LTC3617EUDD
±6A Monolithic Step-Down Regulator for DDR Termination

DESCRIPTION

Demonstration circuit 1707 is a high efficiency monolithic step-down DC/DC switching regulator designed for double-data-rate (DDR) memory termination in computer systems. The VTT output is capable of sourcing and sinking up to 6A with an output voltage equal to one-half the voltage applied to the V_{DDQIN} terminal or one-half the input supply voltage, selected by a jumper. An additional low current output (VTTR) also equal to one-half the voltage on V_{DDQIN} and can source and sink up to 10mA is included. Input voltage range is from 2.25V to 5.5V with overvoltage protection for transients exceeding 6.5V. Switching frequency is set to 1MHz although it can be programmed up to 4MHz and can be synchronized to an external clock for noise sensitive applications. Jumpers are provided for a low quiescent current shutdown and for selecting internal or external compensation. Internal soft-start is included and a PGOOD output terminal that pulls low at start-up and when the VTT output is outside a voltage window. The LTC3617 is available in the 24-pin 3mm × 5mm thermally enhanced QFN package.

The LTC3617 datasheet gives a complete description of the part, operation and application information and should be read in conjunction with this quick start guide.

Design files for this circuit board are available at http://www.linear.com/demo

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PERFORMANCE SUMMARY (T_A = 25°C)

PARAMETER	CONDITIONS	TYPICAL VALUE
Input Voltage Range (V_{IN})		2.25V to 5.5V
Output Voltage (VTTR)	V_{IN} = 3.3V, V_{DDQIN} = 1.800V	900mV ±18mV (±2%)
Output Voltage (VTT)	V_{IN} = 3.3V, V_{DDQIN} = 1.800V	VTTR ±10mV
Load Regulation	V_{IN} = 3.3V, V_{DDQIN} = 1.800V, 0A to 5A Load	2mV
Maximum Output Current	V_{IN} = 3.3V, V_{DDQIN} = 1.800V	±6A
Switching Frequency		1MHz ±20%
Output Voltage Ripple	V_{IN} = 3.3V, 0A to 5A Load	25mV_{P-P}
Efficiency	V_{IN} = 3.3V, V_{OUT} = 900mV, 1A Load	87%
Efficiency	V_{IN} = 3.3V, V_{OUT} = 900mV, 3A Load	85%

QUICK START PROCEDURE

Demonstration circuit 1707 allows the user to quickly evaluate the performance of the LTC3617. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below

1. Place jumpers in the following positions.
   JP2 - EXT REF (lower)
   JP1 - RUN (lower)
   JP3 - V_{IN} (upper)
2. With both power supplies turned down and switched off, connect the supplies and digital voltmeters and ammeters as shown in Figure 1.
3. Switch on the input supply and adjust for approximately 3.3V on V_{IN}, and set the Reference supply to 1.800V on V_{DDQIN}.
4. Verify that the VTTR voltmeter is exactly one-half of V_{DDQIN} ±18mV or approximately 900mV.
5. Verify that the VTT voltmeter reading is equal to the VTTR value ±10mV.
6. To evaluate sourcing current from the VTT terminal, connect one lead of a 0.2Ω 5W load resistor to the VTT terminal and the other lead to the GND terminal. Verify that the voltmeter measurements still meet the specifications shown in the table on page 1.
7. To evaluate sinking current into the VTT terminal, connect one lead of a 0.5Ω 10 or 20W load resistor to the VTT terminal and the other lead to the V_{IN} terminal. Verify that the voltmeter measurements meet the specifications in the Performance Summary table on the front page.

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 V_{IN} or V_{OUT} and GND terminals. See Figure 2 for proper scope probe technique.

NOTE. Additional pads for are located on the board back-side for larger compensation components for optimizing loop compensation.

