TFT LCDs used in portable devices today typically need three different supply voltages: 5V, 15V, and –10V. One way to generate these three voltages is to use a single DC/DC converter and a large number of external components, but this results in mediocre line and load regulation. The LT1944-1 dual micropower DC/DC converter simplifies LCD power supply design by generating three well-regulated output voltages using a small number of external components. Both DC/DC converters in the LT1944-1 use a constant-off-time Burst Mode® control scheme to ensure high efficiency at very light load currents. The two converters are independently optimized for high and low step-up ratios: the first converter generates –10V and 15V using a switch current limited at 100mA with a 400ns off-time, while the second converter generates 5V using a switch current limited to 175mA with a 1.5µs off-time. The longer off-time of the second converter ensures a well-controlled inductor current for applications where the step-up ratio is low (i.e. in a Li-Ion to 5V converter or a 2-cell alkaline to 3.3V converter).

The circuit shown in Figure 1 generates three output voltages from a single Li-Ion battery. This power supply can provide 5V at 30mA, 15V at 2.5mA, and –10V at 1mA, making it ideal for the small LCDs found in cellular phones and handheld computers. If needed, the –10V output can be easily changed to a –15V output by connecting the cathode of diode D3 to ground instead of to the 5V output. The LT1944-1 operates from an input voltage of 1.2V to 15V and is capable of producing output voltages up to ±35V, making it a good choice for a wide variety of applications needing multiple output voltages.

Figure 1. Triple output power supply for LCDs