



MICROCHIP

MCP1632
300 kHz Boost Converter
Demo 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in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates.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, PIC³² 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.

© 2014, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

ISBN: 978-1-62077-8401

**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[®] MCUs and dsPIC[®] DSCs, KEELOQ[®] 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: MCP1632 300 kHz Boost Converter Demo Board User's Guide

EU Declaration of Conformity

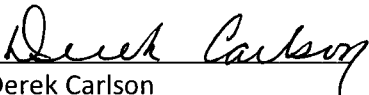
This declaration of conformity is issued by the manufacturer.

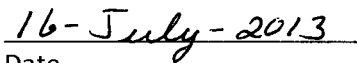
The development/evaluation tool is designed to be used for research and development in a laboratory environment. This development/evaluation tool is not intended to be a finished appliance, nor is it intended for incorporation into finished appliances that are made commercially available as single functional units to end users. This development/evaluation tool complies with EU EMC Directive 2004/108/EC and as supported by the European Commission's Guide for the EMC Directive 2004/108/EC (8th 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.

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


Derek Carlson
VP Development Tools


Date

MCP1632 300 kHz Boost Converter Demo Board User's Guide

NOTES:



MCP1632 300 KHZ BOOST CONVERTER DEMO BOARD USER'S GUIDE

Table of Contents

Preface	7
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
Chapter 1. Product Overview	
1.1 Introduction	11
1.2 Short Overview: MCP1632 PWM Controller	11
1.3 What is the MCP1632 300 kHz Boost Converter Demo Board?	12
1.4 What is Contained in the MCP1632 300 kHz Boost Converter Demo Board Kit?	12
Chapter 2. Installation and Operation	
2.1 Introduction	13
2.2 Getting Started	13
Appendix A. Schematic and Layouts	
A.1 Introduction	17
A.2 Board – Schematic	18
A.3 Board – Top Silk	19
A.4 Board – Top Copper and Silk	20
A.5 Board – Top Copper	21
A.6 Board – Bottom Cooper	22
A.7 Board – Bottom Copper and Silk	23
A.8 Board – Bottom Silk	24
Appendix B. Bill of Materials	
Appendix C. Typical Performance Data, Curves and Waveforms	
C.1 Performance Overview	27
Worldwide Sales and Service	32

MCP1632 300 kHz Boost Converter Demo Board User's Guide

NOTES:



MCP1632 300 KHZ BOOST CONVERTER DEMO 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) 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 MCP1632 300 kHz Boost Converter Demo 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 MCP1632 300 kHz Boost Converter Demo Board as a development tool to emulate and debug firmware on a target board. The manual layout is as follows:

- **Chapter 1. “Product Overview”** – Shows a brief description of the MCP1632 300 kHz Boost Converter Demo Board.
- **Chapter 2. “Installation and Operation”** – Includes instructions on how to get started with the MCP1632 300 kHz Boost Converter Demo Board.
- **Appendix A. “Schematic and Layouts”** – Shows the schematic and layout diagrams for the MCP1632 300 kHz Boost Converter Demo Board.
- **Appendix B. “Bill of Materials”** – Lists the parts used to build the MCP1632 300 kHz Boost Converter Demo Board.
- **Appendix C. “Typical Performance Data, Curves and Waveforms”** – Shows the typical performance graphs.

MCP1632 300 kHz Boost Converter Demo Board User's Guide

CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION CONVENTIONS

Description	Represents	Examples
Arial font:		
Italic characters	Referenced books	<i>MPLAB[®] 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>Save</i></u>
Bold characters	A dialog button	Click OK
	A tab	Click the Power 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>
Courier New font:		
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 MCP1632 300 kHz Boost Converter Demo Board. Other useful documents are listed below. The following Microchip documents are available and recommended as supplemental reference resources.

- **MCP1632 Data Sheet – “High-Speed Low-Side PWM Controller” (DS20005254)**

THE MICROCHIP WEB SITE

Microchip provides online support via our web site at 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 (January 2014)

- Initial Release of this Document.

MCP1632 300 kHz Boost Converter Demo Board User's Guide

NOTES:



MCP1632 300 KHZ BOOST CONVERTER DEMO BOARD USER'S GUIDE

Chapter 1. Product Overview

1.1 INTRODUCTION

This chapter provides an overview of the MCP1632 300 kHz Boost Converter Demo Board and covers the following topics:

- Short Overview: MCP1632 PWM Controller
- What is the MCP1632 300 kHz Boost Converter Demo Board?
- What is Contained In the MCP1632 300 kHz Boost Converter Demo Board Kit?

1.2 SHORT OVERVIEW: MCP1632 PWM CONTROLLER

The MCP1632 is a high-speed, Current Mode PWM controller intended for applications that require low-side MOSFET control, such as the Boost, Flyback or SEPIC converters. The MCP1632 converter integrates all the blocks necessary to develop a standalone switch-mode power supply. The MCP1632 PWM controller offers great flexibility to designers, as the power train can be tailored for various applications and power levels. The MCP1632 converter includes: internal oscillator with two options for switching frequency (300 kHz and 600 kHz), adjustable reference voltage generator and adjustable soft-start time, internal ramp generator for slope compensation and blanking circuit for current sense (CS) signal, and an Undervoltage Lockout circuit (UVLO). The MCP1632 PWM converter can be easily interfaced with PIC[®] microcontrollers in order to develop intelligent solutions. The MCP1632 converter accepts input bias voltages between 3V and 5.5V. For larger input voltages, a linear voltage regulator can be used to provide the necessary bias voltage.

Typical applications include: general purpose DC-DC converters, LED drivers, batteries chargers and bias generators.

MCP1632 300 kHz Boost Converter Demo Board User's Guide

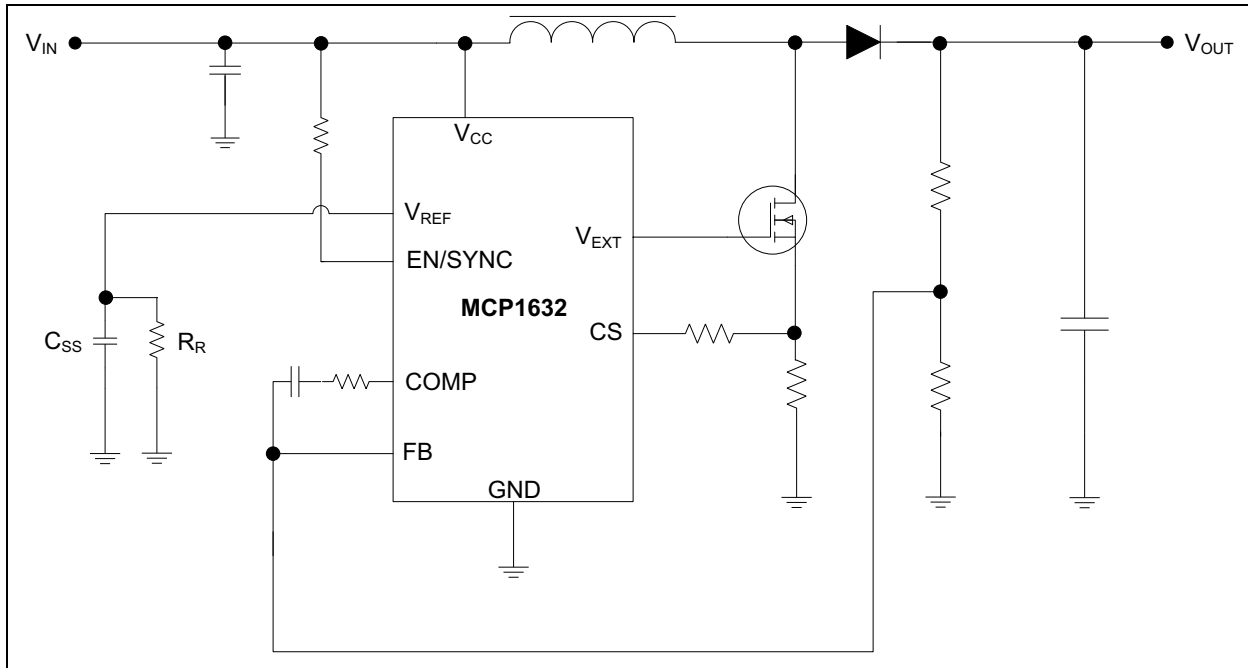


FIGURE 1-1: MCP1632 Typical Application for Peak Current Mode Control.

1.3 WHAT IS THE MCP1632 300 KHZ BOOST CONVERTER DEMO BOARD?

The MCP1632 300 kHz Boost Converter Demo Board is a compact, highly efficient, step-up voltage converter that will convert the input voltage rail (typically 5V) to a regulated 12V output voltage. The maximum output current for this demo board is 0.9A. The board demonstrates the capabilities of the MCP1632 PWM controller. Test points for various signals are provided for measuring different parameters of the converter. The demo board can be modified to support output voltages from 9V to 15V by changing a single resistor.

