Emine buck-boostancı 462 Not-So-High-Efficiency Flyback Converter with Optcoupler Feedback

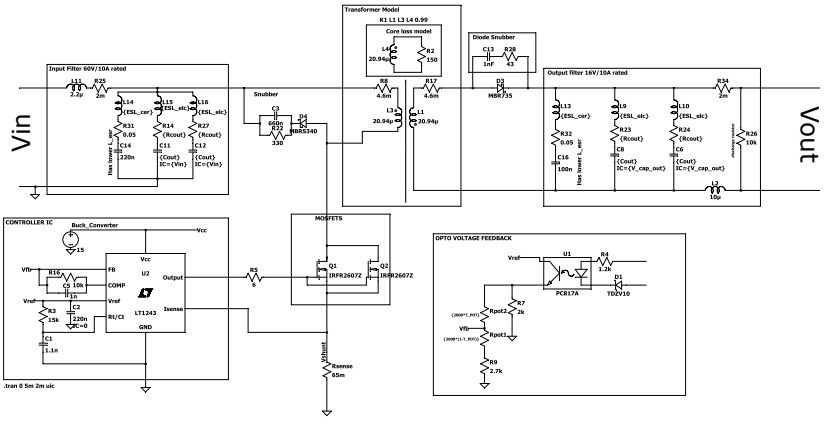
1 Features

- Opto-Coupled Feedback Enables up to 3% Regulation
- 100-kHz Maximum Switching Frequency
- Minimized Core Loss and Magnetic EMI
- No Load Working Capability
- Fault Protections
  - Input Low Line
  - Transformer Fault Protections
  - Protected from User Faults
- Manual Soft Starting Capability
- Control Algorithm for both DCM and CCM Operating Conditions
- Voltage and Current Control
- Two Mosfet Loss Reduction
- Measurement Port
- Output Voltage Setting Capability

2 Applications

- Battery Charger
- PV Converter
- Electronic Load Driver
- DC Motor Driver
- Industrial and Mechanical DC-to-DC Power Supplies

Simplified Schematic



3 Description

Emine BOOStancı Flyback Converter is an output voltage controlled DC/DC converter. It provides Constant-Voltage (CV) using an optical coupler to improve transient response to large-load steps. This device processes information from opto-coupled voltage feedback and from input current to set maximum power. It also enables to set output voltage with a POT.

The controller UC3843 enables to operate at DCM mode at lower loads and operate at CCM at higher loads to increase efficiency. Modulation of switching frequency and primary current-peak amplitude (FM and AM) keeps the conversion efficiency high across the entire load and line ranges. The controller has a maximum switching frequency of 80 kHz and always maintains control of the peak-primary current in the transformer. A minimum switching frequency of 200 Hz facilitates the achievement of low no-load input power.

The magnetic design of the transformer enables it to operate at high power loads without saturating the core compromising the volume. Core losses and copper losses are minimized by operating the core at 100 mT maximum.

A buck converter is used to feed the UC3843 at 15V constant to provide safety. This buck converter also drives a BLDC run fan to cool switching devices.

Device Information	Volume
Emine BOOStancı	2000 cm^3 (20 cm x 10cm x 10cm)

6 Specifications

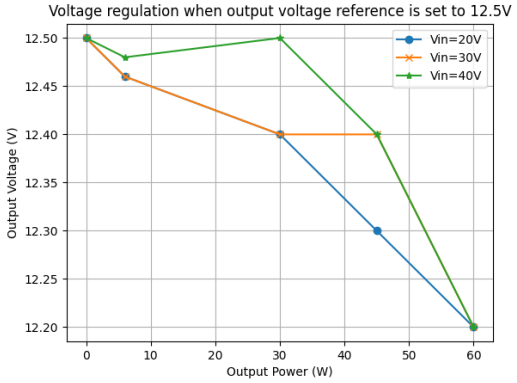
6.1 Absolute Maximum Ratings

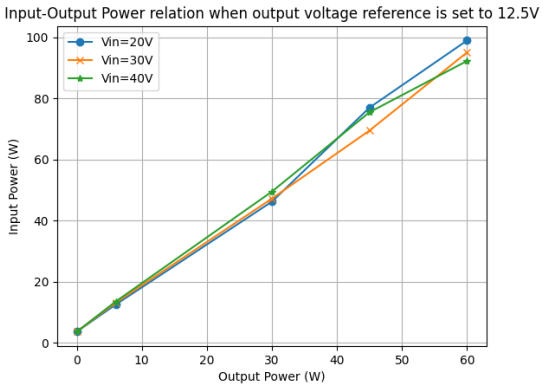
Over operating free-air temperature range (unless otherwise noted) (1)

