QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 884
DUAL OUTPUT HIGH DENSITY 17A STEP-DOWN DC/DC WITH TRACKING

LTC3828EUH

DESCRIPTION

Demonstration circuit 884 is a high current density supply featuring the dual-output, 2-phase synchronous buck regulator LTC3828EUH. The input voltage of the demo board is typically from 5V to 12V. The outputs are 2V/17A_{MAX} and 1.5V/17A_{MAX}. All the critical power and controller IC circuit are within a 1.35" x 0.8" "drop-in" layout space to deliver up to 40A/inch^2 current density. The outputs can be easily configured to have two separate output voltages or a single high current output voltage with two phases in parallel. Depending on the setting of the optional resistors and jumpers, each output can track an external ramp voltage during start up or one output can track another output on the same board. At light load, the supplies can operate in high efficiency mode or low output ripple mode by jumper selection.

The supply can also be synchronized by an external clock signal. A CLOCKOUT pin provides an output clock signal to synchronize other supplies if needed. The LTC3828EUH regulator IC is a small 5mm x 5mm package with exposed thermal pad for low thermal impedance.

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

Table 1. Performance Summary (T_A = 25°C)

PARAMETER	CONDITION	VALUE
Input Voltage	Typical	5V-12V
Input Voltage	Min / Max	4.5V / 15V
Output Voltage V_{OUT1}	I_{OUT1} = 0A to 17A	2.0V ± 2%
Output Voltage V_{OUT2}	I_{OUT2} = 0A to 17A	1.5V ± 2%
Maximum Output Current	VIN = 5V-12V	17A Each Output
Switching frequency	FCB = CCM	400kHz
Full Load Efficiency	V_{IN} = 12V, V_{OUT1} = 2.0V, I_{OUT1} = 17A	88.7% Typical
	V_{IN} = 12V, V_{OUT2} = 1.5V, I_{OUT2} = 17A	87 % Typical

QUICK START PROCEDURE

Demonstration circuit 884 is easy to set up to evaluate the performance of the LTC3828EUH. 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. Following table should be the default jumper settings of the DC884A demo board:

RUN1	RUN2	PHSMD	FCB
on	on	0	CCM

The following tables show the assembly options for the tracking circuits for VOUT1 and VOUT2:

	VOUT1 TRACKING OPTIONS	R15	R17	C1
1*	Softstart W/O tracking	0	DNP	0.1uF
2	Track EXT1	30K	20K	DNP

	VOUT2 TRACKING OPTIONS	R9	R8	C20
1	Softstart W/O tracking	DNP	DNP	0.1uF
2*	Track VOUT1	20K	17.4K	DNP

*With existing tracking circuit assembly, VOUT1 starts independently (Option 1). VOUT2 tracks VOUT1 during start up (option 2). Figure 3 shows a typical start-up waveform with tracking.

2. With power off, connect the input power supply to VIN and GND. Connect the load between VOUT1, VOUT2 and GND. Preset the load current at 0A (minimum). Refer to Figure 1 for correct test set up.

3. Turn on the input power.

NOTE: Make sure that the input voltage does not exceed 15V.

4. Check for the proper output voltages. Vout1 = 1.96V-2.04V, Vout2 = 1.47V-1.53V

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 voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

