

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.

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PERFORMANCE SUMMARY Specifications are at TA = 25°C

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

LT3506A AND LT3506

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.

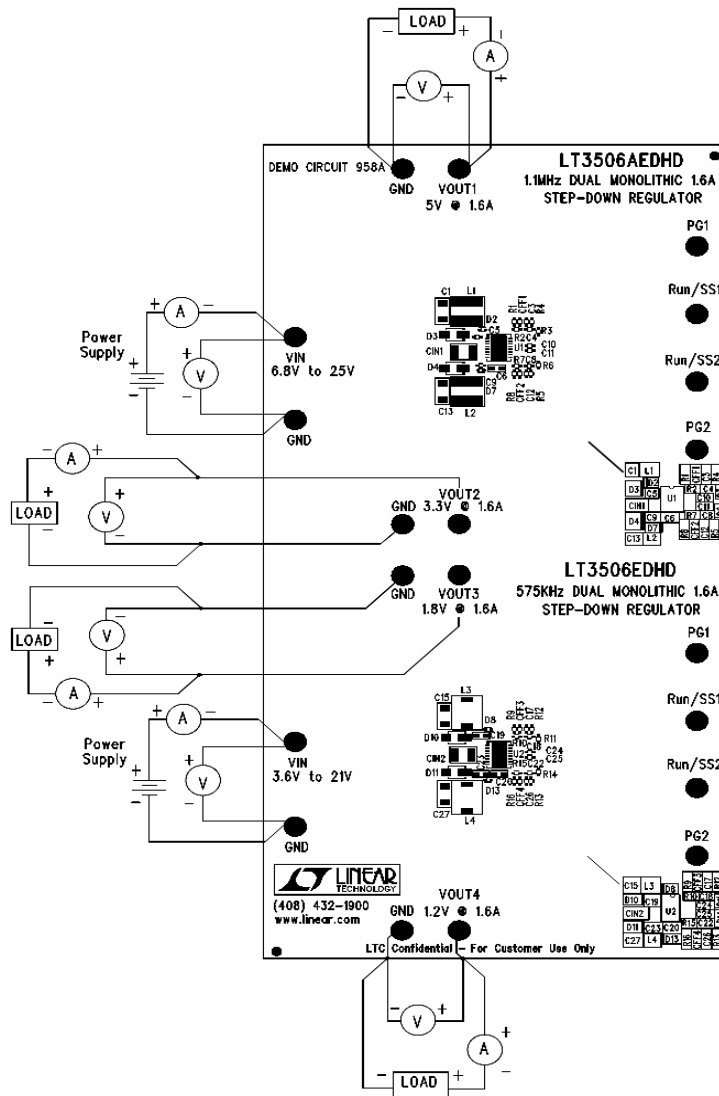


Figure 1. Proper Measurement Equipment Setup

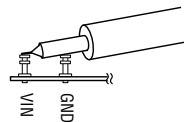
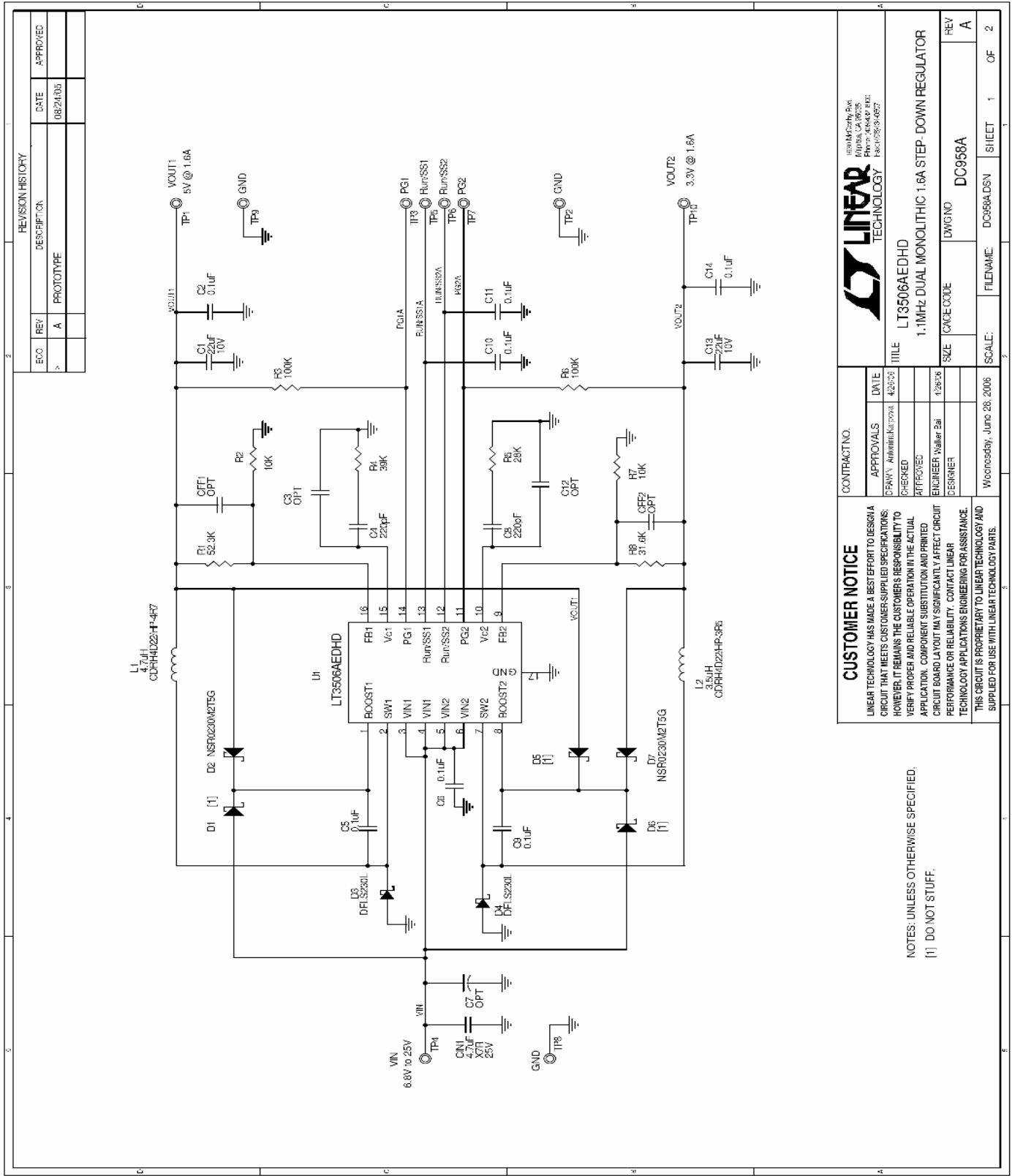


