



PD70210EVB
PD70210 HDBT level PD
Evaluation Board User Guide

Revision 1.0

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1 About this Guide

This user guide provides both description and operation procedures for Microsemi's PD70210 evaluation board. This board type is used for evaluating the performance of PD70210 device.

PD70210ILD device supports both HDBT standard or standard 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 2 **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

PD70210 datasheet, catalog number DS_PD70210_PD70210A

2 Introduction

Microsemi’s PD70210ILD device is part of a family of devices which are targeted for realizing the HDBT 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 HDBT ports	No
PD70210AILD	Twin HDBT ports supporting Wall adapter connection	No
PD70211ILQ	Twin HDBT ports supporting Wall adapter connection	Yes

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

The board uses a single PD device, PD70210ILD, to support the Detection, Class, and Power Supplying phases on the 2/4 Pairs of the Cat5 cable. PD70210ILD supports a standard Twin HDBT 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.

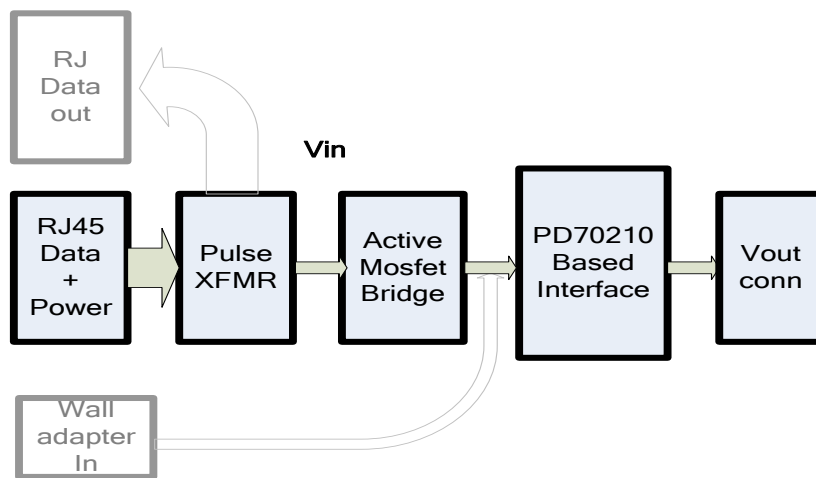


Figure 1: PD70210EVb Block Diagram

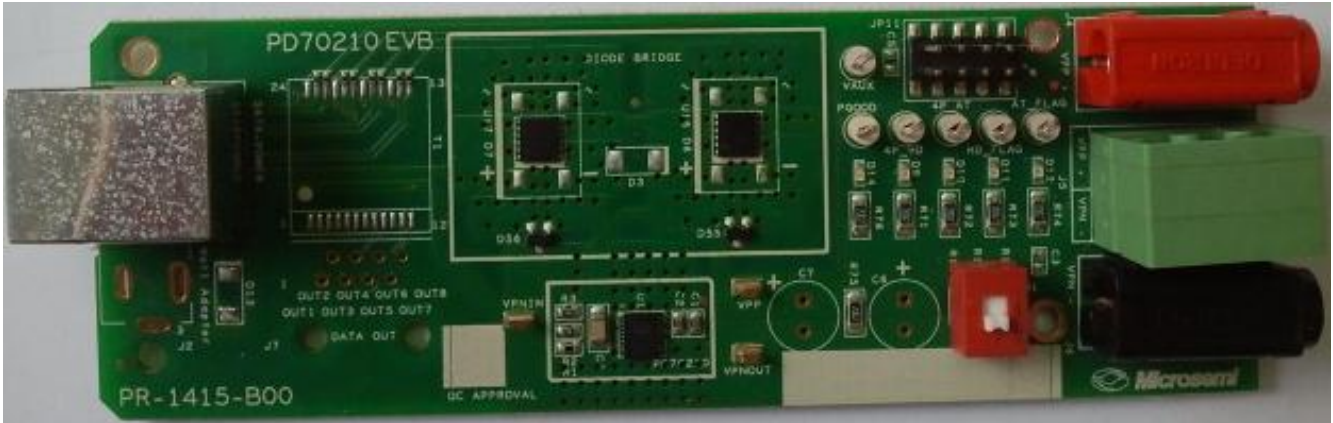


Figure 2: PD70210 Evaluation Board – General View

2.1 Evaluation Boards Ordering Information

Microsemi’s supplies the following Evaluation Boards:

