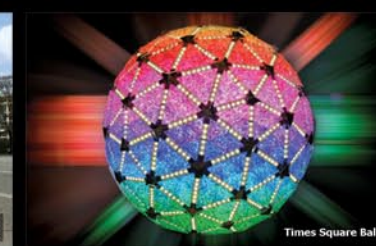


Are you ready to...

Go Deeper?

For a deep dive into SSL Power & Control, you can trust
Future Lighting Solutions and NXP to deliver an innovative solution.



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Making LED Lighting Solutions Simple™



Solid-State Lighting... Be an Innovator

The lighting industry is undergoing a major transformation, driven largely by concerns over climate change and the desire to use energy resources more efficiently.

Governments and consumers alike are setting incandescent lights aside, switching to newer, more energy-efficient solid-state lighting (SSL) solutions.

SSL technology is much more energy-efficient, but also much more challenging to design, since it requires complex driver and control electronics.

THAT’S WHERE NXP AND FUTURE LIGHTING SOLUTIONS CAN HELP.

Future Lighting Solutions and NXP are focused on delivering world class products, engineering support and design services to make it easier to develop and manufacture quality solid-state lighting.

This unique partnership supports customers by offering innovative technology and proven expertise to enable complete, effective and energy efficient solutions.

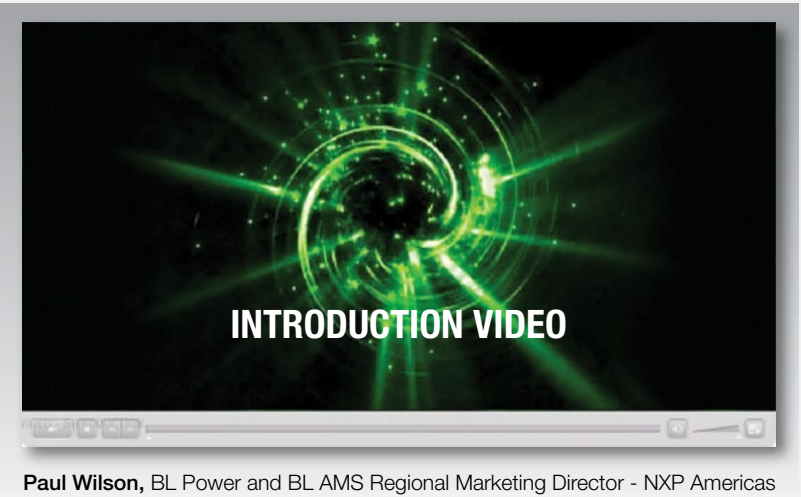


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SSL2101 <1% Flicker Free

This small, highly integrated and highly efficient driver is the next step in SSL retrofit LED lighting. It supports the majority of available dimmers (TRIAC and transistor) and is ideal for small form-factor applications with closed casings.

The [SSL2101](#) is a Switched Mode Power Supply (SMPS) controller IC that operates directly from rectified mains and also in combination with a phase cut dimmer. It is designed to drive LED devices. The device includes a high-voltage power switch and a circuit to allow start-up directly from the rectified mains voltage. Furthermore the device includes high-voltage circuitry to supply the phase cut dimmer.

FEATURES

- High-efficiency and high power-factor for SSL applications below 15 W
- Natural dimming curve via logarithmic correction
- Supports the majority of available dimmers in the market (e.g. TRIAC, transistor)
- Fewer external components due to high integration level, ideal for small form-factor applications with closed casings
- Switched SMPS controller with buck and flyback configurations
- Thermal-enhanced & small SO16 package
- Meets safety and power-factor regulations
- Optimized valley switching with built-in, dedicated circuitry

APPLICATIONS

- [SSL2101T/N1,518](#) retrofits (e.g. GU10, E27) from 3 W to 8 W
- LED modules (e.g. LED spots, downlights) from 8 W to 15 W



Advanced Task Lighting Solutions using LUXEON® Rebel LEDs.



Michael Pena, Director, SSL Applications Engineering - NXP



The SSL2101 is a Switched Mode Power Supply (SMPS) controller IC that operates directly from rectified mains and also in combination with a phase cut dimmer. It is designed to drive LED

devices. The device includes a high-voltage power switch and a circuit to allow start-up directly from the rectified mains voltage. Furthermore the device includes high-voltage circuitry to supply the phase cut dimmer.

