

TNY284-290 TinySwitch-4 Family

Energy-Efficient, Off-Line Switcher with
Line Compensated Overload Power

Product Highlights

Lowest System Cost with Enhanced Flexibility

- 725 V rated MOSFET
 - Increases BV de-rating margin
- Line compensated overload power – no additional components
 - Dramatically reduces max overload variation over universal input voltage range
- $\pm 5\%$ turn on UV threshold: line voltage sense with single external resistor
- 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™-4 choice by swapping devices with no other circuit redesign
- Tight I²f parameter tolerance reduces system cost
 - Maximizes MOSFET and magnetics utilization
- 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 heat sinking to the PCB
- SOURCE pins are electrically quiet for low EMI

Enhanced Safety and Reliability Features

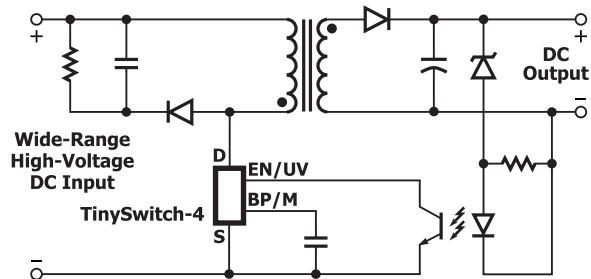
- Accurate hysteretic thermal shutdown protection with automatic recovery eliminates need for manual reset
- Auto-restart delivers <3% of maximum power in short-circuit and open loop fault conditions
- Output overvoltage shutdown with optional Zener
 - Fast AC reset with optional UV external resistor
- 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 <30 mW with bias winding, <150 mW at 265 VAC without bias winding
- ON/OFF control provides constant efficiency down to very light loads – ideal for mandatory CEC regulations and EuP standby requirements

Applications

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



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Figure 1. Typical Standby Application.



SO-8C (D Package)

DIP-8C (P Package)

eSOP-12B (K Package)

Figure 2. Package Options.

