

LTM4627EV

15A Step-Down μ Module Regulator

DESCRIPTION

Demonstration circuit 1669 features the LTM[®]4627EV μ Module regulator, a high-performance high efficiency step-down regulator. The LTM4627EV has an operating input voltage range of 4.5V to 20V and is able to provide an output current of up to 15A. The output voltage is programmable from 0.6V to 5V and can be remotely sensed with the internal optional differential remote sensing amplifier. The LTM4627EV is a complete DC-DC point of load regulator in a thermally enhanced 15mm x 15mm x 4.32mm LGA package requiring only a few input and output capacitors. This regulator is internally compensated and employs constant frequency current

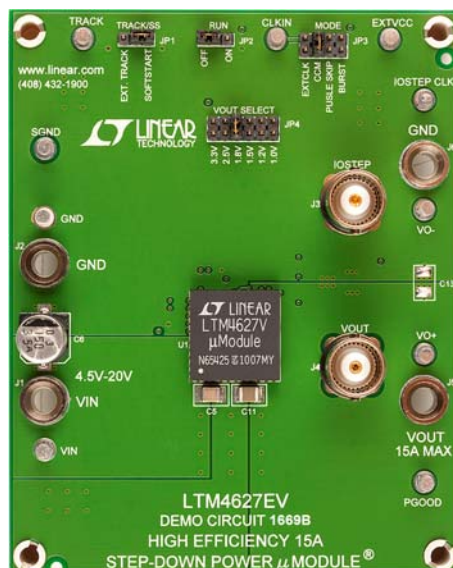
mode architecture, enabling a fast transient response and stable control loop over a wide range of output capacitance. It supports frequency synchronization and Burst Mode[®] operation for increased light load efficiency. Output voltage tracking is also available through the TRACK/SS pin for supply rail sequencing. The LTM4627 datasheet must be read in conjunction with this demo manual for working on or modifying demo circuit 1669.

Design files for this circuit board are available at <http://www.linear.com/demo>

Table 1. Performance Summary

PARAMETER	CONDITIONS / NOTES	VALUE
Input Voltage Range		4.5V - 20V
Output Voltage V_{OUT}	jumper selectable	1.0V _{DC} , 1.2V _{DC} , 1.5V _{DC} , 2.5V _{DC} , 1.8V _{DC} , 3.3V _{DC}
Maximum Continuous Output Current	De-rating is necessary for certain operating conditions. See datasheet for details	15A _{DC}
Default Operating Frequency		500kHz
External Clock Sync. frequency range		250kHz – 770kHz
Efficiency	$V_{IN} = 12V$, $V_{OUT} = 1.8V$, $I_{OUT} = 15A$	86.6% See Figure 2

DEMO BOARD PHOTO



QUICK START PROCEDURE

Demonstration circuit 1669 is easy to set up to evaluate the performance of the LTM4627EV. Please refer to Figure 1 for test setup connections and follow the procedure below.

1. With power off, place the jumpers in the following positions for a typical $1.8V_{out}$ application:

<i>JP1</i>	<i>JP2</i>	<i>JP3</i>	<i>JP4</i>
TRACK/SS	RUN	MODE	V_{OUT} Select
SOFTSTART	ON	CCM	1.8V

2. Before connecting input supply, load and meters, pre-set the input voltage supply to be less than 20V. Pre-set the load current to 0A.
3. With power off, connect the load, input voltage supply and meters as shown in Figure 1.
4. Turn on input power supply. The output voltage meter should display the selected output voltage $\pm 2\%$.
5. Once the proper output voltage is established, adjust the load current within the 0-15A range and observe the load regulation, efficiency, and other parameters. Output voltage ripple should be measured at J4 with a BNC cable and oscilloscope.
6. To observe increased light load efficiency place the Mode pin jumper (JP3) in the Burst Mode position. To observe increased light load efficiency with a reduced output ripple as compared to Burst Mode[®] place the Mode pin jumper in the Pulse skip position.
7. For optional load transient testing apply an adjustable positive pulse signal between IOSTEP CLK and GND pins. The pulse amplitude sets the load step current amplitude. The pulse width should be short ($< 1\mu s$) and pulse duty cycle should be low ($< 15\%$) to limit the thermal stress on the load transient circuit. The load step current can be monitored with a BNC connected to J3 (15mV/A).

Note:

To set the output voltage to 5V turn off the input supply power, apply the following changes listed below.