1.4 WHAT IS CONTAINED IN THE MCP1632 300 KHZ BOOST CONVERTER DEMO BOARD KIT?

This MCP1632 300 kHz Boost Converter Demo Board kit includes the following items:

- MCP1632 300 kHz Boost Converter Demo Board (ADM00530)
- Important Information Sheet

Chapter 2. Installation and Operation

2.1 INTRODUCTION

The MCP1632 300 kHz Boost Converter Demo Board was developed to provide a compact, low-cost and highly efficient step-up conversion for low output currents.

The key features of this board include:

- Input Voltage Range: 3.6V to 5.5V
- Output Voltage: 12V (can be adjusted between 9V and 15V by changing a single resistor)
- Maximum Output Current: 0.9A
- 90% typical efficiency at 12V/0.8A output and 5V input
- 300 kHz fixed switching frequency
- Overcurrent Protection for MOSFETs
- Shutdown input for placing the converter in low-power Standby mode
- Undervoltage Lockout (UVLO) with 2.7V (Off) and 2.8V (On) typical thresholds

2.2 GETTING STARTED

The MCP1632 300 kHz Boost Converter Demo Board is fully assembled and tested to evaluate and demonstrate the capabilities of the MCP1632 PWM controller.

2.2.1 Necessary Instruments and Tools

- Adjustable DC Power Supply with 0V-6V/5 A_{DC} range output capability
- Electronic load with at least 1A current capability and load stepping capability
- Digital Oscilloscope with a minimum bandwidth of 50MHz
- Digital voltmeter/ammeter
- Optionally, a Network Analyzer/Bode Plot Analyzer for loop analysis
- Wires for connections; these wires must sustain high current, 4A for the connection between adjustable DC power supply and board, 1A for the connection between the board and the electronic load

2.2.2 Setup procedure

To power up the MCP1632 300 kHz Boost Converter Demo Board, the following steps must be completed:

1. Connect the Electronic Load to J3 connector of the demo board; the "Positive" (+) and "Negative" (-) connector pins are marked on the board silkscreen.
2. Connect the Adjustable DC Power Supply to J1 connector of the demo board; the "Positive" (+) and "Negative" (-) connector pins are marked on the board silkscreen.
3. The DC voltage supplied by the Adjustable DC Power Supply must be between 3.6V and 5.5V.

MCP1632 300 kHz Boost Converter Demo Board User's Guide

2.2.3 Board Testing

The typical testing setup is depicted in Figure 2-1. Table 2-1 shows all the available test points on the board.

The user can connect various instruments at the listed test points to evaluate the parameters of the converter. The typical performance data, curves and waveforms are presented in [Appendix C. "Typical Performance Data, Curves and Waveforms"](#). Note that some parameters vary with the input voltage (e.g., the maximum output current should not exceed 0.8A if the input voltage is below 4 V).

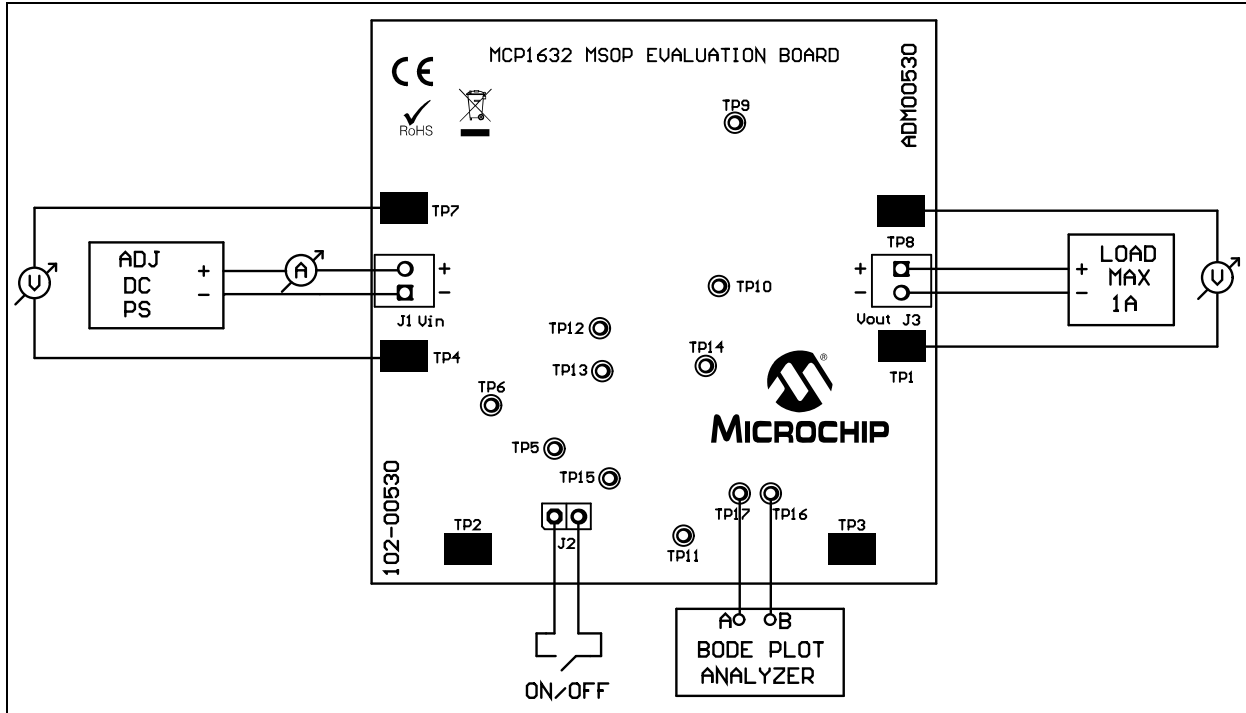


FIGURE 2-1: Typical Test Setup.

TABLE 2-1: TEST POINTS DESCRIPTION

Test Point	Label	Description
TP1, TP2, TP3, TP4	GND	Board GND
TP6, TP7	V_{IN}	Input voltage
TP5	SHDN	Shutdown input (EN pin of MCP1632)
TP14	CS	CS pin of MCP1632
TP12	MCS	MOSFET current sense resistor (R9)
TP10	DR	MOSFET drive signal (pin 6 of MCP1632)
TP9	SW	Main switch node (drain of Q1 MOSFET)
TP13	V_{REF}	Reference voltage (pin 8 of MCP1632)
TP8	V_{OUT}	Converter's output voltage
TP11	FB	Feedback voltage (pin 2 of MCP1632)
TP15	COMP	Output of the error amplifier (pin 2 of MCP1632)
TP16, TP17	CH B, CH A	Signal injection points for loop measurement

2.2.3.1 ADJUSTING THE OUTPUT VOLTAGE

The output voltage can be modified by changing the value of R8 from the feedback divider. The output voltage is set according to Equation 2-1.

EQUATION 2-1: OUTPUT VOLTAGE

$$V_{OUT} = V_{REF} \times \frac{R3 + R8}{R8}$$

Where:

$$\begin{aligned} V_{REF}(V) &= R5(\Omega) \times 50 \times 10^{-6} \\ R3 &= 20 \text{ k}\Omega \end{aligned}$$

Do not modify the value of the R3 resistor (20 kΩ) because this will affect the loop compensation of the system.

Some parameters, such as efficiency, the overcurrent protection thresholds and the input and output voltage ripple, can be affected by the modification of the output voltage.

Table 2-2 shows the standard value of the R8 resistor for several common output voltages.

TABLE 2-2: OUTPUT VOLTAGE VERSUS R8 VALUE (R3 = 20 kΩ)

V _{OUT} (V)	R8 (kΩ)	V _{REF} (V)
9	5.71	2
12	4.02	2
15	3.08	2

MCP1632 300 kHz Boost Converter Demo Board User's Guide

NOTES:



