



MCP39F501
Power Monitor
Demonstration 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in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates.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: 978-1-62077-874-6

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: MCP39F501 Power Monitor Demonstration 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

16-July-2013
Date

NOTES:



MCP39F501 POWER MONITOR DEMONSTRATION 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 What the MCP39F501 Power Monitor Demonstration Board Kit Includes	12
Chapter 2. Installation and Operation	
2.1 Getting Started	13
Chapter 3. Hardware Description	
3.1 Input and Analog Front End	17
3.2 Power Supply Circuit	18
Appendix A. Schematic and Layouts	
A.1 Introduction	19
A.2 Schematics and PCB Layout	19
A.3 Board – Schematic	20
A.4 Board – Top Silk	21
A.5 Board – Top Copper and Silk	22
A.6 Board – Top Copper	23
A.7 Board – Bottom Copper	24
A.8 Board – Bottom Copper and Silk	25
A.9 Board – Bottom Silk	26
Appendix B. Bill of Materials (BOM)	
Worldwide Sales and Service	30

NOTES:



MCP39F501 POWER MONITOR DEMONSTRATION 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 MCP39F501 Power Monitor Demonstration 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 MCP39F501 Power Monitor Demonstration Board as a demonstration board to evaluate the MCP39F501 device. The manual layout is as follows:

- **Chapter 1. “Product Overview”** – Provides important information about the MCP39F501 Power Monitor Demonstration Board
- **Chapter 2. “Installation and Operation”** – Provides information on using the MCP39F501 Power Monitor Demonstration Board, including **Section 2.1.3 “Step 3: Connect the USB cable to a PC with the installed “MCP39F501 Power Monitor Utility” software”** that describes wiring the line and load connections
- **Chapter 3. “Hardware Description”** – Provides details on the function blocks of the power monitor, including the analog front-end design and power supply design
- **Appendix A. “Schematic and Layouts”** – Shows the schematic and layout diagrams
- **Appendix B. “Bill of Materials (BOM)”** – Lists the parts used to build the MCP39F501 Power Monitor Demonstration Board

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 MCP39F501 Power Monitor Demonstration Board. Another useful documents is listed below. The following Microchip document is available and recommended as a supplemental reference resource.

MCP39F501 Data Sheet – “Single Phase Energy and Power Monitoring IC with Calculation” (DS20005256)

This data sheet provides detailed information regarding the MCP39F501 device.

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://support.microchip.com>.

DOCUMENT REVISION HISTORY

Revision A (February 2014)

- Initial Release of this Document.

NOTES:

Chapter 1. Product Overview

1.1 INTRODUCTION

The MCP39F501 Power Monitor Demonstration Board is a fully functional single-phase power monitor. This low-cost design does not use any transformers and requires few external components. The system calculates active power, reactive power, RMS current, RMS voltage and other typical power quantities, as defined in the MCP39F501 data sheet.

The Microchip Energy Meter 1-Phase software is used to calibrate and monitor the system, and can be used to create custom calibration setups. For some accuracy requirements, only a single-point calibration may be needed. The energy meter software offers an automated step-by-step calibration process that can be used to quickly calibrate energy meters.

This demonstration board uses the MCP39F501 Power Monitor Utility software for evaluation via a USB connection to the board. A download link for this software can be found on the evaluation board's web page. For instructions on the use of this software, refer to the software's supporting documentation included within the application install package.



FIGURE 1-1: MCP39F501 Power Monitor Demonstration Board.

1.2 WHAT THE MCP39F501 POWER MONITOR DEMONSTRATION BOARD KIT INCLUDES

This MCP39F501 Power Monitor Demonstration Board kit includes:

- MCP39F501 Power Monitor Demonstration Board (ARD00455)
- Important Information Sheet
- Mini USB cable
- AC Line cable
- AC Load cable
- Plastic enclosure

Chapter 2. Installation and Operation

2.1 GETTING STARTED

To use the MCP39F501 Power Monitor Demonstration Board, follow the steps described in the sections below. The meter design uses a 5A load for calibration current and a maximum current (I_{MAX}) of 15A.

It is not recommended to put more than 15A through the AC plugs mounted on the Printed Circuit Board (PCB).

To test the calibrated meter, the following connections can be made:

2.1.1 Step 1: Wiring connections

[Figure 2-1](#) identifies the line and load connections of the MCP39F501 Power Monitor Demonstration Board.

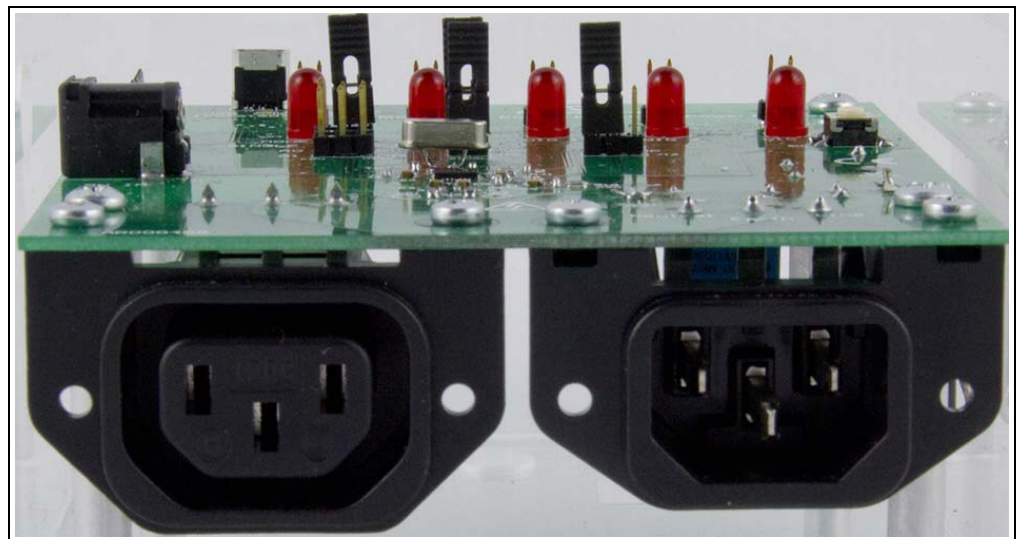


FIGURE 2-1: Connecting the MCP39F501 Power Monitor Demonstration Board.

2.1.2 Step 2: Turn on line/load power to the meter (power the meter)

The meter will turn on when the line connection has between 90V to 220V connected.

2.1.3 Step 3: Connect the USB cable to a PC with the installed “MCP39F501 Power Monitor Utility” software

Select the appropriate COM port. If the meter is connected correctly, the connection status in the bottom left corner of the software will display “Meter Connected”. If no meter is found, the status will be “Meter Disconnected”. Check that the correct COM port was selected and try again.