[SSL2101 Flyback-120V](#).....\$125.00 U.S.

[SSL2101 Flyback-230V](#).....\$125.00 U.S.

[Data Sheet](#)
[Literature](#)

[User Manual](#)
[Application Notes](#)



To Schedule a Demo of our Recess Light Kit call 1.888.5893662



Top 5 Considerations when Specifying Power for LEDs

1. PHYSICAL SPACE CONSTRAINTS

- a. A very demanding specification for today's LED driver solutions - especially for bulb retrofit applications where space is very limited.
- b. NXP has the highest level of integration in its dedicated SSL driver solutions. We integrate the dimming functionality, high power switching function and protections. This allows for the smallest footprint designs.

2. NUMBER OF LEDS TO BE DRIVEN AND AT WHAT CURRENT LEVEL?

- a. This enables you to pick the right power solution.
- b. For applications below 15W, you can choose fully integrated [SSL2101](#). For under 25W, the [SSL2102](#) is the ideal solution.

3. ISOLATION REQUIREMENTS

- a. Regulations stipulate the need for isolation to protect the user from dangerous voltages.
- b. NXP solutions can be configured for isolated flyback designs, which only allow low voltage on the LED board and hence protect the user.

4. DIMMING REQUIREMENTS

- a. TRIAC based dimming?
- b. PWM dimming?
- c. 0-10V dimming?
- d. NXP has the right solution for all dimming types. The most challenging is TRIAC dimming, as it was really designed for higher power incandescent loads. NXP has integrated technology within its ICs to allow excellent TRIAC dimming capability to <1% of light output without flickering.

5. LIFETIME REQUIREMENTS

Most LED manufacturers specify long lifetimes of their products (as long as the LED junction temperature is managed properly). NXP has qualified its LED drivers to extended conditions well above normal qualification criteria for ICs. Our accelerated life testing has shown our products to match the lifetimes of the LEDs they are driving, so you can design with confidence.

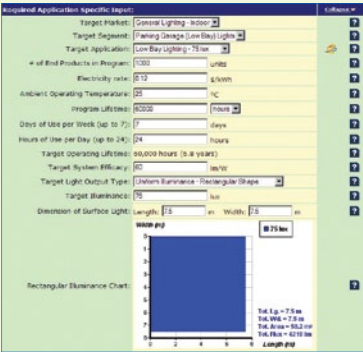
[Click here to buy these products](#)

SSL2101
SSL2102

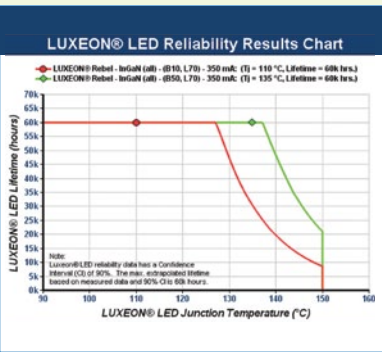


FURTHER READING AND USEFUL TOOLS

[SSL Designer](#)



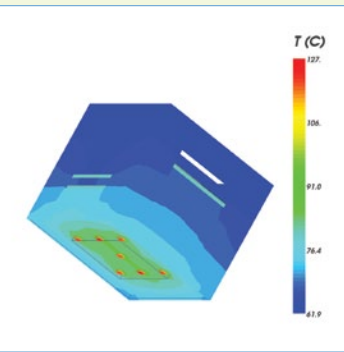
[LED Reliability Tool](#)



[Usable Light Tool 2.0](#)



[QLED Thermal Design and Simulation Software](#)



Future Lighting Solutions Orchestrates

LED MAKEOVER AT PARENT'S EUROPEAN HQ, YIELDING 90% ENERGY SAVINGS

Perched on the busy M25 corridor encircling the London metropolitan area, the 64,000-square-foot home of Future Electronics EMEA is as architecturally striking as the lighting inside. The building in Egham, Surrey, was completed in 2000 and became the European nerve center of Montreal-based electronic components distributor Future Electronics in July 2008.

