MCP7382X EVALUATION KIT USER'S GUIDE

Supports the following Devices:

- **MCP73826**
- **MCP73827**
- **MCP73828**

MCP7382X Evaluation Kit User's Guide

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Preface

Introduction

This section contains general information that will be useful to know before using the MCP7382X Evaluation Board. This board currently supports the following devices:

- MCP73826, MCP73827, MCP73828

Highlights

This section covers the following topics:

- About this Guide
- Recommended Reading
- The Microchip Internet Web Site
- Customer Support

About This Guide

DOCUMENT LAYOUT

This document describes how to use the MCP7382X Evaluation Board.

The User's Guide layout is as follows:

- **Chapter 1: System Overview and Installation** – Important information on how to use the MCP7382X Evaluation Board.
- **Chapter 2: Overview of the MCP7382X Evaluation Board** – For users evaluating the MCP73826, MCP73827, or MCP73828 devices, this chapter describes how to use the various features of the hardware

Appendices:

- **Appendix A: Schematic and Board Layouts** – shows the schematic and layout diagrams for the MCP7382X Evaluation Board
- **Appendix B: Bill of Materials** – lists the parts used to build the MCP7382X Evaluation Kit
- **Worldwide Sales and Service** – gives the address, telephone and fax number for Microchip Technology Inc. sales and service locations throughout the world

Recommended Reading

This user's guide describes how to use the MCP7382X Evaluation Board. For more information regarding the MCP7382X devices, the following are recommended reading.

MCP7382X Data Sheets

These data sheets provide detailed information regarding the MCP7382X Single Cell Lithium-Ion Charge Management Controllers:

- MCP73826 Data Sheet, DS21705
- MCP73827 Data Sheet, DS21704
- MCP73828 Data Sheet, DS21706

README Files

Contains the latest information on the MCP7382X Evaluation Board.

MCP7382X Evaluation Kit User's Guide (DS51267A)

Technical Library CD-ROM (DS00161)

This CD-ROM contains comprehensive application notes, data sheets, and technical briefs for all Microchip products. To obtain this CD-ROM, contact the nearest Microchip Sales and Service location (see back page).

Microchip Web Site

Our web site (http://www.microchip.com) contains a wealth of documentation. Individual data sheets, application notes, tutorials and user's guides are all available for easy download. All documentation is in Adobe Acrobat (pdf) format.

Microsoft® Windows® Manuals

This manual assumes that users are familiar with the Microsoft Windows operating system. Many excellent references exist for this software program and should be consulted for general operation of Windows.

The Microchip Internet Web Site

Microchip provides on-line support on the Microchip World Wide Web (WWW) site.

The web site is used by Microchip as a means to make files and information easily available to customers. To view the site, the user must have access to the internet and a web browser, such as Netscape® Communicator or Microsoft® Internet Explorer®. Files are also available for FTP download from our FTP site.

Connecting to the Microchip Internet Web Site

The Microchip web site is available by using your favorite Internet browser to attach to:

http://www.microchip.com

The file transfer site is available by using an FTP program/client to connect to:

ftp://ftp.microchip.com

The web site and file transfer site provide a variety of services. Users may download files for the latest Development Tools, Data Sheets, Application Notes, User's Guides, Articles, and Sample Programs. A variety of Microchip specific business information is also available, including listings of Microchip sales offices, distributors and factory representatives. Other data available for consideration is:

- Latest Microchip Press Releases
- Technical Support Section with Frequently Asked Questions
- Design Tips
- Device Errata
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- Microchip Consultant Program Member Listing
- Links to other useful web sites related to Microchip Products
- Conferences for products, Development Systems, technical information and more
- Listing of seminars and events

Customer Support

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Corporate Applications Engineer (CAE)
- Hot line

Customers should call their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. See the back cover for a listing of sales offices and locations.

Corporate applications engineers (CAEs) may be contacted at (480) 792-7627.

In addition, there is a Systems Information and Upgrade Line. This line provides system users a listing of the latest versions of all of Microchip's development systems software products. Plus, this line provides information on how customers can receive any currently available upgrade kits.

The Hot Line Numbers are:

- 1-800-755-2345 for U.S. and most of Canada, and
- 1-480-786-7302 for the rest of the world.

MCP7382X EVAL KIT USER'S GUIDE

Chapter 1. Product Overview and Installation

1.1 Introduction

This chapter provides an overview of the MCP7382X Evaluation Board, and instructions on how to connect the system components.

