

# How to Turn an EPC Development Board into a Prototype



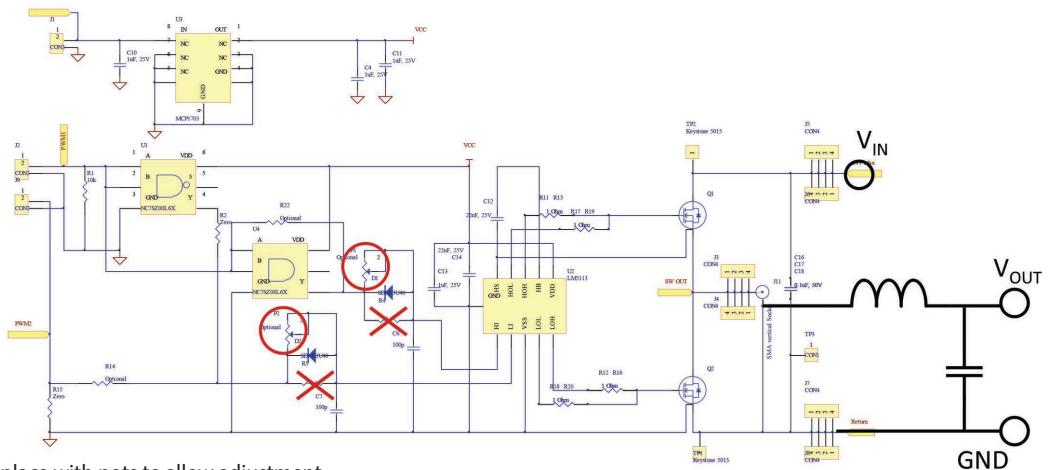
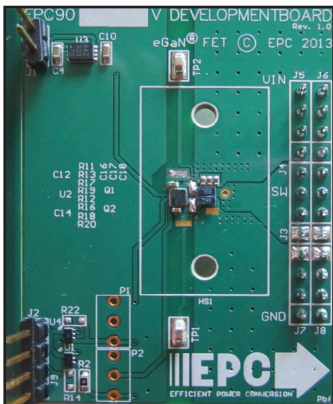
The standard EPC90XX development boards can be used to easily construct a working prototype. Since the boards already contain the half-bridge and drive, only the LC output filter and terminals need to be added.

The boards come with a fixed minimum dead time to provide adequate performance for most applications. However, in the example below we demonstrate how to turn a standard development board into a high frequency buck converter where further dead time optimization is desired.

The Full list of development boards can be found at: <http://epc-co.com/epc/Products/DemoBoards.aspx>

## 1 High Frequency Buck Example – Modification

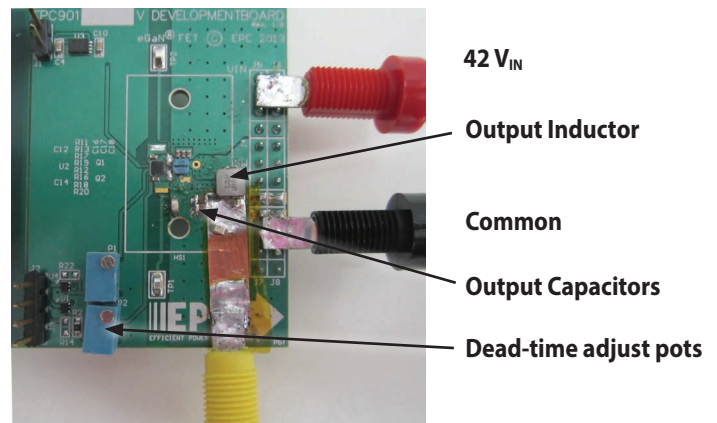
### 42 V to 20 V Buck at 10 MHz / 2 A



- Remove fixed dead-time resistors and replace with pots to allow adjustment.
- Add terminals for input/output power

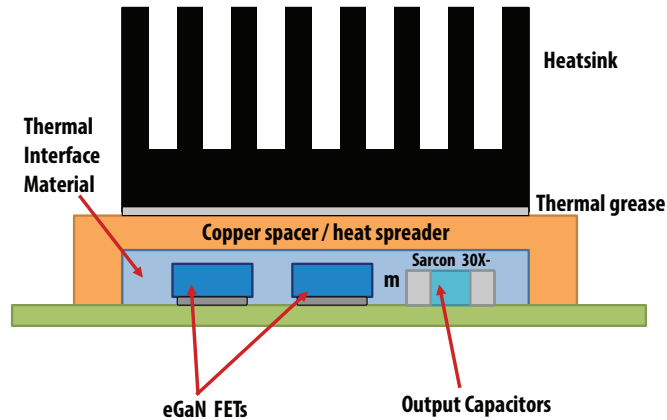
## 2 High Frequency Buck Example – Construction

