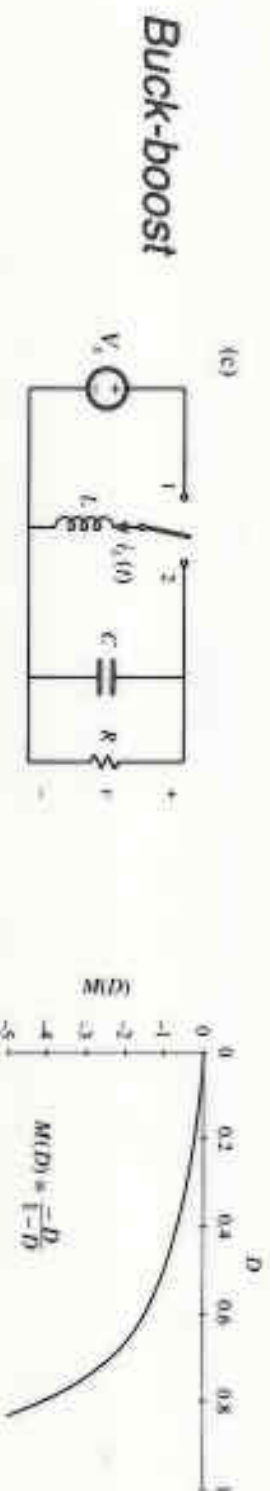
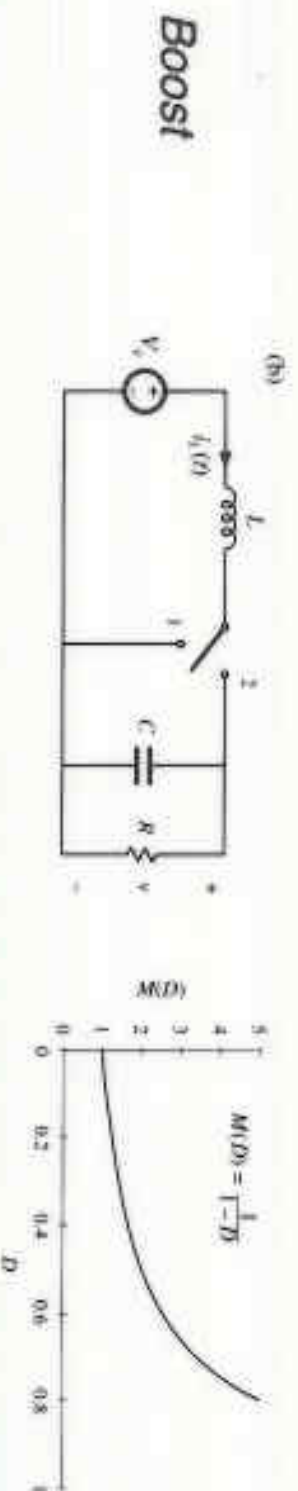
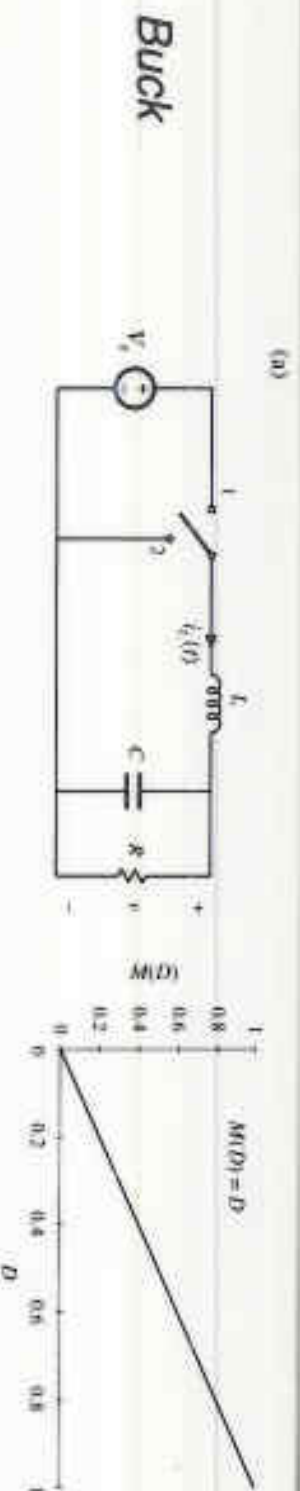