1.2 Highlights

This chapter covers the following topics:

- What the MCP7382X Evaluation Board Is
- MCP7382X Evaluation Board Kit Components

1.3 What the MCP7382X Evaluation Board Is

The MCP7382X Evaluation Board is an evaluation and demonstration tool for Microchip Technology's MCP7382X Single Cell Lithium-Ion Charge Management Controllers. The design provides for dynamic versatility while being able to handle accurate measurements.

When connected, this evaluation board allows for the evaluation of the MCP7382X devices in a variety of applications.

1.4 MCP7382X Evaluation Kit Components

The MCP7382X Evaluation Kit contains:

- MCP7382X Evaluation Board
- MCP73826-4.2VCH, MCP73827-4.2VUA, and MCP73828-4.2VUA Devices installed
- MCP73826 Datasheet, DS21705
- MCP73827 Datasheet, DS21704
- MCP73828 Datasheet, DS21706
- MCP7382X Eval Kit User's Guide, DS51267

MCP7382X EVAL KIT USER'S GUIDE

Chapter 2. MCP7382X Evaluation Board

2.1 Description

The MCP7382X Evaluation Kit is an evaluation kit designed to support Microchip's MCP73826, MCP73827, and MCP73828 single-cell Li-Ion charge management devices. The evaluation kit is fully assembled and tested. The kit is useful for evaluating simple stand-alone operation or for evaluating applications interfaced with a microcontroller.

2.2 Features

The MCP7382X Evaluation Board has the following features:

- Evaluation of MCP73827/28 in 8-pin MSOP packages
- Evaluation of MCP73826 in 6-pin SOT-23 package
- Simple Stand-Alone Operation or Microcontroller Compatible
- Powered from external bench supply or voltage regulated wall cube
- Surface-Mount Design
- Fully Assembled and Tested

2.3 Getting Started

The MCP7382X Evaluation Board is a fully functional, assembled, and tested surface mount board for evaluation of Microchip's MCP73826/27/28 single-cell Li-Ion battery charger devices. The following steps provide simple stand-alone operation. Refer to the set-up configuration diagram below. Note: Do not turn on the input power until all other set-up steps are complete.

1. Place a jumper on JP4 to select the appropriate device for evaluation.
2. Place a jumper on JP5 to enable the appropriate device for evaluation.
3. Connect an external bench supply or voltage regulated wall cube to JP1. **Observe correct polarity of connection.**
4. Connect a single cell Li-Ion battery pack to JP2. **Observe correct polarity of connection.**
5. For MCP73828 evaluation, connect external battery pack thermistor to JP3.
6. Turn-on bench supply or plug-in wall cube.
7. For MCP73827 evaluation, LED D3 shall be turned off when the charge cycle transitions from controlled current mode to constant voltage mode charge.
8. For MCP73828 evaluation, LED D2 shall illuminate when the battery pack is at full charge.