In remodeling the building to suit the company's needs, Future Electronics executives decided to use solid-state lighting products to create a new lighting ambiance and to replace many of the existing halogen and CFL fixtures. The goal was to promote the mission of Future Lighting Solutions - the exclusive supplier of Philips Lumileds' LUXEON® power LEDs as well as a source of LED knowledge, resources, programs, partners, components and logistics support for luminaire manufacturers – by turning the building into a billboard for LUXEON-based lighting applications.

ALL-LED MEETING ROOMS

We decided to retrofit the four executive meeting rooms on the first and second floors, eliminating conventional lighting completely.

In each 14-square-meter meeting room, the four existing twin 26W CFL downlights were replaced with an equal number of **LUXEON Rebel**-based downlights from Integrated Systems Technologies (IST). The solid-state fixtures provide light output comparable to the CFL versions, fit in the same space, and deliver a performance of 45 lumens per watt that complies with the UK's Part L regulations for fuel and power conservation.

In addition, all eight 50W halogen MR16 lamps installed around the edges of each room were retrofitted with the same three-LED Dialight Lumidrives HL16 light engines as the perimeter fixtures in the atrium. The LED lamps provide the same wall-washing effect and can be used for soft illumination when the downlights are turned off.

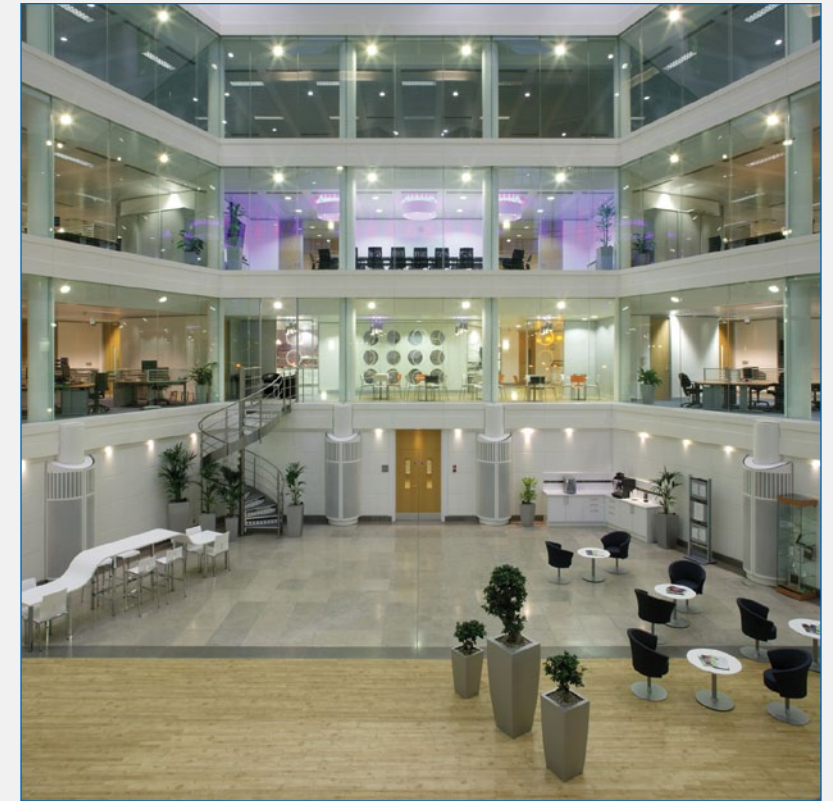
The same HL16 light engines were also in the building's two informal ground-floor meeting rooms. The original GU10 halogen fixtures were replaced with an equal number of HL16s, providing the same level of illumination on the meeting tables.

In total, Future replaced 116 halogen bulbs with warm or neutral-white MR11- or MR16-compatible LED lamps from Dialight Lumidrives, including 42-30W halogen GU10 fixtures in two other meeting rooms near the elevators. The upgrades for those 116 fixtures alone cut energy consumption 92% from 6.974kW to 0.494kW.

To read the case study or installation spotlight, please [click here](#).

“This building gave us an opportunity to show off the capabilities of the LUXEON LEDs we work with every day as well as enjoy LUXEON-based lighting in our own workplace.”