Ordering Number	Description
PD70210EVB	IEEE802.3AT Type 2 PD, based on PD70210 device,

2.2 Evaluation Board Features

- Designed to support Data and Spare current by a single PD70210 device
- Input RJ45 connectors (Data and Power In)
- Output voltage connector.
- On board PSE type LED indicators
- Evaluation Board working temperature: 0° to +70°C
- RoHS compliant



3 Physical Description

3.1 Physical Characteristics

The following Table 1 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:

PD70210 Evaluation Board

3.3 Connectors

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

3.3.1 Connectors Table

Table 2 lists 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.
3	J4,J6	PD device Output	Banana Jacks for connecting a load to output.

3.3.2 Connectors Detailed Explanation

The numbering is in reference to the numbers listed in Table 2.

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 (HDBT Master Negative data port)
3, 6	Data and Power In	Data and power input to powered device (HDBT Master Positive data port)
4, 5	Data and Power In	Data and power input to powered device (HDBT Master Positive data port)
7, 8	Data and Power In	Data and power input to powered device (HDBT Master Negative data port)

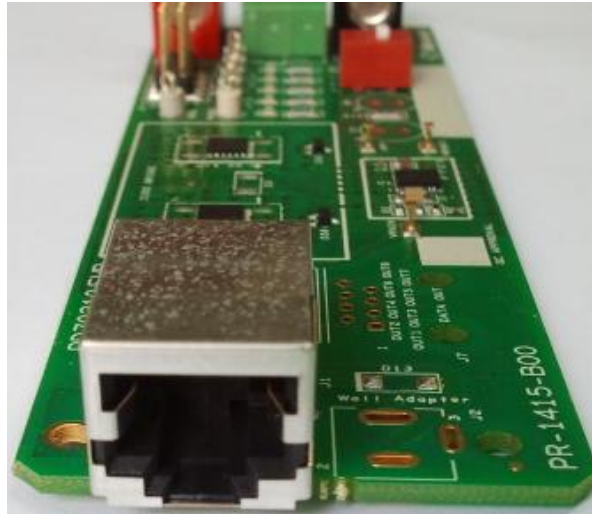


Figure 3: Front RJ45 Connector

2. V_{out} Connectors

See Figure 4.

J5 –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

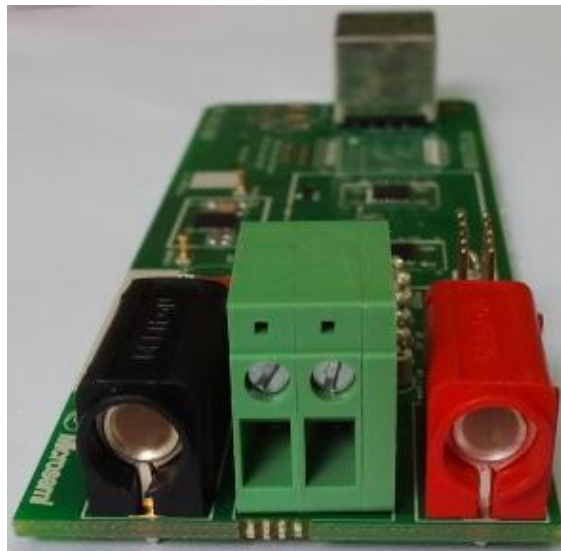


Figure 4: V_{out} Connectors

3.4 Indications

The following sections provide general information regarding unit indications.

3.4.1.1 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.

