RICHTEK
POWER SOLUTIONS FOR LED LIGHTING APPLICATIONS
OVERVIEW

1-Stage FLT Buck C.C.
Non-Dimmable: RT8487/RT8497 series

1-Stage FLT Buck C.V. + 2nd Stage Buck C.C.
RT8432 + RT8420/RT8406

Boost PFC C.V. + HV Buck C.C.
RT7300AD + RT8458A

3W-24W

Boost PFC C.V. + Flyback C.C.
RT7300AD + RT7306S/RT7331S

40W-100W

1-Stage Flyback C.V. + 2nd Stage Buck C.C.
RT7313 or RT7339P/S + RT8420/RT8406/RT8458A

100W-150W

1-Stage Flyback C.C.
Non-Dimmable: RT7304A/RT7330 / Dimmable: RT7306D/RT7331

Non-Isolated Solution

Isolated Solution
## HIGH POWER FACTOR AC/DC ISOLATED SOLUTIONS FOR LED LIGHTING DRIVERS

<table>
<thead>
<tr>
<th>P/N</th>
<th>Topology</th>
<th>MOSFET BVDS</th>
<th>MOSFET Ron</th>
<th>Dimmable</th>
<th>Package</th>
<th>Key features</th>
<th>Status</th>
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</thead>
</table>
| RT7304  | Gen I, Primary-Side-Regulation Flyback/Buck-Boost, C.C |             |            | ×        | SOT-26  | • Tight current regulation ±3%  
• Quasi-Resonant operation                                                   | Mass Production |
| RT7304A | Gen II, Primary-Side-Regulation Flyback/Buck-Boost, C.C |             |            | ×        | SOT-26  | • Tight current regulation ±1.5%  
• Quasi-Resonant operation  
• THD optimization, THD <10%  
• Vin feed-forward compensation                                              | Mass Production |
| RT7330  | Gen III, Primary-Side-Regulation Flyback/Buck-Boost, C.C |             |            | ×        | SOT-26  | • Tight current regulation ±1.5%  
• Advanced Quasi-Resonant operation  
• Fast startup time <0.5s  
• THD optimization, THD <10%  
• Soft drive for better EMI performance  
• Equip Vin UVP/OVP, external OTP                                              | Sampling       |
| RT7306D | Gen II, Primary-Side-Regulation Flyback/Buck-Boost, C.C | Analog PWM  | SOP-8      |          |         | • Tight current regulation ±1.5%  
• Quasi-Resonant operation  
• Built-in HV startup device  
• THD optimization, THD<10%  
• Vin feed-forward compensation  
• VDD hold-up mode for standby power                                           | Mass Production |
| RT7331  | Gen III, Primary-Side-Regulation Flyback/Buck-Boost, C.C | Analog PWM  | SOP-8      |          |         | • Tight current regulation ±1.5%  
• Advanced Quasi-Resonant operation  
• Smart CC/CV mode (Adjustable CV Level)  
• Wide dimming range (1%~100%)  
• Fast startup time <0.5s  
• THD optimization, THD <10%  
• Vin feed-forward compensation  
• Low standby power consumption  
• Soft drive for better EMI performance  
• Equip Vin UVP/OVP, external OTP                                              | Mass Production |
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<th>MOSFET R&lt;sub&gt;on&lt;/sub&gt;</th>
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<td>RT7300AD</td>
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## SECONDARY-SIDE CONTROLLERS

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</table>
| RT8481/A | Secondary-Side, C.C./C.V. Regulator |              |            | ×        | SOT-26  | - Wide input range 4.75V to 50V  
- Precise CV Ref. ±1% and CC Ref. ±3%  
- Smooth transient between CV/CC control loops  
- Low operating current 0.6mA          | Mass Production |
| RT8457A | Secondary-Side, Dimmable C.C. Regulator |              |            |          | SOP-8   | - High precise ref. ±5%  
- Precise analog dimming performance  
- Low operating current 0.5mA         | Mass Production |
# AC/DC NON-ISOLATED SOLUTIONS FOR LED LIGHTING DRIVERS

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| RT8458A| Floating Buck C.C. Controller   |             |            | Analog   | TSOT-26 | • Support both universal or DC input  
  • Support Analog/PWM dimming control and share the same pin                  | Mass Production |
| RT8487 | HPFC Floating Buck C.C. Controller |            |            |          | TSOT-26 | • THD optimization and meet IEC-61000-3-2 Class C requirement  
  • High precise Ref. ±3%  
  • Low quiescent and shut down current  
  • Programmable ZVS setting  
  • Quickly charge for shortening startup time                                  | Mass Production |
| RT8497 | HPFC Floating Buck C.C. Convertor | 500V        | 5.2Ω       |          | SOP-8   | • THD optimization and meet IEC-61000-3-2 Class C Requirement  
  • High precise Ref. ±3%  
  • Low quiescent and shut down current  
  • Programmable ZVS setting  
  • Quickly charge for shortening startup time  
  • A few external components  
  • High quality and reliability                                                | Mass Production |
<p>| RT8497A|                                | 500V        | 2Ω         | X        |         |                                                                              |              |
| RT8497B|                                | 600V        | 4.2Ω       | X        | SOP-8   |                                                                              |              |
| RT8497C|                                | 600V        | 7Ω         |          |         |                                                                              |              |
| RT8497D|                                | 600V        | 3.2Ω       |          |         |                                                                              |              |</p>
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## DC/DC SOLUTIONS FOR LED LIGHTING DRIVERS

