



PD70222EVB

Ideal Diode Bridge

Evaluation Board User Guide

Revision 0.2

PRODUCTION DATA – Information contained in this document is proprietary to Microsemi and is current as of publication date. This document may not be modified in any way without the express written consent of Microsemi. Product processing does not necessarily include testing of all parameters. Microsemi reserves the right to change the configuration and performance of the product and to discontinue product at any time.



Table of Contents

1	ABOUT THIS GUIDE	3
1.1	Audience	3
1.2	Organization	3
1.3	Reference Documents	3
2	INTRODUCTION	4
2.1	Evaluation Boards Ordering Information	5
2.2	Evaluation Board Features	5
3	PHYSICAL DESCRIPTION	6
3.1	Physical Characteristics	6
3.2	Package Contents	6
3.3	Connectors	6
3.4	Indications	8
4	ELECTRICAL CHARACTERISTICS	8
5	INSTALLATION	9
5.1	Preliminary Considerations and Safety Precautions	9
5.2	Initial Configuration	9
6	SCHEMATIC	10
7	LIST OF MATERIALS	12
8	BOARD LAYOUT	13



1 About this Guide

This user guide provides both description and operation procedures for Microsemi's PD70222EVB board. This board type is used for evaluating the performance of PD70222 device which is Ideal Bridge targeted for High current PD devices.

PD70222 device supports 2 x 1 Amp inputs received from PSE side.

This current level supports full HDBaseT power. The current from PD70222 diode bridge flows to PD70210ILQ device which is PD front end for High current applications,

PD70210ILQ device supports both HDBASET standard or standard twice IEEE802.3at PD application interface. The board supports a 95 Watt output at the received voltage level.

1.1 Audience

This user guide is intended for qualified personnel, that is, operators and technicians who have a background in basic concepts of electronics.

1.2 Organization

This guide is arranged according to the following:

- Chapter 1 **About this Guide:** Describes the objectives, audience, and organization.
- Chapter 2 **Introduction:** Provides an overview about evaluation board's main functions, features, physical characteristics and ordering information.
- Chapter 3 **Physical Description:** Provides explanation related to the physical description (switches, jumpers, connectors).
- Chapter 4 **Electrical Characteristics:** Provides electrical characteristics of the evaluation board.
- Chapter 5 **Installation:** Provides a description of the installation process.
- Chapter 6 **Schematic:** Provides a board schematic diagram.
- Chapter 7 **List of Materials:** Provides the board's list of materials.
- Chapter 8 **Board Layout:** Provides board Gerber files description for all layers.

1.3 Reference Documents

PD70222 datasheet, catalog number DS_PD70222

PD70210 datasheet, catalog number DS_PD70210 and PD70210A



2 Introduction

Microsemi's PD70210ILQ device is part of a family of devices which are targeted for realizing the HDBASET or multi 802.3at standard PD interface.

The PD interface family of devices includes the following:

Device type	Power Capability	Integrates PWM Controller
PD70210ILD	Twin HDBASET ports	No
PD70210A ILD	Twin HDBASET ports supporting Wall adapter connection	No
PD70211 ILQ	Twin HDBASET ports supporting Wall adapter connection	Yes
PD70222ILQ	Ideal diode bridge	

Microsemi's PD70222EVB Evaluation Board (see Figure 2) provides designers with the environment needed for evaluating the performance and implementation of PD applications based on PD70222 and PD70210 devices.

The board uses a single PD device, PD70210ILQ, to support the Detection, Class, and Power Supplying phases on the 2/4 Pairs of the Cat5 cable. PD70210ILQ supports a standard Twin HDBASET interface and compatible to IEEE802.3AT Type 2 interface.

All necessary steps and connection instructions required to install and operate this board are provided within this document.

