

## Industrial and Outdoor (>15W)

### AC/DC

- PFC+ Flyback or LLC or HB
- Multi-String/Single-String
- Multi-Transformer for HV LEDs

### DC/DC

- Products and Features

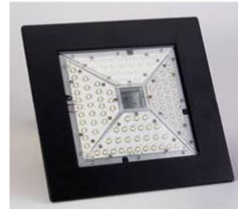
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## Industrial and Outdoor/Infrastructure Lighting LED Driver Solutions

(15W to 250W Applications)

### Key Factors

- PFC
- High Efficiency
- Dimming
- Early Payback (low cost)
- Uniform Intensity
- Safety
- Low Maintenance



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## Different Power Configurations

Applications	Power Level	Primary			Galvanic Isolation	Secondary	
		Primary Topology (AC/DC)	Devices	Output		Secondary Topology	Devices
Downlight Commercial	15 - 50W	Flyback	UCC28810/1 TPS92210 LM3444/45/48	Current	Galvanic Isolation	-	-
			UCC28810/1 TPS92210 LM3444/45/48	Current		Linear	LM3466
			UCC28810/1 TPS92210 LM3450A	Voltage		Linear	LM3463
			UCC28810/1 TPS92210 LM3450A	Voltage		Buck	TPS925xx / LM34xx
Outdoor Industrial Infrastructure	>50W	PFC Boost + Buck + LLC	UCC28810 + UCC28811 + TPS92020	Current		Multi-Transformer	-
		PFC Boost + LLC	UCC28810/1 + TPS92020	Current		Multi-Transformer	-
		PFC Boost + LLC	UCC28810/1 + TPS92020	Current		Linear	LM3466
		PFC Boost + LLC	UCC28810/1 + TPS92020	Voltage		Linear	LM3443
		PFC Boost + LLC	UCC28810/1 + TPS92020	Voltage	Buck	TPS925xx / LM34xx	
		PFC Boost	UCC28810	Voltage	Buck	UCC28811	



## 15-50W Output Power

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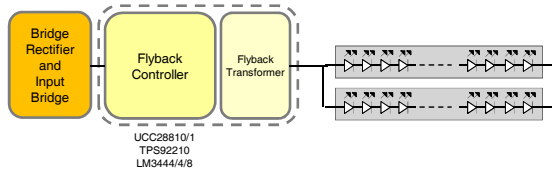


# LED Lighting Power Configurations

## PFC Flyback

15-50W

Supply with PFC Flyback (current regulation) directly drives LED String(s)



PFC Stage -> Required in any implementation

### Benefit:

- Simplest method for achieving PFC and driving LEDs

### Drawbacks:

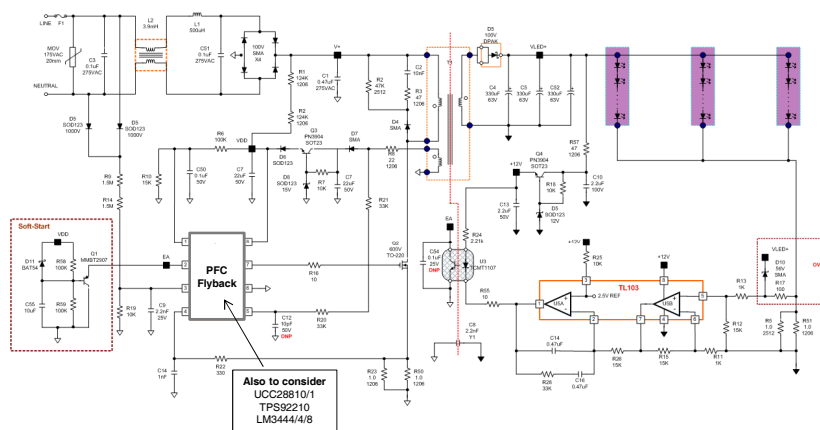
- LED will have full rectified LF output current ripple (dependent on output caps)
- No control over current sharing of the various LED strings



# Direct Drive Solution

(Example using UCC28810)

15-50W



**Comments** – 120/100Hz ripple into LEDs. Short/Open LED fault difficult to manage. Lowest cost with performance implications.

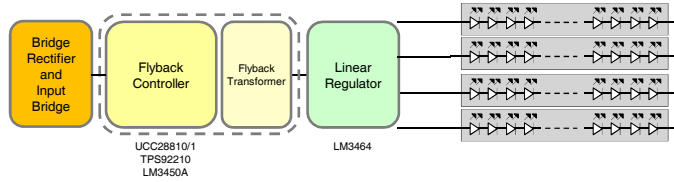
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# LED Lighting Power Configurations

## PFC Flyback + Linear Regulator

Supply with PFC Flyback (voltage regulation) + Linear Regulator



- PFC Stage -> Required in any implementation
- Linear Stage -> Provides constant current and reduced LF ripple
- > LM3464 provides Dynamic Headroom Control

**Benefit:**

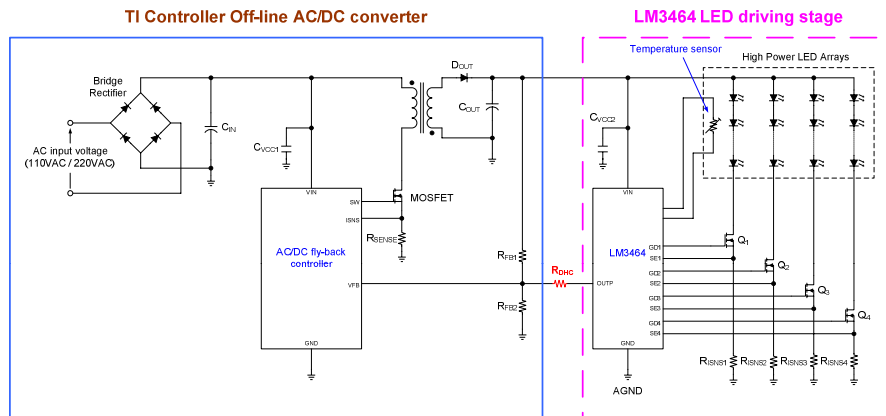
- Linear Regulator reduces system EMI compared to multi-buck implementation
- Dynamic Headroom control regulates flyback output voltage for optimized VLED
- Individual String dimming

**Drawbacks:**

- System efficiency could be reduced
- Depending on design LF current ripple could be present on LEDs



# LM3464 Dynamic Headroom Control



**Comments** – Depending on design may/may not have 120/100Hz ripple into LEDs. Short/Open LED easily managed. No increased EMI signature due to added regulators. Balance of cost v performance. Thermal management,. PWM/Analog Dimming options. Good efficiency. More difficult to design.

