power integrations™

LinkSwitch-TNZ Product Family

Power Supply with Lossless Zero-Cross and X-cap Discharge

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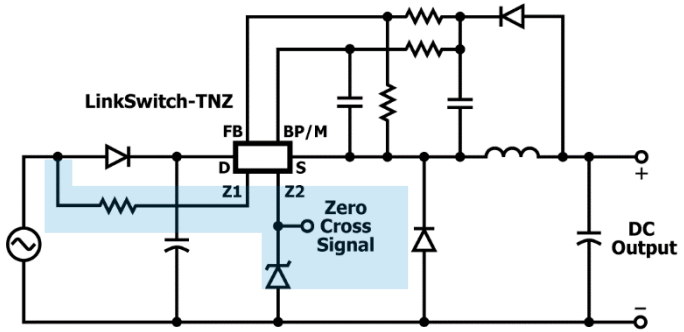
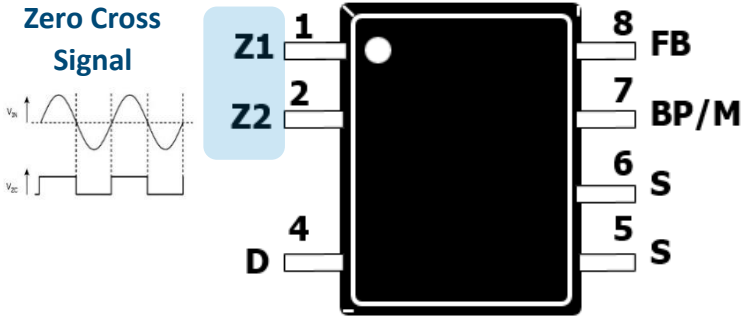
ac-dc converters led drivers gate drivers motor drivers

LinkSwitch-TNZ Product Family

- **Aux Power Supply: LNK33x2-33x7D**
  - Flyback, buck and buck-boost
  - Power: 575 mA buck, 12 W Flyback
  - Soft-start
  - <150 µA leakage minimizes lamp flicker
- **Lossless Integrated Functions**
  - Provides VAC zero-cross signal
  - X-capacitor discharge (LNK331x only)
- **Target Applications**
  - 2/3 wire dimmers, switches, occ. sensors
  - Home Appliances
  - Devices with relay/TRIAC turn-on control
  - Detecting presence or lack of AC line





