

# LNK304-306

## LinkSwitch-TN<sup>®</sup> Family

Lowest Component Count, Energy Efficient  
Off-Line Switcher IC



### Product Highlights

#### Cost Effective Linear/Cap Dropper Replacement

- Lowest cost and component count buck converter solution
- Fully integrated auto-restart for short-circuit and open loop fault protection - saves external component costs
- 66 kHz operation with accurate current limit - allows low cost off-the-shelf 1 mH inductor for up to 120 mA output current
- Tight tolerances and negligible temperature variation
- High breakdown voltage of 700 V provides excellent input surge withstand
- Frequency jittering dramatically reduces EMI (~10 dB) - minimizes EMI filter cost
- High thermal shutdown temperature (+135 °C minimum)

#### Much Higher Performance over Discrete Buck and Passive Solutions

- Supports buck, buck-boost and flyback topologies
- System level thermal overload, output short-circuit and open control loop protection
- Excellent line and load regulation even with typical configuration
- High bandwidth provides fast turn-on with no overshoot
- Current limit operation rejects line ripple
- Universal input voltage range (85 VAC to 265 VAC)
- Built-in current limit and hysteretic thermal protection
- Higher efficiency than passive solutions
- Higher power factor than capacitor-fed solutions
- Entirely manufacturable in SMD

#### EcoSmart<sup>®</sup> – Extremely Energy Efficient

- Consumes typically only 50/80 mW in self-powered buck topology at 115/230 VAC input with no load (opto feedback)
- Consumes typically only 7/12 mW in flyback topology with external bias at 115/230 VAC input with no load
- Meets Blue Angel, Energy Star, and EU requirements

#### Applications

- Appliances and timers
- LED drivers and industrial controls

### Description

LinkSwitch-TN is specifically designed to replace all linear and capacitor-fed (cap dropper) non-isolated power supplies in the under 360 mA output current range at equal system cost while offering much higher performance and energy efficiency.

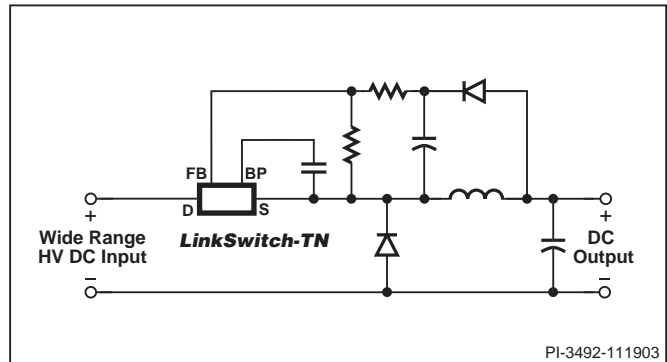
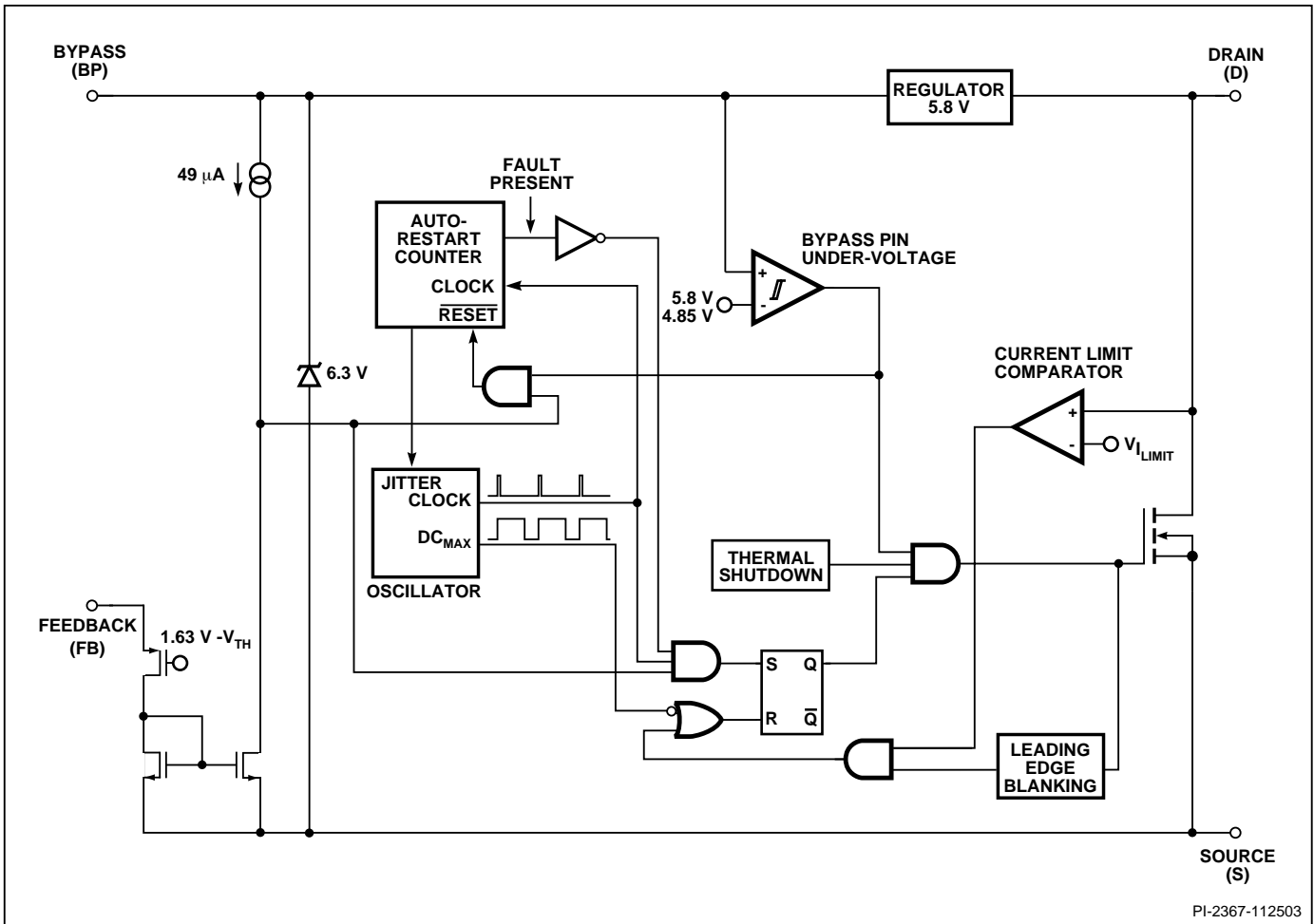