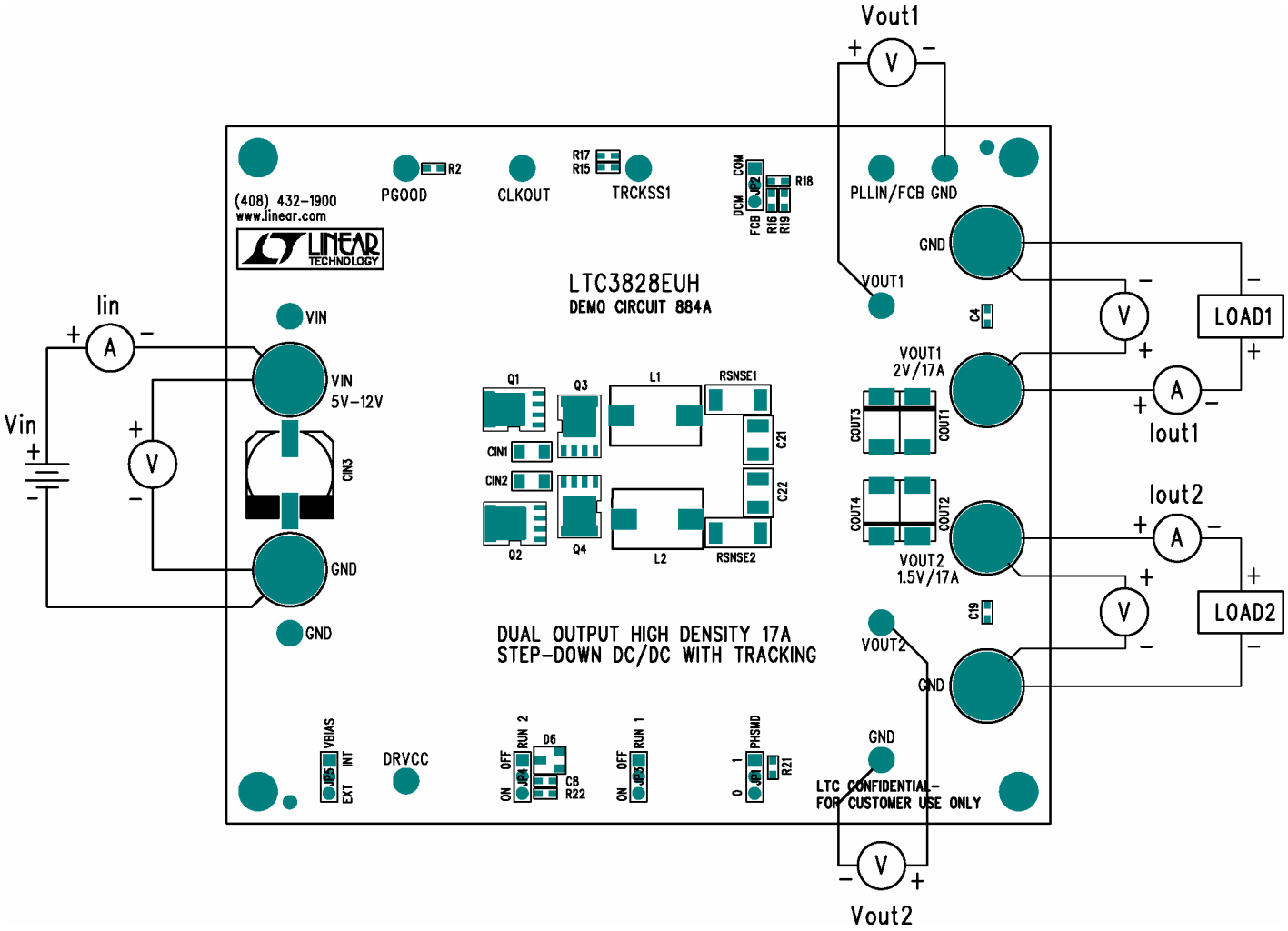


Figure 1. Proper Measurement Equipment Setup

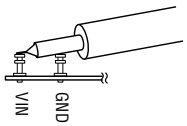


Figure 2. Measuring Input or Output Ripple

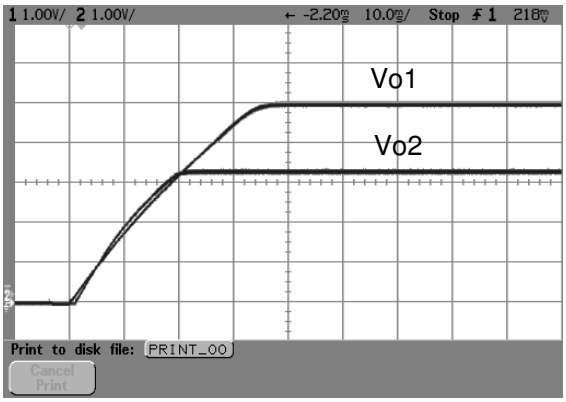


Figure 3. Typical Output Voltage Tracking Waveform during Start-Up (0.4V/DIV)

