

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1414B-A/B 12A HIGH DENSITY POWER MODULE

LTM4601AEV
LTM4601AHVEV

DESCRIPTION

Demonstration circuit 1414B-A/B features the LTM[®]4601AEV/LTM[®]4601AHVEV, the high efficiency, high density switch mode step-down power module. LTM4601A/LTM4601AHV's LGA package is designed with redundant mounting pads to enhance solder-joint strength for extended temperature cycling endurance. The input voltage range is from 5V to 20V for DC1414B-A, and 5V to 28V for DC1414B-B. The output voltage is programmable from 0.6V to 5V, refer to step down ratio curve in the LTM4601A/LTM4601AHV datasheet. The rated load current is 12A, 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 bulk input and output capacitors are needed externally.

An internal phase-lock loop allows the Module to be synchronized to an external clock. The LTM4601A/LTM4601AHV 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 with another supply's output. Margining function is provided for the user who wants to stress their system by varying supply voltages during testing; refer to datasheet for functional diagram.

**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		20V for DC1414B-A 28V for DC1414B-B
Output Voltage V_{OUT}	Jumper selectable (open for 0.6V)	1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5V
Maximum Continuous Output Current	De-rating is necessary for certain V_{IN} , V_{OUT} , and thermal conditions	$12A_{DC}$
Default Operating Frequency		850kHz
External Sync. Clock Freq. Range	Please refer to datasheet for minimum T_{on} and T_{off} requirement.	600kHz to 1000kHz
Efficiency	$V_{IN}=12V$, $V_{OUT}=3.3V$, $I_{OUT}=12A$	89.5%, See Figure 2
Load Transient	$V_{IN}=12V$, $V_{OUT}=1.2V$	See Figure 3 for details

QUICK START PROCEDURE

Demonstration circuit 1414B-A/B is easy to set up to evaluate the performance of the LTM4601AEV/LTM4601AHVEV. 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	MARG0	MARG1
1.5V	ON	LO	LO

2. With power off, connect the input power supply, load and meters as shown in Figure 1.

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Preset the load to 0A and V_{in} supply to be less than 20V.

3. Turn on the power at the input. The output voltage should be $1.5V \pm 1\%$.
4. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters. Output ripple should be measured at J4 with a BNC cable.
5. 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 ($<15\%$) to limit the thermal stress

on the transient load circuit. The output transient current can be monitored at BNC connector J3 (10mV/A).

6. For Margining function test, place jumper MARG0 and MARG1 in the configurations shown in the following table, measure the output voltage at J4.

