AC/DC POWER MANAGEMENT ICs

Digital & Analog AC/DC Converters
Digital AC/DC RapidCharge™ Converters
Digital SSL LED Drivers
INNOVATIVE, HIGH PERFORMANCE IC SOLUTIONS FOR
AC/DC POWER MANAGEMENT

Renesas’ exclusive PrimAccurate™ Digital Control Technology* is at the heart of our AC/DC converters, RapidCharge™ chipsets and solid state lighting LED driver solutions. This digital “engine” optimizes performance over a wide range of operating conditions, reduces external components, and lowers system cost, enabling more power in less space, with very low standby power and reduced system cost.

*All products with iWxxxx part numbers use Renesas’ proprietary digital control technology.

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**DiaSIM™ Simulation Models**

**Simulate Before You Build!**

- Quickly simulate, test and verify AC/DC power supplies before prototype build
- Test component variation and tolerances in existing designs
- Allows true simultaneous simulation of digital blocks and analog circuit elements
- Fast simulations – using "ideal" components
- Easy to use – no non-linear convergence
- Powered by Sideline Software NL5 simulation software (compatible with NL5 32-bit version only)

**Simulation Models are Available for These Parts**

<table>
<thead>
<tr>
<th>Product</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW673</td>
<td>Synchronous rectifier controller</td>
</tr>
<tr>
<td>iW676</td>
<td>Synchronous rectifier controller with Active Voltage Position (AVP) control</td>
</tr>
<tr>
<td>iW873</td>
<td>Synchronous rectifier controller with integrated 60V MOSFET</td>
</tr>
<tr>
<td>iW1602</td>
<td>30W AC/DC PWM controller, optimized for 5V output</td>
</tr>
<tr>
<td>iW1699B</td>
<td>30W AC/DC PWM controller</td>
</tr>
<tr>
<td>iW1702</td>
<td>45W AC/DC PWM controller, optimized for 9V+ output</td>
</tr>
<tr>
<td>iW1709</td>
<td>12W AC/DC PWM controller</td>
</tr>
<tr>
<td>iW1709B</td>
<td>45W AC/DC PWM controller</td>
</tr>
<tr>
<td>iW1720</td>
<td>48W AC/DC PWM controller with &gt; 60W peak output power</td>
</tr>
<tr>
<td>iW1818</td>
<td>12W Primary-side switcher with integrated 800V BJT</td>
</tr>
<tr>
<td>iW1830</td>
<td>15W Primary-side switcher with integrated 700V MOSFET</td>
</tr>
</tbody>
</table>

**DiaSIM™ Simulation Models Quick Start Guide**

## AC/DC PWM Controller Solutions

<table>
<thead>
<tr>
<th>Primary Side</th>
<th>Secondary Side</th>
<th>Synchronous Rectifier (SR) (&gt;90% Efficiency)</th>
<th>Output Power (max)</th>
<th>Primary-Side Driver Type</th>
<th>DLNK&lt;sup&gt;(1)&lt;/sup&gt;</th>
<th>XM-Comm&lt;sup&gt;(3)&lt;/sup&gt;</th>
<th>Features</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>5W</td>
<td>BJT</td>
<td></td>
<td></td>
<td>▪ Zero standby power controller</td>
<td>SOT23-6</td>
</tr>
<tr>
<td>iW1700</td>
<td></td>
<td></td>
<td>12W</td>
<td>BJT</td>
<td></td>
<td></td>
<td>▪ Active start-up scheme enables shortest turn-on delay</td>
<td>SOT23-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Smooth output to drive large (up to 6,000µF) capacitive loads</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30W</td>
<td>FET</td>
<td></td>
<td></td>
<td>▪ Optimized for 5V output</td>
<td>SOT23-6</td>
</tr>
<tr>
<td>iW1602</td>
<td></td>
<td></td>
<td>45W</td>
<td>FET</td>
<td></td>
<td></td>
<td>▪ Optimized for 9V+ output</td>
<td>SOT23-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Option for input OVP</td>
<td>SOT23-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45W</td>
<td>FET</td>
<td></td>
<td></td>
<td>▪ Active start-up scheme enables shortest turn-on delay</td>
<td>SD-8</td>
</tr>
<tr>
<td>iW1702</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Smooth output to drive large (up to 6,000µF) capacitive loads</td>
<td></td>
</tr>
</tbody>
</table>
|              |               |                                             | 27W               | FET                      | XM-COMM         |                | ▪ Qualcomm® Quick Charge™ 3.0, 2.0 (iW662) | SD-8/
| iW1790       | iW662         | Integrated                                 |                   |                          |                 |                | ▪ D+/D- over-voltage protection | SOT23-6 |
|              |               | kW967                                      | 27W               | FET                      |                 |                | ▪ Integrated SR for 90% efficiency, lower BOM (iW967) | |
|              |               | kW962                                      |                   |                          |                 |                |                                                                               | |
|              |               |                                             | 27W               | FET                      | DLNK            |                | ▪ USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (iW957P) | SD-8/
| iW1791       | iW957P        | kW967                                      | 27W               | FET                      |                 |                | ▪ D+/D- over-voltage protection | TDFN-14/
|              |               | kW962                                      |                   |                          |                 |                |                                                                               | SOT23-6 |
|              |               |                                             | 27W               | FET                      | XM-COMM         |                | ▪ Qualcomm® Quick Charge™ 3.0, 2.0 (iW662) | SOT23-6/
| iW1796       | iW662         | Integrated                                 |                   |                          |                 |                | ▪ D+/D- over-voltage protection | SD-8 |
|              |               | kW967                                      | 27W               | FET                      |                 |                | ▪ Integrated SR for 90% efficiency, lower BOM (iW967) | |
|              |               | kW962                                      |                   |                          |                 |                |                                                                               | |
|              |               |                                             | 27W               | FET                      | DLNK            |                | ▪ USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (iW957P) | SOT23-6/
| iW1797       | iW957P        | kW967                                      | 27W               | FET                      |                 |                | ▪ < 20mW standby power with external startup circuit | TDFN-14/
|              |               | kW962                                      |                   |                          |                 |                |                                                                               | SOT23-6 |
|              |               |                                             | 65W               | FET                      | DLNK            |                | ▪ USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (iW957P) | SD-8/
| iW1799       | iW957P        | kW967                                      | 65W               | FET                      |                 |                | ▪ < 20mW standby power with external startup circuit | TDFN-14/
|              |               |                                             |                   |                          |                 |                | ▪ External shutdown, V<sub>in</sub> OVP or X-cap discharge | SOT23-6 |

<sup>(1)</sup> Maximum output power is application dependent.
<sup>(2)</sup> DLNK is Renesas’ digital communication from secondary to primary side via an optocoupler.
<sup>(3)</sup> XM-Comm is Renesas’ proprietary digital communication via the main power transformer that eliminates the need for an optocoupler.