Lawrence Madanda, General Manager, Future Lighting Solutions EMEA





SSL2102 Deep Dimmable Control

This small, highly integrated and highly efficient driver is the next step in SSL retrofit LED lighting. It supports the majority of available dimmers (TRIAC and transistor) and is ideal for small form-factor applications with closed casings.

The NXP mains LED driver IC [SSL2102](#) is a fully integrated LED driver that includes the controller and the switches. The IC delivers high efficiency and high power-factor in SSL retrofit lamps and modules. Supporting the majority of available dimmers (including TRIAC and transistor), it uses very few external components and is ideal for small form-factor applications that use a closed casing.

FEATURES

- High efficiency and high power-factor for SSL applications below 25 W
- Natural dimming curve via logarithmic correction
- Supports the majority of available dimmers in the market (e.g. TRIAC, transistor)
- Limited external components required due to high integration level, ideal for small form-factor applications with closed casings
- Switched SMPS controller with buck and flyback configurations
- Thermally enhanced SO20 wide-body package

APPLICATIONS

- SSL retrofits (e.g. GU10, E27) from 8 to 15 W
- LED modules (e.g. LED spots, downlights) from 15 to 25 W

Note: for power ratings below 15 W (for LED modules) and 8 W (for SSL retrofit), NXP offers the SSL2101.

SSL2101 is directly compatible with SSL2102 which simplifies engineering.

Click here to buy these products

\$

BUY NOW

SSL2102T/N1,518

SSL2102T/DB/FLYB120V,598

SSL2102T/DB/FLYB230V,598



The SSL2102 is a Switched Mode Power Supply (SMPS) controller IC that operates directly from rectified mains and also in combination with a phase cut dimmer. It is designed to drive LED devices. The device includes a high-voltage power switch and a circuit to allow start-up directly from the rectified mains voltage. Furthermore the device includes high-voltage circuitry to supply the phase cut dimmer.

[SSL2102T/DB/FLYB120V,598](#).....\$105.00 U.S.

[SSL2102T/DB/FLYB230V,598](#).....\$105.00 U.S.

[Data Sheet](#)

[Literature](#)

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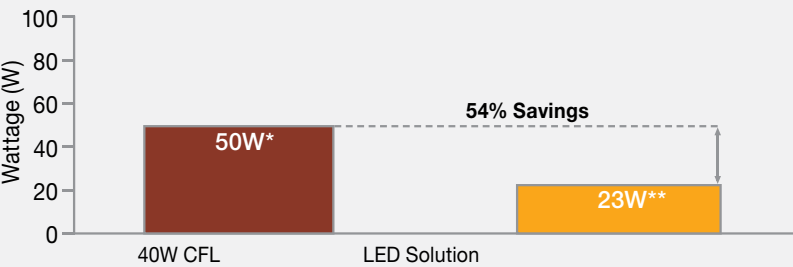


LED Lighting for Indoor Wall Pack Fixtures

Indoor LED Wall Pack fixtures provide better visibility, cleaner & crisp quality of light, and one-of-a-kind designs for interior settings such as doorways, walkways and staircases.

SAVINGS

ENERGY SAVINGS

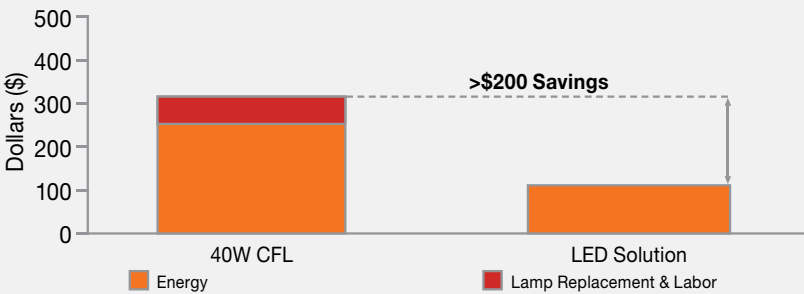


* 40W CFL including driver losses

** Includes driver losses

- Significant savings of over 50% compared to CFL

5 YEAR LIFE CYCLE SAVINGS



- Reduced, labor and lamp replacement costs

ENHANCED ILLUMINATION

LUXEON® LEDs are directional light sources that allow for greater control to maximize efficiency and uniformity. The small footprint means more LEDs can be packaged closer together. Also, standard or special optics are available to create uniform patterns.