<i>R7</i>	<i>R6</i>	<i>R12</i>	<i>JP4</i>
Remove	0 ohm	8.25k (1%)	1V

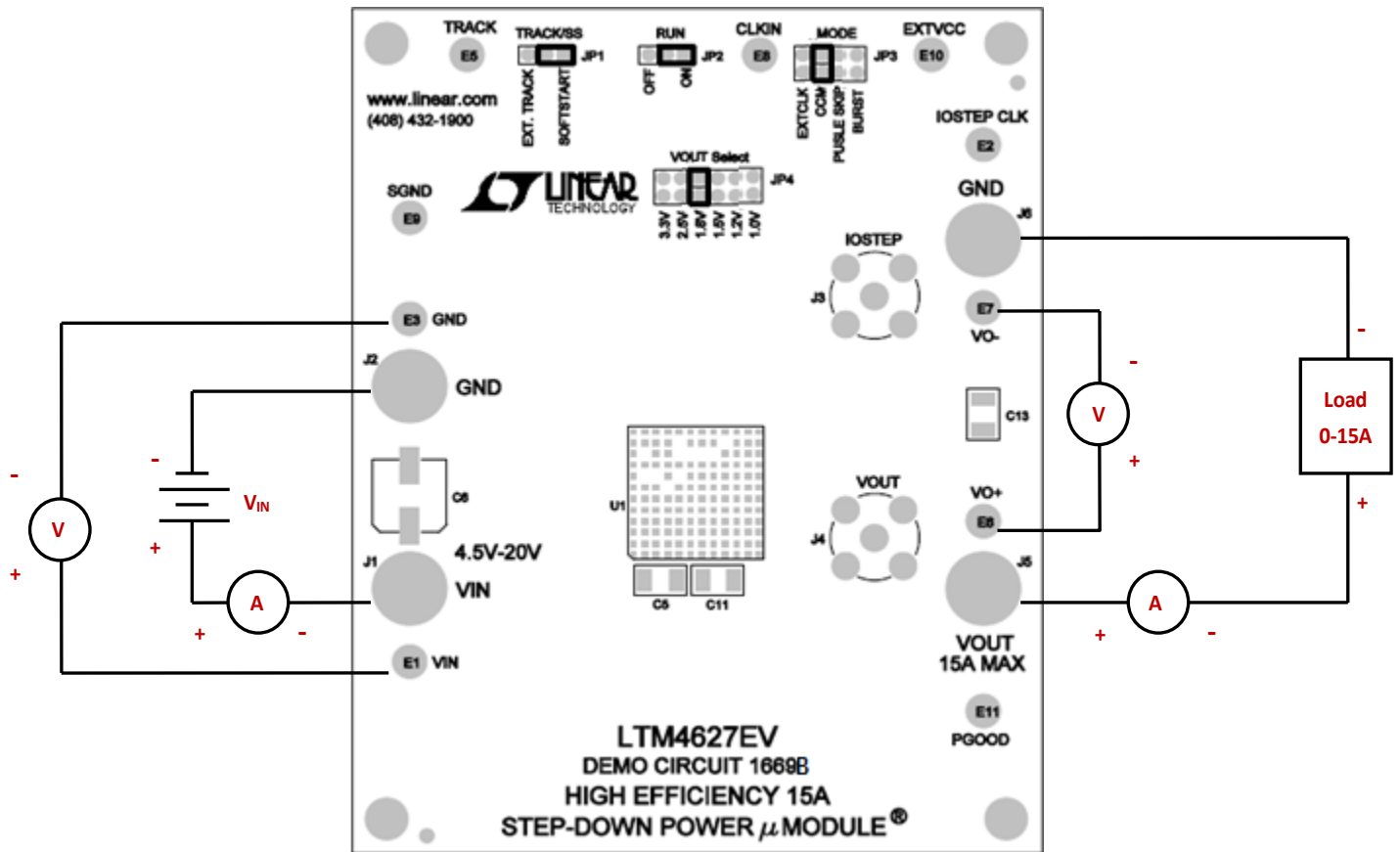


Figure 1. Test Setup of DC1669

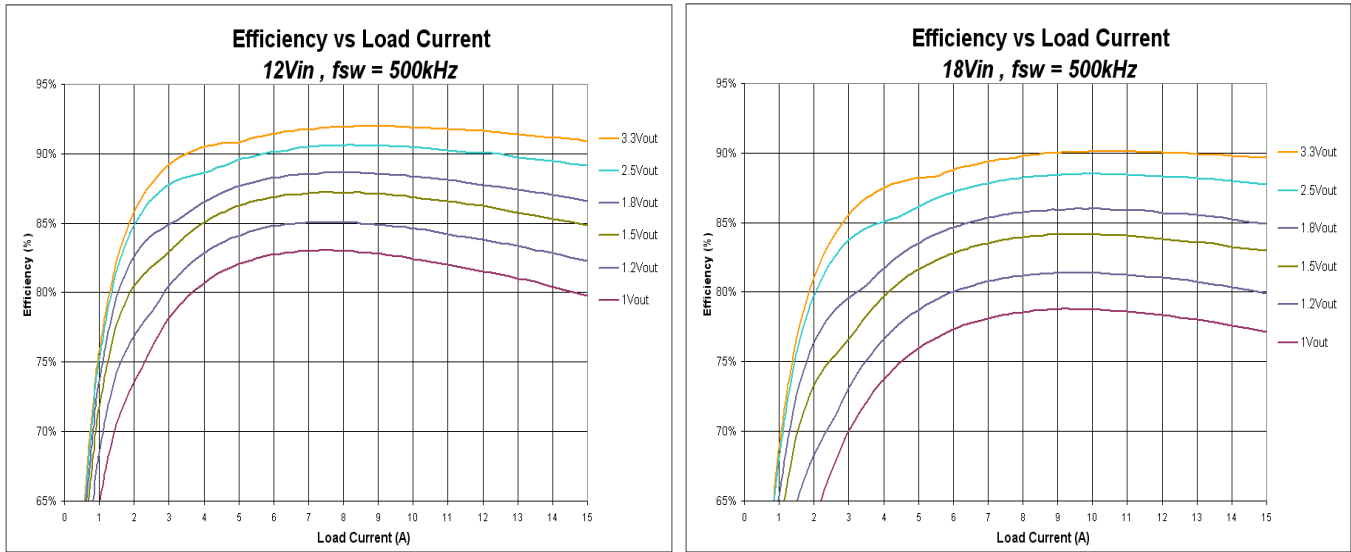
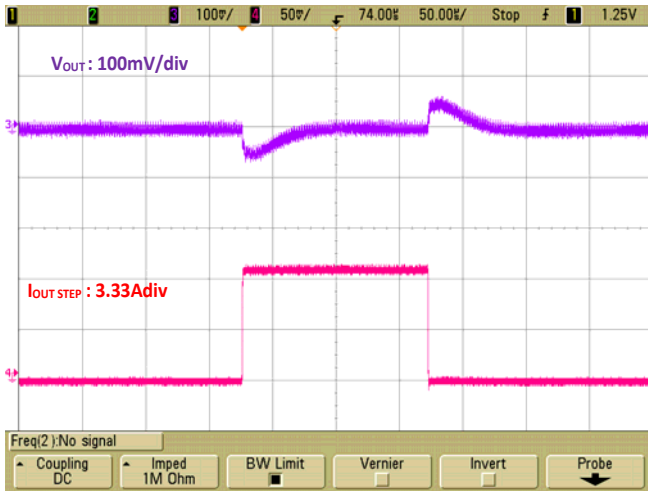
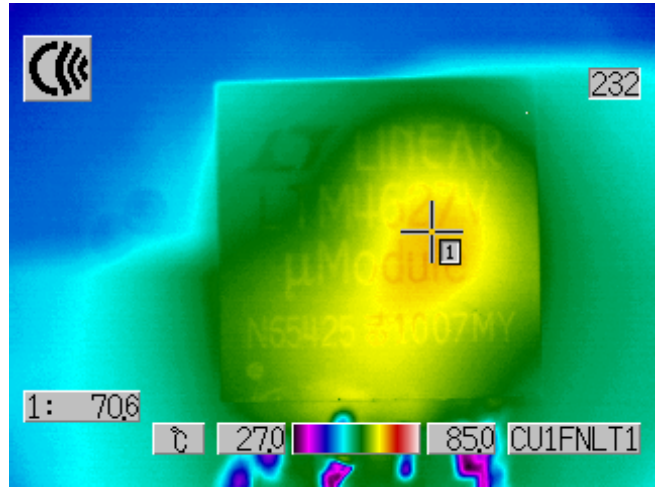


Figure 2. Measured Supply Efficiency at 12Vin & 18Vin



V _{in} (V)	V _{out} (V)	C _{out} Bulk	C _{out} Ceramic	Other
12	1.8	330uF / 6.3V POSCAP	2x100uF 6.3V	C10 = 47pF C19 = 330pF

Figure 3. Measured load transient response (7.5A-15A load step)



V _{in} (V)	V _{out} (V)	I _{out} (A)	Airflow	Ambient (°C)
12	1.8	15	Natural Convection	27

Figure 4. Measured thermal capture