Qualcomm® Quick Charge™ is a product of Qualcomm Technologies, Inc.
## AC/DC PWM Controller Solutions (continued)

<table>
<thead>
<tr>
<th>Primary Side</th>
<th>Secondary Side</th>
<th>Synchronous Rectifier (SR) (&gt;90% Efficiency)</th>
<th>Output Power*</th>
<th>No-Load Standby Power</th>
<th>Primary-Side Driver Type</th>
<th>ZVS(^{(2)})</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
</table>
| iW9801       | iW709          | Integrated iW709                            | 100W          | < 20mW                | FET                     | Yes            | • USB PD 3.0 + Qualcomm® Quick Charge™ 4+ (iW709)  
                |                |                                             |               |                       |             |                | SSR\(^{(3)}\) digital compensation eliminates loop components and ensures stability (iW709) | SD-10/ QFN-16 |
| iW9802       | TL431          | iW610                                       | 100W+         | FET                   | Yes                     | Compatible with TL431  
                |                |                                             |               |                       |             |                | SR controller optimized for ZVS (iW610) | SD-10/ SOT23-6 |
| iW9806       | TL431          | iW611                                       | 100W+         | GaN                   | Yes                     | Optimized for GaN power devices  
                |                |                                             |               |                       |             |                | Compatible with TL431  
                |                |                                             |               |                       |             |                | SR controller optimized for ZVS (iW611) | SD-10/ SOT23-6 |
| iW9809       | iW709          | Integrated iW709                            | 65W           | < 20mW                | FET                     | Yes            | • USB PD 3.0 + Qualcomm® Quick Charge™ 4+ (iW709)  
                |                |                                             |               |                       |             |                | SSR\(^{(3)}\) digital compensation eliminates loop components and ensures stability (iW709) | SD-8/ QFN-16 |
| iW9860       | iW760          | Integrated iW760                            | 63W           | < 5mW                 | FET                     | Yes            | • Zero standby power controller  
                |                |                                             |               |                       |             |                | USB PD 3.0 + Qualcomm® Quick Charge™ 4+ (iW760)  
                |                |                                             |               |                       |             |                | Dual-polarity auxiliary winding sensor improves EMI, simplifies transformer design  
                |                |                                             |               |                       |             |                | SSR\(^{(3)}\) digital compensation eliminates loop components and ensures stability (iW760) | SOT23-6/ TDFN-14 |
| iW9861       | iW760          | Integrated iW760                            | 63W           | < 20mW                | FET                     | Yes            | • USB PD 3.0 + Qualcomm® Quick Charge™ 4+ (iW760)  
                |                |                                             |               |                       |             |                | Dual-polarity auxiliary winding sensor improves EMI, simplifies transformer design  
                |                |                                             |               |                       |             |                | SSR\(^{(3)}\) digital compensation eliminates loop components and ensures stability (iW760) | SOT23-6/ TDFN-14 |
| iW9862       | TL431          | iW610                                       | 65W           | FET                   | Yes                     | Dual-polarity auxiliary winding sensor improves EMI, simplifies transformer design  
                |                |                                             |               |                       |             |                | Compatible with TL431 | SOT23-6/ SOT23-6 |
| iW9870       | iW760          | Integrated iW760                            | 63W           | < 5mW                 | GaN                     | Yes            | • Optimized for GaN power devices  
                |                |                                             |               |                       |             |                | Zero standby power controller  
                |                |                                             |               |                       |             |                | USB PD 3.0 + Qualcomm® Quick Charge™ 4+ (iW760)  
                |                |                                             |               |                       |             |                | Dual-polarity auxiliary winding sensor improves EMI, simplifies transformer design | SOT23-6/ TDFN-14 |
| iW9871       | iW760          | Integrated iW760                            | 63W           | < 20mW                | GaN                     | Yes            | • Optimized for GaN Power Devices  
                |                |                                             |               |                       |             |                | USB PD 3.0 + Qualcomm® Quick Charge™ 4+ (iW760)  
                |                |                                             |               |                       |             |                | Dual-polarity auxiliary winding sensor improves EMI, simplifies transformer design | SOT23-6/ TDFN-14 |
| iW9872       | TL431          | iW611                                       | 65W           | GaN                   | Yes                     | Optimized for GaN power devices  
                |                |                                             |               |                       |             |                | Dual-polarity auxiliary winding sensor improves EMI, simplifies transformer design  
                |                |                                             |               |                       |             |                | Compatible with TL431 | SOT23-6/ SOT23-6 |

(1) Maximum output power is application dependent  
(2) Renesas’ patented ZVS (Zero Voltage Switching) technology for highest power density and low EMI  
(3) SSR: Secondary-Side Regulation  
Qualcomm® Quick Charge™ is a product of Qualcomm Technologies, Inc.
AC/DC RapidCharge™ Adapter Solutions
Renesas Supports Virtually All Fast Charging Protocols

As the leader in AC/DC RapidCharge™ solutions, Renesas supports more fast charging protocols than any other supplier.

