



In renewable energy field, buck and boost topology are the most widely used in DC-DC converters. This application note provides a guide of using DC-DC Converter Inductor Selection of CODACA to choose the suitable power inductor by providing design rules and key parameters as well as the equations needed to determine peak and RMS currents.

The design has a switching frequency of 39kHz and an input voltage of 75 to 50 V. Electrical performance specifications are:

- In/output voltage=75 V / 50 V
- Frequency= 39kHz
- Average current= 34 A
- Ripple current = 7.8 A

This is all the information needed to proceed to the CODACA *DC-DC Optimizer tool*. The first step is to identify Buck as the driver circuit topology as voltage $V_{in}=75V$ and $V_{out}=50V$; The second step requires inputting the operating parameters: V_{in} , V_{out} , Average current, switching frequency and the selection of the allowed peak-peak ripple current. Refer figure 1 .

Figure 1

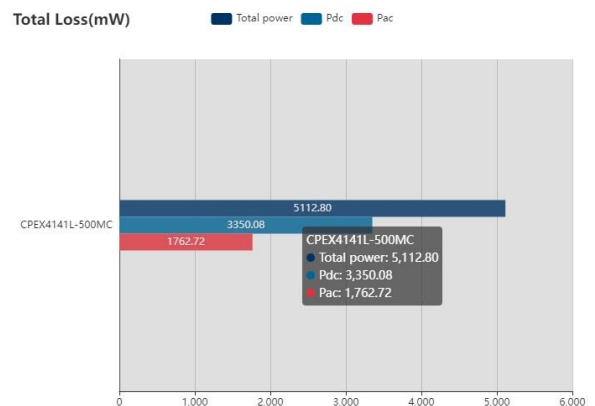


Figure 2

The input voltage as well as the average current and voltage are specified as design requirements. The switching frequency may represent some design freedom if a driver IC is not yet selected, but generally the only degree of freedom in selecting the inductance is the amount of ripple current to be allowed. Therefore, using CODACA's design tool of *Loss Comparison* indicates a temperature rise of 38 ° C at 43 A, and total loss is around 5W at a ripple current of 7.8A with a best recommend high current power inductor CPEX4141L-500MC. Refer to Figure 2.

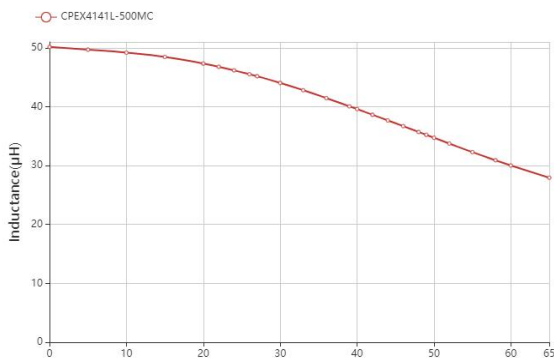
CODACA developed super high current power inductors CPEX series to deliver considerable application benefits for high-power buck and boost converters, fast customization service are available.

Features of CPEX series:

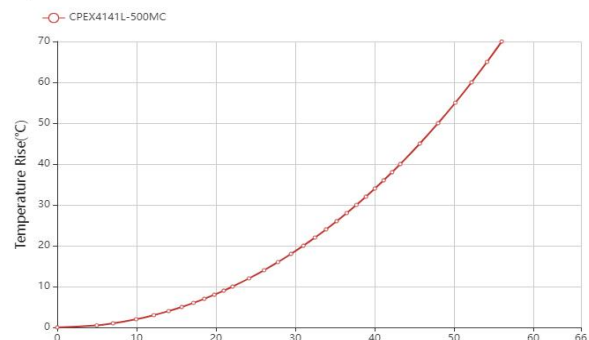
- Ultra-low Power Loss Inductors for Intelligent Home Energy
- Isat up to 44A and Rdc only 2.79mΩMax for 50μH
- Operation temperature up to +150 ° C with no thermal aging

CODACA's CPEX series super high current power inductors are ideally suited for DC-DC converters operating at temperature up to 150 ° C. Operating under harsh environment conditions, the converter requires a high level of reliability and robustness to ensure a long life cycle. CODACA's CPEX series has satisfied the needs for this outstanding performance. Refer to Figure 3 and Figure 4.

Saturation Current



Temperature Rise Current



Conclusion:

CODACA's *DC-DC Converter Inductor Selection* powerful calculation shows new optimal inductor choices for low profile and better performance. The tool can identify the best inductors for boost and buck converters. With just a few clicks you can go from Vin/Vout converter requirements to an inductor selection complete with losses and saturation analysis. This inductor design tools help engineers find suitable inductors for their designs and to simplify the search process.