LED Drivers For Lighting

Dongwoon Anatech
### Product Line Up

<table>
<thead>
<tr>
<th>구분</th>
<th>P/N</th>
<th>Function</th>
<th>PKG</th>
<th>비고</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>DW8501</td>
<td>Operating 5V~40V 1500mA MAX</td>
<td>TO-252</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±5% Accuracy 120°C Tdrating</td>
<td>SOT-223</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DW8502</td>
<td>Operating 5V~40V 2500mA MAX</td>
<td>TO-263</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±5% ±5% Accuracy 120°C Tdrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DW8505A</td>
<td>Operating 5V~40V 100mA MAX</td>
<td>SOT-23</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±3% ±3% Accuracy 120°C Tdrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DW8506</td>
<td>Operating 5V~40V 100mA MAX</td>
<td>SOT-23</td>
<td>New Product</td>
</tr>
<tr>
<td>DC/DC Buck</td>
<td>DW8520</td>
<td>Operating 5V~450V 10 Dimming</td>
<td>8-SOIC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±5% Efficiency Up to 90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>External 120°C Tdrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DW8522</td>
<td>Operating 4.5V~40V 10 Dimming</td>
<td>8-SOIC</td>
<td>6 TDFN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>±5% Efficiency Up to 98%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>External 120°C Tdrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DW8525</td>
<td>Operating 6V~35V On/Off 300kHz</td>
<td>8-SOIC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>±5% Efficiency Up to 95%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internal 120°C Tdrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PFC</td>
<td>DW8527</td>
<td>Operating 90~285V UVLO Soft start</td>
<td>8-SOIC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>THD Low Startup O-Current</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DW8528</td>
<td>Operating 10.3~36V UVLO</td>
<td>8-SOIC</td>
<td>New Product</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.5V Output Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reshaper 120°C Tdrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV/CC</td>
<td>DW8508</td>
<td>Operating 10V~35V 10 Dimming</td>
<td>8-SOIC</td>
<td>New Product</td>
</tr>
<tr>
<td></td>
<td></td>
<td>±5% Efficiency Up to 95%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internal 120°C Tdrating</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**DW850X: Linear type, LED Driver IC**

The DW850X series are linear LED drivers for low/medium/high power LEDs. The DW850X series realize constant current driver ICs with simple circuit design. The DW850X provide cost-effective solutions for LED light bulbs, fluorescent lamp, street light, signage and decorative LED lighting, general lighting of flat panel displays, RGB backlighting, current stabilizer with DC/DC or AC/DC, general purpose constant current source.

<table>
<thead>
<tr>
<th></th>
<th>DW8501</th>
<th>DW8502</th>
<th>DW8505A</th>
<th>DW8506</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vin (min/max(V))</strong></td>
<td>5V to 40V</td>
<td>5V to 40V</td>
<td>5V to 40V</td>
<td>6.5V to 40V</td>
</tr>
<tr>
<td><strong>Output Current(mA)</strong></td>
<td>Up to 1.5A adjustable</td>
<td>Up to 2.5A adjustable</td>
<td>Up to 100mA adjustable</td>
<td>Up to 100mA adjustable</td>
</tr>
<tr>
<td><strong>Dropout Voltage</strong></td>
<td>Max. 0.3V @ I_LED=300mA</td>
<td>Max. 1V @ I_LED=1A</td>
<td>Max. 0.2V @ I_LED=60mA</td>
<td>Max. 0.5V @ I_LED=50mA</td>
</tr>
<tr>
<td><strong>Dimming</strong></td>
<td>PWM</td>
<td>PWM</td>
<td>PWM</td>
<td>–</td>
</tr>
<tr>
<td><strong>Protection Function</strong></td>
<td>Thermal derating</td>
<td>Thermal derating</td>
<td>Thermal derating</td>
<td>Thermal derating</td>
</tr>
<tr>
<td><strong>Package Options</strong></td>
<td>SOT223-5L(6.5 x 3.5 x 1.8) TO252-5L(6.5 x 5.5 x 2.3)</td>
<td>TO263-5L (10.16x15.35x4.57)</td>
<td>SOT23-5L (2.9 x 2.8 x 1.45)</td>
<td>SOT23-5L (2.92 x 2.8 x 1.3)</td>
</tr>
</tbody>
</table>

**Typical application circuit**

![Typical application circuit](image-url)
The DW8520/22/25/35 series are the step-down constant-current high-brightness LED drivers.