Three basic dc-dc converters



Role of D
 ① Low V_{out}
 ② Arr and SW Loss

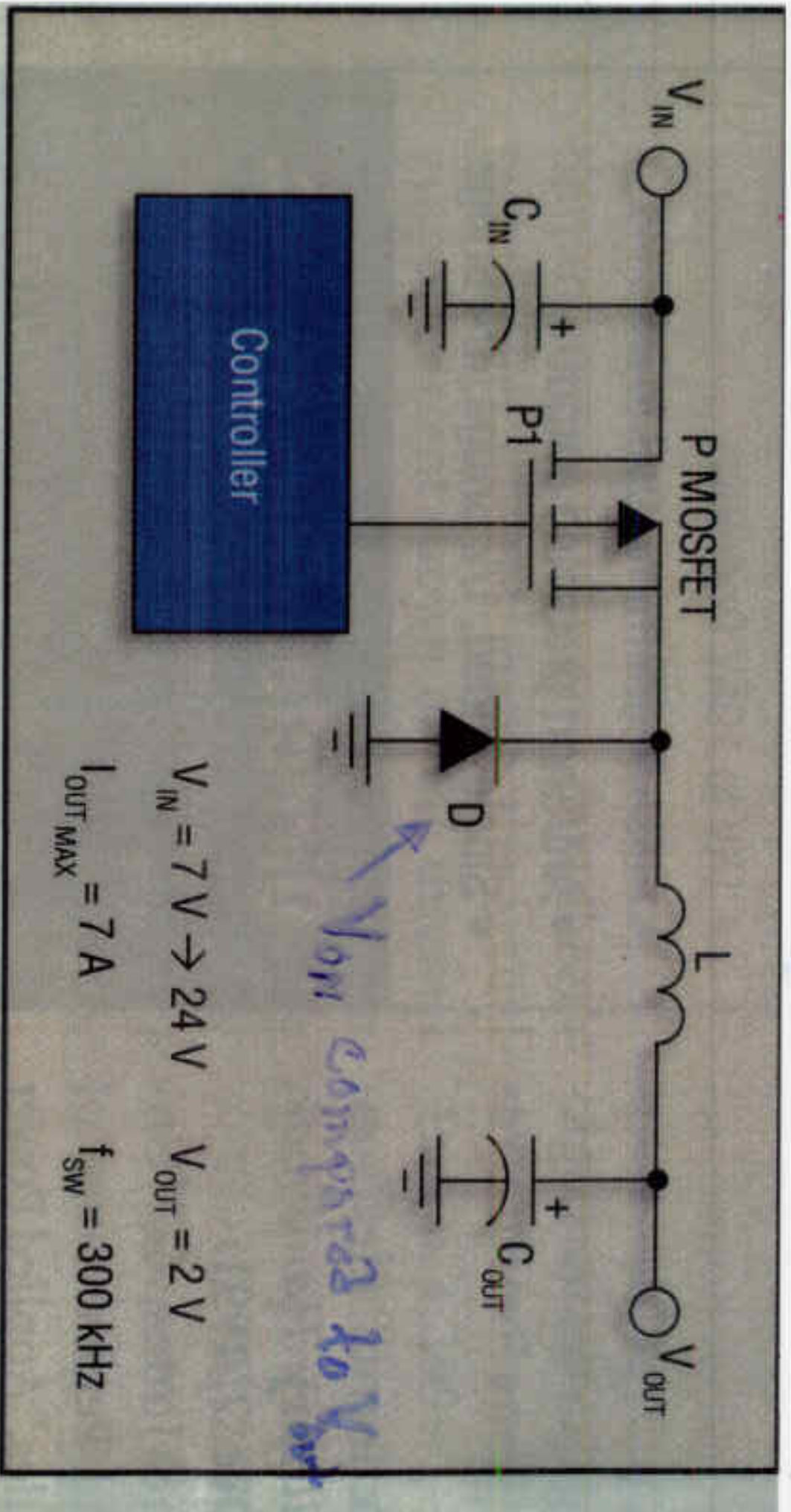


Fig. 1. Basic stepdown converter circuit with operating parameters.

