DESCRIPTION

Demonstration Circuit 412 is a synchronous step-down regulator using the LTC3713 No R_{SENSE}™ switching regulator controller. It can operate at low input voltage down to 1.7V and supply up to 10A of output current. Higher current can be obtained by changing external components. DC412 provides a low input buck regulator to supply lower voltages for microprocessors, DSPs, and bus termination applications. An onboard boost converter generates the gate-drive voltage for the external power MOSFETs and allows the use of standard 5V logic-level N-Channel MOSFETs. **Design files for this circuit board are available. Call the LTC factory.**

JP1 sets the operation mode. The lower position selects Forced Continuous synchronous operation, which minimizes noise and RF interference, and also allows the output to sink current for applications like bus terminators. RSNS1, RSNS2, R7, R8 and D1 help in modifiying the design for symmetric current limit. Please refer to the "Applications Requiring Symmetric Current Limit" section in the LTC3713 data sheet for details.

Table 1. Performance Summary

PARAMETER	CONDITION	VALUE
Input Voltage Range		1.7V to 6V
Maximum Output Current	V_{IN} = 1.7V to 6V	10A
Outputs*	0 to 10A	1.25V ±3%
Typical Output Ripple	10MHz BW; 10A Load; V_{IN} = 3.3V	$15mV_{P-P}$
Typical Load Regulation	I_{OUT} = 0A to 10A; V_{IN} = 3.3V	-10mV
Efficiency	V_{IN} = 3.3V, V_{OUT} = 1.25V, I_{OUT} = 10A	83%

*Higher output current can be achieved by using higher current rating inductor and adding parallel MOSFETs (M3, M4).

QUICK START PROCEDURE

Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Connect the input power supply to the VIN and GND terminals.

   NOTE: Do not increase V_{IN} over 6V (If higher input voltage is desired, use higher voltage rating input capacitors. If the input voltage is always higher than 4V, you probably want to consider using demo circuit DC378, which features the LTC1778.)

2. Connect the desired load between the VOUT and GND terminals. Soldered wires should be used to achieve optimum performance.

3. Shunt JP2 and JP4 for operation. V_{OUT} goes to 0V with either JP2 or JP4 open. If JP3 is connected, overcurrent latchoff is disabled. Refer to the "Applications Information" section in the LTC3713 data sheet for details.

4. Set the FCB Jumper JP1 to the lower position to force continuous synchronous operation at light loads; or to the upper position to enable discontinuous mode operation at light loads.

5. When measuring the output ripple, see Figure 2 for the proper technique using the scope probe.

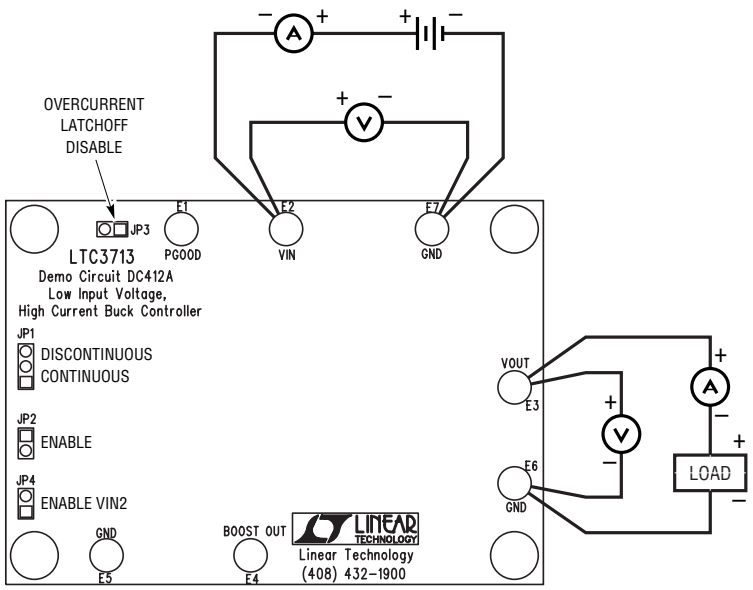

Figure 1. Proper Measurement Equipment Setup

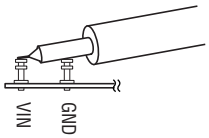

Figure 2. Scope Probe Placement for Measuring Output Ripple

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