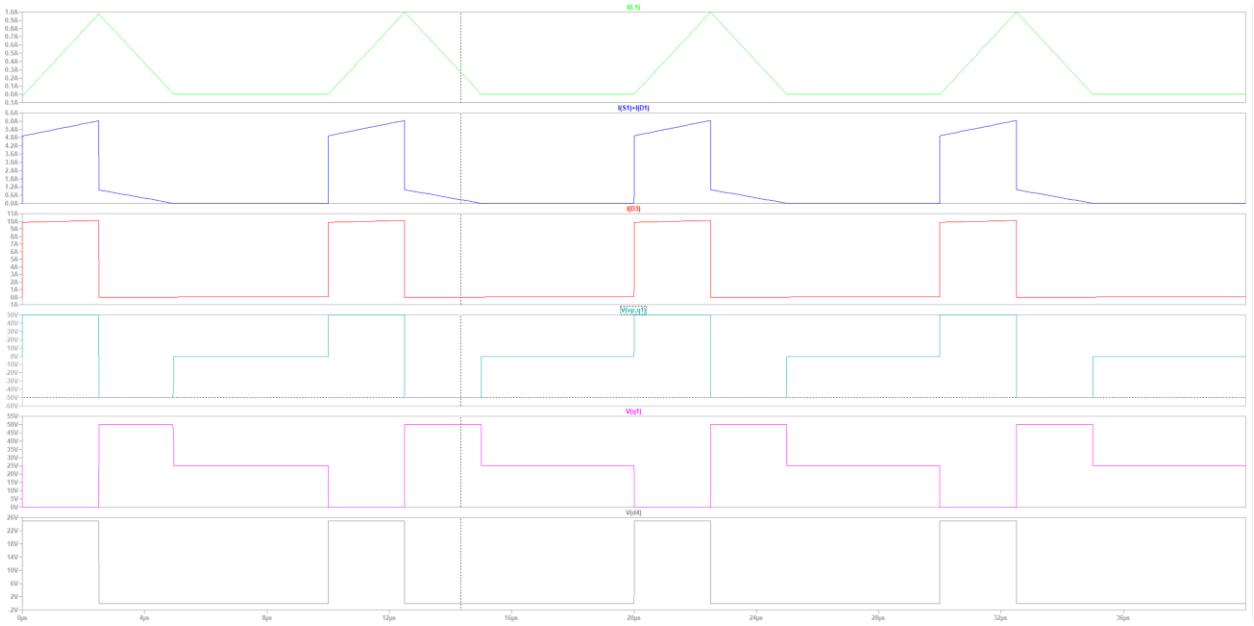
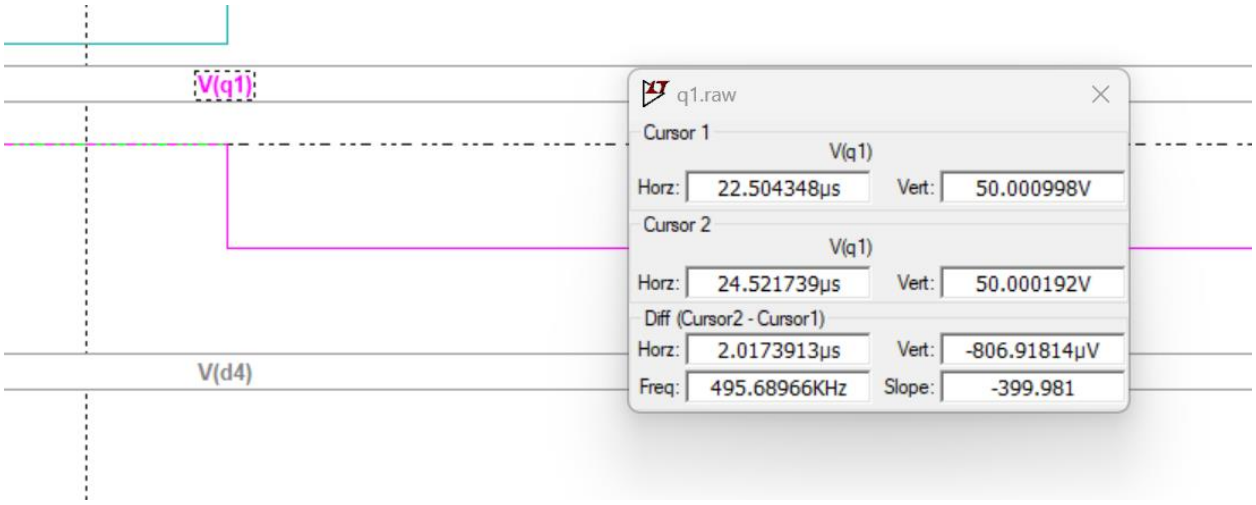
In one page, plot 4 cycles of iμ(t), ip(t), and is(t) and vLμ(t), vQ1(t) and VD4 when Lleak=0.