NOTES:

Chapter 3. Hardware Description

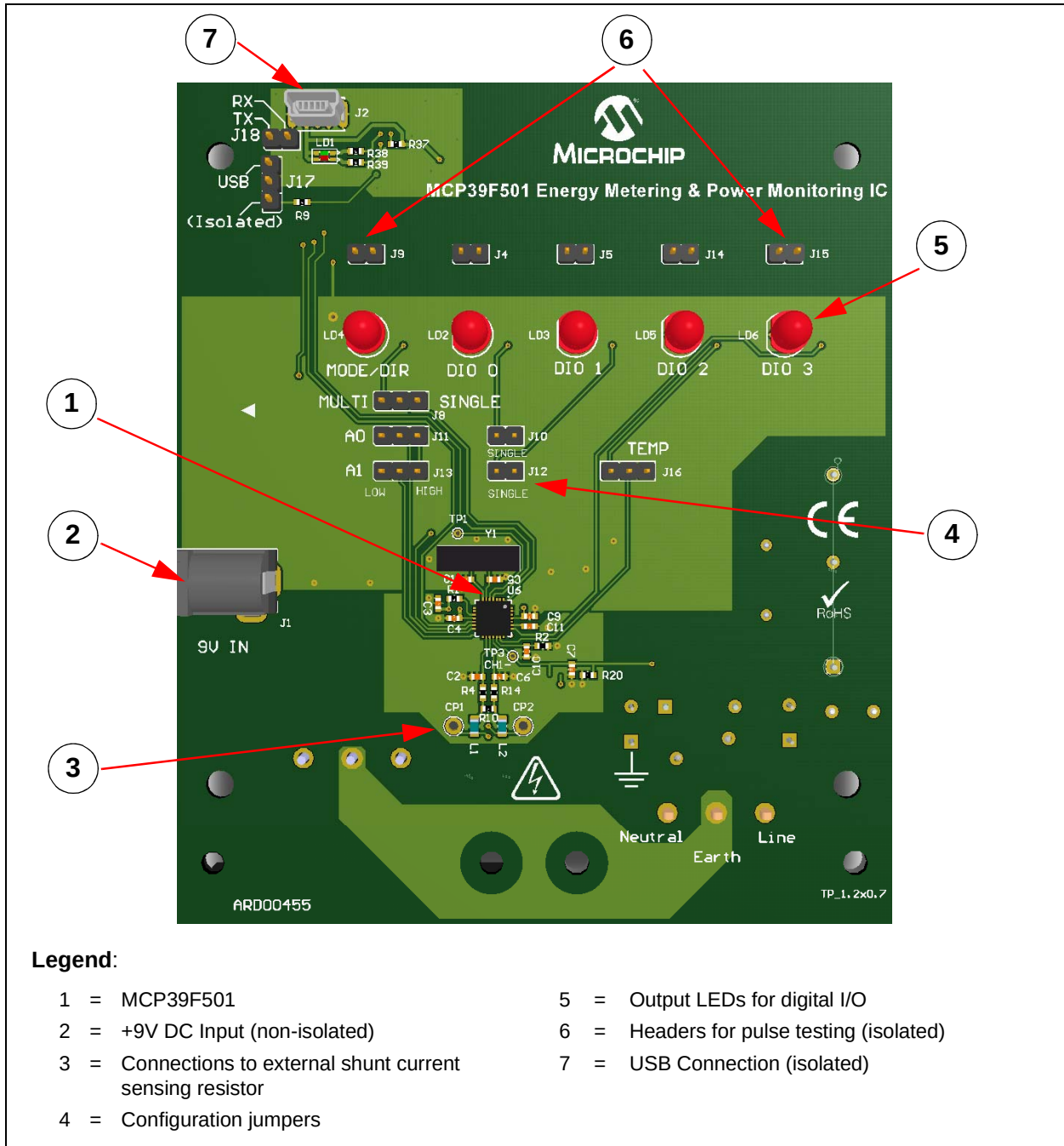


FIGURE 3-1: MCP39F501 Power Monitor Demonstration Board Top View – Hardware Components.

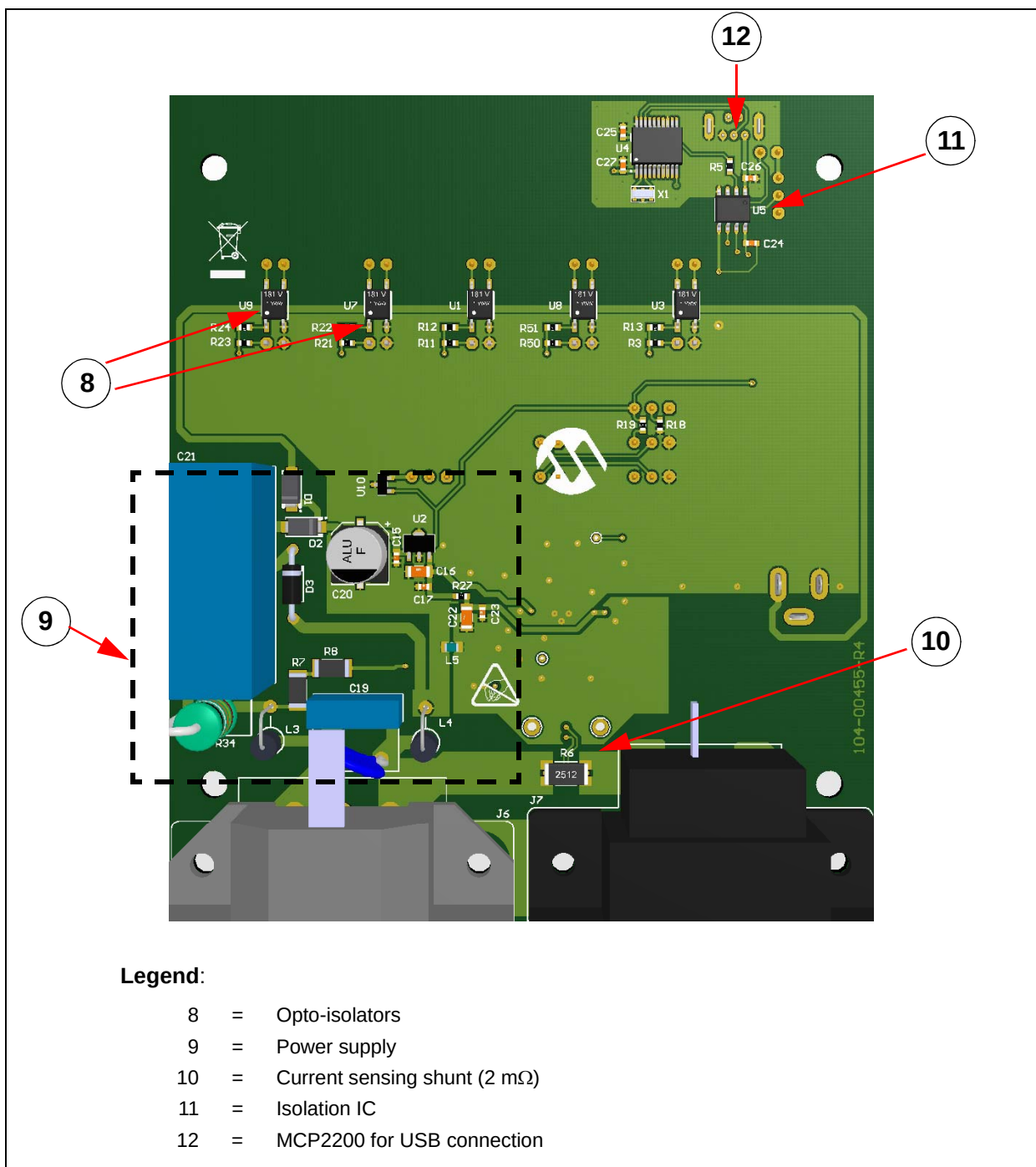


FIGURE 3-2: MCP39F501 Power Monitor Demonstration Board Bottom View – Hardware Components.

