



NOISE: power supplies

[AN-345, AN-1261]

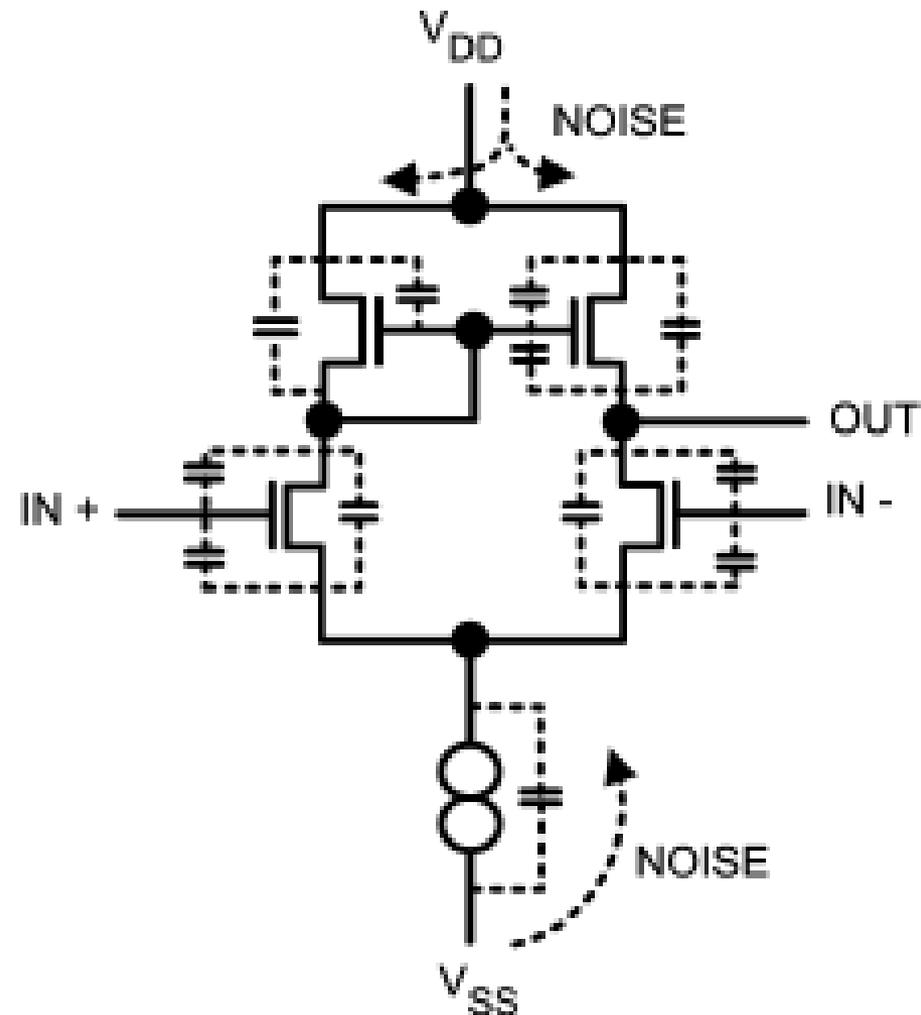


Power lines must have low impedance $Z_0=(L/C)^{1/2} \Rightarrow$

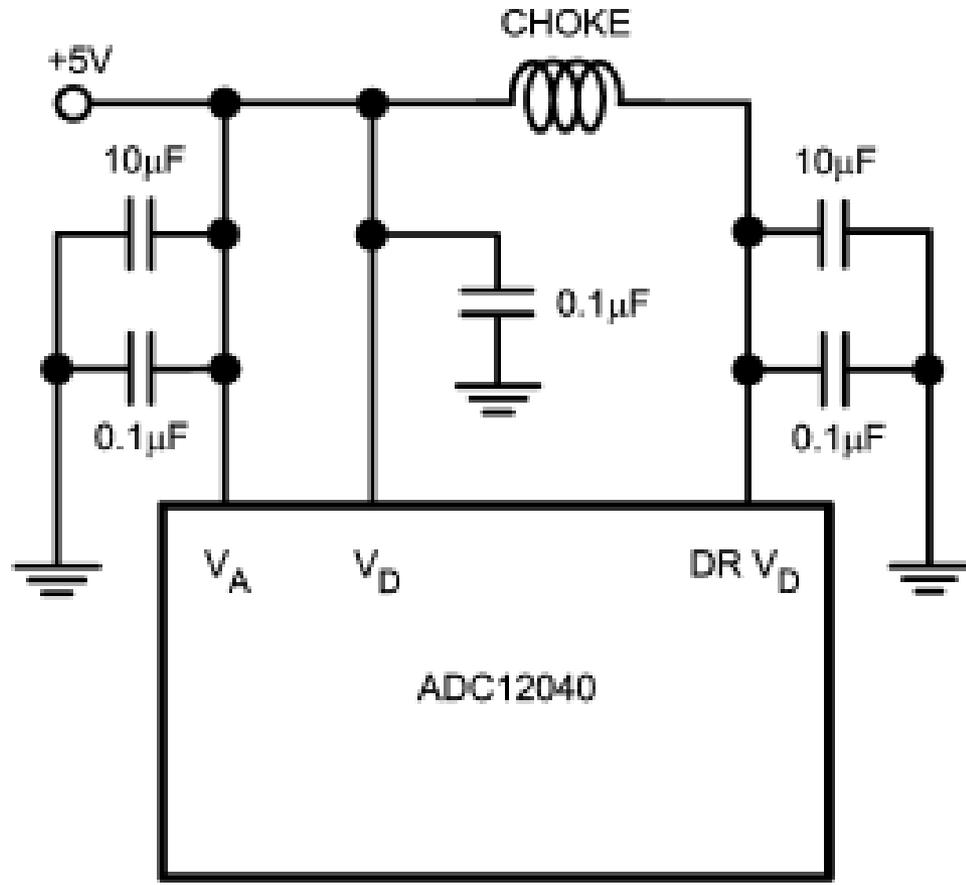
- low L -> ground planes under supply lines
- large C -> bypass capacitors

Power supply may carry noise around

- PSRR (power supply rejection ratio) of analog circuits, including ADCs, DACs and op amps, usually much worse at high frequencies than the DC PSRR seen on data sheets
- any signal or noise on the supply lines couples into the active circuitry through stray capacitances
- e.g. for an op. amp.:



- Analog and digital supply pins should be separately decoupled for both high and low frequencies
- this is often done with two capacitors
- Bring the power directly to the analog supply pins first, then to the digital supply (at least of the output driver) pins through a choke



Switching power supplies

- Noise generated by switching power supplies can be annoying for mixed signal components
- If it is necessary to have a switching supply in the system,
 - be sure to lay it out for minimum RFI/EMI, and
 - keep it as far away from analog and mixed signal areas of the system as possible