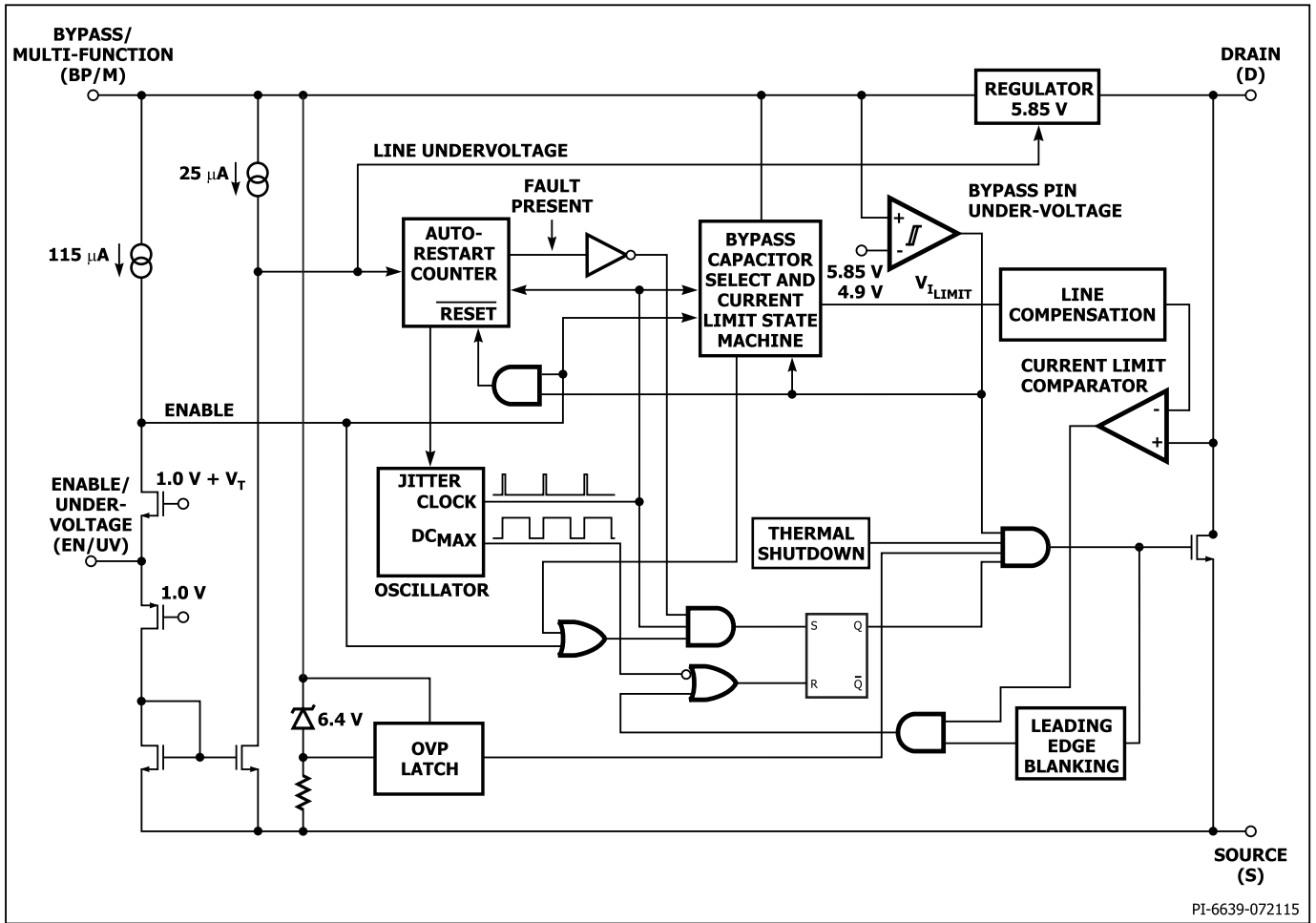
Output Power Table

Product ³	230 VAC \pm 15%		85-265 VAC	
	Adapter ¹	Peak or Open Frame ²	Adapter ¹	Peak or Open Frame ²
TNY284P/D/K	6 W	11 W	5 W	8.5 W
TNY285P/D	8.5 W	15 W	6 W	11.5 W
TNY285K	11 W	15 W	7.5 W	11.5 W
TNY286P/D	10 W	19 W	7 W	15 W
TNY286K	13.5 W	19 W	9.5 W	15 W
TNY287P	13 W	23.5 W	8 W	18 W
TNY287D	11.5 W	23.5 W	7 W	18 W
TNY287K	18 W	23.5 W	11 W	18 W
TNY288P	16 W	28 W	10 W	21.5 W
TNY288D	14.5 W	26 W	9 W	19.5 W
TNY288K	23 W	28 W	14.5 W	21.5 W
TNY289P	18 W	32 W	12 W	25 W
TNY289K	25 W	32 W	17 W	25 W
TNY290P	20 W	36.5 W	14 W	28.5 W
TNY290K	28 W	36.5 W	20 W	28.5 W

Table 1. Output Power Table.

Notes:

1. Minimum continuous power in a typical non-ventilated enclosed adapter measured at +50 °C ambient. Use of an external heat sink will increase power capability.
2. Minimum peak power capability in any design or minimum continuous power in an open frame design (see Key Applications Considerations).
3. Packages: P: DIP-8C, D: SO-8C, K: eSOP-12B. See Part Ordering Information.



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Figure 3. Functional Block Diagram.

Pin Functional Description

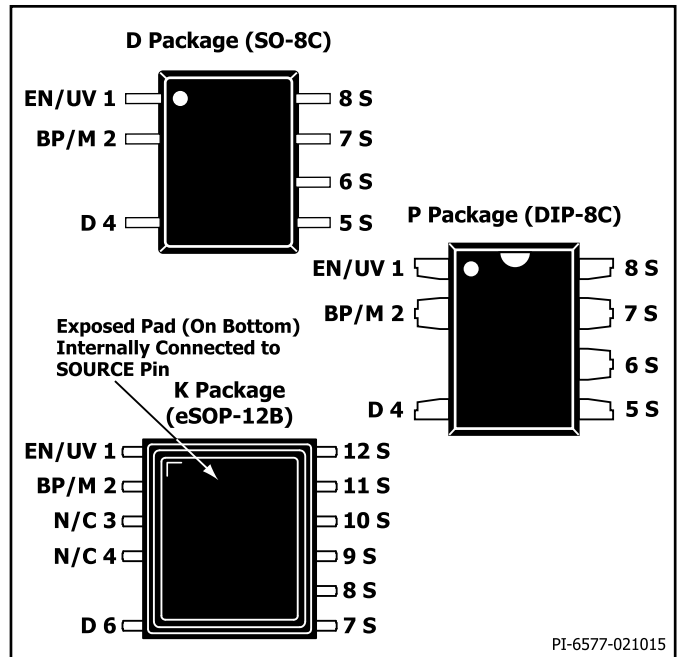
DRAIN (D) Pin:

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

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

This pin has multiple functions:

- It is the connection point for an external bypass capacitor for the internally generated 5.85 V supply.
- 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 TNY285-290.
- 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 or, when the UV function is employed with external resistors connected to the BP/UV pin, by taking the UV/EN pin current below I_{UV} minus the reset hysteresis (Typ. 18.75 μA). This can be used to provide an output overvoltage function with a Zener connected from the BYPASS/MULTI-FUNCTIONAL pin to a bias winding supply.



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Figure 4. Pin Configuration.