

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1295B 6A HIGH DENSITY POWER MODULE

LTM4606EV

DESCRIPTION

Demonstration circuit DC1295B features the LTM[®]4606EV, the low EMI, high efficiency, high density switch mode step-down power module. The input voltage range is from 5V to 28V. The output voltage is programmable from 0.6V to 5V: please refer to step down ratio curve in the LTM4606 datasheet. The rated load current is 6A, while de-rating is necessary for certain V_{IN} , V_{OUT} , and thermal conditions. Integrated input and output filters enable a simple PCB layout. Only input and output capacitors are needed externally. The

LTM4606 allows the user to program output ramp-up and ramp-down through the TRACK/SS pin. The output can be set to coincidentally or ratiometrically track to another voltage rail. Output voltage margining can also be realized through jumper position selections.

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


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Table 1. Performance Summary ($T_A = 25^\circ\text{C}$)

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		5V
Maximum Input Voltage		28V
Output Voltage V_{OUT}	Jumper selectable (open for 0.6V)	1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5V; $\pm 2\%$
Maximum Continuous Output Current	De-rating is necessary for certain V_{IN} , V_{OUT} , and thermal conditions	$6A_{DC}$
Default Operating Frequency		800 KHz
Efficiency	$V_{IN}=12V$, $V_{OUT}=3.3V$, $I_{OUT}=6A$	89.6%, See Figure 4
Load Transient	$V_{IN}=12V$, $V_{OUT}=1.5V$	See Figure 5 for detail

QUICK START PROCEDURE

Demonstration circuit DC1295B is easy to set up to evaluate the performance of the LTM4606EV. Please refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place jumpers in the following positions for a typical $1.5V_{OUT}$ application:

Vout Select	RUN	FCB	MARG1	MARG0
1.5V	ON	CCM	LO	LO

2. With power off, connect the input power supply, load and meters as shown in Fig-

ure 1. Preset the load to 0A and V_{in} supply to be 12V.

3. Turn on the power at the input. The output voltage should be $1.5V \pm 2\%$ ($1.47V \sim 1.53V$).
4. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, efficiency and other parameters.
5. The very low ripple of the LTM4606 requires proper measurement technique. Input ripple can be measured with a typical scope probe, but you should not

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use the ground clip lead. See Figure 2 for an illustration of how to connect to the input capacitor. The output ripple should be measured with a 50Ω BNC cable connected to J6.

- For optional load transient test, apply adjustable pulse signal between IOSTEP_CLK and GND pins. Pulse amplitude sets the current step. The pulse signal should have very small duty cycle (<5%) to limit the thermal stress on the transient load circuit. The output transient current can be monitored at BNC connector J5 (10mV/A), the output voltage can be monitor at BNC connector J6.

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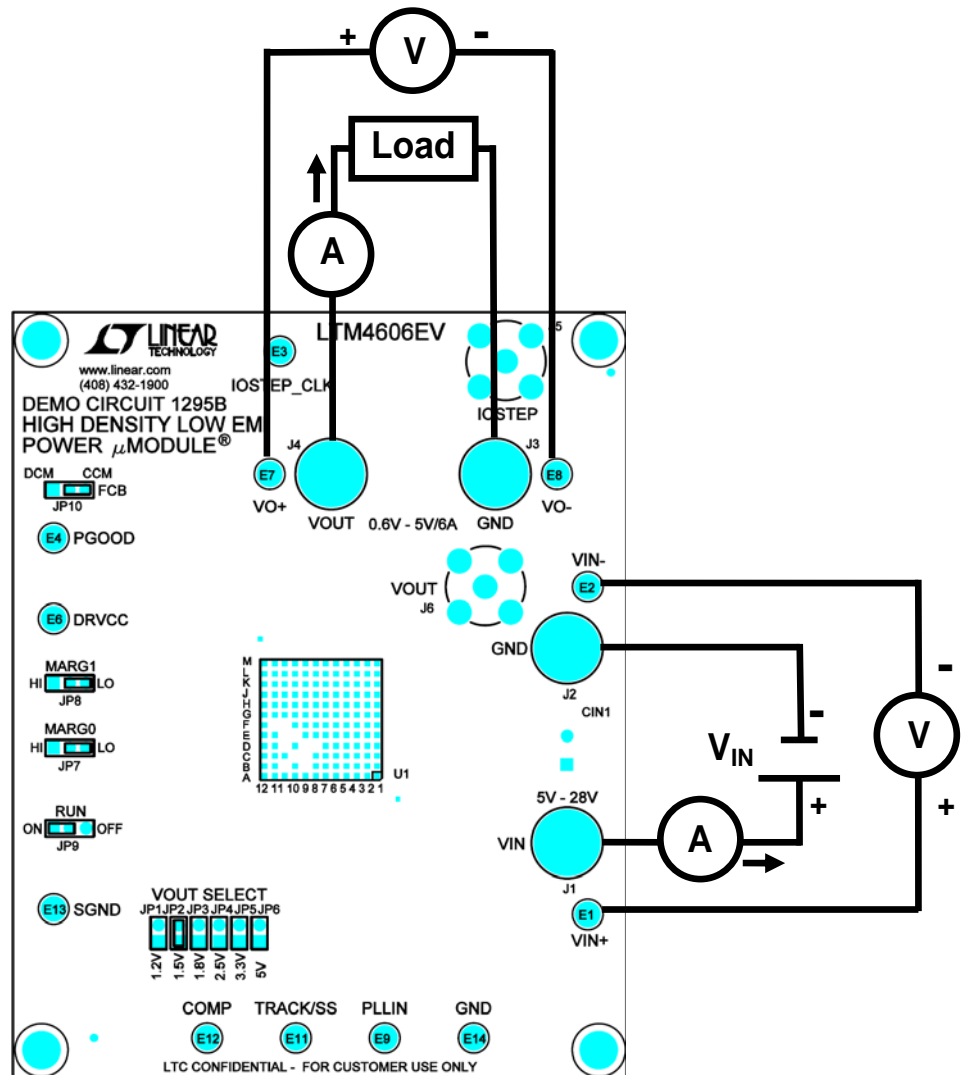


