

LOW QUIESCENT CURRENT, HIGH VOLTAGE STEP-DOWN CONVERTER

DESCRIPTION

Demonstration circuit 1695 is a Low Quiescent Current, Synchronous Buck Converter featuring the LTC3891EFE. DC1695 converts a 4.5V-60V voltage source to 3.3V at 5.0A.

The main features of the board include an internal LDO for power gate driver from VIN or EXTVCC, RUN and PGOOD pins and a Mode selector that allows converter to run in CCM, Pulse Skipping or Burst Mode operation, selectable current limit. DC1695 supports also adjustable output voltage, Soft-Start and Tracking. Synchronization to an external clock is possible as well. The wide input voltage range of 4.5V to 60V is suitable for automotive or other battery fed application and Distributed DC Power Systems where low quiescent current is important.

The LTC3891EFE datasheet gives a complete description of this part, operation and application information. The datasheets must be read in conjunction with this quick start guide for demo circuit 1695.

The 60V avalanche rated MOSFETs, which are used on DC1695, can be operated at their rated voltage. However, if application derating requirements are stricter, MOSFETs with higher voltage

rating can be used. Please note, MOSFETs with higher voltage ratings may affect the efficiency. If 60V MOSFETs are used, keep in mind that avalanche rating and testing is typically done with 30% over voltage margin (78V for 60V rated MOSFET). Please check with particular MOSFET manufacturer to ensure the avalanche voltage rating.

DC1695 supports following MOSFET packages: LPAK, PowerPAK SO-8 and PowerPAK 1212-8. Subsequent logic level MOSFETs can be used with DC1695

Si7850DP	Vishay
RJK0651DPB	Renesas
HAT2266H	Renesas
BSC100N06LS3 G	Infineon
Si7120DN	Vishay

**Design files for this circuit board are available.
Call the LTC factory.**

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PARAMETER	CONDITIONS	VALUE	UNITS
Minimum Input Supply Voltage		4.5	V
Maximum Input Supply Voltage		60	V
Output Voltage Range	VIN = 4.5V to 60V, IOUT1 = 0A to 5A	3.3±2%	V
Typical switching frequency		225	kHz
Typical Output Ripple (VOUT, 3.3V)	I _{LOAD} = 5.0A	40	mV
Efficiency Typical (VOUT, 3.3V)		92	%
Supply Quiescent Current	Vin=24V; VOUT=3.3V, Io=0A, Burst mode	50.8	µA
Supply Shutdown Current	Vin=24V	14.7	µA

QUICK START PROCEDURE

Demonstration circuit 1695 is easy to set up to evaluate the performance of the LTC3891EFE. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

NOTE. When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the VIN or VOUT and GND terminals. See Figure 2 for proper scope probe technique.

1. Place jumper **JP1** in the **ON** position:

2. With power off, connect the input power supply to VIN and GND.
3. Turn on the power at the input. Check for the proper output voltages
 $V_{OUT1} = 3.234V$ to $3.366V$,

NOTE. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

4. Once the proper output voltages are established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

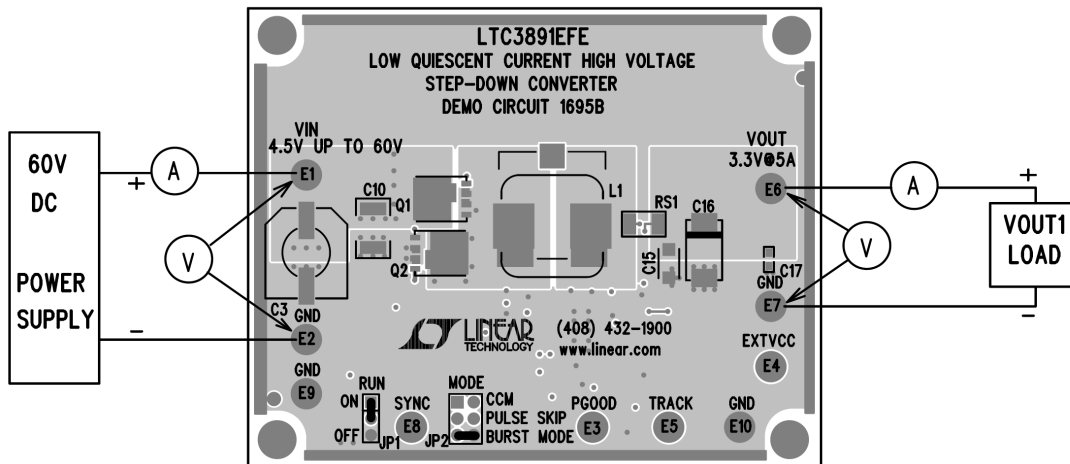
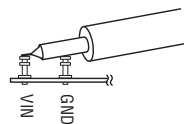


