National Semiconductor

LM3554 PRODUCT BRIEF

Synchronous Boost Converter with 1.2A Dual High Side LED Drivers and I2C Compatible Interface

General Description

The LM3554 is a 2 MHz fixed frequency, current mode synchronous boost converter. The device is designed to operate as a dual 600mA (1.2A total) constant current driver for high current white LEDs, or as a regulated 4.5V or 5V voltage source.

The dual high side current sources allow for grounded cathode LED operation. An adaptive regulation method ensures the current source for each LED remains in regulation and maximizes efficiency.

The main features include: an I2C compatible interface for controlling the LED current or the desired output voltage, a hardware Flash enable input for direct triggering of the Flash pulse, and dual TX inputs which force the Flash pulse into a low current Torch mode allowing for synchronization to RF power amplifier events or other high current conditions. Additionally, an active high hardware enable (HWEN) input provides a hardware shutdown during system software failures.

Five protection features are available within the LM3554 including a software selectable input voltage monitor, an internal comparator, for interfacing with an external temperature sensor, four selectable current limits to ensure the battery current is kept below a predetermined peak level, an over-voltage protection feature to keeps the output voltage below the OVP threshold in case of an open LED, and an output short circuit protection which limits the output current during an output short to GND. Additionally, the device provides various fault indicators including: a thermal fault flag indicating the LED temperature has tripped the thermal threshold, a flag indicating a TX event has occured, a flag indicating the flash timeout counter has expired, a flag indicating the devices die temperature has reached the thermal shutdown threshold, and a flag indicating an open or short LED.

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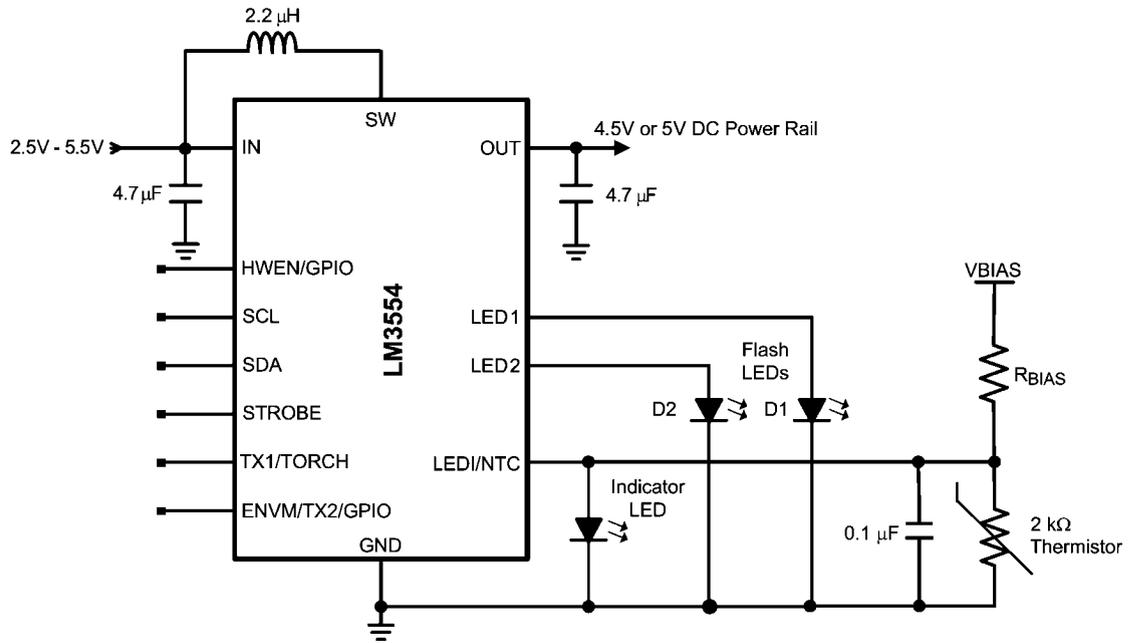
Features

■ Dual High Side Current Sources
■ Grounded Cathode Allowing for Better Heatsinking and LED Routing
■ >90% Efficiency
■ Ultra-Small Solution Size: < 23mm2
■ Four Operating Modes: Torch, Flash, LED Indicator and Voltage Output
■ Accurate and Programmable LED Current from 37.5mA to 1.2A
■ Programmable 4.5V or 5.0V Constant Output Voltage
■ Hardware Flash and Torch Enable
■ LED Thermal Sensing and Current Scaleback
■ Software Selectable Input Voltage Monitor
■ Programmable Flash Timeout
■ Dual Synchronization Inputs for RF Power Amplifier Pulse Events
■ Open and Short LED Detection
■ Active High Hardware Enable for Protection Against System Faults
■ 400kHz I2C Compatible Interface
■ 16-Bump (1.7mm × 1.7mm × 0.6mm) µSMD