Benefits

- Improved safety and visibility
- Even light distribution
- Unique and creative designs with the possibility of more light output

ECO-FRIENDLY

Compared to traditional light sources, LUXEON LEDs are far more energy efficient. Moreover, their long life, compact size and chemical composition make for a very eco-friendly product.

Benefits

- Reduced coal and carbon emissions
- No harmful chemicals (mercury and lead free)
- Easier, cheaper and safer to dispose of
- Reduction of hazardous material (RoHS compliant)





250 Watt SMPS LED Driver

This SMPS controller IC, equipped with flyback control and integrated PFC, delivers highly efficient, flexible operation in a small form factor, and is ideally suited for indoor and outdoor SSL applications above 25 W.

The [SSL1750](#), suitable for indoor and outdoor solid-state lighting (SSL) applications above 25 W, is a highly integrated device that combines a controller for Power Factor Correction (PFC) with a flyback controller.

FEATURES

- Operates from universal mains supply (80 to 276 VAC)
- Supporting the majority of the available dimmers (e.g. TRIAC, transistor)
- High-voltage start-up
- Integrated PFC
- Meets power requirements between 25 and ~ 250 W (PFC needed)

APPLICATIONS

- Indoor SSL applications above 25 W
- Outdoor SSL applications above 25 W
 - Street lighting
 - Area lighting, such as parking lots
 - Tunnel lighting, including lighting tubes based on LED strings



The SSL1750 is a Switched Mode Power Supply (SMPS) controller IC, suitable for driving LED applications from 25 W up to 250 W. The SSL1750 combines a controller for Power Factor Correction (PFC) and a flyback controller.

[SSL1750T/DB/120V,598](#).....\$135.00 U.S.

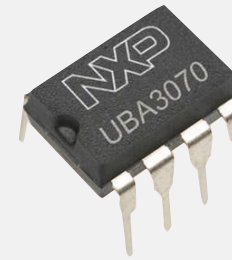
[SSL1750T/DB/230V,598](#)...\$135.00 U.S.

 [Data Sheet](#)

 [User Manual](#)

 [Component Data Sheet](#)

 [Literature](#)



LED Backlight Driver IC

Specially designed for LED string applications that need to be driven accurately and efficiently. [UBA3070](#) provides a highly efficient driver solution for LED string applications. This switch-mode buck converter is capable of driving LED strings at up to 600V.

FEATURES

- Switch-mode buck converter capable of driving LED strings up to 600V
- Direct PWM dimming
- Fast transient response through cycle-by-cycle current control; prevents LED current over- and undershoots
- Zero-current switching for turn-on of switch
- Zero-voltage or valley switching for turn-on of switch
- Over-current and over-temperature protection, under-voltage lockout and leading edge blanking
- Available in SO8 packages
- Minimal required inductance value and size

APPLICATIONS

- Downlighting
- Retail display
- Channel letter and contour lighting



HIGH POWER LED DRIVER DEMONSTRATION BOARD

The UBA3070 driver IC is the first member of a first generation of power-efficient LED backlight

driver ICs. Highly efficient, flexible and reliable LED drivers can easily be designed using the UBA3070 control IC.

[OM8604/3070 GLIGHT](#).....\$80.40 U.S.

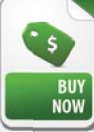
 [DataSheet](#)

 [Literature](#)

 [Product Information](#)

 [Application Note: Buck Converter for SSL](#)

Click here to buy these products

	SSL1750
	SSL1750T/DB/120V,598
	SSL1750T/DB/230V,598
	UBA3070
OM8604/3070 GLIGHT	

LED Street and Road Lighting Driver

BASED ON NXP ICS [SSL1750](#) AND [UBA3070](#)

FEATURES

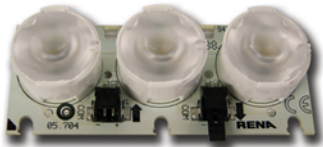
Mains Input	90 - 275V
Power factor	>0.9
3 strings of 16/17 LEDs	
50 LEDs	$V_f = 52V - 55V$
LED current	350 mA +/- 10%
Efficiency	84% (LED power / mains input power)