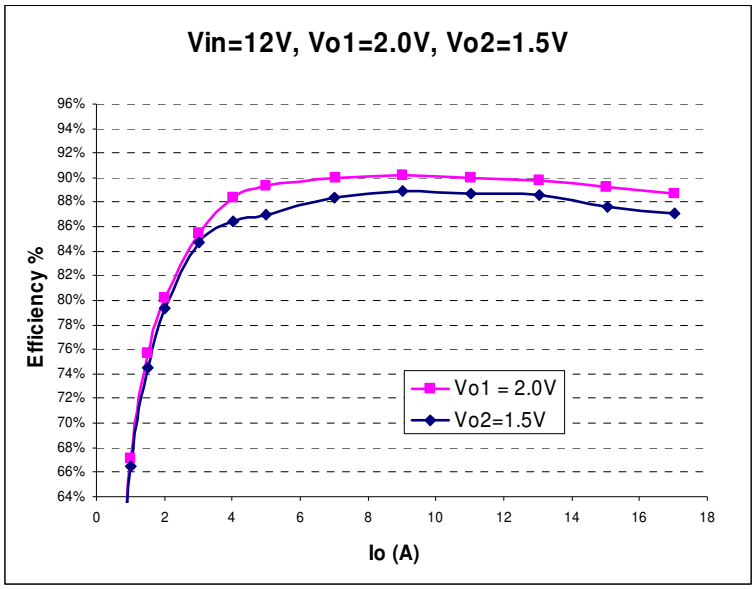
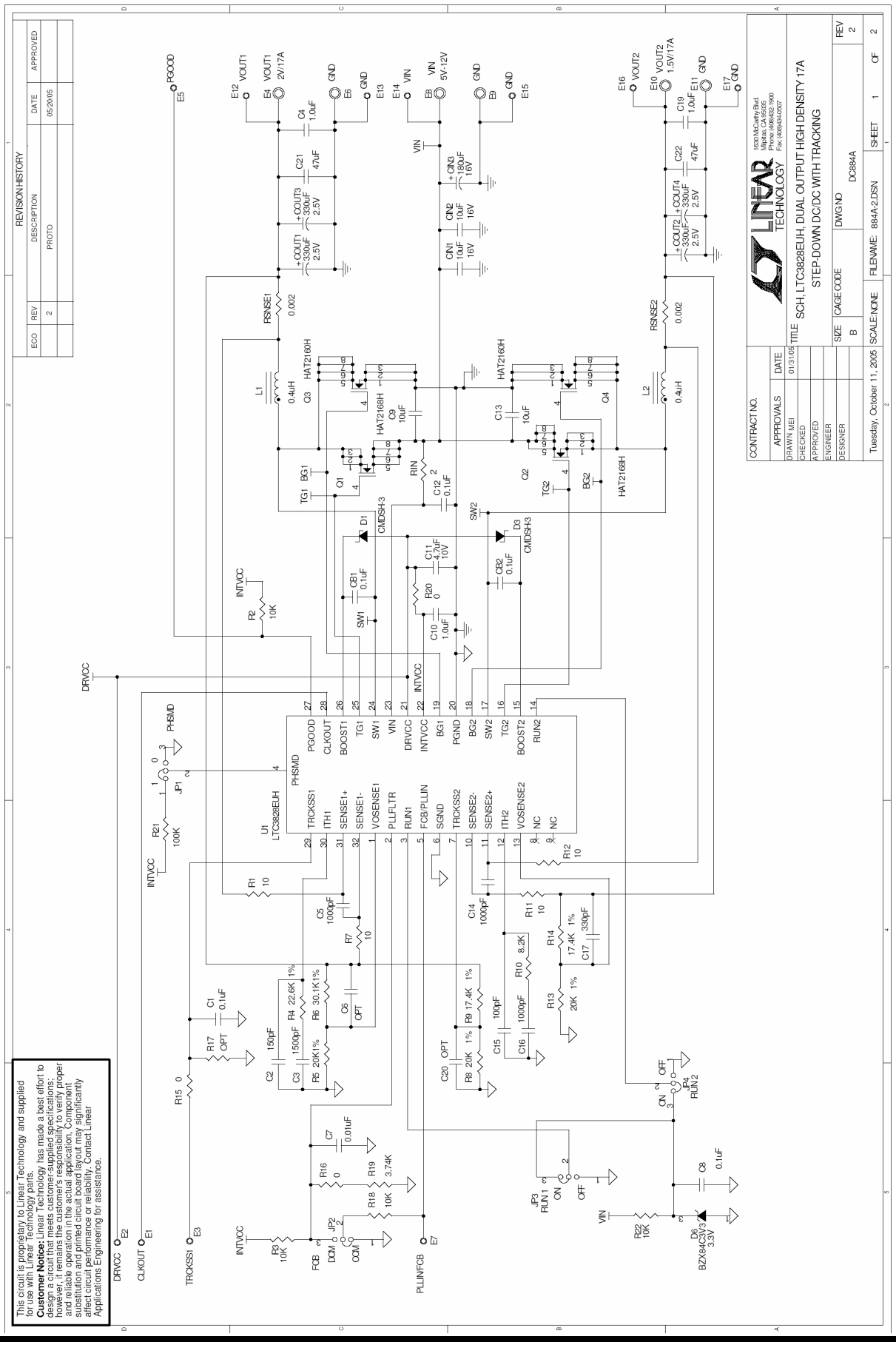


