

Step-Down DC-DC Converter: Waveforms at the boundary of Cont./Discont. Conduction

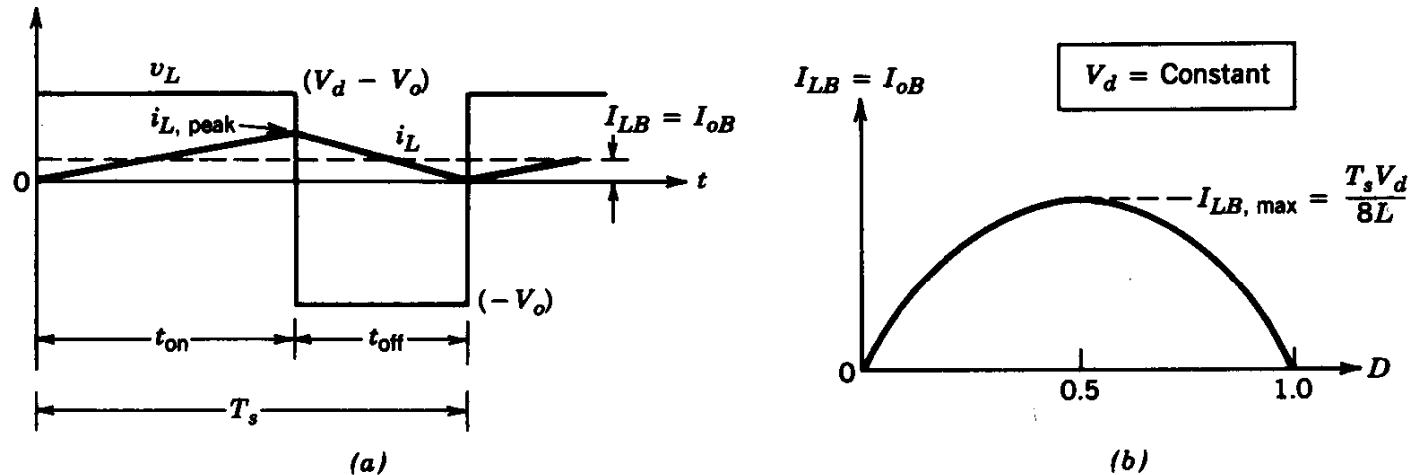


Figure 7-6 Current at the boundary of continuous–discontinuous conduction: (a) current waveform; (b) I_{LB} versus D keeping V_d constant.