BENEFITS

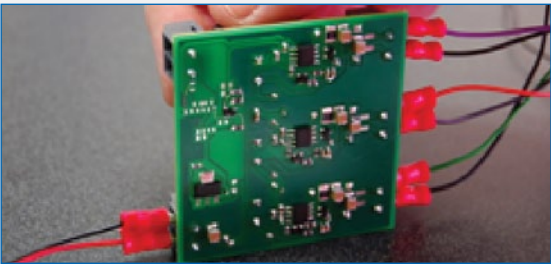
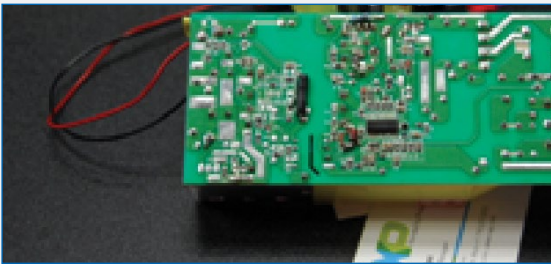
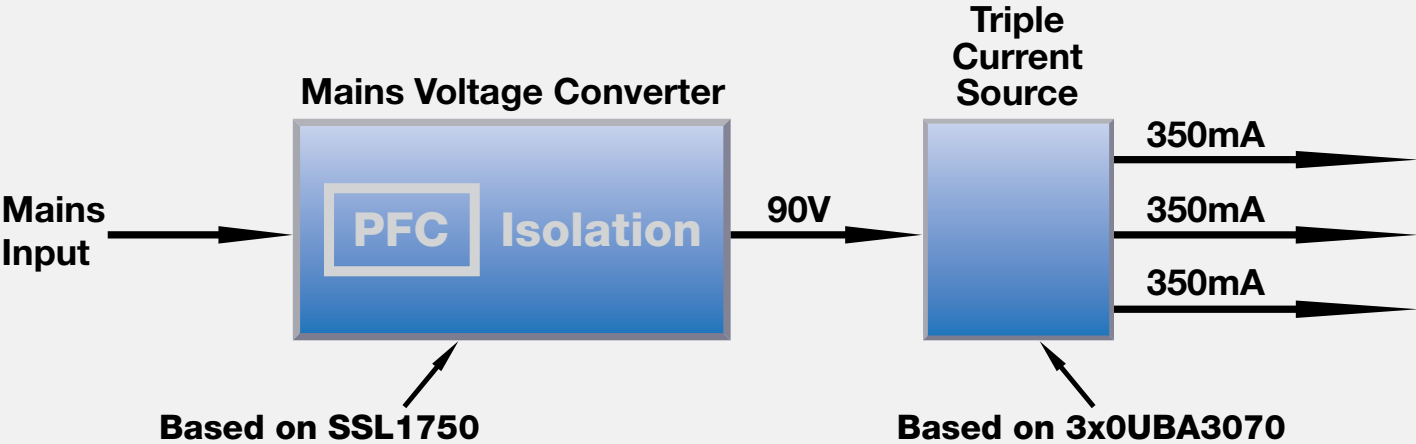
- Driven from universal mains
- Constant current 350mA $\pm 10\%$ to 50 LEDs, divided in 3 strings of 16 or 17 LEDs
- Temperature range: -20 to +50°C, Lifetime: 60.000 hours (95% survivals)
- Complies to: EN61000-4-5 (10kV), EN55015 (CISPR15), IEC 60598-1/2/3,
- Protected against open or shorted output(s)



The Light Bulb



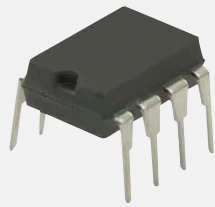
The Light Engine



Now it's your turn to innovate with simpleLED®, visit

www.futurelightingsolutions.com

Future Lighting Solutions' simpleLED® program has over 500 combinations of LUXEON® LED & Optic configurations, enabling you to select the right Light Engine for your application, eliminate prototyping delays and accelerate time to market. Additional benefits include UL recognized quality and a 3 year warranty. Visit our website and start innovating.



