



**MICROCHIP**

---

**MCP1643 Synchronous Boost  
LED Constant Current Regulator  
Evaluation Board  
User's Guide**

---

**Note the following details of the code protection feature on Microchip devices:**

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

---

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights.

**Trademarks**

The Microchip name and logo, the Microchip logo, dsPIC, FlashFlex, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, PIC<sup>32</sup> logo, rfPIC, SST, SST Logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

FilterLab, Hampshire, HI-TECH C, Linear Active Thermistor, MTP, SEEVAL and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.


Analog-for-the-Digital Age, Application Maestro, BodyCom, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, HI-TIDE, In-Circuit Serial Programming, ICSP, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mTouch, Omniscent Code Generation, PICC, PICC-18, PICDEM, PICDEM.net, PICkit, PICtail, REAL ICE, rLAB, Select Mode, SQI, Serial Quad I/O, Total Endurance, TSHARC, UniWinDriver, WiperLock, ZENA and Z-Scale are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

GestIC and ULPP are registered trademarks of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2013, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

ISBN: 978-1-62077-403-8

**QUALITY MANAGEMENT SYSTEM  
CERTIFIED BY DNV  
= ISO/TS 16949 =**

*Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC<sup>®</sup> MCUs and dsPIC<sup>®</sup> DSCs, KEELOQ<sup>®</sup> code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.*

---

---

**Object of Declaration: MCP1643 Synchronous Boost LED Constant Current Regulator  
Evaluation Board User's Guide**

EU Declaration of Conformity

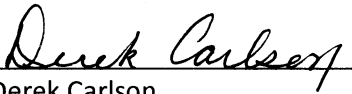
This declaration of conformity is issued by the manufacturer.

The development/evaluation tool is designed to be used for research and development in a laboratory environment. This development/evaluation tool is not a Finished Appliance, nor is it intended for incorporation into Finished Appliances that are made commercially available as single functional units to end users under EU EMC Directive 2004/108/EC and as supported by the European Commission's Guide for the EMC Directive 2004/108/EC (8<sup>th</sup> February 2010).

This development/evaluation tool complies with EU RoHS2 Directive 2011/65/EU.

For information regarding the exclusive, limited warranties applicable to Microchip products, please see Microchip's standard terms and conditions of sale, which are printed on our sales documentation and available at [www.microchip.com](http://www.microchip.com).

Signed for and on behalf of Microchip Technology Inc. at Chandler, Arizona, USA



Derek Carlson

VP Development Tools

16-July-2013

Date

**NOTES:**



# MCP1643 SYNCHRONOUS BOOST LED CONSTANT CURRENT REGULATOR EVALUATION BOARD USER'S GUIDE

## Table of Contents

<b>Preface</b> .....	<b>7</b>
Introduction.....	7
Document Layout .....	7
Conventions Used in this Guide .....	8
Recommended Reading.....	9
The Microchip Web Site .....	9
Customer Support .....	9
Document Revision History .....	9
<b>Chapter 1. Product Overview</b>	
1.1 Introduction .....	11
1.2 MCP1643 Short Overview .....	11
1.3 What is the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board? .....	12
1.4 MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board Kit Contents .....	12
<b>Chapter 2. Installation and Operation</b>	
2.1 Introduction .....	13
2.2 Getting Started .....	14
<b>Appendix A. Schematic and Layouts</b>	
A.1 Introduction .....	17
A.2 Board – Schematic .....	18
A.3 Board – Top Silk and Pads .....	19
A.4 Board – Top Copper .....	19
A.5 Board – Bottom Copper .....	19
<b>Appendix B. Bill of Materials</b> .....	<b>21</b>
<b>Worldwide Sales and Service</b> .....	<b>22</b>

**NOTES:**



# MCP1643 SYNCHRONOUS BOOST LED CONSTANT CURRENT REGULATOR EVALUATION BOARD USER'S GUIDE

## Preface

### NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our web site ([www.microchip.com](http://www.microchip.com)) to obtain the latest documentation available.

Documents are identified with a "DS" number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is "DSXXXXA", where "XXXX" is the document number and "A" is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® IDE online help. Select the Help menu, and then Topics to open a list of available online help files.

## INTRODUCTION

This chapter contains general information that will be useful to know before using the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board. Items discussed in this chapter include:

- Document Layout
- Conventions Used in this Guide
- Recommended Reading
- The Microchip Web Site
- Customer Support
- Document Revision History

## DOCUMENT LAYOUT

This document describes how to use the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board. The manual layout is as follows:

- **Chapter 1. "Product Overview"** – Important information about the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board.
- **Chapter 2. "Installation and Operation"** – Includes instructions on how to get started with the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board and a description of the user's guide.
- **Appendix A. "Schematic and Layouts"** – Shows the schematic and layout diagrams for the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board.
- **Appendix B. "Bill of Materials"** – Lists the parts used to build the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board.

## CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

### DOCUMENTATION CONVENTIONS

Description	Represents	Examples
<b>Arial font:</b>		
Italic characters	Referenced books	<i>MPLAB<sup>®</sup> IDE User's Guide</i>
	Emphasized text	...is the <i>only</i> compiler...
Initial caps	A window	the Output window
	A dialog	the Settings dialog
	A menu selection	select Enable Programmer
Quotes	A field name in a window or dialog	"Save project before build"
Underlined, italic text with right angle bracket	A menu path	<u><i>File&gt;Save</i></u>
Bold characters	A dialog button	Click <b>OK</b>
	A tab	Click the <b>Power</b> tab
N'Rnnnn	A number in verilog format, where N is the total number of digits, R is the radix and n is a digit.	4'b0010, 2'hF1
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
<b>Courier New font:</b>		
Plain Courier New	Sample source code	#define START
	Filenames	autoexec.bat
	File paths	c:\mcc18\h
	Keywords	_asm, _endasm, static
	Command-line options	-Opa+, -Opa-
	Bit values	0, 1
	Constants	0xFF, 'A'
Italic Courier New	A variable argument	<i>file.o</i> , where <i>file</i> can be any valid filename
Square brackets [ ]	Optional arguments	mcc18 [options] <i>file</i> [options]
Curly brackets and pipe character: {   }	Choice of mutually exclusive arguments; an OR selection	errorlevel {0 1}
Ellipses...	Replaces repeated text	var_name [, var_name...]
	Represents code supplied by user	void main (void) { ... }



## RECOMMENDED READING

This user's guide describes how to use MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board. Other useful documents are listed below. The following Microchip documents are available and recommended as supplemental reference resources.

- **MCP1643 Data Sheet - “1 MHz Low Voltage Start-up Synchronous Boost LED Constant Current Regulator” (DS20005208)**
- **AN1311 - “Single Cell Input Boost Converter Design” (DS01311)**

## THE MICROCHIP WEB SITE

Microchip provides online support via our web site at [www.microchip.com](http://www.microchip.com). This web site is used as a means to make files and information easily available to customers. Accessible by using your favorite Internet browser, the web site contains the following information:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip consultant program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

## CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

Technical support is available through the web site at:  
<http://www.microchip.com/support>.

## DOCUMENT REVISION HISTORY

### Revision A (August 2013)

- Initial Release of this Document.

**NOTES:**

## Chapter 1. Product Overview

### 1.1 INTRODUCTION

This chapter provides an overview of the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board and covers the following topics:

- MCP1643 Short Overview
- What is the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board?
- MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board Kit Contents

### 1.2 MCP1643 SHORT OVERVIEW

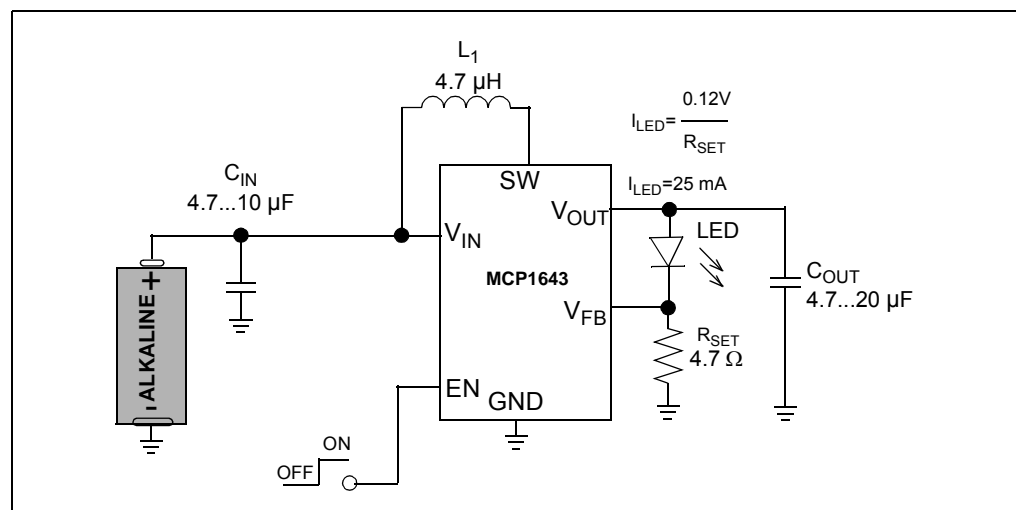
The MCP1643 is a compact, high-efficiency, fixed frequency, step-up DC-DC converter optimized as an LED constant current generator. This product provides an easy-to-use power supply solution, with a minimum number of external components for applications powered by one-cell, two-cell Alkaline, NiCd or NiMH batteries.