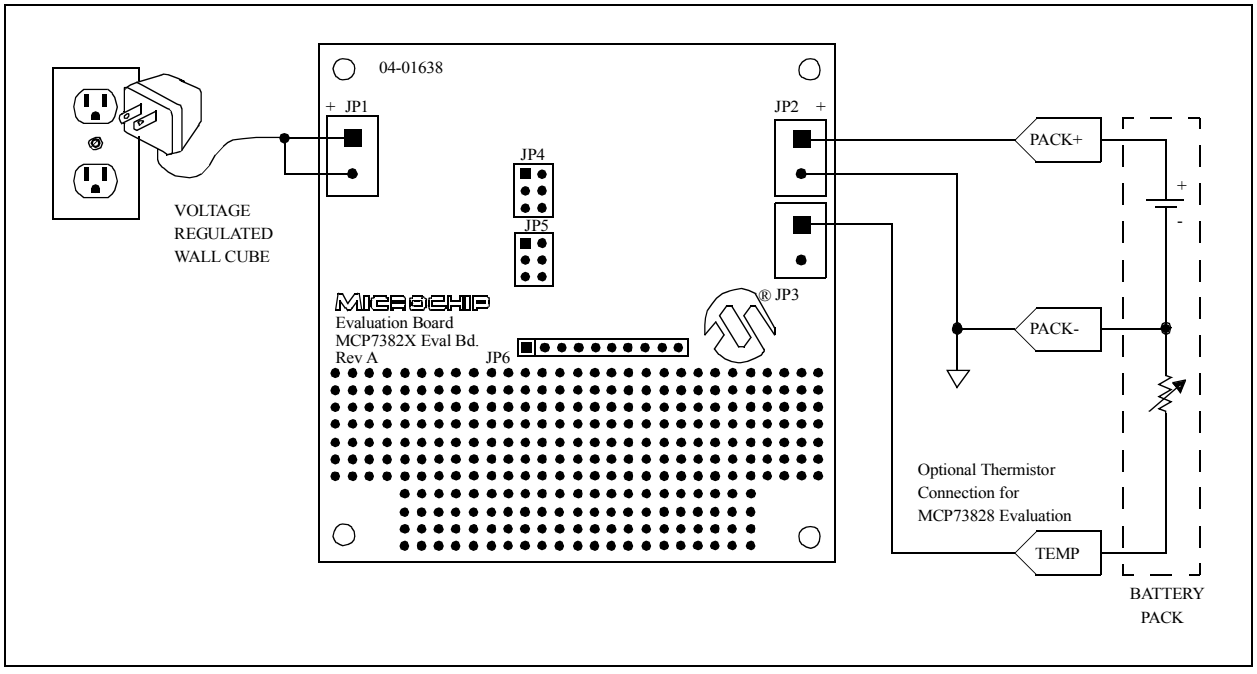


Figure 2.1: Set-Up Configuration Diagram

2.4 Detailed Description

The MCP7382X Evaluation Board is set-up to evaluate simple, stand-alone, linear charging of single cell Li-Ion battery packs. Each of the three Li-Ion battery chargers can be evaluated independently. The chargers provide controlled current charging followed by constant voltage charging. The MCP73826, U1, is provided in a 6-pin SOT23 package and is equipped with shutdown control. The MCP73827, U2, is provided in an 8-pin MSOP package. In addition to shutdown control, the MCP73827 signals when the charge cycle transitions from controlled current mode to constant voltage mode. An LED, D3, is illuminated during the controlled current mode. A voltage representation of the charge current, I_{MON}, is provided for a host microcontroller to monitor the charge profile. The MCP73828, U3, is also provided in an 8-pin MSOP package. In addition to shutdown control, the MCP73828 signals when the charge current has diminished below ten percent of the peak charge current. An LED, D2, is illuminated indicating full charge. A thermistor input is provided to inhibit charging when the cell temperature is outside a pre-defined window. Refer to the appropriate data sheets for details on the individual device features.

2.4.1 Input Source

The MCP7382X Evaluation Board is designed to provide an output current of 1A, typical. A 5V ±10%, 6W input source should be utilized to power the evaluation kit. JP1 terminal 1 is the positive input source connection. JP1 terminal 2 is the negative input source connection.

Higher or lower output currents can be obtained by adjusting the value of the sense resistor, R1. A corresponding higher or lower power input source may need to be utilized. Care should be taken not to over stress the pass transistor, Q1, with excessive power dissipation when higher output currents are desired.

2.4.2 Reverse Blocking Protection

The MCP7382X Evaluation Board is designed to provide reverse blocking protection in the event a reversed polarity input source is connected to JP1. The reverse blocking protection diode, D1, also ensures that a faulted or shorted input source will not adversely effect the battery pack.

2.4.3 Battery Headers

Two headers, JP2 and JP3 are used to connect to an external Li-Ion battery pack and optional protection thermistor. JP2 terminal 1 is the battery pack positive connection, JP2 terminal 2 is the negative battery pack connection. JP3 terminal 1 is for connection to a 10 k ohm NTC thermistor situated in the battery pack for temperature sensing. JP3 terminal 2 is the negative reference for the thermistor.

CAUTION: Improper connection of the battery may result in damage to the battery and the possibility of personal injury. It is also important to avoid shorting the battery terminals together.

2.4.4 Device Support Options

The MCP7382X Evaluation Board provides evaluation of three Li-Ion battery chargers: MCP73826, MCP73827, or MCP73828. Device selection is performed by placing shunts on JP4 and JP5 as indicated in the table below. JP4 determines which device is controlling the pass transistor. JP5 is used to enable the appropriate device.

Table 2.1: Shunt Jumpers

Device Type	JP4 Shunt Location	JP5 Shunt Location
MCP73826	5, 6	1, 2
MCP73827	3, 4	3, 4
MCP73828	1, 2	5, 6

2.4.5 Microcontroller option

JP6 provides an easily accessible location for interface to a host microcontroller. The host microcontroller can be used to disable the charger, monitor charge status, monitor the charge profile, or terminate a charge.

A proto-typing area is provided for generation of a self-contained microcontroller solution.

