DESCRIPTION

Demonstration circuit 1527 is a monolithic step-down DC/DC switching regulator featuring the LT3971. The switching frequency is adjustable up to 2MHz. The demo circuit is designed for 3.3V, 1.2A output from a 4.5V to 38V input. The wide input range of the LT3971 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 1V with 30mV of hysteresis. When Vin is above 6V, adding a resistor divider from Vin to EN can program the LT3971 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 LT3971 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 1527.

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		38V
Output Voltage V$_{OUT}$		3.307±2.5%
Typical switching Frequency		800kHz
Maximum Output Current		1.2A
Typical efficiency	V$_{IN}$=12V, I$_{out}$=1.2A	82.43%
Typical output voltage Ripple	V$_{IN}$=12V, I$_{out}$=1.2A	10mV

QUICK START PROCEDURE

Demonstration circuit 1527 is easy to set up to evaluate the performance of the LT3971. 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. Place JP2 on the RT FREQ position.
3. With power off, connect the input power supply to Vin and GND.
4. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed 38V.

5. 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.

6. 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.
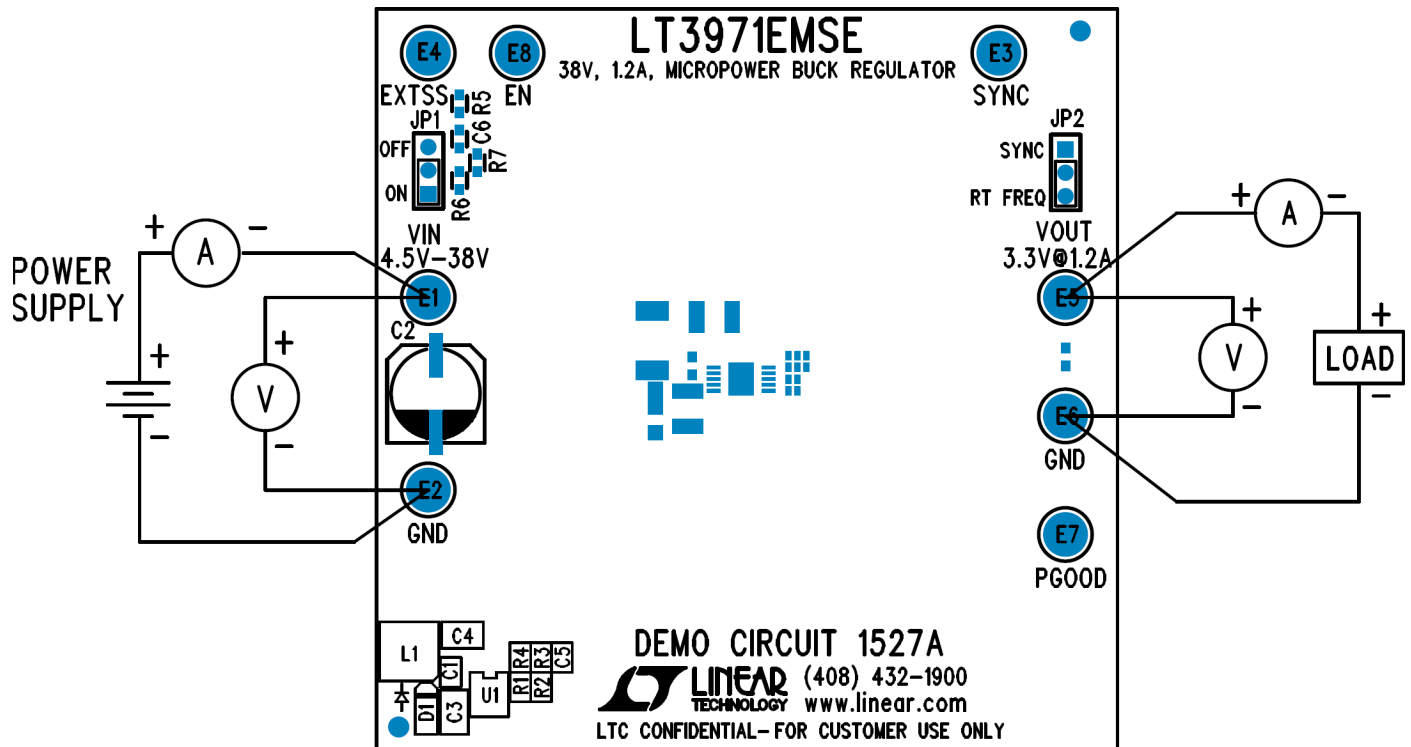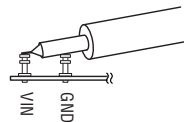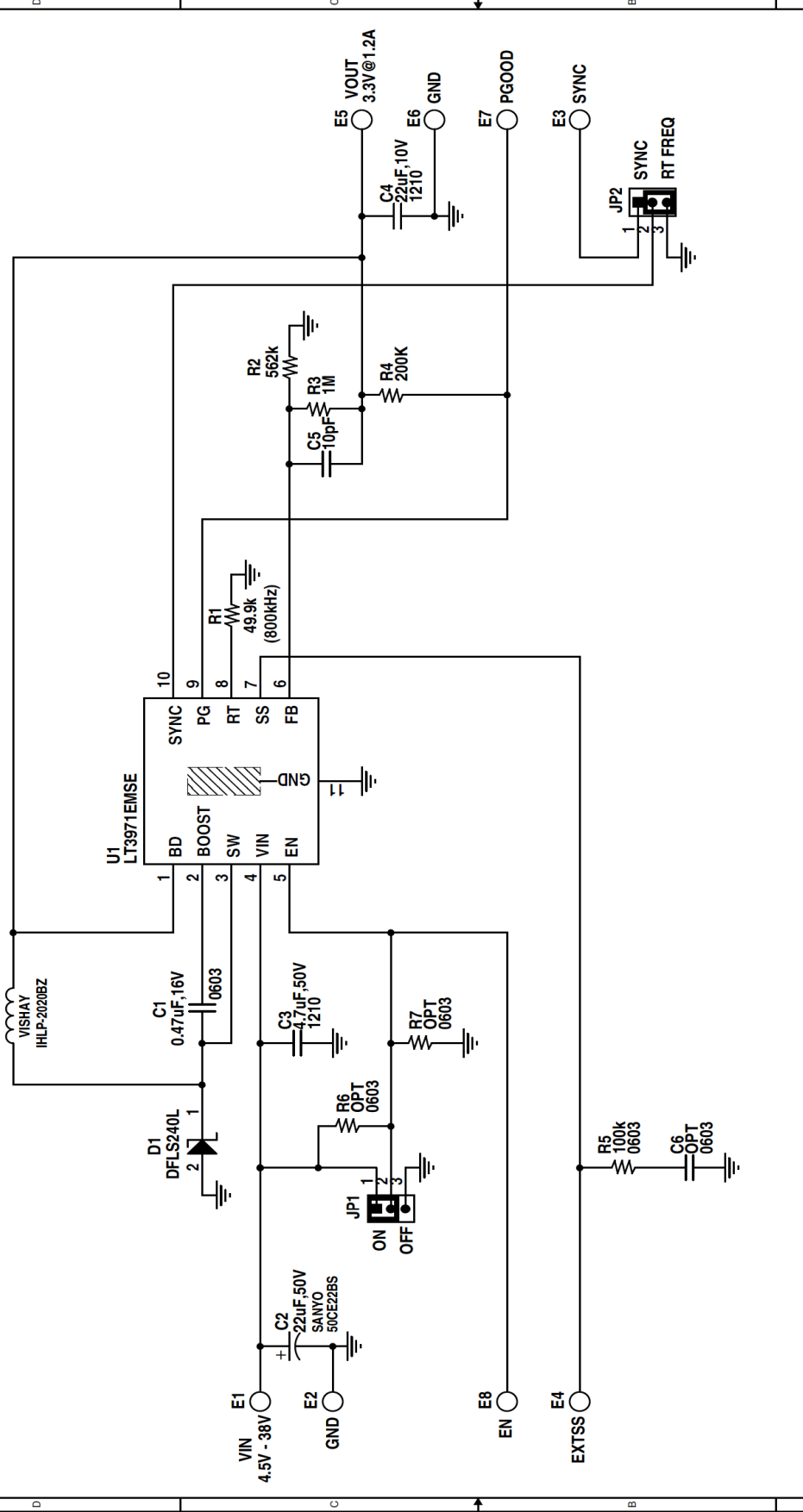

