

TNY174-180

TinySwitch-LT[®] Family

Energy Efficient, Offline Switcher with
Enhanced Flexibility and Extended Power Range



Product Highlights

Lowest System Cost with Enhanced Flexibility

- 650 V rating optimized for non-active PFC applications
- Simple ON/OFF control, no loop compensation needed
- Selectable current limit through BP/M capacitor value
 - Higher current limit extends peak power or, in open frame applications, maximum continuous power
 - Lower current limit improves efficiency in enclosed adapters/chargers
 - Allows optimum *TinySwitch-LT* choice by swapping devices with no other circuit redesign
- Tight I²f parameter tolerance reduces system cost
 - Maximizes MOSFET and magnetics power delivery
 - Minimizes max overload power, reducing cost of transformer, primary clamp & secondary components
- ON-time extension – extends low line regulation range/hold-up time to reduce input bulk capacitance
- Self-biased: no bias winding or bias components
- Frequency jittering reduces EMI filter costs
- Pin-out simplifies heatsinking to the PCB
- SOURCE pins are electrically quiet for low EMI

Enhanced Safety and Reliability Features

- Accurate hysteretic thermal shutdown protection with automatic recovery eliminates need for manual reset
- Auto-restart delivers <3% of maximum power in short circuit and open loop fault conditions
- Output overvoltage shutdown with optional Zener
- Very low component count enhances reliability and enables single-sided printed circuit board layout
- High bandwidth provides fast turn on with no overshoot and excellent transient load response
- Extended creepage between DRAIN and all other pins improves field reliability

EcoSmart[®] – Extremely Energy Efficient

- Easily meets all global energy efficiency regulations
- No-load <150 mW at 265 VAC without bias winding, <50 mW with bias winding
- ON/OFF control provides constant efficiency down to very light loads – ideal for mandatory CEC regulations

Applications

- Chargers/adapters for cell/cordless phones, PDAs, digital cameras, MP3/portable audio, shavers, etc.
- DVD/PVR and other low power set top decoders
- Supplies for appliances, industrial systems, metering, etc.

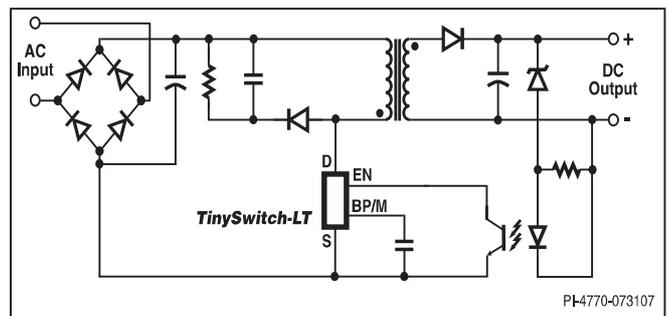


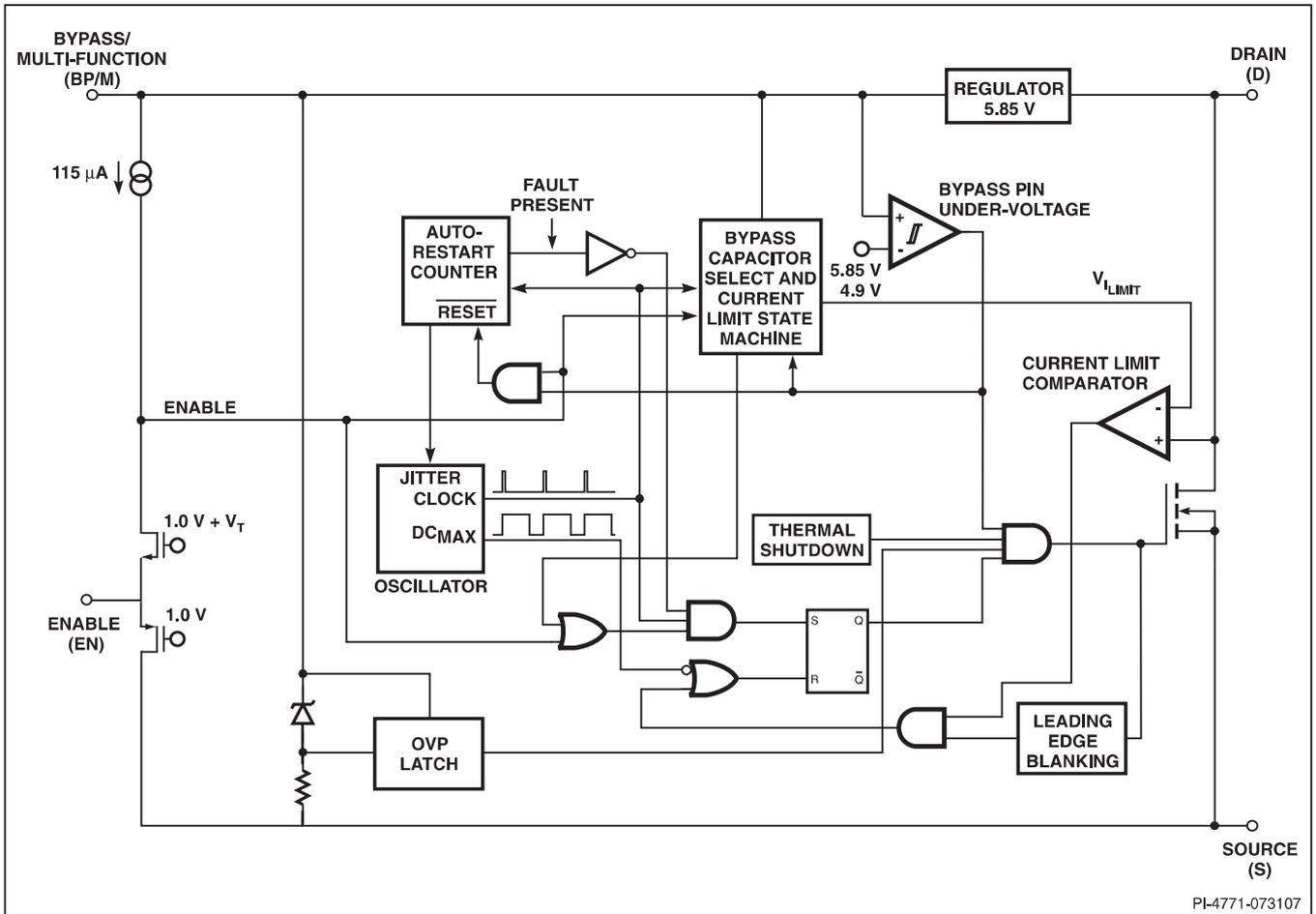
Figure 1. Typical Application.