- Critical current below which inductor current becomes discontinuous

Step-Down DC-DC Converter: Discontinuous Conduction Mode

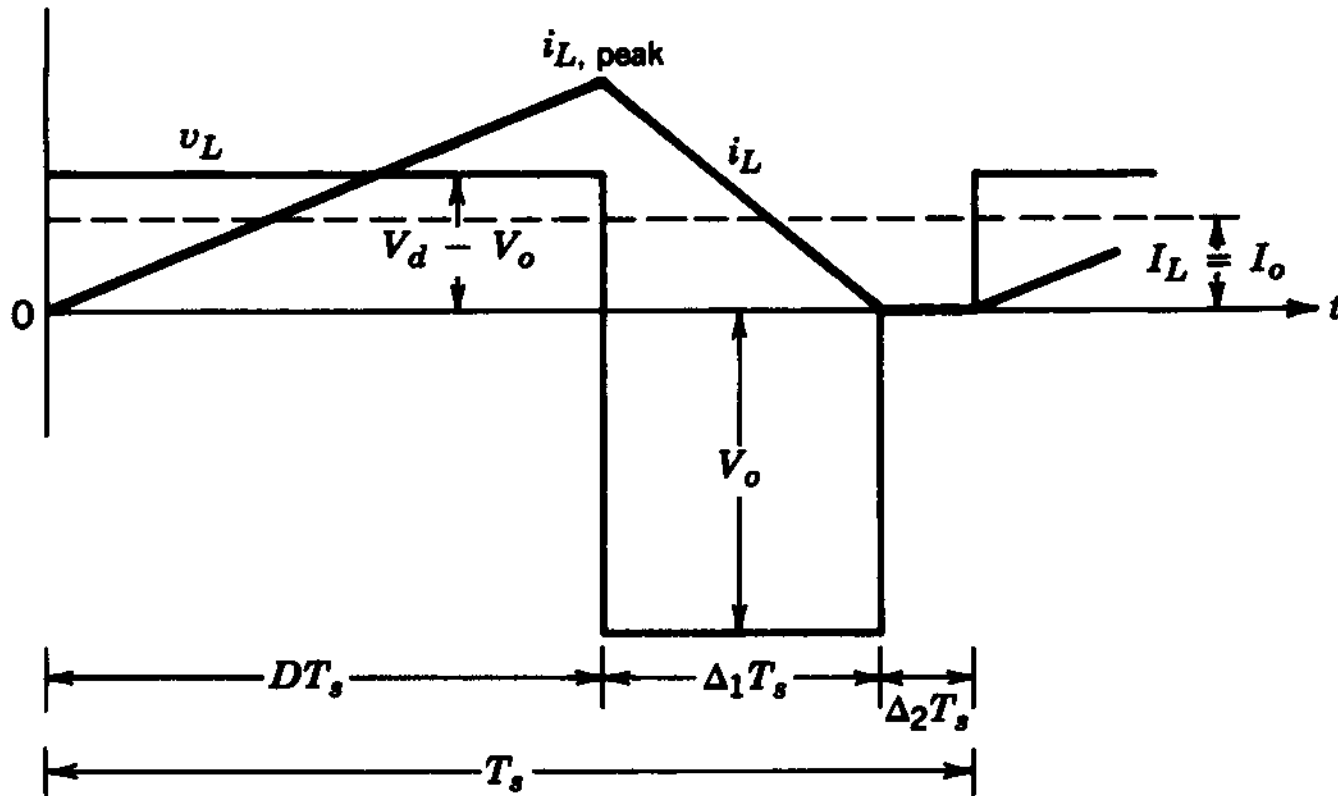


Figure 7-7 Discontinuous conduction in step-down converter.

