

## LT3506A and LT3506 Dual Monolithic 1.6A Step- Down Switching Regulator

### DESCRIPTION

Demonstration circuit 958 is a Dual Monolithic 1.6A Step-Down Switching Regulator featuring the LT3506A and LT3506. The top half of the board features the LT3506A circuit. The bottom half of the board features the LT3506 circuit. These two circuits are totally independent on the demo board. The main difference between the two circuits is the switching frequency. The switching frequency of the LT3506A circuit is 1.1MHz. The LT3506 switching frequency is 575KHz. Higher switching frequency allows smaller components in a given application. Lower switching frequency gives higher efficiency and allows a circuit to operate at a lower duty cycle.

The LT3506A circuit takes a 6.8V to 25V input and generates a 5V and a 3.3V output, both at 1.6A. The LT3506 circuit takes a 3.6V to 21V input and generates a 1.8V and a 1.2V output, both at 1.6A. The wide input voltage of the LT3506A and the LT3506, 3.6V to 25V, accepts a variety of power

sources, from lead-acid batteries and 5V rails to unregulated wall adapters and distributed power supplies. The output voltage of both the LT3506A and LT3506 can be as low as 0.8V.

The LT3506 high switching frequency and current mode control allow the use of small, low profile surface mount components. The circuit is stable with ceramic capacitors. The low ESR of a ceramic capacitor and high switching frequency results in very low, predictable output ripple.

The LT3506 datasheet gives complete description 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 958.

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

LT is registered trademark of Linear Technology

### PERFORMANCE SUMMARY Specifications are at TA = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V <sub>IN</sub>	Input Supply Range	LT3506A Circuit (TOP)	6.8		25	V
V <sub>IN</sub>	Input Supply Range	LT3506 Circuit (BOTTOM)	3.6		21	V
V <sub>OUT1</sub>	Output Voltage Range	LT3506A Circuit (TOP)	4.85	5	5.15	V
V <sub>OUT2</sub>	Output Voltage Range	LT3506A Circuit (TOP)	3.2	3.3	3.4	V
V <sub>OUT3</sub>	Output Voltage Range	LT3506 Circuit (BOTTOM)	1.746	1.8	1.854	V
V <sub>OUT4</sub>	Output Voltage Range	LT3506 Circuit (BOTTOM)	1.164	1.2	1.236	V
I <sub>OUT</sub>	Output Current	Each Output			1.6	A
F	Switching Frequency	LT3506A Circuit (TOP), I <sub>OUT</sub> = 1.6A		1100		KHz
F	Switching Frequency	LT3506 Circuit (BOTTOM), I <sub>OUT</sub> = 1.6A		575		KHz
V <sub>RIPPLE</sub>	Output Ripple	Each Output, V <sub>IN</sub> = 12V, I <sub>OUT</sub> = 1.6A		15		mV
η	Efficiency	LT3506A Circuit (TOP), V <sub>IN</sub> = 6.8V, I <sub>OUT1</sub> = 0.9A, I <sub>OUT2</sub> = 0.9A		86.5		%
η	Efficiency	LT3506 Circuit (BOTTOM), V <sub>IN</sub> = 3.6V, I <sub>OUT3</sub> = 0.9A, I <sub>OUT4</sub> = 0.9A		78		%

# LT3506A AND LT3506

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## QUICK START PROCEDURE

Demonstration circuit 958 is easy to set up to evaluate the performance of the LT3506A and LT3506. 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. With power off, connect a 6.8V–25V or a 3.6V–21V input power supply to the VIN and the GND terminals on the board corresponding to the top circuit or the bottom circuit. Each circuit is powered separately from its own VIN and GND.
2. Turn on the power at the input.

**NOTE.** Make sure that the input voltage does not exceed 25V.

3. Check for the proper output voltages.  $V_{OUT1} = 5V$ ,  $V_{OUT2} = 3.3V$ ,  $V_{OUT3} = 1.8V$ ,  $V_{OUT4} = 1.2V$

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

4. The RUN/SS and the Power Good functions are optional and their terminals can be left floating (disconnected) if their functions are not being used. Connecting a RUN/SS terminal to GND will disable the corresponding output.
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.