- USB Power Delivery 3.0 + PPS
- Qualcomm® Quick Charge™ 4+
- Qualcomm® Quick Charge™ 3.0
- Qualcomm® Quick Charge™ 2.0
- Samsung Adaptive Fast Charging
- Direct Charge
- Other Proprietary OEM Protocols

### RapidCharge™ Protocol

<table>
<thead>
<tr>
<th>Primary Side</th>
<th>Secondary Side</th>
<th>Synchronous Rectifier (SR) (&gt;90% Efficiency)</th>
<th>Primary-Side Driver Type</th>
<th>Qualcomm® Quick Charge™</th>
<th>Direct Charge</th>
<th>USB Power Delivery</th>
<th>Output Power</th>
<th>No-Load Standby Power</th>
<th>Output Voltage</th>
<th>DLNK™/XM-Comm™</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW1790</td>
<td>iW682</td>
<td>Integrated iW682</td>
<td>FET</td>
<td>QC 2.0</td>
<td>QC 2.0</td>
<td>27W</td>
<td>&lt; 20mW</td>
<td>3V - 12V</td>
<td>XM-Comm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iW1791</td>
<td>iW657P</td>
<td>iW676</td>
<td>FET</td>
<td>QC 2.0</td>
<td>QC 2.0</td>
<td>QC 3.0</td>
<td>QC 4+</td>
<td>27W</td>
<td>3.3V - 21V</td>
<td>DLNK</td>
<td>• USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (iW657P)</td>
</tr>
<tr>
<td>iW1799</td>
<td>iW657P</td>
<td>iW676</td>
<td>FET</td>
<td>QC 2.0</td>
<td>QC 2.0</td>
<td>QC 3.0</td>
<td>QC 4+</td>
<td>65W</td>
<td>3.3V - 21V</td>
<td>DLNK</td>
<td>• USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (iW657P)</td>
</tr>
</tbody>
</table>

1. Maximum output power is application dependent
2. DLNK is Renesas’ digital communication from secondary to primary side via an optocoupler
3. XM-Comm is Renesas’ proprietary digital communication via the main power transformer that eliminates the need for an optocoupler

Qualcomm® Quick Charge™ is a product of Qualcomm Technologies, Inc.
## AC/DC RapidCharge™ Adapter Solutions (continued)

### RapidCharge™ Protocol

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<th>Secondary Side</th>
<th>Synchronous Rectifier (SR) (&gt;90% Efficiency)</th>
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<th>Qualcomm® Quick Charge™</th>
<th>Direct Charge</th>
<th>USB Power Delivery</th>
<th>Output Power</th>
<th>No-Load Standby Power</th>
<th>Output Voltage</th>
<th>ZVS®</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW9801</td>
<td>iW709</td>
<td>Integrated iW709</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>100W</td>
<td>&lt; 20mW</td>
<td>3.3V to 21V</td>
<td></td>
<td>• USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW709&gt;) • SSR® digital compensation eliminates loop components and ensures stability (&lt;iW709&gt;)</td>
</tr>
<tr>
<td>iW9802</td>
<td>TL431</td>
<td>iW610</td>
<td>FET</td>
<td>User Defined Interface</td>
<td>User Programmable</td>
<td>Yes</td>
<td>100W+</td>
<td>User Programmable</td>
<td></td>
<td></td>
<td>• Compatible with TL431 • Secondary-Side Regulation (&lt;iW610&gt;)</td>
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<tr>
<td>iW9804</td>
<td>TL431</td>
<td>iW611</td>
<td>FET</td>
<td>User Defined Interface</td>
<td>User Programmable</td>
<td>Yes</td>
<td>100W+</td>
<td>User Programmable</td>
<td></td>
<td></td>
<td>• Optimized for GaN power devices • Secondary-Side Regulation (&lt;iW611&gt;)</td>
</tr>
<tr>
<td>iW9805</td>
<td>iW709</td>
<td>Integrated iW709</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 20mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW709&gt;) • Secondary-Side Regulation (&lt;iW709&gt;)</td>
</tr>
<tr>
<td>iW9806</td>
<td>iW760</td>
<td>Integrated iW760</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 5mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• Zero standby power controller • USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW760&gt;) • Dual-polarity auxiliary winding sensor improves EMI, simplifies transformer design • Secondary-Side Regulation (&lt;iW760&gt;)</td>
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<tr>
<td>iW9807</td>
<td>iW760</td>
<td>Integrated iW760</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 20mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW760&gt;) • Secondary-Side Regulation (&lt;iW760&gt;)</td>
</tr>
<tr>
<td>iW9808</td>
<td>iW760</td>
<td>Integrated iW760</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 5mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• Zero standby power controller • USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW760&gt;) • Secondary-Side Regulation (&lt;iW760&gt;)</td>
</tr>
<tr>
<td>iW9809</td>
<td>iW760</td>
<td>Integrated iW760</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 20mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW760&gt;) • Secondary-Side Regulation (&lt;iW760&gt;)</td>
</tr>
<tr>
<td>iW9810</td>
<td>iW760</td>
<td>Integrated iW760</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 5mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• Zero standby power controller • USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW760&gt;) • Secondary-Side Regulation (&lt;iW760&gt;)</td>
</tr>
<tr>
<td>iW9811</td>
<td>iW760</td>
<td>Integrated iW760</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 20mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW760&gt;) • Secondary-Side Regulation (&lt;iW760&gt;)</td>
</tr>
<tr>
<td>iW9812</td>
<td>iW760</td>
<td>Integrated iW760</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 5mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• Zero standby power controller • USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW760&gt;) • Secondary-Side Regulation (&lt;iW760&gt;)</td>
</tr>
<tr>
<td>iW9813</td>
<td>iW760</td>
<td>Integrated iW760</td>
<td>FET</td>
<td>QC 2.0</td>
<td>✓</td>
<td>✓</td>
<td>65W</td>
<td>&lt; 20mW</td>
<td>3.4V to 21V</td>
<td></td>
<td>• USB PD 3.0 + PPS + Qualcomm® Quick Charge™ 4+ (&lt;iW760&gt;) • Secondary-Side Regulation (&lt;iW760&gt;)</td>
</tr>
</tbody>
</table>

(1) Maximum output power is application dependent
(2) Renesas’ patented ZVS (Zero Voltage Switching) technology for highest power density and low EMI
(3) SSR: Secondary-Side Regulation

Qualcomm® Quick Charge™ is a product of Qualcomm Technologies, Inc.
AC/DC **RapidCharg**™ Adapter Solutions (continued)

**iW9801 + iW709**

High-Power Density Solution Enables 65W USB PD Fast Chargers in Half the Size

- **iW9801** AC/DC digital primary-side controller with Renesas’ patented Zero Voltage Switching (ZVS) control
  - Excellent efficiency over the input/load range up to 94%
  - Low EMI and no audible noise
- **iW709** USB PD 3.0 controller
  - Integrated synchronous rectifier
  - Secondary-side digital compensation eliminates loop components, ensures stability
  - USB-IF PD certified (USB PD 3.0 + PPS)