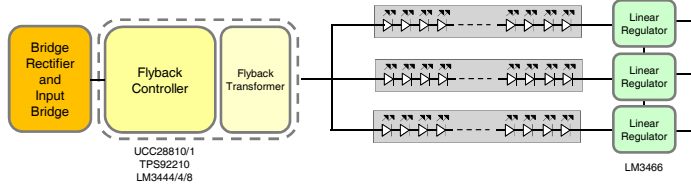


# LED Lighting Power Configurations

## PFC Flyback + Linear Regulators

15-50W

Supply with PFC Flyback (current regulation) + Linear Regulators



- PFC Stage -> Required in any implementation  
 Linear Stage -> Provides constant current and reduced LF ripple  
 -> LM3466 provides current equalization between strings

**Benefit:**

- Linear Regulator reduces system EMI compared to multi-buck implementation
- Current Equalizer shares LED current ratio-metrically in case of LED open

**Drawbacks:**

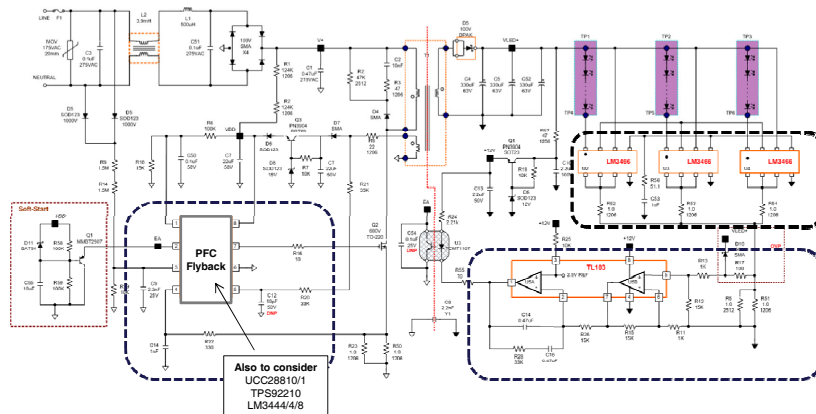
- System efficiency could be reduced
- Depending on design LF current ripple could be present on LEDs



# Dynamic Current Equalizer

## (Example using UCC28810 & LM3466)

15-50W



**Comments** – 120/100Hz ripple into LEDs. Short/Open LED easily managed. No increase in EMI signature. Slight increase in cost over direct drive solution. Well regulated current through multiple strings of LEDs.

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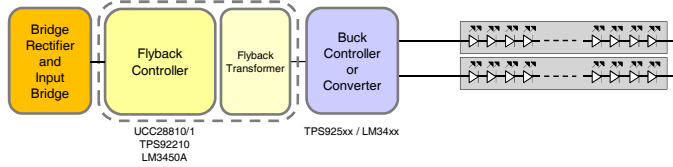


# LED Lighting Power Configurations

## PFC Flyback + Buck Controller/Converter

15-50W

Supply with PFC Flyback (voltage regulation) + Buck Controller/Converter



- PFC Stage -> Required in any implementation
- DC-DC Stage -> Provides constant current and reduced LF ripple

### Benefit:

- Simplest method for achieving PFC
- LEDs have constant DC current

### Drawbacks:

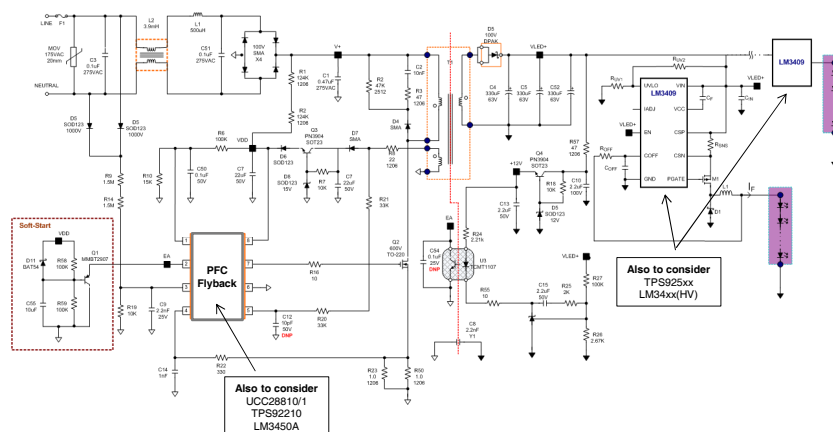
- Addition cost of Buck + FET + Inductor + Diode per string



# AC/DC with DC/ILED Driver (Two Stage)

## (Example using UCC28810 and LM3409)

15-50W



**Comments** – No 120/100Hz ripple into LEDs. Short/Open LED easily managed. Increased EMI signature due to added regulators. Increased cost of regulators.

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## >50W Output Power

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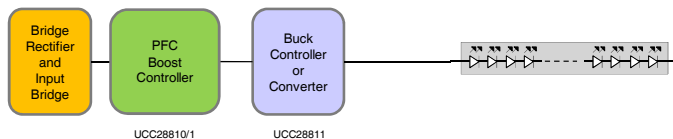


## LED Lighting Power Configurations

>50W

### PFC Boost + Buck Controller/Converter

Supply with PFC Flyback (voltage regulation) + Buck



PFC Stage -> Required in any implementation  
DC-DC Stage -> Provides constant current and reduced LF ripple

#### Benefit:

- LEDs have constant DC current with no LF ripple
- Can drive high number of LEDs in a single-string

#### Drawbacks:

- Addition cost of Buck + FET + Inductor + Diode
- Non-Isolation Design

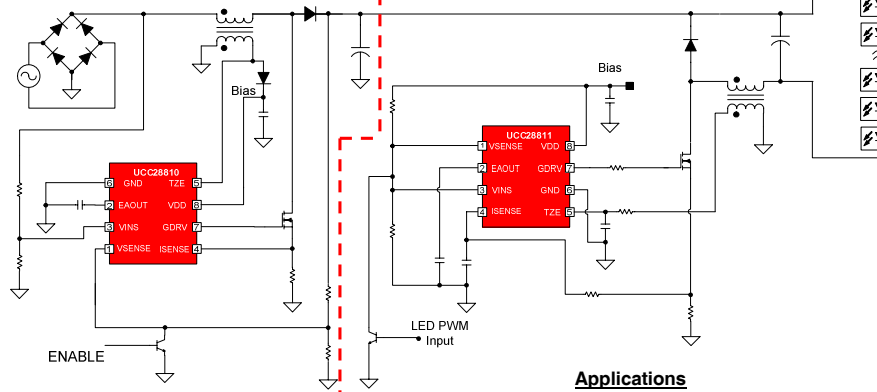


## UCC28810EVM-002 Block Diagram

>50W

1<sup>st</sup> stage: TM Boost for PFC

2<sup>nd</sup> stage: TM Buck for LED current



### Applications

- LED Street & Roadway Lighting
- LED High Bay Industrial Lighting
- DTV LED backlighting