MCP1632 300 KHZ BOOST CONVERTER DEMO BOARD USER'S GUIDE

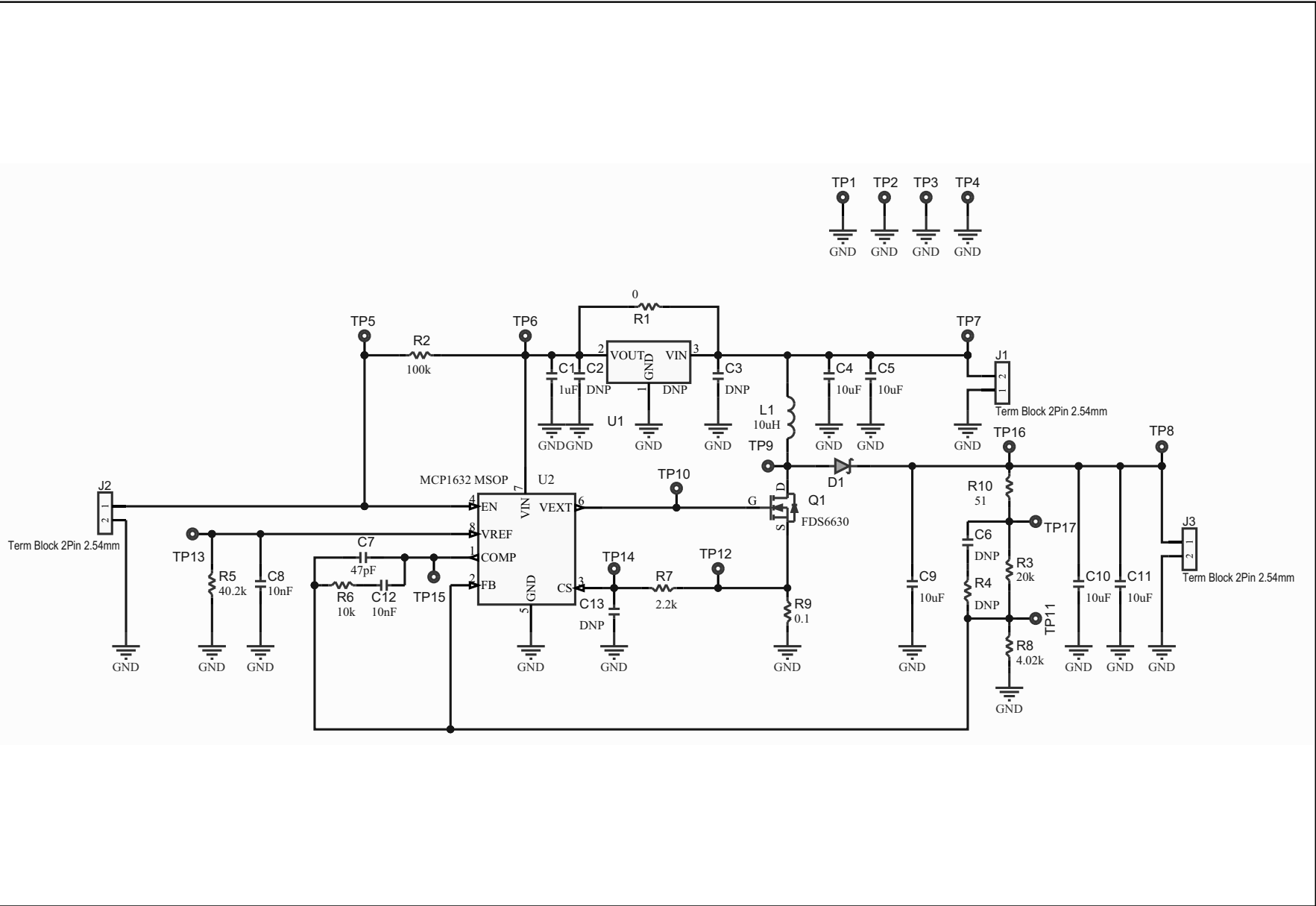
Appendix A. Schematic and Layouts

A.1 INTRODUCTION

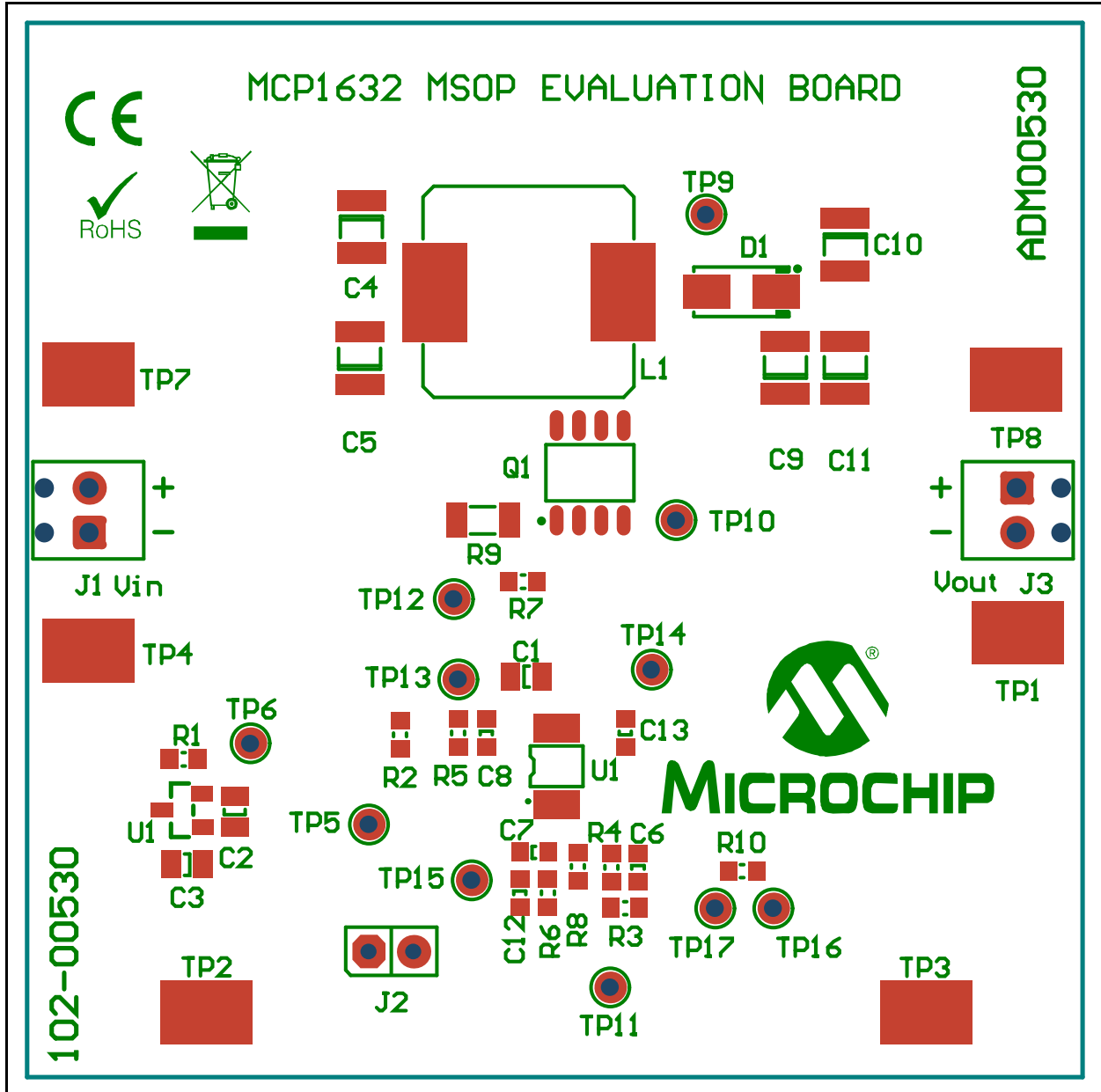
This appendix contains the following schematics and layouts for the MCP1632 300 kHz Boost Converter Demo Board:

- Board – Schematic
- Board – Top Silk
- Board – Top Copper and Silk
- Board – Top Copper
- Board – Bottom Cooper
- Board – Bottom Copper and Silk
- Board – Bottom Silk

