DEMO CIRCUIT 1526
QUICK START GUIDE

LT3991
55V, 1.2A, MicroPower Buck Regulator

DESCRIPTION

Demonstration circuit 1526 is a monolithic step-down DC/DC switching regulator featuring the LT®3991. The switching frequency is adjustable up to 2MHz. The demo circuit is designed for 3.3V, 1.2A output from a 4.5V to 55V input. The wide input range of the LT3991 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 15mV. 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 1.01V with 30mV of hysteresis. When Vin is above 6V, adding a resistor divider from Vin to EN can program the LT3991 to regulate the output only when Vin is above a desired voltage.

The circuit consumes only 2.8µA of quiescent current. The boost diode, control and logic circuit are integrated to reduce the components count and solution size. The current mode control scheme creates fast transient response and good loop stability.

The LT3991 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 1526.

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		4.5V
Maximum Input Voltage		55V
Output Voltage V_{OUT}		3.307±2.5%
Typical switching Frequency		400kHz
Maximum Output Current		1.2A
Typical efficiency	V_{IN}=24V, I_{out}=1.2A	79.4%
Typical output voltage Ripple	V_{IN}=24V, I_{out}=1.2A	20mV

QUICK START PROCEDURE

Demonstration circuit 1526 is easy to set up to evaluate the performance of the LT3991. 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 55V.

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.