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## UCC28810EVM-002 Specification

>50W

UCC28810EVM-002		
Specification	Value	Unit
Input Voltage	90-264	VAC
LED Configuration	17-34	Series
Output Current	900	mA
Output Voltage	55-110	VDC
Output Power	50-100	W
Topology	PFC Boost + TM Buck	
Efficiency	93	%
Power Factor	0.97	
Dimming Input	PWM	
Dimming Level	10-100	%
Current Sensing	Resistive	
Isolation	2500	VAC
Driver Dimensions	264 x 51	mm

- Universal input non isolated design
- Regulated LED current
- PWM Dimming, 200Hz to 1kHz
- High Efficiency
  - Maintained during dimming
- Active power factor correction

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# UCC28810EVM-002 Design Tool

>50W

**SIMPLE Drive Isolated LED driver**  
*Note: User values in green cells*

DESIGN REQUIREMENTS		USER SELECTED COMPONENT PARAMETERS	
Minimum input voltage	230Vrms	DC Inductor	Target: 600µH, Actual: 600µH
Maximum input voltage	260Vrms	Boost PFC Inductor	Target: 1.5mH, Actual: 1.5mH
Minimum line frequency	50Hz	Buck Inductor	Target: 58µH, Actual: 58µH
LED minimum voltage @50	30V	Half Bridge Transformer	Target: 110:0, Actual: 110:0
LED maximum voltage @50	36V		
LED operating current	1.5A		
LED dynamic resistance per LED	10Ω		
Number of LEDs per string	4		
Number of strings per string	1		

**Boost PFC Inductor**

Topology	Boost
Switching frequency	23.6 kHz
Maximum volt x microseconds	3055 Vµs
Energy storage	6.816 mJ
Primary Peak current	4.49 A
Primary RMS current	1.91 A
Secondary RMS current	0.51 A
Primary Inductance	600 µH
Primary to secondary turns ratio	0.6

**Buck Inductor**

Topology	Buck
Switching frequency	58.8 kHz
Maximum volt x microseconds	870 Vµs
Energy storage	6.806 mJ
Primary Peak current	1.50 A
Primary DC current	0.54 A
Secondary RMS current	0.61 A
Primary Inductance	58 µH
Primary to secondary turns ratio	0.99

**Half Bridge Transformer**

Topology	Half Bridge
Switching frequency	110.0 kHz
Maximum volt x microseconds	276 Vµs
Throughput Power	0.53 W
Imaginating	1.18 A
Primary RMS current	1.11 A
Secondary RMS current	0.35 A
Primary Inductance	0.35 µH
Primary to secondary turns ratio	1.051

**PFC Stage Schematic and BOM**

**Go to UCC28810EVM-002 Design Tool**

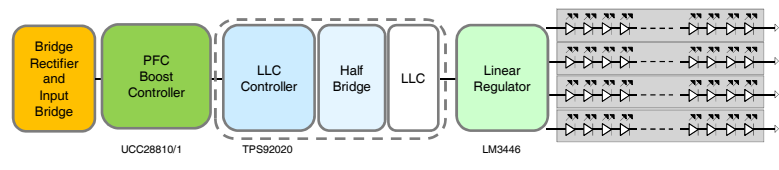


# LED Lighting Power Configurations

## PFC Boost + LLC + Linear Regulator

>50W

Supply with PFC Boost + LLC (voltage regulation) + Multi-String Linear Regulator



- PFC Stage -> Required in any implementation
- LLC -> High-Efficiency at higher power levels
- Linear Regulator -> LM3464 provides Dynamic Headroom Control

**Benefit:**

- Linear Regulator reduces system EMI compared to multi-buck implementation
- Dynamic Headroom regulates LLC Controller output voltage for optimized VLED
- Individual String dimming

**Drawbacks:**

- System efficiency could be reduced

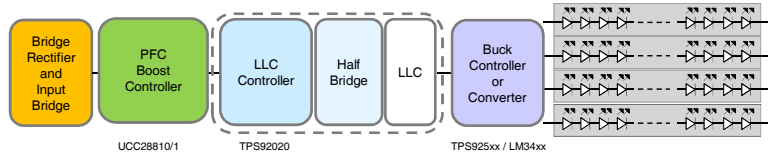


## LED Lighting Power Configurations

### PFC Boost + LLC + Buck Converters/Regulators

>50W

Supply with PFC Boost + LLC (voltage regulation) + Multi-String Buck Regulator



- PFC Stage -> Required in any implementation
- LLC -> High-Efficiency at higher power levels
- Buck Regulator -> Provides constant current and reduced LF ripple

**Benefit:**

- High system efficiency
- Individual String dimming

**Drawbacks:**

- Addition cost of Buck + FET + Inductor + Diode needed for each string

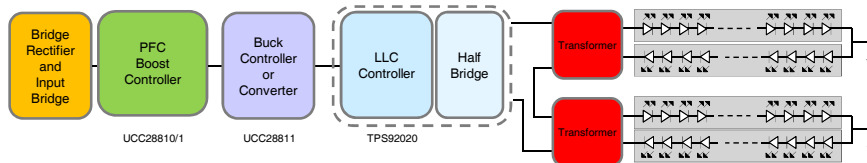


## LED Lighting Power Configurations

### PFC Boost + Buck + HB + Multi-Transformers

>50W

Supply with PFC Boost + Buck (current regulation) + HB + Multi-Transformer (3-Stage)



- PFC Stage -> Required in any implementation
- Low Side Buck -> Provides constant LED Current and main control
- LLC -> High-Efficiency at higher power levels
- Series Transformers -> Provides same current to each LED string

**Benefit:**

- One control section for all string currents,
- Lower part count, higher reliability and lower cost

