

LM3530 PRODUCT BRIEF

High Efficiency White LED Driver with Programmable Ambient Light Sensing Capability and I²C Compatible Interface

General Description

The LM3530 current mode boost converter supplies the power and controls the current in up to 11 series white LED's. The 839mA current limit and 2.7V to 5.5V input voltage range, makes the device a versatile backlight power source ideal for operation in portable applications.

The LED current is adjustable from 0 to 29.5mA via an I²C compatible interface. The 127 different current steps and 8 different maximum LED current levels give over 1000 programmable LED current levels. Additionally, PWM brightness control is possible through an external logic level input.

Additionally, the device features two Ambient Light Sensor inputs. These are designed to monitor analog output ambient light sensors and provide programmable adjustment of the LED current with changes in ambient light. Each ambient light sensor input has independently programmable internal voltage setting resistors which can be made high impedance to reduce power during shutdown. The LM3530's 500kHz switching frequency allows for high converter efficiency over a wide output voltage range accommodating from 2 to 11 series LEDs. Finally, the support of Content Adjusted Backlighting maximizes battery life while maintaining display image quality.

The LM3530 is available in a tiny 12-bump (1.6mm × 1.2mm × 0.425mm) micro SMD package and operates over the -40°C to +85°C temperature range.

Notice: This document is not a full datasheet. For more information regarding this product, or to order samples, please contact your National Semiconductor sales office or visit <http://www.national.com/support/dir.html>.

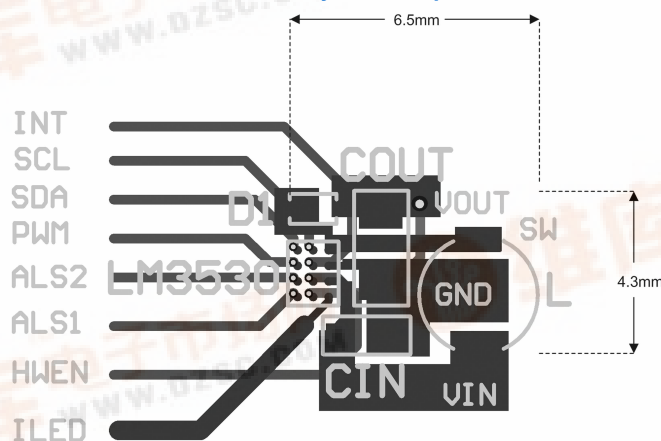
Features

- Drives up to 11 LED's in series
- 1000:1 Dimming Ratio
- 90% Efficiency
- Programmable Dual Ambient Light Sensor Inputs with internal ALS Voltage Setting Resistors
- I²C Programmable Logarithmic or Linear Brightness Control
- External PWM Input for Simple Brightness Adjustment
- True Shutdown Isolation for LED's and Ambient Light Sensors
- Internal Soft-Start Limits Inrush Current
- Wide 2.7V to 5.5V Input Voltage Range
- 40V Over-Voltage Protection
- 500 kHz Fixed Frequency Operation
- 839mA Peak Current Limit
- Low Profile 12-bump micro SMD Package