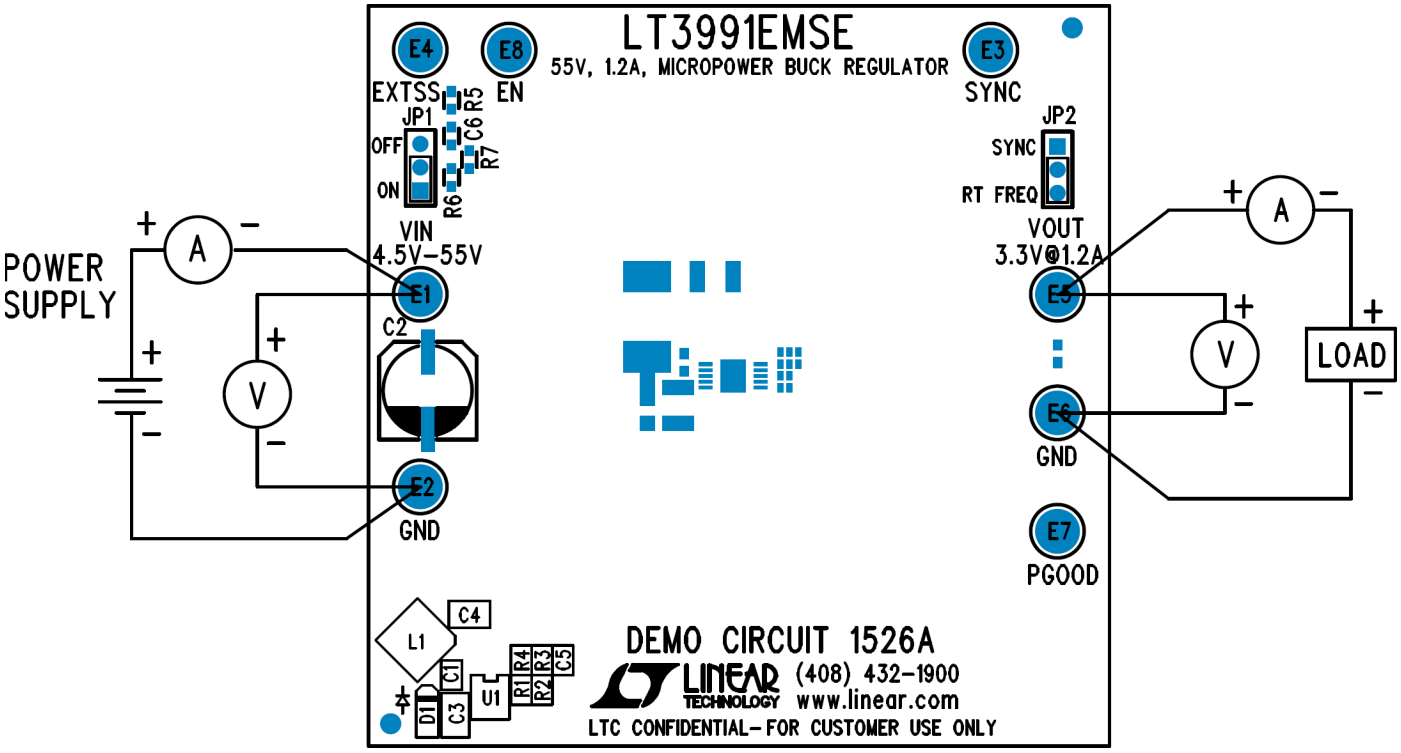


Figure 1. Proper Measurement Equipment Setup

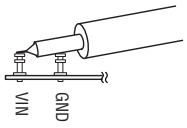
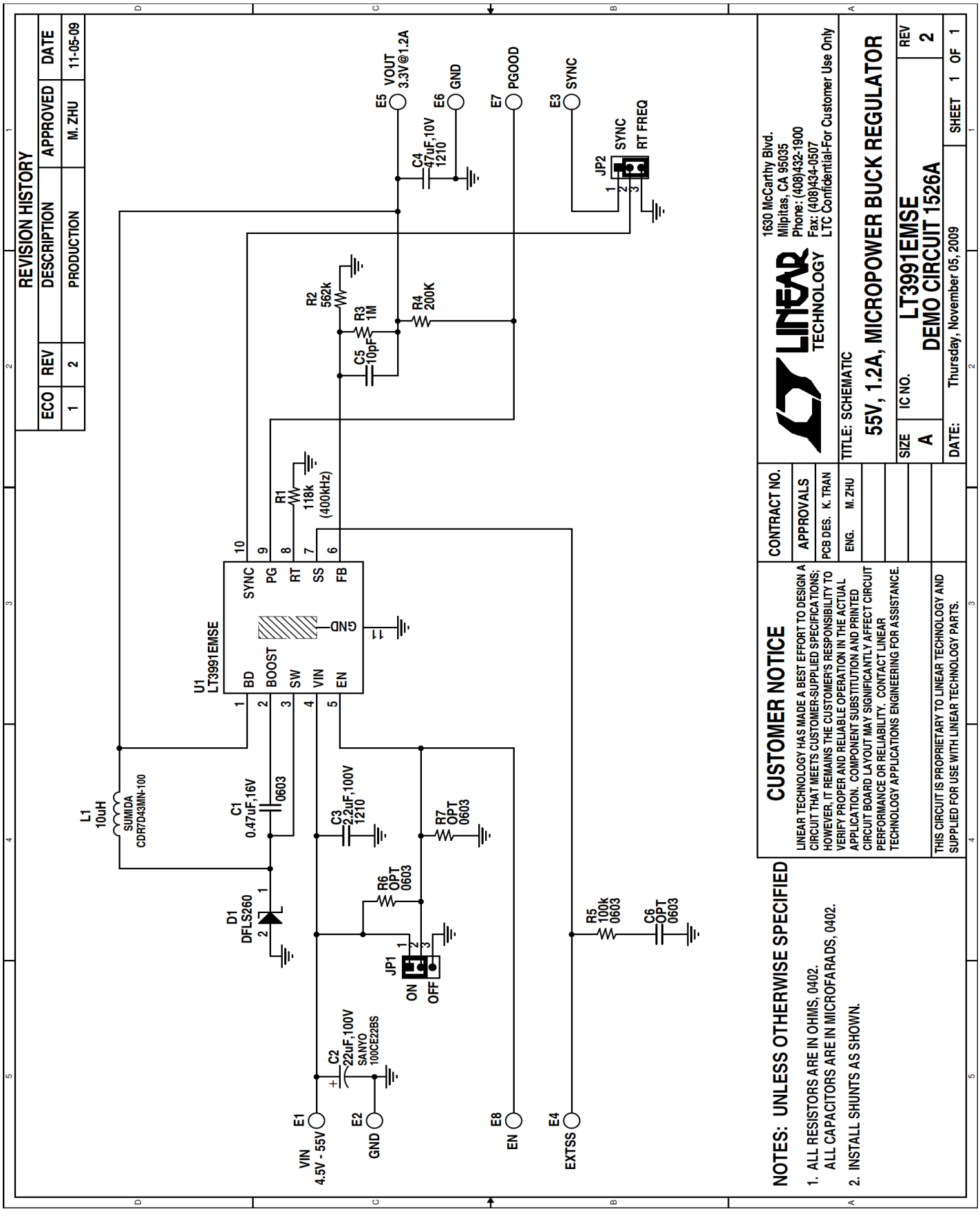


Figure 2. Measuring Input or Output Ripple


REVISION HISTORY
ECO REV DESCRIPTION APPROVED DATE
1 2 PRODUCTION M. ZHU 11-05-09
U1 LT3991EMSE
BD BOOST SW VIN EN GND SYNC PG RT SS FB
L1 10uH SUMIDA CDR7D43MN-100
C1 0.47uF,16V 0603
C2 22uF,100V SANYO 100CE22BS
C3 2.2uF,100V 1210
C4 47uF,10V 1210
C5 10pF
C6 OPT 0603
D1 DFLS260
JP1 ON OFF
JP2 SYNC RT FREQ
R1 118k (400kHz)
R2 562k
R3 1M
R4 200K
R5 100k 0603
R6 OPT 0603
R7 OPT 0603
E1 VIN 4.5V - 55V
E2 GND
E3 SYNC
E4 EXTSS
E5 VOUT 3.3V@1.2A
E6 GND
E7 PGOOD
E8 EN
NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE IN OHMS, 0402.
ALL CAPACITORS ARE IN MICROFARADS, 0402.
2. INSTALL SHUNTS AS SHOWN.
CUSTOMER NOTICE
LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.
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LTC Confidential-For Customer Use Only
TITLE: SCHEMATIC
55V, 1.2A, MICROPOWER BUCK REGULATOR
SIZE A
IC NO. LT3991EMSE
DEMO CIRCUIT 1526A
REV 2
DATE: Thursday, November 05, 2009
SHEET 1 OF 1