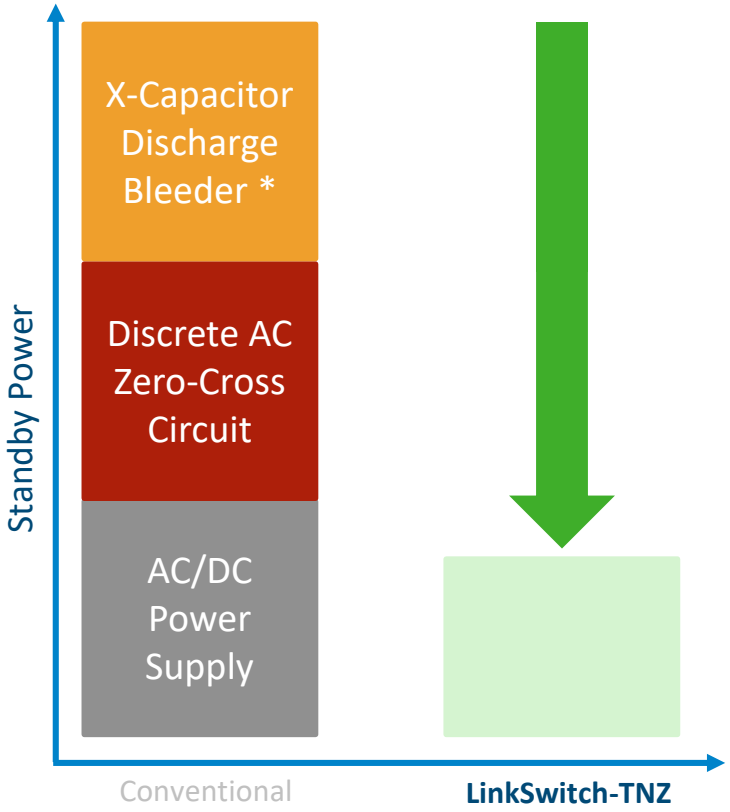
Power Out and Functionality Options

Part Number	230 VAC ± 15%		85-265 VAC	
	MDCM	CCM	MDCM	CCM
Buck Topology				
LNK33x2	63 mA	80 mA	63 mA	80 mA
LNK33x4	120 mA	170 mA	120 mA	170 mA
LNK33x6	225 mA	360 mA	225 mA	360 mA
LNK33x7	360 mA	575 mA	360 mA	575 mA
Flyback Topology (Assumes Open Frame Design)				
	230 VAC ± 15%		85-265 VAC	
LNK33x2	5 W		3 W	
LNK33x4	10 W		6 W	
LNK33x6/7	18 W		12 W	

Output Options		Buck	Flyback
Power Supply	Isolated	NA	√
	Non-Isolated	√	√
Power Supply + Zero-Cross-Detection (ZCD): **LNK330x**		√	√
Power Supply + X-Capacitor Discharge: **LNK331x**		√	√
Power Supply + ZCD + X-Capacitor Discharge: **LNK331x**		√	√

Value Proposition

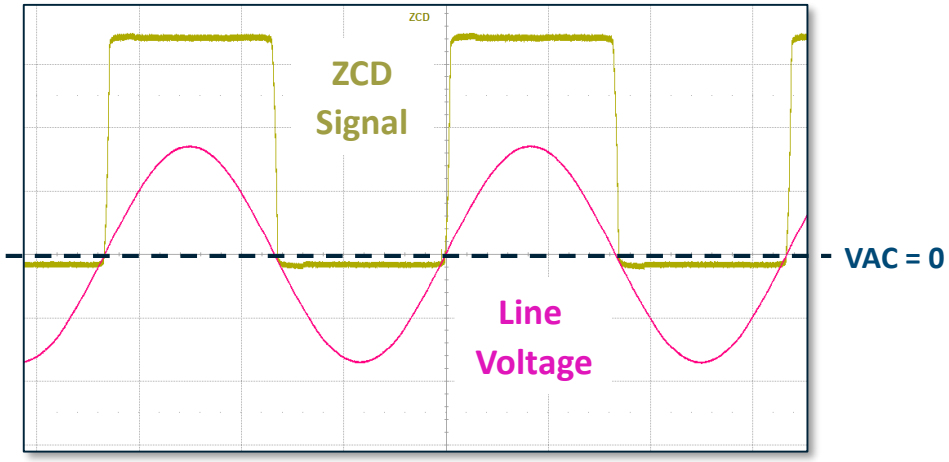
- **Superior Standby Performance**
  - Discrete solution today consumes 50-100mW
  - Improved light-load efficiency allows powering more product functions in standby
  - Customers want lowest leakage to prevent lamp flicker
  - X-cap discharge function
- **Zero-voltage switching for relays and TRIACs to reduce inrush current**
  - Dimmers need ZC for leading/trailing edge dimming
  - Increased lifetime for relay used in switches and sensors by zero-voltage turn-on
- **Lowest component count solution**
  - 40% or higher reduction compared to discrete



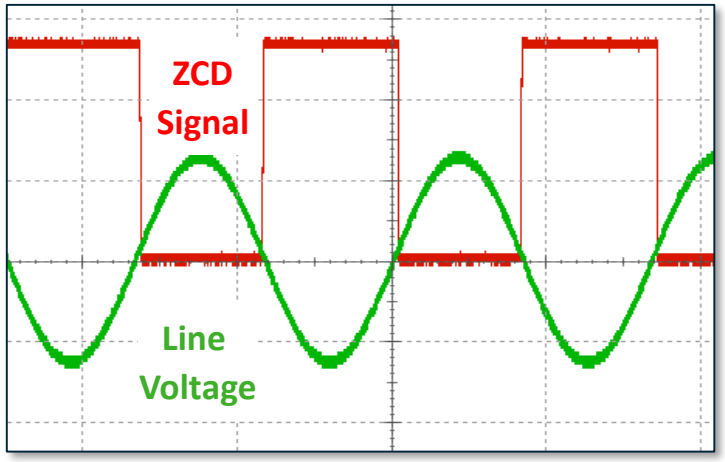
* Function of X-capacitor value

AC Zero-Cross Signal – Transition at Crossover

- **Zero-cross detection provides logic signal when VAC passes through 0 V**
  - Signal used to synchronize turn-on of power supply via relay or TRIAC
  - By switching at VAC = 0 inrush current is dramatically reduced