2.4.6 Output voltage options

The MCP7382X Evaluation Board is provided with a constant voltage mode output voltage of 4.2V. Evaluation with a constant voltage mode output voltage of 4.1V can be achieved by replacing U1, U2, or U3 with the appropriate device. Refer to the appropriate data sheets for device ordering information.

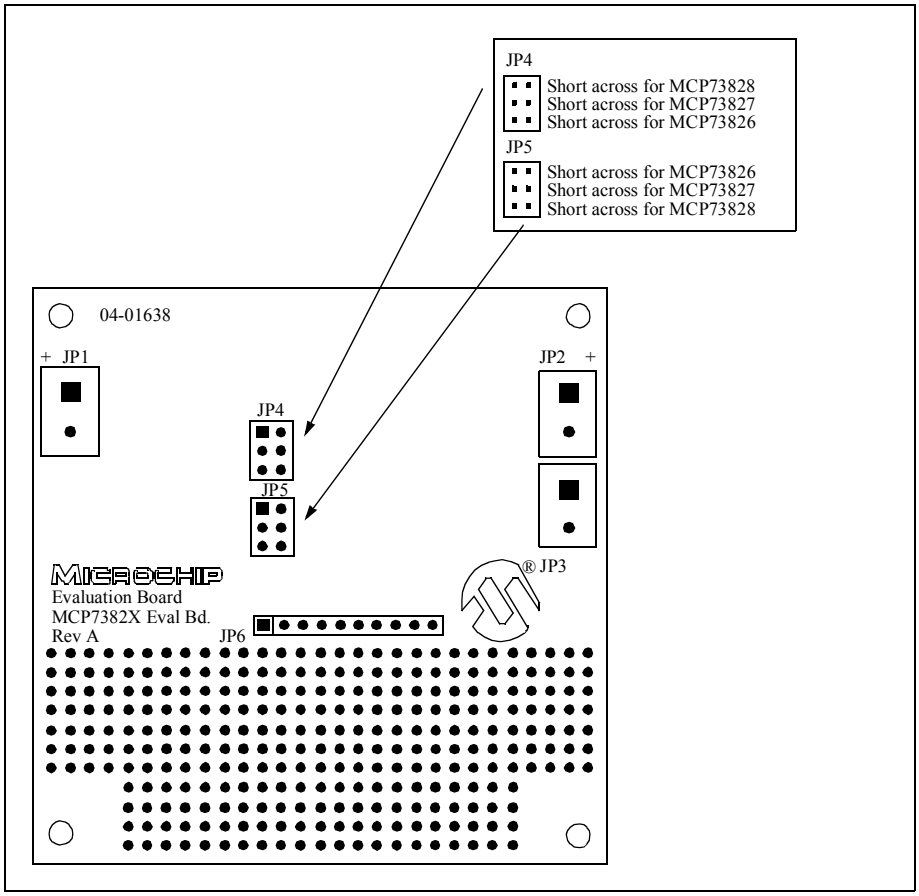


Figure 2.2: Jumper Locations on the MCP7382X Evaluation Board

NOTES:

Appendix A. Schematic and Board Layouts

A.1 Introduction

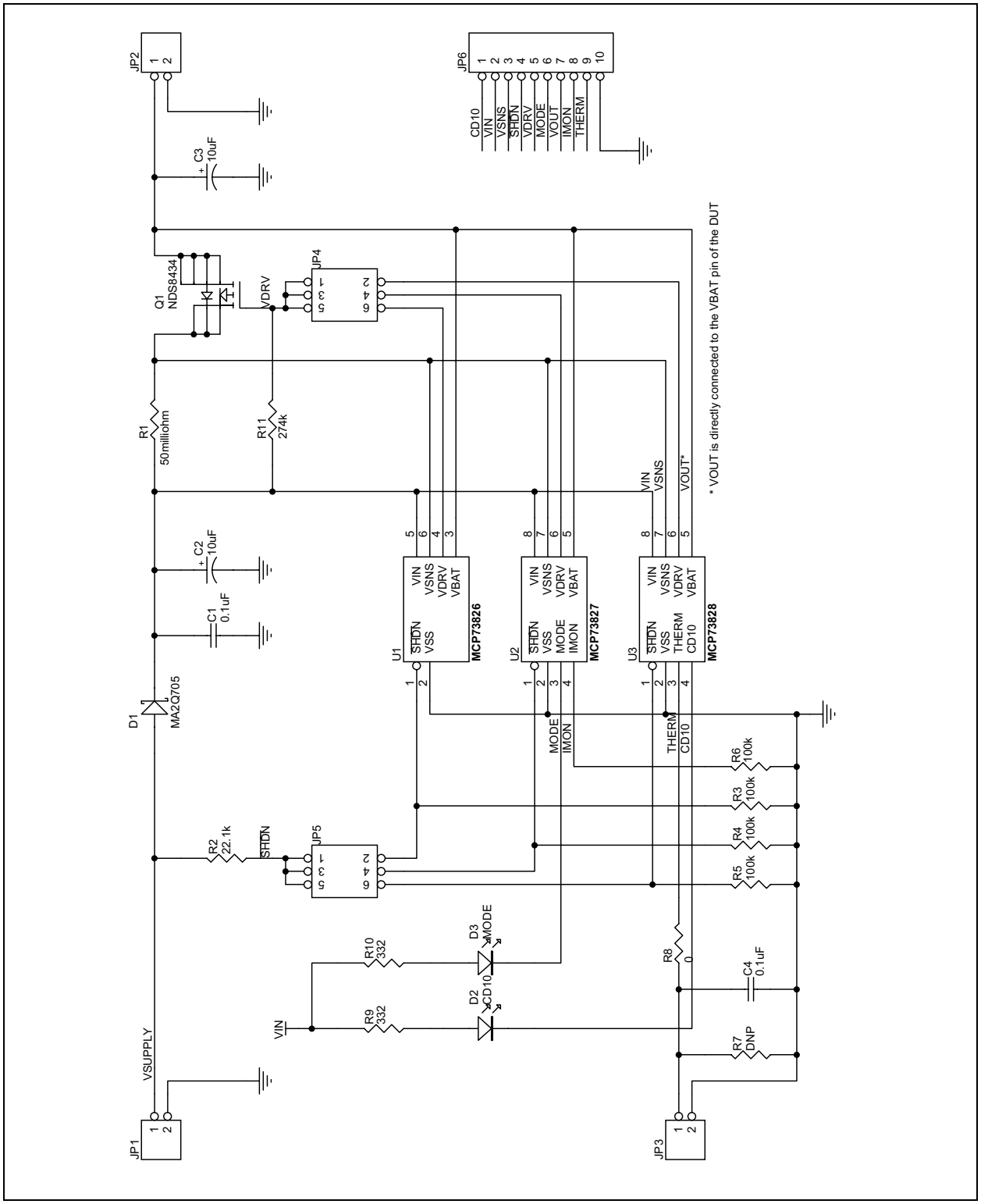
This appendix contains the schematic and board layouts for the MCP7382X Evaluation Board.