**Drawback:**

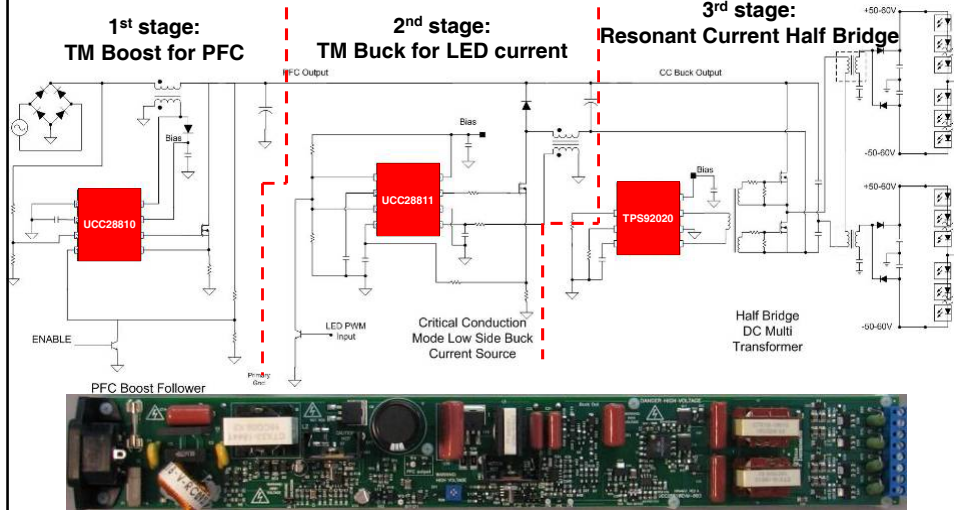
- All strings will be dimmed simultaneously (if individual dimming is required)



# UCC28810EVM-003 - SIMPLedrive™

>50W

Series Input, Multiple Parallel Equivalent LED Drive (SIMPLedrive)



[Go to Evaluation Module \(EVM\) Product Folder](#)

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# UCC28810EVM-003 Design Tool

>50W

**SIMPLedrive Isolated LED driver**

Input: user values in green cells. Schematics and BOMs can be found on subsequent work sheets.

DESIGN REQUIREMENTS	USER SELECTED COMPONENT PARAMETERS
<b>INPUT SPECIFICATIONS</b>	<b>PFC Inductor L<sub>p</sub></b>
Minimum input voltage: 40 Vrms	Target: 0.95
Maximum input voltage: 200 Vrms	Actual: 0.959
Minimum line frequency: 47 Hz	L <sub>p</sub> Inductance at Peak Bias Current: 0.95
	Loss ratio: $\frac{1}{1 + 0.008 \times \pi}$ > 0.996

LED LOAD SPECIFICATIONS	PFC Current Sense: 006, 024
LED maximum voltage drop: 3.0 Vdc	Target value for PFC: 0.95
LED nominal voltage drop: 3.5 Vdc	Maximum value for PFC: 0.96
LED minimum voltage drop: 1.5 Vdc	
LED operating current: 0.8 A	
Number of LEDs: 96	

**DESIGN ASSUMPTIONS**

Minimum PFC switching frequency: 20 kHz
Over ride Buck min input: Yes
PFC Min Output: 100 V
Enter a voltage between 150V and 400V

**Boost PFC Inductor**

Topology: Boost	Switching frequency: 23.9 kHz
Maximum volt x microseconds: 2900 Vus	Energy Storage: 4.17E-03 J
Primary Peak current: 3.25 A	Primary RMS current: 1.48 A
Secondary RMS current: 0.15 A	Primary Inductance: 750 uH
Primary to secondary turns ratio: 0.096	

**Buck Inductor**

Topology: Buck	Switching frequency: 89.7 kHz
Maximum volt x microseconds: 640 Vus	Energy Storage: 7.37E-03 J
Primary Peak current: 1.90 A	Primary DC current: 0.98 A
Secondary RMS current: 0.01 A	Primary Inductance: 400 uH
Primary to secondary turns ratio: 0.093	

**PFC Stage Schematic and BOM**

IC base:

**Go to UCC28810EVM-003 Design Tool**



>50W

## UCC28810EVM-003 Specification

Specification	Value	Unit
Input Voltage	90-265	VAC
LED Configuration	4 x 15	Series
Output Current	500	mA
Output Voltage	48-54	VDC
Output Power	110	W
Topology	<i>PFC Boost + CC Buck + LLC</i>	
Efficiency	90	%
Power Factor	0.98	
Dimming Input	<i>PWM</i>	
Dimming Level	10-100	%
Current Sensing	<i>Resistive</i>	
Isolation	2500	VAC
Driver Dimensions	369 x 51	mm

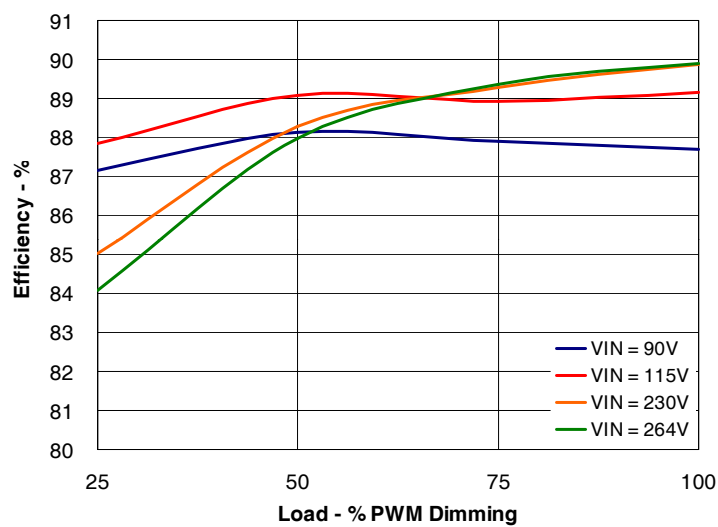


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## UCC28810EVM-003 using SIMPLEDrive Efficiency