- High switching frequency up to 200kHz enables
  - Smaller, lighter weight transformer
  - Lowest BOM cost
- < 20mW no-load standby power consumption
- **iW9802** option for industry-standard interface (e.g. TL431)
- Hardwired state machine prevents fast chargers from hacking

**See Renesas ZVS video here**
AC/DC RapidCharge™ Adapter Solutions (continued)

**iW9860 + iW760**

Zero Standby Power 63W USB PD Adapters

- <5mW no-load standby power consumption
- Simple, easy-to-use, low BOM count solution
  - Single-layer PCB
- iW9860 AC/DC digital primary-side quasi-resonant (QR) flyback controller
  - Dual-polarity auxiliary winding sensor improves EMI, simplifies transformer design

- iW760 QR interface controller
  - Integrated synchronous rectifier
  - Secondary-side digital compensation eliminates loop components, ensures stability
  - USB-IF PD certified (USB PD 3.0 + PPS)
- Hardwired state machine prevents fast chargers from hacking

Eco-friendly design enables zero standby power
<5mW at 230VAC

Space-Saving Packages

TDFN-3x4
SOT23-6

![Diagram of iW9860 + iW760 USB PD Adapter Solution]
AC/DC **RapidCharge™** Adapter Solutions (continued)

**iW9806 + iW611**

Digital ZVS Controller Optimized for GaN

- iW9806 AC/DC digital primary-side controller with Renesas’ patented Zero Voltage Switching (ZVS) control
- Optimized for GaN power ICs
- Supports third-party USB PD secondary-side controllers
- Low EMI and no audible noise

- High switching frequency up to 200kHz enables
  - Smaller, lighter weight transformer
  - Lowest BOM cost
- Works with industry-standard interfaces (e.g. TL431)
- Works with iW611 synchronous rectifier optimized for ZVS to enable > 90% efficiency
AC/DC Secondary-Side ICs

<table>
<thead>
<tr>
<th>Product</th>
<th>Voltage Position Controller</th>
<th>Synchronous Rectifier Controller</th>
<th>Quiescent Current</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
</table>
| iW610   | ✓                           | ✓                                | < 150μA at no load | ▪ Low Vcc charging loss  
▪ Optimized for high power density applications  
▪ Optimized to support Quasi-Resonant, DCM, CCM Flyback, ZVS & Active Clamp Flyback topologies | SOT23-6 |
| iW611   | ✓                           | ✓                                | < 150μA at no load | ▪ Low Vcc charging loss  
▪ Optimized for high power density applications  
▪ Optimized to support high frequency Quasi-Resonant, DCM, CCM Flyback, ZVS and Active Clamp Flyback topologies | SOT23-6 |
| iW673   | ✓                           | ✓                                | < 450μA at no load | ▪ Replaces Schottky diode with MOSFET | SOT23-6 |
| iW676   | ✓                           | ✓                                | < 650μA at no load | ▪ 25V Output, optimized for lowest BOM cost in applications up to 12V  
▪ Optimized for Direct charging applications down to 3V  
▪ Incorporates AVP (Active Voltage Positioning) for fast dynamic load response | SOT23-6 |
| iW873   | ✓                           | ✓                                | < 450μA at no load | ▪ Integrated 60V power MOSFET | SO-8 |

**iW673, iW676**

Digital Synchronous Rectifiers Replace Schottky Diode for Higher Efficiency, Ultra-Compact Power Adapters

- Eliminates parallel Schottky diode for lower BOM cost
- Added benefits of iW676
  - 25V output, optimized for lowest BOM cost in applications up to 12V
  - Optimized for Direct Charging applications down to 3V
  - Incorporates AVP (Active Voltage Positioning) for fast dynamic load response
- DiaSIM™ simulation models available

**iW610, iW611**

Synchronous Rectifier Controllers Optimized for ZVS

- Optimized for high power density ZVS applications
  - Supports multiple flyback topologies: QR, DCM/CCM mode, active clamp, ZVS
- Patented Vcc charging technology for higher system efficiency
- Support for high-side and low-side SR topologies
  - No auxiliary winding required
- Wide operating output voltage: 3V - 28V
- High frequency switching up to 500kHz (iW611)
# AC/DC PWM ICs with Integrated AccuSwitch™ High-Voltage Switch

