

LTM4619EV

4.5V-28V, DUAL 4A STEP-DOWN μ MODULE

DESCRIPTION

Demonstration circuit 1453A features the LTM[®]4619EV, the high input voltage, high efficiency, high density, dual 4A step-down power module. De-rating is necessary for certain V_{IN} , V_{OUT} , and thermal conditions. The two outputs are interleaved with 180° phase to minimize the input ripple and reduce the input capacitors. A minimum design only requires the bulk input and output capacitors and voltage setting resistors. The LTM4619EV features output voltage tracking, power good indicator, RUN pin control,

clock synchronization and soft-start programming. Protection features include foldback current limiting and overvoltage protection. Burst mode or pulse skipping mode can be selected for better light load efficiency.

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	CONDITIONS / NOTES	VALUE
Minimum Input Voltage		4.5V
Maximum Input Voltage		28V
Output Voltage V_{out1}		3.3V \pm 2%
Output Voltage V_{out2}		1.8V \pm 2%
Maximum Continuous Output Current	De-rating is necessary for certain V_{IN} , V_{OUT} , and thermal conditions, see datasheet for details.	4A _{DC} for V_{out1} , V_{out2}
Default Operating Frequency	JP2 on the "500KHz" position.	500kHz
Efficiency of Channel 1	$V_{IN}=12\text{V}$, $V_{OUT1}=3.3\text{V}$, $I_{OUT1}=4\text{A}$, switching frequency = 500KHz.	89.4%, see Figure 3
Efficiency of Channel 2	$V_{IN}=12\text{V}$, $V_{OUT2}=1.8\text{V}$, $I_{OUT2}=4\text{A}$, switching frequency = 500KHz.	84.1% see Figure 3
Load Transient of Channel 1	$V_{IN}=12\text{V}$, $V_{OUT1}=3.3\text{V}$, switching frequency = 500KHz.	See Figure 4
Load Transient of Channel 2	$V_{IN}=12\text{V}$, $V_{OUT2}=1.8\text{V}$, switching frequency = 500KHz.	See Figure 5

QUICK START PROCEDURE

Demonstration circuit 1453A is easy to set up to evaluate the performance of the LTM4619EV. Please refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

- Place jumpers in the following positions for a typical 3.3V and 1.8V application:

RUN1	RUN2	TRACK1
ON	ON	Soft start

TRACK2	FREQUENCY	MODE/CLK SEL.
Soft start	500KHz	CCM

- With power off, connect the input power supply, load and meters as shown in Figure 1. Preset the loads to 0A and V_{IN} supply to be less than 28V.

3. Turn on the power at the input. The output voltage between Vo1+ and Vo1– should be $3.3V \pm 2\%$, and the voltage between Vo2+ and Vo2– should be $1.8V \pm 2\%$.
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. To measure input and output ripple, please refer to Figure 2 for proper setup.
5. For applications that V_{IN} is always below 5.5V, stuff a 0Ω resistor at R16. This prevents the switching frequency to drop because of low V_{IN} . Do not stuff R16 if V_{IN} is higher than 5.5V!
6. If the switching frequency is set to be higher than 500KHz, the $1.8V V_{OUT2}$ may not keep regulated as V_{IN} approaches its maximum value, 28V. The LTM4619 has a 90nS (typ) minimum on time, which limits its step-down ratio. Therefore, for high V_{IN} application, the switching frequency may need to be reduced by adjusting the FREQ/PLLFLTR pin voltage.
7. Both channels of the LTM4619 can track another supply. The jumpers, JP3 and JP4, allow choosing from soft-start or output tracking. If tracking ext. signal is selected, the corresponding test point, TRACK1 or TRACK2, needs to be connected to a valid voltage signal.
8. The LTM4619 can be synchronized to an external clock signal. Place the jumper JP2 in the “EXT. CLK” position, and the jumper JP1 in the “BURST MODE / EXT. CLK” position, then apply the clock signal on the “CLK SYNC” test point.