>50W

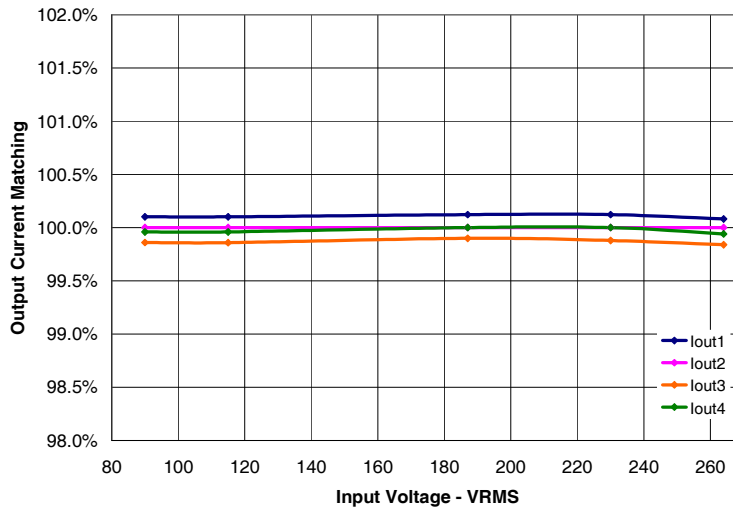


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## UCC28810EVM-003 using SIMPLedrive String Current Matching

>50W



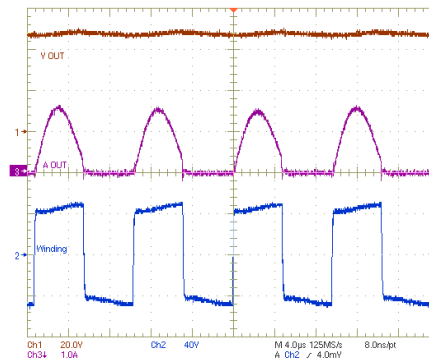
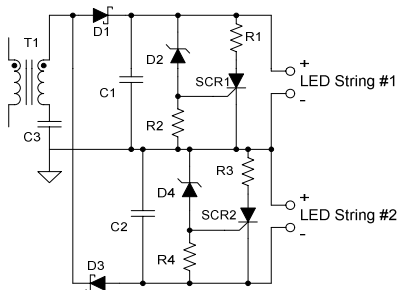
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## UCC28810EVM-003 Open String Protection

>50W

- If one string fails the other remain on.
- Each output incorporates a zener and SCR crowbar circuit
  - D2, SCR1, R1 and R2
- When string fails, zener voltage is exceeded and SCR latches on
- Transformer continues to deliver current to SCR and LED String #2

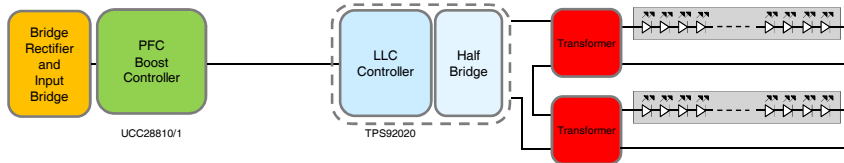


# LED Lighting Power Configurations

## PFC Boost + HB + Multi-transformers (PMP5660)

>50W

Supply with PFC Boost + HB (current regulation) + Multi-Transformer (2-Stage)



- PFC Stage -> Required in any implementation
- LLC -> High-Efficiency at higher power levels
- Series Transformers -> Provides same current to each LED string

**Benefit:**

- One control section for all string currents with a two stage only power supply
- Lower part count, higher reliability and lower cost
- Very High efficiency

**Drawback:**

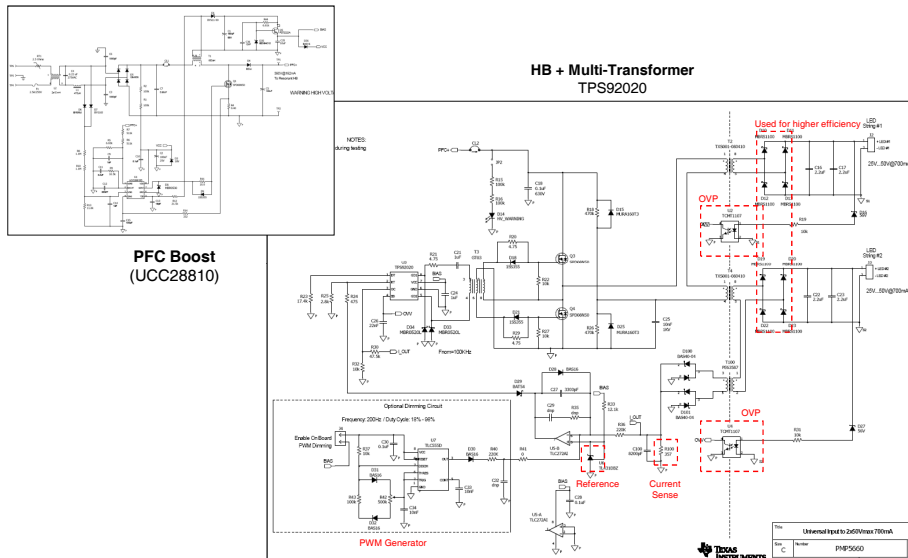
- All strings will be dimmed simultaneously



# LED Lighting Power Configurations

## PFC Boost + HB + Multi-Transformers (PMP5660)

>50W

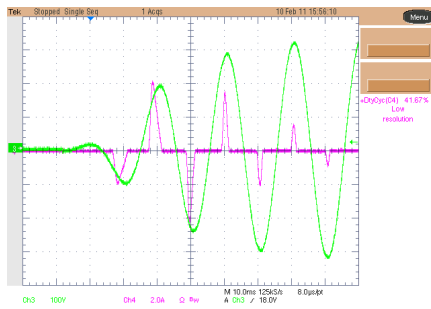


## Test Results on PMP5660 reference design

>50W

- Tests performed @ 230Vac, 50Hz and 115Vac, 60Hz input voltage
- Variable number of LED connected: 7...14 LEDs, 700mA nominal
- Measured the unbalance between strings: one string kept @ 14 LEDs while the second connected to a 7...14 LEDs string
- PWM dimming at 200Hz, 18%...98%

Inrush current < 4Apk @ 230Vac



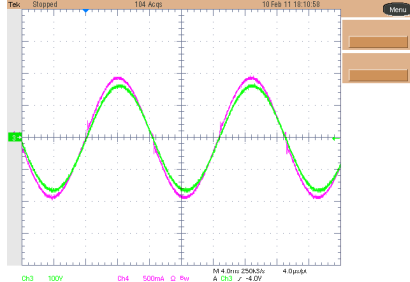
Turn ON delay ~ 1sec @ 230Vac



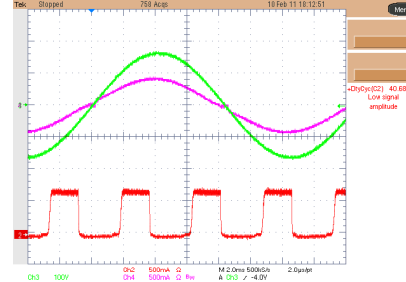
## Input current and voltage:

