Low Noise 33V Varactor Bias Supply

by Jeff Witt

Wideband tuning circuits, such as those used in cable television systems, require a power supply for driving a varactor. This bias supply is usually at a voltage higher than the system supply voltage, allowing a large tuning range. The supply must have very little noise; voltage ripple, for example, can appear as sidebands on a local oscillator. This circuit takes advantage of the fixed operating frequency of the LT1317B boost regulator to generate a low noise 33V bias voltage.

The circuit (Figure 1) is a simple boost regulator with its output voltage doubled by diodes D2 and D3 and capacitor C3. With this doubler, the circuit can generate an output voltage greater than the voltage rating of the LT1317B's internal power switch. This supply can deliver 10mA at 33V from a 3V to 6V input, allowing operation from either 3.3V or 5V logic rails. The high operating frequency (600kHz) results in low, easily filtered output ripple, as shown in Figure 2. The high frequency also allows the use of small, low cost external components.

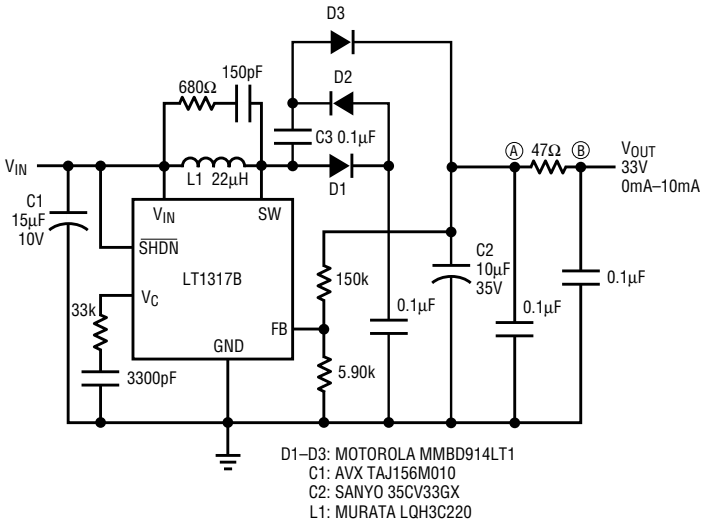

Figure 1. This circuit generates a low noise bias supply for varactor-based tuning circuits.

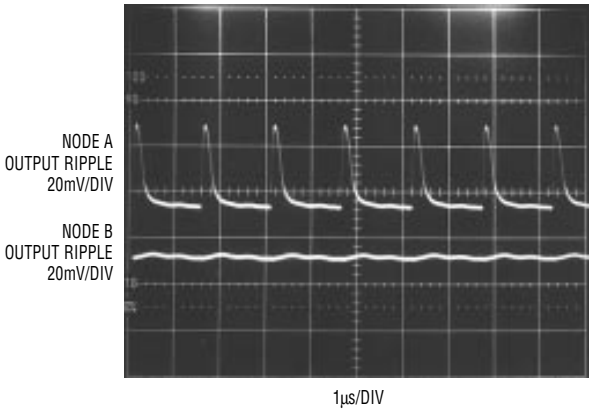

Figure 2. The output ripple of Figure 1's supply as it delivers 5mA at 33V from a 5V input; traces A and B show ripple before and after the RC output filter, respectively.

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