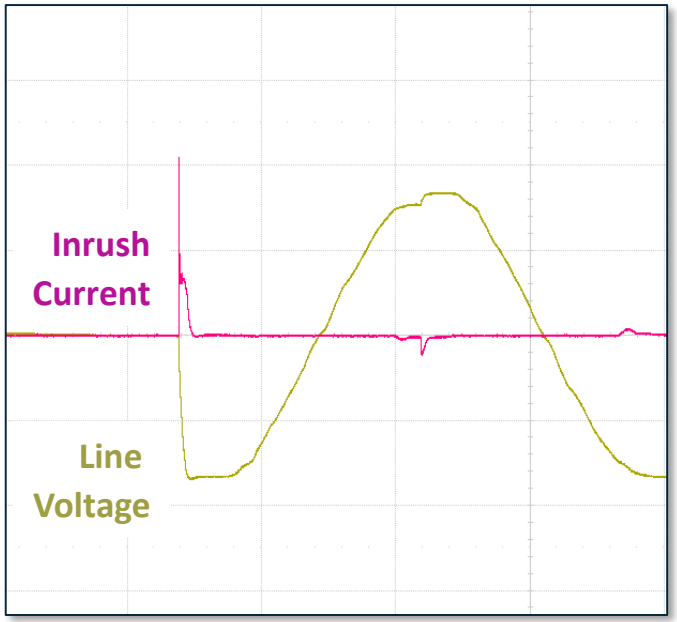


Buck Configuration



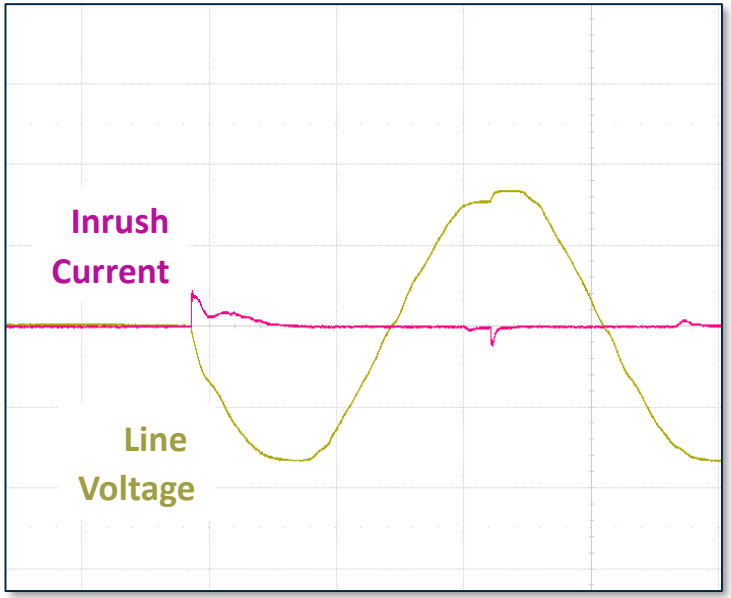
Isolated Flyback

Zero-Cross Detection Dramatically Reduces Inrush Current in a Relay-Switched Application



No ZCD

Peak inrush current = 103 A



With ZCD

Peak inrush current = 21.8 A

Design Tools

DER-874
6V/80mA output
<150uA input current
LNK3302

RDK-866
5V/500mA output
Non-isolated ZCD
LNK3307

RDK-877
12V/0.5A output
Isolated ZCD signal
LNK3306

DER-879
12V/0.75A & 5V/0.2A
ZCD + Xcap discharge
LNK3317

0.5 W | 2.5 W | 6 W | 10 W | **Power**

Non-isolated Buck | Isolated Flyback

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