DEMO CIRCUIT 1471
QUICK START GUIDE

LT3990

62V, 350mA Step-Down Regulator with 2.5µA Quiescent Current and Integrated Diodes

DESCRIPTION

Demonstration circuit 1471 is a monolithic step-down DC/DC switching regulator featuring the LT3990. The switching frequency is adjustable up to 2.2MHz. The demo circuit is designed for 5V, 350mA output from a 6.5V to 62V input. The wide input range of the LT3990 allows a variety of input sources including automotive batteries and 24V industrial supplies. Low ripple Burst Mode increases the efficiency at the light load while keeping the output ripple below 5mV in a typical application. The part is in shutdown when the EN pin is low and active when the pin is high. The threshold of the EN pin is accurate at 1V when Vin is above 4.2V. Adding a resistor divider from Vin to EN can program the LT3990 to regulate the output only when Vin is above a desired voltage.

The catch diode and boost diode are integrated to reduce the components count and solution size. The circuit consumes only 2.5µA of quiescent current. The current mode control scheme creates fast transient response and good loop stability. The catch diode current is limited to protect the part under short circuit and overvoltage conditions.

The LT3990 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 1471.

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

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Performance Summary (T_A = 25°C)

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		6.5V
Maximum Input Voltage		62V
Output Voltage V_{OUT}		5.04V ±3%
Typical switching Frequency		400kHz
Maximum Output Current		350mA
Typical efficiency	V_{IN}=12V, I_{out}=350mA	83.27%
Typical output voltage Ripple	V_{IN}=12V, I_{out}=350mA	15mV

QUICK START PROCEDURE

Demonstration circuit 1471 is easy to set up to evaluate the performance of the LT3990. 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 JP1 on the ON position.
2. With power off, connect the input power supply to Vin and GND.
3. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed 62V.