>50W

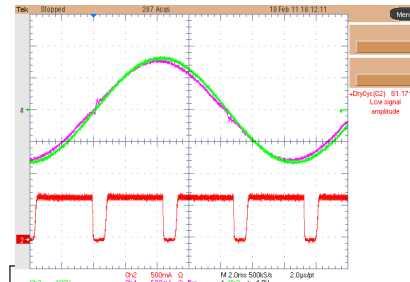
No dimming, 115Vac, 60Hz



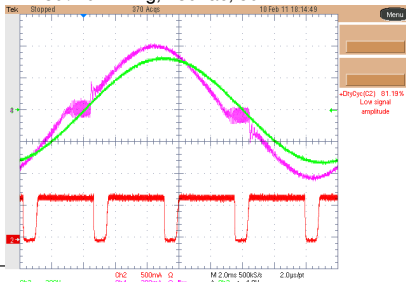
40% dimming, 115Vac, 60Hz



80% dimming, 115Vac, 60Hz

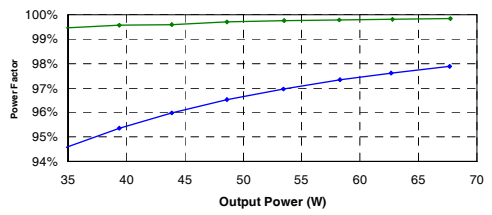


80% dimming, 230Vac, 50Hz

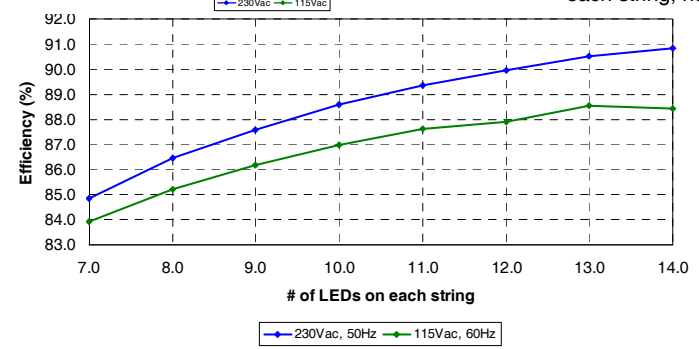


>50W

## Efficiency and power factor vs. output power



Power factor vs output power @ 230Vac and 115Vac, no dimming



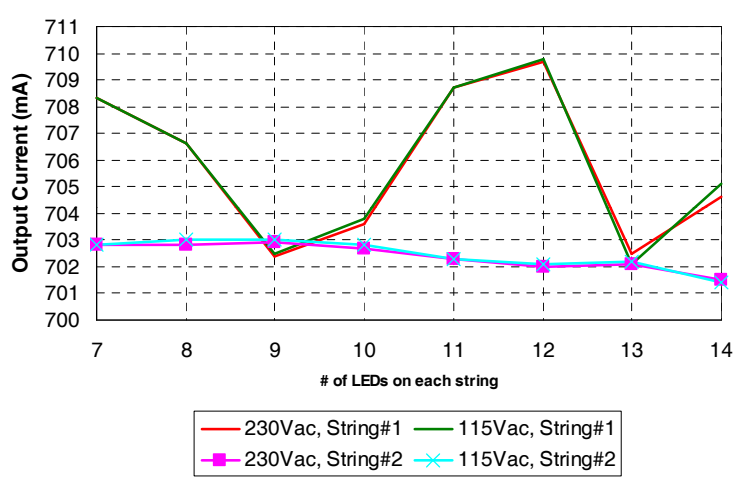
Total efficiency vs. # of LEDs for each string, no dimming



>50W

## String Current Regulation

Output current regulation (here +/-0.5%) with same # of LEDs for each string

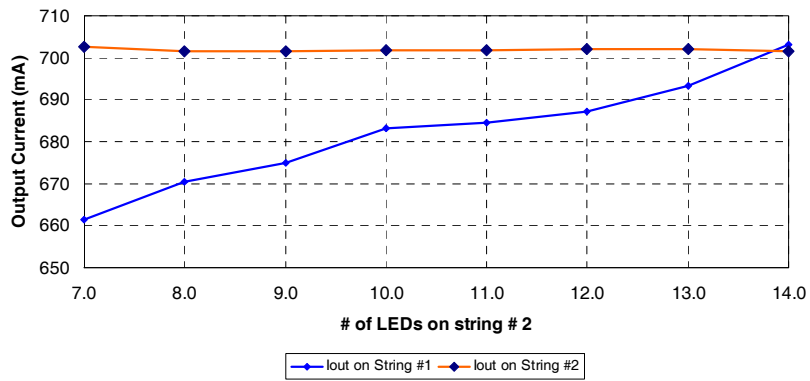




>50W

## String Current Unbalance

Output current unbalance (max -5.7%) on string #1 when on the string #2 is connected a variable # of LEDs



## Portfolio Overview

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# TPS92210

## PFC Offline LED Lighting Driver Controller



### Features

- Flexible Operating Modes: Peak Primary Current, Constant On-Time, or both
- Cascoded MOSFET Configuration
- Works with TRIAC Dimmers
- Transformer Zero Energy Detection
- Discontinuous Conduction or Transition Mode Operation
- Advanced Over-Current Protection and Integrated Over-voltage Protection

### Benefits

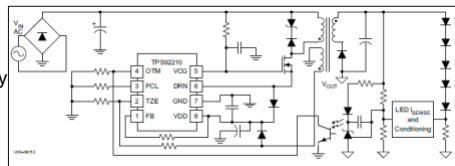
- Constant On-Time implements Single Stage Power Factor Correction (PFC)
- Fast start up; Line Surge Ruggedness Better Than Internal HV FET
- Continuous Exponential Dimming
- High Efficiency, Low EMI
- No Reverse Recovery Loss in Output Rectifier
- Protects Driver Against Fault Conditions

### Applications

- Residential LED Lighting Drivers: A19 (E26/27, E14), PAR30/38, GU10
- Lighting Applications: Light Bulb Replacement, Sconces, Wall Washers, Architectural and Display Lighting, Commercial Troffers and Downlights



