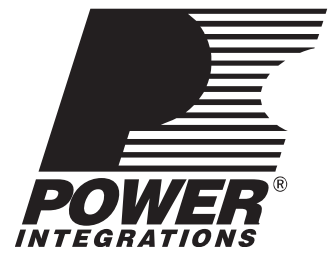


# TNY263-268

## TinySwitch-II® Family

Enhanced, Energy Efficient,  
Low Power Off-line Switcher



### Product Highlights

#### TinySwitch-II Features Reduce System Cost

- Fully integrated auto-restart for short circuit and open loop fault protection – saves external component costs
- Built-in circuitry practically eliminates audible noise with ordinary dip-varnished transformer
- Programmable line under-voltage detect feature prevents power on/off glitches – saves external components
- Frequency jittering dramatically reduces EMI (~10 dB) – minimizes EMI filter component costs
- 132 kHz operation reduces transformer size – allows use of EF12.6 or EE13 cores for low cost and small size
- Very tight tolerances and negligible temperature variation on key parameters eases design and lowers cost
- Lowest component count switcher solution
- Expanded scalable device family for low system cost

#### Better Cost/Performance over RCC & Linears

- Lower system cost than RCC, discrete PWM and other integrated/hybrid solutions
- Cost effective replacement for bulky regulated linears
- Simple ON/OFF control – no loop compensation needed
- No bias winding – simpler, lower cost transformer
- Simple design practically eliminates rework in manufacturing

#### EcoSmart® – Extremely Energy Efficient

- No load consumption <50 mW with bias winding and <250 mW without bias winding at 265 VAC input
- Meets California Energy Commission (CEC), Energy Star, and EU requirements
- Ideal for cell-phone charger and PC standby applications

#### High Performance at Low Cost

- High voltage powered – ideal for charger applications
- High bandwidth provides fast turn on with no overshoot
- Current limit operation rejects line frequency ripple
- Built-in current limit and thermal protection improves safety

### Description

TinySwitch-II integrates a 700 V power MOSFET, oscillator, high voltage switched current source, current limit and thermal shutdown circuitry onto a monolithic device. The start-up and operating power are derived directly from the voltage on the DRAIN pin, eliminating the need for a bias winding and associated circuitry. In addition, the

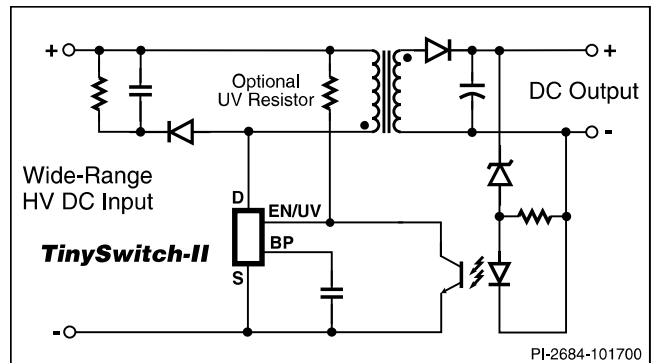
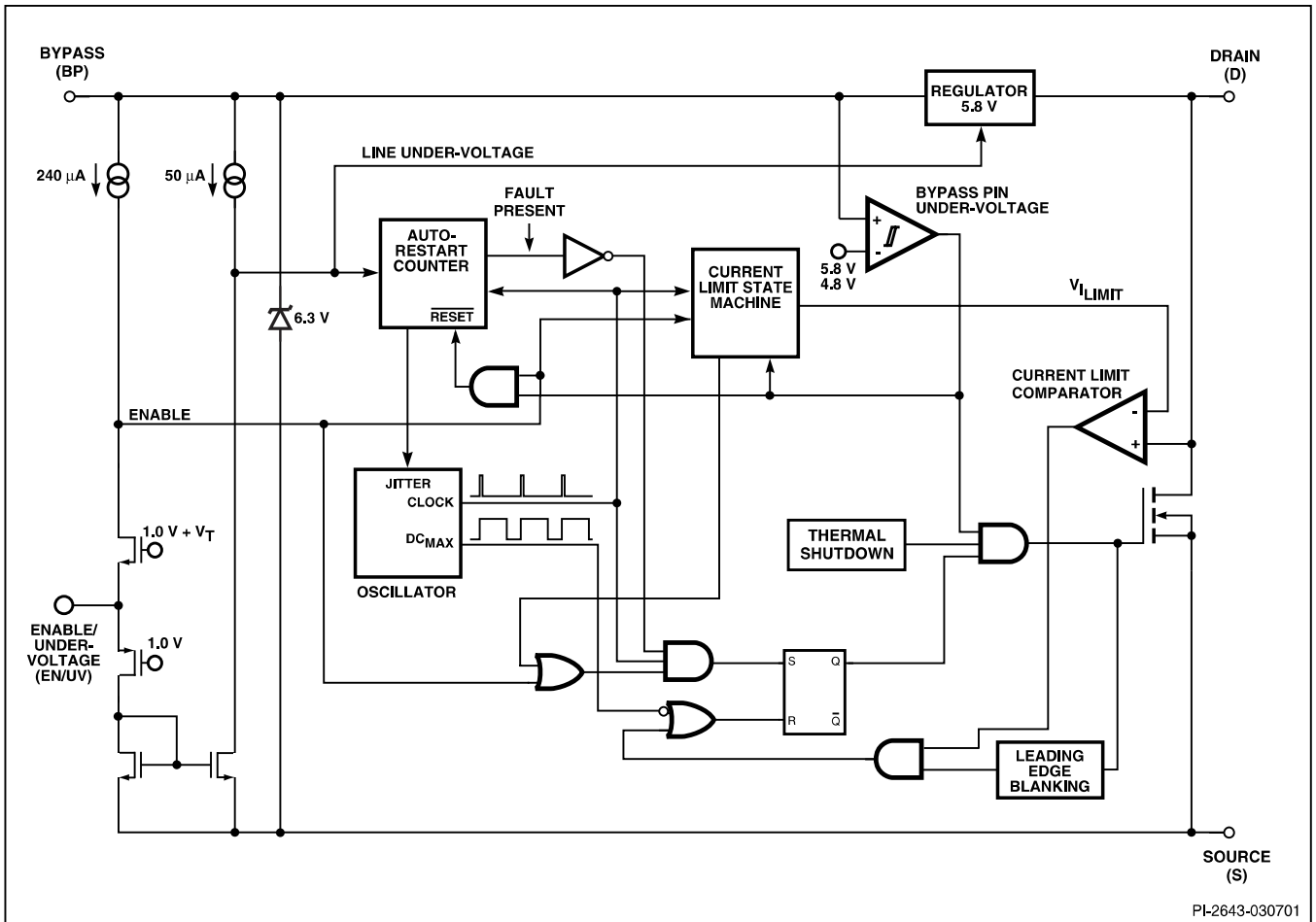