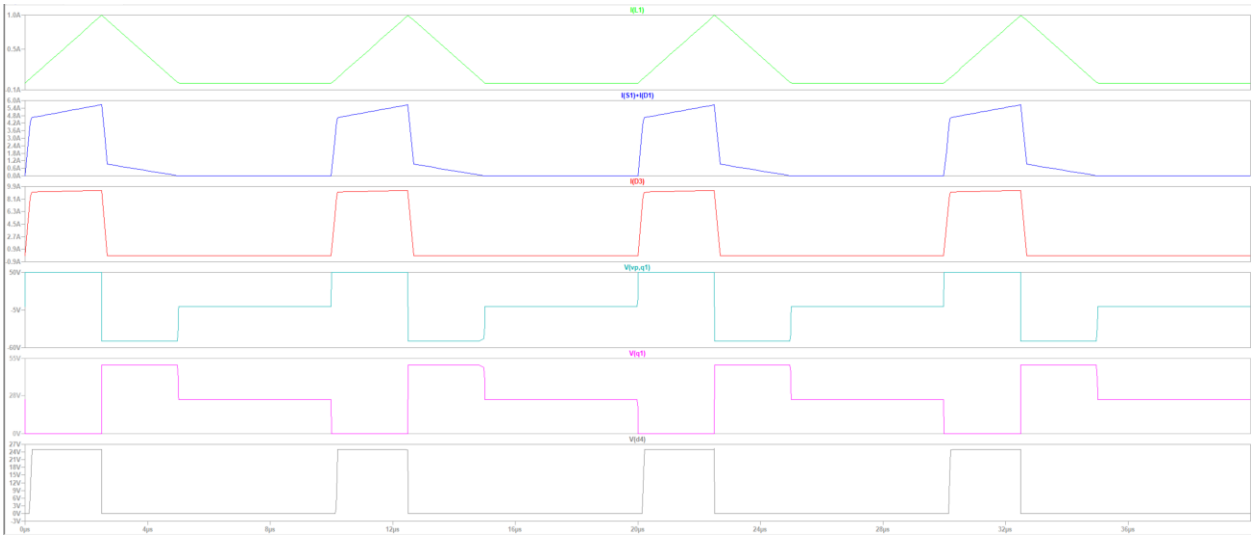


- What is the maximum voltage across vQ1(t)?



- What is the maximum and minimum of the magnetizing current iμ(t)? (only one trace per plot please).

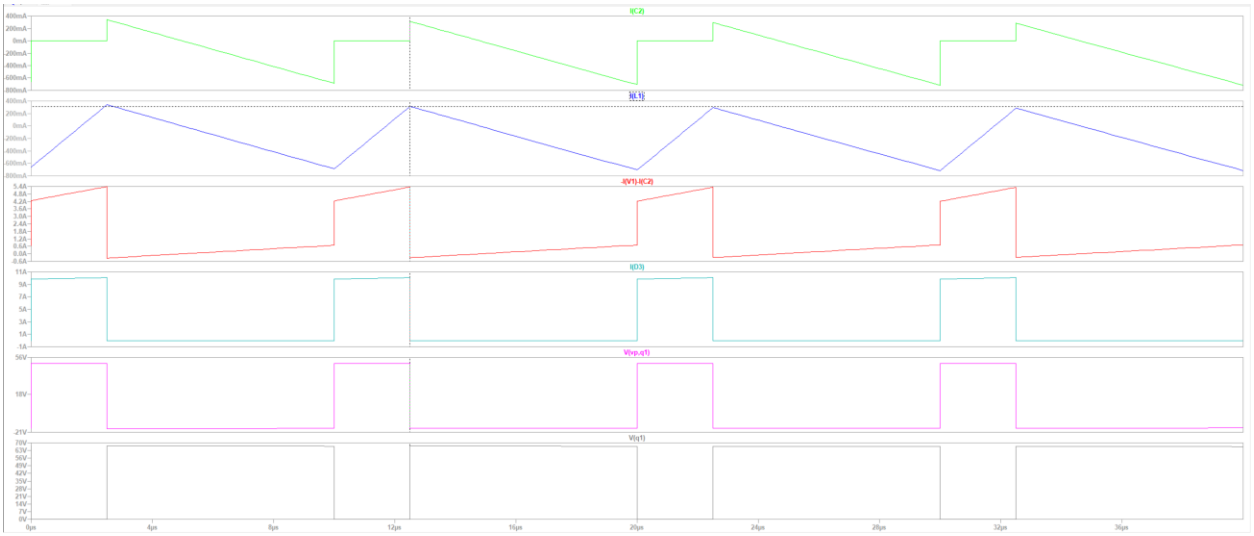
In one page, plot 4 cycles of iμ(t), ip(t), is(t) and vLμ(t), vQ1(t) and VD4 when Lleak=500 nH.



