Since the topology is Push-Pull, duty cycle should be between 0 and 0.5 because D is used twice during a period. We would like to have charging and discharging durations to be close to each other in order to stay away from discontinuous conduction mode. We set up an xlsx file in order to observe the change in circuit parameters due to frequency, desired duty cycle etc. We set a duty cycle for the input voltage which is the mean of maximum and minimum and calculated Dmax and Dmin accordingly.

metin içeren bir resim

Açıklama otomatik olarak oluşturuldu

Duty cycle will be the controlled parameter in order to keep the output voltage constant with changing input voltage. We calculated the interval of duty cycle.

metin içeren bir resim

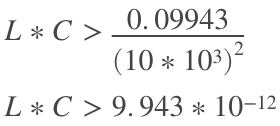
Açıklama otomatik olarak oluşturuldu

Since the output side of the push-pull topology is identical to buck converter, output voltage ripple has the same characteristics with half of the period.

metin içeren bir resim

Açıklama otomatik olarak oluşturuldu

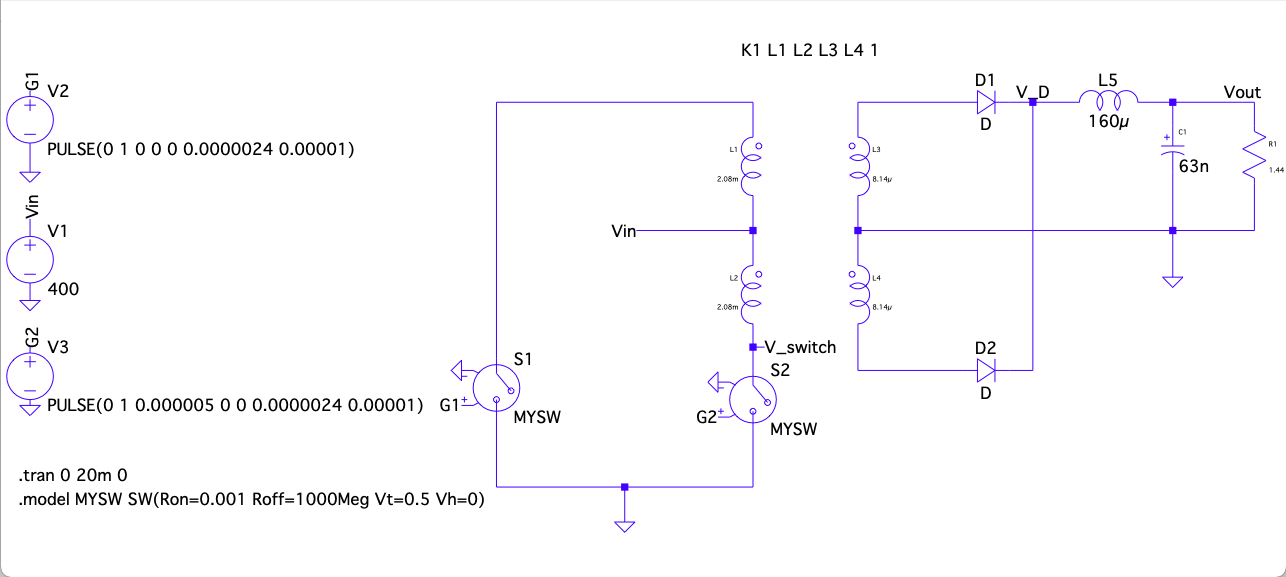
As we increase the frequency, we can use smaller components for L and C and reduce the cost. We set the switching frequency at 100kHz.



We set L value as 160μH, so C value is calculated as:

metin içeren bir resim

Açıklama otomatik olarak oluşturuldu



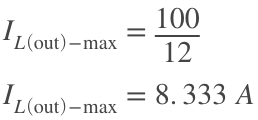
*Figure X: Circuit Schematic of Push-Pull Circuit without any Control*

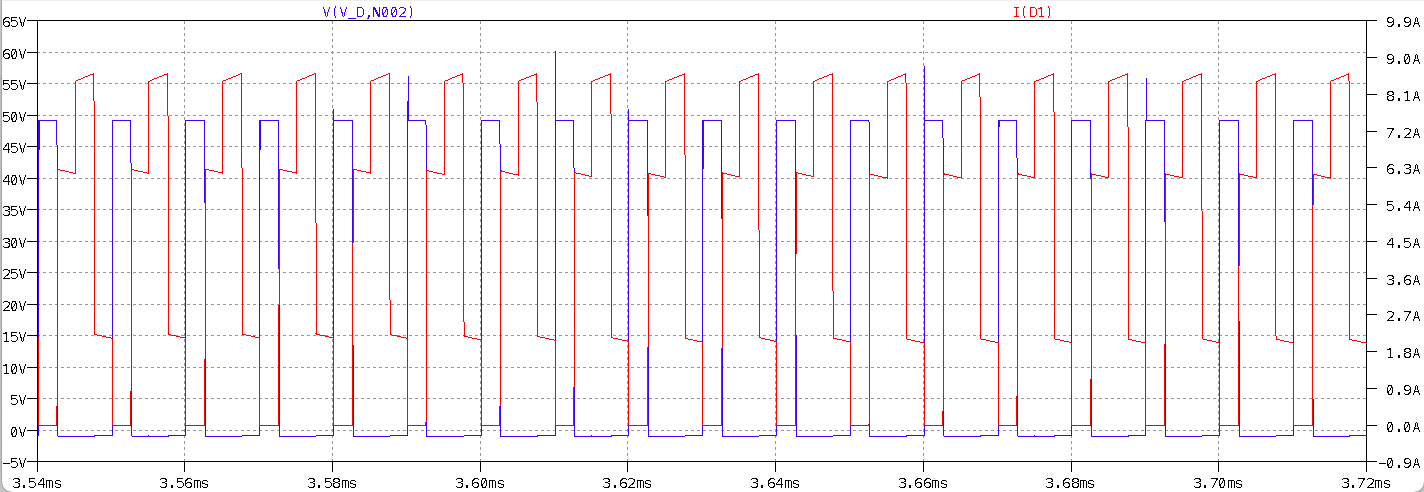
tablo içeren bir resim

Açıklama otomatik olarak oluşturuldu

*Figure X: Output Voltage and Inductor Current Waveforms of Converter*

As seen in Figure X, output voltage is in the limits of 4% ripple criteria. Maximum voltage rating of output capacitor should be higher than 12.48V. Maximum current flowing through output inductor should be higher than 8.333A, which can be also calculated as:



**

*Figure X: Voltage and Current Waveforms of DC Side Diodes*

metin, cihaz içeren bir resim

Açıklama otomatik olarak oluşturuldu

*Figure X: Voltage and Current Waveforms of Switches*

As seen in Figure X, diodes should be capable of handling 9A current and 50V reverse voltage. Switches should be able to block at least 800V and conduct more than 800mA according to Figure X.