•TPS92210EVM-647 (110V)  
•TPS92210EVM-613 (230V)  
[Design Calculator](#)



# TPS92020

## Resonant-Switching Driver Controller for LED Lighting

### Features

- LLC Resonant Switching Controller
- Half-Bridge Topology
- Fixed or Variable Switching Frequency Control
- Programmable Soft-Start
- Over-Temperature and Current Limit Protection
- Implements TI SimpLEDrive™ Multi-String Topology

### Benefits

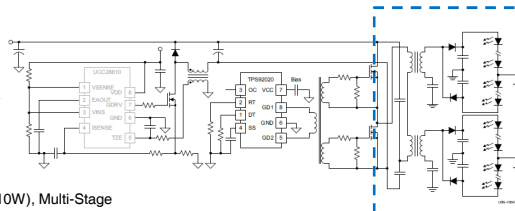
- Zero Current Switching for High-Efficiency
- High Power (High Light Output) Lighting Applications
- Tune to Resonant Frequency of LLC for Higher Efficiency
- Provides Flexible Dimming Option
- Protects Against Faults and Abnormal Operating Conditions
- Transformer Scalable High Light Output Designs

### Applications

- Commercial and Industrial LED Lighting Applications: High Bay, Street Lighting, Area Lighting



•UCC28810EVM-003 (Universal, 110W), Multi-Stage  
[Design Calculator](#)



SimpLEDrive™ shown



# Linear DC/DC

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## DC/DC LED Lighting Solutions

Boost		Buck		Linear	
Controllers	Converters	Controllers	Converters	Controllers	Converters
TPS40211*	LM3410	LM3401	TPS92510	LM3464/A	LM3466
LM3430	TPS61165	LM3409/HV	LM3402/HV		
LM3431/A	TPS61166	LM3421*	LM3404/HV		
	TPS61195	LM3423*	LM3406/HV		
	TPS61500	LM3424*	LM3405/A		
	LM3492	LM3429*	LM3407		
		LM3433	LM3414/HV		
		LM3434			

\* Primary Topology Listed. Additional Topologies Supported.



# LM3466

## Smart Linear LED Driver for Multi-Channel LED Systems

### Features

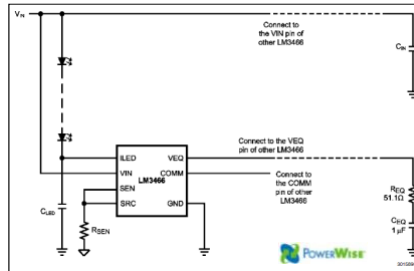
- Wide Input Voltage Range: 6 to 70V
  - 70V, 1.5A MOSFET with 2A Limit
- Works with Constant Current Power Supplies
- Automatic Equalization
- LED Open, LED Short Detection
- Thermal Shutdown

### Benefits

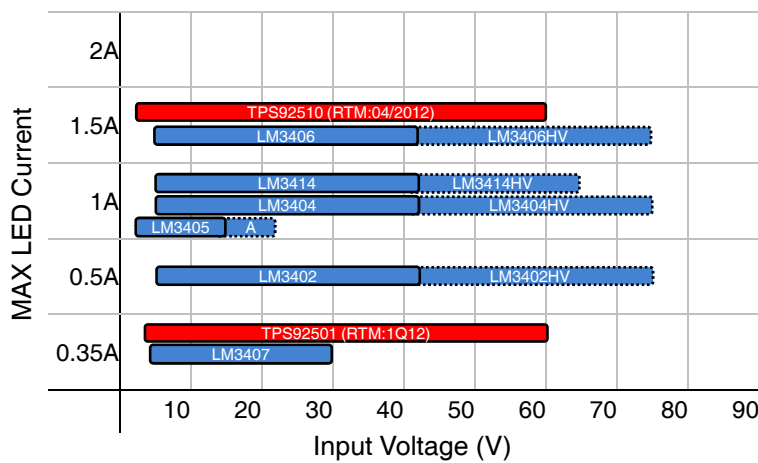
- Support Up to 20 LEDs in Series
- Regulates LED String Current Based on User Settings
- Balances Current of Every Active String, Even if String Voltages Are Not Equal
- Fault Flag Notifies MCU of Abnormal Condition
- Protects LM3466 Against High-Temperature Conditions

### Applications

- LED Street Lighting, High-Bay Lighting
- Multi-String LED Luminaires



## DC/DC Buck Converters for LED Lighting



# TPS92510

## Wide VIN Range Buck Driver for HB LED Lighting

coming soon!  
2Q12

### Features

- Input Operating Range: 3.5V to 60V
- IOUT up to 1.5A with Integrated MOSFET
- VREF = 200mV
- Thermal Foldback
- 100kHz to 2.5MHz Adjustable Switching Frequency
- PWM Dimming: 100Hz – 1kHz
- UVLO, Over-Current, and Over-Temperature Protection

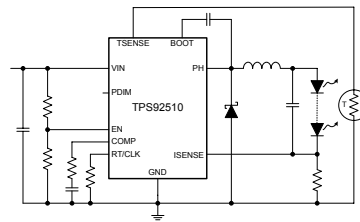
### Applications

- Street Lighting, High-Bay Lighting, MR-16
- Emergency, Flash Lights
- Automotive Lighting



### Benefits

- Suitable for a Wide Variety of LED Applications
- Reduced BoM and PCB Space
- Low Power Dissipation in Current Sense Resistor
- Improves LED Reliability and Maintains Reduced Light Output During High LED Temp. Conditions
- Flexible Inductor Selection
- Accurate Control of Light Intensity
- Protects IC During Fault and Abnormal Operating Conditions



# LM3402/LM3402HV

## 0.5A Constant Current Buck Reg. for Driving HB LEDs

### Features

- VIN range from
  - 6V to 42V (LM3402)
  - 6V to 75V (LM3402HV)
- Hysteretic Operation with Controlled On-Time
- Integrated 0.5A N-Channel MOSFET
- PWM Dimming Input
- Over-Temperature, LED Open/Short Protection

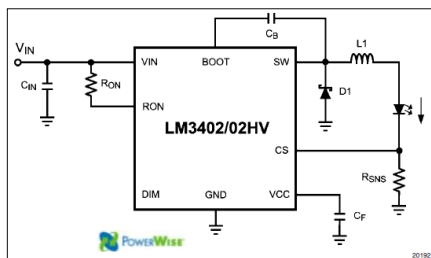
### Applications

- LED General Illumination
- Industrial Lighting
- Automotive Lighting



### Benefits

- Two voltage grades optimized for different application needs
- No Control Loop Compensation Required
- Easily Drives 1W HB LEDs
- Allows for External Source Such as a MCU to Control LED Brightness
- Protects Against Abnormal and Fault Conditions