Very similar to without leakage current but the transition between different periods in I(p) and I(d) are more smooth (less steep and sudden) because the inductor is trying to maintain current. This is only a small change because the leakage inductance is quite small so the inductance can only store so much energy and therefore only can ramp up and down a certain amount. The slope is high because the inductance is low.

Question 3

In one page, plot 4 cycles of iaux(t), iμ(t), ip(t), is(t), vLμ(t), vQ1(t) and vD2(t) when Lleak=0. What is the maximum voltage across vQ1(t)? What is the maximum and minimum magnetizing current iμ(t)? (only one trace per plot please)

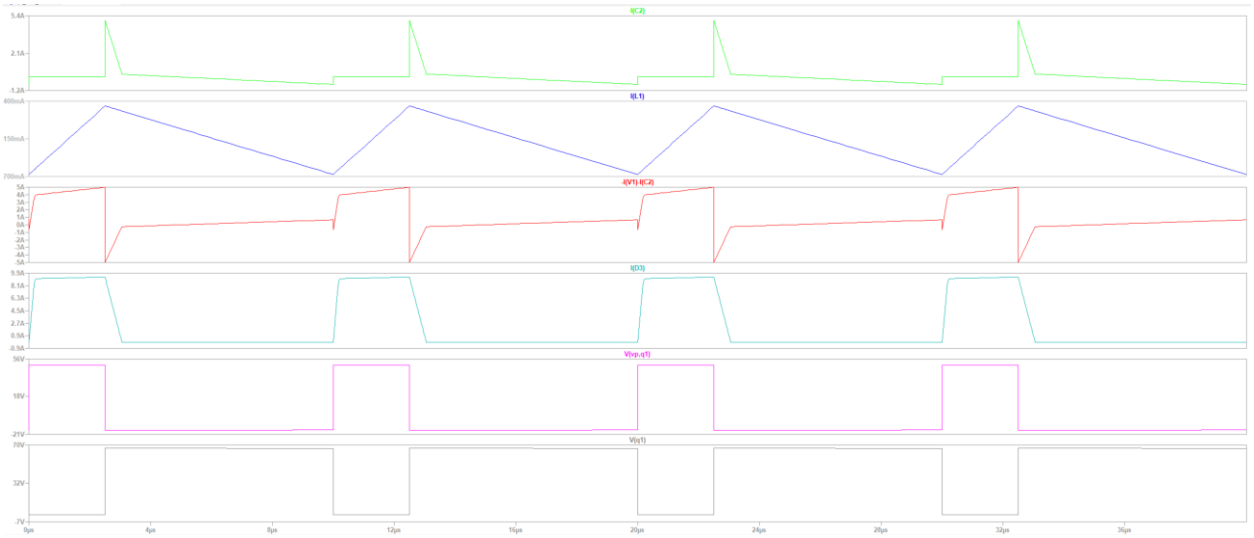


Max voltage across =66.85 V

Min magnetizing current = 500.58mA

Minimum magnetizing current = -500.05 mA

- In one page, plot 4 cycles of iμ(t), ip(t),
  and is(t) and vLμ(t), vQ1(t) and vD2(t) when Lleak=500 nH. What is the maximum voltage across vQ1(t)? What is the maximum and minimum of the magnetizing current iμ(t)? (only one trace per plot please)



Max voltage across =66.48 V

Min magnetizing current = 330.67 mA

Minimum magnetizing current = -669.17 mA

Compare your plots with the plots you got for the two-switch forward converter of Figure 1.1. Comment on the differences and how each circuit handles the leakage inductance of the transformer.

The two switch forward converter handles the leakage inductance with little impact to the peak values of the waveforms. The biggest difference is that current ramps up with a steep slope rather than immediately turning from one value to the next. However, leakage current in the active clamps causes the current in the capacitor to spike, which also causes the Ip to spike. Overall, the switch still handles the same amount of maximum voltage. However, the capacitor would have to be specified to handle higher currents. In addition, the average value of the magnetic current is no longer centered around 0 because when the capacitor current spikes, the inductor current can no longer be as large. Therefore, the peak to peak graph is shifted down.