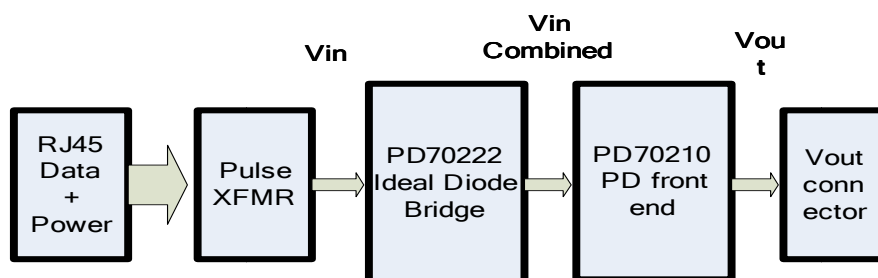


Figure 1: PD70222EVB Block Diagram

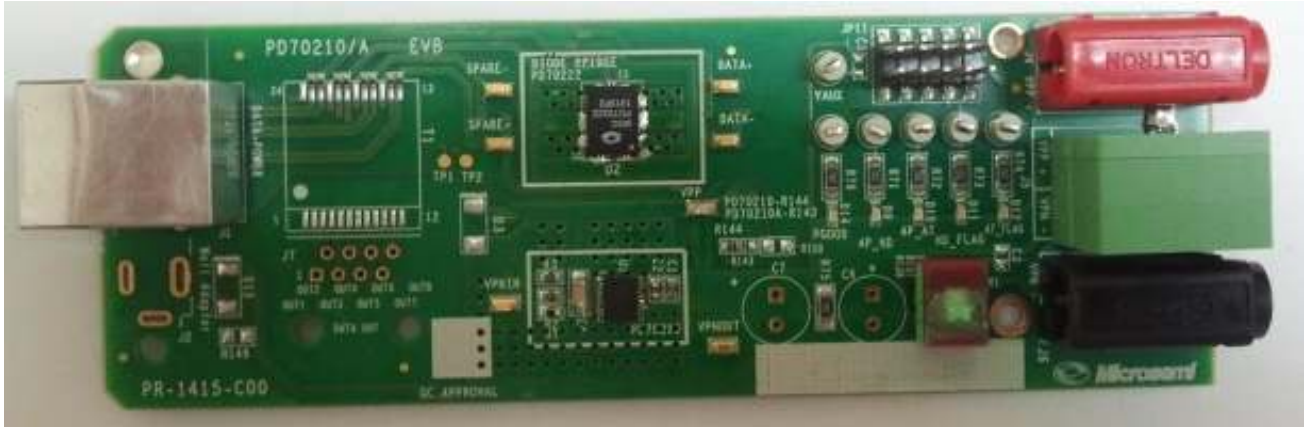


Figure 2: PD70222EVB Evaluation Board – General View

2.1 Evaluation Boards Ordering Information

Microsemi's supplies the following Evaluation Boards:

Ordering Number	Description
PD70222EVB	Dual IEEE802.3AT Type 2 PD/ Twin HDBaseT board, based on PD70210 device. Using PD70222 Ideal diode bridge

2.2 Evaluation Board Features

- Designed to support Data and Spare current using a single PD70210 device
- Data and Power In RJ45 connector (.
- Output voltage connector.
- On board Power Good LED indicator
- On board AT detected LED indicator
- On board 4P_AT detected LED indicator
- On board HD detected LED indicator
- On board 4P_HD detected LED indicator
- Evaluation Board working temperature: 0° to +70°C
- RoHS compliant



3 Physical Description

3.1 Physical Characteristics

The following table lists the evaluation board's physical characteristics.

Table 1: Physical Characteristics

Parameter	Value
Mechanical dimensions in mm	134 x 45 x 19mm (L x W x H)

3.2 Package Contents

Upon opening the Evaluation Board package, verify the following part is included; If it seems damaged, contact local representative or Microsemi's headquarters.

Package content for standard shipments is:

PD70222EVB Evaluation Board

3.3 Connectors

The following sections provide both general and detailed information regarding unit's connectors.

3.3.1 Connectors Table

Lists of the Evaluation Board's connectors.

