

FIGURE 3-35a The internal schematic of the TL431 featuring a 2.5 V reference voltage.

The output drives a bipolar transistor, actually making the TL431 a shunt regulator: when the voltage on the reference pin (R) is below 2.5 V, the transistor remains open, and the TL431 is transparent to the circuit. As soon as the voltage exceeds the reference, the transistor starts to conduct and a current circulates inside the device. If an optocoupler LED appears in series with the cathode, it becomes possible to build an opto-isolated feedback system. Figure 3-35b shows how most of today's power supplies implement a TL431: here, in a typical flyback converter.

The TL431 also exists in different precision versions, depending on what you are looking for. In some cases where you need output voltages below 2.5 V, the TLV431 might be a good choice. The latter also features a smaller minimum biasing current compared to the TL431. It can be a good advantage in low-standby-power designs. The following array compares all versions.

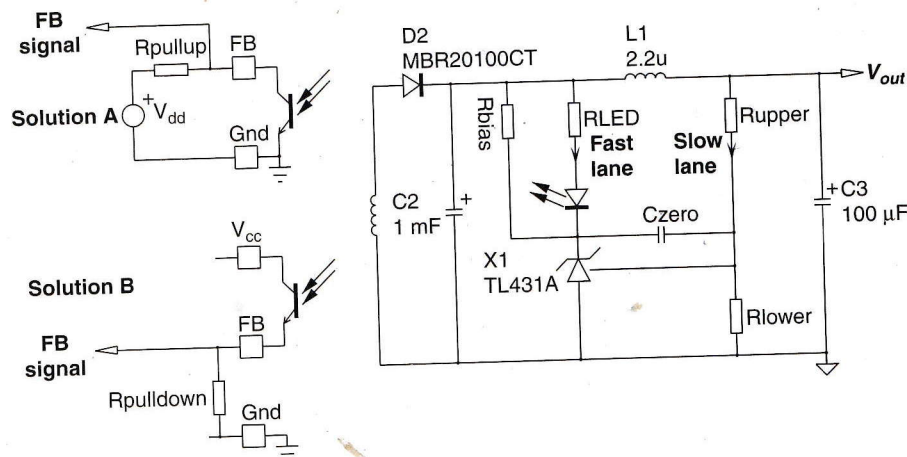


FIGURE 3-35b A TL431 monitors a portion of the output voltage and activates an optocoupler LED to transmit the feedback information to the nonisolated primary side.