4. Check for the proper output voltage.

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

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

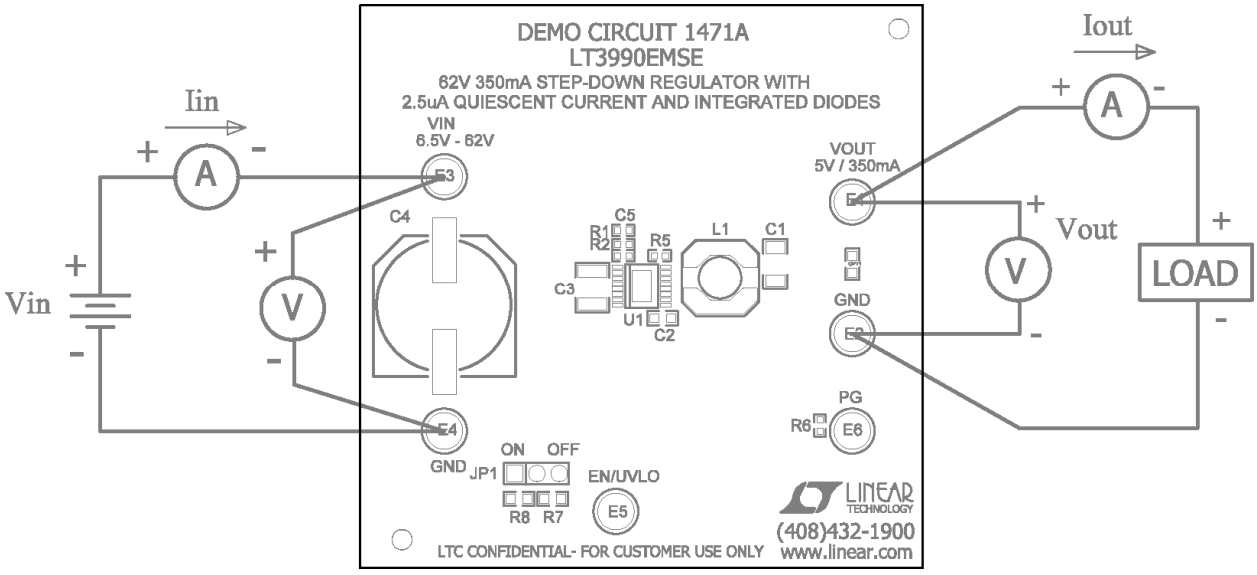


Figure 1. Proper Measurement Equipment Setup

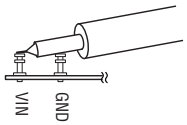
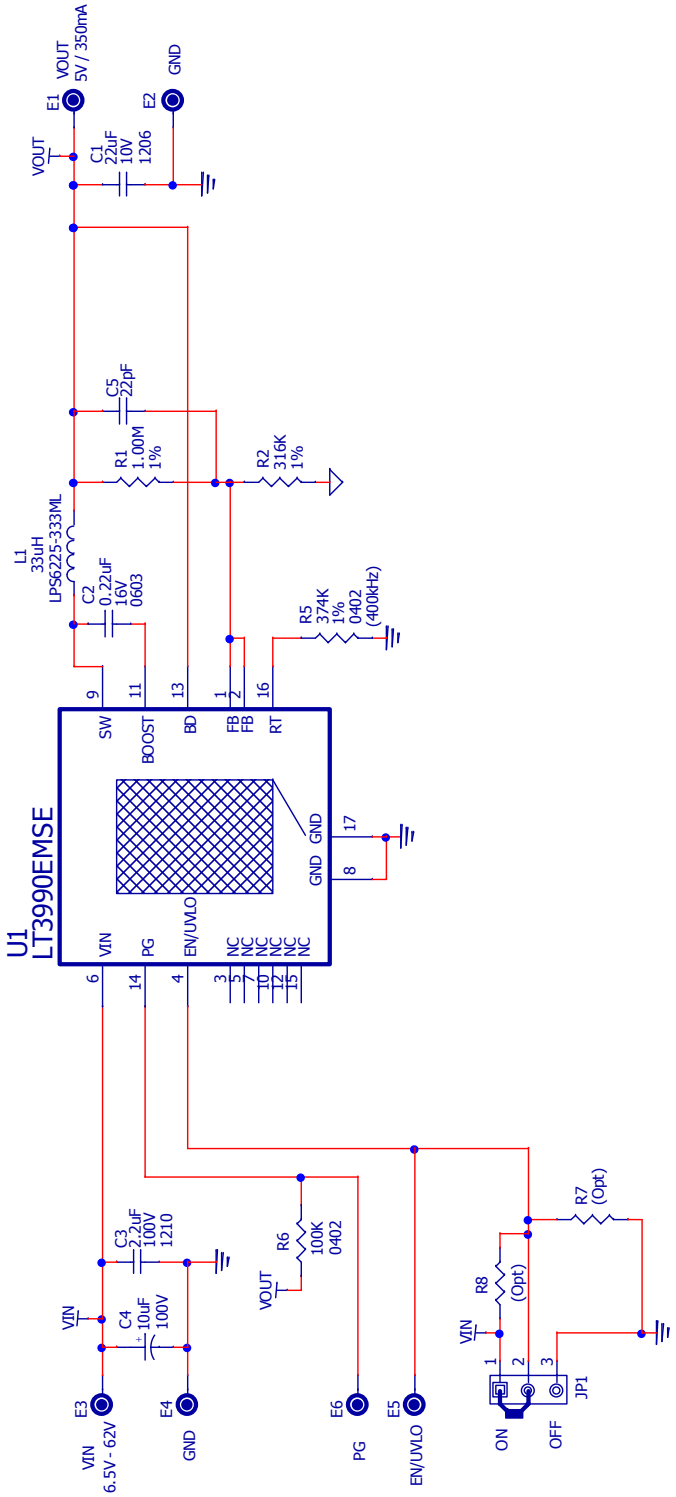


Figure 2. Measuring Input or Output Ripple


E1
VOUT
5V / 350mA
E2
GND
VOUT
C1
22uF
10V
1206
C5
22pF
R1
1.00M
1%
R2
316K
1%
L1
33uH
LPS6225-333ML
C2
0.22uF
16V
0603
R5
374K
1%
0402
(400kHz)
U1
LT3990EMSE
SW
BOOST
BD
FB
FB
RT
GND
GND
VIN
PG
EN/UVLO
NC
NC
NC
NC
NC
C3
2.2uF
100V
1210
C4
10uF
100V
R6
100K
0402
R7
(Opt)
R8
(Opt)
JP1
ON
OFF
E3
VIN
6.5V - 62V
E4
GND
E6
PG
E5
EN/UVLO