

$$V_{in} := 800 \text{ V}$$

$$V_{inmax} := 857 \text{ V}$$

$$V_{inmin} := 400 \text{ V}$$

$$P_{outmax} := 10 \text{ W}$$

$$f_{sw} := 130 \text{ kHz}$$

$$V_{out} := 12 \text{ V}$$

$$V_{outmin} := V_{out} - 8\% \cdot V_{out} = 11.04 \text{ V}$$

$$V_{outmax} := V_{out} + 8\% \cdot V_{out} = 12.96 \text{ V}$$

$$V_d := 0.5 \text{ V}$$

$$V_r := 300 \text{ V}$$

$$V_{ddoff} := 8.5 \text{ V}$$

$$V_{inrun} := V_{inmin}$$

$$V_{ddon} := 22 \text{ V}$$

$$D := 0.2$$

$$\eta := 80\%$$

$$\beta := 0.16 \text{ T}$$

$$I_{out} := \frac{P_{outmax}}{V_{out}} = 0.833 \text{ A}$$

$$I_{run} := 2.1 \text{ mA}$$

$$I_{vslrun} := 220 \text{ }\mu\text{A}$$

$$I_{start} := 1 \text{ }\mu\text{A}$$

$$V_{vsr} := 4.05 \text{ V}$$

$$V_{ccr} := 300 \text{ mV}$$

$$L_p := 8 \text{ mH}$$

$$L_s := 0.008 \text{ mH}$$

$$I_{peak} := 0.155 \text{ A}$$

$$V_{ocv} := V_{out}$$

Auxiliary Winding:

$$N_p := 80$$

$$N_s := N_p \cdot 0.042$$

$$V_{ddmin} := 22 \text{ V}$$

$$V_{ddmax} := 25 \text{ V}$$

$$N_{amin} := \frac{V_{ddmin} \cdot N_s}{V_{outmin} + V_d} = 6.406$$

$$N_a := 7$$

$$N_{amax} := \frac{V_{ddmax} \cdot N_s}{V_{outmin} + V_d} = 7.279$$

$$N_{as} := \frac{N_a}{N_s} = 2.083$$

$$N_{ap} := \frac{N_a}{N_p} = 0.088$$

$$L_a := L_s \cdot (N_{as})^2 = 34.722 \text{ }\mu\text{H}$$

Voltage Sense

$$N_{pa} := \frac{1}{N_{ap}}$$

$$260$$

$$R_{s1} := \frac{V_{inmin} \cdot \sqrt{2}}{N_{pa} \cdot I_{vslrun}} = 224.989 \text{ k}\Omega$$

$$R_{s2} := \frac{R_{s1} \cdot V_{vsr}}{N_{as} \cdot (V_{ocv} + V_d) - V_{vsr}} = 41.434 \text{ k}\Omega$$

$$V_{ocv} = 12 \text{ V}$$

$$V_{vsr} = 4.05 \text{ V}$$

Current Sense

$$R_{cs} := \frac{0.75 \text{ V}}{I_{peak}} = 4.839 \text{ }\Omega$$

$$R_{lc} := \frac{25 \cdot R_{s1} \cdot R_{cs} \cdot 70 \cdot 10^{-9} \cdot s \cdot N_{pa}}{L_p} = 2.722 \text{ k}\Omega$$

Vdd

$$C_{dd} := \frac{(I_{run} + 1 \text{ mA}) \cdot \frac{30 \cdot \mu\text{F} \cdot V_{outmin}}{I_{out}}}{V_{ddon} - V_{ddoff} - 1 \text{ V}} = 98.565 \text{ nF}$$

$$R_{str} := \frac{\sqrt{2} \cdot V_{inmin}}{I_{start} + \frac{V_{ddon} \cdot C_{dd}}{500 \mu\text{s}}} = 130.406 \text{ k}\Omega$$