- **Step 1:** Design and find the necessary inductor and output caps that will be used and place them on the board where you'd like them to be.
- **Step 2:** Add a piece of polyimide tape over the section that will become the output terminal and cover that with some copper tape.
- **Step 3:** Remove / scratch open the green solder mask in places necessary to connect the inductor, capacitors and Kelvin terminals. Tin the open copper using solder.
- **Step 4:** Solder all the components, banana connectors and also Kelvin point connectors onto the board.
- **This completes the steps required for prototyping with fixed standard dead time values.**
- **Step 5:** Add dead-time adjustment pots P1 and P2 (500 ohm is a good value for most applications). Remove resistors R4 and R5 on the back that would be in parallel with the pots and the standard dead-time adjust values.



### 3 High Frequency Buck Example – Thermal Management

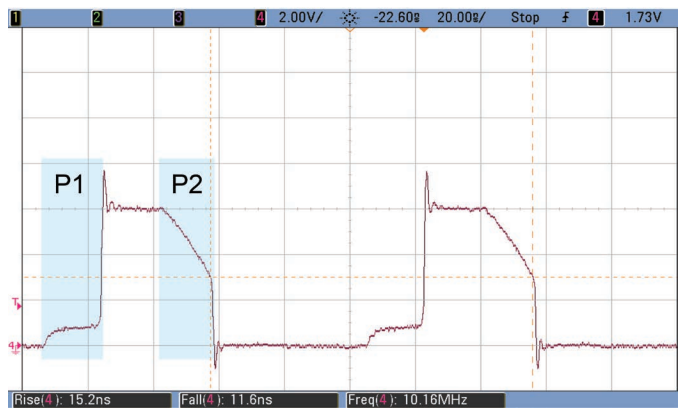
- For this particular board we need double sided cooling to be able to operate at 10 MHz
- We use a U-shaped copper spacer and fill the cavity of it with Sarcon 30X-m
- The cavity has been excavated to about 1mm to avoid placing any direct pressure on the die or capacitors



### 2 High Frequency Buck Example – Adjusting Dead-time

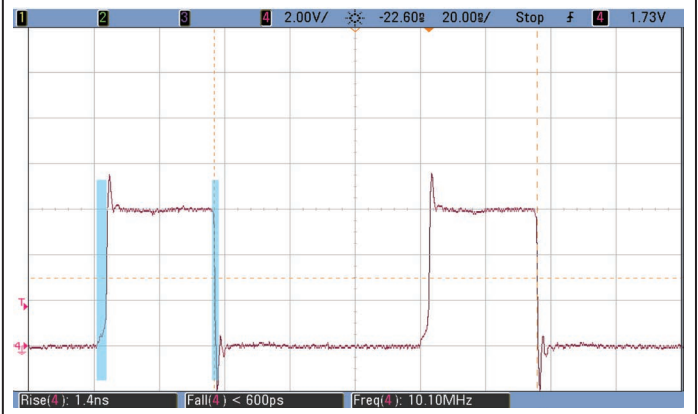
#### Step 1

- Turn on board at low voltage / no load
- Measure switch node to determine dead-time



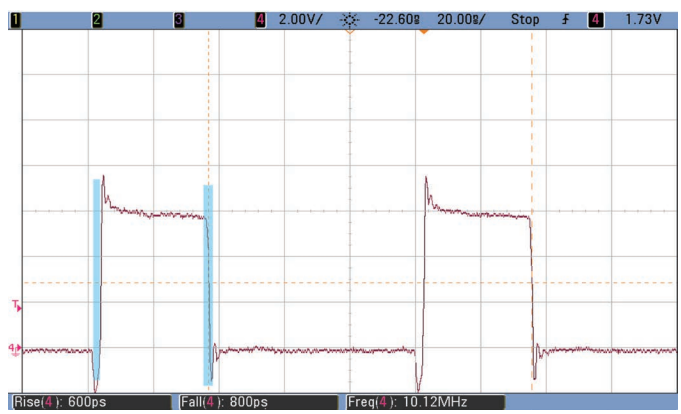
#### Step 2

- Turn pots to reduce dead-time to a few ns
- Increase bus and check no-load operation



#### Step 3

- Return to low bus voltage and add small load
- Adjust pots for minimizing diode conduction



#### Step 4

- Increase bus voltage and load
- Adjust rising / falling edges as needed