- Steady state; inductor current discontinuous

Step-Down DC-DC Converter: Limits of Cont./Discont. Conduction

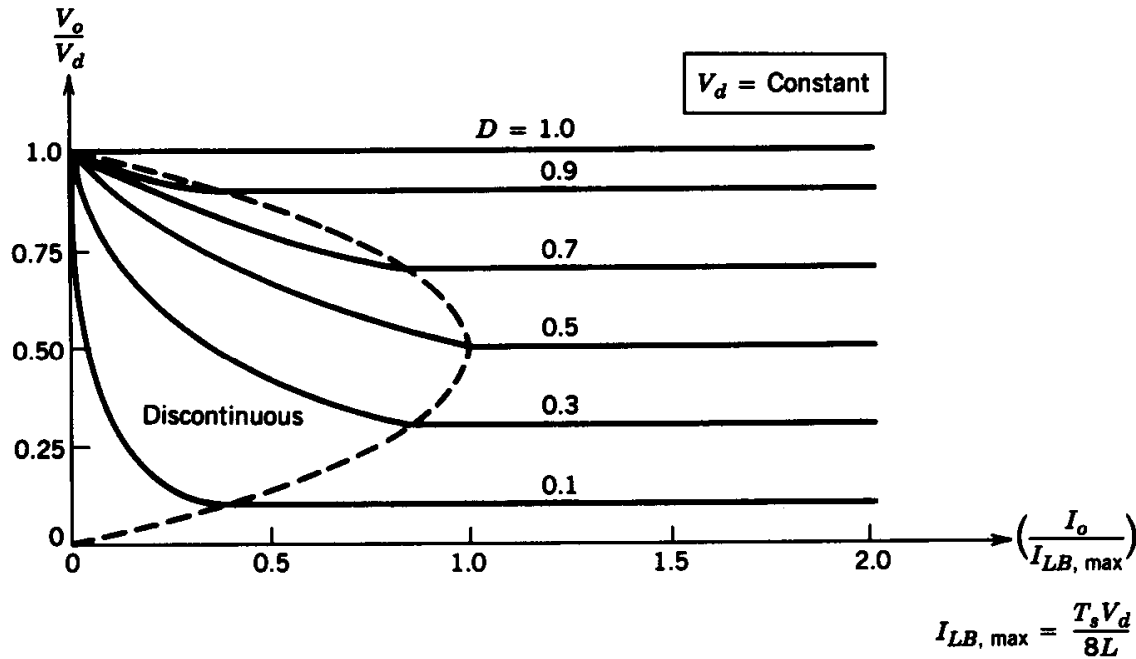


Figure 7-8 Step-down converter characteristics keeping V_d constant.

- The duty-ratio of 0.5 has the highest value of the critical current

Step-Down Conv.: Output Voltage Ripple

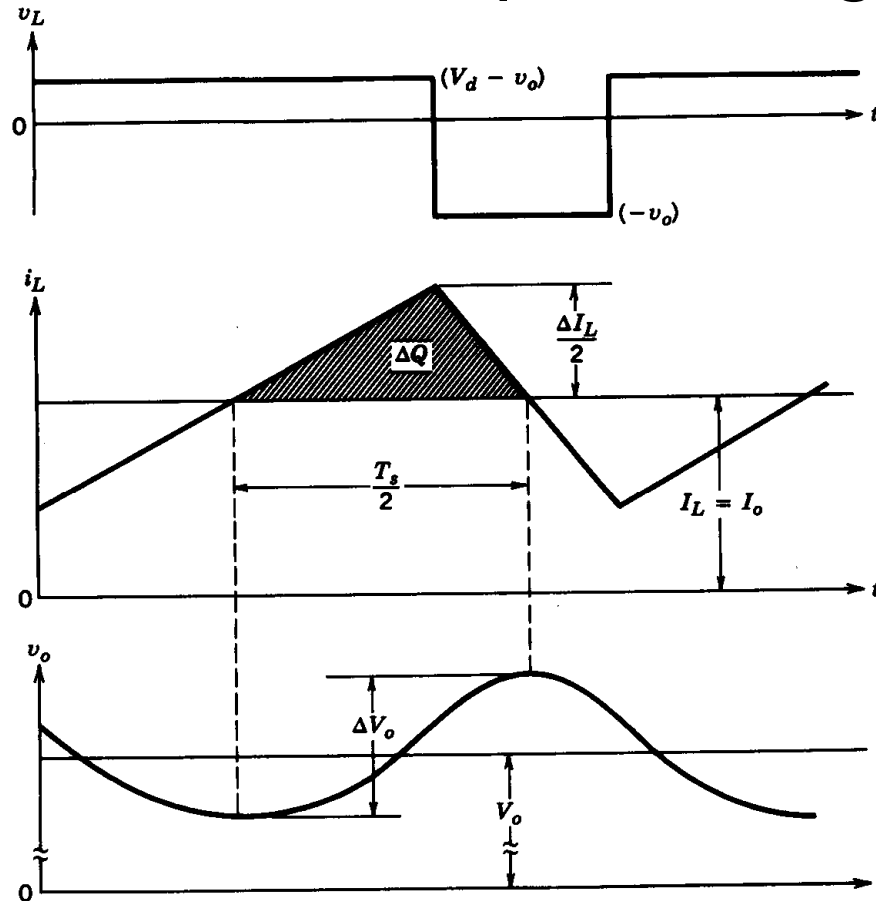


Figure 7-10 Output voltage ripple in a step-down converter.

