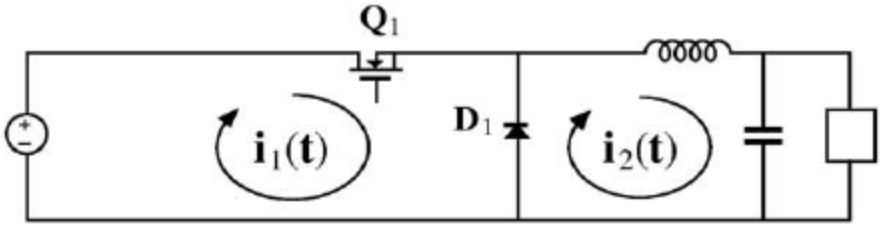
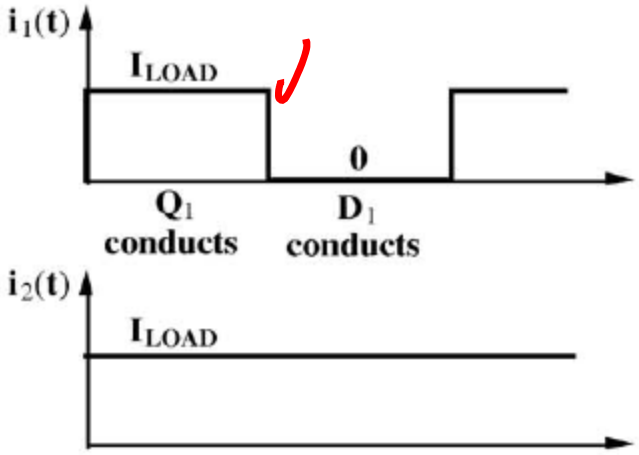
POWER CONVERTER LAYOUT

Power Converter Layout: Buck Example

Use loop analysis





switched input current $i_1(t)$ contains large high frequency harmonics

—hence inductance of input loop is critical

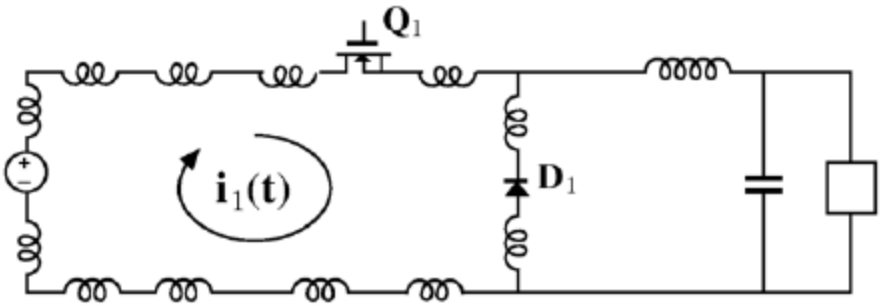
inductance causes ringing, voltage spikes, switching loss, generation of B- and E-fields, radiated EMI

the second loop contains a filter inductor, and hence its current $i_2(t)$ is nearly dc

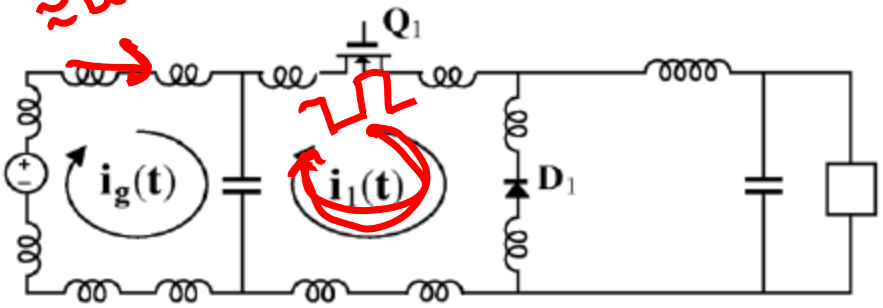
—hence additional inductance is not a significant problem in the second loop

Parasitic Wire Inductances

Parasitic inductances of input loop explicitly shown:



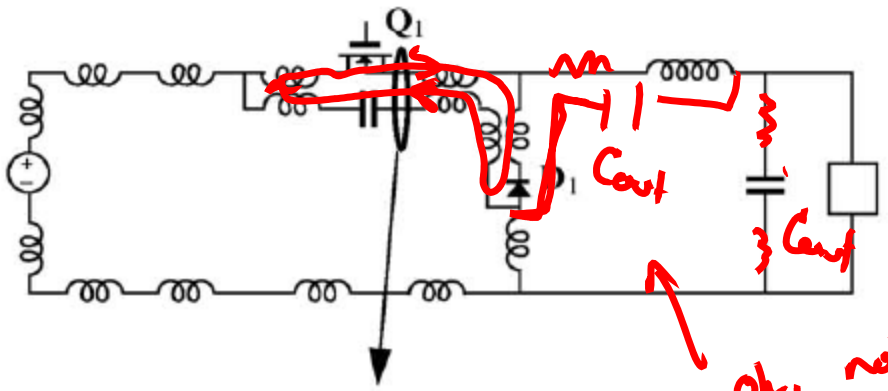
Addition of bypass capacitor confines the pulsating current to a smaller loop:

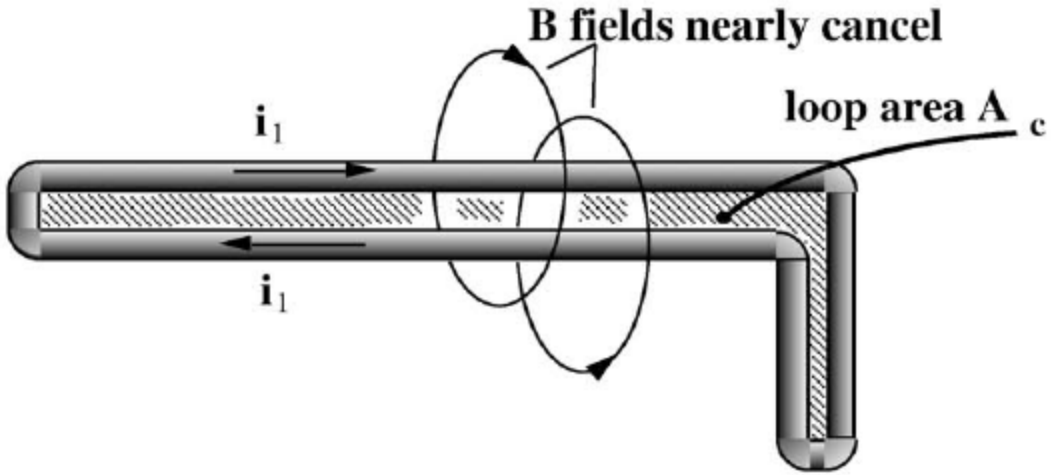


high frequency currents are shunted through capacitor instead of input source

Loop Minimization

Even better: minimize area of the high frequency loop, thereby minimizing its inductance





Effect of Loop Inductance