

$$D := 1 - \frac{V_{in}}{V_{out}}$$

For $D \leq 1/3$:

$$I_{ripple} := \left[\frac{V_{in}}{L} - 2 \frac{(V_{out} - V_{in})}{L} \right] \cdot D \cdot T_s$$

Substitute D and can simplify above equation as:

$$I_{ripple} := -3 \frac{\left(V_{in} - \frac{5V_{out}}{6} \right)^2 \cdot T_s}{L \cdot V_{out}} + \frac{V_{out} \cdot T_s}{12 \cdot L}$$

The worse case ripple is when $V_{out}=407V$, $V_{in}=339.4V$:

$$I_{ripple} := \frac{V_{out} \cdot T_s}{12 \cdot L}$$

For $1/3 < D < 2/3$:

$$I_{ripple} := \left[\frac{2V_{in}}{L} - \frac{(V_{out} - V_{in})}{L} \right] \cdot \left(D - \frac{1}{3} \right) \cdot T_s$$

Substitute D and can simplify above equation as:

$$I_{ripple} := -3 \frac{\left(V_{in} - \frac{V_{out}}{2} \right)^2 \cdot T_s}{L \cdot V_{out}} + \frac{V_{out} \cdot T_s}{12 \cdot L}$$

The worse case ripple is when $V_{out}=600V$, $V_{in}=300V$:

$$I_{ripple} := \frac{V_{out} \cdot T_s}{12 \cdot L}$$

For $D \geq 2/3$:

$$I_{\text{ripple}} := \left(\frac{3V_{\text{in}}}{L} \right) \cdot \left(\mathbf{D} - \frac{2}{3} \right) \cdot T_s$$

Substitute D and can simplify above equation as:

$$I_{\text{ripple}} := -3 \frac{\left(\mathbf{V}_{\text{in}} - \frac{V_{\text{out}}}{6} \right)^2 \cdot T_s}{L \cdot V_{\text{out}}} + \frac{V_{\text{out}} \cdot T_s}{12 \cdot L}$$

The worse case ripple is when $V_{\text{out}}=600\text{V}$, $V_{\text{in}}=100\text{V}$:

$$I_{\text{ripple}} := \frac{\mathbf{V}_{\text{out}} \cdot T_s}{12 \cdot L}$$

So worst case ripple is with 600V V_{out} :

$$I_{\text{ripple}} := \frac{\mathbf{V}_{\text{out}} \cdot T_s}{12 \cdot L}$$

In order to make $I_{\text{ripple}} < 10\% \cdot I_{\text{ac_max}} = 0.1 \cdot 6600 / 240 \cdot \text{SQRT}(2) / 0.98 = 3.97\text{A}$,

$$L_{\text{min}} := \frac{(V_{\text{out}} \cdot T_s)}{12 \cdot \mathbf{I_{\text{ripple}}}}$$

$$L_{\text{min}} := \frac{(600 \cdot 10)}{12 \cdot 3.97}$$

$$L_{\text{min}} = 125.945$$