## LM3404/LM3404HV 1A Constant Current Buck Reg. for Driving HB LEDs

### Features

- VIN range from
  - 6V to 42V (LM3404)
  - 6V to 75V (LM3404HV)
- Hysteretic Operation with Controlled On-Time
- Integrated 1A N-Channel MOSFET
- PWM Dimming Input
- Over-Temperature, LED Open/Short Protection

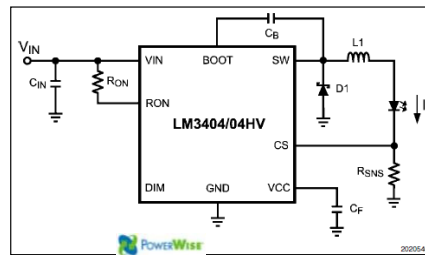
### Applications

- LED General Illumination
- Industrial Lighting
- Automotive Lighting

**EVM TOOLS** •LM3404EVAL/NOPB  
•LM3404FSTDIMEV/NOPB  
•LM3404MREVAL  
**WEBENCH®**

### Benefits

- Two voltage grades optimized for different application needs
- No Control Loop Compensation Required
- Easily Drives 3W HB LEDs
- Allows for External Source Such as a MCU to Control LED Brightness
- Protects Against Abnormal and Fault Conditions



**TEXAS INSTRUMENTS**

## LM3406/LM3406HV 1.5A Constant Current Buck Reg. for Driving HB LEDs

### Features

- VIN range from
  - 6V to 42V (LM3406)
  - 6V to 75V (LM3406HV)
- Hysteretic Operation with Controlled On-Time
- Up to 1.5A Constant Current Output
- PWM Dimming Input
- Over-Temperature, LED Open/Short Protection

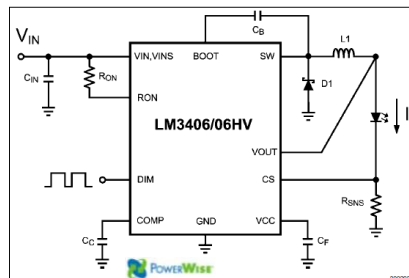
### Applications

- LED General Illumination
- Industrial Lighting
- Automotive Lighting

**EVM TOOLS** •LM3406MHEVAL/NOPB  
**WEBENCH®**

### Benefits

- Two Voltage Grades Optimized for Different Application Needs
- No Control Loop Compensation Required
- Easily Drives a Variety of HB LEDs
- Allows for External Source Such as a MCU to Control LED Brightness
- Protects Against Abnormal and Fault Conditions



**TEXAS INSTRUMENTS**





## LM3414/LM3414HV 1A Floating Buck for Driving HB LEDs

### Features

- Input Operating Range
  - 4.5 to 42V (LM3414)
  - 4.5 to 65V (LM3414HV)
- Adjustable LED current: 350-1000mA
- Adjustable Switching Frequency: 250kHz to 1MHz
- Analog and PWM Dimming
- Internally Compensated
- UVLO, Thermal Shutdown and Open-Circuit Protection

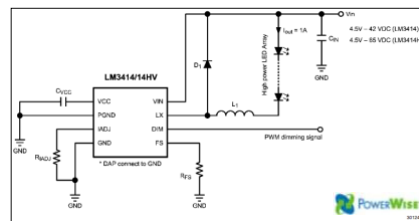
### Applications

- High Light Output Designs (Troffers, Architectural Lighting)
- MR-16 Replacement
- Automotive Lighting



### Benefits

- Two Voltage Grades Optimized for Different Application Needs
- Supports 1-3W HB LEDs
- Allows for Optimization of Efficiency Versus Inductor Size, Reduced EMI
- Up to 1/10 Switching Frequency (PWM)
- Simplifies Design and Reduces Component Count
- Protects Against Abnormal and Fault Conditions



## LM3464/LM3464A 4-Channel High-Voltage, Constant Current LED Driver with Dynamic Headroom Voltage Monitoring

### Features

- Wide Input Voltage Range
  - 12 to 60V (LM3464)
  - 12 to 95V (LM3464A)
- Dynamic Headroom Control
- Analog and PWM Dimming
- LED Open, LED Short Detection
- Thermal Detection with Foldback

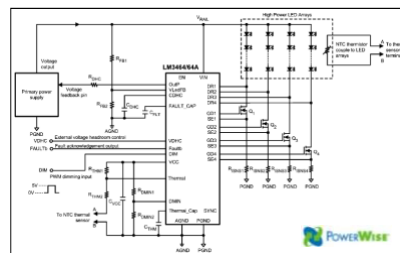
### Applications

- LED Street Lighting, High-Bay Lighting
- Multi-String LED Luminaires



### Benefits

- Two voltage grades optimized for different application needs
- Provides Feedback to AC/DC Converter to Ensure Maximum Efficiency
- Optimize for LED Color Shift and Brightness Control
- Fault Flag Notifies MCU of Abnormal Condition
- Maintains LEDs ON, but at Reduced Brightness Until LED Over-Temperature Condition Clears.



## LM3463

### 6-Ch High-Voltage, Constant Current LED Driver with Dynamic Headroom Voltage Monitoring and 4-Ch PWM

#### Features

- Wide Input Voltage Range
  - 18 to 95V
- Dynamic Headroom Control
- Analog and 4-Ch PWM Dimming/SPI interface
- LED Open, LED Short Detection
- Thermal Detection with Foldback

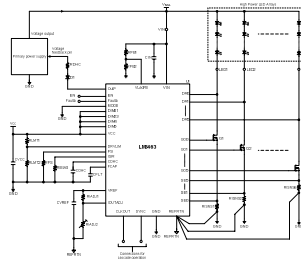
#### Applications

- LED Street Lighting, High-Bay Lighting
- Multi-String LED Luminaries



#### Benefits

- Two voltage grades optimized for different application needs
- Provides Feedback to AC/DC Converter to Ensure Maximum Efficiency
- Optimize for LED Color Shift and Brightness Control
- Fault Flag Notifies MCU of Abnormal Condition
- Maintains LEDs ON, but at Reduced Brightness Until LED Over-Temperature Condition Clears.



## Q&A?

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