A.2 Highlights

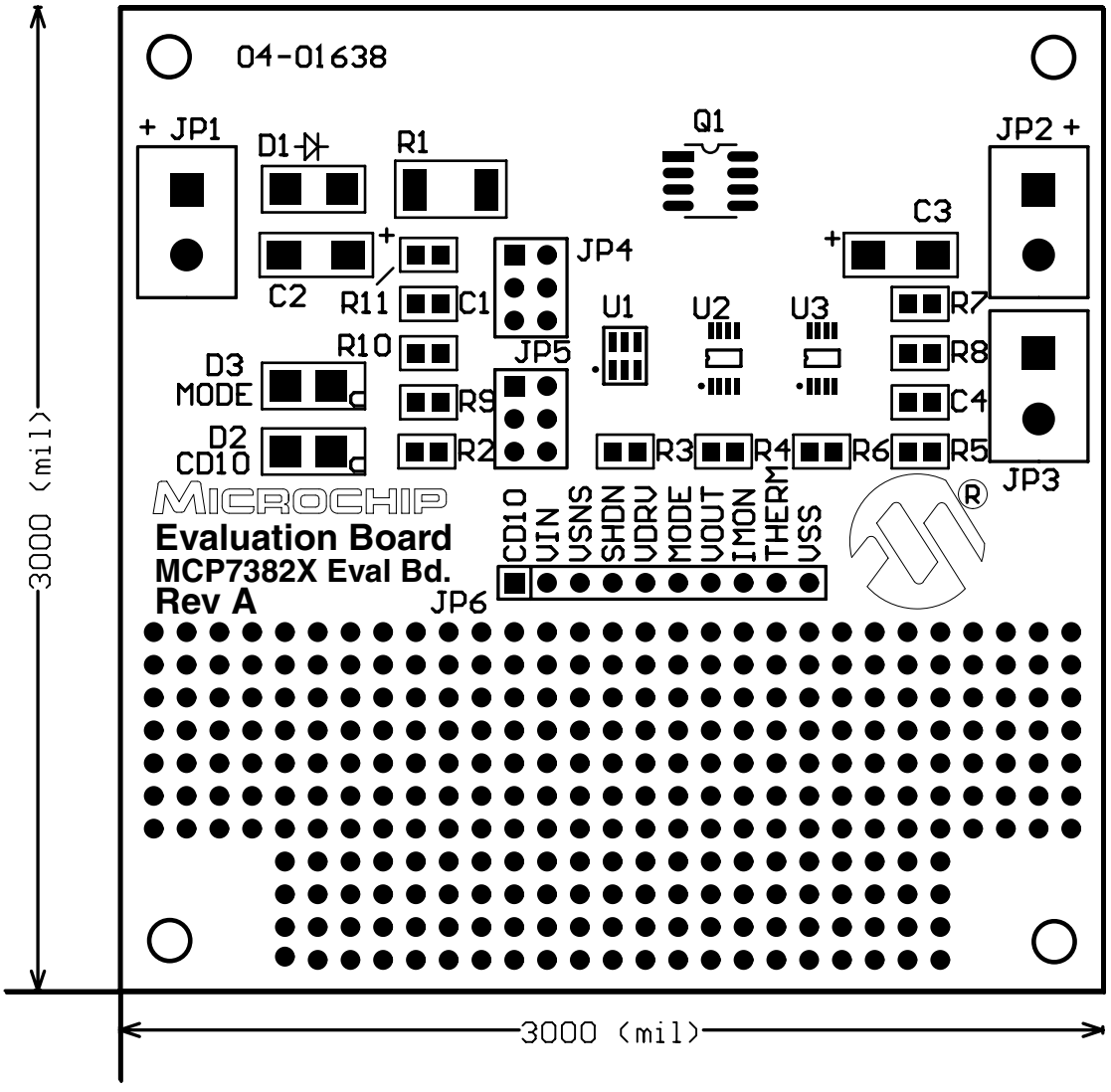
Diagrams included in this appendix:

- Board Schematic
- Board Layout - Top Assembly
- Board Layout - Top Layer
- Board Layout - Bottom Layer

