

DESCRIPTION

Demonstration circuit DC835 is a MOSFET driver circuit that is designed to facilitate adding a MOSFET driver to an existing design.

Demonstration circuit DC835 is small and allows the MOSFET driver LTC4441 to be added to an existing design in order to evaluate the performance. The board has a ground strip along one side that can be directly soldered to source pins of an SO-8 or similar MOSFET. This assures the MOSFET driver will be most effective due to low connection inductance between its output and MOSFET gate pin.

Demonstration circuit DC835 can be easily modified to generate different gate drive output voltages by changing the voltage divider of the internal LDO regulator.

The DC835 has a small circuit footprint. It is a high performance and cost effective solution for driving big MOSFETs in Telecom, Automotive and Industrial applications.

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

 LTC and LT are registered trademarks of Linear Technology Corporation.

QUICK START PROCEDURE

Demonstration circuit DC835 is easy to set up to evaluate the performance of the LTC4441. For proper measurement equipment setup refer to Figure 1 and follow the procedure below:

NOTE: When measuring the input or output voltage waveforms, care must be taken to minimize the length of the oscilloscope probe ground lead. Measure the input or output voltage waveforms by connecting the probe tip directly across the PWM INPUT or G1 output and GND terminals as shown in Figure 2.

1. With power off, connect the input power supply to Vin and GND.
2. Turn the input power source on and slowly increase the input voltage. Be careful not to exceed 24V.

NOTE: Higher input voltage will cause higher power dissipation in the LTC4441 LDO regulator. If very big MOSFETs are used and switching frequency is high

the power dissipation may overheat the part. Please consult the LTC4441 data sheet for details.

3. Set the Pulse Generator to 300kHz and turn the pulse output ON.
4. Check for the proper output voltage of 6V and waveforms as shown in Figure 3.

PROGRAMMING GATE OUTPUT VOLTAGE

Changing resistor R8 can program the output voltage at the OUT pin of the LTC4441. Do not change the value of resistor R2. The 330kohm value is required for stability of the internal LDO regulator. For more information, please refer to the LTC4441 data sheet.

BEWARE OF MOSFET DRIVER DELAYS

MOSFET driver delays, which are on the order of 30ns, need careful consideration. Some PWM controllers have built in leading edge blanking that prevents mis-triggering of the current comparator due to leading edge current spikes. If this blanking period is too short it may not cover the additional delay caused by the MOSFET driver. The LTC4441 has a built in programmable blank-

ing circuit that may be used to circumvent the shortcomings of other PWM circuit's leading edge blanking. Please refer to the LTC4441 data sheet for more details. Demo Circuit DC835 has an input filter (R6 and C3) that is used to prevent ringing on the PWM INPUT line from causing false pulses at the output. This RC filter also adds to the delay and needs to be taken into account. The RC filter can be removed if the PWM input line is laid out correctly and is relatively short.