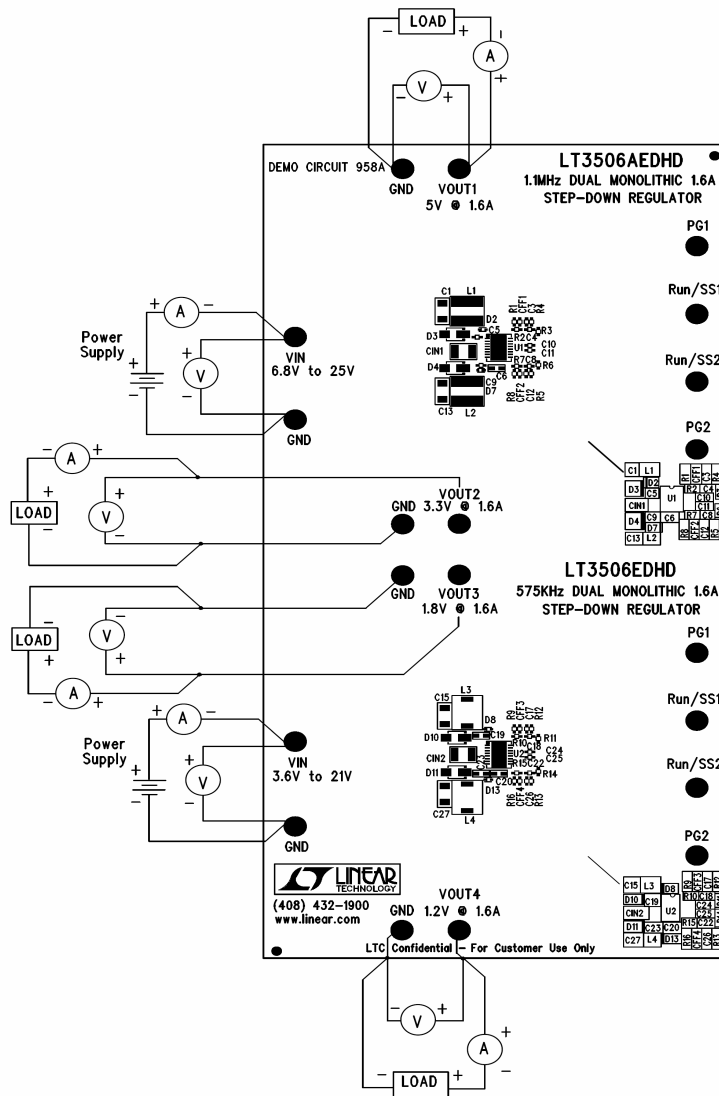


Figure 1. Proper Measurement Equipment Setup