The MCP1643 is a PWM-only device that operates at a fixed 1 MHz switching frequency. The device has an operating input voltage range from 0.5V to 5V (with a 0.65V start-up voltage).

The LED can be turned ON and OFF with a variable duty cycle applied to the EN pin for applications that require dimming. The maximum dimming frequency is only limited by the internal soft-start of 240  $\mu$ s.

The device is available in MSOP-8 and 2X3 TDFN-8 packages.

The scope of the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board is to demonstrate the LED driving capabilities of the MCP1643 when supplied from one AA battery.



**FIGURE 1-1:** Typical MCP1643 Boost Converter Single Cell Battery Input.

### 1.3 WHAT IS THE MCP1643 SYNCHRONOUS BOOST LED CONSTANT CURRENT REGULATOR EVALUATION BOARD?

The MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board is used to evaluate and demonstrate Microchip Technology's MCP1643 device. This board demonstrates the MCP1643 in a boost converter application supplied by one AA battery, or from an external voltage source, which drives an LED with four selectable currents. The MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board was developed to help engineers reduce the product design cycle time.

Four output currents can be selected: 25,50,75 and 100mA. The output current can be changed with a dual switch that changes the external LED current sense equivalent resistance (for the position of the switches and output current see [Table 2-1.](#))

An enable switch is used to enable and disable the converter. When enabled, the MCP1643 will regulate the output current; when disabled, the MCP1643 disconnects the path from input to output for "true-disconnect". In this state, the current consumed from the battery is 1.2  $\mu$ A, typically.

### 1.4 MCP1643 SYNCHRONOUS BOOST LED CONSTANT CURRENT REGULATOR EVALUATION BOARD KIT CONTENTS

This MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board kit includes the following items:

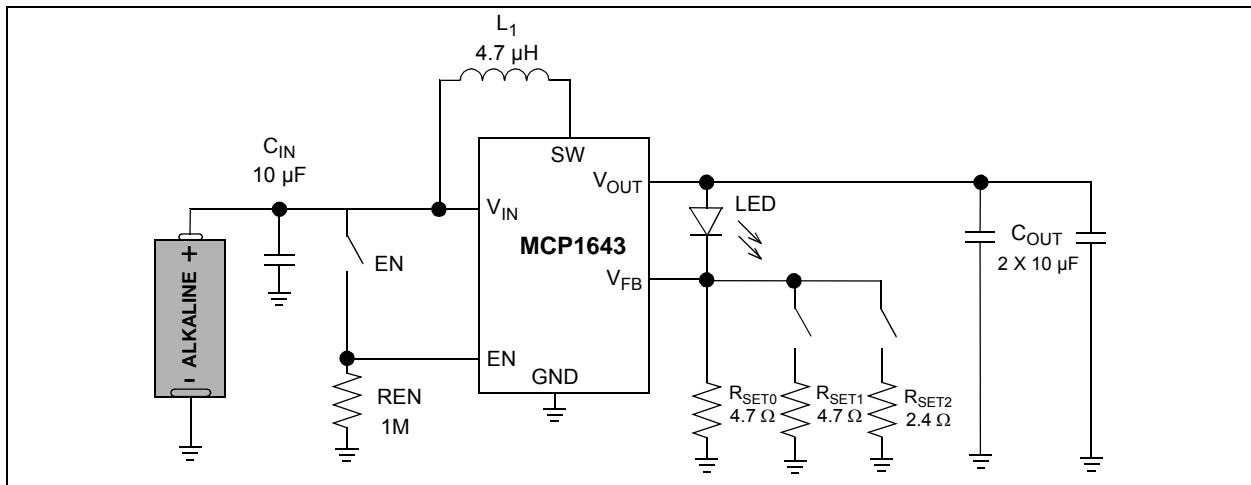
- MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board (ADM00435)
- Important Information Sheet

## Chapter 2. Installation and Operation

### 2.1 INTRODUCTION

The MCP1643 has been developed for applications that require driving an LED from a low-voltage source. The Microchip low-voltage technology allows the device to start up from a low 0.65V input voltage without output overshoot. At the same time, the device is capable of achieving high efficiency by integrating the low resistance N-Channel Boost switch and the synchronous P-Channel switch and by using a low voltage reference (0.120V) to reduce the power dissipation on the sensing resistor. Another important feature is that the device integrates the compensation and protection circuitry, so that the final solution will require a minimum number of additional components.

When disabled using the EN switch, the true disconnect option removes the normal boost topology path from input to output.