<table>
<thead>
<tr>
<th>x</th>
<th>DW8520</th>
<th>DW8522</th>
<th>DW8525</th>
<th>DW8535</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topology</td>
<td>Buck</td>
<td>Hysteretic Buck</td>
<td>Buck</td>
<td>2-Channel Hysteretic Buck</td>
</tr>
<tr>
<td>Efficiency</td>
<td>up to 90%</td>
<td>up to 97%</td>
<td>up to 96%</td>
<td>Up to 95%</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>9V~450V</td>
<td>4.5~40V</td>
<td>6V~35V</td>
<td>6.5V~60V</td>
</tr>
<tr>
<td>Quiescent Current</td>
<td>Typical 0.5mA</td>
<td>Typical 1.0mA</td>
<td>Typical 1.2mA</td>
<td>Typical 3mA</td>
</tr>
<tr>
<td>Switching Frequency</td>
<td>Constant frequency or constant off-time operation</td>
<td>Up to 2MHz</td>
<td>Fixed 300kHz</td>
<td>Up to 2MHz</td>
</tr>
<tr>
<td>Dimming</td>
<td>PWM and Analog</td>
<td>PWM and Analog</td>
<td>-</td>
<td>PWM and Analog</td>
</tr>
<tr>
<td>Protection Function</td>
<td>Thermal shutdown</td>
<td>Thermal derating, Thermal shutdown</td>
<td>Thermal derating, Thermal shutdown</td>
<td>Thermal derating</td>
</tr>
<tr>
<td>Accuracy</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
<td>2.5%</td>
</tr>
<tr>
<td>FET</td>
<td>External</td>
<td>Internal</td>
<td>External</td>
<td></td>
</tr>
<tr>
<td>Package Option</td>
<td>8 SOIC(4.9 x 6.0 x 1.4)</td>
<td>6 TDFN(3.0 x 3.0 x 0.75)</td>
<td>8 SOIC(4.9 x 6.0 x 1.4)</td>
<td>16 SOIC(6 x 9.9 x 1.75)</td>
</tr>
</tbody>
</table>

![Typical application circuit diagram](image-url)
The DW8527/28 series are active boundary-mode power factor correction controller for AC-DC SMPS applications.

<table>
<thead>
<tr>
<th></th>
<th>DW8528</th>
<th>DW8527</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topology</td>
<td>PFC IC</td>
<td>PFC IC</td>
</tr>
<tr>
<td>VCC Operating Voltage</td>
<td>10.3V ~ 36V</td>
<td>10.3V ~ 22V</td>
</tr>
<tr>
<td>VCC Hysteresis</td>
<td>6.5V</td>
<td>2.5V</td>
</tr>
<tr>
<td>Vcs Sensing Voltage</td>
<td>0.8V</td>
<td>0.8V</td>
</tr>
<tr>
<td>FET</td>
<td>External</td>
<td>External</td>
</tr>
<tr>
<td>AC High Voltage Input – THD/PF</td>
<td>High Performance THD/PF</td>
<td>-</td>
</tr>
<tr>
<td>Soft Start</td>
<td>-</td>
<td>Adjusted Soft Start time</td>
</tr>
<tr>
<td>Protection Function</td>
<td>Thermal shutdown,</td>
<td>Thermal shutdown</td>
</tr>
<tr>
<td></td>
<td>Feed back Open Protection</td>
<td></td>
</tr>
<tr>
<td>Package Option</td>
<td>8 SOIC(4.9 x 6.0 x 1.4)</td>
<td>8 SOIC(4.9 x 6.0 x 1.4)</td>
</tr>
</tbody>
</table>

Typical application circuit

![Typical application circuit for DW8527/28]
The DW8508 is CC/CV( Constant Current & Constant Voltage ) IC for stable LEDs driving in a secondary side.

<table>
<thead>
<tr>
<th></th>
<th>DW8508</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toplogy</strong></td>
<td>Dual Opamp</td>
</tr>
<tr>
<td><strong>VCC Operating Voltage</strong></td>
<td>8V ~ 36V</td>
</tr>
<tr>
<td><strong>Opamp Sink Diode</strong></td>
<td>No need</td>
</tr>
<tr>
<td><strong>Dimming</strong></td>
<td>Analog / PWM</td>
</tr>
<tr>
<td><strong>0 -10 Dimming</strong></td>
<td>Good Implementation</td>
</tr>
<tr>
<td><strong>0 ' Dimming</strong></td>
<td>No Flicker</td>
</tr>
<tr>
<td><strong>Protection Function</strong></td>
<td>OVP, LED Open, LED short, Thermal Protection</td>
</tr>
<tr>
<td><strong>Package Option</strong></td>
<td>8 SOIC(4.9 x 6.0 x 1.4)</td>
</tr>
</tbody>
</table>