A.2 BOARD – SCHEMATIC

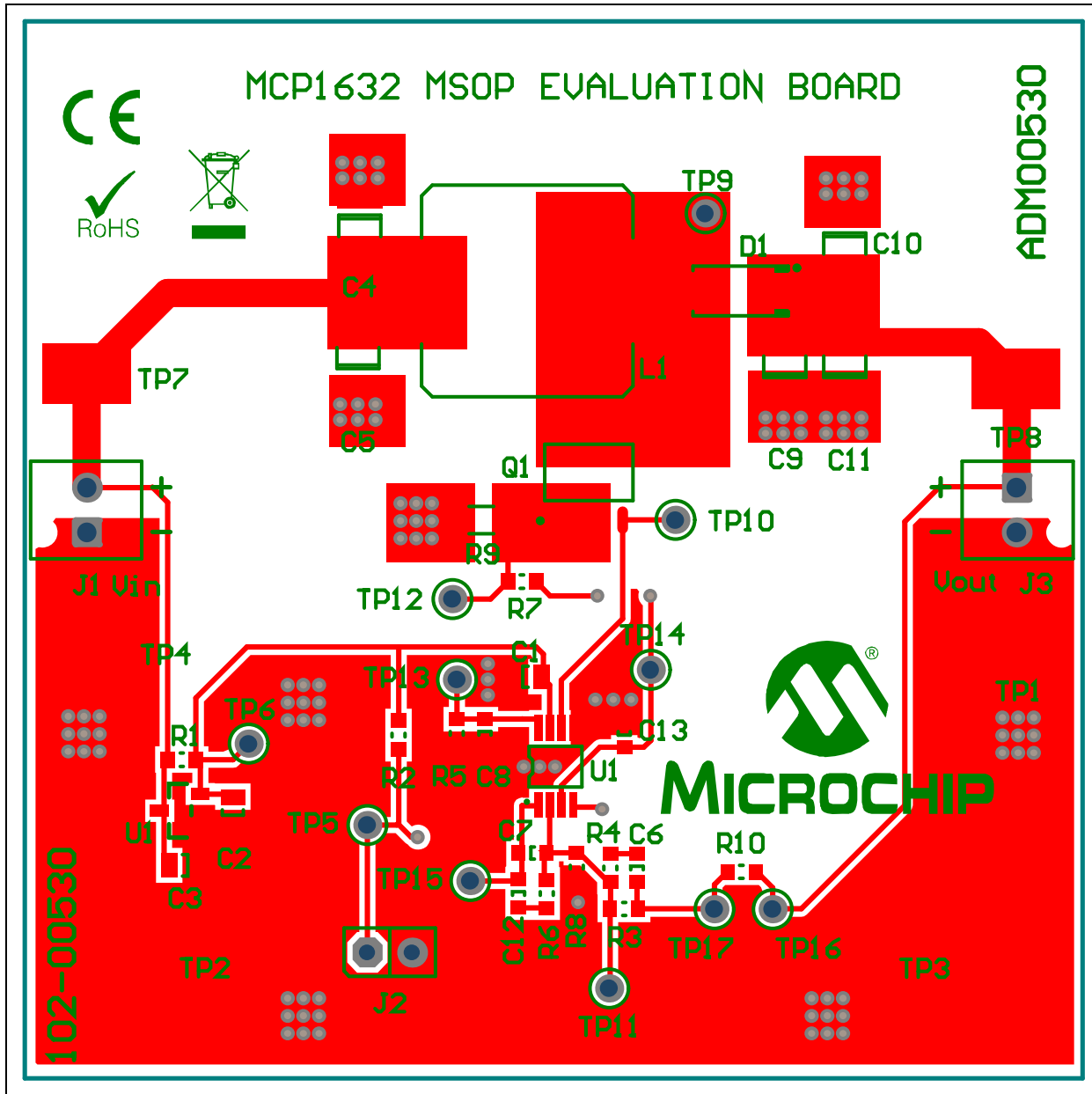


A.3 BOARD – TOP SILK

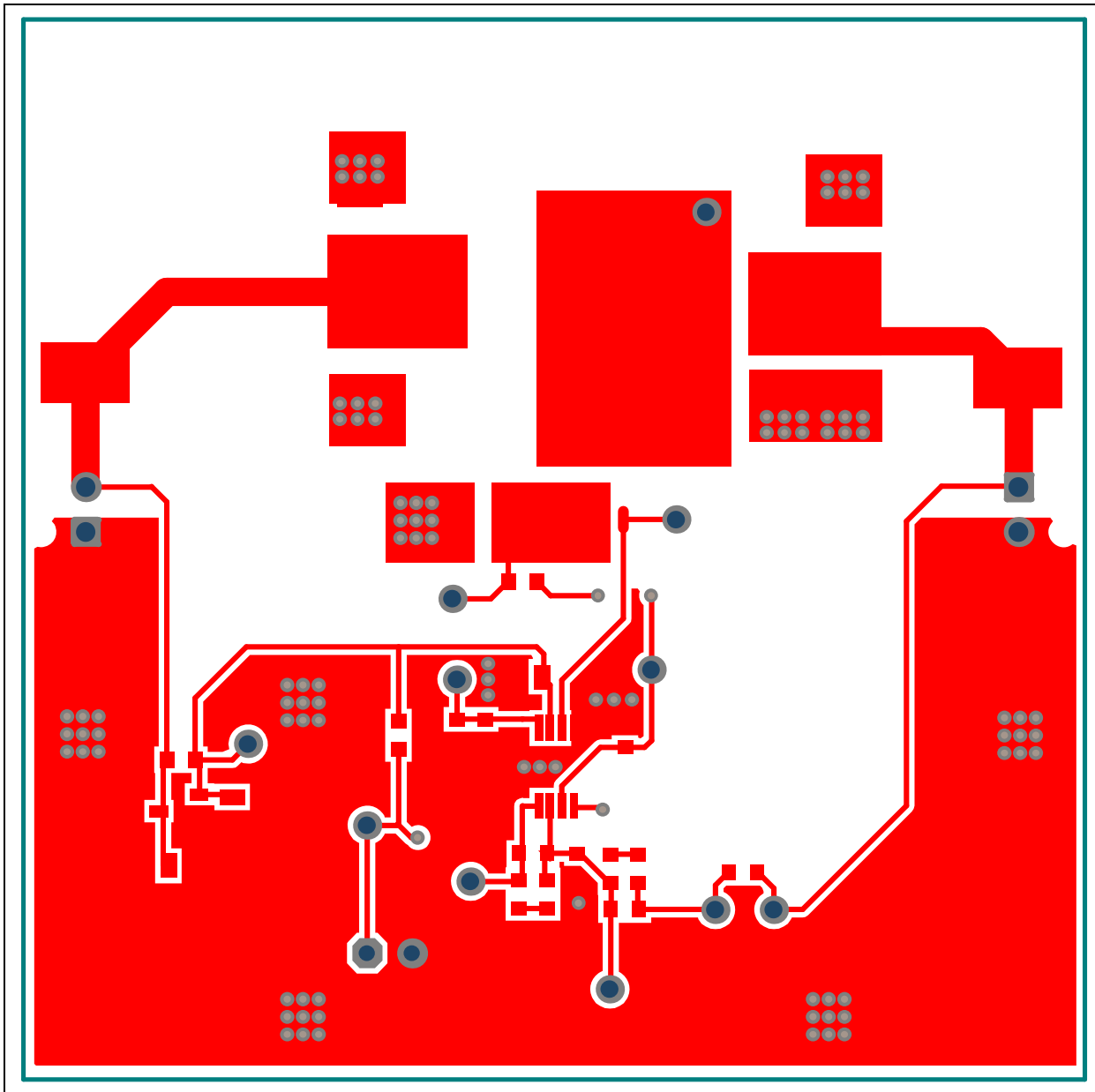


MCP1632 300 kHz Boost Converter Demo Board User's Guide

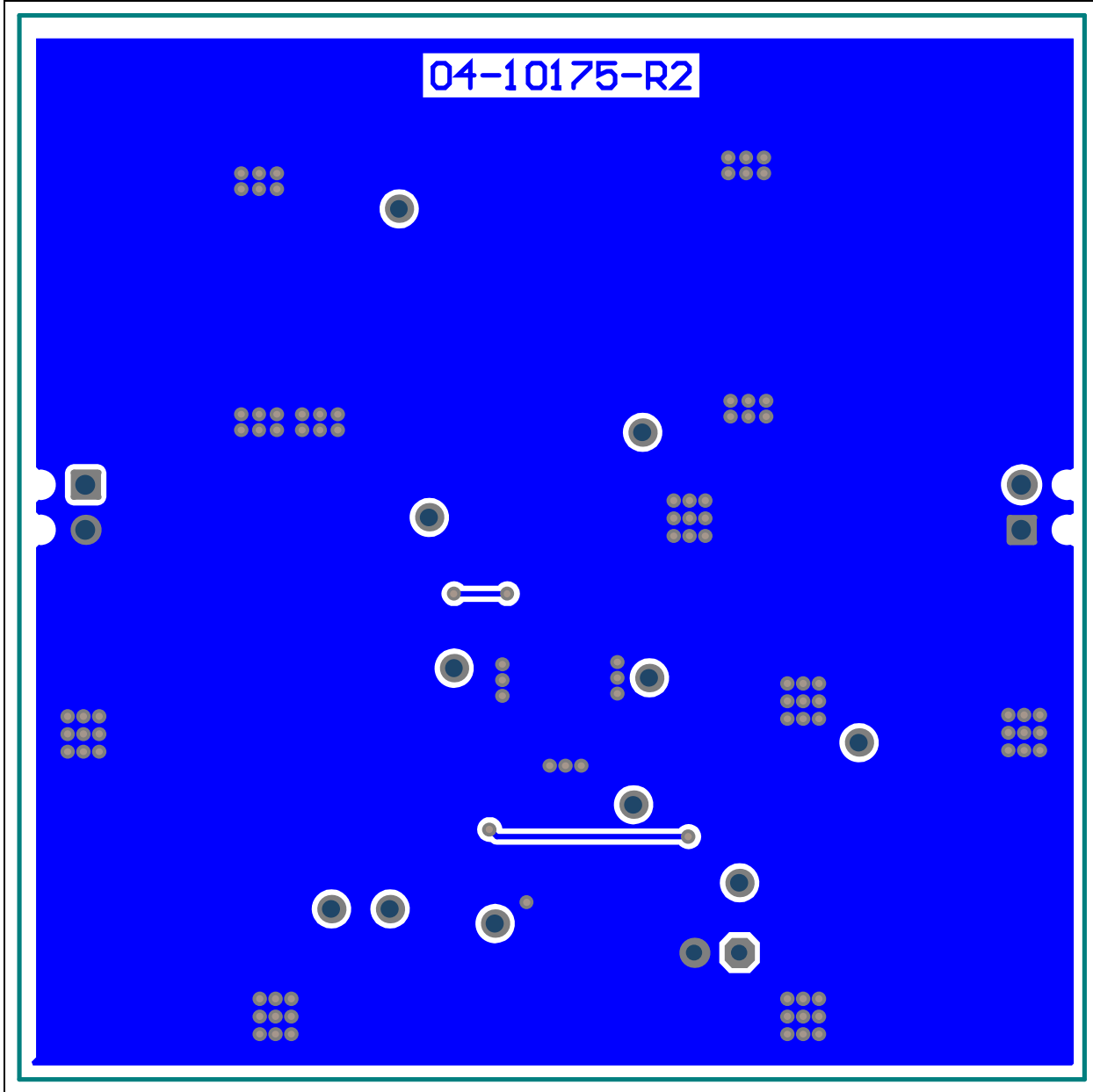
A.4 BOARD – TOP COPPER AND SILK



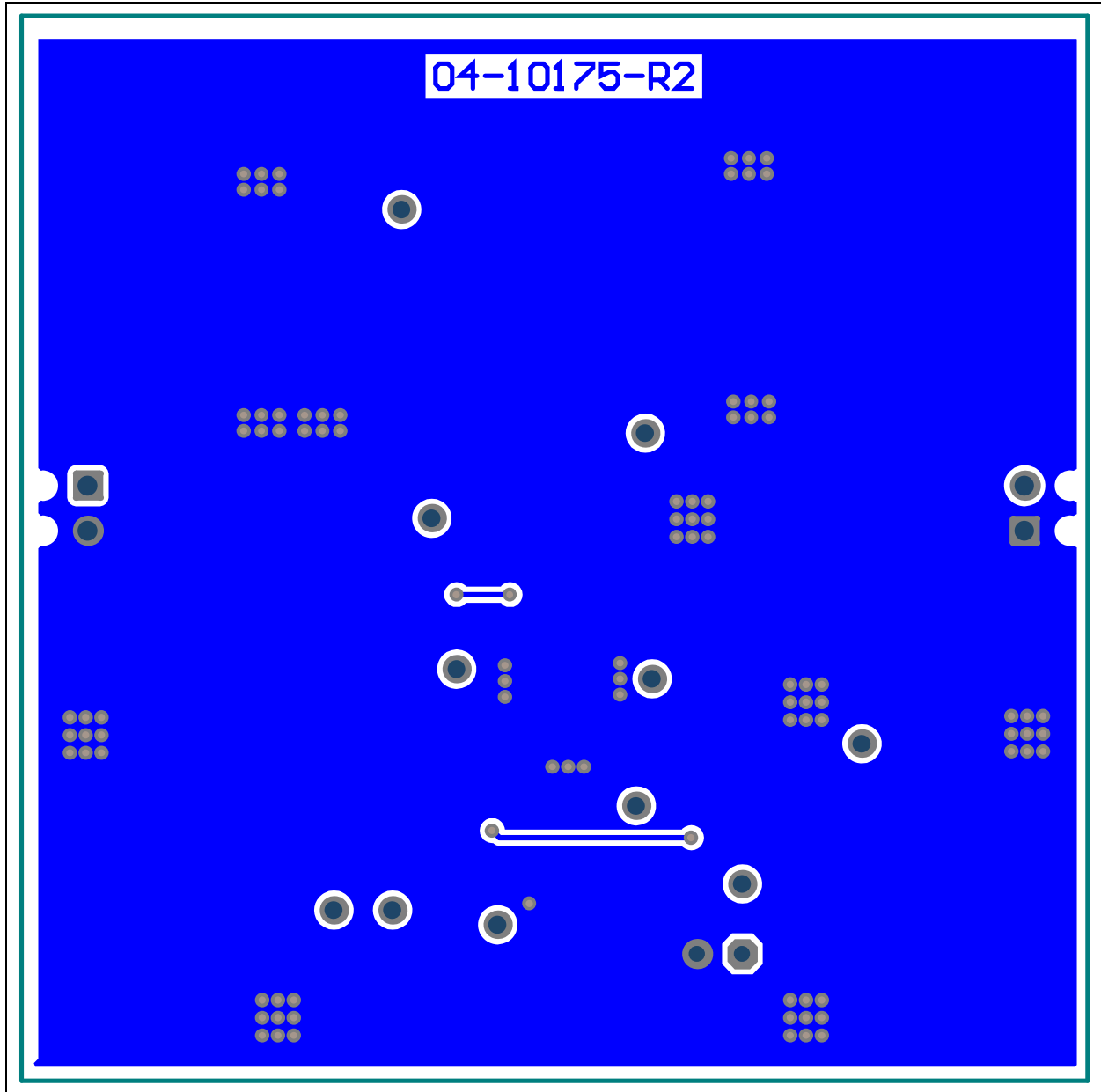