Table 2: Connectors List

#	Connector	Name	Description
1	J1	RJ45 Connector	RJ45 port for Data and Power In for PSE connection
2	J5	PD device Output	Terminal blocks for connecting a load to output regulator.
3	J4,J6	PD device Output	Banana Jacks for connecting a load to output regulator.

3.3.2 Connectors Detailed Explanation

The numbering is in reference to the numbers listed in the schematics.

1. RJ45 Connector

There is a Data+Power dedicated RJ45 connector, See Figure 3.

Table 3: RJ45 Connectors

CON1 Pin No	Signal Name	Description
1, 2	Data and Power In	Data and power input to powered device (HDBASET Master Negative data port)
3, 6	Data and Power In	Data and power input to powered device (HDBASET Master Positive data port)
4, 5	Data and Power In	Data and power input to powered device (HDBASET Master Positive data port)
7, 8	Data and Power In	Data and power input to powered device (HDBASET Master Negative data port)



Figure 3: Front RJ45 Connector

2. V_{out} Connectors

See Figure 4.

J5 – DCDC output connection, used for connecting to external load.

For easy connection, Black and Red Banana jacks are parallel to J5 connections.

Table 4: J5 Connector (Green)

Pin No.	Signal Name	Description
J5 (Left)- Pin 1	Vout_Rtn	Return PD received output voltage
J5 (Right)-Pin 2	Vout	Positive PD received output voltage



Figure 4: V_{out} Connectors

3.4 Indications

The following sections provide general information regarding unit indications.

3.4.1 LED Indication

See Figure 5.

D14 is the Power_GOOD indication LED, a PD70210 device output signal indicating the device isolation switch is operated. In all operating state this flag is lit.

D12 is the AT_FLAG indication LED, a PD70210 device output signal indicating the device has detected a 2 finger class event from the PSE side in the class stage. The flag will be operative at 3, 4, and 6 fingers detection as well.

D10 is the 4P_AT indication LED, a PD70210 device output signal indicating the device has detected a 4 finger class event from the PSE side in the class stage, or a 2 finger class event from the PSE side in the class stage, and SUPP_Sa and SUPP_Sb are both High.

The flag will be operative at 6 fingers detection as well.

D11 is the HD_FLAG indication LED, a PD70210 device output signal indicating the device has detected a 3 finger class event from the PSE side in the class stage.

The flag will be operative at 6 fingers detection as well.

D9 is the 4P_HD indication LED, a PD70210 device output signal indicating the device has detected a 6 finger class event from the PSE side in the class stage.



Figure 5: LED Indications

4 Electrical Characteristics

Evaluation board electrical characteristics are described below:

Table 5: Electrical Characteristics

Parameter	Min	Max	
RJ45 connector	37	57	V
Maximum Available Current	2.2		A

5 Installation

5.1 Preliminary Considerations and Safety Precautions

Verify board's power supply is turned off before all peripheral devices are connected.

Note: In maximum power at the output, some of the devices may reach high temperatures (still less than 70 degrees). Pay attention while testing these devices.

5.2 Initial Configuration

Note: Prior to starting any operation, it is important to verify that the Evaluation Board is setup as shown in Figure 6.

1. Connect load to main board (J1).
2. Connect a Cat5 cable from PSE to Evaluation Board (CON1). Alternatively connect a power cable from Power supply to Evaluation Board (J2).
3. When there is a need to test the Ethernet data, connect Ethernet cable from Evaluation Board (CON2) to PD Ethernet Host.

