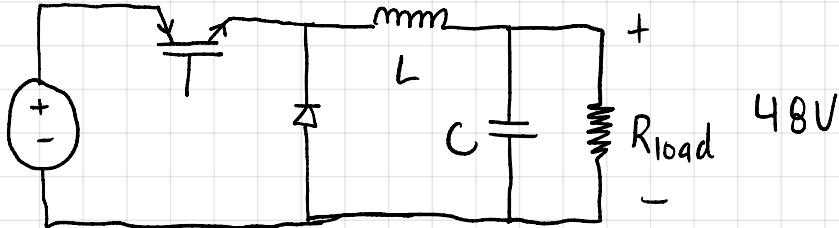


1) Given:  $V_{out} = 48V$      $\Delta V_{load} = 2V$      $T_{sw} = \frac{1}{10 \text{ kHz}}$   
 $V_{in} = 480V$     Load Range: 2 kW to 20 kW



$$V_{out} = D \cdot V_{in}$$

$$48V = 480V \cdot D$$

$$D = \frac{1}{10}$$

$$2\text{ kW} = \frac{48^2}{R_{load, \text{light}}}$$

$$R_{load, \text{light}} = 1.152 \Omega$$

$$L = 1.1L_{crit} \quad R_{load, \text{heavy}} = 0.1152 \Omega$$

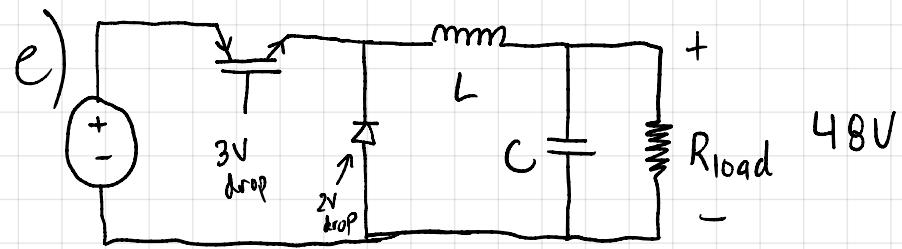
$$L_{crit} = \frac{R_{load} \cdot T_{sw} \cdot (1-D)}{2} = \frac{1.152 \Omega \cdot (1-0.1)}{2 \cdot 10,000 \text{ Hz}} = \frac{1.152 \Omega \cdot 0.9}{20,000} = 51.84 \mu\text{H}$$

$$L = 1.1 \cdot L_{crit} = \boxed{57.024 \mu\text{H}}$$

$$C \geq \frac{(1-D) T_{sw}^2}{8 \cdot L \cdot \frac{\Delta V_{load}}{V_{load}}} = C \geq \frac{(1-\frac{1}{10}) \left(\frac{1}{10 \text{ kHz}}\right)^2}{8 \cdot 57.024 \mu\text{H} \cdot \frac{2V}{48V}}$$

$$\boxed{C \geq 473.49 \mu\text{F}}$$





$$i_L(t + \Delta t) = i_L(t) + \Delta t \left[ \frac{-V_{load}(t + \Delta t) + s\omega(t + \Delta t)V_{in}}{L} \right]$$