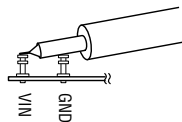
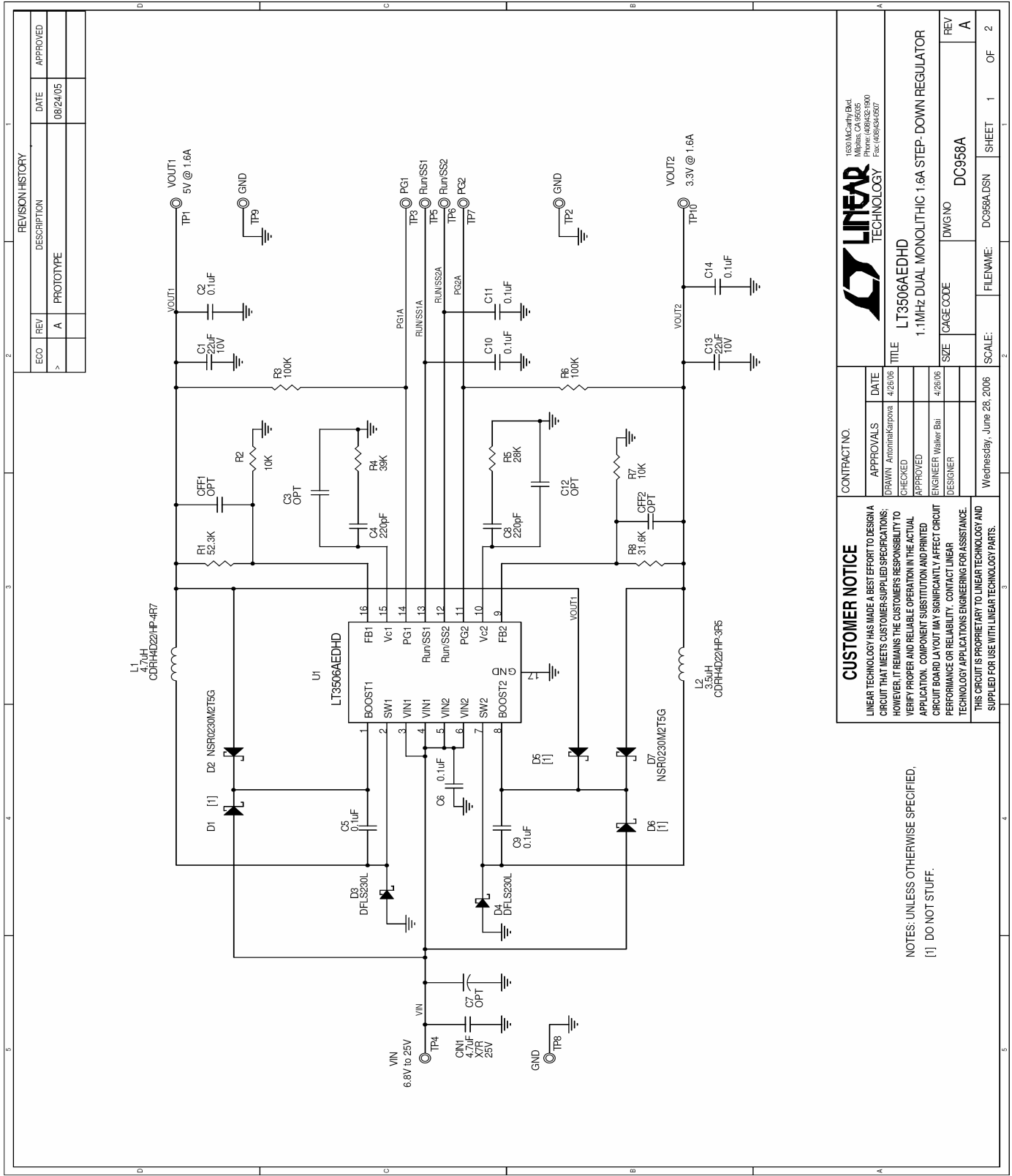


