### Output Characteristics and Power

**Non-Isolated Buck or Buck-Boost**

<table>
<thead>
<tr>
<th>Output Current</th>
<th>0 mA</th>
<th>80 mA</th>
<th>120 mA</th>
<th>240 mA</th>
<th>360 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV ±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Primary-Side Regulation Flyback**

<table>
<thead>
<tr>
<th>Linear Transformer/ Loose CV/CC PSR</th>
<th>LinkSwitch-LP</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV ±5% CC ±10% PSR</td>
<td>LinkSwitch-3</td>
</tr>
<tr>
<td>CV ±5% PSR</td>
<td>LinkSwitch-CV</td>
</tr>
<tr>
<td></td>
<td>LinkSwitch-HP</td>
</tr>
</tbody>
</table>

**Secondary-Side Regulation Flyback**

<table>
<thead>
<tr>
<th>CV ±2% SSR</th>
<th>LinkSwitch-XT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorporates Primary MOSFET, Flyback and Synchronous Rectification Driver</td>
<td></td>
</tr>
<tr>
<td>CV ±2% CC ±5% SSR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOPSwitch™-JX</td>
</tr>
<tr>
<td></td>
<td>TinySwitch™-4</td>
</tr>
<tr>
<td></td>
<td>InnoSwitch™-EP</td>
</tr>
</tbody>
</table>
## LinkSwitch-TN2 – Highly Energy Efficient Off-line Switcher IC with Integrated System Level Protection for Low Component-Count Power Supplies

### IC Product Tables

<table>
<thead>
<tr>
<th>Product Code</th>
<th>MDCM (mA)</th>
<th>CCM (mA)</th>
<th>MDCM (mA)</th>
<th>CCM (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNK3202P/G/D</td>
<td>63</td>
<td>80</td>
<td>63</td>
<td>80</td>
</tr>
<tr>
<td>LNK3204P/G/D</td>
<td>120</td>
<td>170</td>
<td>120</td>
<td>170</td>
</tr>
<tr>
<td>LNK3205P/G/D</td>
<td>175</td>
<td>270</td>
<td>175</td>
<td>270</td>
</tr>
<tr>
<td>LNK3206P/G/D</td>
<td>225</td>
<td>360</td>
<td>225</td>
<td>360</td>
</tr>
</tbody>
</table>

**Additional Features:**
- 725 V internal MOSFET rating
- Self-powered
- ON/OFF control
- Hysteretic thermal shutdown
- Power limiting
- Frequency jitter reduces EMI
- EcoSmart™ low standby/no-load power consumption

### Notes:
1. Typical output current in a non-isolated buck converter with devices operating at default current limit and adequate heat sinking. Output power capability depends on respective output voltage and thermal requirements. 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.

## LinkSwitch-CV / LP / XT – Very Low Power AC-DC Power Conversion

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Continuous Output Power (W)</th>
<th>Continuous Output Power (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNK623P/D</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>LNK624P/D</td>
<td>11</td>
<td>6.5</td>
</tr>
<tr>
<td>LNK625P/D</td>
<td>13.5</td>
<td>8</td>
</tr>
<tr>
<td>LNK626P/D</td>
<td>17</td>
<td>10</td>
</tr>
</tbody>
</table>

**Additional Features:**
- 700 V internal MOSFET rating
- Self-powered
- ON/OFF control
- Hysteretic over-temperature protection
- Power limiting
- Frequency jitter reduces EMI
- EcoSmart low standby/no-load power consumption

### 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.

## LinkSwitch-3 – Energy-Efficient, Accurate Primary-Side Regulation CV/CC Switcher for Adapters and Chargers

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Open Frame (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNK6404D / LNK6424D</td>
<td>4.1</td>
</tr>
<tr>
<td>LNK6405D / LNK6415D / LNK6425D</td>
<td>5.1</td>
</tr>
<tr>
<td>LNK6406D / LNK6416D / LNK6426D / LNK6436D / LNK6446D</td>
<td>6.1</td>
</tr>
<tr>
<td>LNK6407D / LNK6417D / LNK6427D</td>
<td>7.5</td>
</tr>
</tbody>
</table>

**Additional Features:**
- Compensates for transformer inductance tolerances
- Compensates for input line voltage variations
- Compensates for cable voltage drop
- Compensates for external component temperature variations
- Very accurate IC parameter tolerances using proprietary trimming technology
- Frequency jittering greatly reduces EMI filter cost
- Even tolerances achievable with external resistor selection/trimming
- Programmable switching frequency up to 85 kHz to reduce transformer size
- Minimum operation frequency fixed to improve transient load response

### Notes:
1. Assumes minimum input DC voltage >90 VDC, $K_p \geq 1$ (Recommend $K_p \geq 1.15$ for accurate CC regulation), $\eta >78\%$, $D_{max} <55\%$.
2. Output power capability is reduced if a lower input voltage is used.
3. Minimum continuous power with adequate heat sink measured at 50 °C ambient with device junction below 110 °C.
4. Assumes bias winding is used to supply BYPASS pin.
### TinySwitch-4 – Energy-Efficient, Off-Line Switcher with Line Compensated Overload Power

