DEMO CIRCUIT 1149
QUICK START GUIDE

LT3680EMSE
3.5A,36V Step-down Switching Regulator with SYNC Function

DESCRIPTION

Demonstration circuit 1149 is a monolithic step-down DC/DC switching regulator featuring LT3680. The LT3680 can be synchronized over a 250 KHz to 2 MHz range. The demo board is designed for 5V output from a 6.3V to 36V input. The wide input range of the LT3680 allows a variety of input sources. The typical sources are automotive batteries, wall adaptors and industrial supplies. The modes of operation (Burst Mode or synchronization) are jumper selectable. The Burst Mode operation increases the efficiency at light loads.

The current mode control scheme creates fast transient response and good loop stability. The gate drive of the internal switch is boosted to a voltage that is higher than the Vin to ensure saturation of the switch. The LT3680's integrated boost diode reduces the parts count. The RUN/SS pin can be used to set the part in micropower shutdown mode, reducing the supply current to less than 1uA. The RUN/SS pin can also be used to program soft start. In this mode, the RUN/SS pin is driven through an external RC filter to create a voltage ramp on this pin. The soft start function reduces the input current surge during start-up.

The LT3680 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 1149.

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

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Performance Summary for Step-down Switching Regulator (T_A = 25°C)

PARAMETER FOR BUCK REGULATOR	CONDITION	VALUE
Minimum Input Voltage		6.3V
Maximum Input Voltage		36V
Output Voltage V_{OUT}		5V +/- 5%
Maximum Output Current		3.5A
Typical Switching Frequency		600kHz

QUICK START PROCEDURE

Demonstration circuit 1149 is easy to set up to evaluate the performance of the LT3680. 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 RUN position.

2. With power off, connect the input power supply to Vin and GND.

3. Turn on the power at the input.

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.

6. An external clock can be added to the SYNC pin when SYNC function is used. See synchronization section in the datasheet for details.

Figure 1. Proper Measurement Equipment Setup

Figure 2. Measuring Input or Output Ripple

VIN
6.3V - 36V
E1
GND
E8
GND
E2
C2
22UF,50V
SANYO
50CE22BS
JP1
RUN
SHDN
EXTSS
E4
EXTSS
D1
MBRA340T3
SUMIDA
CDRH8D43-6R8
L1
6.8UH
C1
0.47UF
C3
4.7UF,50V
1210
U1
LT3680EMSE
BD
BOOST
SW
VIN
RUN/SS
RT
VC
FB
PGOOD
SYNC
GND
R6
100K
C7
0.22UF,50V
0805
R1
63.4K
R2
110K
R3
590K
R4
100K
R5
15K
C6
1000PF
C8
100PF
JP2
BURST MODE
SYNC ON
E5
VOUT
5V@3.5A
C5
0.1UF
50V
0603
E6
GND
C4
47UF,10V
1206
E7
PGOOD
E3
GND
E9
SYNC
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LTC Confidential-For Customer Use Only
TITLE: SCHEMATIC
3.5A, 36V STEP-DOWN SWITCHING REGULATOR
WITH SYNC FUNCTION
SIZE A
DWG NO. DC1149A * LT3680EMSE
REV A
DATE: Thursday, August 09, 2007
SHEET 1 OF 1
NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE IN OHMS, 0402.
ALL CAPACITORS ARE IN MICROFARADS, 0402.
2. INSTALL SHUNT ON JP1 AND JP2 PINS 1&2.

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