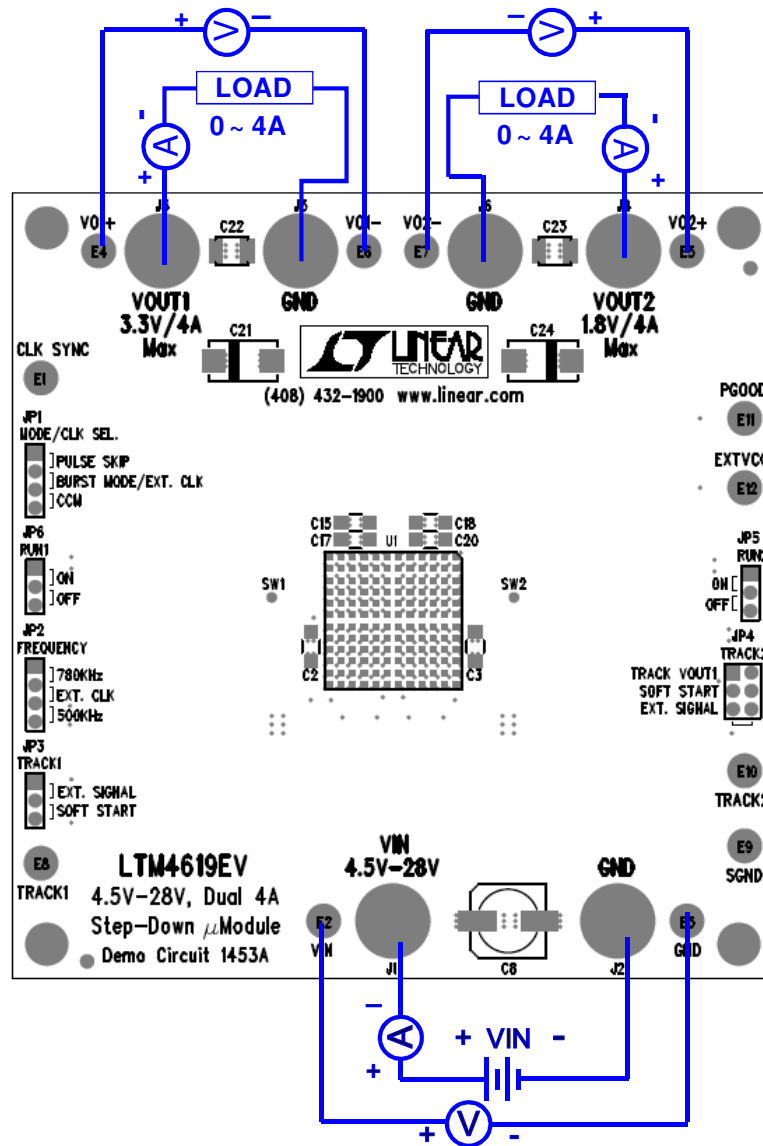
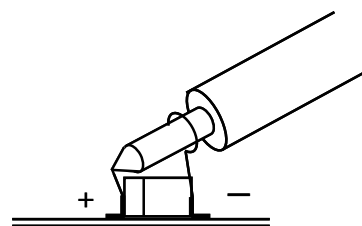


Figure 1. Test Setup of DC1453A



Input or Output Capacitor

Figure 2. Proper Scope Probe Placement for Measuring Input or Output Ripple.