<table>
<thead>
<tr>
<th>Product</th>
<th>Peak or Open Frame (W)</th>
<th>Peak or Open Frame (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNY284P/D/K</td>
<td>11</td>
<td>8.5</td>
</tr>
<tr>
<td>TNY285P/D</td>
<td>15</td>
<td>11.5</td>
</tr>
<tr>
<td>TNY285K</td>
<td>15</td>
<td>11.5</td>
</tr>
<tr>
<td>TNY286P/D</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>TNY286K</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>TNY287P</td>
<td>23.5</td>
<td>18</td>
</tr>
<tr>
<td>TNY287D</td>
<td>23.5</td>
<td>18</td>
</tr>
<tr>
<td>TNY287K</td>
<td>23.5</td>
<td>18</td>
</tr>
<tr>
<td>TNY288P</td>
<td>28</td>
<td>21.5</td>
</tr>
<tr>
<td>TNY288D</td>
<td>26</td>
<td>19.5</td>
</tr>
<tr>
<td>TNY288K</td>
<td>28</td>
<td>21.5</td>
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<tr>
<td>TNY289P</td>
<td>32</td>
<td>25</td>
</tr>
<tr>
<td>TNY289K</td>
<td>32</td>
<td>25</td>
</tr>
<tr>
<td>TNY290P</td>
<td>36.5</td>
<td>28.5</td>
</tr>
<tr>
<td>TNY290K</td>
<td>36.5</td>
<td>28.5</td>
</tr>
</tbody>
</table>

**Additional Features:**
- 725 V internal MOSFET rating
- Self-powered
- Hysteresis thermal shutdown protection
- Frequency jitter reduces EMI
- EcoSmart low standby/no-load power consumption
- On-time extension
- Latching output overvoltage protection
- Line undervoltage lockout
- Selectable current limit

**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.

### LinkSwitch-HP – Energy Efficient, High-Power Off-Line Switcher with Accurate Primary-Side Regulation (PSR)

<table>
<thead>
<tr>
<th>Product</th>
<th>Heat Sink</th>
<th>230 VAC ±15%</th>
<th>85-265 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNK6xx3K/V</td>
<td>PCB-W</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>LNK6xx3E</td>
<td>Metal</td>
<td>35</td>
<td>27</td>
</tr>
<tr>
<td>LNK6xx4K/V</td>
<td>PCB-W</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>LNK6xx4E</td>
<td>Metal</td>
<td>47</td>
<td>36</td>
</tr>
<tr>
<td>LNK6xx5K/V</td>
<td>PCB-W</td>
<td>30</td>
<td>22</td>
</tr>
<tr>
<td>LNK6xx5E</td>
<td>Metal</td>
<td>59¹</td>
<td>45</td>
</tr>
<tr>
<td>LNK6xx6K/V</td>
<td>PCB-W</td>
<td>34</td>
<td>26</td>
</tr>
<tr>
<td>LNK6xx6E</td>
<td>Metal</td>
<td>88¹</td>
<td>68¹</td>
</tr>
<tr>
<td>LNK6xx7K/V</td>
<td>PCB-W</td>
<td>41</td>
<td>30</td>
</tr>
<tr>
<td>LNK6xx7E</td>
<td>Metal</td>
<td>117</td>
<td>90</td>
</tr>
<tr>
<td>LNK6xx8K/V</td>
<td>PCB-W</td>
<td>47</td>
<td>34</td>
</tr>
<tr>
<td>LNK6xx8E</td>
<td>Metal</td>
<td>135</td>
<td>104</td>
</tr>
<tr>
<td>LNK6xx9K/V</td>
<td>PCB-W</td>
<td>54</td>
<td>39</td>
</tr>
<tr>
<td>LNK6xx9E</td>
<td>Metal</td>
<td>153</td>
<td>118</td>
</tr>
</tbody>
</table>

**Additional Features:**
- EcoSmart – energy efficient
- Multi-mode control maximizes efficiency
- No-load consumption below 30 mW at 230 V (LNK6xx)
- >75% efficiency with 1 W input at 230 VAC
- >50% efficiency with 0.1 W input at 230 VAC
- High design flexibility for low system cost
- Dramatically simplifies power supply designs
- Eliminates optocoupler and all secondary control circuitry
- ±5% or better output voltage tolerance
- 132 kHz operation reduces transformer and power supply size
- Accurate programmable current limit
- Compensation over line limits overload power
- Frequency jittering reduces EMI filter cost