<table>
<thead>
<tr>
<th>Product</th>
<th>Typical Output Power (max.)</th>
<th>Regulation</th>
<th>Power Supply Topology</th>
<th>No-Load Standby Power</th>
<th>Driver Type</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW1818</td>
<td>5W</td>
<td>Primary-side</td>
<td>Isolated Flyback</td>
<td>&lt; 30mW</td>
<td>Integrated 800V BJT</td>
<td></td>
<td>SO-7</td>
</tr>
<tr>
<td>iW1818</td>
<td>12W</td>
<td>Primary-side</td>
<td>Isolated Flyback</td>
<td>&lt; 50mW</td>
<td>Integrated 800V BJT</td>
<td></td>
<td>PDIP-7</td>
</tr>
<tr>
<td>iW1821</td>
<td>12W</td>
<td>Primary-side</td>
<td>Isolated Flyback</td>
<td>&lt; 50mW</td>
<td>Integrated 1200V BJT</td>
<td>• Optimized for high-voltage 3-phase systems</td>
<td>SO-10 Batwing</td>
</tr>
<tr>
<td>RAA223181</td>
<td>12W</td>
<td>Secondary-side</td>
<td>Isolated Flyback</td>
<td>&lt;150mW</td>
<td>Integrated 900V FET</td>
<td>▪ Single 400V input capacitor for input up to 1500V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Frequency doubling for heavy load operation, up to 12W within 100ms</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Programmable fixed switching frequency, friendly with PLC communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Valley switching for best efficiency and EMI across full load range</td>
<td></td>
</tr>
<tr>
<td>RAA223182</td>
<td>12W</td>
<td>Secondary-side</td>
<td>Isolated Flyback</td>
<td>&lt;150mW</td>
<td>Integrated 1000V FET</td>
<td>▪ Single 400V input capacitor for input up to 1500V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Frequency doubling for heavy load operation, up to 12W within 100ms</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Programmable fixed switching frequency, friendly with PLC communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Valley switching for best efficiency and EMI across full load range</td>
<td></td>
</tr>
<tr>
<td>iW1820</td>
<td>15W</td>
<td>Primary-side</td>
<td>Isolated Flyback</td>
<td>&lt; 30mW</td>
<td>Integrated 800V BJT</td>
<td>• Optimized for 5V output</td>
<td>SO-10 Batwing</td>
</tr>
<tr>
<td>iW1830</td>
<td>15W</td>
<td>Primary-side</td>
<td>Isolated Flyback</td>
<td>&lt; 50mW</td>
<td>Integrated 700V FET</td>
<td>• Optimized for 12V output</td>
<td>PDIP-7</td>
</tr>
<tr>
<td>RAA223881</td>
<td>15W</td>
<td>Secondary-side</td>
<td>Isolated Flyback</td>
<td>Integrated 700V FET</td>
<td></td>
<td>▪ Quasi-resonant switching at full load and PFM at light load for best efficiency and EMI across full load range</td>
<td>SOIC8-7</td>
</tr>
<tr>
<td>iW1819</td>
<td>18W</td>
<td>Primary-side</td>
<td>Isolated Flyback</td>
<td>&lt; 30mW</td>
<td>Integrated 800V BJT</td>
<td></td>
<td>SO-10 Batwing</td>
</tr>
<tr>
<td>iW1822</td>
<td>18W</td>
<td>Primary-side</td>
<td>Isolated Flyback</td>
<td>&lt; 30mW</td>
<td>Integrated 900V BJT</td>
<td>• 900V high breakdown voltage</td>
<td>SO-10 Batwing</td>
</tr>
<tr>
<td>iW1823</td>
<td>25W</td>
<td>Primary-side</td>
<td>Isolated Flyback</td>
<td>&lt; 75mW</td>
<td>Integrated 700V FET</td>
<td>• Configurable light load mode</td>
<td>SO-10 Batwing</td>
</tr>
<tr>
<td>RAA223882</td>
<td>30W</td>
<td>Secondary-side</td>
<td>Isolated Flyback</td>
<td>Integrated 700V FET</td>
<td></td>
<td>▪ Quasi-resonant switching at full load and PFM at light load for best efficiency and EMI across full load range</td>
<td>PDIP8-7</td>
</tr>
<tr>
<td>RAA223883</td>
<td>40W</td>
<td>Secondary-side</td>
<td>Isolated Flyback</td>
<td>Integrated 700V FET</td>
<td></td>
<td>▪ Quasi-resonant switching at full load and PFM at light load for best efficiency and EMI across full load range</td>
<td>PDIP8-7</td>
</tr>
</tbody>
</table>
AC/DC PWM ICs with Integrated AccuSwitch™ High-Voltage Switch

**iW1821, iW1822**

*AccuSwitch™* PWM Controllers Optimized for Smart Electricity Meters

- PWM controller and BJT in one package
  - *iW1821*: 12W output, integrated 1200V BJT, for high voltage three-phase meters
  - *iW1822*: 18W output, integrated 900V BJT, for single-phase and three-phase meters
- *PrimAccurate™* digital primary-side regulation eliminates optocoupler
- Isolated flyback power supply topology without adding components
- Optimized to start into large capacitive loads up to 6,000µF
- High light-load and active-mode efficiency
- Low standby power *iW1821* < 50mW, *iW1822* < 30mW
- *EZ-EMI™* - valley mode switching lowers EMI, reduces filtering components size/cost

---

Innovative 10-lead SOIC Batwing package
- Based on JEDEC-standard SOIC-14
- Provides high-voltage isolation
- Small footprint, enhanced thermal performance

---

![Diagram of AC/DC PWM ICs with Integrated AccuSwitch™ High-Voltage Switch](image)
AC/DC PWM ICs
with Integrated AccuSwitch™ High-Voltage Switch

**iW1816, iW1819**

**AccuSwitch™ PWM Controllers Optimized for Appliances**

- PWM controller and BJT in one package
  - **iW1816**: 5W output, integrated 800V BJT
  - **iW1819**: 18W output, integrated 800V BJT
- **PrimAccurate™** digital primary-side regulation eliminates optocoupler
- Isolated flyback power supply topology without adding components
- Optimized to start into large capacitive loads up to 6,000µF
- High light-load and active-mode efficiency
- Low standby power < 30mW
- **EZ-EMI™** - valley mode switching lowers EMI, reduces filtering components size/cost

- Innovative 10-lead SOIC batwing package (**iW1819**)
  - Based on JEDEC-standard SOIC-14
  - Provides high-voltage isolation
  - Small footprint, enhanced thermal performance
AC/DC Non-Isolated High-Voltage Buck Regulators

<table>
<thead>
<tr>
<th>Product</th>
<th>Typical Output Power (max.)</th>
<th>Power Supply Topology</th>
<th>No-Load Standby Power</th>
<th>Driver Type</th>
<th>Key Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA2223012</td>
<td>2.5W</td>
<td>Non-Isolated Buck</td>
<td>&lt;10mW</td>
<td>Integrated 700V MOSFET</td>
<td>Low EMI, no audible noise, supports 3.3V or 5V output directly - no second-stage LDO needed</td>
<td>TSOT23-5, SOIC-8</td>
</tr>
<tr>
<td>RA2223011</td>
<td>4W</td>
<td>Non-Isolated Buck</td>
<td>&lt;10mW</td>
<td>Integrated 700V MOSFET</td>
<td>Low EMI, no audible noise, supports 3.3V or 5V output directly - no second-stage LDO needed</td>
<td>TSOT23-5, SDIC-8-7, SDIC-8</td>
</tr>
<tr>
<td>RA2223010</td>
<td>6W</td>
<td>Non-Isolated Buck</td>
<td>~5-30mW</td>
<td>Integrated 700V MOSFET</td>
<td>Low EMI, no audible noise, supports 3.3V or 5V output directly - no second-stage LDO needed</td>
<td>SOIC8-7</td>
</tr>
<tr>
<td>RA2223021</td>
<td>8W</td>
<td>Non-Isolated Buck</td>
<td>&lt;20mW</td>
<td>Integrated 700V MOSFET</td>
<td>Low EMI, no audible noise, supports 3.3V or 5V output directly - no second-stage LDO needed</td>
<td>SOIC8-7</td>
</tr>
</tbody>
</table>