Figure 1. Test Setup of DC1295B.

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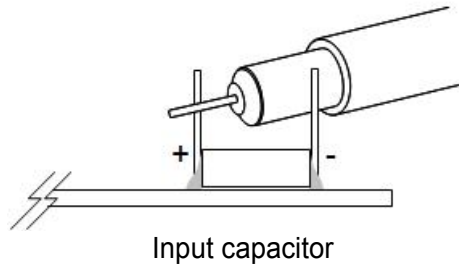
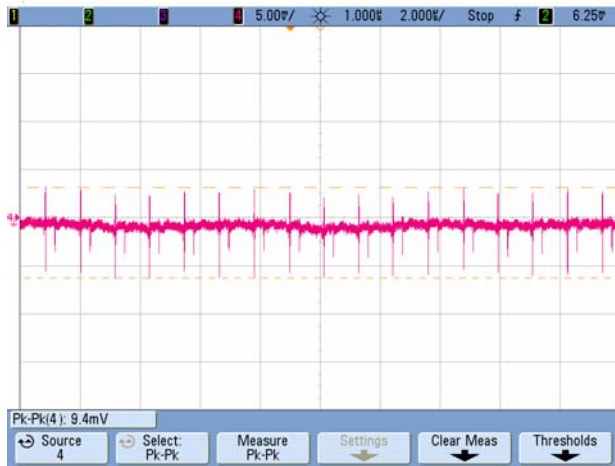
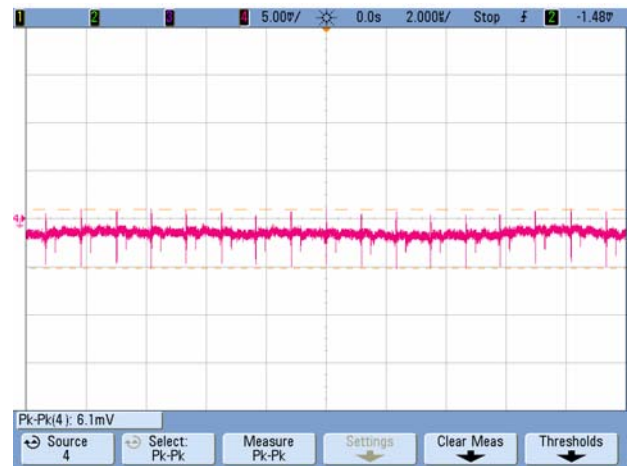


Figure 2. Scope Probe Placements for Measuring Input Ripple.



$V_{IN}=5V$, $V_{OUT}=1.2V$, $I_{OUT}=5A$

Output capacitance: 100uF+22uF ceramic caps



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Add a 1uF ceramic cap close to C_{OUT1}

Figure 3. Output Ripple (300MHz BW).