Figure 4. Typical Supply Efficiency vs Load Current @ 12Vin


REVISION HISTORY
ECO REV DESCRIPTION DATE APPROVED
2 PROTO 05/20/05
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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 Applications Engineering for assistance.
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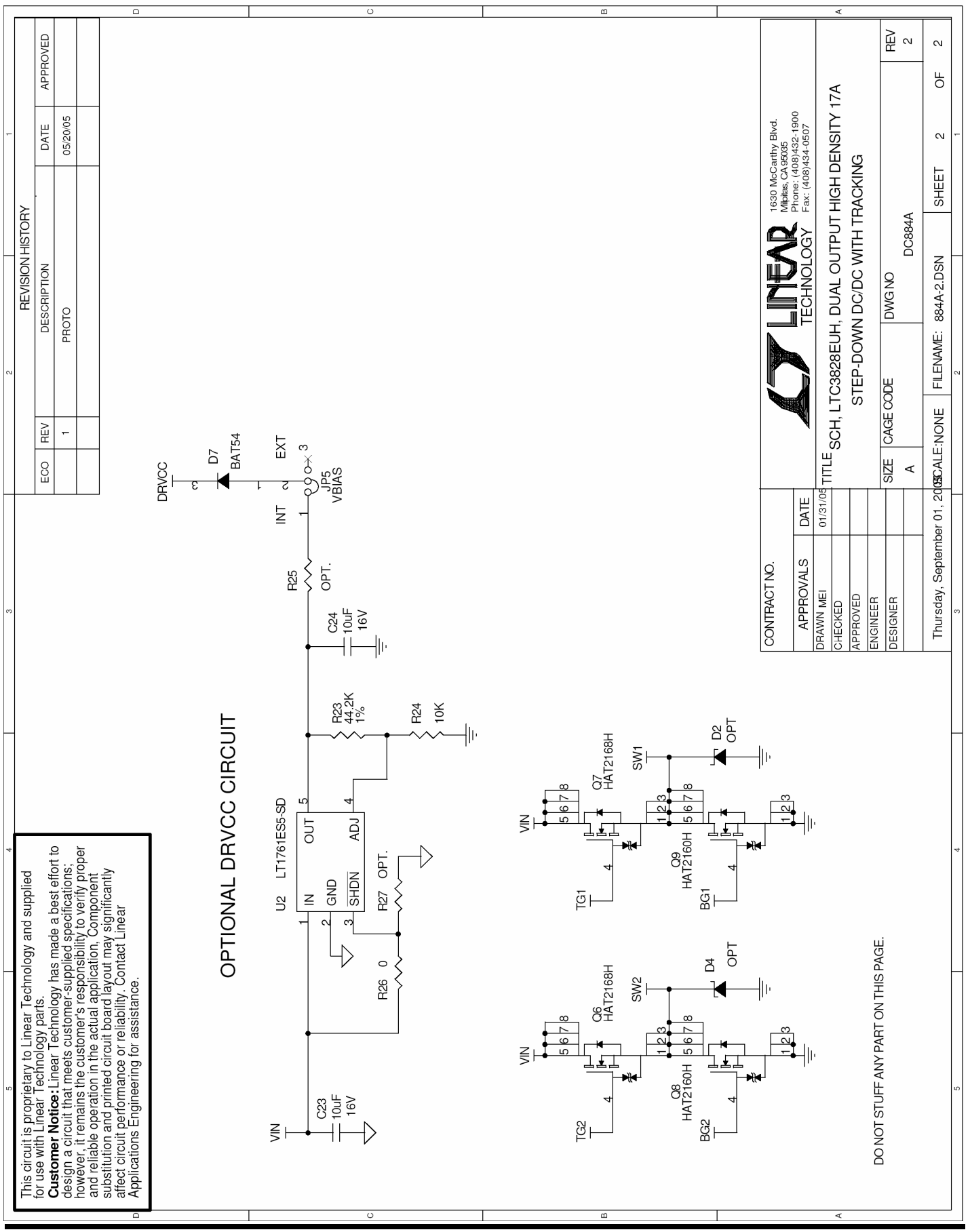
TITLE SCH, LTC3828EUH, DUAL OUTPUT HIGH DENSITY 17A STEP-DOWN DC/DC WITH TRACKING
SIZE B CAGE CODE DWG NO DC884A REV 2
Tuesday, October 11, 2005 SCALE=NONE FILENAME: 884A-2.DSN SHEET 1 OF 2
U1 LTC3828EUH
PGOOD CLKOUT BOOST1 TG1 SW1 VIN DRVCC INTVCC BG1 PGND BG2 SW2 TG2 BOOST2 RUN2
TRCKSS1 ITH1 SENSE1+ SENSE1- VOSENSE1 PLLFLTR RUN1 FCB/PLLIN SGND TRCKSS2 SENSE2- SENSE2+ ITH2 VOSENSE2 NC NC PHSMD
L1 0.4uH
L2 0.4uH
Q1 Q2 Q3 Q4 HAT2168H
D1 D3 CMDSH-3
D6 BZX84C3V3 3.3V
RSNSE1 0.002
RSNSE2 0.002
COUT1 330uF 2.5V
COUT2 330uF 2.5V
COUT3 330uF 2.5V
COUT4 330uF 2.5V
CIN1 10uF 16V
