DEMO CIRCUIT 1312
QUICK START GUIDE

LT3689

Monolithic 700mA Step-Down Regulator with Power-On Reset and Watchdog Timer

DESCRIPTION

Demonstration circuit 1312 is a Monolithic 700mA Step-Down Regulator with Power-On Reset and Watchdog Timer featuring the LT3689. The board operates from inputs up to 36V and withstands transients up to 60V. Output is 3.3V, 700mA. When output current is low, the circuit operates in Burst Mode. Users can popular R7 on the EN/UVLO pin to provide a programmable under voltage lockout. Fault protections are provided through power switch current limit, switching frequency fold back and thermal shutdown, etc.

The power-on reset and watchdog timer periods are independently adjustable using external capacitors. Tight accuracy specifications and glitch immunity ensure reliable operation of the circuit. Window mode or time out mode is selectable through JP1. Watchdog can be enabled or disabled by JP2. Circuit can be synchronized to an external clock connected to SYNC turret. If SYNC function is used, the Rt resistor should be chosen to set the LT3689 internal switching frequency at least 20% below the lowest synchronization input frequency.

The LT3689 datasheet gives complete descriptions of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for working on or modifying the demo circuit 1327.

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

PERFORMANCE SUMMARY

Specifications are at TA = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range	V_{OUT}=3.3V	4.5		36	V
V_{OUT}	Output Voltage Range		3.2	3.3	3.4	V
I_{OUT}	Output Current		0		700	mA
I_Q	No Load Quiescent Current	No load		77		uA
EFF	Efficiency	V_{IN} = 12V, I_{OUT} = 700mA		82		%
T_{WDU}	Watchdog Upper Boundary Period	C3=10nF		182		ms
T_{WDL}	Watchdog Lower Boundary Period	C3=10nF		5.88		ms
T_{RST}	Programmed Reset Period	C4=10nF		23		ms

QUICK START PROCEDURE

Demonstration circuit 1312 is easy to set up to evaluate the performance of the LT3689. Refer to 0 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 terminals of the input or output capacitors. See Figure 2 for proper scope probe technique.

1. Place jumpers in the following positions:

   JP1 T or W (bar)

   JP2 ON or OFF (When OFF, watchdog disabled)

2. With power off, connect the input power supply to VIN and GND.
3. With power off, connect the load to VOUT and GND.
4. Turn on the power at the input.

   NOTE. Make sure that the input voltage does not exceed 36V.

5. Check for the proper output voltages. VOUT=3.3V

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

6. Once the proper output voltage is established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.
7. To test watchdog timer, connect a clock input to the WDI terminal. Observe output at the WDO terminal while the clock parameters are adjusted.
8. To test Power-On reset, observe output at the RESET terminals.