**FIGURE 2-1:** Synchronous Boost 25, 50, 75, 100 mA Constant Current Application.

#### 2.1.1 MCP1643 Evaluation Board Features

The MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board has the following features:

- It can be powered by one-cell Alkaline, NiCd, or NiMH batteries, or by external power supply
- Input voltage range,  $V_{IN}$ : 0.5V to 2.5V, with  $V_{IN} < V_{OUT}$ , after start-up
- Start-up voltage: 0.65V
- Fixed output current: 25 mA, 50 mA, 75 mA or 100 mA, selected using a mini-dip switch on board
- PWM Switching Frequency: 1 MHz
- Enable state selectable using mini-dip switch on board
- 1.6A Peak Input Current Limit
- Overtemperature Protection (if the die temperature exceeds 150°C, 25°C hysteresis)
- Mechanical battery reverse polarity protection

**Note:** For  $V_{IN} < V_{OUT}$ ,  $I_{LED}$  remains in regulation up to  $V_{IN} = V_{LED} @ LED$  typical  $V_F$  and  $I_F$ .

## 2.2 GETTING STARTED

The MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board is fully assembled and tested to evaluate and demonstrate the MCP1643 product. This board requires the use of an external power supply or an AA battery.

### 2.2.1 Power Input and Output Connection

#### 2.2.1.1 POWERING THE MCP1643 SYNCHRONOUS BOOST LED CONSTANT CURRENT REGULATOR EVALUATION BOARD

Soldered test points are available for input voltage connections. The maximum input voltage should not exceed 2.5V. The output current will not remain in regulation for input voltages that are greater than, or equal to, the forward voltage of the LED. White LEDs have  $V_F$  typical between 2.5 and 3.5V, depending on the LED drive current.

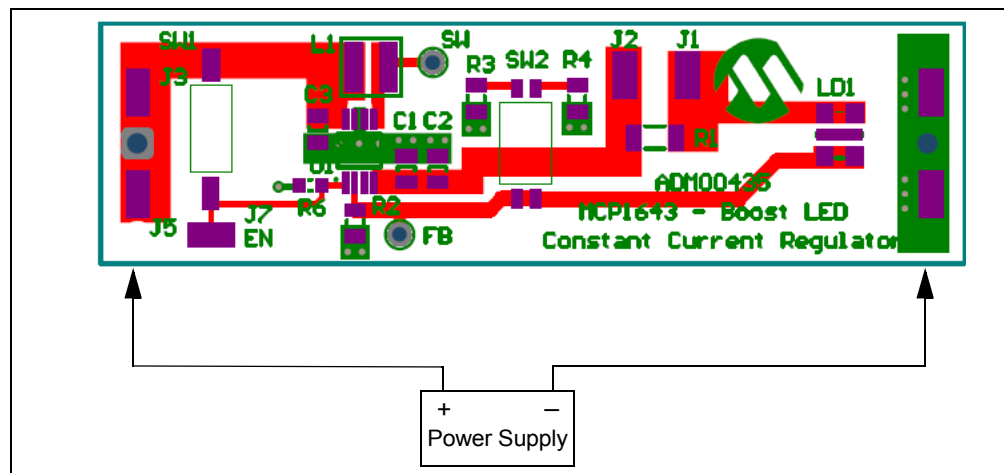
The MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board was designed to be used in the process of validating the device. The package selected for the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board is the MSOP-8.

SW1 is the Enable switch, which gives the state of the converter, ON or OFF. A soldered test point that can be used for PWM dimming is also available for the EN pin. The second switch is used to modify the value of the sense resistor, in order to modify the LED current and achieve analog dimming (for the position of the switches and output current, see Table 2-1).

#### 2.2.1.2 BOARD POWER UP PROCEDURE

1. Connect the input supply as shown in Figure 2-2 or connect an AA battery in the battery holder on the bottom of the board.
2. Use SW1 to change the state of the converter from ON to OFF.
3. Change the value of the output current using SW2. There are four available currents: 25 mA, 50 mA, 75 mA and 100 mA.

Additional test points are available to visualize different signals (SW, output current, FB) or to modify the output current by dimming, using the EN pin. Note: Due to the holder reverse polarity protection, the battery can only be inserted in the correct position.



**FIGURE 2-2:** MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board Setup.


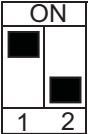


## 2.2.1.3 ADJUSTABLE LED CURRENT SETTING BY RECALCULATING THE SENSE RESISTOR

The Sense Resistor is used to modify the value of the output current. The value for the sense resistor can be calculated using the following equation:

$$R_2 = V_{FB}/I_{LED}$$

Where:  $V_{FB} = 0.120V$

**TABLE 2-1: LED CURRENT SELECTION**

Switch Position	LED Current
	25 mA
	50 mA
	75 mA
	100 mA

**Note:** If the sense resistor is recalculated, the switch used for current selection will not be used, as it will add a resistor in parallel with the calculated component. When recalculating the sense resistor, check the Maximum Limits for  $I_{LED}$  in the Regulation graph available in the data-sheet.

