

## LP8550 PRODUCT BRIEF High-Efficiency LED Backlight Driver for Notebooks

Check for Samples: [LP8550](#)

### FEATURES

- High-voltage DC/DC boost converter with integrated FET with four switching frequency options: 156/312/625/1250 kHz
- 2.7V – 22V input voltage range to support 1x...5x cell Li-Ion batteries
- Programmable PWM resolution
  - -8 to 13 true bit (steady state)
  - -Additional 1 to 3 bits using dithering during brightness changes
- I<sup>2</sup>C and PWM brightness control
- Automatic PWM & current dimming for improved efficiency
- PWM output frequency and LED current set through resistors

- Optional synchronization to display V<sub>SYNC</sub> signal
- 6 LED outputs with LED fault (short/open) detection
- Low input voltage, over-temperature, over-current detection and shutdown
- Minimum number of external components
- Micro SMD-25 package, 2.466 x 2.466 x 0.6 mm

### APPLICATIONS

- Notebook and Netbook LCD Display LED Backlight
- LED Lighting

### DESCRIPTION

The LP8550 is a white LED driver with integrated boost converter. It has six adjustable current sinks which can be controlled by PWM input or with I<sup>2</sup>C-compatible serial interface.

The boost converter has adaptive output voltage control based on the LED driver voltages. This feature minimizes the power consumption by adjusting the voltage to lowest sufficient level in all conditions.

LED outputs have 8-bit current resolution and up to 13-bit PWM resolution with additional 1-3 bit dithering to achieve smooth and precise brightness control. Proprietary Phase Shift PWM control is used for LED outputs to reduce peak current from the boost converter, thus making the boost capacitors smaller. The Phase Shifting scheme also eliminates audible noise.

Internal EEPROM is used for storing the configuration data. This makes it possible to have minimum external component count and make the solution very small.

LP8550 has safety features which make it possible to detect LED outputs with open or short fault. As well low input voltage and boost over-current conditions are monitored and chip is turned off in case of these events. Thermal de-rating function prevents overheating of the device by reducing backlight brightness when set temperature has been reached.

LP8550 is available in National's micro SMD-25 package.

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



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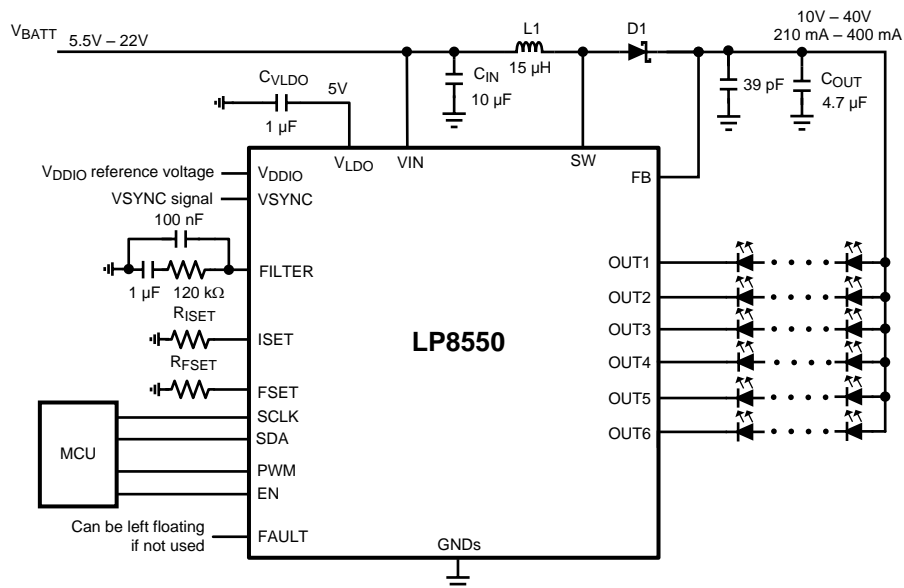
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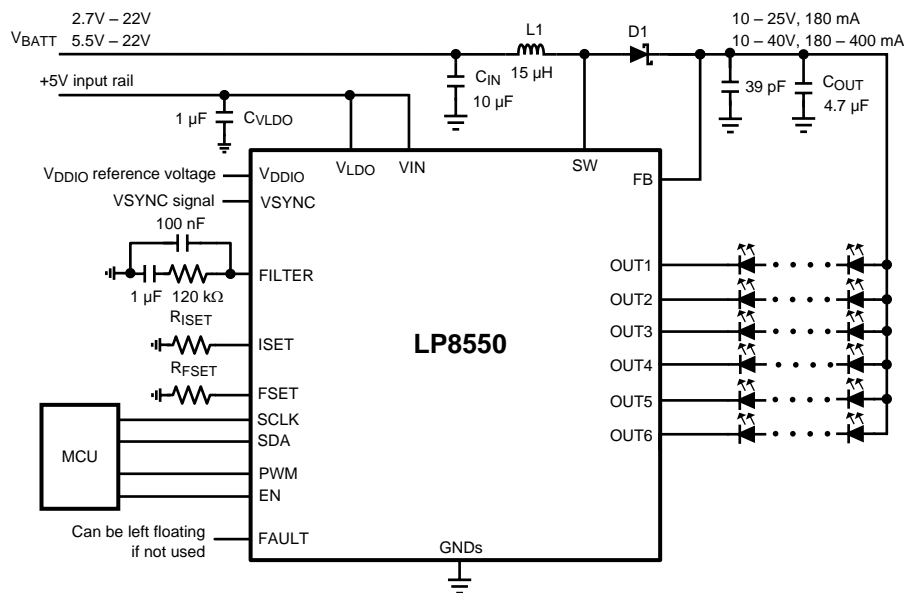