**RAA223010**

**Key Features**

- Non-isolated buck makes AC/DC design easy
  - Eliminates power transformer
- Also supports flyback topologies
- No audible noise, even at light load
- Low standby power: 5 to 30mW
- Low EMI (conducted and radiated)
- Supports 3.3V or 5V output directly
  - No second-stage LDO needed

**Renesas’ Quiet light-load PFM Mode**

Low peak current keeps filter components quiet

Controlled frequency eliminates sub-harmonic energy
Induction Cooker Controller

Smart IGBT Controller Simplifies Induction Heat Cooker Design

- Digital controller and analog driver blocks in one IC
  - Digital state machine replaces traditional MCU
  - Integrated IGBT controller
  - No programming needed
  - Full functions built in
- Built-in advanced protection circuitry, including:
  - Input voltage and current sense circuit
  - System component temperature sense circuit
  - Pan detection circuit to protect IGBT
  - Over-voltage protection for IGBT collector
  - Three dedicated over-temperature protection pins
  - Input surge protection
  - Output power compensation
  - EMI enhancement
- Eliminates up to 35 components
- Low-power continuous mode operation option
- 10W resolution power control, starts from 0W
- Supports 110V AC and 220V AC

See Renesas iW248 video
### SSL LED Drivers Commercial

#### Two-Stage SSL Phase-Cut Drivers

<table>
<thead>
<tr>
<th>Product</th>
<th>Typical Output Power</th>
<th>Power Factor</th>
<th>Topology</th>
<th>Maximum Switching Frequency</th>
<th>Boost Driver Type</th>
<th>Flyback Driver Type</th>
<th>Dimming Range</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW3614</td>
<td>3W - 15W</td>
<td>PF &gt; 0.9</td>
<td>2 Stages</td>
<td>200kHz</td>
<td>FET</td>
<td>FET</td>
<td>1% - 100%</td>
<td>▪ Phase-cut dimming</td>
<td>SO-8</td>
</tr>
<tr>
<td>iW3616</td>
<td>3W - 12W</td>
<td>PF &gt; 0.95</td>
<td>2 Stages</td>
<td>200kHz</td>
<td>BJT</td>
<td>FET</td>
<td>1% - 100%</td>
<td>▪ Phase-cut dimming</td>
<td>SO-14</td>
</tr>
<tr>
<td>iW3617</td>
<td>12W - 25W</td>
<td>PF &gt; 0.95</td>
<td>2 Stages</td>
<td>200kHz</td>
<td>BJT</td>
<td>FET</td>
<td>1% - 100%</td>
<td>▪ Phase-cut dimming</td>
<td>SO-14</td>
</tr>
</tbody>
</table>

#### Single-Stage PFC and PFC Flyback SSL Controllers

<table>
<thead>
<tr>
<th>Product</th>
<th>Typical Output Power</th>
<th>Power Factor</th>
<th>Topology</th>
<th>Maximum Switching Frequency</th>
<th>Boost Driver Type</th>
<th>CC Tolerance</th>
<th>Flyback Driver Type</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
</table>
| iW2206  | 3W - 250W            | PF > 0.9     | 1 Stage (Boost PFC)               | 300kHz                     | FET               | N/A          | N/A                 | ▪ High-power boost PFC front-end controller  
▪ Configurable DC bus voltage | SOT23-6   |
| iW3627  | 3W - 90W             | PF > 0.9     | 1 Stage Constant Voltage         | Configurable 90kHz or 120kHz | N/A               | N/A          | FET                 | ▪ PFC front-end controller  
▪ Output OVP, OCP  
▪ Over-temperature protection | SOT23-6   |
| iW3636  | 3W - 90W             | PF > 0.9     | 1 Stage                           | Configurable 72kHz or 90kHz | N/A               | ± 5%         | 1% - 100%           | ▪ 0-10V & PWM dimming | SO-8     |
| iW3671  | 3W - 90W             | PF > 0.9     | 1 Stage                           | 300kHz                     | N/A               | ± 5%         | FET                 | ▪ PFC front-end controller  
▪ CV/CC flyback | SOT23-6   |
| iW3677  | 3W - 90W             | PF > 0.9     | 1 Stage                           | 300kHz                     | N/A               | ± 5%         | FET                 | ▪ PFC front-end controller  
▪ CV/CC flyback  
▪ Integrated high-voltage startup | SO-7      |
| iW3827  | 3W - 8W              | PF > 0.9     | 1 Stage Constant Voltage         | Configurable 90kHz or 120kHz | N/A               | N/A          | Internal 650V FET   | ▪ Output OVP, OCP  
▪ Over-temperature protection | SO-7      |

---

**SSL LED Drivers Commercial**

**Two-Stage SSL Phase-Cut Drivers**

- **iW3614**: 3W - 15W, PF > 0.9, 2 Stages, 200kHz, FET-FET, 1% - 100%, Phase-cut dimming, SO-8
- **iW3616**: 3W - 12W, PF > 0.95, 2 Stages, 200kHz, BJT-FET, 1% - 100%, Phase-cut dimming, SO-14
- **iW3617**: 12W - 25W, PF > 0.95, 2 Stages, 200kHz, BJT-FET, 1% - 100%, Phase-cut dimming, SO-14

**Single-Stage PFC and PFC Flyback SSL Controllers**

- **iW2206**: 3W - 250W, PF > 0.9, 1 Stage (Boost PFC), 300kHz, FET-N/A-N/A, High-power boost PFC front-end controller, Configurable DC bus voltage, SOT23-6
- **iW3627**: 3W - 90W, PF > 0.9, 1 Stage Constant Voltage, Configurable 90kHz or 120kHz, N/A-N/A-FET, PFC front-end controller, Output OVP, OCP, Over-temperature protection, SOT23-6
- **iW3636**: 3W - 90W, PF > 0.9, 1 Stage, Configurable 72kHz or 90kHz, N/A±5%-1% - 100%, 0-10V & PWM dimming, SO-8
- **iW3671**: 3W - 90W, PF > 0.9, 1 Stage, 300kHz, N/A±5%-FET, PFC front-end controller, CV/CC flyback, SOT23-6
- **iW3677**: 3W - 90W, PF > 0.9, 1 Stage, 300kHz, N/A±5%-FET, PFC front-end controller, CV/CC flyback, Integrated high-voltage startup, SO-7
- **iW3827**: 3W - 8W, PF > 0.9, 1 Stage Constant Voltage, Configurable 90kHz or 120kHz, N/A-N/A, Internal 650V FET, Output OVP, OCP, Over-temperature protection, SO-7
# SSL Interface ICs