Figure 1. Typical Standby Application.

OUTPUT POWER TABLE				
PRODUCT <sup>3</sup>	230 VAC ±15%		85-265 VAC	
	Adapter <sup>1</sup>	Open Frame <sup>2</sup>	Adapter <sup>1</sup>	Open Frame <sup>2</sup>
TNY263 P or G	5 W	7.5 W	3.7 W	4.7 W
TNY264 P or G	5.5 W	9 W	4 W	6 W
TNY265 P or G	8.5 W	11 W	5.5 W	7.5 W
TNY266 P or G	10 W	15 W	6 W	9.5 W
TNY267 P or G	13 W	19 W	8 W	12 W
TNY268 P or G	16 W	23 W	10 W	15 W

Table 1. Notes: **1.** Minimum continuous power in a typical non-ventilated enclosed adapter measured at 50 °C ambient. **2.** Minimum practical continuous power in an open frame design with adequate heat sinking, measured at 50 °C ambient (See Key Applications Considerations). **3.** Packages: P: DIP-8B, G: SMD-8B. For lead-free package options, see Part Ordering Information.

TinySwitch-II devices incorporate auto-restart, line under-voltage sense, and frequency jittering. An innovative design minimizes audio frequency components in the simple ON/OFF control scheme to practically eliminate audible noise with standard taped/varnished transformer construction. The fully integrated auto-restart circuit safely limits output power during fault conditions such as output short circuit or open loop, reducing component count and secondary feedback circuitry cost. An optional line sense resistor externally programs a line under-voltage threshold, which eliminates power down glitches caused by the slow discharge of input storage capacitors present in applications such as standby supplies. The operating frequency of 132 kHz is jittered to significantly reduce both the quasi-peak and average EMI, minimizing filtering cost.



PI-2643-030701

Figure 2. Functional Block Diagram.

## Pin Functional Description

### DRAIN (D) Pin:

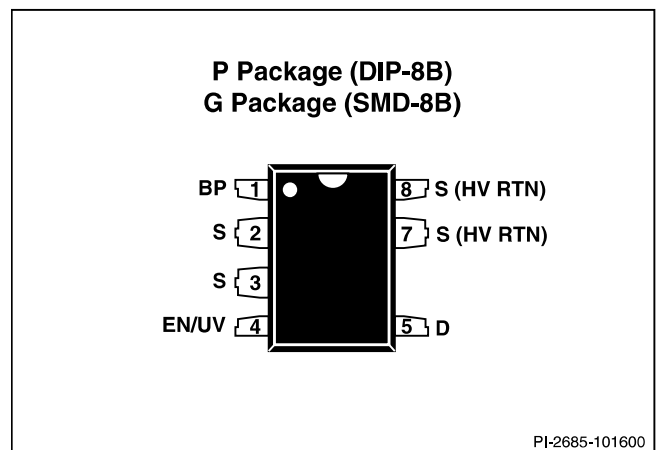
Power MOSFET drain connection. Provides internal operating current for both start-up and steady-state operation.

### BYPASS (BP) Pin:

Connection point for a 0.1 μF external bypass capacitor for the internally generated 5.8 V supply.

### ENABLE/UNDER-VOLTAGE (EN/UV) Pin:

This pin has dual functions: enable input and line under-voltage sense. During normal operation, switching of the power MOSFET is controlled by this pin. MOSFET switching is terminated when a current greater than 240 μA is drawn from this pin. This pin also senses line under-voltage conditions through an external resistor connected to the DC line voltage. If there is no external resistor connected to this pin, *TinySwitch-II* detects its absence and disables the line under-voltage function.



PI-2685-101600

Figure 3. Pin Configuration.

### SOURCE (S) Pin:

Control circuit common, internally connected to output MOSFET source.

### SOURCE (HV RTN) Pin:

Output MOSFET source connection for high voltage return.