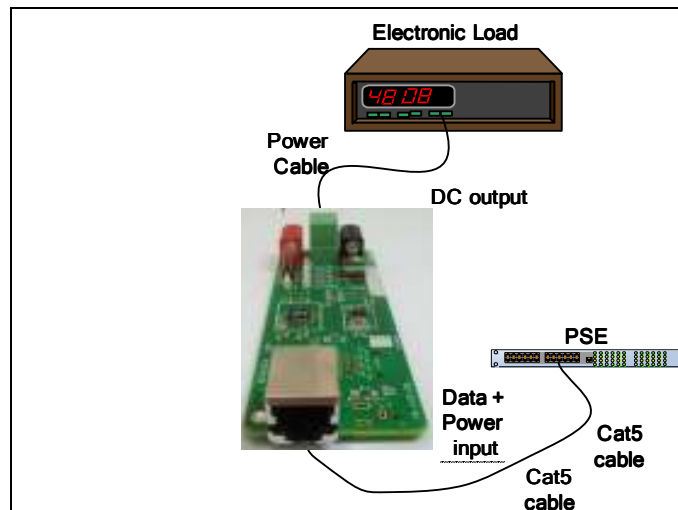


Figure 6: Test Setup

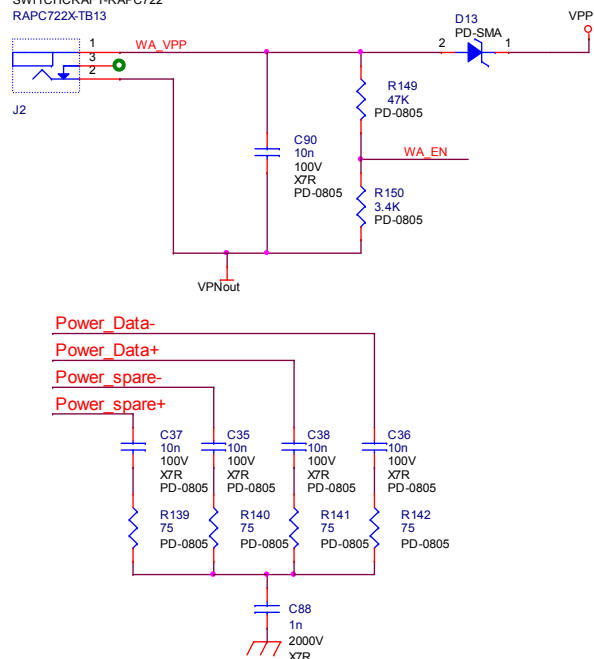


POWER + DATA INPUT





SWITCHCRAFT-RAPC722
RAPC722X-TB13



PD70222EVB Evaluation Board – User Guide

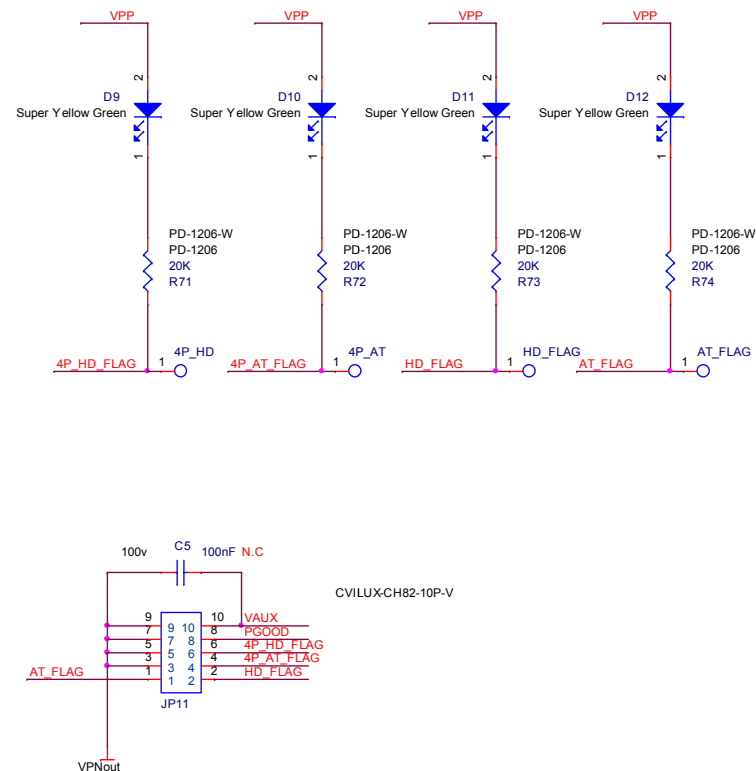


Figure 8: Board Schematics (2 of 2)