## 2.2.1.4 ADJUSTABLE LED CURRENT SETTING BY USING THE EN PIN (PWM DIMMING)

The MCP1643 allows PWM dimming by turning the LED ON or OFF with a variable duty cycle PWM signal applied to the EN pin. The maximum frequency for dimming is limited by the internal soft-start of 240  $\mu s$  typical. By varying the duty cycle of the PWM signal applied on EN input, the LED current is changing linearly and the light intensity changes as well.

A 0 $\Omega$  R1 resistor is used for bench testing. By removing R1, the soldered test points can be used to either insert a multimeter to measure the LED current, or create a loop and visualize the current through the LED by using an oscilloscope current probe.

**NOTES:**





# MCP1643 SYNCHRONOUS BOOST LED CONSTANT CURRENT REGULATOR EVALUATION BOARD USER'S GUIDE

---

---

## Appendix A. Schematic and Layouts

---

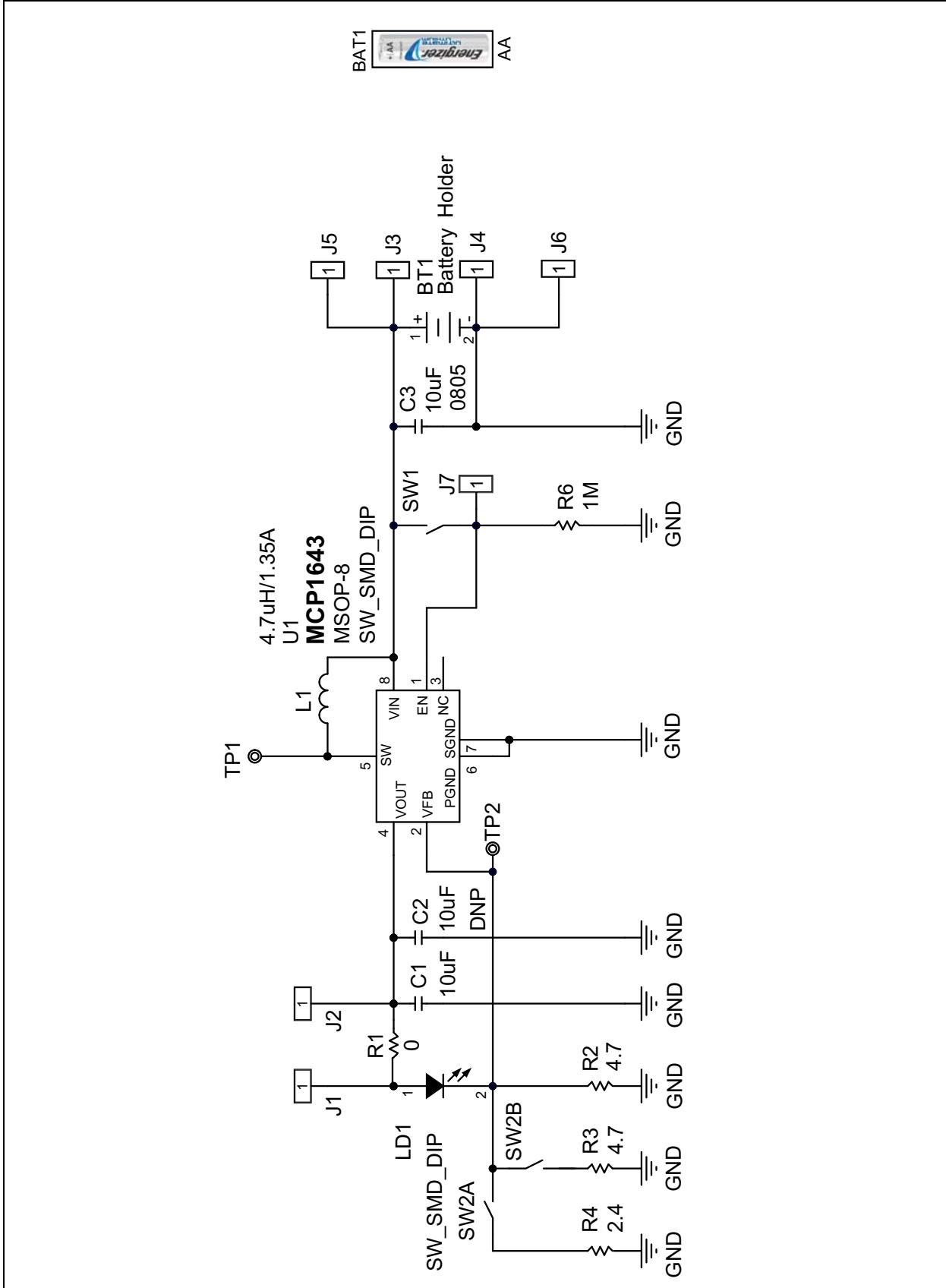
---

### A.1 INTRODUCTION

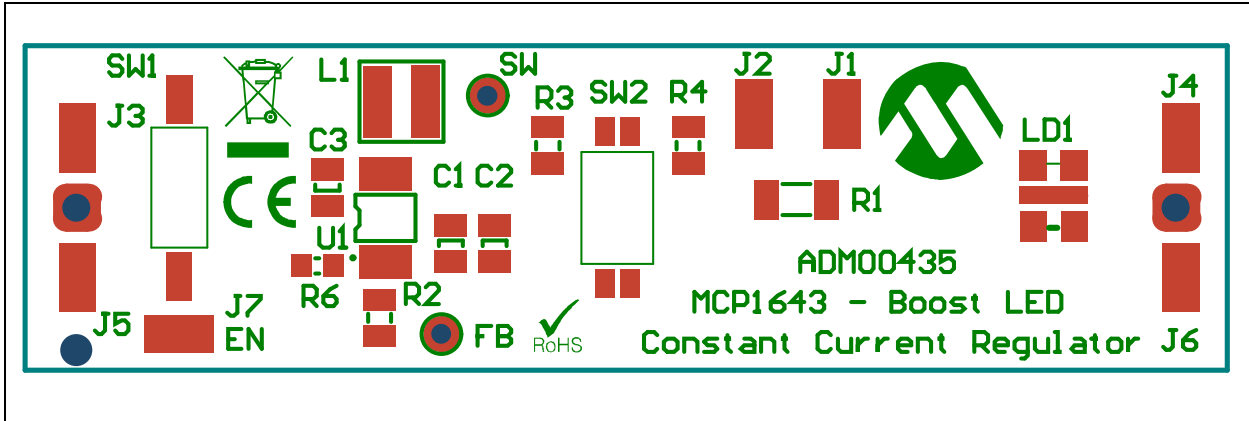
This appendix contains the following schematics and layouts for the MCP1643 Synchronous Boost LED Constant Current Regulator Evaluation Board:

- [Board – Schematic](#)
- [Board – Top Silk and Pads](#)
- [Board – Top Copper](#)
- [Board – Bottom Copper](#)