Figure 1. Typical Buck Converter Application (See Application Examples Section for Other Circuit Configurations).

OUTPUT CURRENT TABLE <sup>(1)</sup>				
PRODUCT <sup>(4)</sup>	230 VAC ±15%		85-265 VAC	
	MDCM <sup>(2)</sup>	CCM <sup>(3)</sup>	MDCM <sup>(2)</sup>	CCM <sup>(3)</sup>
LNK304P or G	120 mA	170 mA	120 mA	170 mA
LNK305P or G	175 mA	280 mA	175 mA	280 mA
LNK306P or G	225 mA	360 mA	225 mA	360 mA

Table 1. Notes: 1. Typical output current in a non-isolated buck converter. Output power capability depends on respective output voltage. See Key Applications Considerations Section for complete description of assumptions, including fully discontinuous conduction mode (DCM) operation. 2. Mostly discontinuous conduction mode. 3. Continuous conduction mode. 4. Packages: P: DIP-8B, G: SMD-8B. Please see ordering information.

LinkSwitch-TN devices integrate a 700 V power MOSFET, oscillator, simple On/Off control scheme, a high voltage switched current source, frequency jittering, cycle-by-cycle current limit and thermal shutdown circuitry onto a monolithic IC. The start-up and operating power are derived directly from the voltage on the DRAIN pin, eliminating the need for a bias supply and associated circuitry in buck or flyback converters. The fully integrated auto-restart circuit safely limits output power during fault conditions such as short-circuit or open loop, reducing component count and system-level load protection cost. A local supply provided by the IC allows use of a non-safety graded optocoupler acting as a level shifter to further enhance line and load regulation performance in buck and buck-boost converters, if required.



PI-2367-112503

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:

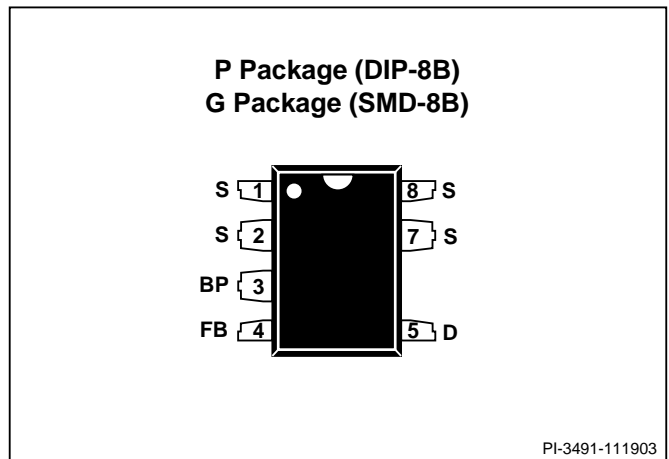
Connection point for a 0.1 uF external bypass capacitor for the internally generated 5.8 V supply.

### FEEDBACK (FB) Pin:

During normal operation, switching of the power MOSFET is controlled by this pin. MOSFET switching is terminated when a current greater than 49 μA is delivered into this pin.

### SOURCE (S) Pin:

This pin is the power MOSFET source connection. It is also the ground reference for the BYPASS and FEEDBACK pins.



PI-3491-111903

Figure 3. Pin Configuration.