A.5 BOARD – TOP COPPER



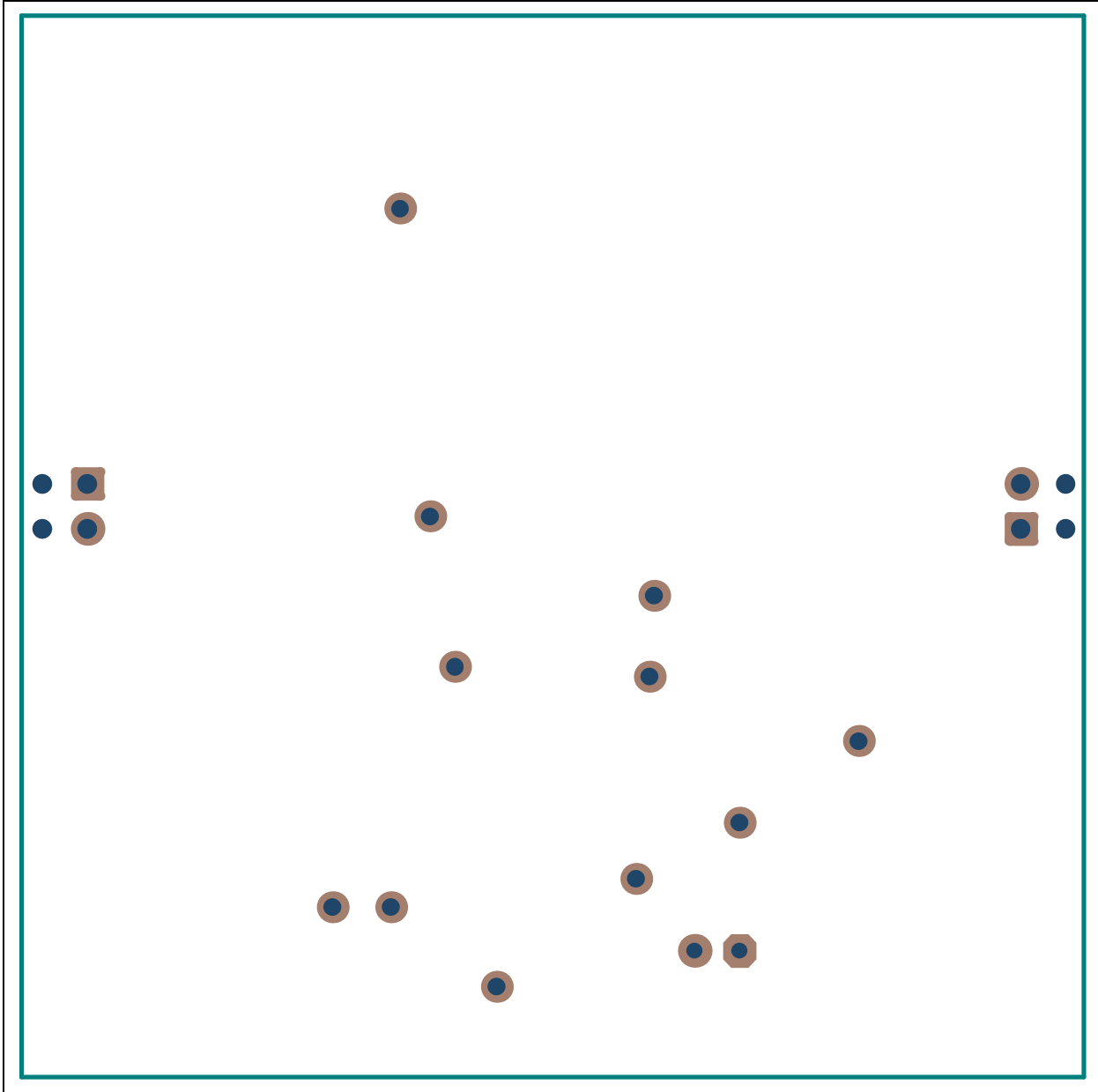
A.6 BOARD – BOTTOM COOPER



A.7 BOARD – BOTTOM COPPER AND SILK



A.8 BOARD – BOTTOM SILK





MCP1632 300 KHZ BOOST CONVERTER DEMO BOARD USER'S GUIDE

Appendix B. Bill of Materials

TABLE B-1: BILL OF MATERIALS (BOM)