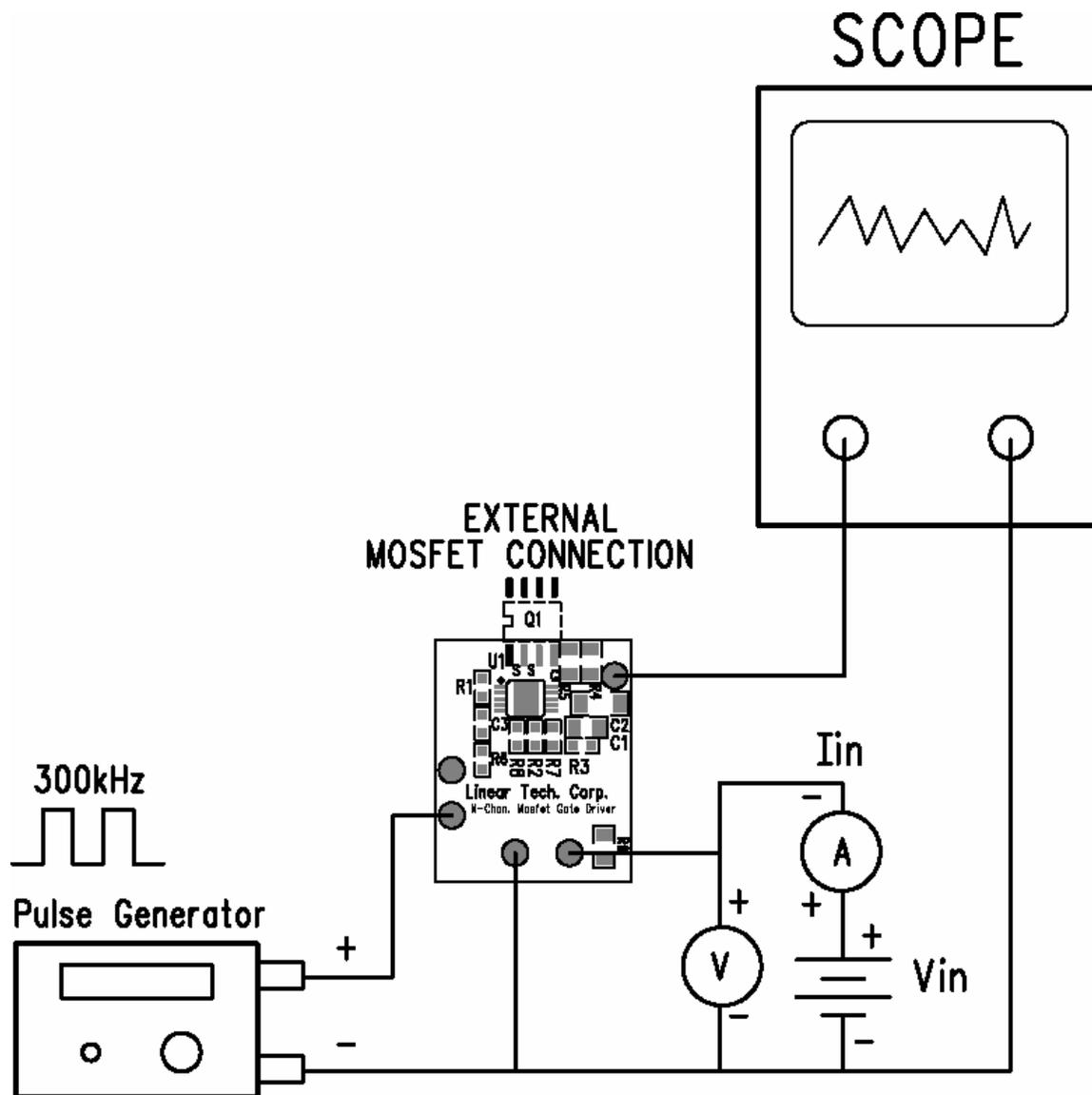


Figure 1. Proper Measurement Equipment Setup

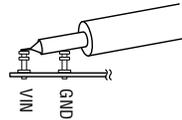