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| RT8471| 1.2A/1A Hysteretic Control Buck C.C. Converter| 36V          | 350mΩ      | Analog   | TSOT-25      | • Fast response w/o compensation  
  • A few external components  
  • Tight current regulation ±5%                                                        | Mass Production |
|       |                                               |              |            | PWM      | PSOP-8 MSOP-8| • Fast response w/o compensation  
  • A few external components  
  • Tight current regulation ±5%  
  • 1MHz frequency limited at low percentage dimming  
  • Adjustable MOSFET rising/falling speed                                               |               |
| RT8420| 1.2A Hysteretic Control Buck C.C. Converter   | 50V          | 350mΩ      | Analog   | PSOP-8 MSOP-8| • Wide input range 4.5V to 50V  
  • Support Buck/Boost/Buck-Boost topology  
  • Tight current regulation ±3%                                                        | Mass Production |
| RT8477A|Average Sensing Control C.C. Controller        |              |            | Analog   | PSOP-8       | • Support Buck/Boost/Buck-Boost topology  
  • Tight current regulation ±3%  
  • Adjustable OVP level                                                               | Mass Production |
| RT8474A|Floating Buck C.V. Converter                   | 50V          | 150Ω       | Analog   | PSOP-8       | • Tight current regulation ±3%  
  • 1% low dimming precision  
  • Low standby power consumption  
  • High input range (Up to 65V)  
  • High efficiency over 97%  
  • Adjustable switching frequency                                                     | Mass Production |
<p>| RT8406| Average Sensing Control C.C. Controller       |              |            | Analog   | SOP-8        |                                                                                   | Mass Production |</p>
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| RT8480| Average Sensing Control Boost C.C. Controller |              |            | Analog PWM | SOP-16  | • $V_{\text{OUT}}$ is limited by external MOSFET switch  
• Support pure PWM dimming                                                                       | Mass Production |
| RT8462| Average Sensing Control C.C. Controller  |              |            | Analog PWM | SOP-14  | • Support Buck/Boost/Buck-Boost topology  
• Programmable switching frequency  
• Programmable soft-start/OVP  
• Support output up to 60V (RT8462),  
90V (RT8475 and RT8494)  
• Automotive grade 1 AEC-Q100 qualified (RT8494)                                                  | Mass Production |
| RT8475| (Automotive grade)                       |              |            |            |         |                                                                                                        |              |
| RT8494| (Automotive grade)                       |              |            |            |         |                                                                                                        |              |
# LIGHT QUALITY SOLUTIONS FOR LED LIGHTING DRIVERS

<table>
<thead>
<tr>
<th>P/N</th>
<th>Topology</th>
<th>MOSFET BVdSS</th>
<th>MOSFET Ron</th>
<th>Dimmable</th>
<th>Package</th>
<th>Key features</th>
<th>Status</th>
</tr>
</thead>
</table>
| RT7315A | Adaptive 100Hz/120Hz Current Ripple Regulator |              |            |          | SOT-26  | • Suitable for dimmable LED lighting system  
• Support wide LED voltage range  
• Adjustable ripple ratio for high efficiency  
• Support electronic-load test/development | Mass Production |
| RT8479C | 2-Stage Hysteretic Control C.C. Converter | 36V          | 150mΩ/200mΩ|          | PSOP-8   | • Wide Vin range 4.5V to 36V  
• Excellent power factor  
• Tight current regulation ±5%  
• High ET compatibility and flicker free  
• Independent dual stage function  
• Integrated dual MOSFET       | Mass Production |
| RT8495  | 2-Stage Hysteretic Control C.C. Converter | 36V          | 200mΩ      |          | WDFN3x3  | • Wide Vin range 4.5V to 36V  
• Excellent power factor  
• Equip internal active bleeder  
• High ET/Dimmer compatibility  
• Flicker free in dimming process | Mass Production |