These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

## Typical Application (1)



## Typical Application for Low Input Voltage (2)



**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
LP8550TLE/NOPB	ACTIVE	DSBGA	YZR	25	250	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	
LP8550TLX/NOPB	ACTIVE	DSBGA	YZR	25	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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**TAPE AND REEL INFORMATION**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
LP8550TLE/NOPB	DSBGA	YZR	25	250	178.0	8.4	2.69	2.69	0.76	4.0	8.0	Q1
LP8550TLX/NOPB	DSBGA	YZR	25	3000	178.0	8.4	2.69	2.69	0.76	4.0	8.0	Q1

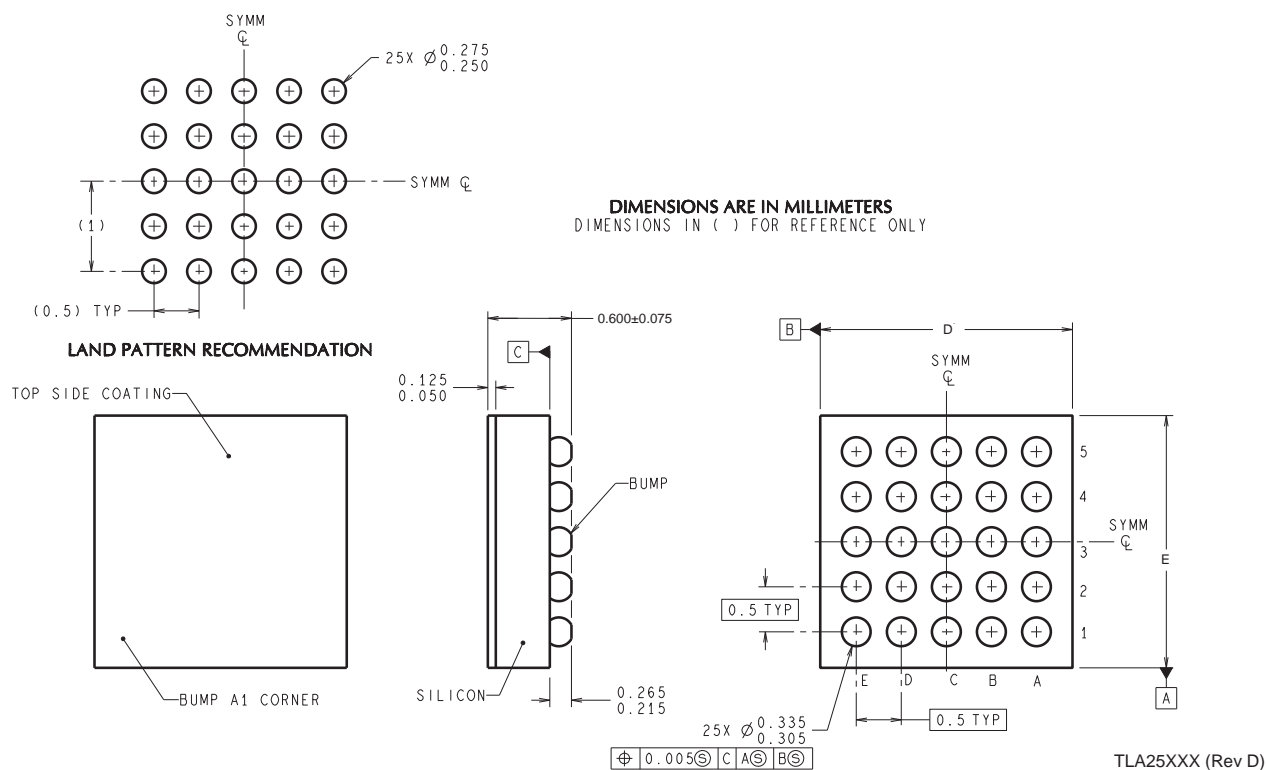
## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LP8550TLE/NOPB	DSBGA	YZR	25	250	203.0	190.0	41.0
LP8550TLX/NOPB	DSBGA	YZR	25	3000	206.0	191.0	90.0

YZR0025



D: Max = 2.51 mm, Min = 2.41 mm

E: Max = 2.51 mm, Min = 2.41 mm

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NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.  
B. This drawing is subject to change without notice.

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