Fakulti:	FAKULTI KEJURUTERAAN ELEKTRIK
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SEE 3742

FAKULTI KEJURUTERAAN ELEKTRIK
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PROBLEM PACK

Buck-boost Converter

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Purpose:

To design and build of a dc-dc buck-boost converter prototype.

Background:

Throughout this PBLab, various activities will be performed relating to design and testing a dc-dc buck converter. In the final portion of this project the various parts of the project are to be put together to complete the design resulting in a working buck-boost converter capable of handling approximately 10 watts of power. The PWM signal required for the MOSFET will be generated by IC PWM controller SG3524. Because of the buck-boost converter contains a high side MOSFET, the high side driver such as IR2117 has to be used.

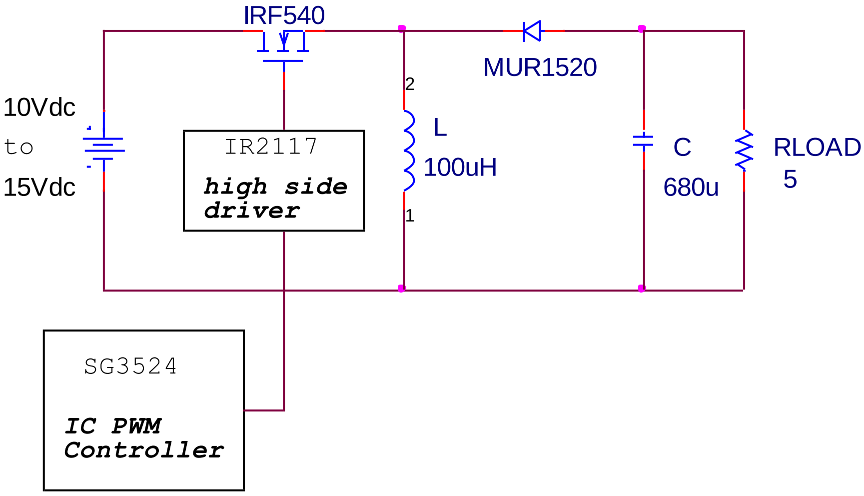

Figure 1: A buck-boost converter driven by SG3524 through IR2117

You will design a dc-dc buck-boost converter which has specifications as follows:

- Operating in CCM
- Input voltage Vin = 12 V nominal, 10V min, 15 V max..
- Output voltage Vout = -5Vdc.
- Output current capability from 1.0 A nominal, 2 A maximum, 0.5A minimum.
- Converter Vout ripple = 100 mV maximum.
- Converter inductor current ripples = 1A peak-to-peak maximum

As the other circuit parameters were fixed, you have to choose the switching frequency to meet the above specifications.

Project Tasks:

The overall project can be divided into three portions:

(i) To assemble the dc-dc buck converter power stage on a PCB.

(ii) To generate PWM signal using IC PWM controller SG3524 on a proto-board.

(iii) To assemble the dc-dc buck converter prototype.

For further information:

1. Refer to the Student Pack for further information.