Figure 2. Measuring Input or Output Ripple

LT3506A AND LT3506



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

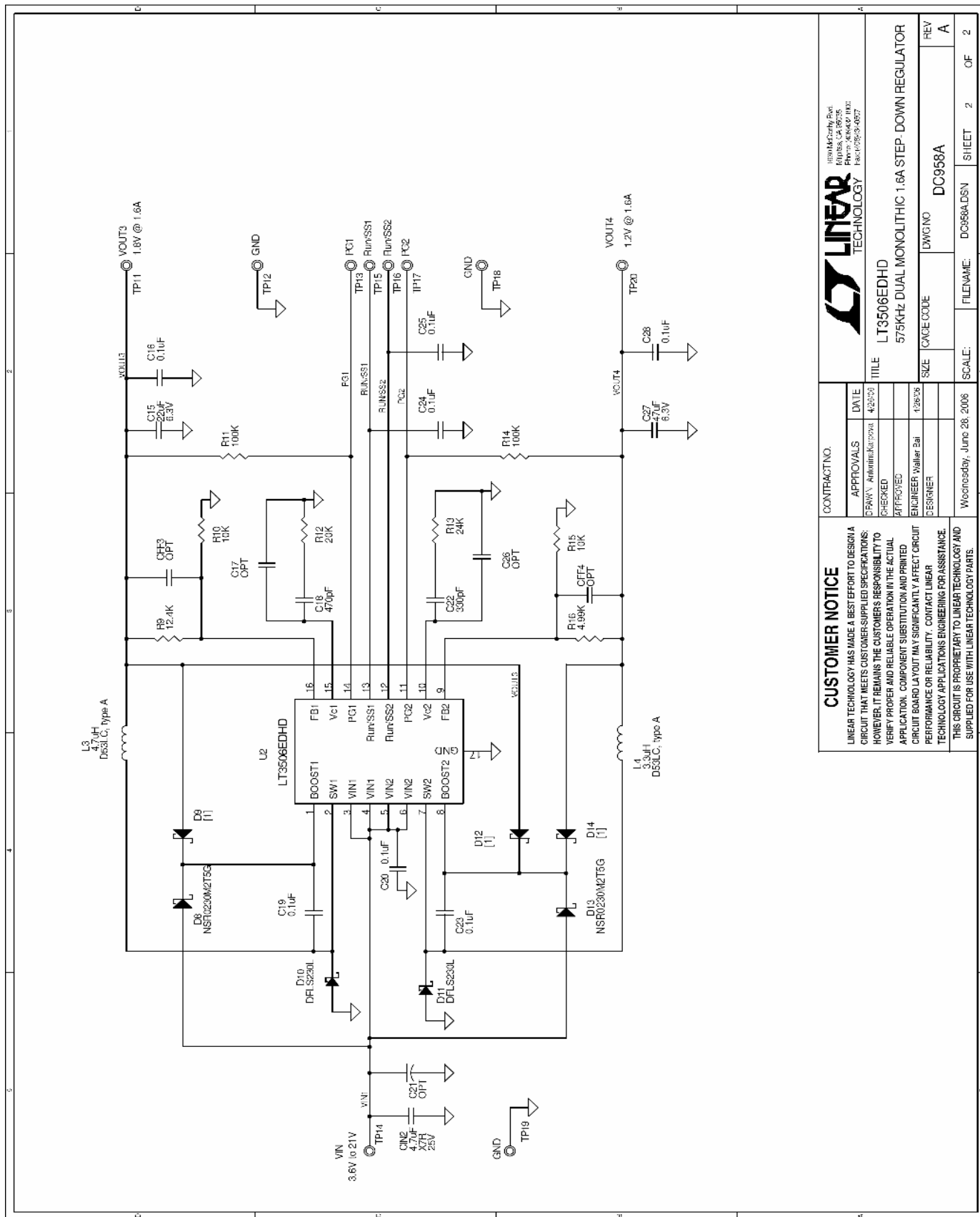
CONTRACT NO.		DATE
APPROVALS	DATE	4/25/05
CFANY, Admin/for 5594		
CHECKED		
APPROVED		
ENGINEER: Yuhua Bai	DATE: 4/25/05	
DESIGNER		

TITLE		LT3506AEDHD
1.1MHz DUAL MONOLITHIC 1.6A STEP-DOWN REGULATOR		
SIZE	PACKAGE CODE	DWGNO DC958A
REV		A

SCALE:	FILENAME:	SHEET	1	OF	2
Wooten, June 28, 2006					

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 THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

NOTES: UNLESS OTHERWISE SPECIFIED,
 (1) DO NOT STUFF.



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CONTRACT NO.		DATE	
APPROVALS	DESIGNED BY	DATE	DESIGNED BY
CHECKED	DESIGNED BY	4/28/06	DESIGNED BY
APPROVED	DESIGNED BY		DESIGNED BY
ENGINEER	DESIGNED BY		DESIGNED BY
DESIGNER	DESIGNED BY		DESIGNED BY
TITLE		SCALE	
LT3506EDHD		2 OF 2	
575KHz DUAL MONOLITHIC 1.6A STEP-DOWN REGULATOR		REV	
SIZE	DWG NO	REV	REV
DC958A	DC958A	A	A
FILENAME	DC958A.DSN	SHEET	2
SCALE	2	OF	2
Wednesday, June 28, 2006			



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