DESCRIPTION

Demonstration circuit 474 is a step-down buck regulator using the LT1374CFE 500kHz-switching regulator. The high switching frequency allows the use of small inductors and filter components, making this circuit ideal for space conscious systems.

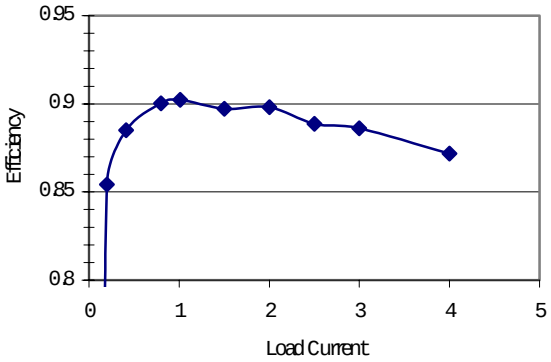

Figure 1. Efficiency, 10V V_{IN}, 5V V_{OUT}

Figure 1 shows efficiency versus load for a typical application. The best efficiency is realized with a load current between 700mA and 2 amps. Full load efficiency is 87%. The maximum allowed die temperature is 125°C. Figure 2 shows die temperature vs. output load current with V_{IN} of 12V. At full load the die temperature rise is 70°C indicating that the demo is suitable for ambient temperatures of up to 125°C – 70°C = 55°C.

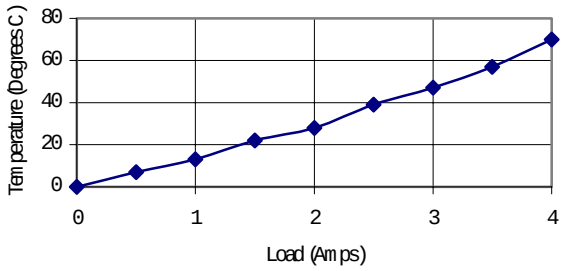

Figure 2. Die Temperature vs Output Current, V_{IN} = 12V

QUICK START PROCEDURE

Refer to Figure 3 for proper measurement equipment setup and follow the procedure below:

1. Connect input power to the Vin and GND terminals. V_{IN} should be between 5V and 25V. The power source should be capable of delivering 25W.

   NOTE: 5V output operation requires a minimum V_{IN} of 6V

2. Connect the output load to the Vout and GND terminals.

3. Select desired output voltage using the voltage selecting jumper

   NOTE: Choose 3.3V operation by moving the voltage selection jumper to the 3.3V position. Demonstration circuit 474 is optimized for 5V operation, and when operating at 3.3V out, high V_{IN} and light load some instability may arise. Increasing the output capacitance removes this instability. Use a 330µF, 4V, low ESR cap such as the "Poscap" or "Oscon".

4. To turn the circuit off, ground the terminal labeled SHDN

5. To test the synchronization feature of the demo board apply a sync signal to the sync terminal and note the shift in the operating frequency. The Sync signal should have an amplitude greater than 2.2V, duty cycle of between 10% and 90% and a frequency of 580kHz–1000kHz

MEASUREMENT NOTES

Voltage measurements

The correct way to measure voltage is at the terminal of the demo board. Attempts to measure output voltage at the load will result in a too low output voltage due to wiring loss. This is especially true at high current. Needless to say any efficiency calculation should be made using demo circuit terminal voltages as opposed to load or power source terminal voltages.

Ripple Voltage Measurements

The ceramic capacitors used in this demo board have almost no ESR and are extremely effective filters. In order to correctly measure output ripple voltage correct technique is important. The scope ground lead and sheath should be removed and the output ripple measured by placing the scope probe directly across the output Vout and GND pins as illustrated in Figure 4.

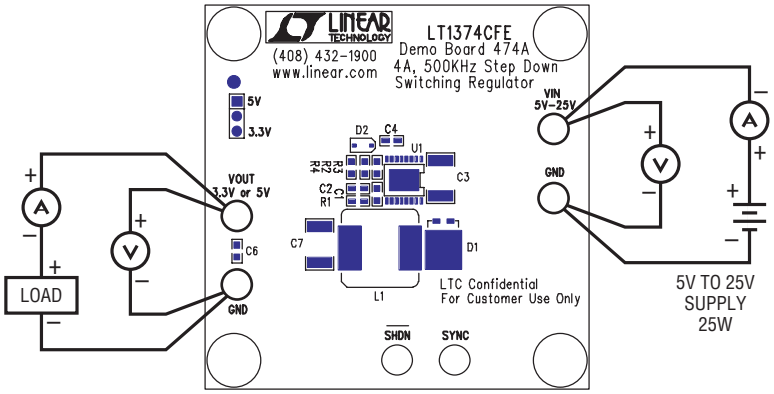

Figure 3. Proper Measurement Equipment Setup

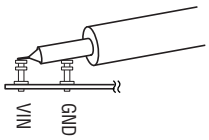

Figure 4. Scope Probe Placement for Measuring Output Ripple