Switch loss

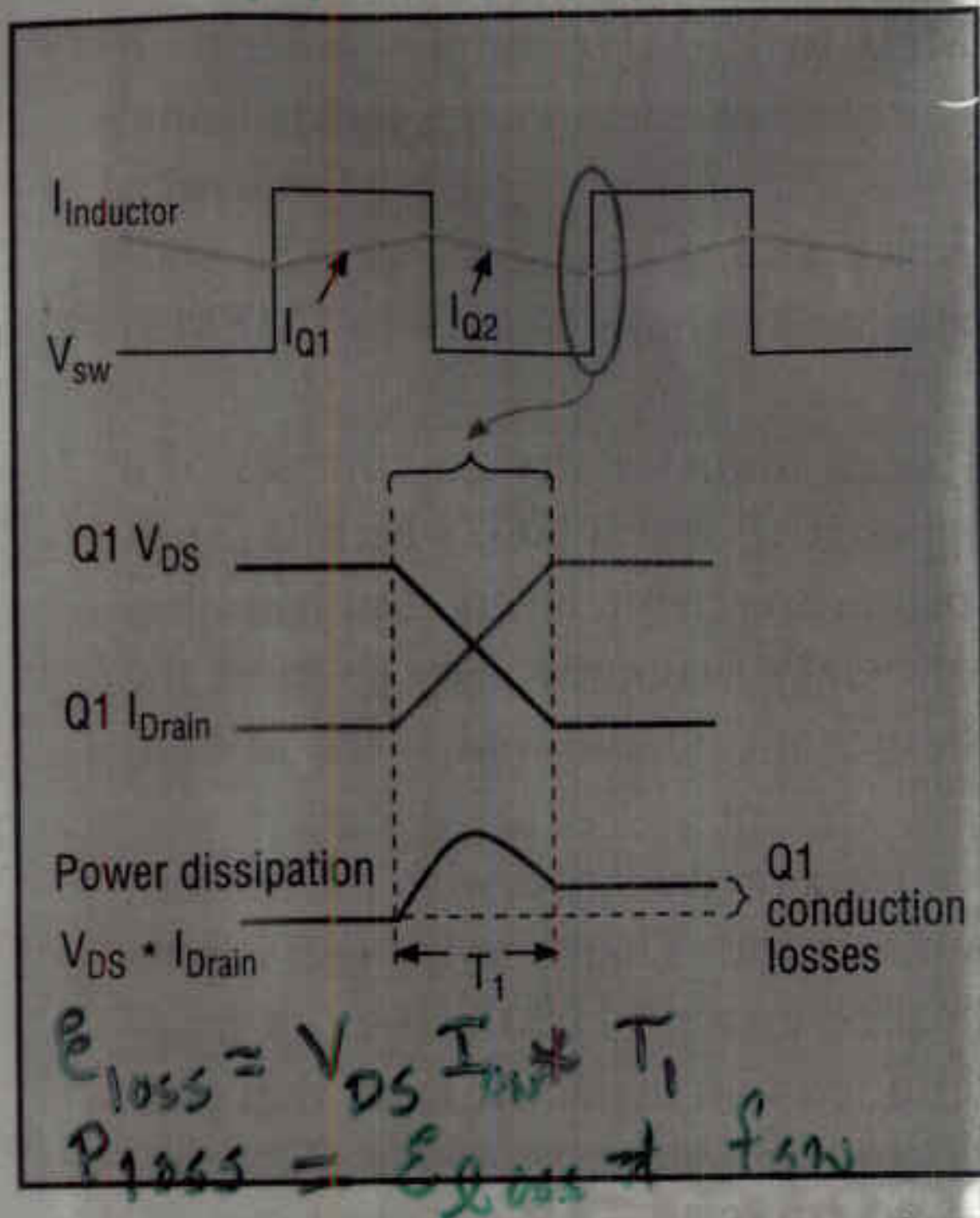


Fig. 2. In the synchronous buck converter, when $Q1$ is ON the voltage across it is close to zero, and V_{sw} is high. When $Q1$ is OFF, the voltage across it is almost V_{in} , and V_{sw} is low. During the switching transition region T_1 , the voltage and current changes across $Q1$ result in the