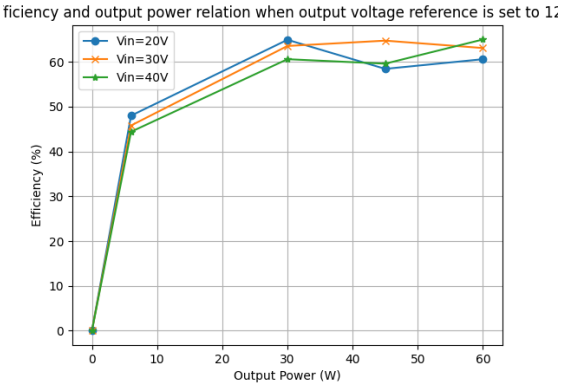
		MIN	TYPICAL	MAX	UNIT
V_{in}	Supply voltage	20		40	V
V_{out}	Output voltage	12.2	12.5	13.0	V
P_{in}	Supply power	0	100	120	W
P_{out}	Output power	0	60	70	W
V_{GS}	Gate-to-source voltage	-20	10	+20	V
I_{FB}	FB, peak current			18.7	A
I_{in}	Supply current	0		5	A
I_{out}	Output current	0		5	A
T_C	Operang case temperature range	-55		120	˚C
L_m	Magnezing inductance		21.9		µH
$L_{leakage}$	Leakage inductance		1		%

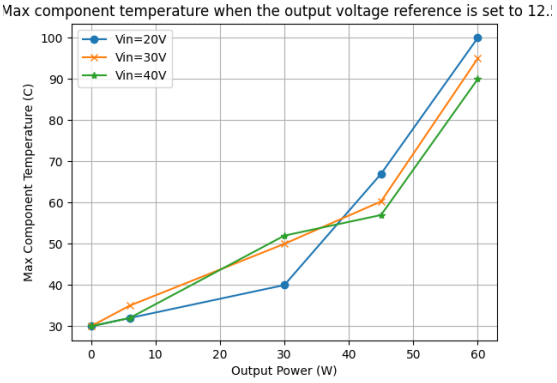
(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

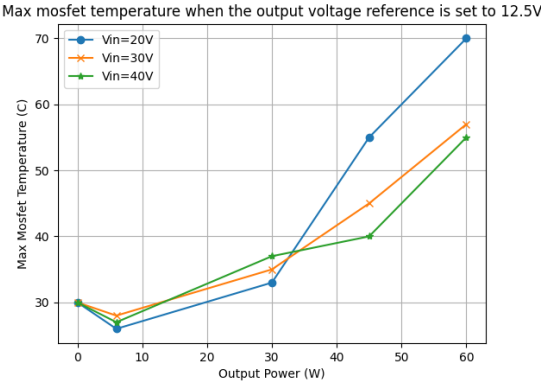
6.6 Typical Characteristics

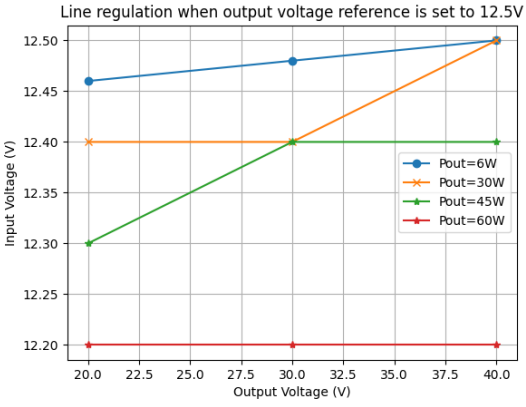












10.2 Layout Example