

LP5523 PRODUCT BRIEF

Programmable 9-Output LED Driver

General Description

The LP5523 is a 9-channel LED driver designed to produce lighting effects for mobile devices. A high-efficiency charge pump enables LED driving over full Li-Ion battery voltage range. The device is equipped with an internal program memory, which allows operation without processor control.

The LP5523 maintains excellent efficiency over a wide operating range by autonomously selecting the best charge pump gain based on LED forward voltage requirements. LP5523 is able to automatically enter power-save mode when LED outputs are not active, thus lowering idle current consumption down to 10 μ A (typ).

The LP5523 has an I²C-compatible control interface with four pin selectable addresses. The device has a flexible General Purpose Output (GPO), which can be used as a digital control pin for other devices. INT pin can be used to notify processor when a lighting sequence has ended (interrupt -function). Also, the device has a trigger input interface, which allows synchronization, for example, between multiple LP5523 devices.

The device requires only four small and low-cost ceramic capacitors. The LP5523 is available in a tiny 25-bump 2.27 mm x 2.27 mm x 0.60 mm micro SMD package (0.4 mm pitch).

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>.

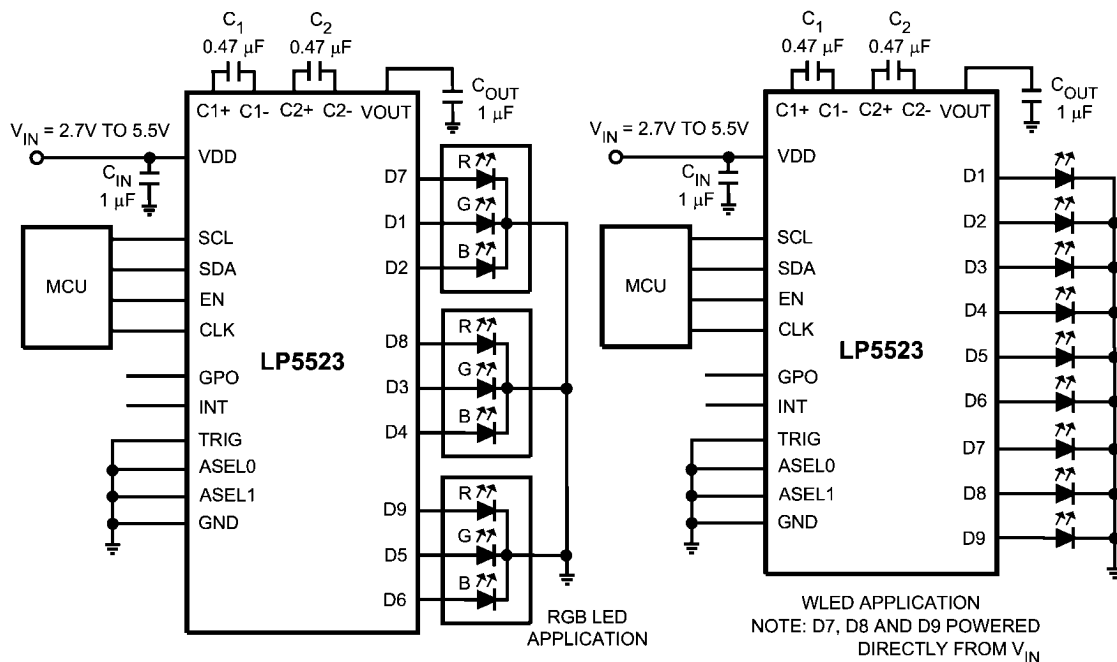
Features

- Three independent program execution engines; 9 programmable outputs with 25.5 mA full-scale current, 8-bit current setting resolution and 12-bit PWM control resolution
- Adaptive high efficiency 1x/1.5x fractional charge pump - efficiency up to 94%
- LED drive efficiency up to 93%
- Charge pump with soft start and overcurrent/short circuit protection
- Built-in LED test
- 200 nA typical standby current
- Automatic power save mode; I_{VDD} = 10 μ A (typ.)
- Two wire, I²C-compatible, control interface
- Flexible instruction set
- Large SRAM program memory
- Small application circuit
- Source (high side) drivers
- Architecture supports color control.

Applications

- Fun lights and indicator lights
- LED backlighting
- Haptic feedback
- Programmable current source

Typical Application

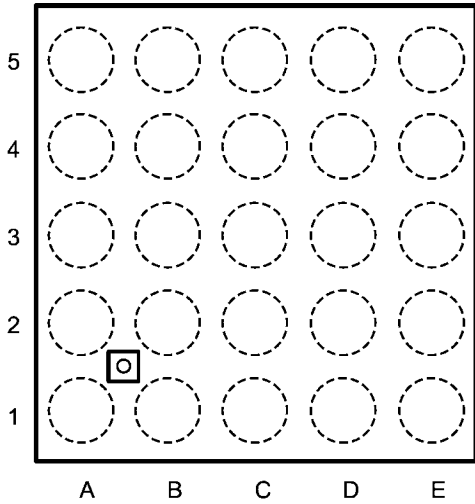


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Connection Diagrams and Package Mark Information