3.1 INPUT AND ANALOG FRONT END

The MCP39F501 Power Monitor Demonstration Board comes populated with components designed for 220V line voltage. However, it will work from 90V to 230V. At the bottom of the main board, there are the high-voltage line and neutral connections. There are four connections from the PCB to the meter casing. They are labeled LINE, NEUTRAL, SHUNT1 and SHUNT2. The shunt sits on the high- or line-side of a two-wire system and the meter employs a hot or “live” ground. The wires going into the shunt to SHUNT1 and SHUNT2 should be twisted together. The wires going into the LINE and NEUTRAL side of the meter should be twisted together, and also kept away from the SHUNT1 and SHUNT2 wires, if possible.

The neutral side of the two-wire system goes into a resistor divider on the voltage channel input. Anti-aliasing low-pass filters are included. The voltage channel uses two 499 k Ω resistors to achieve a divider ratio of 1000:1. For a line voltage of 230 V_{RMS}, the channel 1 input signal size will be 230 mV_{RMS}.

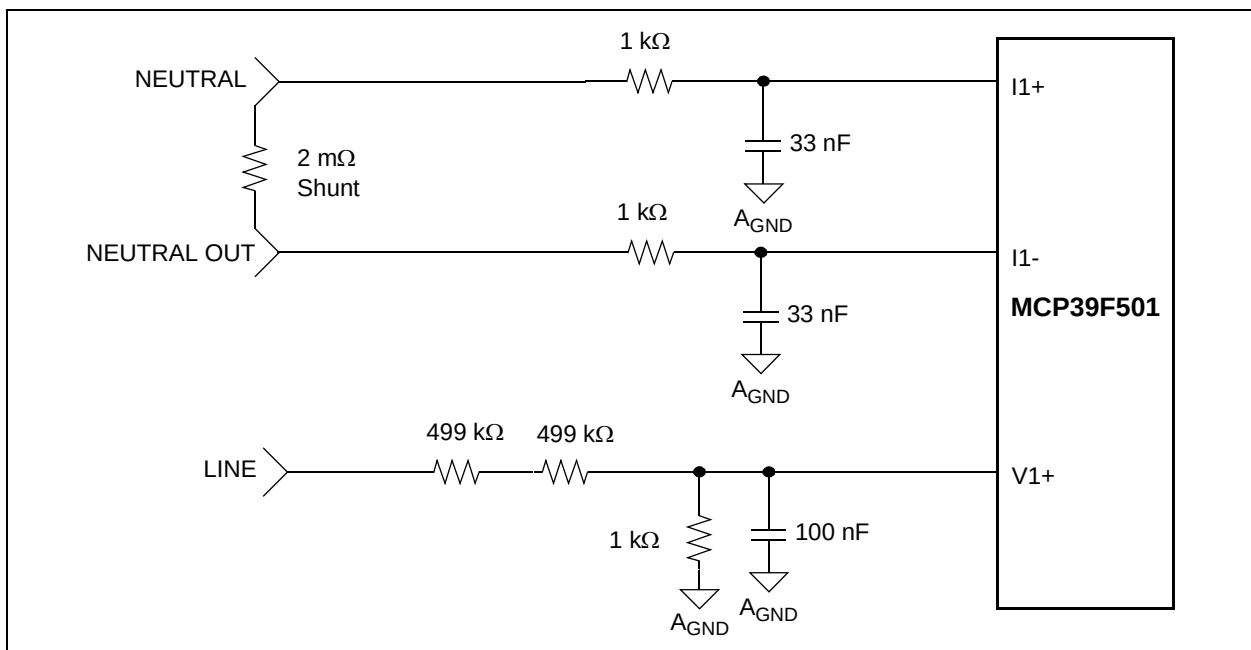


FIGURE 3-3: Analog Front-End Circuitry.

Note that all of the analog circuitry associated with this part of the circuit is connected to the analog ground plane (A_{GND}).

3.2 POWER SUPPLY CIRCUIT

The power supply circuit for the MCP39F501 Power Monitor Demonstration Board uses a half-wave rectified signal and a +3.3V voltage regulator.

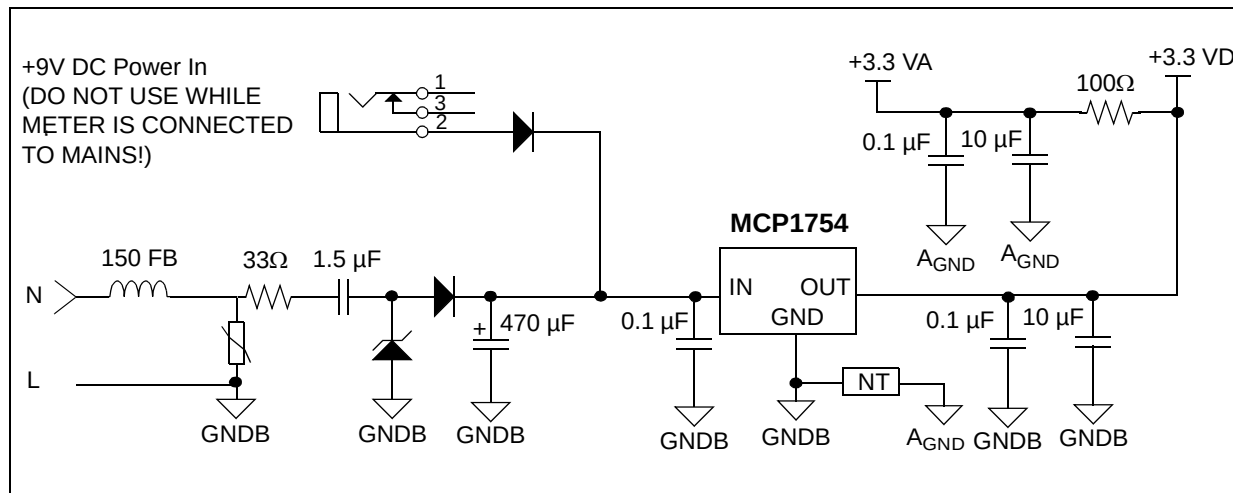


FIGURE 3-4: Low-Cost Power Supply Circuit.