Qty	Reference	Description	Manufacturer	Part Number
1	C1	Cap. ceramic 1 μ F 16V 10% X7R 0805	Yageo Corporation	CC0805KKX7R7BB105
0	C2 – C3, C6, C13	DO NOT POPULATE	—	—
2	C4 – C5	Cap. ceramic 10 μ F 16V 10% X7R 1210	Samsung Electro-Mechanics America, Inc.	CL32B106KOULNNE
1	C7	Cap. ceramic 47 pF 100V 5% COG 0603	AVX Corporation	06031A470JAT2A
2	C8, C12	Cap. ceramic 10000 pF 25V 5% NP0 0603	TDK Corporation	C1608C0G1E103J080AA
3	C9 – C11	Cap. ceramic 10 μ F 25V 10% X7R 1210	TDK Corporation	C3225X7R1E106K
1	D1	Diode Schottky 40V 2A DO214AC	Vishay	SSA24-E3/61T
2	J1, J3	Conn. term. block 2.54 MM 2 POS	Phoenix Contact GmbH & Co.	1725656
2	J2	Conn. header Vert. 0.100" Gold	TE Connectivity, Ltd.	5-146868-1
1	L1	Inductor power 10 UH 4.00A SMD	EPCOS AG	B82477G2103M
	PCB	Printed Circuit Board - MCP1632 300 kHz Boost Converter Demo Board	—	104-00530
1	Q1	MOSFET N-Ch. 30V 6.5A 8 SOIC	Fairchild Semiconductor®	FDS6630A
1	R1	Res. 0 Ω 1/10W 0603 SMD	Panasonic® - ECG	ERJ-3GEY0R00V
1	R2	Res. 100 k Ω 1/10W 1% 0603 SMD	Panasonic - ECG	ERJ-3EKF1003V
1	R3	Res. 20.0 k Ω 1/10W 1% 0603 SMD	Panasonic - ECG	ERJ-3EKF2002V
0	R4	DO NOT POPULATE	—	—
1	R5	Res. 40.2 k Ω 1/10W 1% 0603 SMD	Yageo Corporation	RC0603FR-0740K2L
1	R6	Res. 10.0 k Ω 1/8W 1% SMD 0603	Vishay	MCT06030C1002FP500
1	R7	Res. 2.20 k Ω 1/8W 1% SMD 0603	Vishay	MCT06030C2201FP500
1	R8	Res. 4.02 k Ω 1/10W 1% 0603 SMD	Yageo Corporation	RC0603FR-074K02L
1	R9	Res. 0.1 Ω 1/2W 1% 1206 SMD	Bourns®, Inc.	CRM1206-FX-R100ELF
1	R10	Res. 51.0 Ω 1/10W 1% 0603 SMD	Yageo Corporation	RC0603FR-0751RL
5	TP1, TP3 – TP4, TP7 – TP8	PC test point compact SMT	Keystone Electronics Corp.	5016
0	TP5 – TP6, TP9 – TP17	DO NOT POPULATE	—	—
0	U1	DO NOT POPULATE	—	—
1	U2	High-Speed Boost Controller	Microchip Technology Inc.	MCP1632-AAE/MS

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.

MCP1632 300 kHz Boost Converter Demo Board User's Guide

NOTES:

Appendix C. Typical Performance Data, Curves and Waveforms

C.1 PERFORMANCE OVERVIEW

This chapter shows some of the typical performance parameters and curves of the MCP1632 300 kHz Boost Converter Demo Board.

TABLE C-1: CONVERTER PARAMETERS

Parameter	Value	Comments
Input Voltage Range (V)	3.6 – 5.5	
Output Voltage (V)	12	±2.5% Tolerance
Maximum Output Current (A)	0.9	Steady State output current
Output Voltage Ripple (mV)	< 120	$V_{IN} = 5V, I_{OUT} = 0.85A$
Input Voltage Ripple (mV)	< 30	$V_{IN} = 5V, I_{OUT} = 0.85A$
Output Voltage Overshoot during Step Load (mV)	< 600	Step Load 0.3A to 0.8A
Switching Frequency (kHz)	250 – 350	Typical 300 kHz

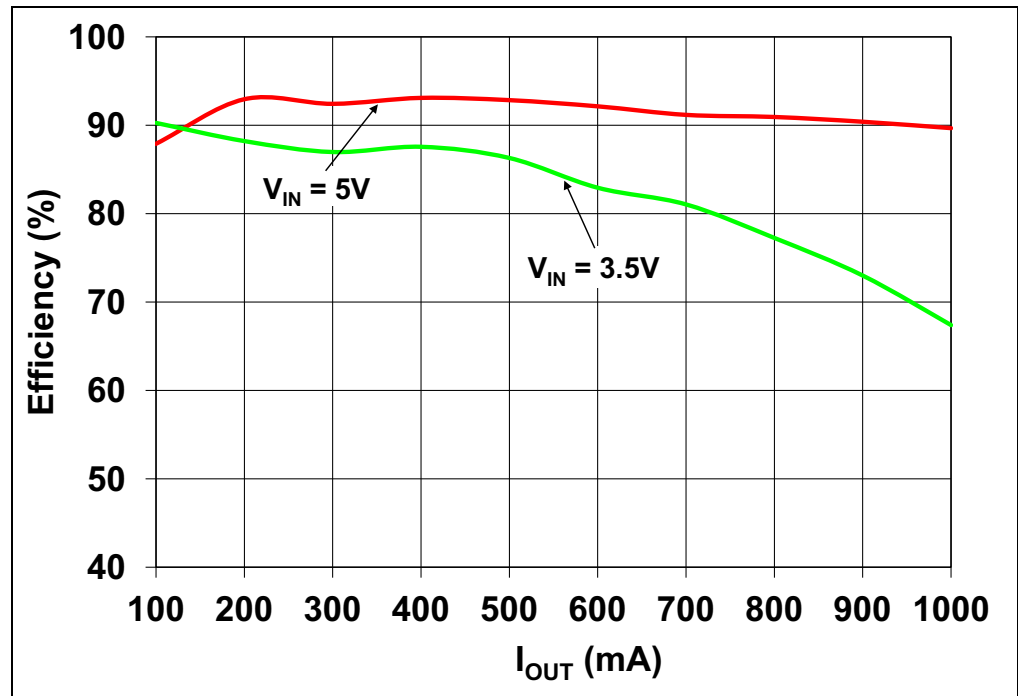


FIGURE C-1: Efficiency.

MCP1632 300 kHz Boost Converter Demo Board User's Guide

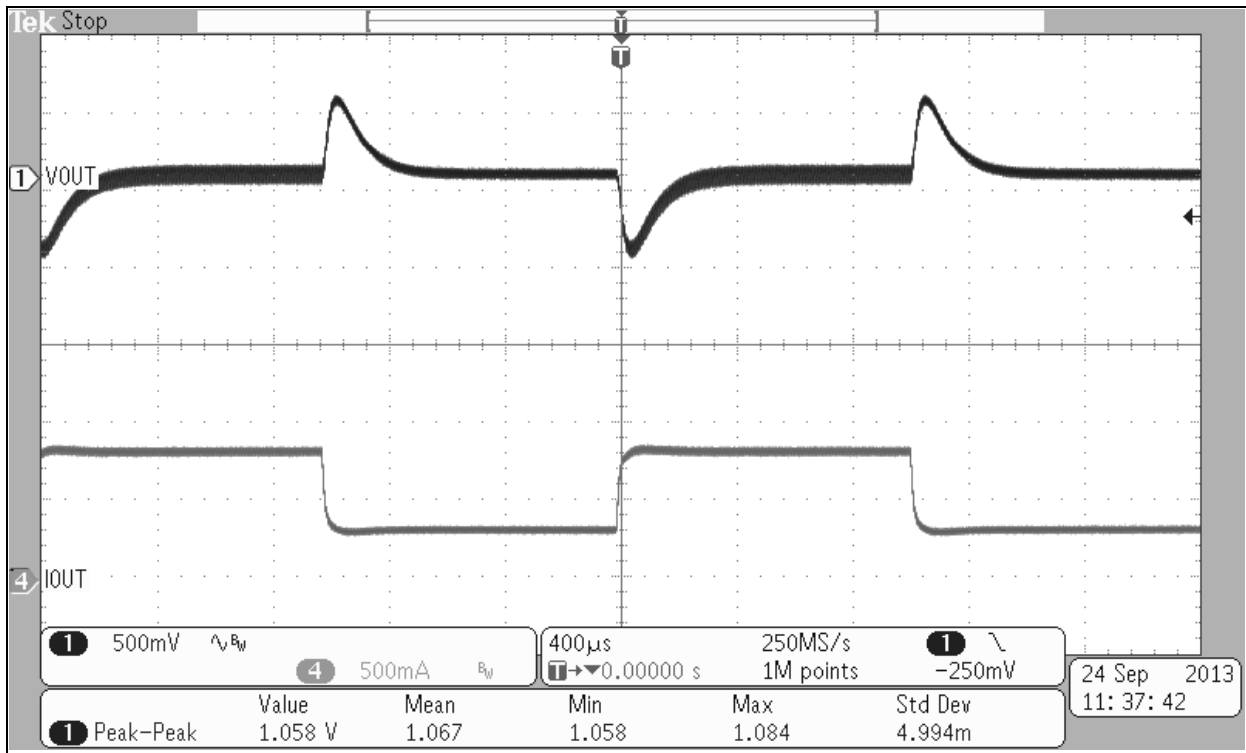


FIGURE C-2: Step Load ($V_{IN} = 5V$).