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Efficiency vs. Load Current @ 12V Vin (DCM)

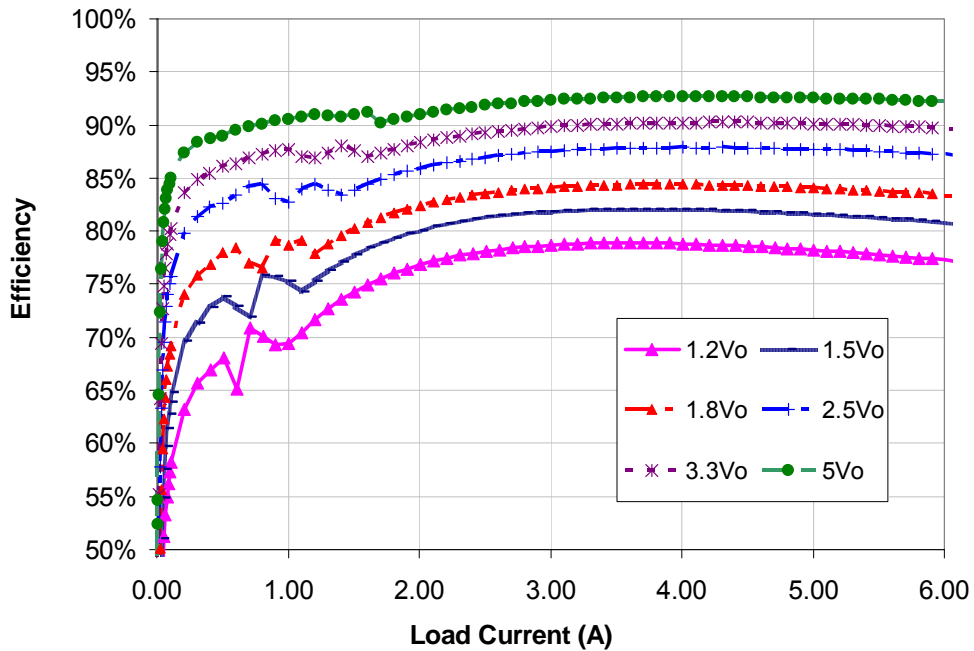
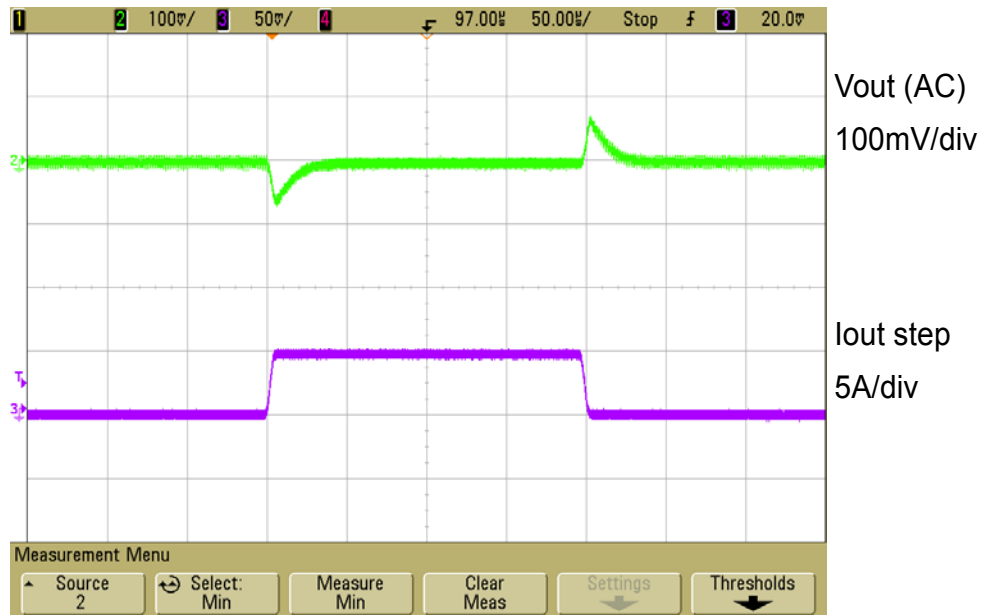