# MR16 SOLUTIONS FOR LED LIGHTING DRIVERS

<table>
<thead>
<tr>
<th>P/N</th>
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<th>MOSFET BVdSS</th>
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| RT7315A | Adaptive 100Hz/120Hz Current Ripple Regulator |              |            |          | SOT-26  | • Suitable for dimmable LED lighting system  
• Support wide LED voltage range  
• Adjustable ripple ratio for high efficiency  
• Support electronic-load test/development | Mass Production |
| RT8479C | 2-Stage Hysteretic Control C.C. Converter | 36V          | 150mΩ/200mΩ|          | PSOP-8   | • Wide Vin range 4.5V to 36V  
• Excellent power factor  
• Tight current regulation ±5%  
• High ET compatibility and flicker free  
• Independent dual stage function  
• Integrated dual MOSFET       | Mass Production |
| RT8495  | 2-Stage Hysteretic Control C.C. Converter | 36V          | 200mΩ      |          | WDFN3x3  | • Wide Vin range 4.5V to 36V  
• Excellent power factor  
• Equip internal active bleeder  
• High ET/Dimmer compatibility  
• Flicker free in dimming process | Mass Production |
RT7330
Primary-Side Regulation LED Driver Controller with Active-PFC

KEY FEATURES
- Tight LED Current Regulation
- Power Factor Correction
- THD Optimization (THD<10%)
- Fast Startup
- Soft Drive for Better EMI performance
- Vin Feed-Forward Compensation
- Equip Vin UVP/OVP, External OTP
- Support Wide Output Range
- Maximum Frequency Limitation (117KHz)
- Robust System Failure Protection
- Design Tool Available
- Available in SOT-26 package
**RT7331**

Primary-Side Regulation Dimmable LED Driver Controller with Active-PFC

**KEY FEATURES**
- Tight LED Current Regulation
- Smart CC/CV Mode Control
- Wide Dimming Range (1%~100%)
- Power Factor Correction
- THD Optimization (THD<10%)
- Advanced Quasi-Resonant Operation
- Fast Startup
- Adjustable CV Level
- Soft Drive for Better EMI performance
- Vin Feed-Forward Compensation
- Low Standby Power Consumption
- Equip Vin UVP/OVP, External OTP
- Support Wide Output Range
- Maximum Frequency Limitation (117KHz)
- Green Mode for Excellent Power Saving
- Robust System Failure Protection
- Design Tool Available
- Available in SOP-8 package

**TYPICAL APPLICATION CIRCUIT**

**PIN CONFIGURATION**
Standby Power Consumption (W/O D-NMOS)

DIM Curve

V_{in} = 110V_{ac}
V_{in} = 220V_{ac}

DIM Curve

Output Current

PMM Duty Ratio (%)
**RT7339P**

Primary-Side Regulation Constant Voltage Controller with Active-PFC

**KEY FEATURES**
- Tight Voltage Regulation
- Power Factor Correction
- THD Optimization (THD<10%)
- Quasi-Resonant Operation
- Fast Startup
- Ultra-Low Standby Power Consumption
- Excellent Dynamic Load Transient Response
- Soft Drive for Better EMI performance
- Vin Feed-Forward Compensation
- Equip Vin UVP/OVP, External OTP
- Wide Supply Voltage Range (Up to 34V)
- Maximum Frequency Limitation (117KHz)
- Robust System Failure Protection
- Design Tool Available
- Available in SOT-26 Package
RT8432
Constant Voltage Buck Controller with Active-PFC

KEY FEATURES
• Tight Voltage Regulation
• Power Factor Correction
• THD Optimization
• Quasi-Resonant Operation
• Fast Startup
• Ultra-Low Standby Power Consumption
• Excellent Dynamic Load Transient Response
• Soft Drive for Better EMI performance
• Vin Feed-Forward Compensation
• Equip External OTP
• Wide Supply Voltage Range (Up to 34V)
• Maximum Frequency Limitation (117KHz)
• Robust System Failure Protection
• Design Tool Available
• Available in SOT-26 package

TYPICAL APPLICATION CIRCUIT

PIN CONFIGURATION
RT8406
High Voltage Buck LED Driver with Dimming Control
Read more →

KEY FEATURES
- Tight LED Current Regulation over Wide LED Voltage Range
- 1% Low Dimming Precision
- Low Standby Power Consumption
- High Input Range: Vin up to 65V
- 65KHz/130KHz Adjustable Switching Frequency
- Support Analog/PWM Dimming Control and Share the Same Pin
- Design Tool Available
- Available in SOP-8 package
**RT7315A**

Flicker-Filter for LED Lighting

**KEY FEATURES**

- Adaptive 100Hz/120Hz LED Current Ripple Regulator
- Suitable for Dimmable LED Lighting System
- Support Wide LED Voltage Range
- Adjustable Ripple Ratio for Higher Efficiency
- Support Electronic-Load Test/Development
- Design Tool Available
- Available in SOT-23-6 package
Richtek Technology Corporation is one of the world’s leading analog IC companies. The company consistently delivers inventive power management solutions that improve the performance of consumer electronics, computers, and communications equipment. Richtek adds value to end equipment by synthesizing technological innovation, uncompromised quality, and devotion to customer service. Founded in 1998, the Company is headquartered in Taiwan with additional offices in Asia, the U.S., and Europe. For more information about Richtek and its analog IC solutions, please visit the Company’s website at www.richtek.com.