Appendix A. Schematic and Layouts

A.1 INTRODUCTION

This appendix contains the following schematics and layouts for of the MCP39F501 Power Monitor Demonstration Board:

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

A.2 SCHEMATICS AND PCB LAYOUT

The layer order is shown in [Figure A-1](#).

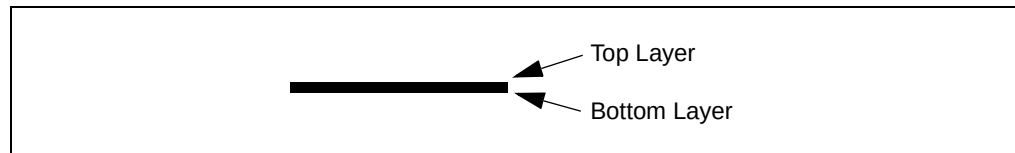
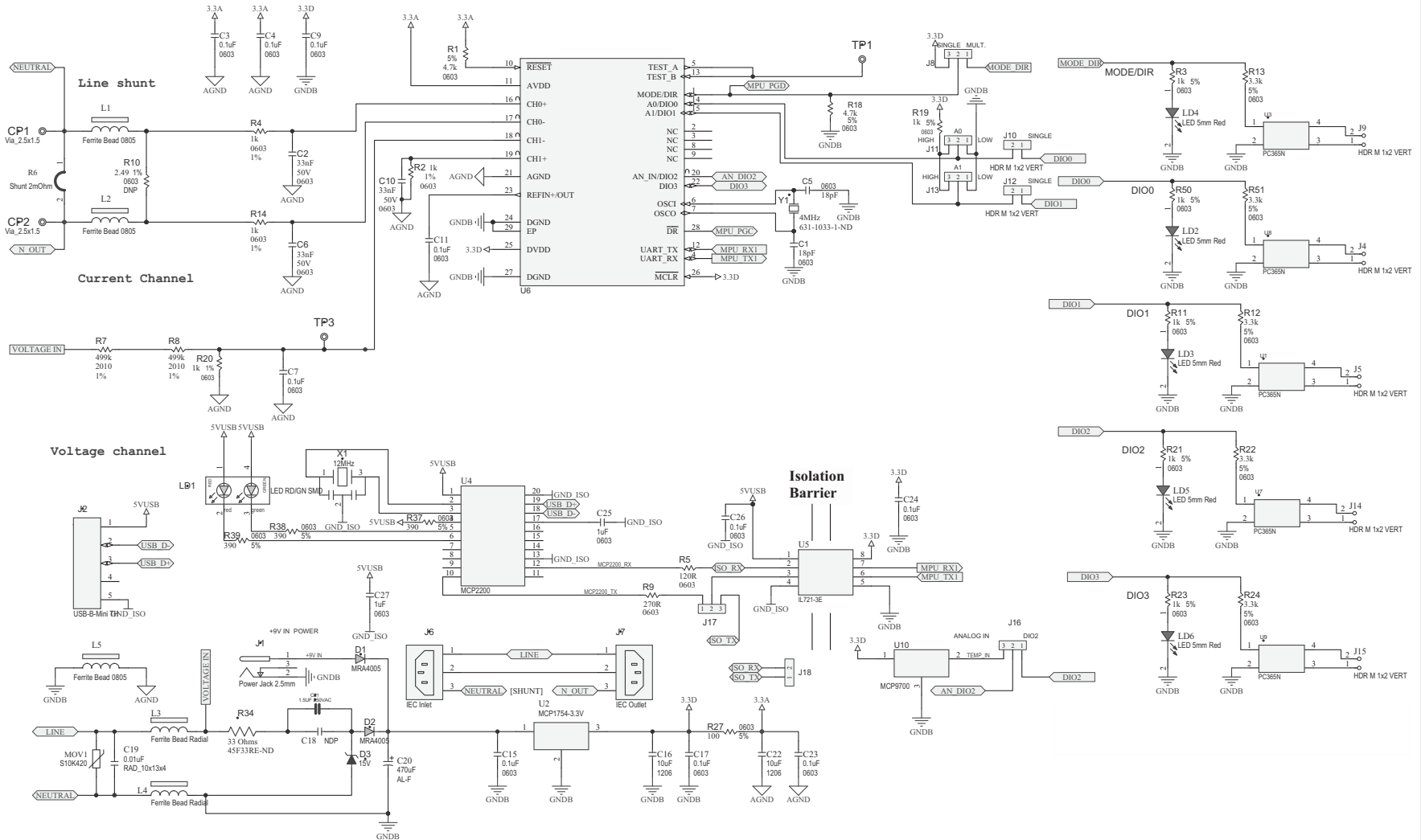
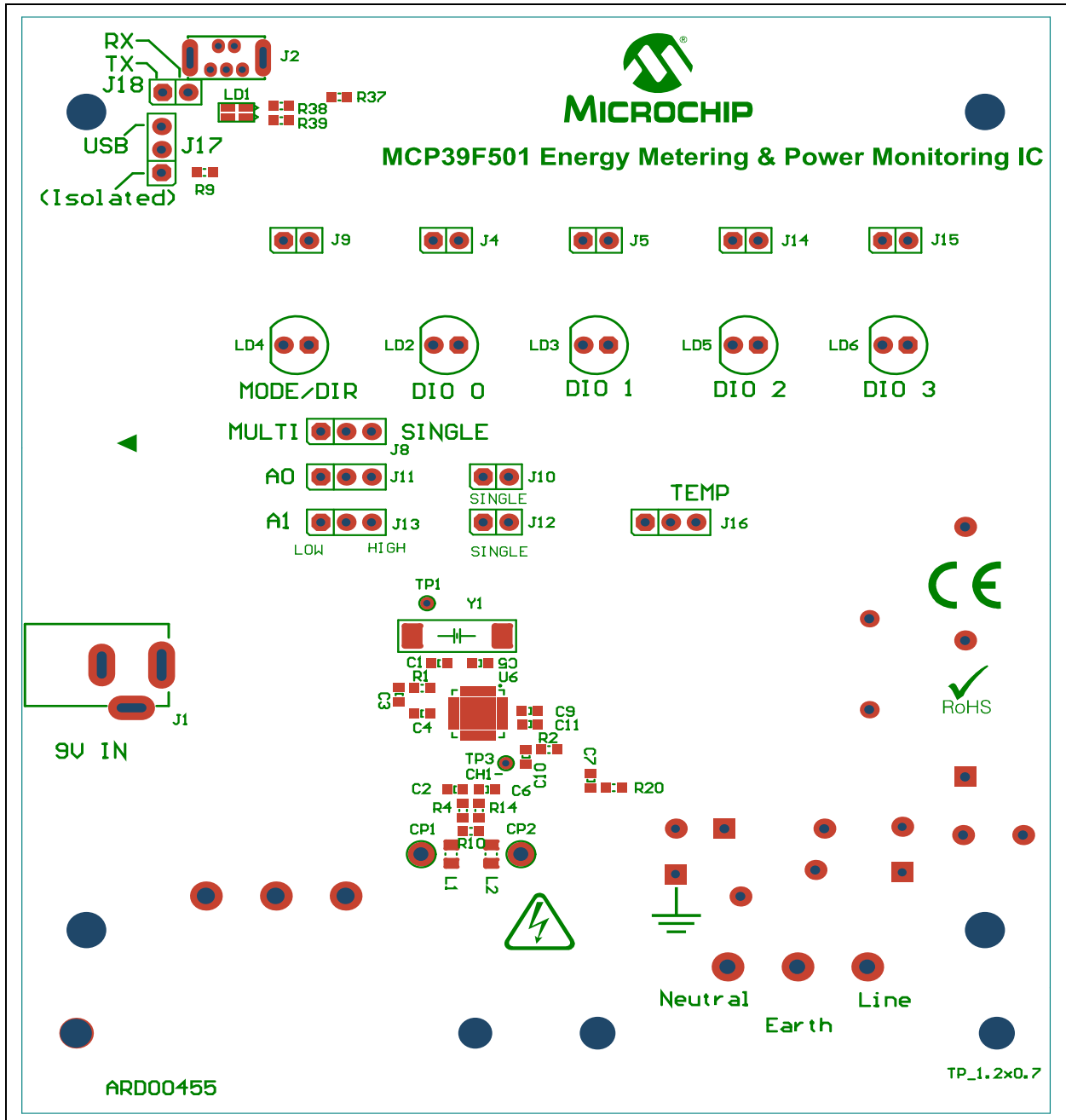