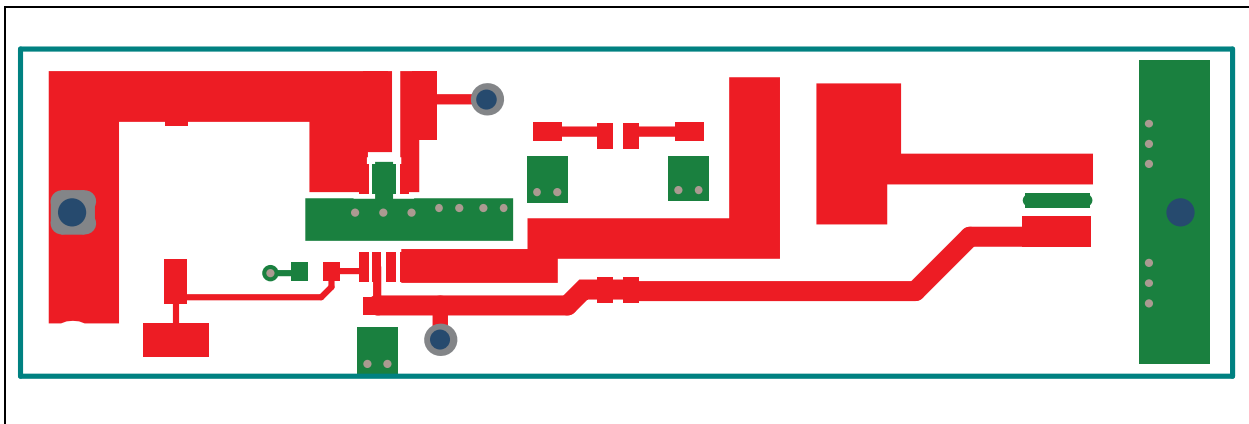
A.2 BOARD – SCHEMATIC



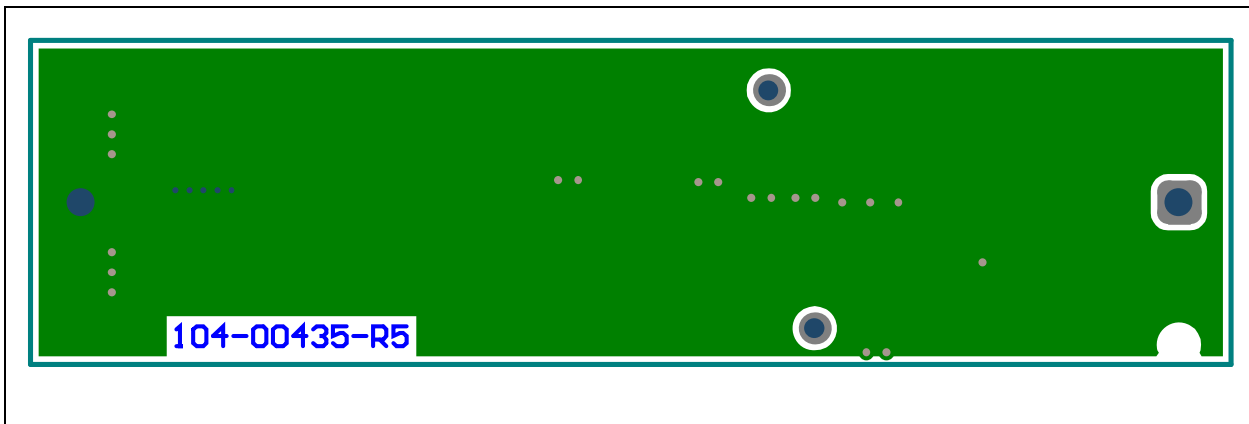
## A.3 BOARD – TOP SILK AND PADS



## A.4 BOARD – TOP COPPER



## A.5 BOARD – BOTTOM COPPER



**NOTES:**



# MCP1643 SYNCHRONOUS BOOST LED CONSTANT CURRENT REGULATOR EVALUATION BOARD USER'S GUIDE

## Appendix B. Bill of Materials

TABLE B-1: BILL OF MATERIALS (BOM)

Qty.	Reference	Description	Manufacturer	Part Number
1	BT1	Holder Battery AA Polar Protection	MPD (Memory Protection Devices)/Keystone	BHAA-POL
2	C1, C3	Cap. Ceramic 10 UF 10V 10% X7R 0805	Murata Electronics® North America	GRM21BR71A106KE51L
7	J1, J2, J3, J4, J5, J6, J7	PC Test Point Tin SMD	Harwin Plc.	S1751-46R
1	L1	Choke, TPC 2828, 4.7UH 20% 1.35A	Würth Elektronik Group	744025004
1	LD1	LED, Hi Bright, 51.7LM, Warm White	Cree, Inc.	MLEAWT-A1-R250-0004E5
1	R1	Resistor, 1206 0R0	Welwyn Components	WCR1206-R005JI
3	R4	Resistor, 0805, 2R4 5%, 0.125W	Panasonic - ECG	ERJ-6RQF2R4V
1	R6	Resistor, 1M Ohm 1/10W 1% 0603 SMD	Panasonic - ECG	ERJ-3EKF1004V
1	SW1	2.54 mm SW_SMD_DIP	Würth Elektronik Group	418121270801
1	SW2	1.27 mm SW_SMD_DIP	Würth Elektronik Group	416131160802
2	R2, R3	Resistor, 0805, 4R7 5%, 0.125W	Panasonic - ECG	ERJ-B3BF4R7V-ND
1	U1	LED Driver, Boost Converter	Microchip Technology Inc.	MCP1643-I/MS
1	BAT1	Battery Lithium AA Cell 1.5 Volt	Energizer Battery Company	L91
1	C2	Cap. Ceramic 10uF 10V 10% X7R 0805 - <b>DO NOT POPULATE</b>	Murata Electronics® North America	GRM21BR71A106KE51L