Figure 2. Measuring Input or Output Waveforms

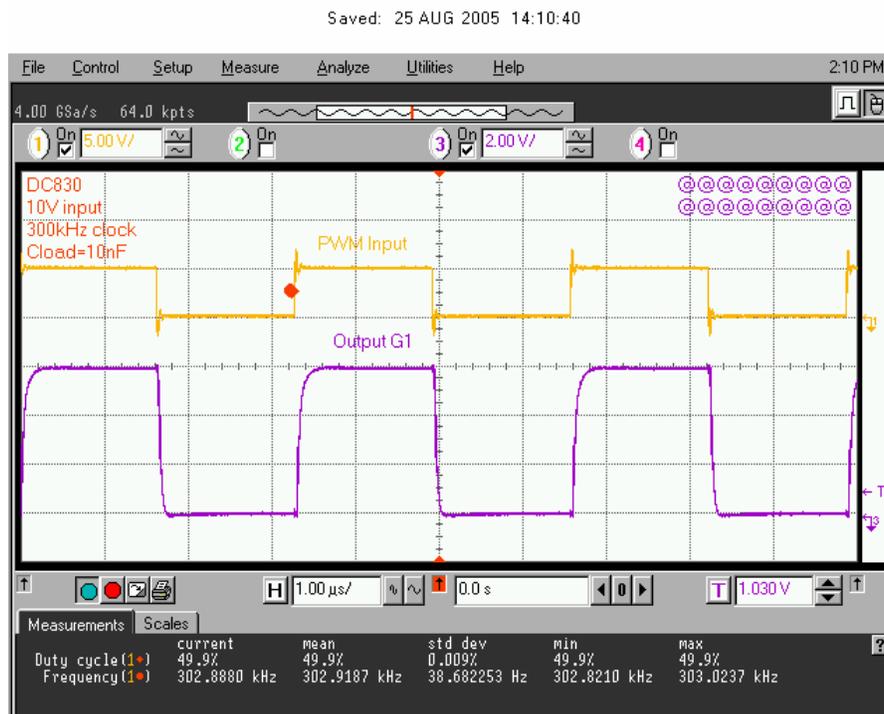
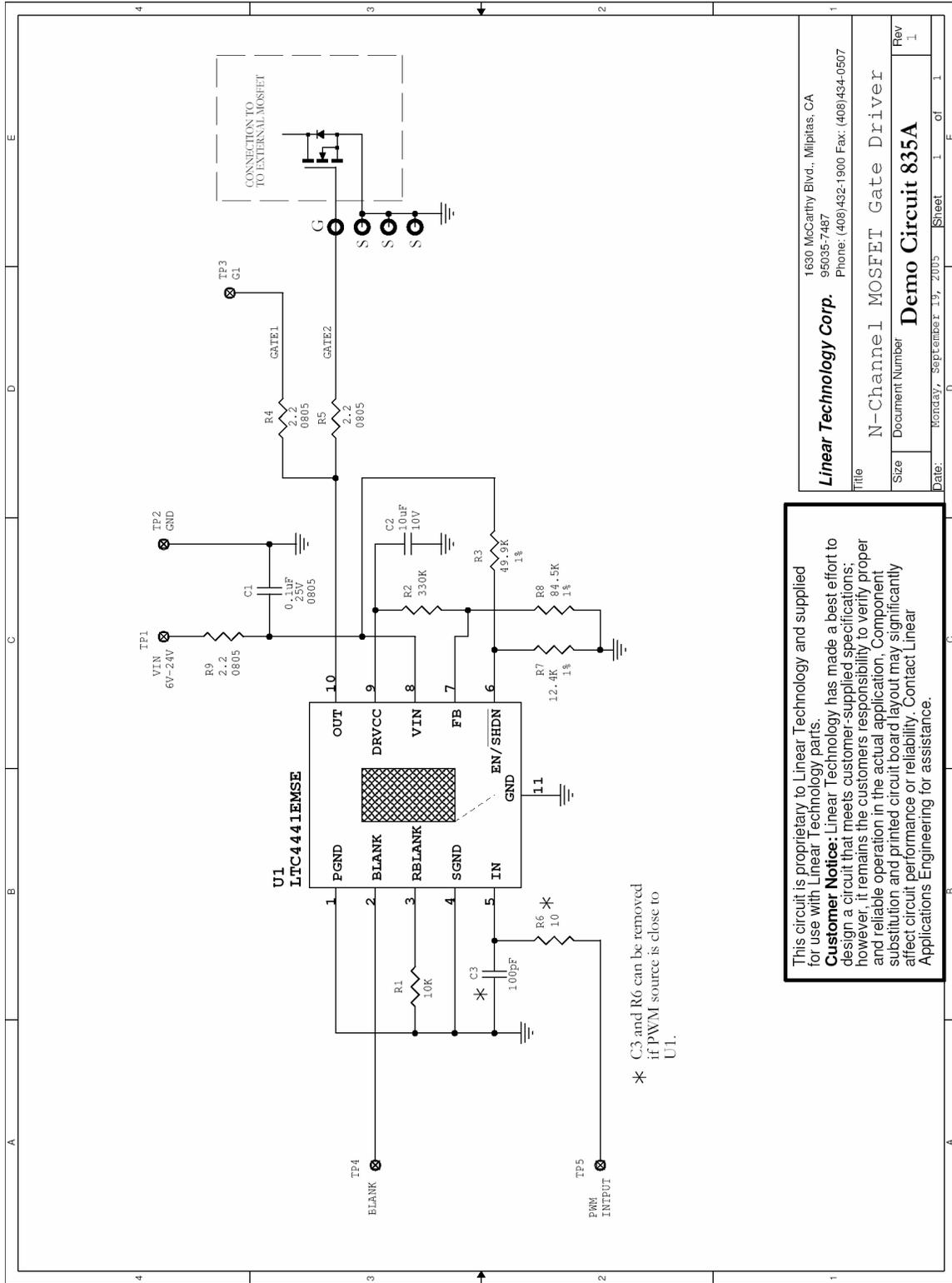


