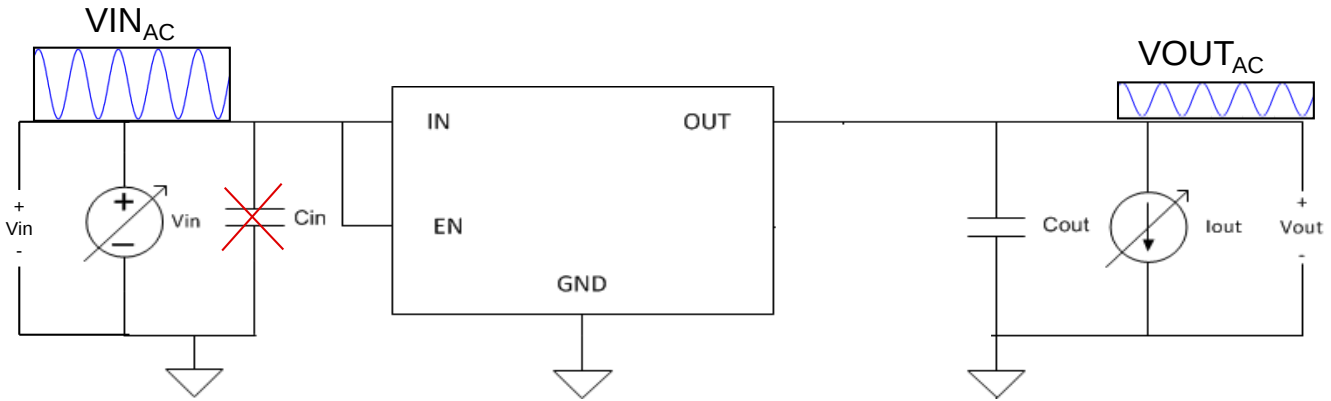
PSRR gives a measure of how well a circuit rejects ripple as it is injected at it's input.

In LDOs PSRR is a measure, in dB, of the regulates OUTPUT voltage ripple compared to the INPUT voltage ripple over a wide frequency range.

$$PSRR = 20 \bullet \log\left(\frac{Ripple_{input}}{Ripple_{output}}\right)$$

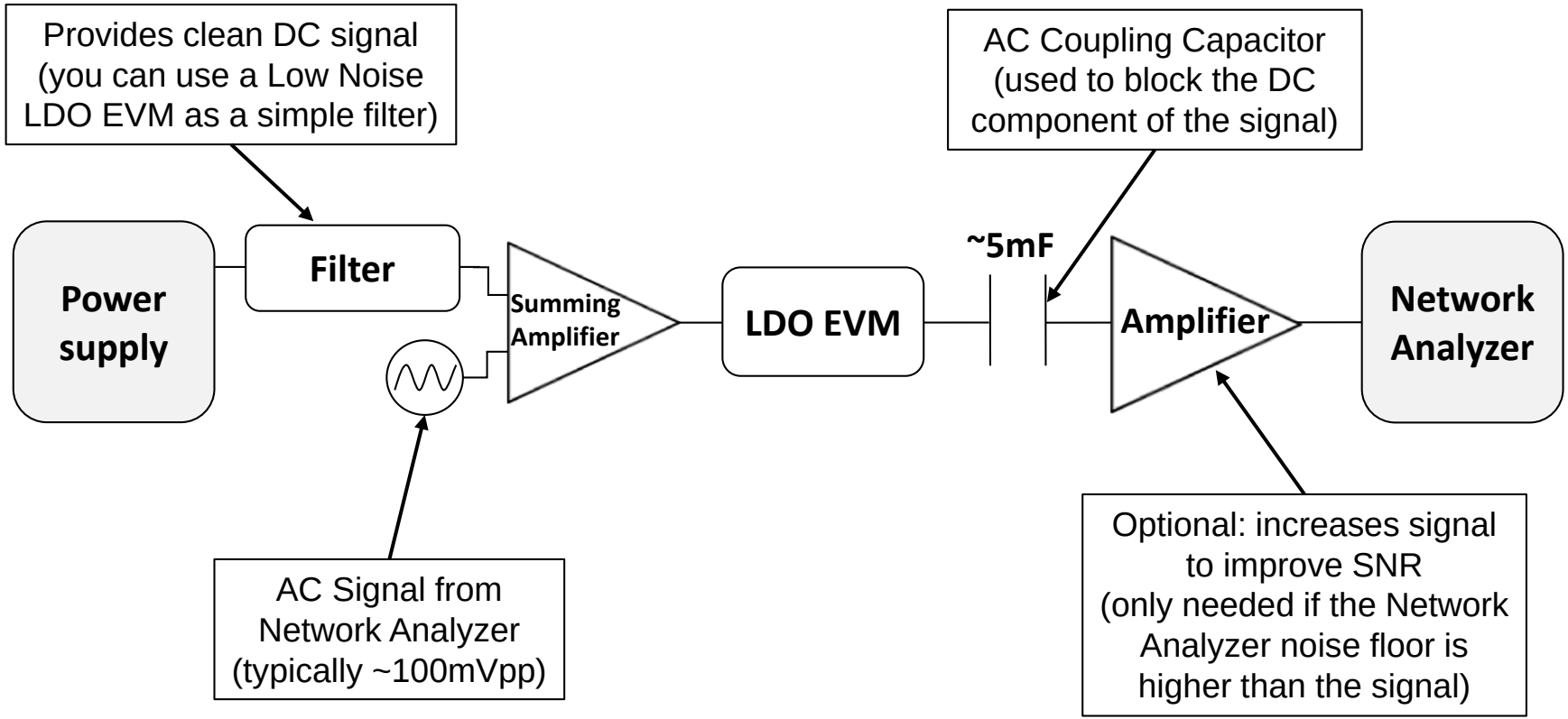
The larger the attenuation of the input signal, the larger the PSRR value is going to be.

PSRR Simplified Schematic



$$PSRR = 20 * \log\left(\frac{VIN_{AC}}{VOUT_{AC}}\right)$$

PSRR Measurement Block Diagram



Things to keep in mind

- Make sure that the noise floor of the measurement equipment is lower than the noise floor of the LDO.
- The AC coupling capacitor should be large enough to ensure that the low frequency noise is adequately captured large (3-10 mF for measuring 10 Hz) .
- Try to keep all connections and wires as short as possible and/or shielded to reduce the environmental noise pick up.
- PSRR measurements are made with no input capacitor (Cin), or one that is as small as possible to keep the LDO stable.
  - Including Cin will filter out some of the signal you are trying to inject into the LDO
  - Also too much Cin can make the Summing Amplifier unstable
- The amplitude of the input signal for PSRR measurements should be large enough to be able to measure after being attenuated
  - We often use 100 mVpp, but if the head room is very small we have to use less and if the PSRR is very large then we have to use more.
- Make sure the bottom of the sine wave doesn't force the LDO in dropout