Typical application circuit
**Features**
- 5V to 40V Supply voltage
- Regulated output current 300mA fixed
- Low dropout voltage: Max. 300mV @ $I_{LED}=300mA$
- Built-in thermal derating circuit
- Thermal enhanced package SOT89-3L

**Applications**
- LED light bulbs
- Signage and decorative LED lighting
- General lighting of flat panel displays
- RBG backlighting
- Current stabilizer with DC/DC or AC/DC
- General purpose constant current source

**Typical Application**

```
Vin = 5 ~ 40Vdc

300mA

GND
V IN
OUT

DW8500
```

**Package**

```
DW8500
SOT-89
(4.5 mm x 2.45mm x 1.5mm)
```
**DW8501 : Linear type , High power LED Driver IC**

**Features**
- 5V to 40V Supply voltage
- Regulated output current up to 1.5A adjustable
- Low dropout voltage : Max. 1V @ I_LED=1A
- Built-in thermal derating circuit
- Available PWM dimming control
- Thermal enhanced package
  - SOT223-5L, TO252-5L

**Applications**
- LED light bulbs
- Signage and decorative LED lighting
- General lighting of flat panel displays
- Automotive
- RGB backlighting
- Current stabilizer with DC/DC or AC/DC
- General purpose constant current source

**Typical Application**

**Package**

- SOT-223
  - (6.5mm x 3.5mm x 1.8mm)
- TO-252
  - (6.5mm x 5.5mm x 2.3mm)
DW8502 : Linear type, High power LED Driver IC

Features
- 5V to 40V Supply voltage
- Regulated output current up to 2.5A adjustable
- Low dropout voltage: Max. 1V @ I_LED=1A
- Built-in thermal derating circuit
- Available PWM dimming control
- Thermal enhanced package
  TO263-5L, TO220-5L

Applications
- LED light bulbs
- Signage and decorative LED lighting
- General lighting of flat panel displays
- Automotive
- RBG backlighting
- Current stabilizer with DC/DC or AC/DC
- General purpose constant current source

Typical Application

Package

TO-263
(10.1mm x 8.4mm x 4.6mm)

TO-220
(10.26mm x 28.85mm x 4.57mm)
**DW8505A : Linear type, Low power LED Driver IC**

**Features**
- 5V to 40V Supply voltage
- Regulated output current up to 100mA adjustable
- Low dropout voltage: Max. 0.2V @ $I_{LED}$=60mA
- Built-in thermal derating circuit
- Available PWM dimming control
- Thermal enhanced package SOT23-5L

**Applications**
- LED light bulbs
- Signage and decorative LED lighting
- General lighting of flat panel displays
- Automotive
- RGB backlighting
- Current stabilizer with DC/DC or AC/DC
- General purpose constant current source

**Typical Application**

**Package**

SOT23-5
(2.9mmx2.8mmx0.7mm)
DW8506 : Linear type, Low power LED Driver IC

Features
- 6.5V to 40V Supply voltage
- Regulated output current up to 100mA adjustable
- Low dropout voltage: Max. 0.6V @ ILED=50mA
- Built-in thermal derating circuit
- Thermal enhanced package SOT23-5L

Applications
- LED light bulbs
- Signage and decorative LED lighting
- General lighting of flat panel displays
- RGB backlighting
- Current stabilizer with DC/DC or AC/DC
- General purpose constant current source

Typical Application

Package

SOT23-5
(2.9mmx2.8mmx0.7mm)
DW8520: Universal High power LED Driver IC

**Features**
- 9V to 450V supply voltage
- Buck converter topology LED drivers
- Internal zener regulator
- Constant frequency or constant off-time operation
- Linear and PWM dimming capability
- Open loop peak current controller
- High efficiency up to 90%
- Thermal enhanced package SOIC-8

**Applications**
- DC/DC or AC/DC LED driver applications
- Signage and decorative LED lighting
- General lighting of flat panel displays
- RGB backlight
- General purpose constant current source
- Bulb light

**Typical Application**

**Package**

8 SOIC
(4.9mm x 6.0mm x 1.4mm)
DW8522 : High Speed/Performance LED Driver IC

**Features**
- 4.5V to 40V Input voltage range
- Hysteretic buck control: Low parts count
- Single pin On/Off and brightness control
  Using DC voltage and PWM
- Thermal derating function
- 20KHz maximum dimming PWM frequency
- Up to 2MHz switching frequency
- ±2.5% LED current accuracy
- Thermal enhanced package SOIC-8, TDFN-6