Applications

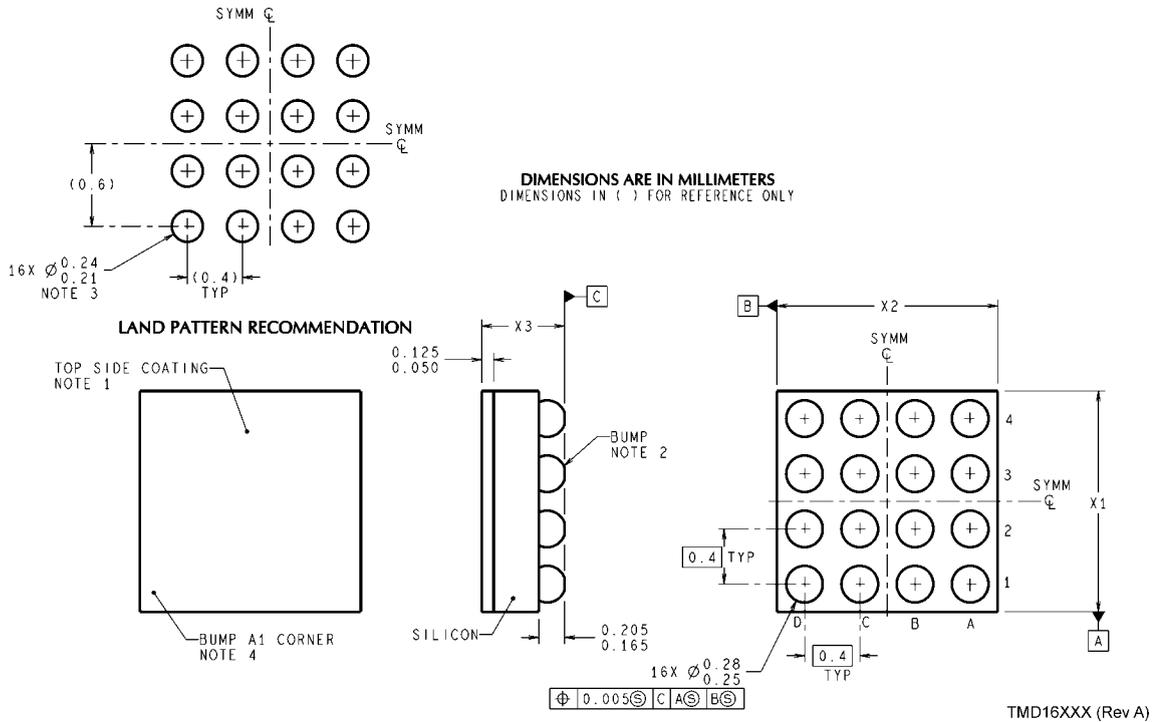■ Camera Phone LED Flash Controller
■ Class D Audio Amplifier Power
■ LED Current Source Biasing

Typical Application Circuits

30042001

Physical Dimensions inches (millimeters) unless otherwise noted

SYMM ℄

(0.6)

16X ∅ 0.24 / 0.21
NOTE 3

(0.4)
TYP

SYMM ℄

LAND PATTERN RECOMMENDATION

DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS IN ( ) FOR REFERENCE ONLY

TOP SIDE COATING
NOTE 1

BUMP A1 CORNER
NOTE 4

SILICON

X3

0.125 / 0.050

BUMP
NOTE 2

0.205 / 0.165

⊞ C

16X ∅ 0.28 / 0.25

⊕ 0.005Ⓢ C AⓈ BⓈ

B

X2

SYMM ℄

4

3

SYMM ℄

2

1

D   C   B   A

0.4 TYP

X1

⊟ A

0.4 TYP

TMD16XXX (Rev A)

16 Bump μSMD (0.4mm pitch)
For Ordering, Refer to Ordering Information Table
NS Package Number TMD16CCA
X1 = 1.695mm (±0.03mm), X2 = 1.695mm (±0.03mm), X3 = 0.6mm(±0.075mm)

Notes

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

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 Reference	www.national.com/vref	Design Made Easy	www.national.com/easy
PowerWise® Solutions	www.national.com/powerwise	Solutions	www.national.com/solutions
Serial Digital Interface (SDI)	www.national.com/sdi	Mil/Aero	www.national.com/milaero
Temperature Sensors	www.national.com/tempsensors	SolarMagic™	www.national.com/solarmagic
Wireless (PLL/VCO)	www.national.com/wireless	PowerWise® Design University	www.national.com/training

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