



**PD-IM-7508**  
**Evaluation Board User Guide**  
**Including:**  
**PD69108 – PoE Manager**  
**PD39100 – PoE Controller**

**Security Status: Restricted**

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### Reference Documents

- IEEE 802.3af-2003 Standard, DTE Power via MDI
- IEEE802.3at-2009 Standard, DTE Power via MDI
- PD69108 datasheet, catalog number DS\_PD69108
- PD39100 datasheet, catalog number DS\_PD39100
- PD70200 datasheet, catalog number DS\_PD70100\_PD70200
- Application note 206: Designing an 8-port with PD39100 & PD69108 (802.3af/802.3at Compliant), catalog number PD39100\_PD69108\_AN206
- Application note 186: Layout Design Guidelines for PD69108/PD69104 PoE Systems, catalog number 06-0081-080
- PD63000/G & PD69000 & PD69100 Serial Communication Protocol User Guide , catalog number PD63000\_UG
- Software GUI user guide catalog number 06-0027-056

The above documents can be obtained via Microsemi customer support. To access other documents, go to our website at <http://www.microsemi.com/>, and under Tech Support\Documentation look up the relevant documents.



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# 1 About this Guide

## 1.1 Objectives

This user guide provides both a description and operation procedures for Microsemi's PD-IM-7508 evaluation system. This system is used to evaluate the performance of 8 port PoE applications.

## 1.2 Audience

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

## 1.3 Organization

This guide is divided into several sections:

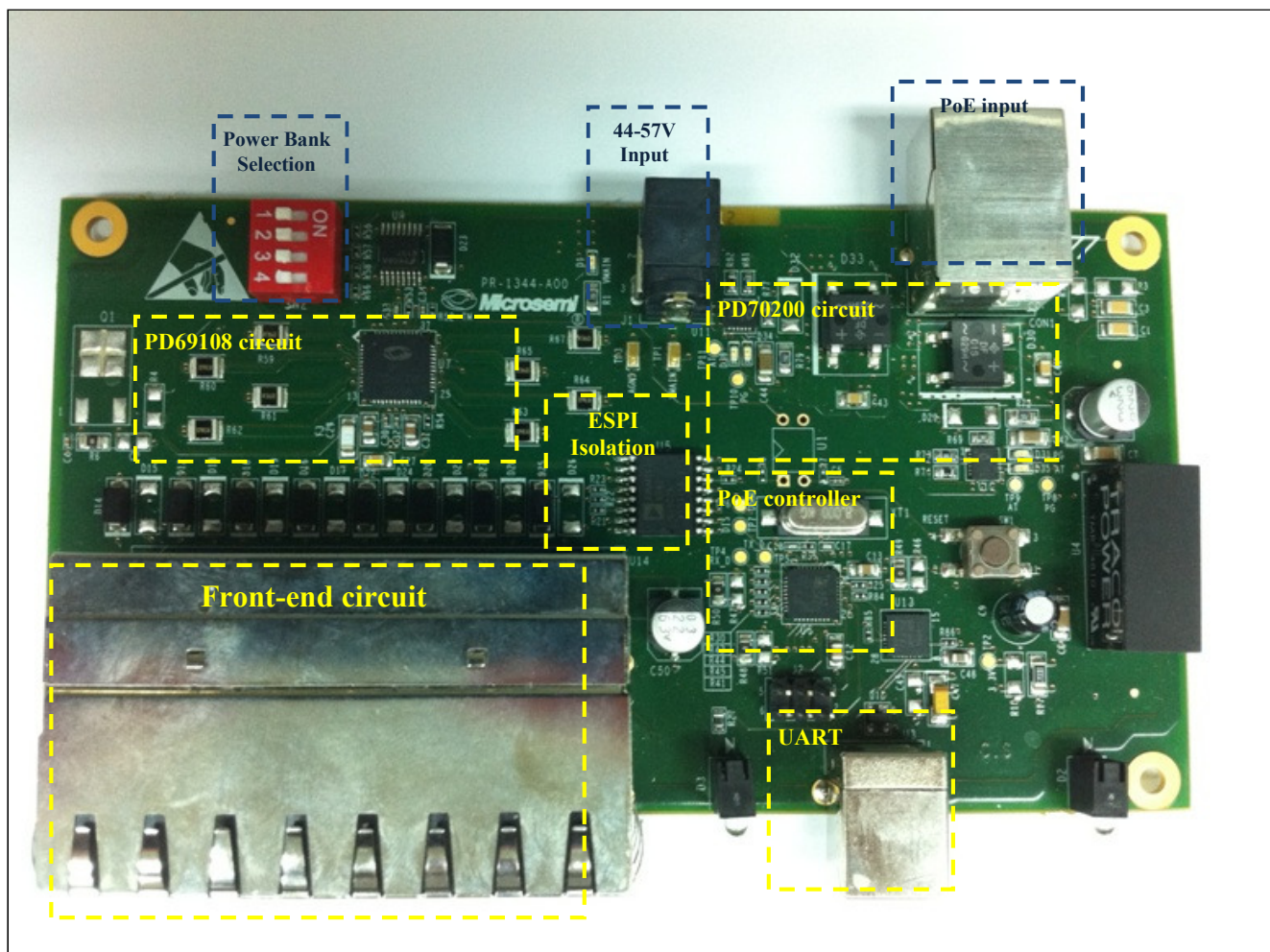
Chapter 1	"About this Guide" which describes the objectives, audience and organization.
Chapter 2	"Introduction" which gives an overview of the main functions, features, physical characteristics, and ordering information.
Chapter 3	"Physical Description" which provides a physical description of the components (switches, jumpers, connectors).
Chapter 4	"Electrical Characteristics" which lists the electrical characteristics of the PoE evaluation system.
Chapter 5	"Installation" which describes the installation process.