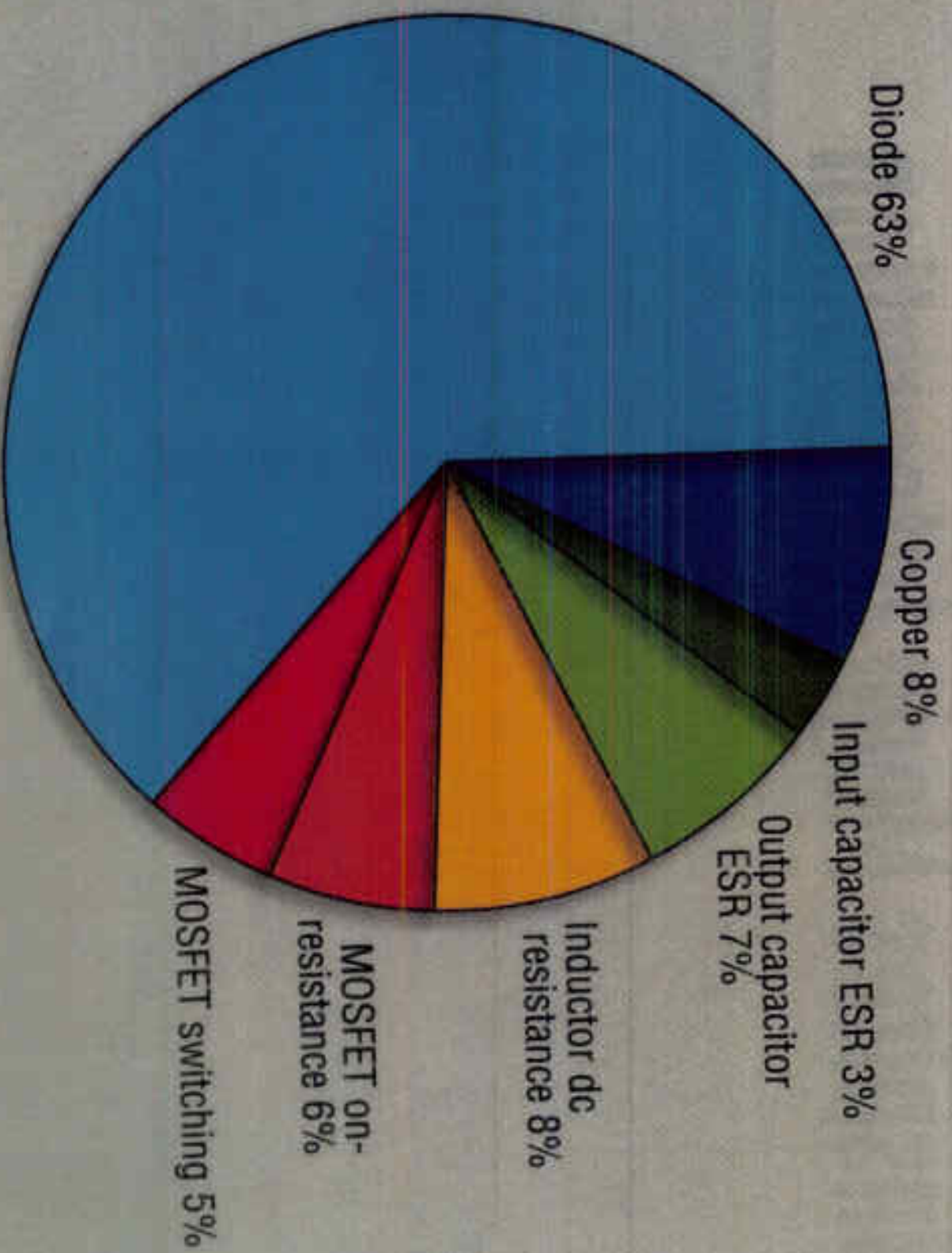


Fig. 6. Power loss caused by the freewheeling diode should be eliminated to increase the converter's efficiency.