A.3 Board Schematic

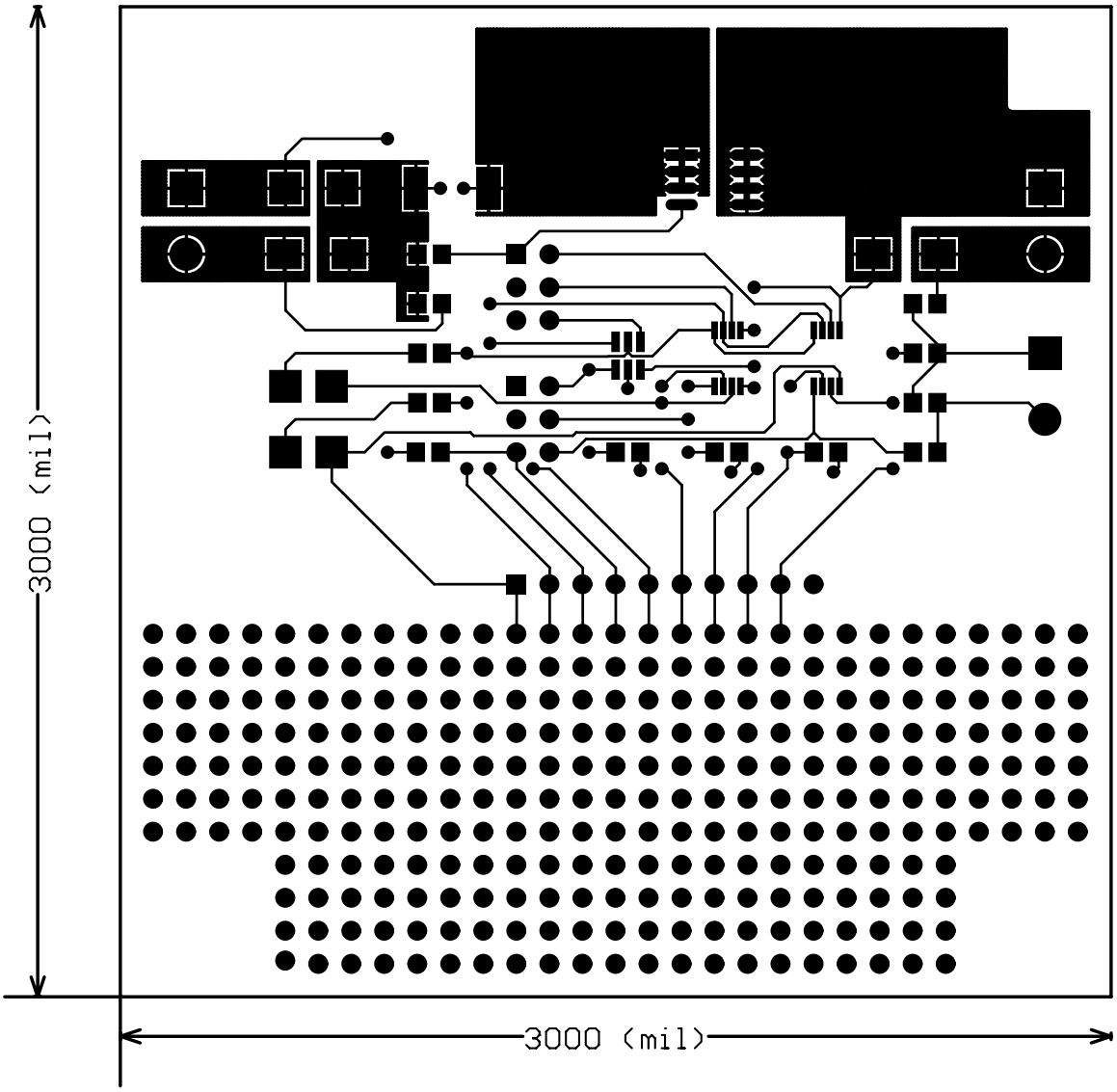


A.4 Board Layout - Top Assembly

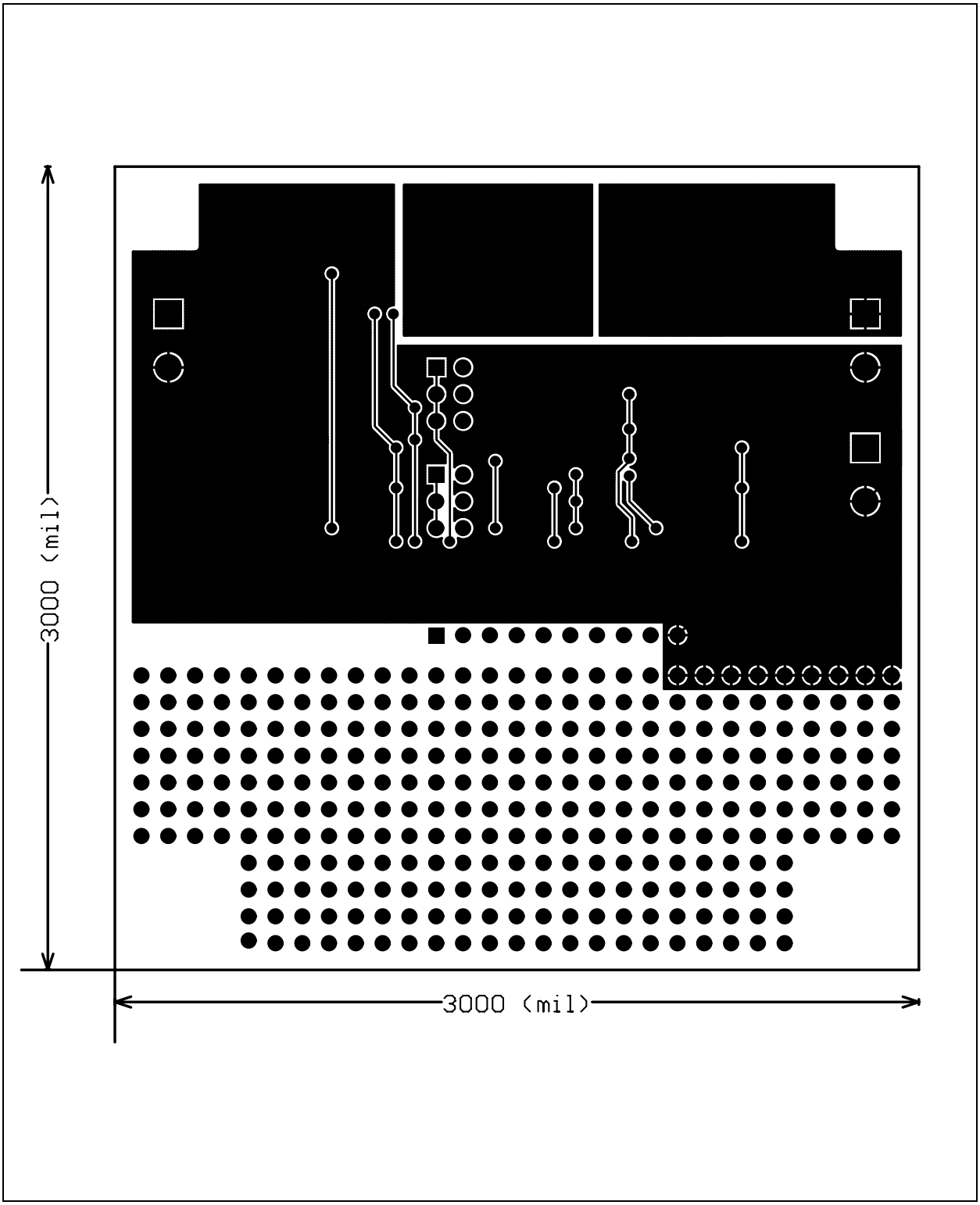


Note: The V_{OUT} connected on JP6 is directly connected to the V_{BAT} pin of the DUT

A.5 Board Layout - Top Layer



A.6 Board Layout - Bottom Layer



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Appendix B. Bill Of Materials (BOM)

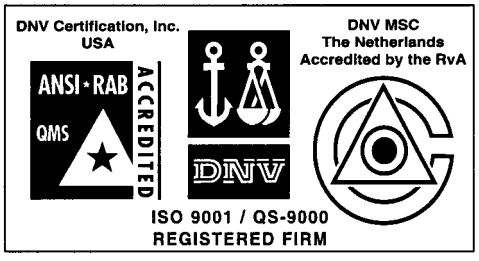
Table B.1: Bill Of Materials (BOM)

Reference Designator	Quantity	Description	Manufacturer	Manufacturer Part Number
R1	1	50 milliohm sense resistor	Panasonic	ERJ-L1WKF050U
R2	1	22.1 kohm, 1/10W, 1%, Thick Film Chip, 0805	Panasonic	ERJ-6ENF2212V
R3, R4, R5, R6	4	22.1 kohm, 1/10W, 1%, Thick Film Chip, 0805	Panasonic	ERJ-6ENF2212V
R7	0	Not populated, 0805		
R8	1	0.0 ohm Jumper, 0805	Phycomp	9C08052A0R00JLH
R9, R10	2	332 ohm, 1/10W, 1%, Thick Film Chip, 0805	Panasonic	ERJ-6ENF3320V
R11	1	274 kohm, 1/10W, 1%, Thick Film Chip, 0805	Panasonic	ERJ-6ENF2743V
C1, C4	2	0.1 µF, 25V, Y5U Ceramic, 0805	Panasonic	ECJ-2VF1E104Z
C2, C3	2	10 µF, 25V, Tantalum, SMC, Input/Output	Panasonic	ECS-T1EC106R
U1	1	Lithium-Ion Battery Charger, SOT23-6	Microchip	MCP73826-4.2VCH