QUICK START PROCEDURE

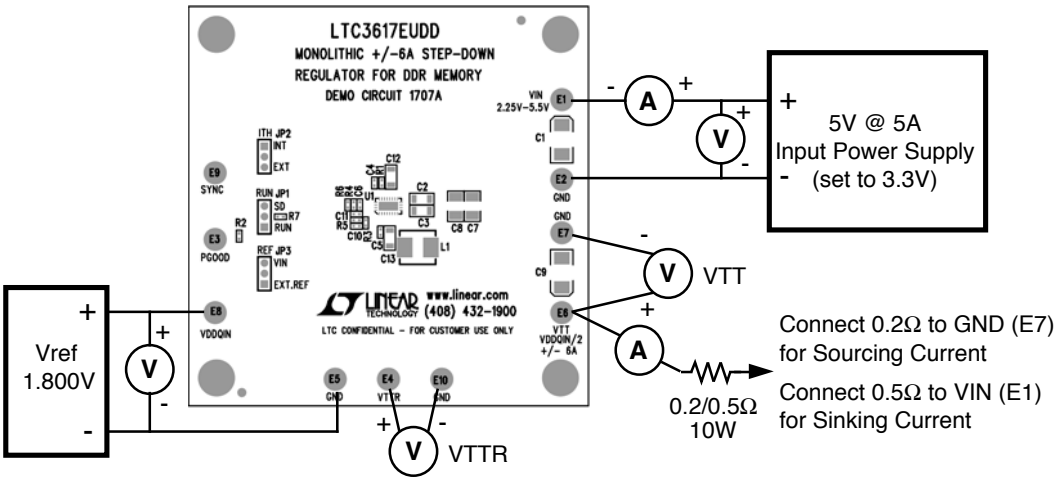


Figure 1. Proper Measurement Equipment Setup

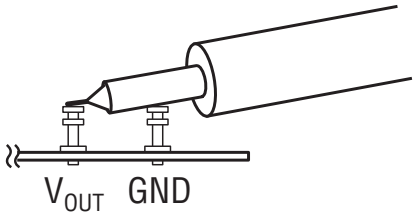
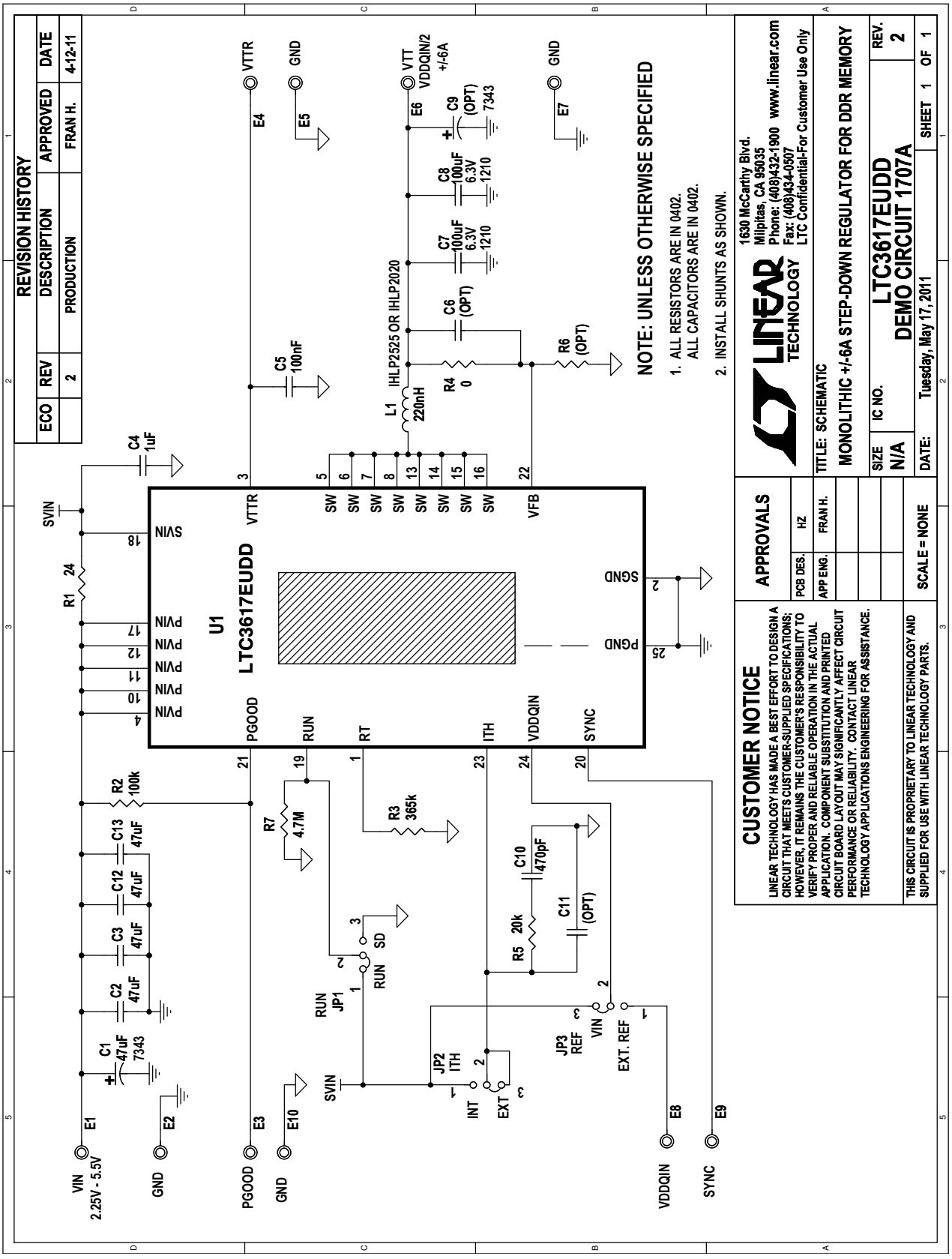