- ESR is assumed to be zero

Step-Up DC-DC Converter

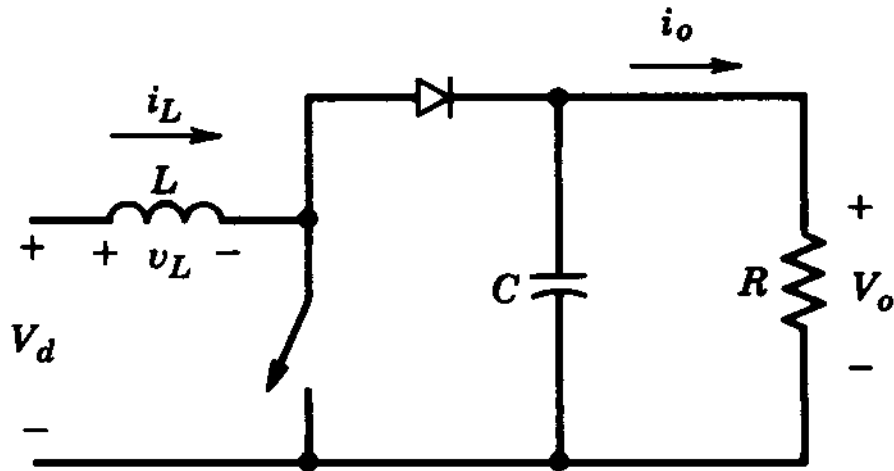


Figure 7-11 Step-up dc–dc converter.

- Output voltage must be greater than the input

Step-Up DC-DC Converter Waveforms

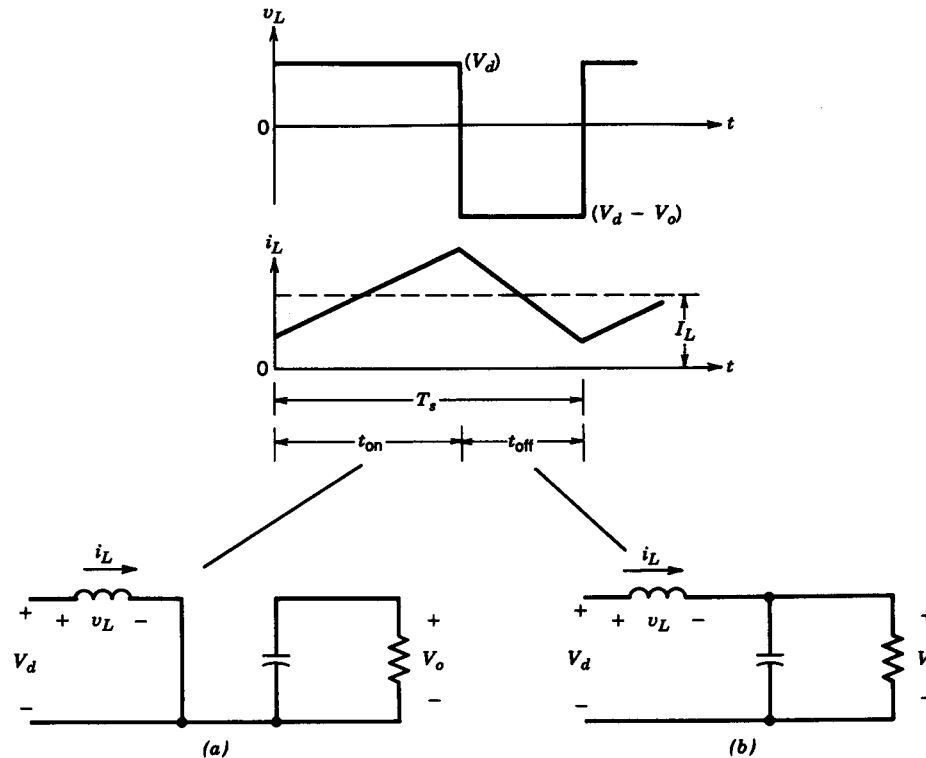


Figure 7-12 Continuous-conduction mode: (a) switch on; (b) switch off.