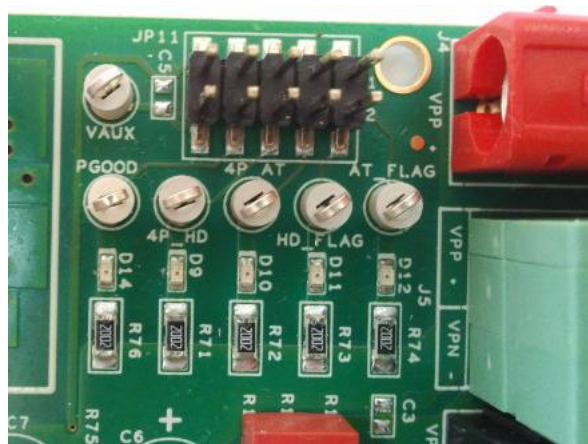


Figure 5: LED Indications

4 Electrical Characteristics

Evaluation board’s electrical characteristics are described below:

Table 5: Electrical Characteristics

Parameter	Min	Max	
RJ45 connector	38	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 (J5), while it is turned Off.

Notice: To comply with IEEE802.3AT standard, the load should be set only after the PSE is On.
The indication for PSE On is PGOOD led lit.

2. Connect a Cat5 cable from PSE to Evaluation Board (J1).
3. Turn On the Load.

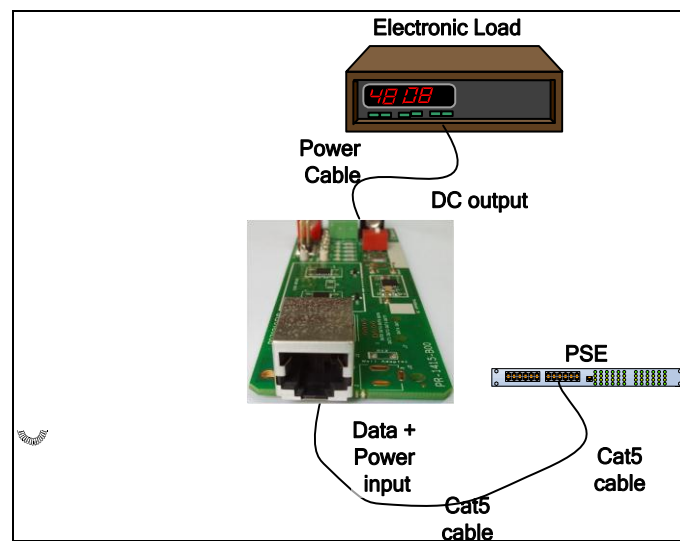
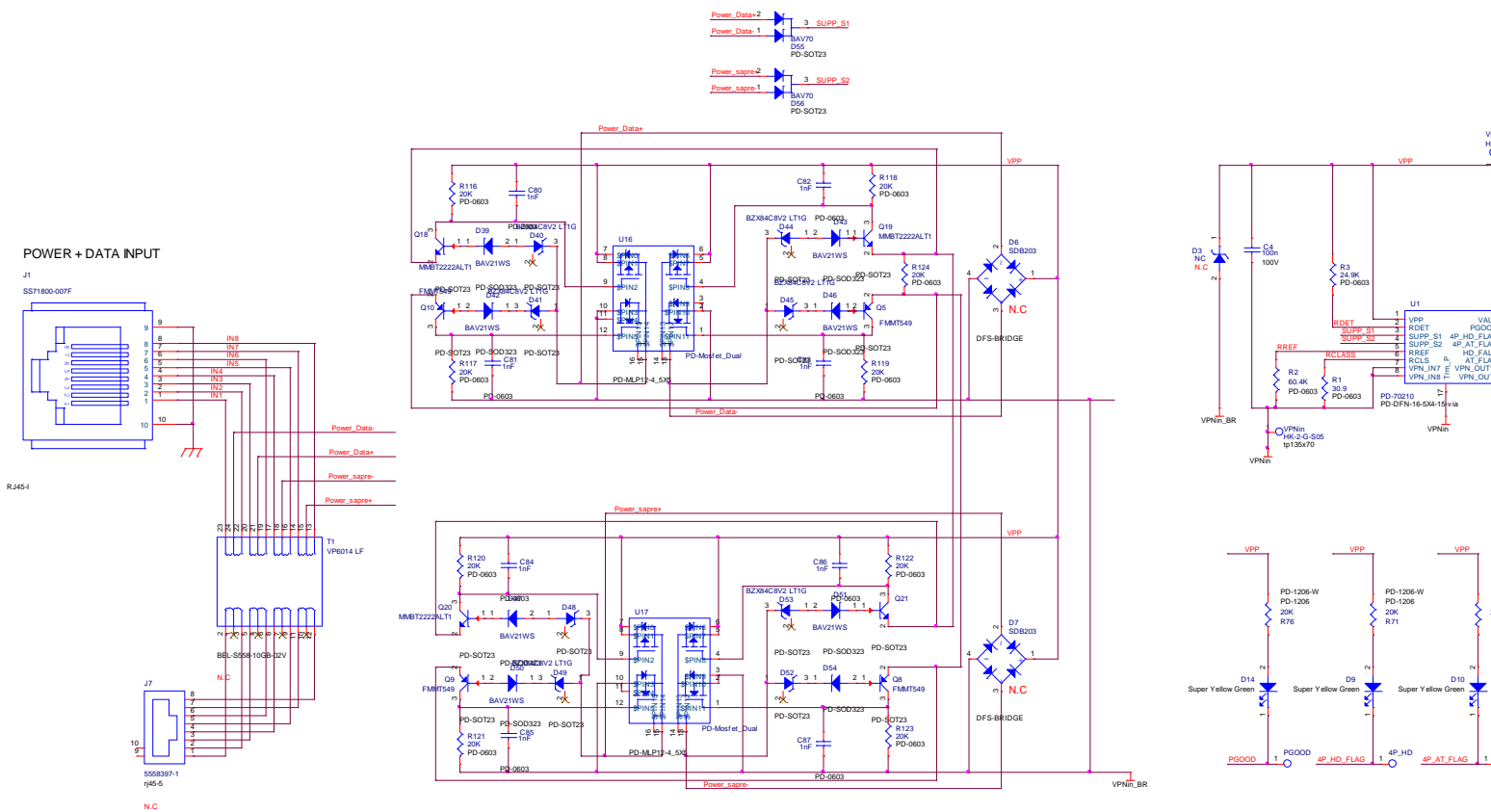