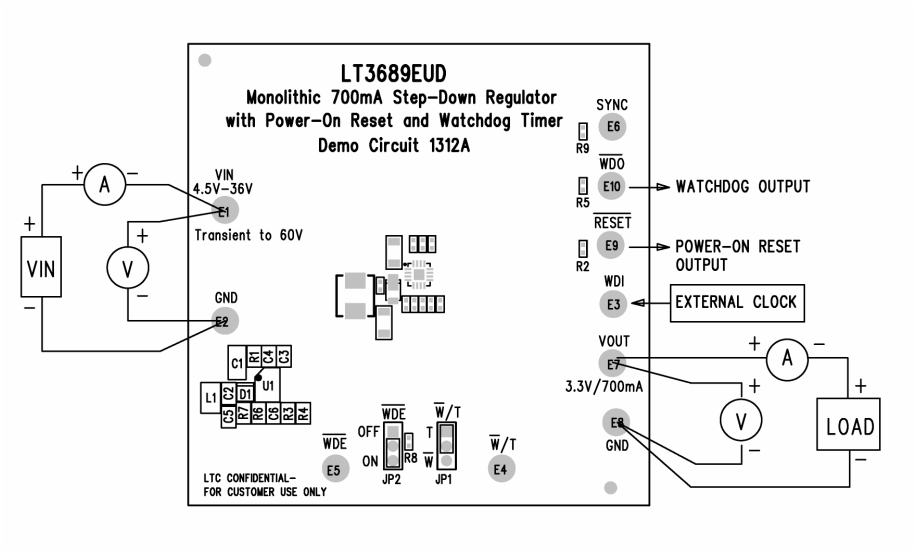


Figure 1. Measurement Equipment Setup

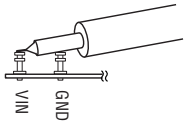
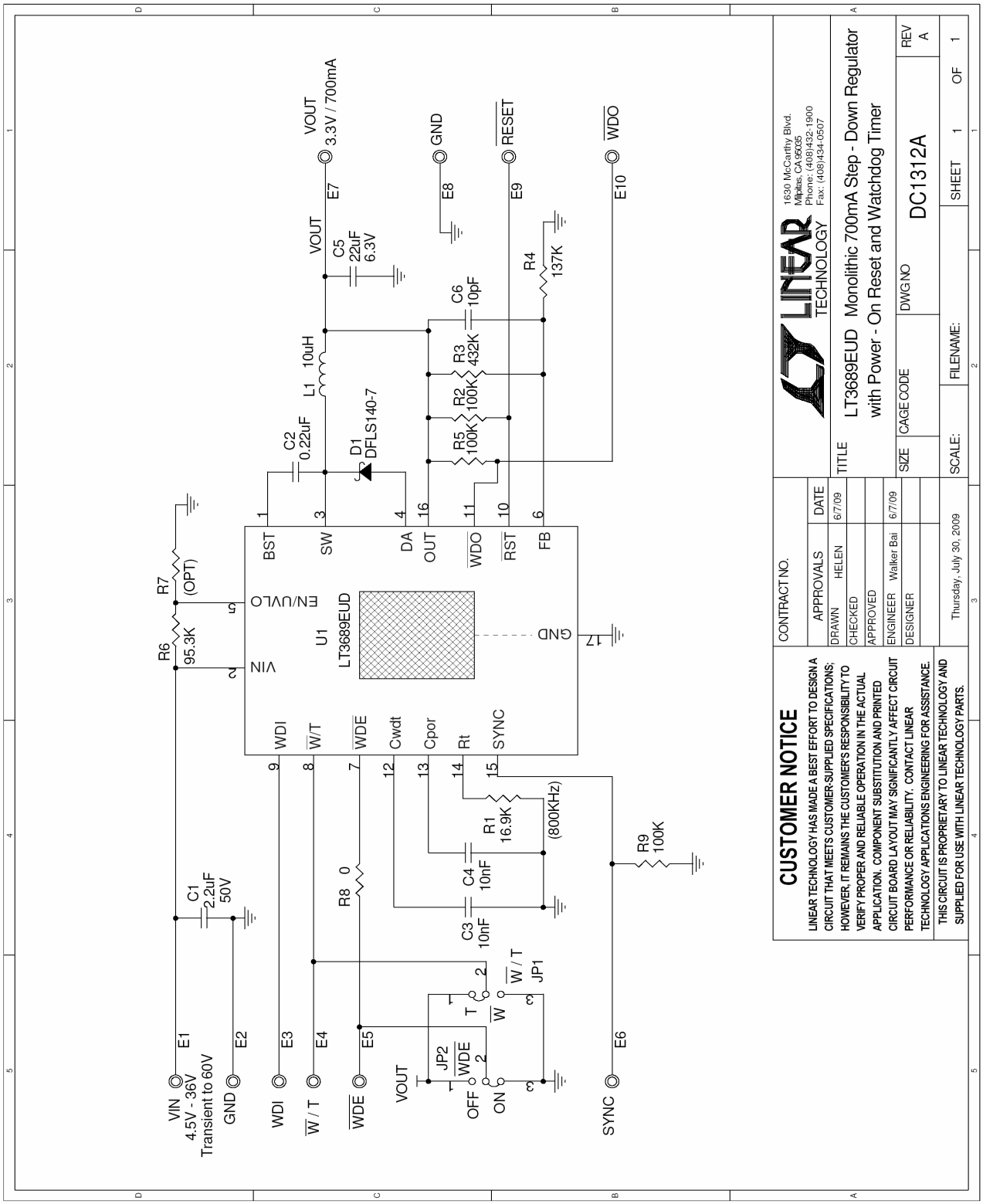


Figure 2. Measuring Input or Output Ripple


VIN
4.5V - 36V
Transient to 60V
GND
WDI
W / T
WDE
VOUT
OFF
ON
SYNC
E1
E2
E3
E4
E5
E6
C1
2.2uF
50V
R6
95.3K
R7
(OPT)
JP2
WDE
JP1
W / T
R8 0
C3
10nF
C4
10nF
R1
16.9K
(800KHz)
R9
100K
U1
LT3689EUD
VIN
EN/UVLO
BST
SW
DA
OUT
WDO
RST
FB
GND
C2
0.22uF
L1 10uH
D1
DFLS140-7
R5
100K
R2
100K
R3
432K
C6
10pF
R4
137K
C5
22uF
6.3V
VOUT
3.3V / 700mA
GND
RESET
WDO
E7
E8
E9
E10
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.
CONTRACT NO.
APPROVALS
DRAWN HELEN 6/7/09
CHECKED
APPROVED
ENGINEER Walker Bai 6/7/09
DESIGNER
DATE
Thursday, July 30, 2009
SCALE:
LINEAR TECHNOLOGY
1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900
Fax: (408)434-0507
TITLE
LT3689EUD Monolithic 700mA Step - Down Regulator with Power - On Reset and Watchdog Timer
SIZE
CAGE CODE
DWG NO
DC1312A
REV A
FILENAME:
SHEET 1 OF 1