## 2 Introduction

Microsemi's Evaluation Board PD-IM-7508 provides the designer with the environment to evaluate the performance and the implementation of 8-port Power over Ethernet (PoE), based on Microsemi's PoE Devices (PD39100 & PD69108).

Evaluation Board assists Switch designers to evaluate an IEEE- 802.3af-2003 and IEEE802.3at-2009PoE based solution, with maximum flexibility and ease in configuration.

Microsemi's PD69108 is a 8-port, mix-signal, high-voltage Power over Ethernet (PoE) Manager designed to support IEEE- 802.3af-2003 and IEEE802.3at-2009 PoE applications.



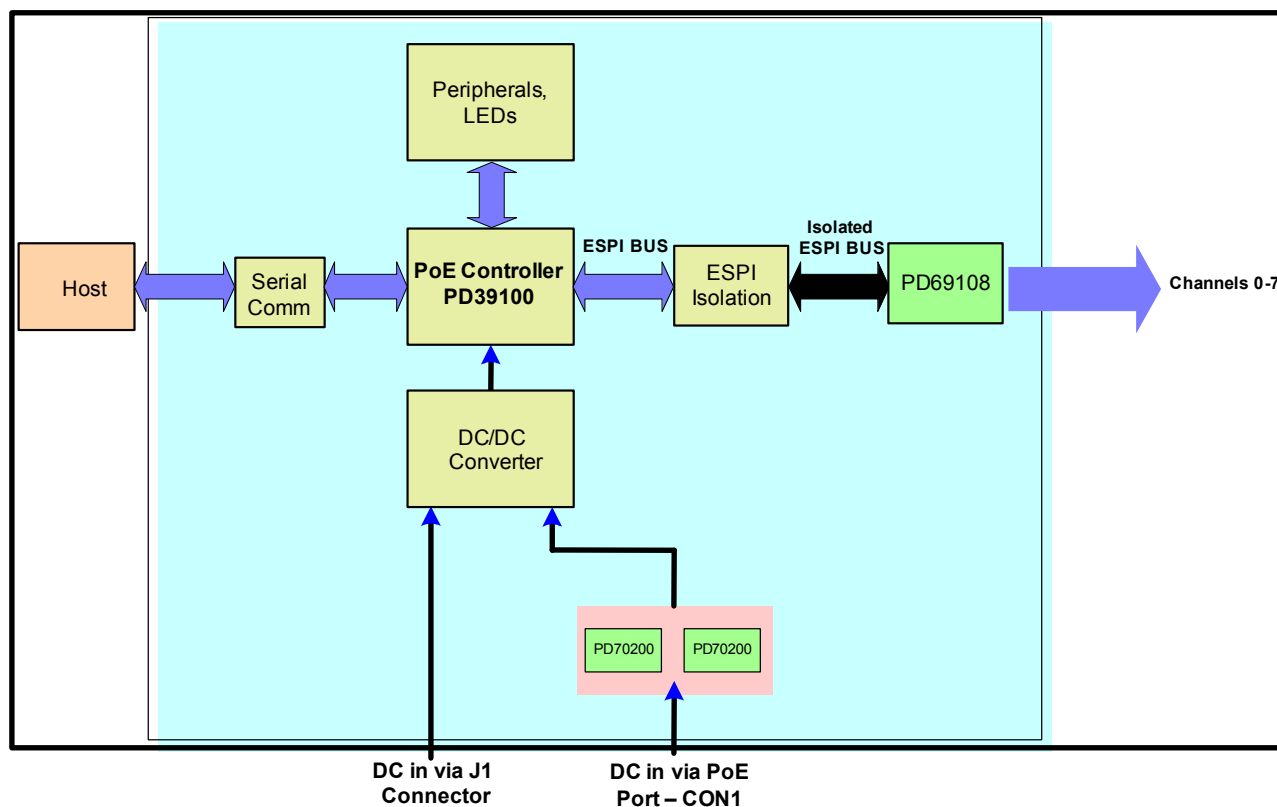
**Figure 1: PD-IM-7508 Evaluation Board – General View**