15W SMPS Controller IC Mains LED Driver

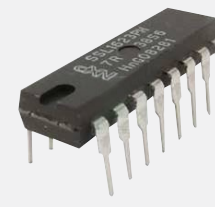
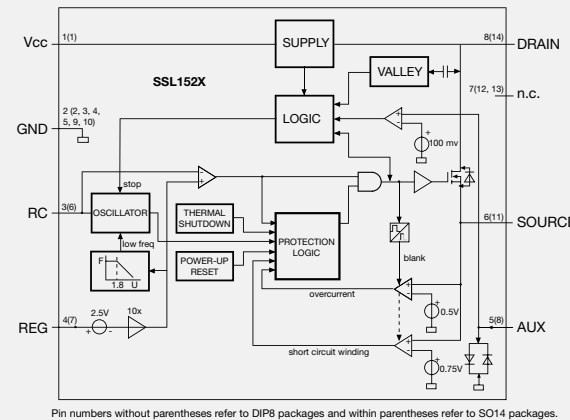
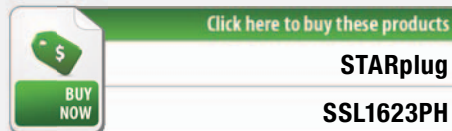
Based on the NXP [STARplug](#) family, it uses robust components and proven technologies to simplify the design of solid-state lighting (SSL) applications. These ICs offer the lowest cost solution when designing systems that do not require TRIAC dimming. The solutions can be dimmed via PWM or 0-10V dimming techniques.

FEATURES

- High energy efficiency at approx. 15 W: 85% at 120 V AC, 82% at 230 V AC
- Power factor above 0.9
- 80 - 270 V AC input
- Output voltage follows VF of the LEDs
- Output current 1000 mA ($\pm 5\%$)
- Meets safety / isolation regulations (UL 1598 Class 2 and IEC60950)
- Wide range of built-in protection circuits

APPLICATIONS

- Retrofit LED lamps
- LED ballasts
- Signage
- Contour lighting
- Commercial lighting (e.g. cabinet or freezer lights)
- Other lighting applications



25W SMPS Controller IC Mains LED Driver

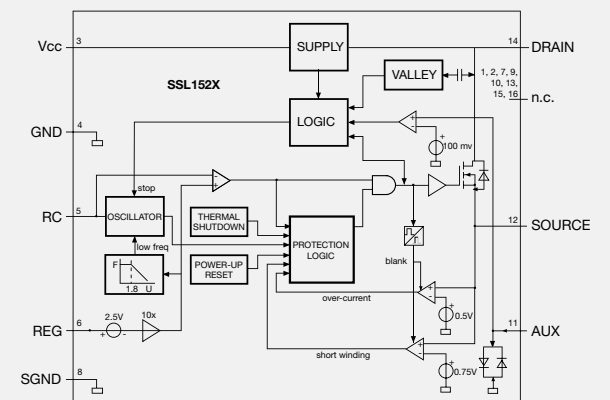
The [SSL1623PH](#) is a Switched Mode Power Supply (SMPS) controller IC that operates directly from the rectified universal mains. The device includes a high voltage power switch and a circuit for start-up directly from the rectified mains voltage. A dedicated circuit for valley switching is built in, which makes a very efficient slim-line electronic LED driver concept possible. The SSL1623PH can operate in LED applications with a power range of up to 25 W.

FEATURES

- Integrated power switch: 6.5 Ohm and 650 V
- Operates from universal AC mains supplies, 80 V to 276 V
- Adjustable frequency for flexible design
- RC oscillator for load insensitive regulation loop constant
- Valley switching for minimum switch-on loss
- Adjustable over-current protection
- Under-voltage protection and temperature protection
- Short circuit winding protection
- Safe restart mode for system fault conditions

APPLICATIONS

- LED ballasts
- Contour lighting
- LED spotlights
- Channel letter lighting
- Downlighting
- Commercial lighting (e.g. retail displays)