**Notes:**
1. PCB heat sink with wave soldering.

#### Additional Features:
- A Highly Integrated, Compact Footprint
- Incorporates flyback controller, 725 V / 900 V MOSFET, secondary-side sensing and synchronous rectification driver
- FluxLink™ integrated, HIPOT-isolated, feedback link
- Exceptional CV accuracy, independent of transformer design or external components
- Excellent multi-output cross regulation with weighted SSR feedback and synch FETs
- EcoSmart – Energy Efficient
  - <10 mW no-load at 230 VAC when supplied by transformer bias winding
  - Easily meets all global energy efficiency regulations
- Advanced Protection / Safety Features
  - Primary sensed output OVP
  - Secondary sensed output overshoot clamp
  - Secondary sensed output OCP to zero output voltage
  - Hysteretic thermal shutdown
  - Input voltage monitor with accurate brown-in/brown-out and overvoltage protection
- Full Safety and Regulatory Compliance
  - 100% production HIPOT compliance testing equivalent to 6 kV DC/1 sec
  - Reinforced insulation
  - Isolation voltage >3,500 VAC for INN26xx series, >4,000 VAC for INN2904 series
  - UL1577 and TUV (EN60950) safety approved
  - EN61000-4-8 (100 A/m) and EN61000-4-9 (1000 A/m) compliant
- Green Package
  - Halogen free and RoHS compliant
- Applications
  - Appliance, industrial, and smart lighting

<table>
<thead>
<tr>
<th>Product</th>
<th>Peak or Open Frame (^1) (^2) (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>725 V MOSFET</td>
</tr>
<tr>
<td></td>
<td>230 VAC ±15%</td>
</tr>
<tr>
<td></td>
<td>85-265 VAC</td>
</tr>
<tr>
<td>INN2603K</td>
<td>24</td>
</tr>
<tr>
<td>INN2604K</td>
<td>27</td>
</tr>
<tr>
<td>INN2605K</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>900 V MOSFET</td>
</tr>
<tr>
<td></td>
<td>230 VAC ±15%</td>
</tr>
<tr>
<td></td>
<td>85-484 VAC</td>
</tr>
<tr>
<td>INN2904K</td>
<td>29</td>
</tr>
</tbody>
</table>

**Notes:**
1. Minimum continuous power in a typical non-ventilated enclosed typical size adapter measured at 40 °C ambient. Max output power is dependent on the design. With condition that package temperature must be ≤ 125 °C.
2. Minimum peak power capability.
3. Package: K: eSOP-R16B.
Design Examples

LinkSwitch-TN2 – Non-Isolated Output Buck (RDK-506)

1.44 W, 12 V, 120 mA OUTPUT, 85 – 265 VAC INPUT, NON-ISOLATED BUCK APPLIANCE POWER SUPPLY

![LinkSwitch-TN2 Circuit Diagram]

---

LinkSwitch-TN2 – Non-Isolated Buck (DER-507)

175 mW, 5 V, 35 mA OUTPUT, 85 – 265 VAC INPUT, NON-ISOLATED BUCK APPLIANCE POWER SUPPLY

![LinkSwitch-TN2 Circuit Diagram]
LinkSwitch-TN – Ultra Wide Input Range Power Supply (DI-124)

3 W, 12 V, 250 mA OUTPUT, 57 – 580 VAC INPUT FLYBACK POWER SUPPLY

LinkSwitch-XT – Tamper Proof Energy Meter Power Supply (DER-141)

0.75 W, 5 V, 150 mA OUTPUT, 85 – 265 VAC INPUT FLYBACK POWER SUPPLY
**Design Examples**

**LinkSwitch-XT – High Efficiency Constant Voltage Adapter (EPR-89)**

2 W, 6.2 V, 322 mA OUTPUT, 85 – 265 VAC INPUT, FLYBACK POWER SUPPLY

![Circuit Diagram](PI-4205-042613)

**LinkSwitch-CV – 2-Output Constant Voltage Power Supply (DER-213)**

3.8 W, 12 V, 0.25 A, and 5 V, 0.15 A DUAL OUTPUT, 85 – 265 VAC INPUT FLYBACK POWER SUPPLY

![Circuit Diagram](PI-5405-040309)
**LinkSwitch-3 – Low Power Constant Voltage, Constant Current Charger/Adapter (DER-403)**

10 W, 2 V, 1 A OUTPUT, 90 – 265 VAC INPUT FLYBACK POWER SUPPLY

**LinkSwitch-4 – 3-Output, Isolated Flyback Power Supply (DER-479)**

6 W, 11 W PK, 3.3 V, 150 mA, 8 V, 500 mA and 12 V, 1 A OUTPUTS, 185 – 440 VAC INPUT, NON-ISOLATED FLYBACK POWER SUPPLY
Design Examples

LinkSwitch-HP – 2-Output, Constant Voltage Power Supply (RDK-321)

17 W, 5 V, 1 A and 18 V, 670 mA OUTPUT, 90 – 265 VAC INPUT FLYBACK POWER SUPPLY

![Diagram of LinkSwitch-HP circuit](image)

TinySwitch-4 – Universal Input Adapter (RDK-399)

12 W, 12 V, 1 A OUTPUT, 85 – 265 VAC INPUT FLYBACK POWER SUPPLY

![Diagram of TinySwitch-4 circuit](image)

*R5, R8, C8 and C9 are optional components*
Design Examples

17.5 W, 12 V, 1.25 A and 5 V, 500 mA OUTPUTS, 85 – 484 VAC INPUT FLYBACK POWER SUPPLY
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