- Continuous current conduction mode

Step-Up DC-DC Converter: Effect of Parasitics

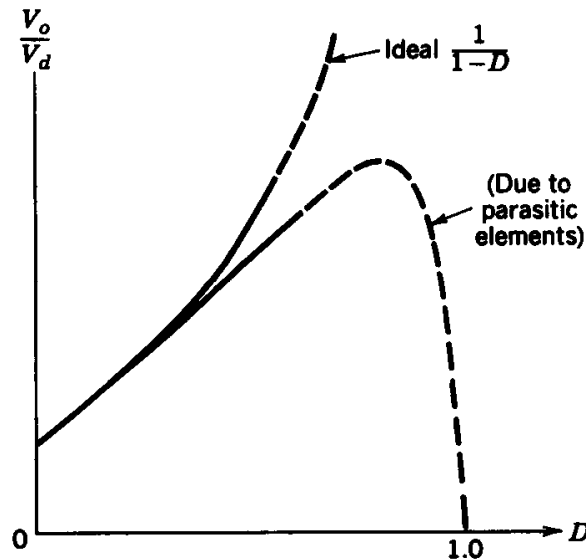


Figure 7-16 Effect of parasitic elements on voltage conversion ratio (step-up converter).

- The duty-ratio is generally limited before the parasitic effects become significant

Step-Up DC-DC Converter Output Ripple

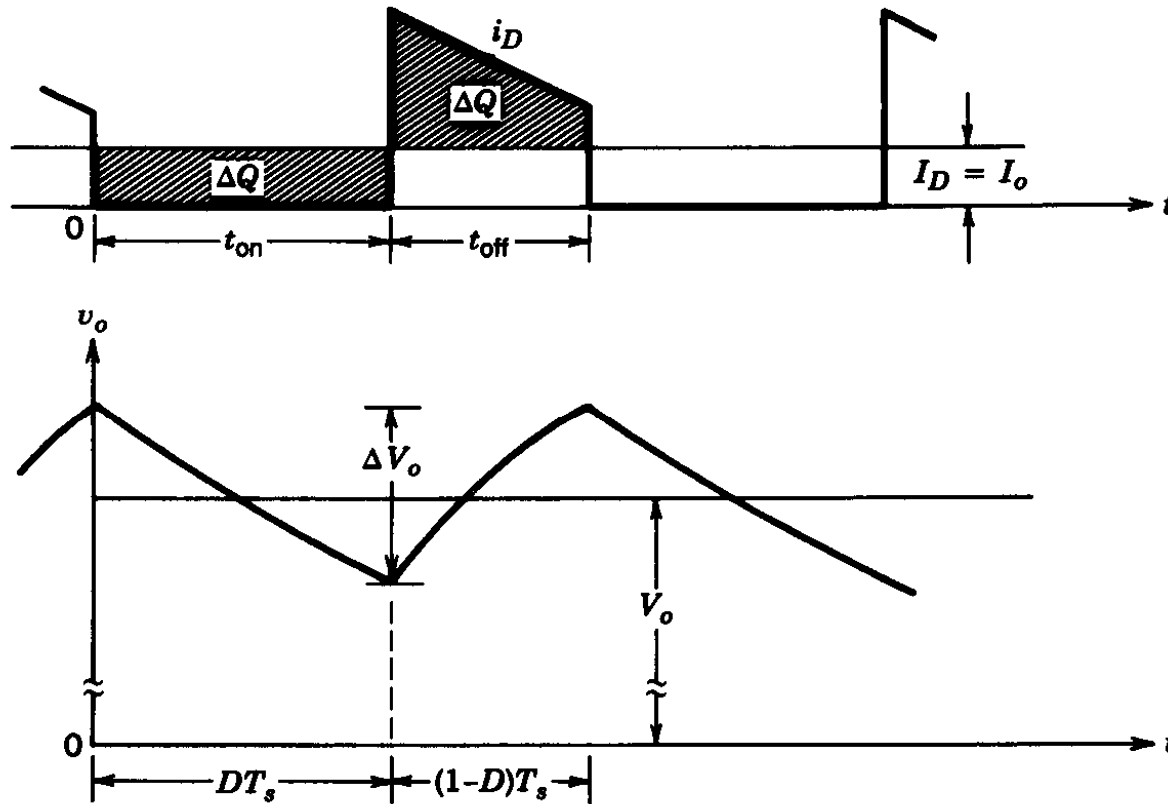


Figure 7-17 Step-up converter output voltage ripple.

- ESR is assumed to be zero