LED Driver Selection Guide

Segment	Subsegment	<u>SSL152x</u>	<u>SSL162x</u>	<u>SSL2101</u>	<u>SSL2102</u>	<u>SSL1750</u>	<u>UBA3070</u>
General Lighting	Architectural	✓	✓	✓	✓	✓	✓
	Retail Display	✓	✓	✓	✓	✓	✓
	Street Lighting					✓	✓
	Residential	✓	✓	✓	✓	✓	✓
	Spot-Downlights	✓	✓	✓	✓	✓	✓
	Channel / Contour					✓	✓
Signal	Traffic Lighting					✓	✓
	Safety, Security	✓	✓	✓	✓	✓	✓
Special Lighting	Entertainment					✓	✓
	LED Screens					✓	✓

Offering the deepest dimmable control for LED lighting solutions, NXP and Future Lighting Solutions give you the power to never stop innovating.

NXP's [SSL Driver Solutions](#) are designed to provide deep dimming completely flicker free with a natural dim curve. Isolated voltage circuitry accelerates UL approval, thus speeding your time to market.



Go Deeper



Knowledge Center

APPLICATION NOTES

-  [Application Note 10754](#): This application note describes how to design a mains dimmable LED driver using the NXP SSL2101/2102 LED Driver IC in flyback mode.
-  [Application Note 10831](#): This application note gives an overview of the design considerations when designing a 30 W flyback application with the SSL2102.
-  [Application Note 10876](#): This document describes how to design a buck converter that can, for example, be used to drive an LED string and also illustrates the method of calculating components in the Boundary Conduction Mode (BCM).
-  [Application Note 10829](#): This application note describes a simple and highly efficient flyback converter application design for low output power.

DATA SHEETS

-  [SSL2101](#)
-  [SSL2102](#)
-  [SSL1750](#)
-  [UBA3070](#)

INSTALLATION SPOTLIGHT

[Future Electronics EMEA](#)

USER MANUALS

-  [SSL2101](#)
-  [SSL2102](#)

FUTURE LIGHTING SOLUTIONS AUTOMATED DESIGN TOOL VIDEO TUTORIALS

-  [SSL Designer](#)
-  [Usable Light Tool](#)
-  [LED Reliability Tool](#)
-  [QLED](#)



Transim Design Tool

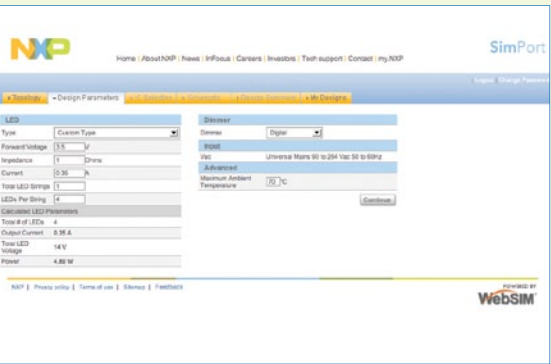
www.nxp.com/technical_support/designportal/ssl/

To keep today's development cycles as short as possible, NXP helps you simplify your design with intuitive online tools. Our latest SSL design tool focuses on creating LED drivers from 2 W up to 25 W. The applications include:

- SSL retrofit lamps (e.g. GU10, E27)
- LED modules, separate power supplies, e.g. LED spots, downlights
- LED strings, e.g. retail display
- LED ballasts
- Contour lighting
- Channel letter lighting
- Other lighting applications

Output power is user-defined and can be fixed, dimmed using pulse width modulation (PWM), or requires mains TRIAC dimmable solutions. Choose from two different application types - an isolated (flyback) converter and a non-isolated (buck) converter.

The tool generates schematic, bill of material and transformer parameters, calculates the design's efficiency, and presents an overview of losses. Also, for a better understanding of the application it can be simulated either online or even locally after downloading the schematics and simulator.





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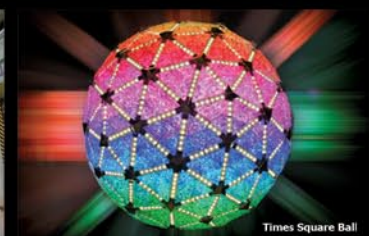
Phillips Hadco



MAZet GmbH



Hong Kong Mass
Transit Railway (MTR)



Times Square Ball