CIN2 10uF 16V
CIN3 180uF 16V
VOUT1 2V/17A
VOUT2 1.5V/17A
VIN 5V-12V
INTVCC
DRVCC
PGOOD
PHSMD
CLKOUT
TRCKSS1
PLLINFCB
FCB
JP1 JP2 JP3 JP4
RUN1 RUN2
ON OFF
R1 10
R2 10K
R3 10K
R4 22.6K 1%
R5 20K 1%
R6 30.1K 1%
R7 10
R8 20K 1%
R9 17.4K 1%
R10 8.2K
R11 10
R12 10
R13 20K 1%
R14 17.4K 1%
R15 0
R16 0
R17 OPT
R18 10K
R19 3.74K
R20 0
R21 100K
R22 10K
C1 0.1uF
C2 150pF
C3 1500pF
C4 1.0uF
C5 1000pF
C6 OPT
C7 0.01uF
C8 0.1uF
C9 10uF
C10 1.0uF
C11 4.7uF 10V
C12 0.1uF
C13 10uF
C14 1000pF
C15 100pF
C16 1000pF
C17 330pF
C19 1.0uF
C20 OPT
C21 47uF
C22 47uF
CB1 0.1uF
CB2 0.1uF
RIN 2
SW1 SW2
TG1 TG2 BG1 BG2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OPTIONAL DRVCC CIRCUIT
DRVCC
D7
BAT54
EXT
INT
JP5
VBIAS
R25
OPT.
C24
10uF
16V
R23
44.2K
1%
R24
10K
U2
LT1761ES5-SD
IN
GND
SHDN
OUT
ADJ
R27
OPT.
R26
0
VIN
C23
10uF
16V
Q7
HAT2168H
Q9
HAT2160H
SW1
D2
OPT
TG1
BG1
Q6
HAT2168H
Q8
HAT2160H
SW2
D4
OPT
TG2
BG2
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