Figure 6: Test Setup



6 Schematic





PD70210

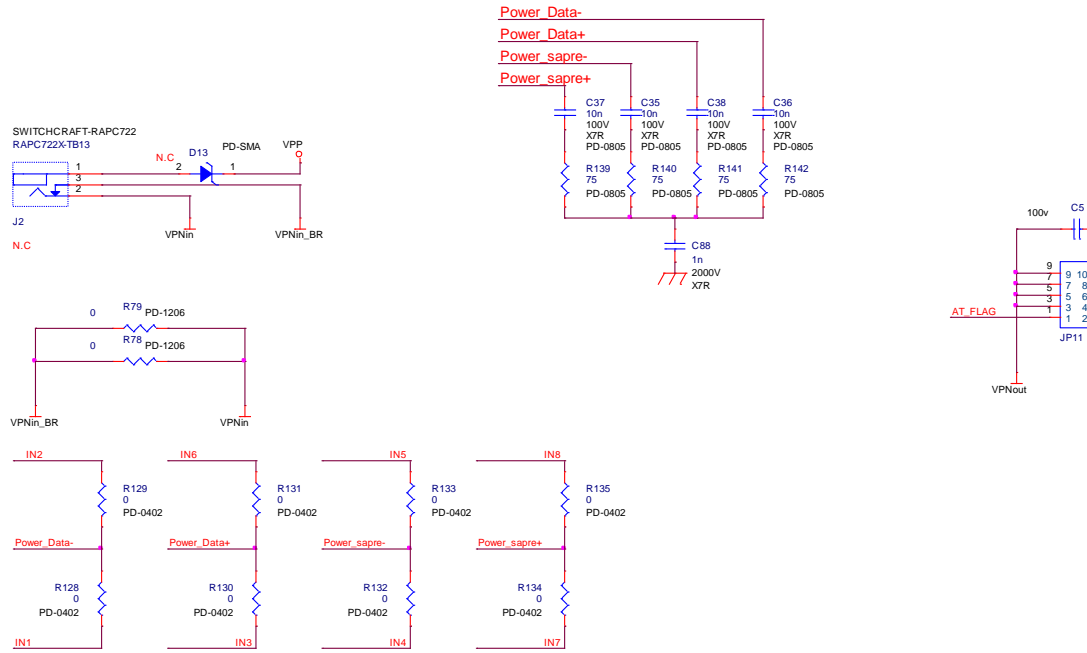


Figure 8: Board Schematics (2 of 2)