Figure 1. Proper Measurement Equipment Setup



Measuring Input or output Ripple

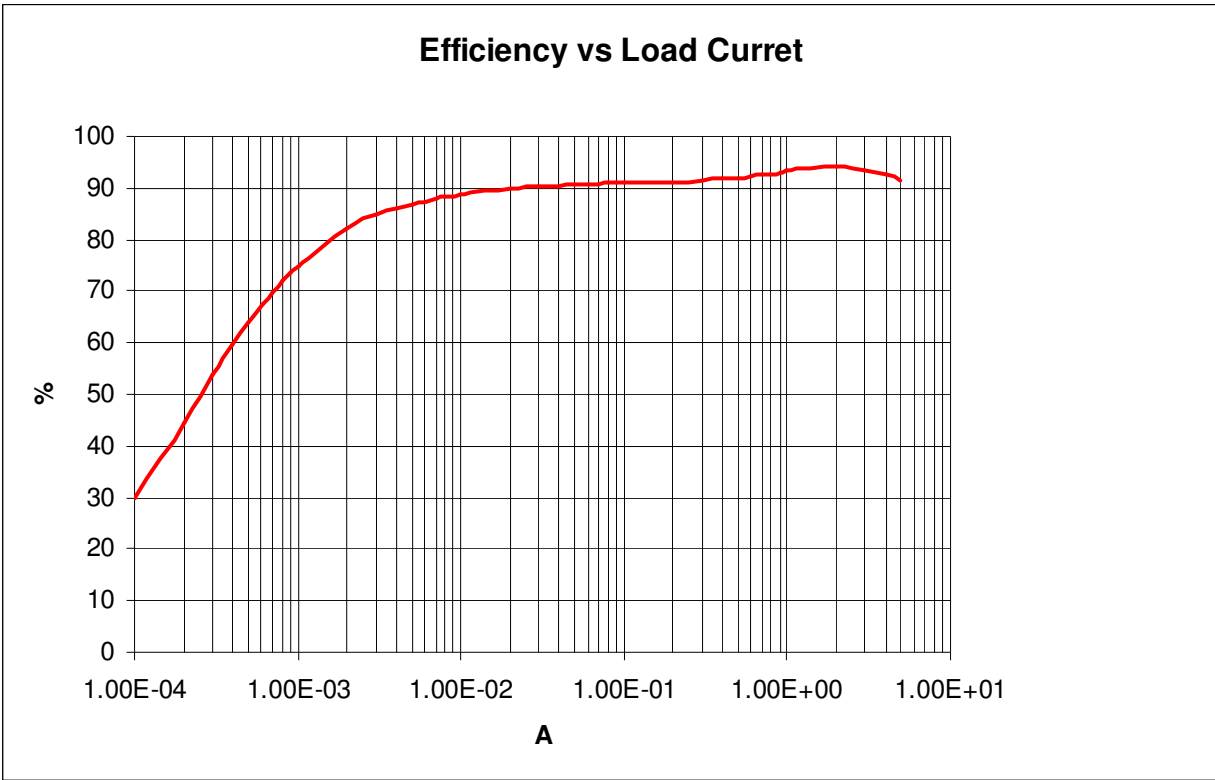
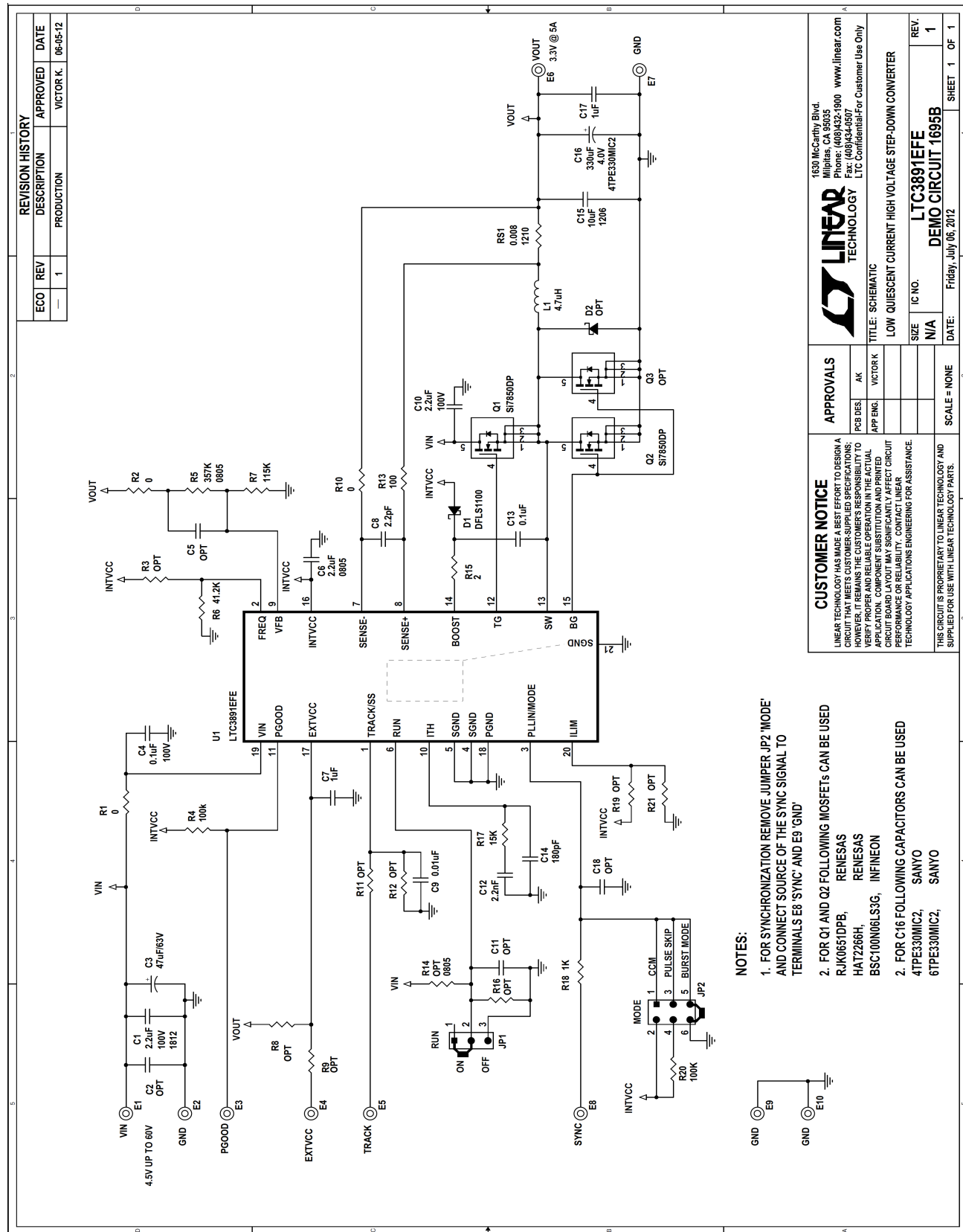


Figure 3. 3.3V Output, Efficiency vs. Load, Burst Mode, Vin 12V



REVISION HISTORY				
ECO	REV	DESCRIPTION	APPROVED	DATE
—	1	PRODUCTION	VICTOR K.	06-05-12

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- NOTES:**
- FOR SYNCHRONIZATION REMOVE JUMPER JP2 'MODE' AND CONNECT SOURCE OF THE SYNC SIGNAL TO TERMINALS E8 'SYNC' AND E9 'GND'
 - FOR Q1 AND Q2 FOLLOWING MOSFETS CAN BE USED
 RJK0651DPB, RENESAS
 HAT2266H, RENESAS
 BSC100N06LS3G, INFINEON
 4TPE330MIC2, SANYO
 6TPE330MIC2, SANYO

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