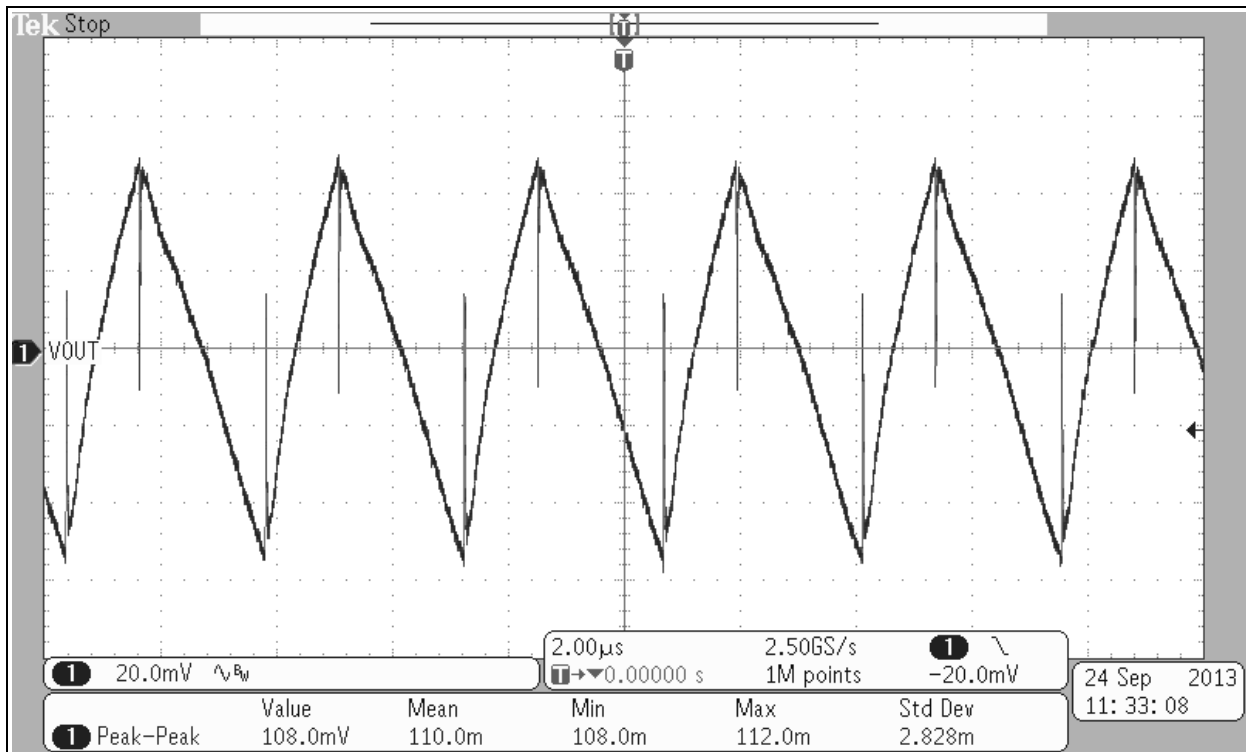


FIGURE C-3: Output Voltage Ripple/Noise ($V_{IN} = 5V$, $I_{OUT} = 0.85A$, $BW = 200\text{ MHz}$).

Typical Performance Data, Curves and Waveforms

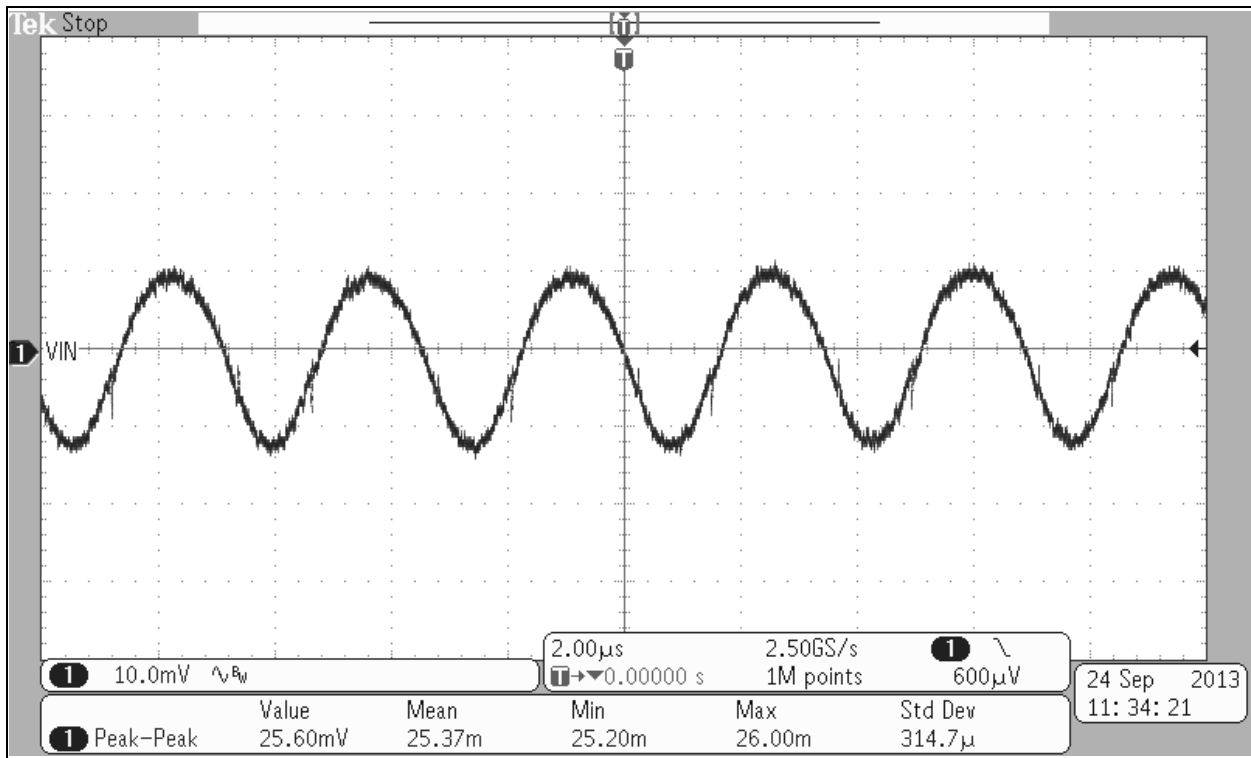


FIGURE C-4: Input Voltage Ripple/Noise ($V_{IN} = 5V$, $I_{OUT} = 0.85A$, $BW = 200\text{ MHz}$).