Applications

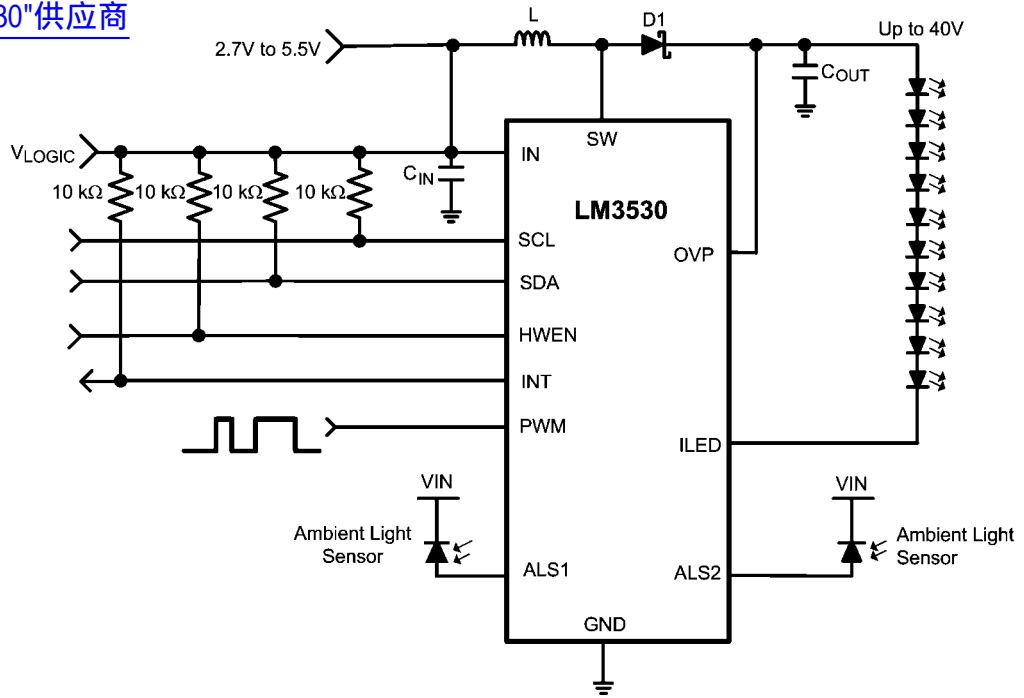
- Smartphone LCD Backlighting
- Personal Navigation LCD Backlighting
- 2 to 11 series White LED Backlit Display Power Source

LM3530 Layout Example



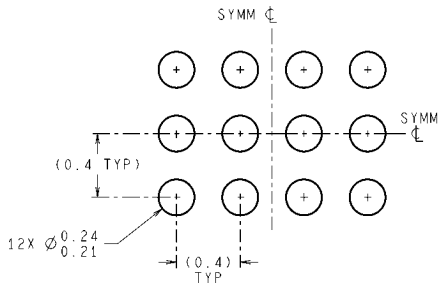
30086683

Typical Application Circuit

[查询"LM3530"供应商](#)

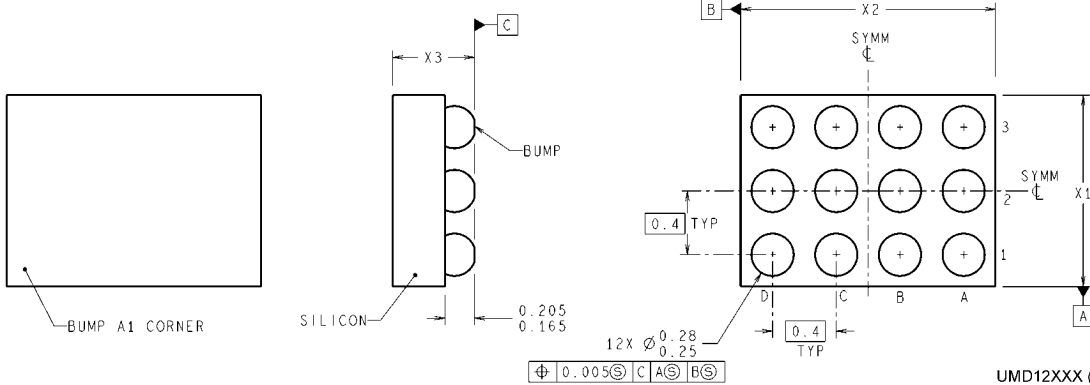
30086601

Physical Dimensions inches (millimeters) unless otherwise noted
[查询"LM3530"供应商](#)



LAND PATTERN RECOMMENDATION

DIMENSIONS ARE IN MILLIMETERS
 DIMENSIONS IN () FOR REFERENCE ONLY



UMD12XXX (Rev A)