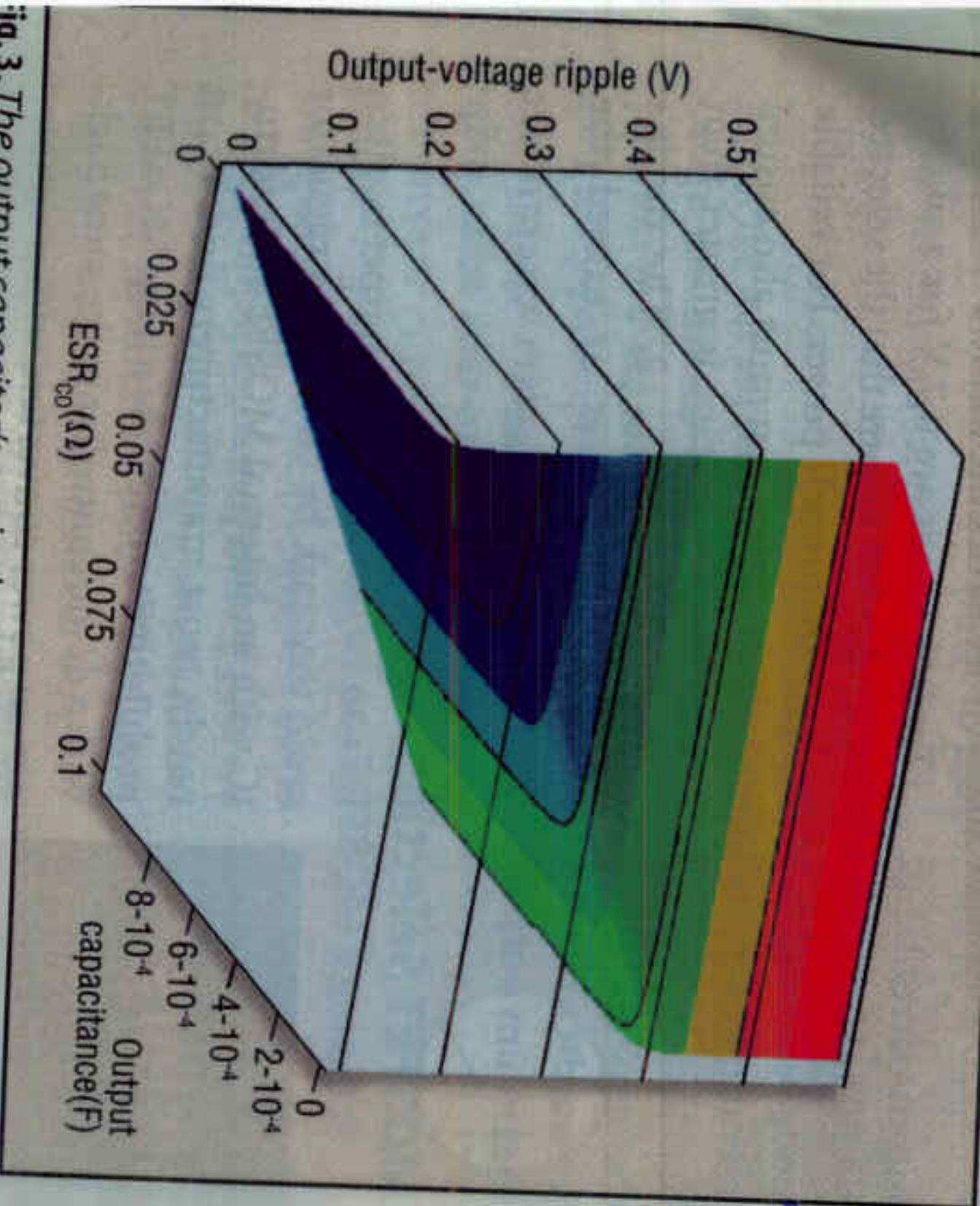


fig. 3. The output capacitor's equivalent series resistance (ESR) dominates the output-voltage ripple.

$$I_{\Delta} \downarrow \frac{1}{s} \downarrow V_c^T$$

$$V_c^T = 0$$