Figure 1. Proper Measurement Equipment Setup

Figure 2. Measuring Input or Output Ripple

LINEAR TECHNOLOGY

REVISION HISTORY

ECO	REV	DESCRIPTION	APPROVED	DATE
1	1	PRODUCTION	M. ZHU	10-15-09

U1
LT3971EMSE

BD 1
BOOST 2
SW 3
VIN 4
EN 5

SYNC 10
PG 9
RT 8
SS 7
FB 6

GND 11

L1
4.7uH
VISHAY
IHLP-2020BZ

C1
0.47uF,16V
0603

D1
DFLS240L

C3
4.7uF,50V
1210

R6
OPT
0603

R7
OPT
0603

JP1
ON
OFF

C2
22uF,50V
SANYO
50CE22BS

R5
100k
0603

C6
OPT
0603

R1
49.9k
(800kHz)

R2
562k

R3
1M

C5
10pF

R4
200K

C4
22uF,10V
1210

JP2
SYNC
RT FREQ

E1 VIN
4.5V - 38V

E2 GND

E8 EN

E4 EXTSS

E5 VOUT
3.3V@1.2A

E6 GND

E7 PGOOD

E3 SYNC

CONTRACT NO.

APPROVALS
PCB DES. K. TRAN
ENG. M. ZHU

TITLE: SCHEMATIC

38V, 1.2A, MICROPOWER BUCK REGULATOR

LT3971EMSE
DEMO CIRCUIT 1527A

IC NO.

SIZE A

DATE: Thursday, October 15, 2009

REV 1

SHEET 1 OF 1

CUSTOMER NOTICE

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, 0402.
   ALL CAPACITORS ARE IN MICROFARADS, 0402.

2. INSTALL SHUNTS AS SHOWN.

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