7 List of Materials

#	Item Description	Qty	Ref Des	Manufacturer	Manufacture P/N
1	CAP CRM 10nF 100V 5% X7R 0805 SMT	4	C35-C38	AVX	08051C103JAT2A
2	CAP CRM 1nF/2000V X7R 1206 SMT	1	C88	AVX	1206GC102KAT1A
3	CAP CRM 100nF 100V 10% X7R 1206 SMT	1	C4	AVX	12061C104KAT2A
4	Capacitor, X7R, 1uF, 25V, 10% 0603	1	C2	Murata	GRM188R71E105KA12D
5	Capacitor, X7R, 100nF, 100v, 10% 0603	1	C1	Murata	GRM188R72A104KA35D
6	PIN HEADER 2*5 PINs SMT 0.1"	1	JP11	CviLux	CH81-102M100-00
7	CON RJ45 SINGLE 8 POS	1	J1	Bel Stewart	SS71800-007F
8	Banana Socket Red	1	J4	Deltron	571-0500
9	Banana Socket Black	1	J6	Deltron	571-0100
10	Terminal block	1	J5	DINKLE	DT-123RA-02P
11	Ideal Diode Bridge dual bridge SMT	1	U2	Microsemi	PD70222
12	LED SuperYelGrn 0603 SMD	5	D9-D12, D14	Everlight	19-21-SYGCS530E3TR8
13	RES 75R 125mW 1% 0805 SMT	4	R139-R142	Bourns	CR0805-FX-75R0-ELF
14	Resistor, 0 Ohm, 5%, 1/16W 0402	8	R128-R135	ASJ	CR10-000ZK
15	RES TCK FLM 7.87K 1% 62.5mW 0402 SMT	2	R151, R152	Bourns	CR0402-FX-7871-ELF
16	RES TK FLM 20K 250mW 1% 1206	6	R71-R76	Bourns	CR1206-FX-2002-ELF
17	RES TCK FLM 0R 62.5mW 5% 0603 SMT	1	R144	ASJ	CR16-000ZL
18	RES TCK FLM 24.9K 62.5mW 1% 0603 SMT	1	R3	ASJ	CR16-2492FL
19	Resistor, 30.9R 1%, 1/10W 0603	1	R1	KOA	RK73H1JTTD30R9F
20	RES TCK FLM 60.4K 62.5mW 1% 0603 SMT	1	R2	ASJ	CR16-6042FL
21	DIP SWITCH 2 Positions 1 pole T/H	1	SW1	Grayhill	7801T
22	High Power Front-End PD IF SMT	1	U1	Microsemi	PD70210ILD

8 Board Layout

This paragraph presents the layout of the evaluation board.

The board is a 2 layer board. The layers are 2 Oz layers. Below figures present the two copper layers and the silk of the board for tracking devices placements.