Figure 3. Input and Output Waveforms with 10nF load capacitor

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 835

LTC4441, MOSFET DRIVER



* C3 and R6 can be removed if PWM source is close to U1.

This circuit is proprietary to Linear Technology and supplied for use with Linear Technology parts.
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.

Linear Technology Corp.		1630 McCarthy Blvd., Milpitas, CA	
		95035-7487	
		Phone: (408)432-1900 Fax: (408)434-0807	
Title			
N-Channel MOSFET Gate Driver			
Document Number			
Demo Circuit 835A			
Rev			
1			
Date:	Monday, September 19, 2005	Sheet	1 of 1

Item	Qty	Reference	Part Description	Manufacture / Part #
1	1	C1	Cap., X7R 0.1uF 25V 10%	AVX 08053C104KAT2A
2	1	C2	Cap., X5R 10uF 10V 10%	TDK C3216X5R1A106K
3	1	C3	Cap., X7R 100pF 25V 10%	AVX 06033C101KAT2A
4	0	Q1	(Opt)	
5	1	R1	Res., Chip 10K 0.1W 5%	AAC CR16-103JM
6	1	R2	Res., Chip 330K 0.1W 5%	AAC CR16-334JM
7	1	R3	Res., Chip 49.9K 0.06W 1%	VISHAY CRCW060349.9K1%
8	3	R4,R5,R9	Res., Chip 2.2 0.1W 5%	AAC CR10-2R2JM
9	1	R6	Res., Chip 10 OHM 0.1W 5%	AAC CR16-100JM
10	1	R7	Res., Chip 12.4K 0.1W 1%	AAC CR16-1242FM
11	1	R8	Res., Chip 84.5K 0.06W 1%	Panasonic ERJ3EKF8452V
12	5	TP1,TP2,TP3,TP4,TP	Testpoint, Turret	Mill Max 2309-1
13	1	U1	I.C., MOSFET Driver	Linear Technology Corp. LTC4441EMSE
14	1		FAB, PRINTED CIRCUIT BOA	DEMO CIRCUIT #835A
15	1		STENCIL, 20X20	STENCIL 835A, 20X20

REQUIRED CIRCUIT COMPONENTS:				
1	1	C2	Cap., X5R 10uF 10V 10%	TDK C3216X5R1A106K
2	1	R1	Res., Chip 10K 0.1W 5%	AAC CR16-103JM
3	1	R2	Res., Chip 330K 0.1W 5%	AAC CR16-334JM
4	1	R3	Res., Chip 49.9K 0.06W 1%	VISHAY CRCW060349.9K1%
5	3	R4,R5,R9	Res., Chip 2.2 0.1W 5%	AAC CR10-2R2JM
6	1	R7	Res., Chip 12.4K 0.1W 1%	AAC CR16-1242FM
7	1	R8	Res., Chip 84.5K 0.06W 1%	Panasonic ERJ3EKF8452V
8	1	U1	I.C., MOSFET Driver	Linear Technology Corp. LTC4441EMSE
ADDITIONAL DEMO BOARD CIRCUIT COMPONENTS:				
1	1	C3	Cap., X7R 100pF 25V 10%	AVX 06033C101KAT2A
2	1	R6	Res., Chip 10 OHM 0.1W 5%	AAC CR16-100JM