


1.25MHz, 1.5A, MS8 Monolithic Step-Down Converter Keeps Switching Noise above the Signal Spectrum

by Karl Edwards

The size of communication devices is shrinking while data rates continue to rise. Building a small, efficient switching power supply in proximity to sensitive signal circuitry is increasingly difficult. The LT1767 has been designed to address this problem. At 1.25MHz, the switching frequency is above the bandwidth of many systems. If needed, the Sync pin can be

used to further increase the operating frequency to 2MHz, keeping switching noise out of any particularly sensitive frequency bands. The high switching frequency reduces the size of the input and output filtering components and allows the use of chip inductors, reducing overall system cost. The lower storage requirements of these filters make possible an all-ceramic-capacitor design.

Inside its MS8 package, the LT1767 provides regulation and control circuitry along with a high efficiency 0.22Ω switch. This small-footprint monolithic approach both reduces board space and simplifies associated circuitry. Its wide 2.7V to 25V operating supply range and 1.5A maximum switching current limit makes this part ideal in a wide range of applications. Other useful features of the LT1767 include an internal undervoltage lockout and a shutdown mode that reduces quiescent current to 6μA.

The LT1767 can be used in a variety of high-side switch converter configurations. The circuit shown in Figure 1 is a dual-output SEPIC converter, producing both 5V and -5V using only a single magnetic component. The two inductors shown are wound on a single BH Electronics toroidal core. The topology for the 5V output is a standard buck converter. If C4 were not present, the -5V topology would be a simple flyback winding coupled to the buck converter. C4 creates a SEPIC topology, which improves regulation and helps share current between L1A and L1B. Without C4, the voltage swing on L1B compared to L1A would vary due to relative loading and coupling losses. C4 provides a low impedance path to maintain an equal voltage swing in L1B, improving regulation. Figure 2 shows negative load regulation with constant positive load currents of 100mA, 200mA and 400mA. Positive load regulation error is insignificant at less than 1%. For more information on this circuit, refer to Linear Technology Design Note 100. 

DESIGN IDEAS

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Karl Edwards

Triple, High Output Current Supply Requires only 3.3V Input and Minimal Input Capacitance

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San-Hwa Chee

1.4MHz Switching Regulator Draws Only 10μA Supply Current

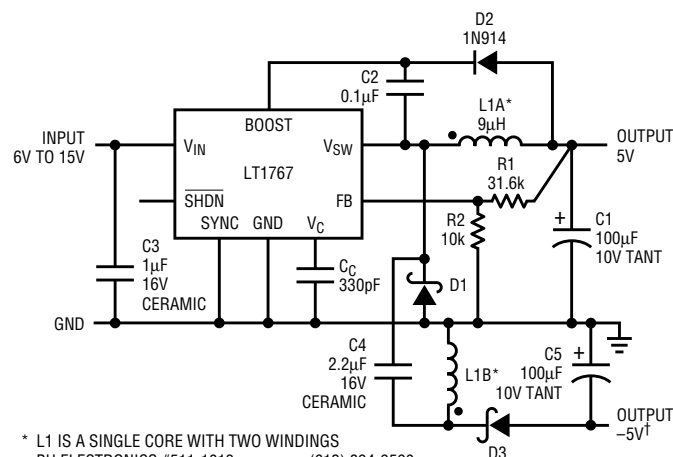
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Jaime Tseng

Infinite Sample-and-Hold Outperforms Many Legacy Sample-and-Hold Amplifiers

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Derek Redmayne



* L1 IS A SINGLE CORE WITH TWO WINDINGS
BH ELECTRONICS #511-1013 (612) 894-9590
D1, D3: ON SEMICONDUCTOR MBRD140 (602) 244-6600
† IF LOAD CAN GO TO ZERO, AN OPTIONAL PRELOAD OF 1k TO 5k MAY BE USED TO IMPROVE LOAD REGULATION

Figure 1. Dual-output SEPIC converter

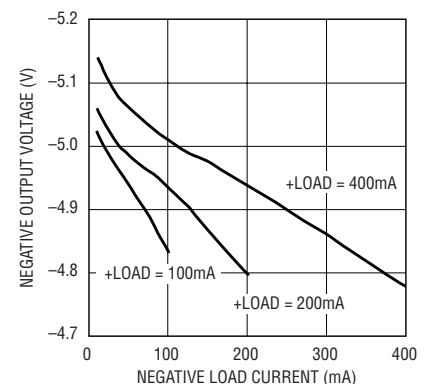


Figure 2. Negative load regulation at several positive loads