Figure 2. Measuring Input or Output Ripple

# LT3506A AND LT3506



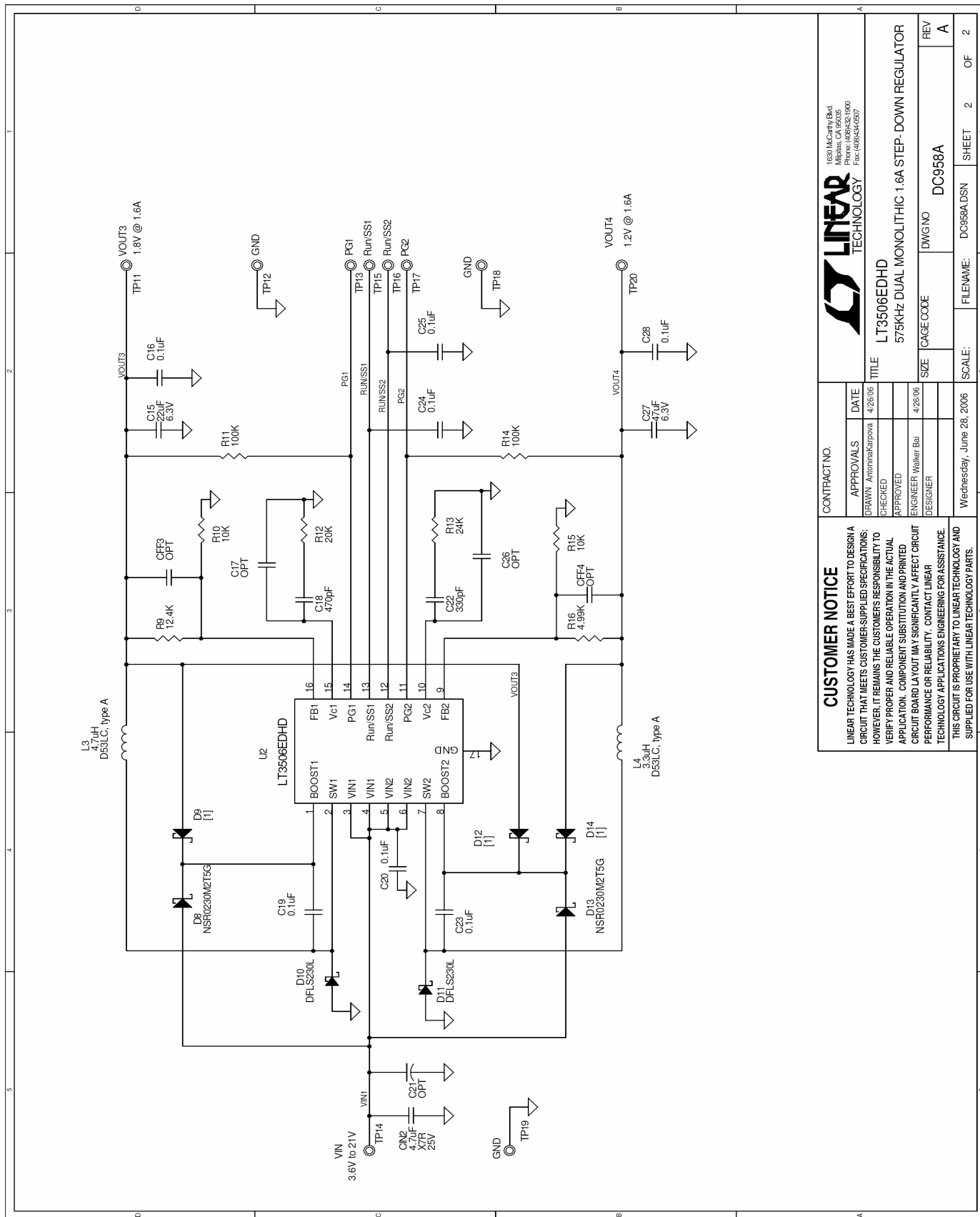
REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
>	A	PROTOTYPE	08/24/05	

		1630 McCarthy Blvd Milpitas, CA 95035 (415) 964-7000 Fax: (415) 964-8507	
TITLE: LT3506AEDHD 1.1MHz DUAL MONOLITHIC 1.6A STEP-DOWN REGULATOR			
REV	DC958A	DWGNO	DC958A
REV	A	SCALE:	1 OF 2

CONTRACT NO.		DATE	
APPROVALS	DATE	APPROVALS	DATE
DRAWN: AnomalaKarpova	4/25/06	APPROVED	
CHECKED		ENGINEER: Valerii Bai	4/25/06
DESIGNER			

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NOTES: UNLESS OTHERWISE SPECIFIED,  
 [1] DO NOT STUFF.



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### CONTRACT NO.

APPROVALS	DATE
DRAWN: AntoninaKarpova	4/26/06
CHECKED:	
APPROVED:	
ENGINEER: Walker Bai	4/26/06
DESIGNER:	



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TITLE	LT3506EDHD
DESCRIPTION	575kHz DUAL MONOLITHIC 1.6A STEP-DOWN REGULATOR
SIZE	CAGE CODE
DWG NO	DC958A
REV	A

SCALE:	1
FILENAME:	DC958A.DSN
SHEET	2
OF	2

Wednesday, June 28, 2006