12- Bump Ultra Thin Micro SMD Package
For Ordering, Refer to Ordering Information Table
NS Package Number UMD12
X1 = 1.215 mm (±0.1 mm), X2 = 1.615 mm (±0.1 mm), X3 = 0.425 mm

[查询"LM3530"供应商](#)

Notes

For more National Semiconductor product information and proven design tools, visit the following Web sites at:
www.national.com

Products		Design Support	
Amplifiers	www.national.com/amplifiers	WEBENCH® Tools	www.national.com/webench
Audio	www.national.com/audio	App Notes	www.national.com/appnotes
Clock and Timing	www.national.com/timing	Reference Designs	www.national.com/refdesigns
Data Converters	www.national.com/adc	Samples	www.national.com/samples
Interface	www.national.com/interface	Eval Boards	www.national.com/evalboards
LVDS	www.national.com/lvds	Packaging	www.national.com/packaging
Power Management	www.national.com/power	Green Compliance	www.national.com/quality/green
Switching Regulators	www.national.com/switchers	Distributors	www.national.com/contacts
LDOs	www.national.com/ldo	Quality and Reliability	www.national.com/quality
LED Lighting	www.national.com/led	Feedback/Support	www.national.com/feedback
Voltage References	www.national.com/vref	Design Made Easy	www.national.com/easy
PowerWise® Solutions	www.national.com/powerwise	Applications & Markets	www.national.com/solutions
Serial Digital Interface (SDI)	www.national.com/sdi	Mil/Aero	www.national.com/milaero
Temperature Sensors	www.national.com/tempensors	SolarMagic™	www.national.com/solarmagic
PLL/VCO	www.national.com/wireless	PowerWise® Design University	www.national.com/training

THE CONTENTS OF THIS DOCUMENT ARE PROVIDED IN CONNECTION WITH NATIONAL SEMICONDUCTOR CORPORATION ("NATIONAL") PRODUCTS. NATIONAL MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS PUBLICATION AND RESERVES THE RIGHT TO MAKE CHANGES TO SPECIFICATIONS AND PRODUCT DESCRIPTIONS AT ANY TIME WITHOUT NOTICE. NO LICENSE, WHETHER EXPRESS, IMPLIED, ARISING BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT.

TESTING AND OTHER QUALITY CONTROLS ARE USED TO THE EXTENT NATIONAL DEEMS NECESSARY TO SUPPORT NATIONAL'S PRODUCT WARRANTY. EXCEPT WHERE MANDATED BY GOVERNMENT REQUIREMENTS, TESTING OF ALL PARAMETERS OF EACH PRODUCT IS NOT NECESSARILY PERFORMED. NATIONAL ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR BUYER PRODUCT DESIGN. BUYERS ARE RESPONSIBLE FOR THEIR PRODUCTS AND APPLICATIONS USING NATIONAL COMPONENTS. PRIOR TO USING OR DISTRIBUTING ANY PRODUCTS THAT INCLUDE NATIONAL COMPONENTS, BUYERS SHOULD PROVIDE ADEQUATE DESIGN, TESTING AND OPERATING SAFEGUARDS.

EXCEPT AS PROVIDED IN NATIONAL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, NATIONAL ASSUMES NO LIABILITY WHATSOEVER, AND NATIONAL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THE SALE AND/OR USE OF NATIONAL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE CHIEF EXECUTIVE OFFICER AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

Life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

National Semiconductor and the National Semiconductor logo are registered trademarks of National Semiconductor Corporation. All other brand or product names may be trademarks or registered trademarks of their respective holders.

Copyright© 2010 National Semiconductor Corporation

For the most current product information visit us at www.national.com



**National Semiconductor
Americas Technical
Support Center**
Email: support@nsc.com
Tel: 1-800-272-9959

**National Semiconductor Europe
Technical Support Center**
Email: europe.support@nsc.com

**National Semiconductor Asia
Pacific Technical Support Center**
Email: ap.support@nsc.com

**National Semiconductor Japan
Technical Support Center**
Email: jpn.feedback@nsc.com