

# Design Idea DI-41

## TOPSwitch-GX<sup>®</sup> 43 W, 100/115 VAC

### Multi-output Set-top Box Power Supply



Application	Device	Power Output	Input Voltage	Output Voltage	Topology
Set-top Box	TOP247Y	43 W cont. / 57 W pk	90-132 VAC	3.3 V, 5 V, 12 V, 18 V, 33 V	Flyback

### Design Highlights

- Low cost, low component count solution
- Excellent output voltage tracking and cross-regulation - no linear regulators required
- High efficiency, >71% at 90 VAC
- Line undervoltage detection (UV) and power system surge protection (OV)
- Meets CISPR22B/EN55022B conducted EMI limits
- Differential and common mode surge immunity to 4 kV (EN61000-4-5)
- 100 kHz ring wave immunity to 4 kV (IEEE C62.41)

### Operation

The design in Figure 1 utilizes the TOP247Y and takes advantage of many of the TOPSwitch-GX features. Line UV and OV (100 V and 450 V, respectively) are implemented using a single 2 MΩ resistor (R1). Undervoltage eliminates output glitches and overvoltage provides protection for both short duration transients and long duration power system surges. Resistor R4 programs the internal current limit of U1 to 80% of nominal, limiting overload power.

The key performance characteristic of the circuit shown is the excellent output voltage tracking and cross-regulation. Two techniques are used to properly center the output voltages. The extra voltage drop of the ultra-fast rectifier D10 (used instead of a Schottky) centers the 5 V output at precisely 5 V

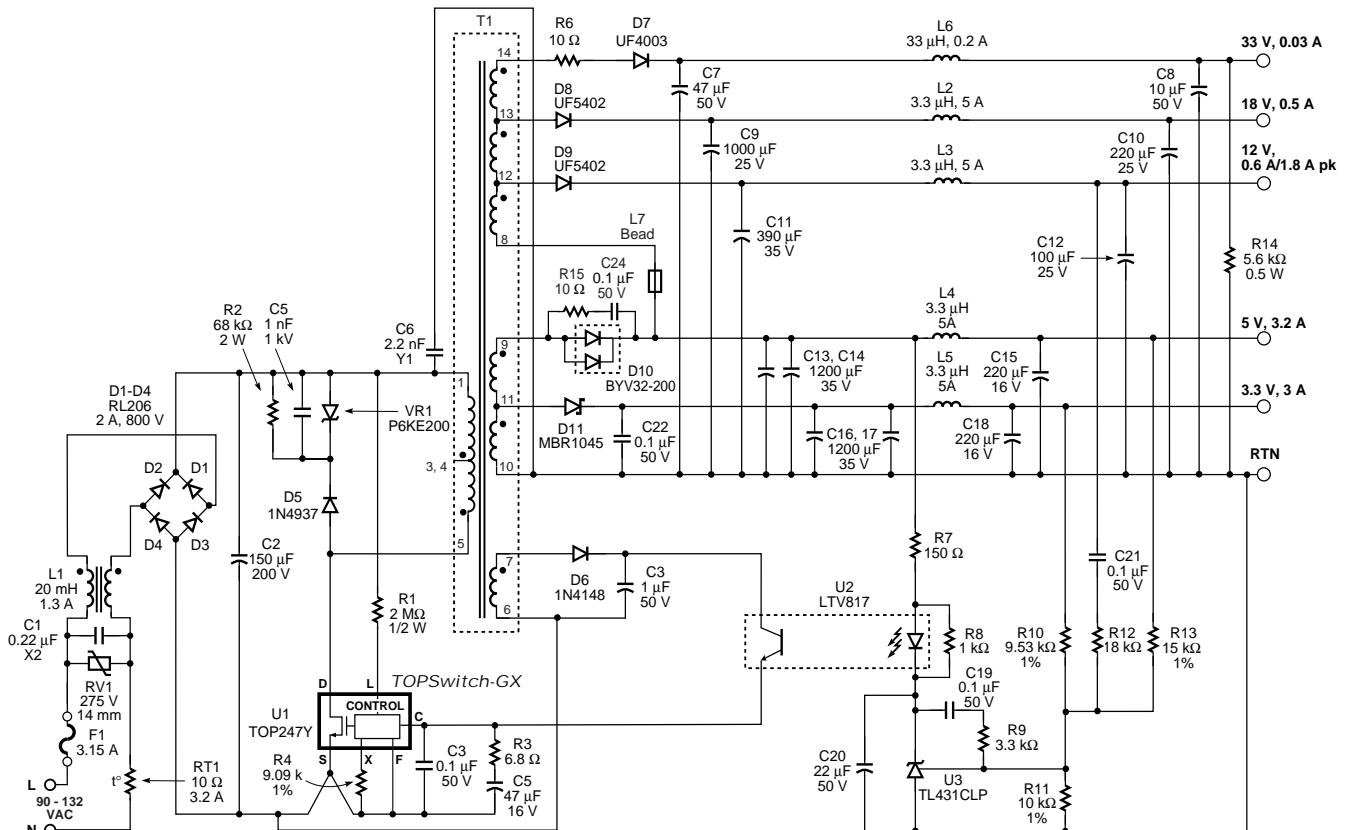


Figure 1. TOPSwitch-GX 43 W Continuous, 57 W Peak Set-Top Box Power Supply.

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