FIGURE A-1: Layer Order.

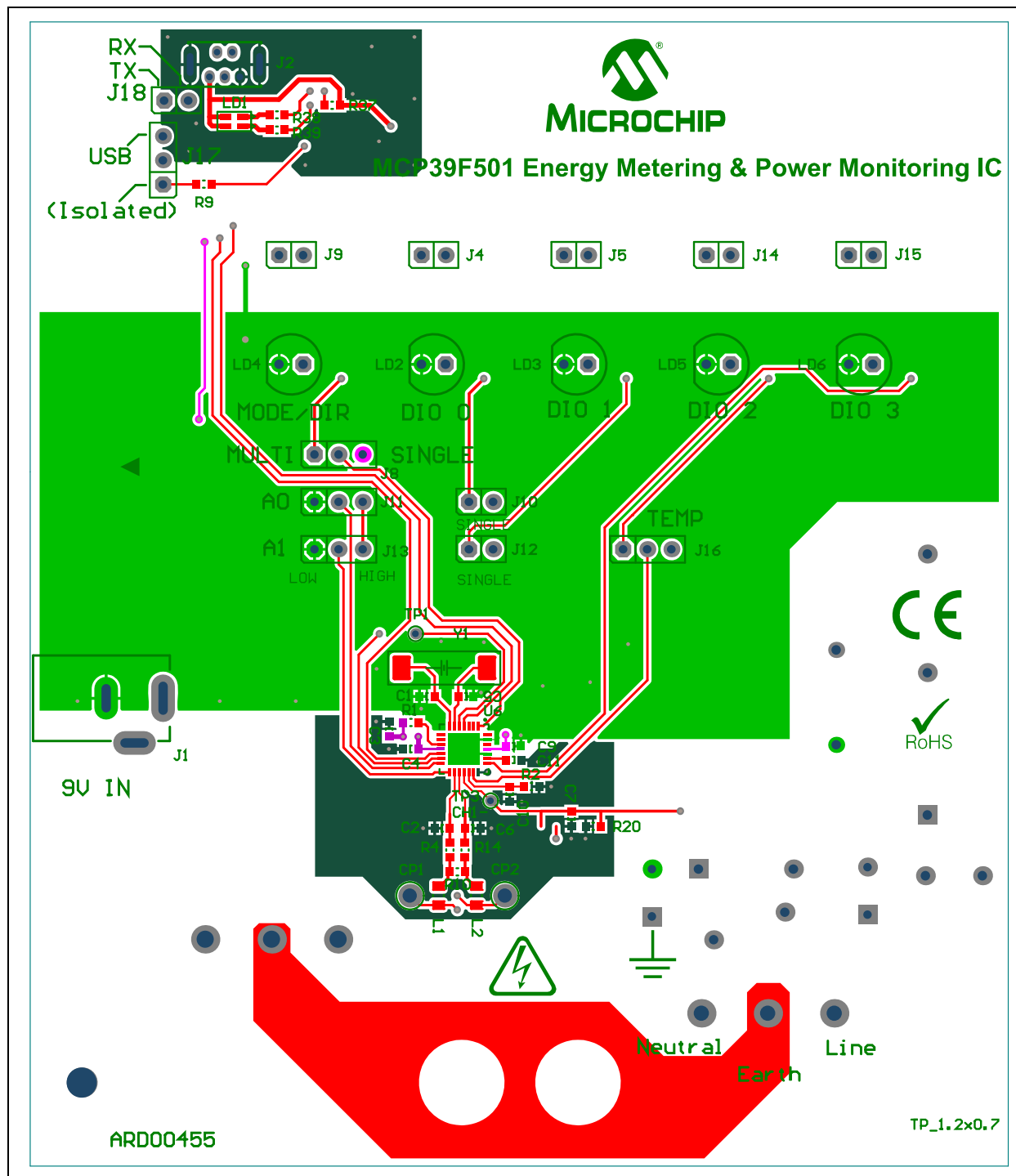
A.3 BOARD - SCHEMATIC



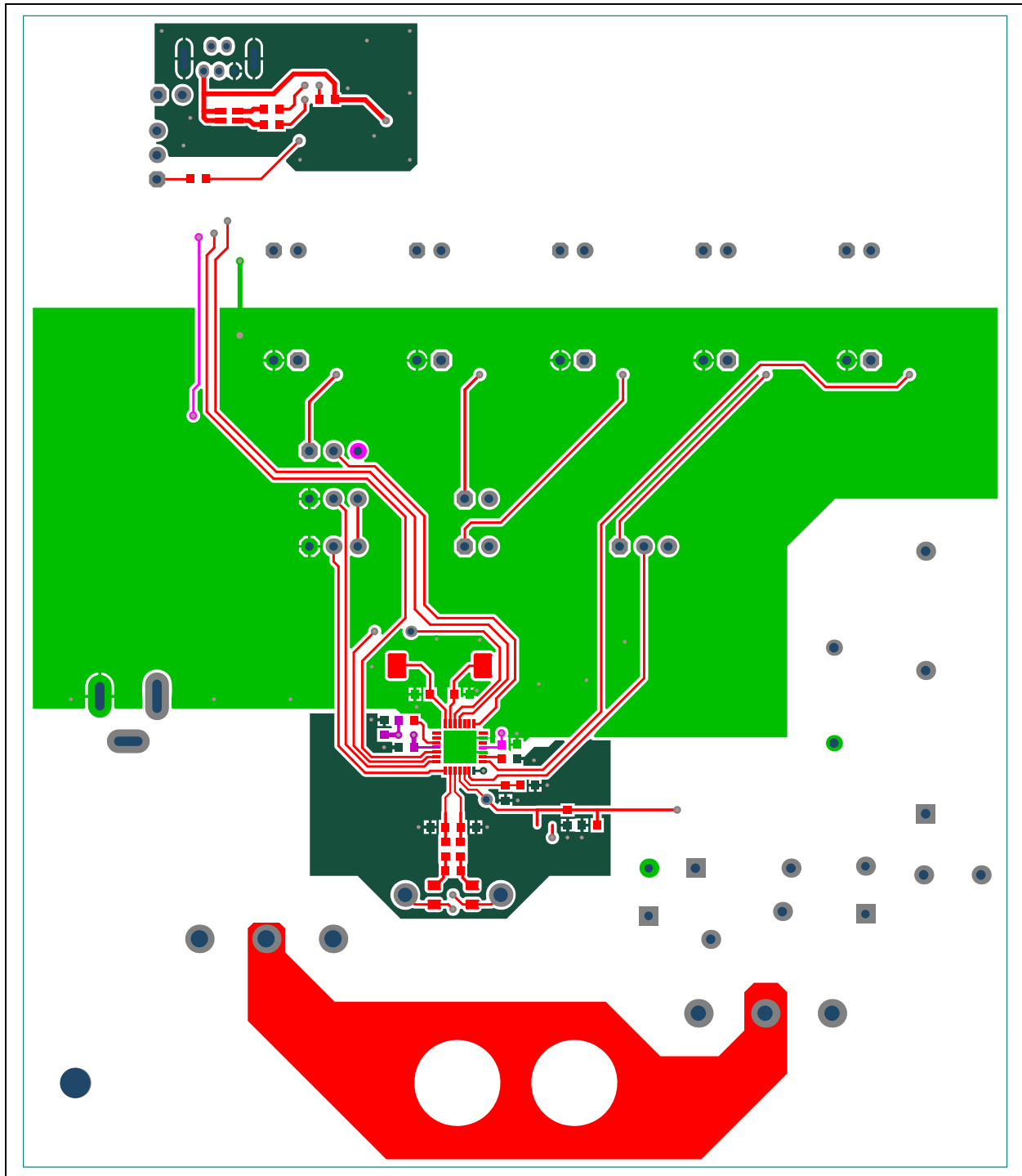
A.4 BOARD – TOP SILK