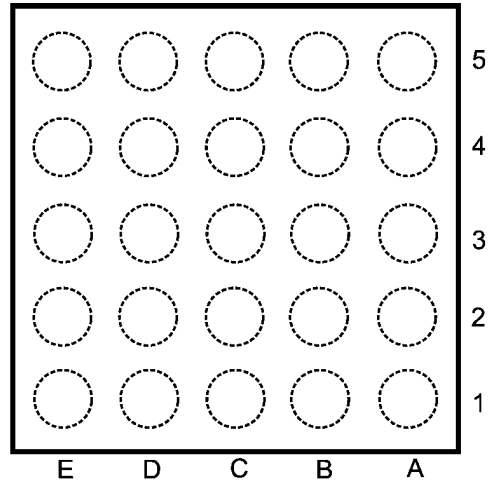
Connection Diagrams

Thin micro SMD 25-bump package, 2.27 x 2.27 x 0.60 mm body size, 0.4 mm pitch NS Package Number TMD25LLA



Top View

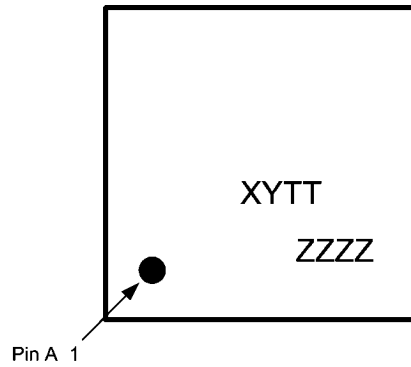
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Bottom View

30043603

Package Mark



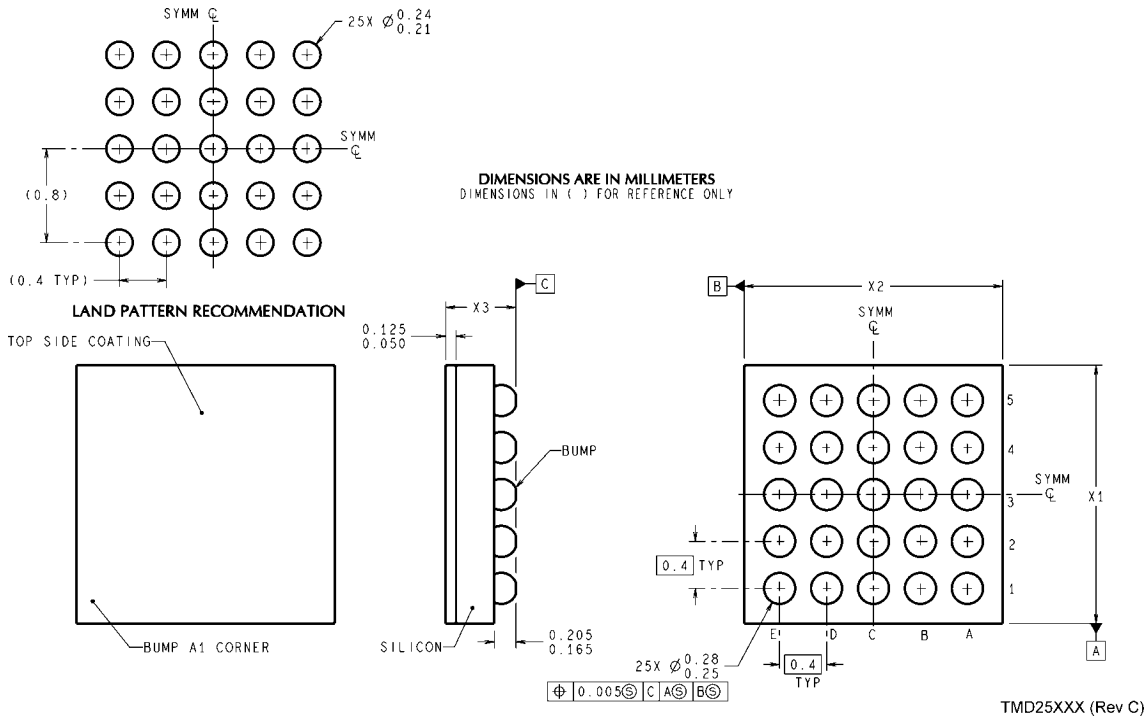
Top View: XY — Date Code TT — Die Traceability ZZZZ — Product Identification

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Ordering Information

Order Number	Product Identification	Supplied As	Spec/Flow
LP5523TM	5523	Tape and reel, 250 units	NOPB
LP5523TMX	5523	Tape and reel, 3000 units	NOPB

Physical Dimensions inches (millimeters) unless otherwise noted



The dimension for X1, X2 and X3 are as given:

- X1 = 2.27 mm ±0.03 mm
- X2 = 2.27 mm ±0.03 mm
- X3 = 0.60 mm ±0.075 mm

NS Package Number TMD25LLA
25-bump micro SMD

See National Semiconductor Application Note 1112 Micro SMD Wafer Level Chip Scale Package for PCB design and assembly instructions.

Notes

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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
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