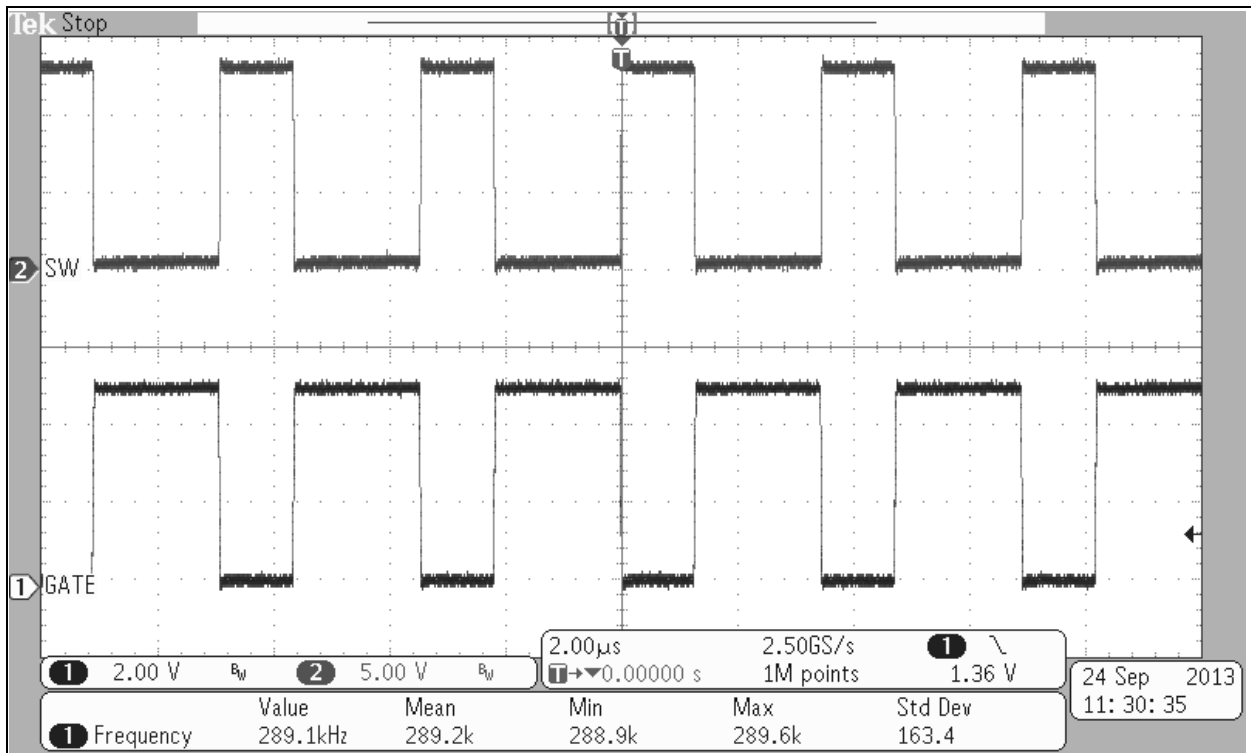


FIGURE C-5: SW and Gate Signals ($V_{IN} = 5V$, $I_{OUT} = 0.85A$, $BW = 300\text{ MHz}$).

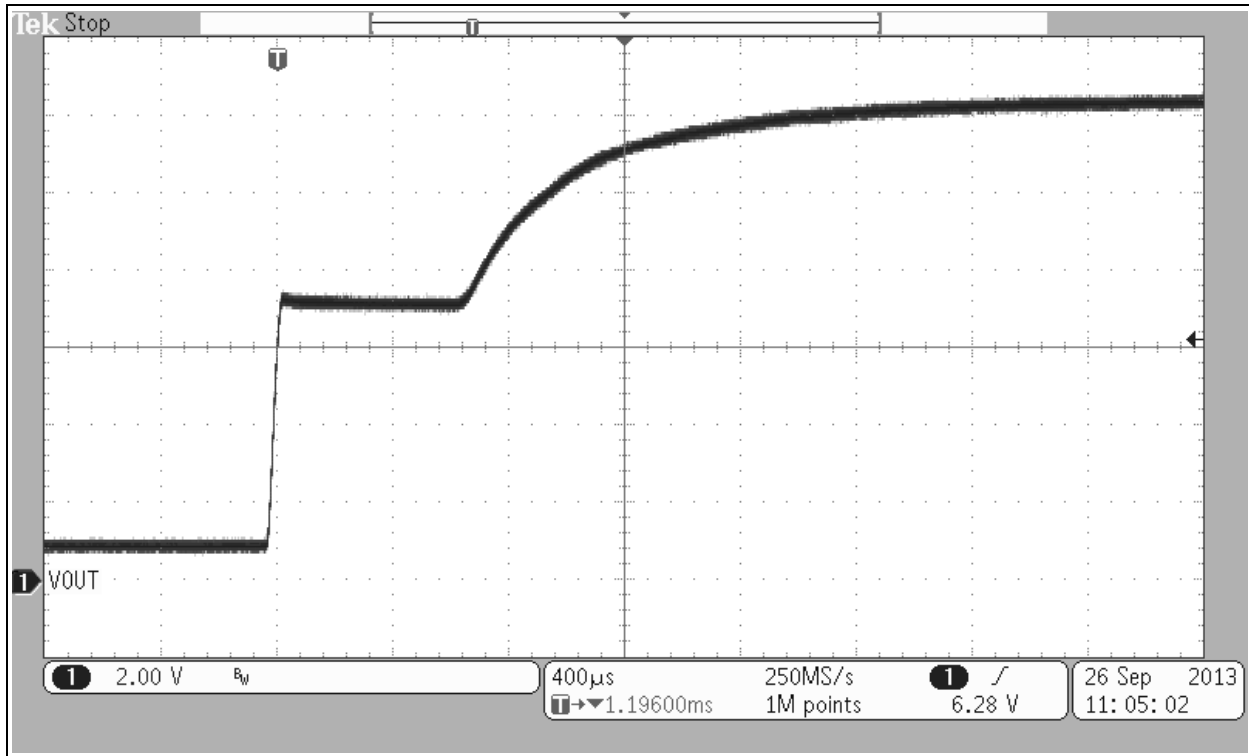


FIGURE C-6: Soft Start.

Typical Performance Data, Curves and Waveforms

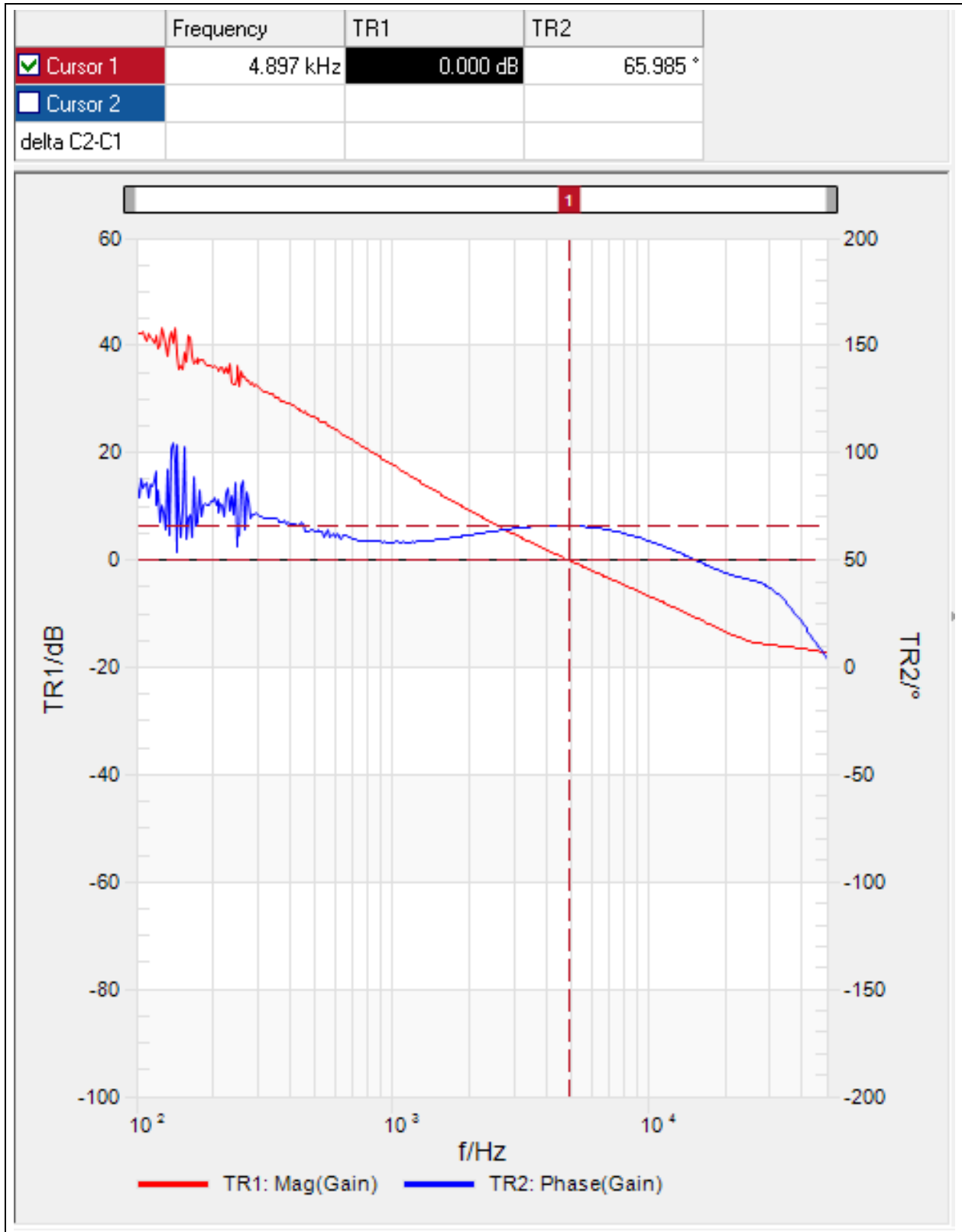


FIGURE C-7: Bode Plots (Red-Gain, Blue-Phase) ($V_{IN} = 5V$, $V_{OUT} = 12V$, $I_{OUT} = 0.5A$).



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

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

Austin, TX
Tel: 512-257-3370

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
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

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

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

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110

Canada - Toronto
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: 886-7-213-7830

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 - Dusseldorf
Tel: 49-2129-3766400

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

Germany - Pforzheim
Tel: 49-7231-424750

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

Italy - Venice
Tel: 39-049-7625286

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

Poland - Warsaw
Tel: 48-22-3325737

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

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820