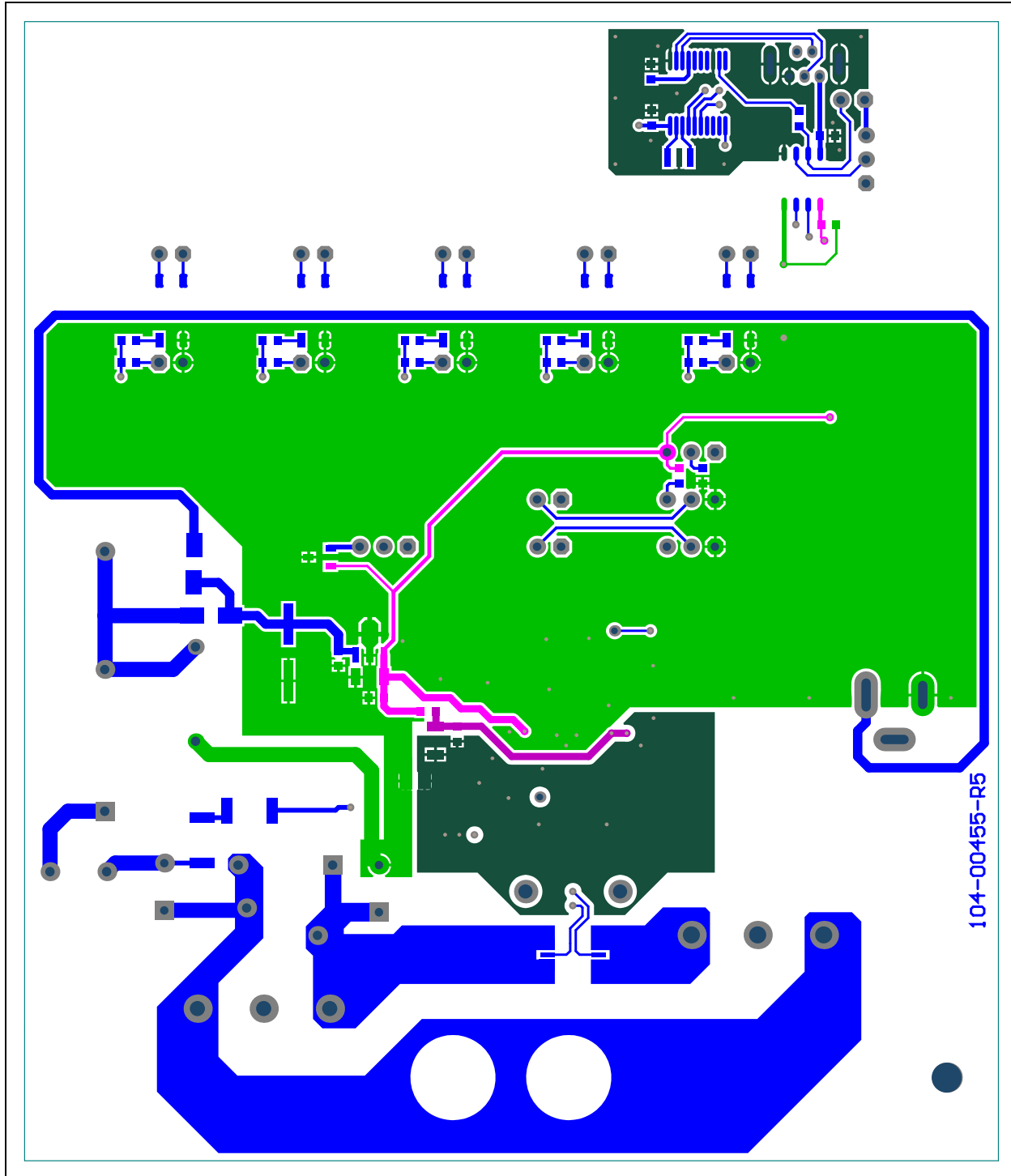
A.5 BOARD – TOP COPPER AND SILK



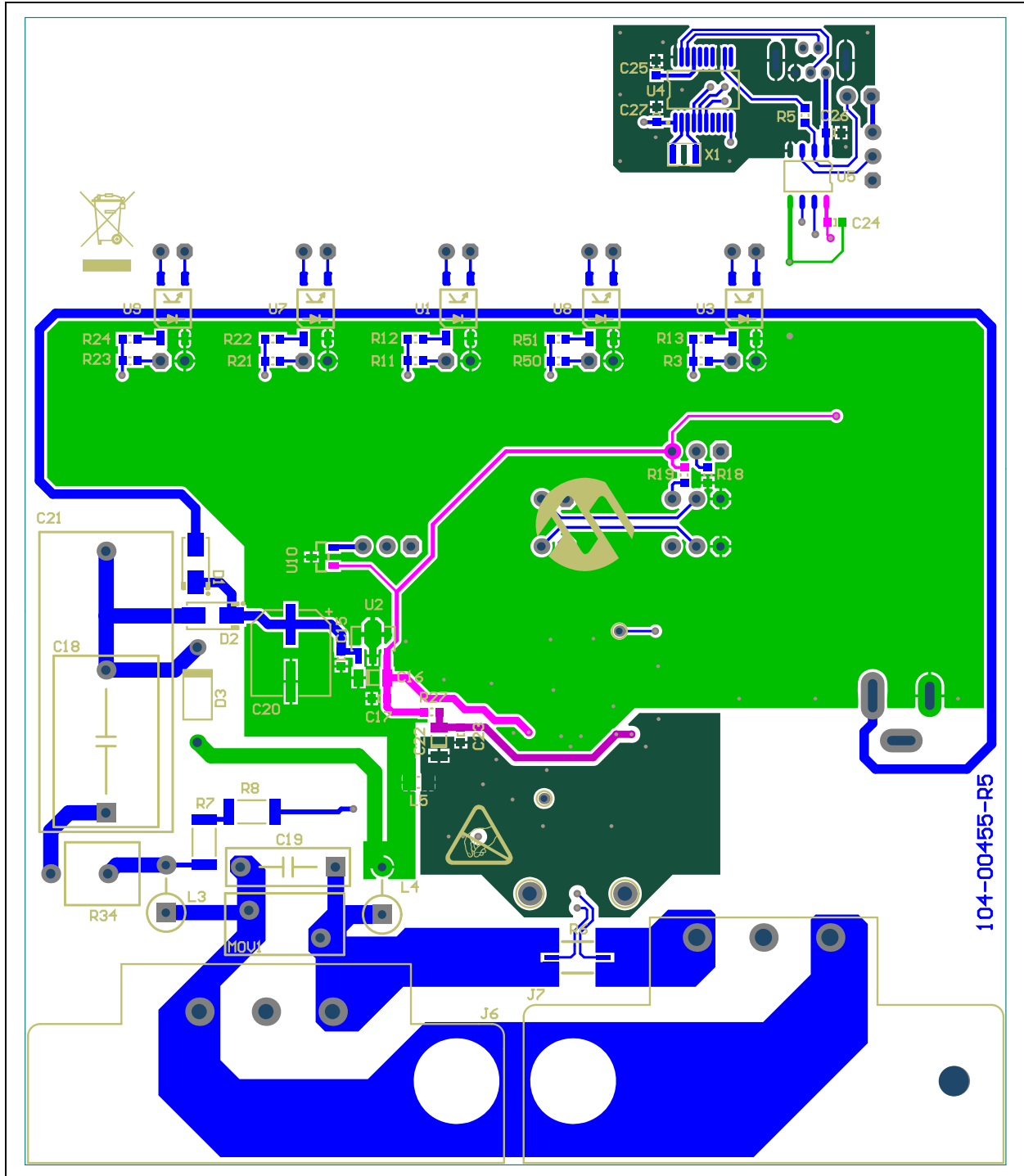
A.6 BOARD – TOP COPPER