<table>
<thead>
<tr>
<th>Product</th>
<th>Voltage</th>
<th>Optocoupler Delay Elimination</th>
<th>Analog</th>
<th>PWM</th>
<th>Resistive</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW330</td>
<td>5V - 60V Operating</td>
<td>Yes</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Serial Interface Controller</td>
</tr>
<tr>
<td>iW337</td>
<td>15V - 60V Operating</td>
<td>Yes</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Serial Interface Controller</td>
</tr>
<tr>
<td>iW338</td>
<td>8V - 60V Operating</td>
<td>No</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>0 - 0.6V Analog Interface Controller</td>
<td>SO-8</td>
</tr>
<tr>
<td>iW339</td>
<td>15V - 60V Operating</td>
<td>Yes</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Serial Interface Controller</td>
</tr>
<tr>
<td>iW350</td>
<td>15V - 60V Operating</td>
<td>Yes</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Serial Interface Controller with programmable: - Minimum duty - Maximum voltage - PWM frequency range - Turn-off voltage</td>
</tr>
</tbody>
</table>

# Second-Stage SSL PWM Controllers

<table>
<thead>
<tr>
<th>Product</th>
<th>Input Voltage</th>
<th>Output Power</th>
<th>Integrated FET</th>
<th>Dimming Range</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW383</td>
<td>Low-voltage DC</td>
<td>90W</td>
<td>N/A</td>
<td>1% - 100%</td>
<td>Buck Regulator with True DC dimming</td>
<td>SO-8</td>
</tr>
<tr>
<td>iW383i</td>
<td>High-voltage DC or AC</td>
<td>150W</td>
<td>N/A</td>
<td>1% - 100%</td>
<td>Buck/Flyback Regulator with True DC dimming</td>
<td>SO-8</td>
</tr>
<tr>
<td>iW381</td>
<td>22V - 78V Input</td>
<td>150W</td>
<td>N/A</td>
<td>0.0625% – 100%</td>
<td>Buck Regulator with high-resolution True DC dimming - IEC62386-2014 DALI-2 compliant - iW380-40 for stage lighting applications</td>
<td>SO-10</td>
</tr>
<tr>
<td>iW381i</td>
<td>22V - 78V Input</td>
<td>40W</td>
<td>Yes</td>
<td>0.0625% – 100%</td>
<td>Buck Regulator with high-resolution True DC dimming - IEC62386-2014 DALI-2 compliant - Integrated MOSFET</td>
<td>SO-10 Batwing</td>
</tr>
</tbody>
</table>
SSL LED Drivers Commercial (continued)

**iW380, iW388**

High-Resolution, True DC Dimming Solutions for DALI, Stage Lighting

- High-resolution, second-stage PWM buck controllers
- True DC dimming – low-end dimming without flicker
  - Deep dimming range: 0.0625% to 100%
  - Flicker-free dimming resolution: 0.0625% steps
- IEC62386-2014 DALI-2 compliant
- 3-in-1 dimming: RSET, PWM, analog
- Wide input voltage range: 22V – 78V

**iW380: 150W Low-Voltage Buck Controller**

**iW388: 40W Low-Voltage Buck Controller with Integrated MOSFET**

**Innovative SO-10 Batwing Package**

- Based on JEDEC-standard SOIC-14
- Provides high-voltage isolation
- Small footprint, enhanced thermal performance
SSL LED Drivers Commercial (continued)

**iW380-40**

*High-Resolution, High-Frequency PWM Controller Optimized for Stage Lighting*

- High-resolution, second-stage PWM buck controller
- DC dimming combined with PWM dimming
  - Deep dimming range: 0.01% to 100%
  - Flicker-free dimming resolution: 0.0625% steps
- PWM control for accurate color mixing
- Fast PWM dimming: 20kHz to 35kHz input frequency range
- Uses power NMOS as buck main switch
- Highly integrated to reduce BOM size/cost
  - Built-in LED short-circuit MOS driver (Shunt pin)
  - Internal reverse MCU PWM signal
- Digital control
  - Simplifies design, eliminates many resistors and capacitors
  - Enables stable, flickerless low-end dimming

---

**Diagram Description**

- **AC** to **12Vdc / 5Vdc / 48Vdc**
- **MCU (Control)**
- **PWM Dimming Signal**
- **DMX512 Protocol Control Signal**
- **Lamp Holder Rotation Motor**
- **MCU (Decode)**
- **RGBW Light Source**
- **LED+** to **LED-**
SSL LED Drivers Commercial (continued)

Combo SSL LED Drivers

<table>
<thead>
<tr>
<th>Product</th>
<th>Typical Output Power</th>
<th>Power Factor</th>
<th>Topology</th>
<th>Maximum Switching Frequency</th>
<th>Dimming Resolution</th>
<th>CC Tolerance</th>
<th>Flyback Driver Type</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW3629</td>
<td>5W - 120W</td>
<td>PF &gt; 0.95</td>
<td>2 Stages (Boost+Flyback)</td>
<td>200kHz</td>
<td>N/A</td>
<td>± 5%</td>
<td>FET</td>
<td>▪ Non-dimmable ▪ Flickerless high PF and low THD combo chip ▪ Over-temperature protection and derating, optional external NTC</td>
<td>SO-14</td>
</tr>
<tr>
<td>iW3631</td>
<td>5W - 120W</td>
<td>PF &gt; 0.95</td>
<td>2 Stages (Boost+Flyback)</td>
<td>200kHz</td>
<td>N/A</td>
<td>± 5%</td>
<td>FET</td>
<td>▪ 0-10V Dimming ▪ Flickerless high PF and low THD combo chip ▪ Over-temperature protection and derating, optional external NTC</td>
<td>SO-14</td>
</tr>
<tr>
<td>iW3700</td>
<td>5W - 120W</td>
<td>PF &gt; 0.95</td>
<td>2 Stages (Boost+Flyback)</td>
<td>200kHz</td>
<td>0.0625%</td>
<td>± 3%</td>
<td>FET</td>
<td>▪ UART or 3-in-1 dimming option ▪ Flickerless high PF and low THD combo chip ▪ 0.0625% dimming resolution</td>
<td>SO-14</td>
</tr>
<tr>
<td>iW3701</td>
<td>5W - 200W</td>
<td>PF &gt; 0.95</td>
<td>2 Stages (Boost+HV Buck)</td>
<td>200kHz</td>
<td>0.0625%</td>
<td>± 3%</td>
<td>FET</td>
<td>▪ UART or 3-in-1 dimming option ▪ Flickerless high PF and low THD combo chip ▪ 0.0625% dimming resolution</td>
<td>SO-14</td>
</tr>
</tbody>
</table>