**Note 1:** The components listed in this Bill of Materials are representative of the PCB assembly. The released BOM used in manufacturing uses all RoHS-compliant components.



# MICROCHIP

## Worldwide Sales and Service

### AMERICAS

**Corporate Office**  
2355 West Chandler Blvd.  
Chandler, AZ 85224-6199  
Tel: 480-792-7200  
Fax: 480-792-7277  
Technical Support:  
<http://www.microchip.com/support>  
Web Address:  
[www.microchip.com](http://www.microchip.com)

**Atlanta**  
Duluth, GA  
Tel: 678-957-9614  
Fax: 678-957-1455

**Boston**  
Westborough, MA  
Tel: 774-760-0087  
Fax: 774-760-0088

**Chicago**  
Itasca, IL  
Tel: 630-285-0071  
Fax: 630-285-0075

**Cleveland**  
Independence, OH  
Tel: 216-447-0464  
Fax: 216-447-0643

**Dallas**  
Addison, TX  
Tel: 972-818-7423  
Fax: 972-818-2924

**Detroit**  
Farmington Hills, MI  
Tel: 248-538-2250  
Fax: 248-538-2260

**Indianapolis**  
Noblesville, IN  
Tel: 317-773-8323  
Fax: 317-773-5453

**Los Angeles**  
Mission Viejo, CA  
Tel: 949-462-9523  
Fax: 949-462-9608

**Santa Clara**  
Santa Clara, CA  
Tel: 408-961-6444  
Fax: 408-961-6445

**Toronto**  
Mississauga, Ontario,  
Canada  
Tel: 905-673-0699  
Fax: 905-673-6509

### ASIA/PACIFIC

**Asia Pacific Office**  
Suites 3707-14, 37th Floor  
Tower 6, The Gateway  
Harbour City, Kowloon  
Hong Kong  
Tel: 852-2401-1200  
Fax: 852-2401-3431