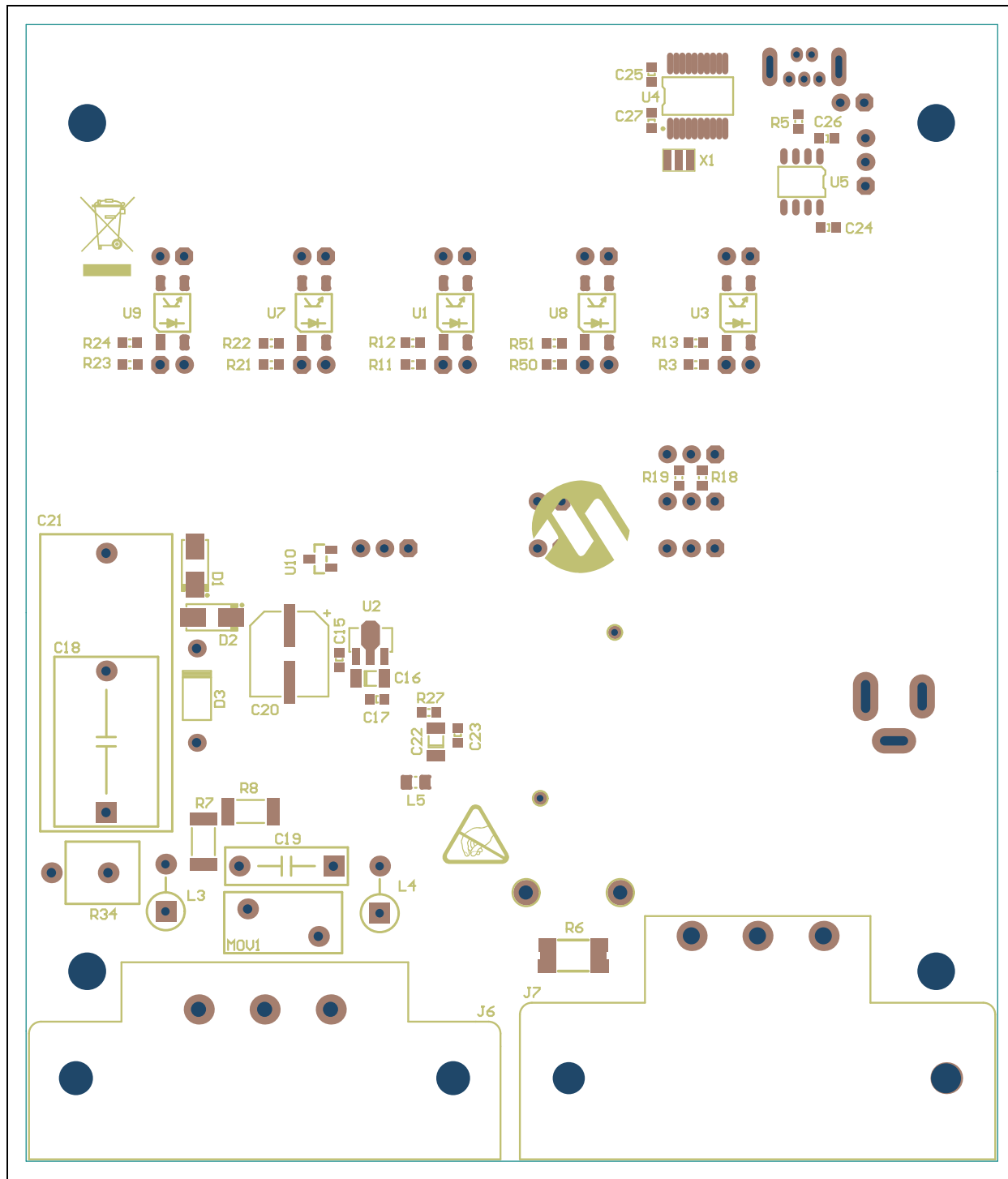
A.7 BOARD – BOTTOM COPPER



A.8 BOARD – BOTTOM COPPER AND SILK



A.9 BOARD – BOTTOM SILK



Appendix B. Bill of Materials (BOM)