iW3700, iW3701

Digital Combo SSL Controllers Optimized for Industrial Lighting

- Digital PFC + flyback and PFC + buck topologies
- True DC dimming – low-end dimming without flicker
  - Maximum dimming range: 0.0625% to 100%
  - Flicker-free dimming resolution: 0.0625% steps
- High PF > 0.95 with low THD < 20% at 277V/50Hz, 50% load
- Digital PFC stage optimizes for high PF, low THD at light loads with fast dynamic load response
  - Enables use of small input capacitors with low voltage rating for higher power density, lower cost

- Meets IEC61000-3-2 harmonic current requirements
- Dual dimming ports for application flexibility
  - One port: field program maximum LED current
  - Second port: 3-in-1 dimming (0-10V analog, PWM, resistive)
- UART communication simplifies design for smart applications (e.g. IEC62386-2014 DALI-2)
PFC Front-End Controllers

**iW2206**

High-Power Boost Front-End Controller with PFC
- Universal AC input (90V\(_{AC}\) - 305V\(_{AC}\))
- Output power up to 250W
- Low standby power < 150mW at 230V\(_{AC}\) with 100W input power
- No audible noise at steady and dynamic load
- Configurable DC bus voltage
- High PF > 0.9, with low THD < 10% at 120V\(_{AC}\) and 230V\(_{AC}\) with full load
- Meets IEC61000-3-2 harmonic current requirements

**iW3671, iW3677**

Flyback Front-End Controllers with PFC
- Universal AC input (90V\(_{AC}\) - 305V\(_{AC}\))
- Output power up to 90W
- Low standby power < 150mW at 230V\(_{AC}\) with 90W input power
- No audible noise at steady and dynamic load
- High PF > 0.9, with low THD < 10% at 120V\(_{AC}\) and 230V\(_{AC}\) with full load
- Meets IEC61000-3-2 harmonic current requirements
- Integrated high-voltage startup (iW3677)
### SSL LED Drivers Residential

#### Phase-Cut Dimmable LED Drivers

<table>
<thead>
<tr>
<th>Product</th>
<th>Typical Output Power</th>
<th>Power Factor</th>
<th>Topology</th>
<th>Maximum Switching Frequency</th>
<th>Boost Driver Type</th>
<th>Flyback Driver Type</th>
<th>Dimming Range</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW3602</td>
<td>3W - 10W</td>
<td>PF &gt; 0.9</td>
<td>2 Stages</td>
<td>200kHz</td>
<td>FET</td>
<td>FET</td>
<td>1% - 100%</td>
<td>• Phase-cut dimming</td>
<td>SO-8</td>
</tr>
<tr>
<td>iW3605</td>
<td>5W - 25W</td>
<td>PF &gt; 0.92</td>
<td>1 Stage</td>
<td>90kHz</td>
<td>N/A</td>
<td>FET</td>
<td>10% - 100%</td>
<td>• Phase-cut dimming • Bleederless</td>
<td>SO-8</td>
</tr>
<tr>
<td>iW3658</td>
<td>3W - 15W</td>
<td>Configurable</td>
<td>1 Stage</td>
<td>200kHz</td>
<td>N/A</td>
<td>FET (Integrated)</td>
<td>1% - 100%</td>
<td>• Phase-cut dimming • Integrated FET</td>
<td>SO-7</td>
</tr>
<tr>
<td>iW3662</td>
<td>4W - 8W</td>
<td>PF &gt; 0.7</td>
<td>2 Stages</td>
<td>1MHz</td>
<td>FET</td>
<td>FET</td>
<td>5% - 100%</td>
<td>• Phase-cut dimming • Magnetic or electronic transformer capable</td>
<td>QFN-16</td>
</tr>
<tr>
<td>iW3688</td>
<td>3W - 20W</td>
<td>PF &gt; 0.92</td>
<td>1 Stage</td>
<td>90kHz</td>
<td>N/A</td>
<td>FET</td>
<td>1% - 100%</td>
<td>• Phase-cut dimming • Configurable temperature derating point</td>
<td>SO-14</td>
</tr>
<tr>
<td>iW3689</td>
<td>3W - 25W</td>
<td>PF &gt; 0.92</td>
<td>1 Stage</td>
<td>200kHz</td>
<td>N/A</td>
<td>FET</td>
<td>1% - 100%</td>
<td>• Phase-cut dimming • Configurable temperature derating point</td>
<td>SO-8</td>
</tr>
<tr>
<td>iW3689</td>
<td>3W - 15W</td>
<td>Configurable</td>
<td>Linear</td>
<td>N/A</td>
<td>N/A</td>
<td>FET</td>
<td>1% - 100%</td>
<td>• AC direct phase-cut dimming</td>
<td>QFN-12</td>
</tr>
</tbody>
</table>

#### Non-Dimmable LED Drivers

<table>
<thead>
<tr>
<th>Product</th>
<th>Typical Output Power</th>
<th>Power Factor</th>
<th>Topology</th>
<th>Maximum Switching Frequency</th>
<th>Boost Driver Type</th>
<th>CC Tolerance</th>
<th>Flyback Driver Type</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>iW3626</td>
<td>3W - 10W</td>
<td>Configurable</td>
<td>1 Stage</td>
<td>72kHz</td>
<td>N/A</td>
<td>± 5%</td>
<td>BJT</td>
<td>• LED Open/Short • Over-temperature protection and derating</td>
<td>SOT23-6</td>
</tr>
<tr>
<td>iW3625</td>
<td>10W-45W</td>
<td>Configurable</td>
<td>1 Stage</td>
<td>72kHz</td>
<td>N/A</td>
<td>± 5%</td>
<td>FET</td>
<td>• LED Open/Short • Over-temperature protection and derating</td>
<td>SOT23-6</td>
</tr>
</tbody>
</table>