Figure 2. Measuring Input or Output Ripple

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP., TANT, 47µF, 10V,20%, 7343	AVX, TPSC476M010R0350
2	0	C9 (OPT)	CAP., TANT, 100µF, 10V, 20%, 7343	AVX, TPSC107M010R0150
3	4	C2, C3, C12, C13	CAP., X5R, 47µF, 10V, 20% 1206	TAIYO YUDEN, LMK316BJ476ML-T
4	1	C4	CAP., X5R, 1µF, 10V, 10% 0402	MURATA, GRM155R61A105KE15D
5	1	C5	CAP., X7R, 0.1µF, 16V, 10% 0402	MURATA, GRM155R71C104KA88D
6	2	C7, C8	CAP., X5R, 100µF, 10V, 20% 1210	TAIYO YUDEN, LMK325BJ107MM-T
7	1	C10	CAP., X5R, 470pF, 16V, 10% 0402	AVX, 0402YC471KAT2A
8	0	C6, C11(OPT)	CAP., 0402	
9	10	E1-E10	TESTPOINT, TURRET, .094"	MILL-MAX, 2501-2-00-80-00-00-07
10	3	JP1-JP3	HEADER 3 PIN 0.079 SINGLE ROW	SAMTEC, TMM-103-02-L-S
11	3	JP1-JP3 SHUNT	SHUNT	SAMTEC, 2SN-BK-G
12	1	L1	INDUCTOR, 220nH IHP-2020	VISHAY, IHLP2020BZERR22M01
13	1	R1	Res., CHIP, 24, 1% 0402	VISHAY, CRCW040224R0FKED
14	1	R2	Res., CHIP, 100K, 1% 0402	VISHAY, CRCW0402100KFKED
15	1	R3	Res., CHIP, 365K, 1% 0402	VISHAY, CRCW0402365KFKED
16	1	R4	Res., CHIP, 0, 1% 0402	VISHAY, CRCW04020000Z0ED
17	1	R5	Res., CHIP, 20K, 1% 0402	NIC, NRC04F2002TRF
18	0	R6 (OPT)	Res., 0402	
19	1	R7	Res., CHIP, 4.7M, 5% 0402	VISHAY, CRCW04024M70JNED
20	1	U1	IC., LTC3617EUDD QFN-24 3X5MM	LINEAR TECH., LTC3617EUDD
21	4	MH1-MH4	STAND-OFF, NYLON 0.25"	KEYSTONE, 8831 (SNAP ON)
22	1		FAB, PRINTED CIRCUIT BOARD	DEMO CIRCUIT 1707A
23	1		STENCIL	STENCIL

SCHEMATIC DIAGRAM



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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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