TABLE B-1: BILL OF MATERIALS (BOM)

Qty	Reference	Description	Manufacturer	Part Number
2	C1, C5	Cap. ceramic 18 pF 50V C0G 5% 0603	TDK Corporation	C1608C0G1H180J
3	C2, C6, C10	Cap. ceramic 33 nF 50V 10% X7R SMD 0603	TDK Corporation	C1608X7R1H333K
10	C3 – C4, C7, C9, C11, C15, C17, C23 – C24, C26	Cap. ceramic 0.1 μ F 16V 10% X7R 0603	TDK Corporation	C1608X7R1C104K
2	C16, C22	Cap. ceramic 10 μ F 10V X7R 20% 1206	TDK Corporation	C3216X7R1A106M
1	C18	Cap. film 0.47 μ F 305 VAC Power Supply – DO NOT POPULATE	EPCOS AG	B32932A3474M
1	C19	Cap. film 0.01 μ F 330 VAC Suppress	EPCOS AG	B32911A3103M
1	C20	Cap. elect. 470 μ F 16V 20% vs size F	Panasonic® - ECG	EEE-1CA471UP
1	C21	Cap. film 1.5 μ F 275 VAC radial	Panasonic - ECG	ECQ-U2A155ML
2	C25, C27	Cap. ceramic 1 μ F 10V X7R 20% 0603	TDK Corporation	C1608X7R1A105M
1	C36	Cap. ceramic 0.1 μ F 16V 10% X7R 0603 – DO NOT POPULATE	TDK Corporation	C1608X7R1C104K
2	D1 – D2	Diode std. rec. 1A 600V SMA	ON Semiconductor®	MRA4005T3G
1	D3	Diode Zener 15V 1W DO-41	Fairchild Semiconductor®	1N4744A
1	J1	Conn. power jack male 2.5 mm CLSD	CUI Inc.	PJ-002B
1	J2	Conn. recept. USB TH vert. 5 pos.	Molex® Connector Corporation	500075-1517
1	J3	Conn. hdr. male 0.100 1x6 pos. vert.	Tyco Electronics	68001-106HLF
5	J4 – J5, J9, J14 – J15	Conn. hdr. male 0.100 1x2 pos. vert.	FCI	77311-118-02LF
1	J6	Module inlet. ang. GND W/M3 hole PCB	SCHURTER Inc.	GSP1.9103.1
1	J7	Module outlet F screw-on PCB	SCHURTER Inc.	6182.0033
5	J8, J11, J13, J16 – J17	Conn. hdr. male 0.100 1x3 pos. vert.	Tyco Electronics	HDR M 1x3 Vertical
3	J10, J12, J18	Conn. hdr. male 0.100 1x2 pos. vert.	FCI	77311-118-02LF
3	L1 – L2, L5	Ferrite 800 mA 150 m Ω 0805 SMD	Laird Technologies®	LI0805H151R-10
2	L3 – L4	Bead core single 3.8 x 5.3 mm Radial	Panasonic - ECG	EXC-ELSR35S
1	LD1	LED 2 x 1.2 mm RD/GN wtr. clr. SMD	Kingbright Corp.	APHBM2012SURKCGKC

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.

Bill of Materials (BOM)

TABLE B-1: BILL OF MATERIALS (BOM) (CONTINUED)

Qty	Reference	Description	Manufacturer	Part Number
5	LD2 – LD6	LED 5 mm red 640 nm 20 mcd 2 mA	Kingbright Corp.	WP7113LSRD
1	MOV1	Varistor 420 VRMS 10 mm Radial	EPCOS AG	S10K420
	PCB	Printed Circuit Board – MCP39F501 Power Monitor Demonstration Board	—	104-00455
1	R1	Res. 4.7 k Ω 1/10W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ472V
4	R2, R4, R14, R20	Res. 1 k Ω 1/10W 1% 0603 SMD	Panasonic - ECG	ERJ-3EKF1001V
6	R3, R11, R19, R21, R23, R50	Res. 1 k Ω 1/10W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ102V
1	R5	Res. TKF 120R 5% 1/10W SMD 0603	Panasonic - ECG	ERJ-3GEYJ121V
1	R6	Current sense resistor 2 m Ω 2W 1% 2512 SMD	Stackpole Electronics, Inc.	CSNL2512FT2L00
2	R7 – R8	Res. 499 k Ω 3/4W 1% 2010 SMD	Vishay/Dale	CRCW2010499KFKEF
1	R9	Res. TKF 270R 5% 1/10W SMD 0603	KOA Speer Electronics, Inc.	RK73B1JT2D271J
1	R10	Res. 2.49 Ω 1/10W 1% 0603 SMD	Vishay/Dale	CRCW06032R49FKEA
5	R12 – R13, R22, R24, R51	Res. 3.3 k Ω 1/10W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ332V
1	R18	Res. 4.7 k Ω 1/10W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ472V
1	R27	Res. 100 Ω 1/10W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ101V
1	R34	Res. 33 Ω 5W 1% AXIAL	Ohmite [®] Manufacturing	45F33RE
3	R37 – R39	Res. 390 Ω 1/10W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ391V
1	R40	Res. 1 k Ω 1/10W 5% 0603 SMD – DO NOT POPULATE	Panasonic - ECG	ERJ-3GEYJ102V
1	R41	Res. 10 k Ω 1/10W 5% 0603 SMD – DO NOT POPULATE	Panasonic - ECG	ERJ-3GEYJ103V
1	SW1	Switch Tact. 6 mm 160GF H = 4.3 mm – DO NOT POPULATE	Omron Electronics LLC – EMC Division	B3S-1000P
5	U1, U3, U7 – U9	Photocoupler Darl. Out 4-SMD	Sharp Corporation	PC365NJ0000F
1	U5	Isolator HS dual digital SOIC-8	NVE Corporation/ Isolation Products	IL721-3E
1	X1	Resonator ceramic 12.0 MHz CST- CE_G	Murata Electronics [®]	CSTCE12M0G55-R0
1	Y1	Crystal 4.0 MHz 20 pF SMD	Fox Electronics [®]	FQ1045A-4
5	Jumpers – See Test procedure for locations	Conn. jumper shorting TIN	Sullins Connector Solutions	STC02SYAN

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.

Bill of Materials (BOM)

TABLE B-2: BILL OF MATERIALS – MICROCHIP CONSIGNED PARTS

Qty	Reference	Description	Manufacturer	Part Number
1	U2	IC reg. LDO 150 mA 3.3V SOT-89-3	Microchip Technology Inc.	MCP1754ST-3302E/MB
1	U4	IC USB TO UART SSOP-20	Microchip Technology Inc.	MCP2200-I/SS
1	U6	MCP39F501 QFN-28	Microchip Technology Inc.	MCP39F501-E/MQ
1	U10	IC Sensor Thermal 2.3V SOT-23-3	Microchip Technology Inc.	MCP9700T-E/TT

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.

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

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9