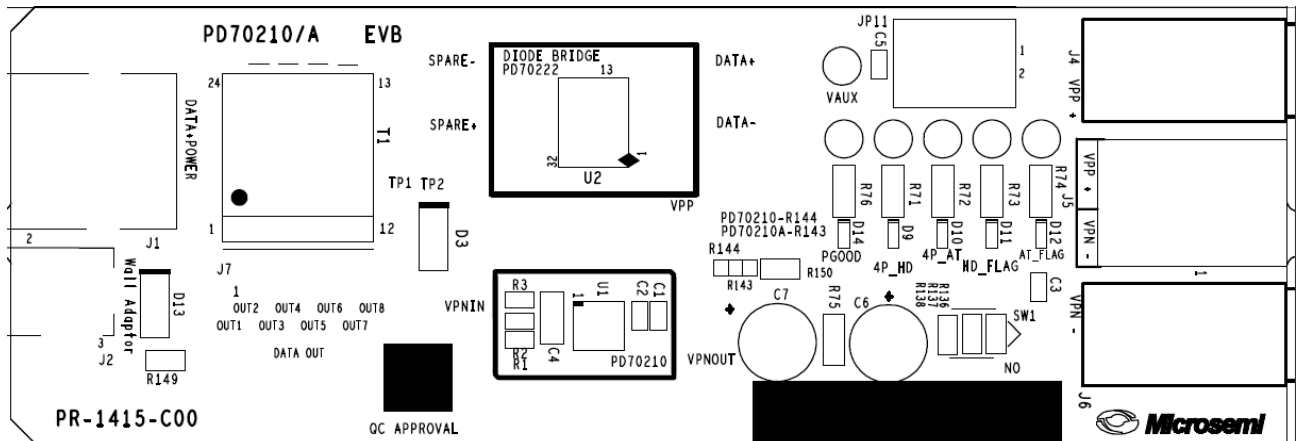


Figure 9: PD70222EVB PCB Silk Top

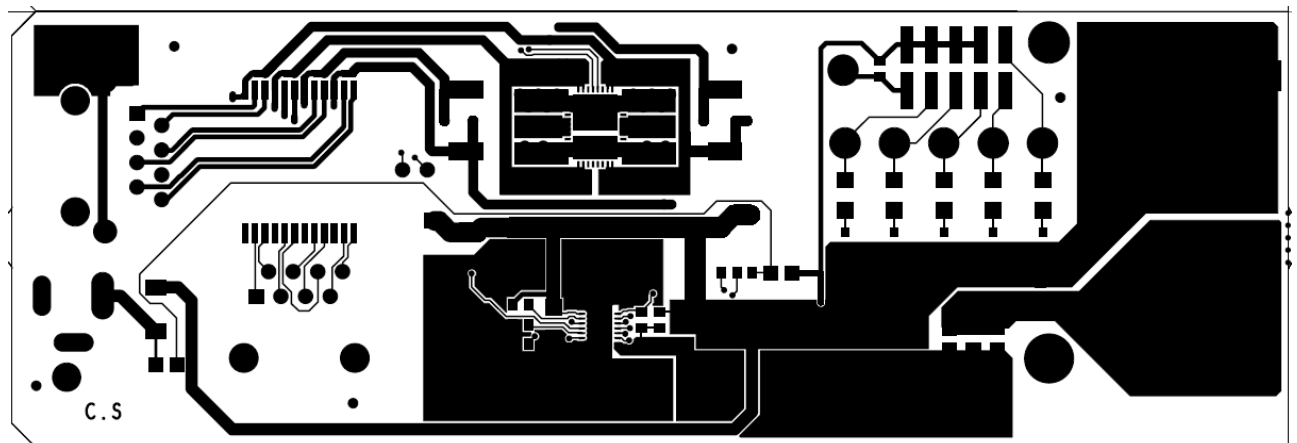


Figure 10: PD70222EVB PCB Top Copper

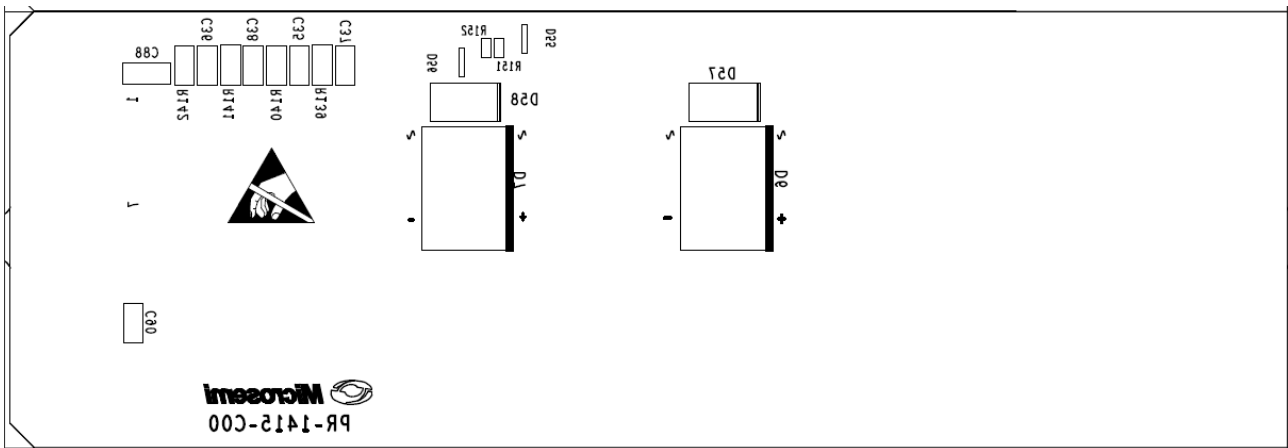


Figure 11: PD70222EVB PCB Silk Bottom

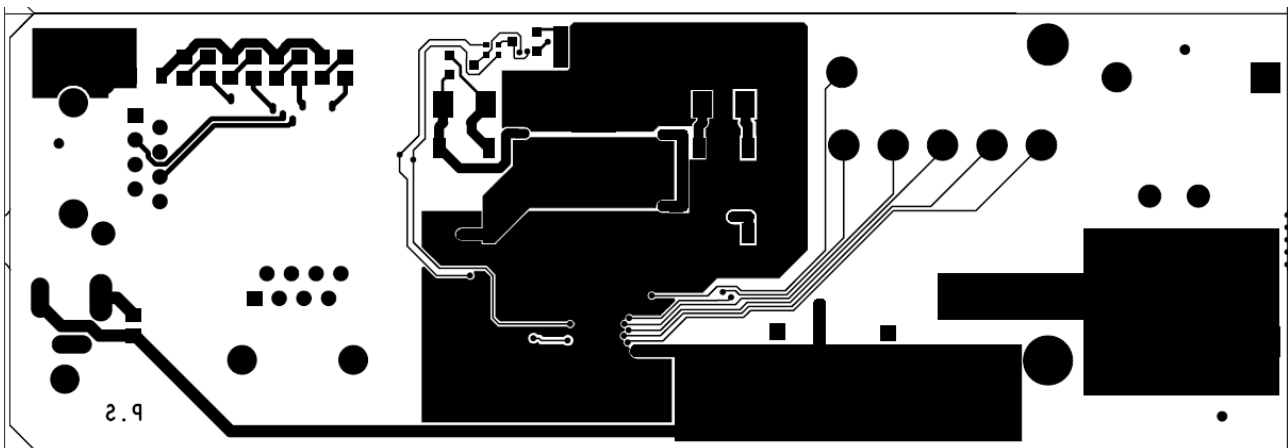


Figure 12: PD70222EVB PCB Bottom Copper



The information contained in the document is PROPRIETARY AND CONFIDENTIAL information of Microsemi and cannot be copied, published, uploaded, posted, transmitted, distributed or disclosed or used without the express duly signed written consent of Microsemi. If the recipient of this document has entered into a disclosure agreement with Microsemi, then the terms of such Agreement will also apply. This document and the information contained herein may not be modified, by any person other than authorized personnel of Microsemi. No license under any patent, copyright, trade secret or other intellectual property right is granted to or conferred upon you by disclosure or delivery of the information, either expressly, by implication, inducement, estoppels or otherwise. Any license under such intellectual property rights must be approved by Microsemi in writing signed by an officer of Microsemi.

Microsemi reserves the right to change the configuration, functionality and performance of its products at anytime without any notice. This product has been subject to limited testing and should not be used in conjunction with life-support or other mission-critical equipment or applications. Microsemi assumes no liability whatsoever, and Microsemi disclaims any express or implied warranty, relating to sale and/or use of Microsemi products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right. The product is subject to other terms and conditions which can be located on the web at <http://www.microsemi.com/legal/tnc.asp>

Revision History

Revision Level / Date	Para. Affected/Page	Description
0.1 / 30-April-13		Initial revision
0.2 / 01-May-13		Fix layout figures

© 2013 Microsemi Corp.

All rights reserved.

For support contact: sales_AMSG@microsemi.com

Visit our web site at: www.microsemi.com

Catalog Number: PD70222EVB_UG