MARG1	MARG0	Vout
LO	LO	0
LO	HI	+5%
HI	LO	-5%
HI	HI	0

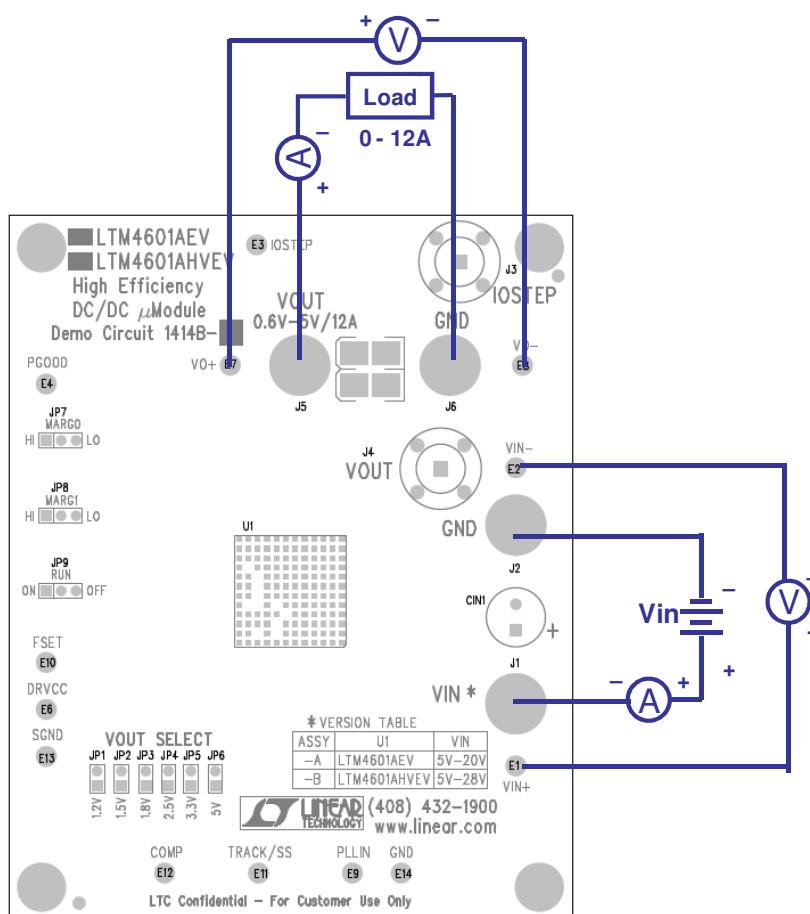


Figure 1. Test Setup of DC1414B-A/B

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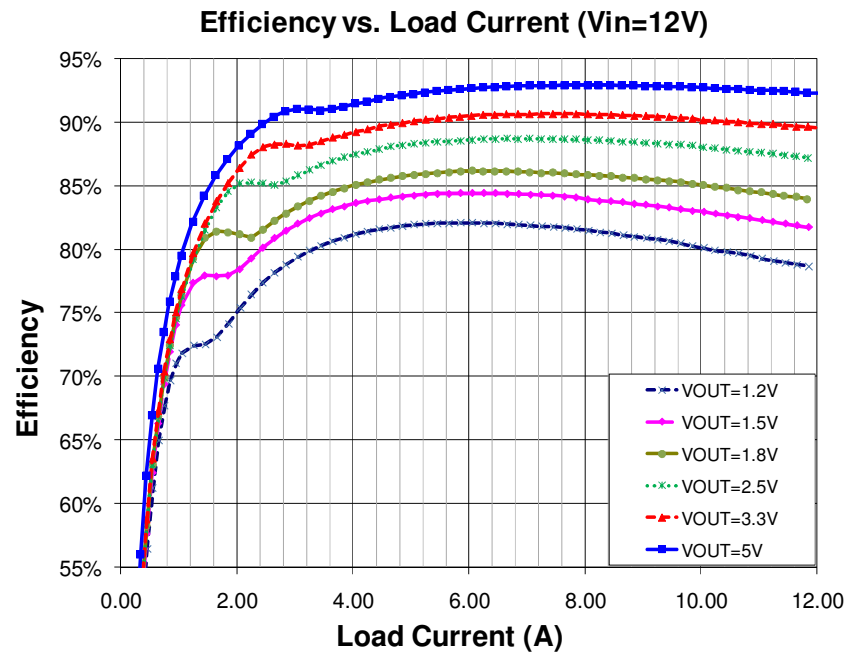
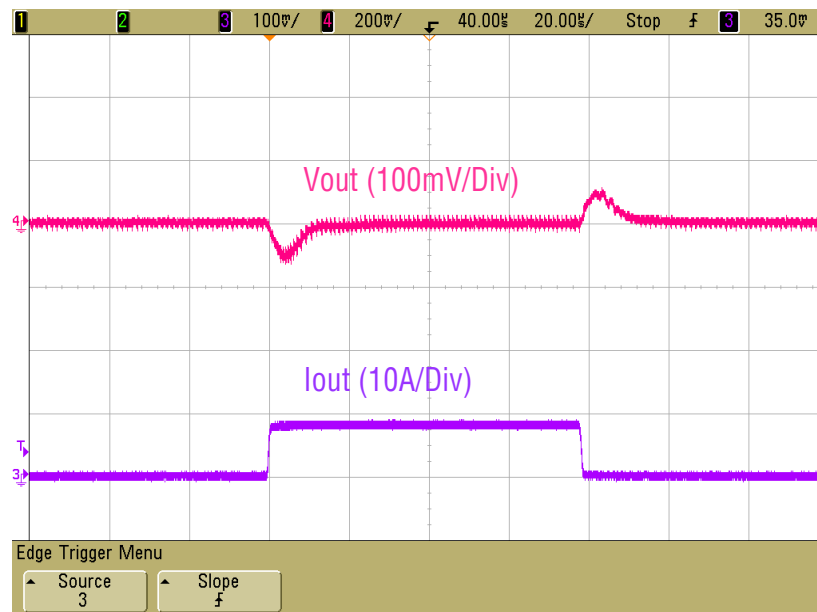


Figure 2. Measured Supply Efficiency with Different V_{OUT} ($V_{IN}=12V$) on DC1414B-A



$V_{in} = 12V$

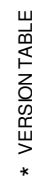
$V_{out} = 1.2V$

2A to 10A LOAD STEP

$C_{out} = 2 \times 100\mu F/3.6V/X5R/1812$ ceramic + 1 $\times 22\mu F/10V/X5R/1206$ ceramic

Figure 3. Measured Load Transient Response on DC1414B-A

LINEAR
TECHNOLOGY



Assembly Version	UI	VN
DC1414B-A	LTM4601AEV	5V -20V
DC1414B-B	LTM4601AHVEV	5V -20V

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CHECKED		J. Sun		3/25/08			
APPROVED		SIZE		CAGE CODE			
		DWG NO		REV			
		DC1414B		B			
SCALE		1		OF			
FILE NAME		SHEET		1			
Thursday, August 07, 2008							