7 List of Materials

Table 6: PD70210EVB Components

	Item Description	Qty	Ref Des	Mfr	Manufacturer PN
1	HDbaseT, AF/AT PD CHIP Front End	1	U1	Microsemi	PD70210ILD
2	CAP CRM 10nF 100V 5% X7R 0805 SMT	4	C35-C38	AVX	08051C103JAT2A
3	CAP CRM 1nF/2000V 10%++X7R 1206 SMT	1	C88	AVX	1206GC102KAT1A
4	CAP CRM 100nF 100V 10% X7R 1206 SMT	1	C4	AVX	12061C104KAT2A
5	Cap 1nF 100V 10% X7R 0603 SMT	8	C80-C87	Hitano	0603B102K101NT
6	Capacitor,X7R, 1uF, 25V, 10% 0603	1	C2	Murata	GRM188R71E105KA12D
7	Capacitor, X7R, 100nF,100v, 10% 0603	1	C1	Murata	GRM188R72A104KA35D
8	PIN HEADER 2*5 PINs SMT 0.1" PIN SQUER TIN	1	JP11	CviLux	CH81-102M100-00
9	CON RJ45 SINGLE 8 POS. SHILD ED	1	J1	Bel Stewart	SS71800-007F
10	90o Socket 4mm Red	1	J4	Deltron	571-0500
11	90oSocket 4mm Black	1	J6	Deltron	571-0100
12	Terminal block 2 pole insert	1	J5	DINKLE	DT-123RA-02P
13	DIO 200V 250mA SOD323 SMT trr=50nSEC SWI	8	D39,D42,D43,D46,D47, D50,D51,D54	Diodes Inc.	BAV21WS-7-F
14	DIO DUAL 70V 200mA 250mW Trr=6nS COM. CAT SOT23	2	D55,D56	Infineon	BAV70
15	DIO 8.2V 225mW 5% Ir=5uA SOT23 SMT ZENER	8	D40,D41,D44,D45,D48, D49,D52,D53	ON Semi	BZX84C8V2 LT1G
16	LED SuperYelGrn 100-130o 20-40mcd h=1 0603 SMD	5	D9-D12,D14	Everlight	19-21-SYGCS530E3TR8
17	RES 75R 125mW 1% 0805 SMT	4	R139-R142	Bourns	CR0805-FX-75R0-ELF
18	Resistor, 0 Ohm, 5%, 1/16W 0402	8	R128-R135	ASJ	CR10-000ZK
19	RES 0R 250mW 5% 1206 SMT JUMPER<0.05R	2	R78,R79	Samsung	RC3216J000CS
20	RES TK FLM 20K 250mW 1% 1206	6	R71-R76	Bourns	CR1206-FX-2002-ELF
21	Resistor, 20K, 5%, 1/16W 0603	9	R116-R124	ASJ	CR16-203JL
22	RES TCK FLM 24.9K 62.5mW 1% 0603 SMT	1	R3	ASJ	CR16-2492FL
23	Resistor, 30.9R 1%, 1/10W 0603	1	R1	KOA	RK73H1JTTD30R9



	Item Description	Qty	Ref Des	Mfr	Manufacturer PN
					F
24	RES TCK FLM 60.4K 62.5mW 1% 0603 SMT	1	R2	ASJ	CR16-6042FL
25	DIP SWITCH 2 Positions 1 pole	1	SW1	Grayhill	7801T
26	TRN PNP -30V -1A SOT23	4	Q5,Q8-Q10	Fairchild	FMMT549
27	TRN NPN 40V 600mA SOT23 300 mW	4	Q18-Q21	Diodes Inc.	MMBT2222A-7-F
28	IC Dual N/P CH power mosfet 100v 6A SMT	2	U16,U17	Fairchild	FDMQ8203

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.