U2	1	Lithium-Ion Battery Charger, MSOP8	Microchip	MCP73827-4.2VUA
U3	1	Lithium-Ion Battery Charger, MSOP8	Microchip	MCP73828-4.2VUA
D1	1	1.5 A Shottky Diode, Reverse Protection	Panasonic	MA2Q705
D2, D3	2	Red LED, Surface Mount	Lumex	SML-LX2832GC
Q1	1	P-channel MOSFET, SOIC8	Fairchild	NDS8434
JP1, JP2, JP3	3	Screw Header	Weidmuller	171602
JP4, JP5	1	Dual In-Line Header, "0.100, 3x2 Position	Sullins	PTC36DAAN [1]
JP6	1	Single In-Line Header, "0.100, 10x1 Position	Sullins	PTC36SYAN [2]
	2	Header Shunts	Sullins	STC02STAN
	4	Bumpons - Protective Products	3M	SJ5003-0

Note 1: JP4, JP5 are ordered as a 36x2 strip header. Cut to fit. One for every 5 boards built.

2: JP6 is ordered as a 36x1 strip header. Cut to fit. One for every 3 boards built.

NOTES:



Microchip received QS-9000 quality system certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona in July 1999. The Company's quality system processes and procedures are QS-9000 compliant for its PICmicro® 8-bit MCUs, KEELOQ® code hopping devices, Serial EEPROMs and microperipheral products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001 certified.

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