

Boost & Buck-Boost Controller — Design Flow Checklist

1. Define targets: VIN range, VOUT, IOUT, efficiency, ripple, temp.
2. Pick topology: Boost / Non-inverting buck-boost / Inverting / SEPIC / **Buck**.
3. Choose control: current-mode vs voltage-mode; valley vs peak sensing.
4. Pick fSW; set ΔIL (20–40% IOUT typ.).
5. Compute D; size Lmin = $VIN \cdot D / (\Delta IL \cdot f_{SW})$.
6. Select MOSFET/diode: VDS/IF margin, RDS(on), Qg, reverse recovery.
7. COMP: Type-II/III; place zeros near LC double pole; set $f_c \sim 1/10 f_{SW}$.
8. Start-up: soft-start, pre-bias handling; protections: OCP/OVP/UVLO/OTP.
9. Layout/EMI: hot-loop area, snubber, ground partition, sense routing.
10. Prototype → measure Bode/load transient → iterate → freeze.