| OUTPUT POWER TABLE | | | | |
|----------------------|----------------------|---------------------------------|----------------------|---------------------------------|
| PRODUCT ³ | 230 VAC ±15% | | 85-265 VAC | |
| | Adapter ¹ | Peak or Open Frame ² | Adapter ¹ | Peak or Open Frame ² |
| TNY174PN | 6 W | 11 W | 5 W | 8.5 W |
| TNY175PN | 8.5 W | 15 W | 6 W | 11.5 W |
| TNY176PN | 10 W | 19 W | 7 W | 15 W |
| TNY177PN | 13 W | 23.5 W | 8 W | 18 W |
| TNY178PN | 16 W | 28 W | 10 W | 21.5 W |
| TNY179PN | 18 W | 32 W | 12 W | 25 W |
| TNY180PN | 20 W | 36.5 W | 14 W | 28.5 W |

Table 1. Notes: 1. Minimum continuous power in a typical non-ventilated enclosed adapter measured at 50 °C ambient. Use of an external heatsink will increase power capability 2. Minimum peak power capability in any design or minimum continuous power in an open frame design (see Key Application Considerations). 3. Packages: P: DIP-8C, G: SMD-8C. See Part Ordering Information.

Description

TinySwitch-LT incorporates a 650 V power MOSFET, oscillator, high voltage switched current source, current limit (user selectable) and thermal shutdown circuitry. The IC family uses an ON/OFF control scheme and offers a design flexible solution with a low system cost and extended power capability.



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Figure 2. Functional Block Diagram.

Pin Functional Description

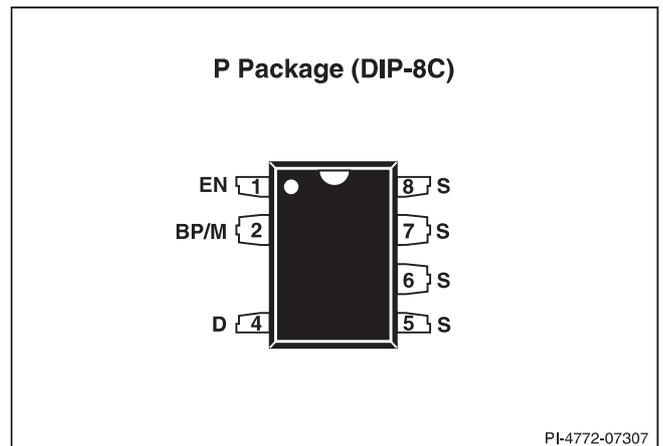
DRAIN (D) Pin:

This pin is the power MOSFET drain connection. It provides internal operating current for both startup and steady-state operation.

BYPASS/MULTI-FUNCTION (BP/M) Pin:

This pin has multiple functions:

1. It is the connection point for an external bypass capacitor for the internally generated 5.85 V supply.
2. It is a mode selector for the current limit value, depending on the value of the capacitance added. Use of a 0.1 μF capacitor results in the standard current limit value. Use of a 1 μF capacitor results in the current limit being reduced to that of the next smaller device size. Use of a 10 μF capacitor results in the current limit being increased to that of the next larger device size for TNY175-180.
3. It provides a shutdown function. When the current into the bypass pin exceeds I_{SD} , the device latches off until the BP/M voltage drops below 4.9 V, during a power down. This can be used to provide an output overvoltage function



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Figure 3. Pin Configuration.

with a Zener connected from the BP/M pin to a bias winding supply.

ENABLE (EN) Pin:

The switching of the power MOSFET is controlled by this pin. MOSFET switching is terminated when a current greater than

