

Small, simple, high-voltage supply features single IC

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Sensors, electrostatic traps, and other applications require

regulated, high-voltage power supplies that deliver modest amounts of

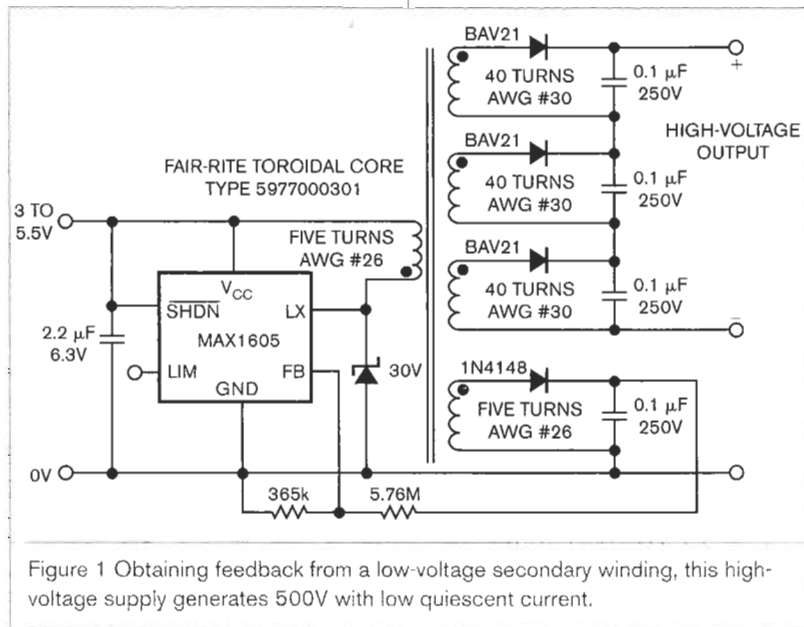


Figure 1 Obtaining feedback from a low-voltage secondary winding, this high-voltage supply generates 500V with low quiescent current.

output current. Simplicity, low quiescent current, and compactness are desirable in such supplies. The circuit of **Figure 1** meets these requirements, and its magnetically isolated output allows you to configure a positive, negative, or floating output. A separate winding that generates a feedback voltage proportional to the output voltage, but lower, enables the floating output. This arrangement eliminates the need for high-value resistors in a resistive-feedback divider, which the circuit would otherwise require for direct sampling of the high-voltage output. This low-voltage divider contains resistors with much lower values, which dissipate much less power.

The MAX1605 IC from Maxim (www.maxim-ic.com) contains the necessary switching regulator, modulator, error amplifier, and power switches (**Reference 1**). It drives the primary of a toroidal transformer that includes a feedback secondary and several output windings. With the component values in the **figure**, the circuit can generate 500V (**figures 2 and 3**). You can vary the output voltage $\pm 30\%$ by adjust-

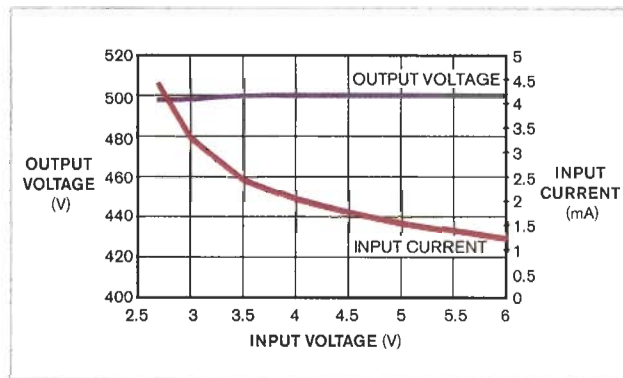


Figure 2 The graph shows output voltage and input current versus input voltage.

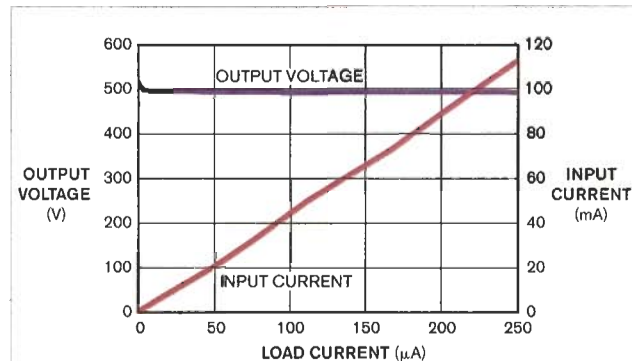


Figure 3 The graph shows output voltage and input current versus load current.

ing the ratio of the resistive-feedback divider. You can also increase or decrease the output voltage in steps by adding or removing the rectifier/capacitor/output-winding modules. The BAV21 is a high-voltage, low-reverse-current, general-purpose diode.

As with all switching converters, EMI

(electromagnetic interference) and circuit parasitics can present problems. The circuit needs careful PCB (printed-circuit-board) layout, along with filtering, decoupling, and shielding. The high-voltage output has approximately 1% ripple. You can add an RC or an LC filter in series with the output to

achieve lower output ripple. **EDN**

REFERENCE

■ "30V Internal Switch LCD Bias Supply," MAX1605 data sheet, Maxim, October 2003, <http://datasheets.maxim-ic.com/en/ds/MAX1605.pdf>.