**Australia - Sydney**  
Tel: 61-2-9868-6733  
Fax: 61-2-9868-6755

**China - Beijing**  
Tel: 86-10-8569-7000  
Fax: 86-10-8528-2104

**China - Chengdu**  
Tel: 86-28-8665-5511  
Fax: 86-28-8665-7889

**China - Chongqing**  
Tel: 86-23-8980-9588  
Fax: 86-23-8980-9500

**China - Hangzhou**  
Tel: 86-571-2819-3187  
Fax: 86-571-2819-3189

**China - Hong Kong SAR**  
Tel: 852-2943-5100  
Fax: 852-2401-3431

**China - Nanjing**  
Tel: 86-25-8473-2460  
Fax: 86-25-8473-2470

**China - Qingdao**  
Tel: 86-532-8502-7355  
Fax: 86-532-8502-7205

**China - Shanghai**  
Tel: 86-21-5407-5533  
Fax: 86-21-5407-5066

**China - Shenyang**  
Tel: 86-24-2334-2829  
Fax: 86-24-2334-2393

**China - Shenzhen**  
Tel: 86-755-8864-2200  
Fax: 86-755-8203-1760

**China - Wuhan**  
Tel: 86-27-5980-5300  
Fax: 86-27-5980-5118

**China - Xian**  
Tel: 86-29-8833-7252  
Fax: 86-29-8833-7256

**China - Xiamen**  
Tel: 86-592-2388138  
Fax: 86-592-2388130

**China - Zhuhai**  
Tel: 86-756-3210040  
Fax: 86-756-3210049

### ASIA/PACIFIC

**India - Bangalore**  
Tel: 91-80-3090-4444  
Fax: 91-80-3090-4123

**India - New Delhi**  
Tel: 91-11-4160-8631  
Fax: 91-11-4160-8632

**India - Pune**  
Tel: 91-20-3019-1500

**Japan - Osaka**  
Tel: 81-6-6152-7160  
Fax: 81-6-6152-9310

**Japan - Tokyo**  
Tel: 81-3-6880-3770  
Fax: 81-3-6880-3771

**Korea - Daegu**  
Tel: 82-53-744-4301  
Fax: 82-53-744-4302

**Korea - Seoul**  
Tel: 82-2-554-7200  
Fax: 82-2-558-5932 or  
82-2-558-5934

**Malaysia - Kuala Lumpur**  
Tel: 60-3-6201-9857  
Fax: 60-3-6201-9859

**Malaysia - Penang**  
Tel: 60-4-227-8870  
Fax: 60-4-227-4068

**Philippines - Manila**  
Tel: 63-2-634-9065  
Fax: 63-2-634-9069

**Singapore**  
Tel: 65-6334-8870  
Fax: 65-6334-8850

**Taiwan - Hsin Chu**  
Tel: 886-3-5778-366  
Fax: 886-3-5770-955

**Taiwan - Kaohsiung**  
Tel: 886-7-213-7828  
Fax: 886-7-330-9305

**Taiwan - Taipei**  
Tel: 886-2-2508-8600  
Fax: 886-2-2508-0102

**Thailand - Bangkok**  
Tel: 66-2-694-1351  
Fax: 66-2-694-1350

### EUROPE

**Austria - Wels**  
Tel: 43-7242-2244-39  
Fax: 43-7242-2244-393

**Denmark - Copenhagen**  
Tel: 45-4450-2828  
Fax: 45-4485-2829

**France - Paris**  
Tel: 33-1-69-53-63-20  
Fax: 33-1-69-30-90-79

**Germany - Munich**  
Tel: 49-89-627-144-0  
Fax: 49-89-627-144-44

**Italy - Milan**  
Tel: 39-0331-742611  
Fax: 39-0331-466781

**Netherlands - Drunen**  
Tel: 31-416-690399  
Fax: 31-416-690340

**Spain - Madrid**  
Tel: 34-91-708-08-90  
Fax: 34-91-708-08-91

**UK - Wokingham**  
Tel: 44-118-921-5869  
Fax: 44-118-921-5820

08/20/13

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкуренеспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)  
Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)