**Applications**
- MR16, PAR, L-Tube Lighting
- Offline LED lamps and fixtures
- Signage and Decorative lighting
- General purpose LED lighting

**Typical Application**

**Package**

6 TDFN (3mm x 3mm x 0.75mm)

8 SOIC – EP (4.9mm x 6.0mm x 1.4mm)
DW8525: 1A Buck Converter LED Driver IC

Features
- 6V to 35V supply voltage
- Buck converter topology LED drivers
- 1.0A Output current
- Internal high-side switch
- Fixed 300kHz internal oscillator
- Thermal shutdown and short-circuit protection
- Thermal enhanced package SOIC-8

Applications
- MR16 Lighting
- Offline LED lamps and fixtures
- Signage and Decorative lighting
- General purpose LED lighting

Typical Application

Package
8 SOIC-EP
(4.9mm x 6.0mm x 1.4mm)
DW8527 : Primary PFC IC

**Features**
- Transition mode PFC controller
- Multiplier with Improved power factor and THD
- Ultra low start-up (30uA) / Quiescent current (2.5mA)
- On chip filter on current sense
- -600mA/+800mA Totem pole gate driver
- Built-In protection (Soft-Start, OVP, UVLO, Feedback Open)
- Open load regulation
- 2nd detect by comp voltage
  - Vcomp=low : No load, OVP
  - Vcomp>4V : Load open, FB-GND Short
- Zero current switching for low power consumption

**Applications**
- All of LED lighting Applications
- AC Input LED Lighting Applications
- In / Outdoor Lighting, Street, Roadway, Parking, Construction Lamp

**Typical Application**

**Package**
- 8 SOIC (4.9mm x 6.0mm x 1.4mm)
Features
- Wide operating range of VCC (9.5~36V)
- Boundary mode PFC control
- Improved power factor and THD
- Extremely low startup low quiescent current
- On chip filter on current sense
- Disable function on ZCD pin
- -600mA/+800mA Totem pole gate driver
- Under voltage lock out
- Output over voltage protection
- Thermal shutdown protection
- VCC over voltage protection (VCC>40V)
- Feedback open protection

Typical Application

Applications
- All of LED lighting Applications
- AC Input LED Lighting Applications
- In / Outdoor Lighting, Street, Roadway, Parking, Construction Lamp

Package
8 SOIC
(4.9mm x 6.0mm x 1.4mm)
DW8508 : CC/ CV with Dimming Controller

Features
- Constant current & Constant voltage Driving
- Wide range operating voltage (8V~30V)
- Built in 5V Regulator
- PWM/Analog Dimming Control
  - 0V ~ 10V Dimming (0V LED No flicker)
- Thermal derating function
- Built in Protection circuit (LED Open/Short)
- Low feedback voltage (0.3V)
- Thermal enhanced package SOIC-8

Applications
- All of LED lighting Applications
- AC Input LED Lighting Applications
- In / Outdoor Lighting, Street, roadway, Parking, Construction Lamp

Typical Application

Package

8 SOIC
(4.9mm x 6.0mm x 1.4mm)
Features
- 6.5V to 60V Input voltage range
- 2-Channel hysteretic buck control
- +/-2.5% LED Current accuracy
- Up to 95% efficiency
- Analog and PWM dimming simultaneously
- Various fault detection or protection function (LED open/short, Temperature, TSD)
- Up to 2MHz switching frequency
- Over temperature derating (30%)

Applications
- Offline LED lamps and fixtures
- Signage and Decorative lighting
- General purpose LED lighting
- LED Streetlights
- LED Flat Panel Lighting

Typical Application

Package
16 SOIC
(10mm x 6.2mm x 1.75mm)
Customers (Driver for LED Lighting)
LED Lighting IC Roadmap

- **Linear**
  - OCP, OVP, Analog / PWM 60V Linear IC
  - 1Q 2Q 3Q 4Q

- **Primary**
  - AC step driver
  - MR16 + Triac
  - PFC + PSR IC
  - Vielitien buck with PFC(SOT-23)

- **DC/DC**
  - OCP, OVP, Analog / PWM 60V 4CH Linear IC
  - 1-CH Buck IC External FET
  - 1-CH 60V Buck IC Internal FET

Timeline:
- 2012
  - 3Q
  - 4Q
  - 1Q
  - 2Q
- 2013
  - 3Q
  - 4Q
- 2014