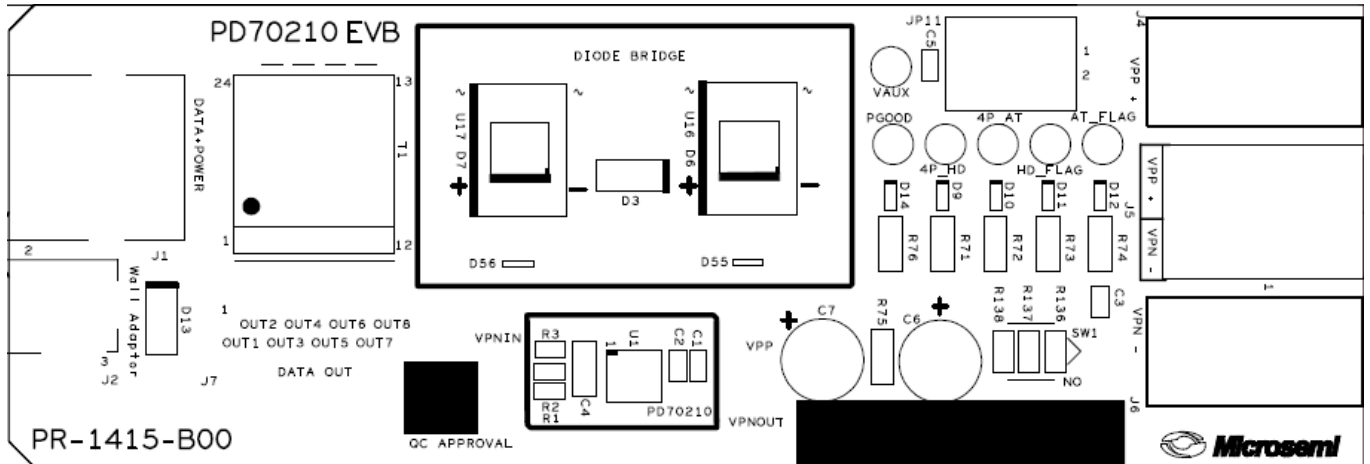


Figure 9: Top Silk

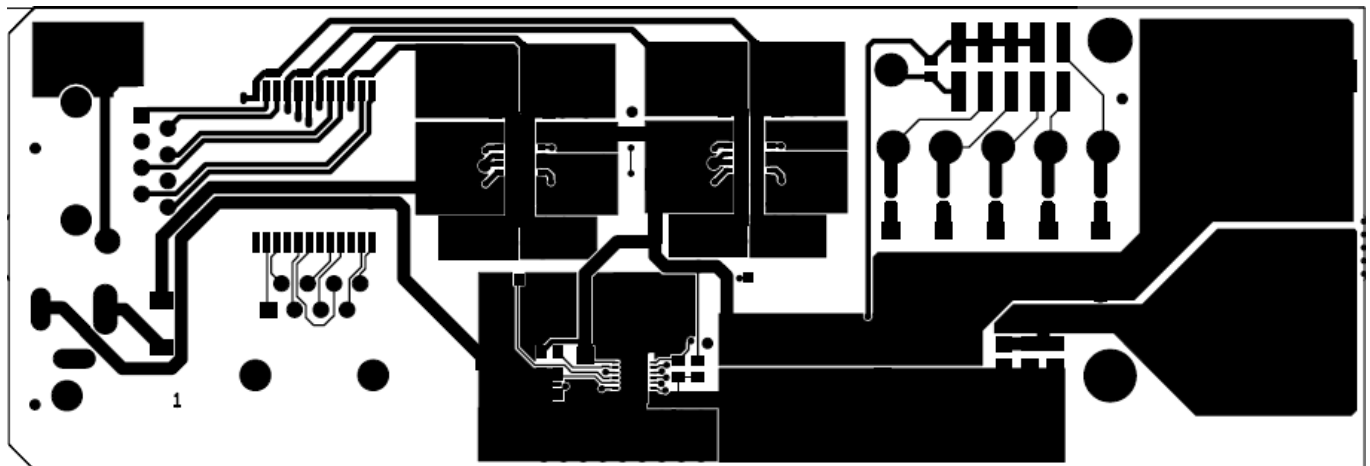


Figure 10: Top Layer

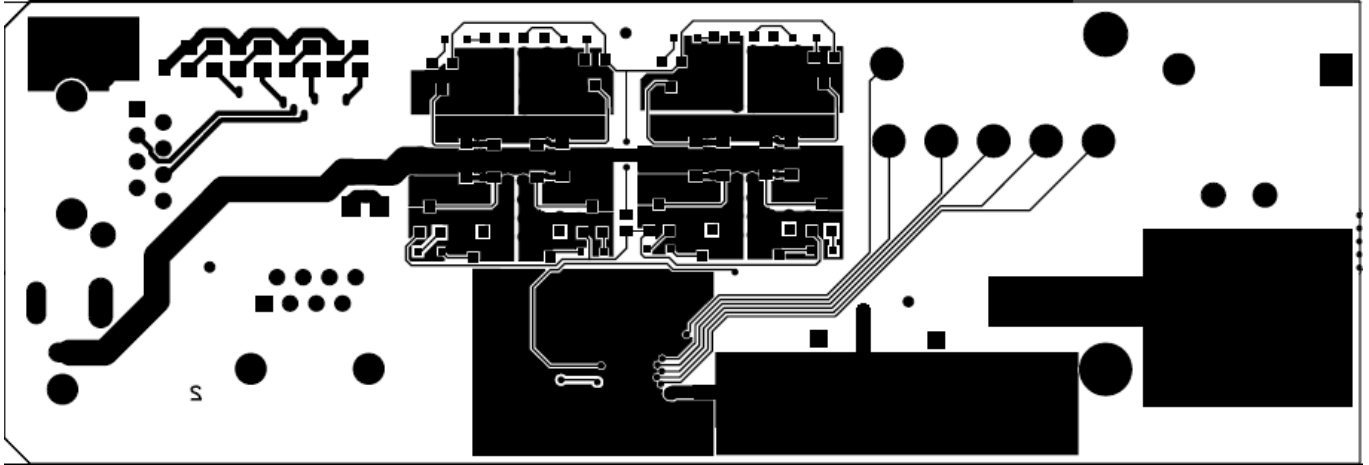
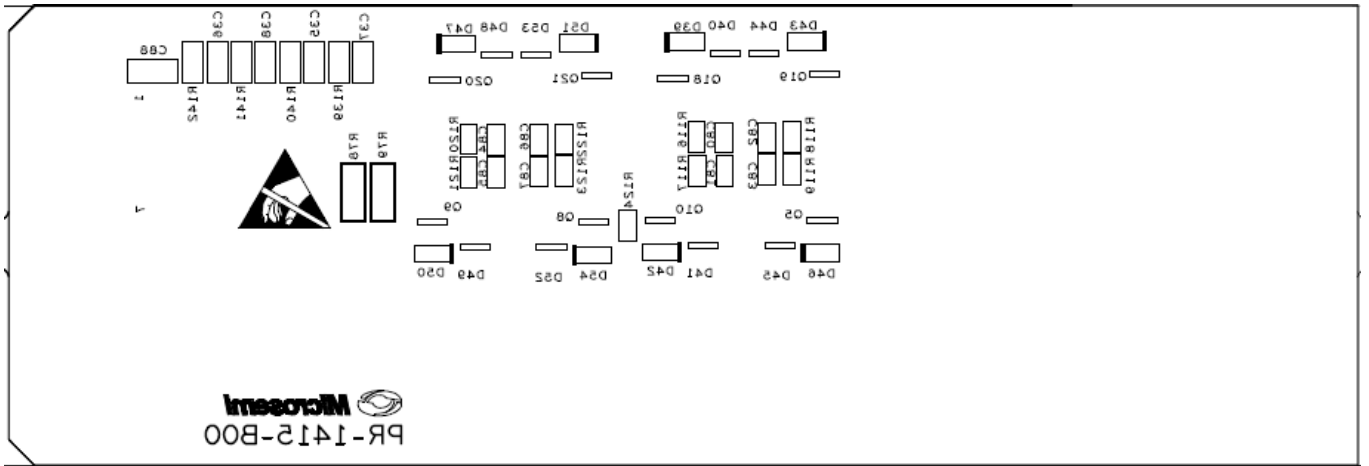


Figure 11: Bottom Layer





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Revision History

Revision Level / Date	Para. Affected/Page	Description
0.1 / 07-01-13		Initial revision
1.0 / 09-10-13		updated BOM

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