Figure 4. Measured Supply Efficiency @ 12V V_{IN} with Different V_{OUT}



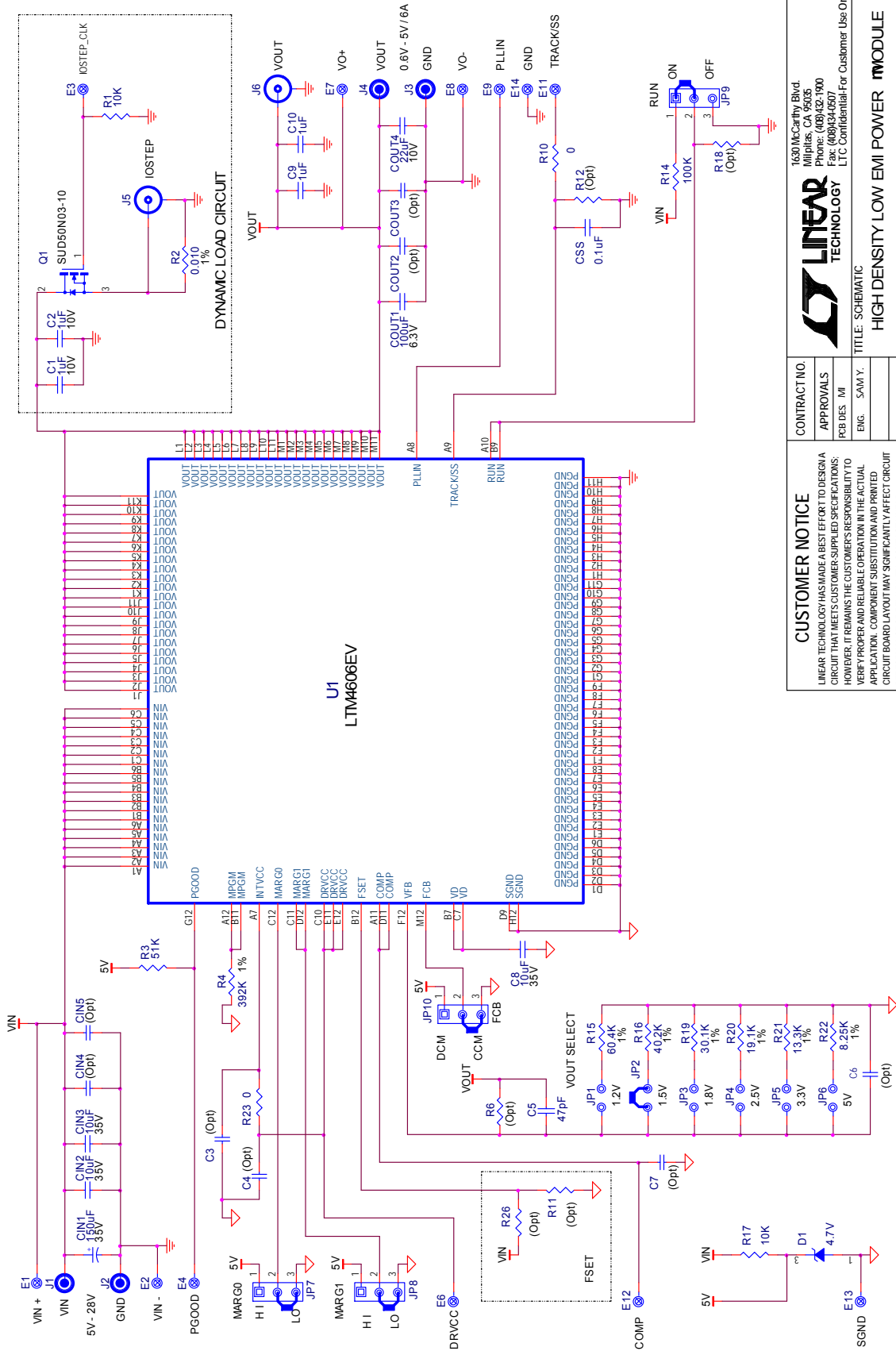
$V_{IN}=12V$, $V_{OUT}=1.5V$, 0 to 5A load step (CCM)

$C_{OUT}=100\mu F/6.3V/X5R+22\mu F/10V/X5R$ ceramic capacitors

Figure 5. Measured Load Transient Response

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REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
1	1	REMOVED AND ADDED PARTS, LAYOUT CHANGES	07/14/10	SAM Y.
		CHANGED AWW PER ATTACHED SHEETS		



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 TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE. THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.	
CONTRACT NO.	APPROVALS	1630 McCarthy Blvd., Milpitas, CA 95035 Phone: (408)432-1000 Fax: (408)944-6507 LTC Confidential-For Customer Use Only	
	ENG. SAM Y.	LINEAR TECHNOLOGY	
		TITLE: SCHEMATIC	
		HIGH DENSITY LOW EMI POWER MODULE	
SIZE	IC NO.	LTM4606EV	REV
N/A		DEMO CIRCUIT 1295B	1
DATE:	Thursday, October 21, 2010	SHEET	1 OF 1

