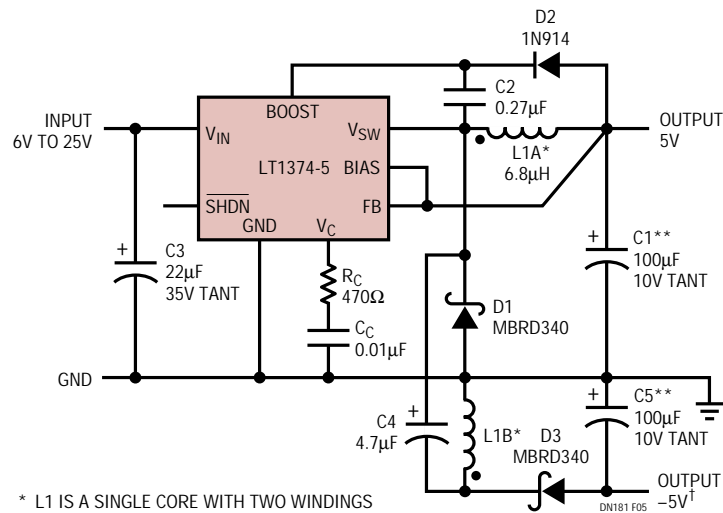


## Dual Output SEPIC Converter Operates Over Wide Input Range

The circuit below generates both positive and negative 5V outputs from two windings on a single core. The converter for the 5V output is a standard buck converter. The -5V topology would be a simple flyback winding coupled to the buck converter if C4 were not present. C4 creates a SEPIC (single-ended primary inductance converter) topology, which improves regulation and reduces ripple current in L1. 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. In a flyback converter, during switch on-time, all the converter's

energy is stored in L1A only, since no current flows in L1B. At switch off, energy is transferred by magnetic coupling into L1B, powering the -5V rail. C4 pulls L1B positive during switch on-time, causing current to flow and energy to build in L1B and C4. At switch off, the energy stored in both L1B and C4 supplies the -5V rail. This reduces the current in L1A and changes L1B's current waveform from square to triangular. This circuit is ideal for meeting the demands of medium power  $\pm 5V$  applications in compact designs with high peak loads.



\* L1 IS A SINGLE CORE WITH TWO WINDINGS  
 BH ELECTRONICS #501-0726 (612) 894-9590  
 \*\* TOKIN IE475ZY5U-C304 (408) 432-8020  
 † IF LOAD CAN GO TO ZERO, AN OPTIONAL  
 PRELOAD OF 1k TO 5k MAY BE USED TO  
 IMPROVE LOAD REGULATION

Source: Design Note 181  
[www.linear-tech.com/distrib.html](http://www.linear-tech.com/distrib.html)