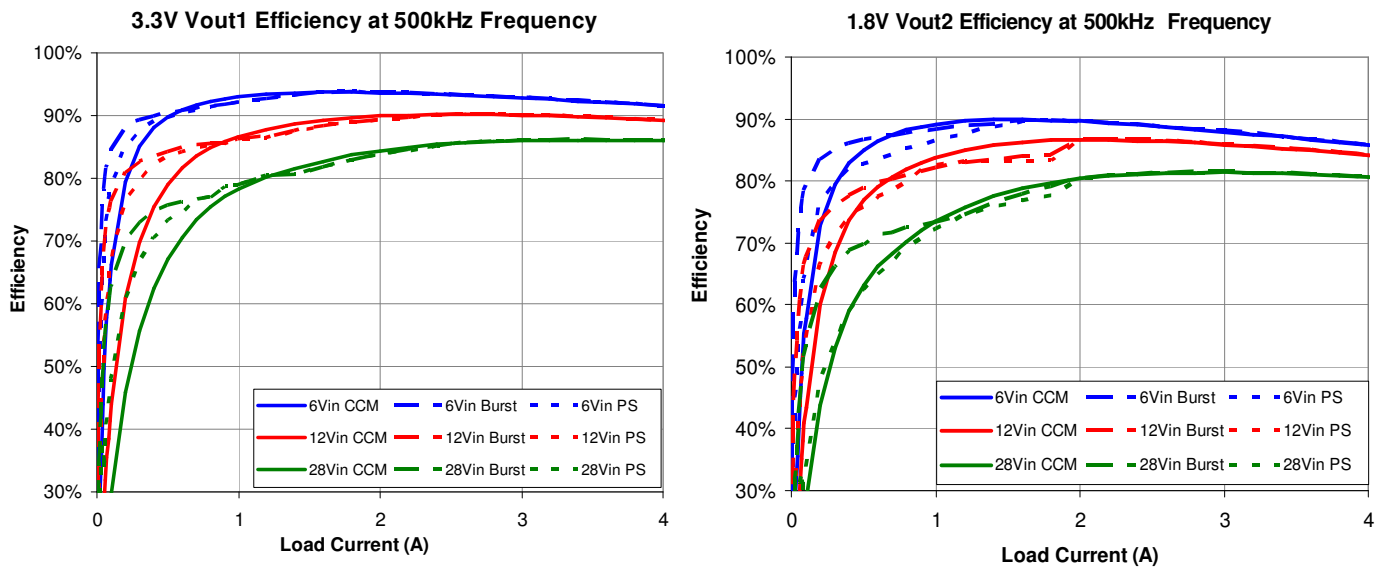
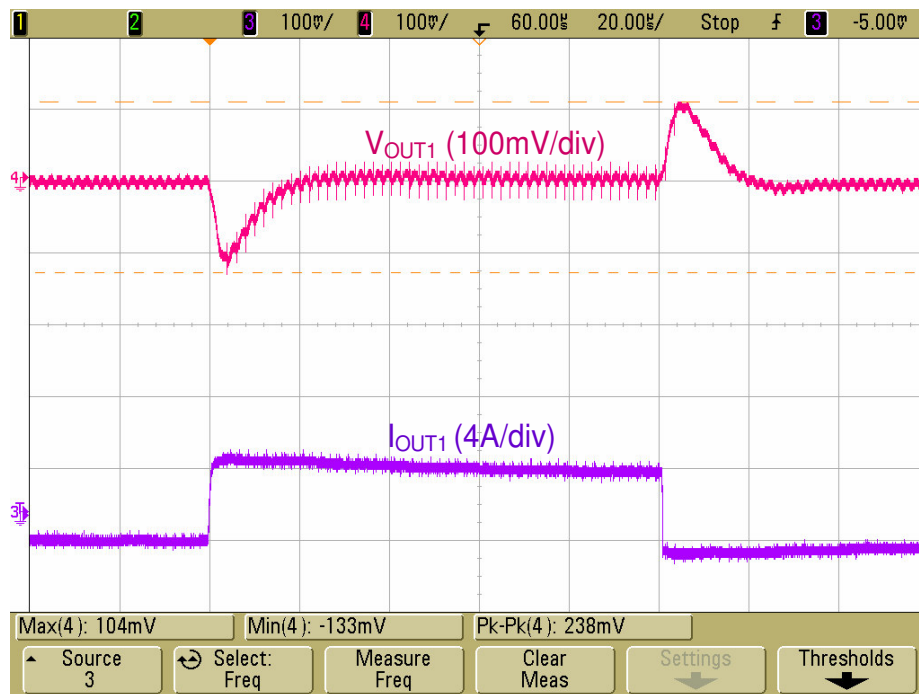


Figure 3. Measured Efficiency for two outputs on DC1453A.



$V_{IN} = 12V$
 $V_{OUT1} = 3.3V$
 Continuous Current Mode (CCM)
 0A to 4A LOAD STEP on V_{OUT1}
 $C_{OUT1} = 100\mu F$ ceramic (1210, X5R, 6.3V) + $22\mu F$ ceramic (1206, X5R, 6.3V)

Figure 4. Measured Load Transient Response for V_{OUT1} .



$V_{IN} = 12V$

$V_{OUT2} = 1.8V$

Continuous Current Mode (CCM)

0A to 4A LOAD STEP on V_{OUT2}

$C_{OUT2} = 100\mu F$ ceramic (1210, X5R, 6.3V) + $22\mu F$ ceramic (1206, X5R, 6.3V)

Figure 5. Measured Load Transient Response for V_{OUT2} .

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.

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4.5V - 28V, Dual 4A Step-Down¹, Module

Size	Document Number	Rev.
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Demo Circuit 1453A	A
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