This document details the steps and connection instructions required to install and operate this board.

Evaluation Board enables PoE designers to evaluate Microsemi's PoE solution with maximum flexibility and ease in configuration.

## 2.1 Hardware Block Diagram Description

The block diagram shown in Figure 2 illustrates the 8-port Evaluation Board. A single PD39100 microcontroller unit (PoE Controller) is connected to a single PD69108 PoE device. As shown in the figure, the PoE Controller controls and monitors the PoE device using an isolated ESPI bus. Communication with PoE controller is done by a serial communication interface (UART by USB). EVB can be powered by an external power supply or by another 4pairs PSE port.



**Figure 2: System Configuration**

## 2.2 Evaluation Board/System Ordering Information

The following table lists EVB ordering information.

Ordering Number	Description
PD-IM-7508	8-port Power over Ethernet (PoE) based on Microsemi's PoE Devices (PD39100 & PD69108)

## 2.3 Evaluation System Features

- Single RJ45 gang (contain 8 X RJ45 connectors)
- Switch domain isolated from PoE domain
- Switch domain USB interface
- External power supplies interface
- PoE Controller Manual Reset (on motherboard)
- There are no pulse transformers & common mode chocks per port



### 2.4 Evaluation System Interfaces & Connections

Board has several interfaces:

- **RJ45:** Running from EVB to PD (powered device) (U14)
- **V<sub>in</sub> Connectors:** DC in (V<sub>main</sub>) connection from External PSU to EVB (J1) and DC in (V<sub>main</sub>) connection from a PSE port to EVB (CON1)
- **Isolated USB:** USB to UART communication between hosting system and PoE Controller (U3)
- **Power Good:** 'Power good' signals indicates operational/failed power supply to PD69108 (SW2)

## 3 Physical Description

### 3.1 Switches

Evaluation system comprises switches used to select the desired configuration states of the board.

#### 3.1.1 Reset Button

The dedicated Reset push button SW1 (see Figure 3) resets PoE controller PD39100.

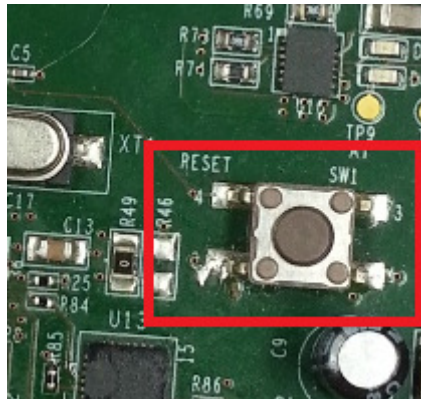


Figure 3: Reset Push Button (SW1)

#### 3.1.2 Power Good Dip Switch

The dedicated Power Good dip switch SW2 (see Figure 4) sets the Power Good pins of the PD69108. This will allow the user to select one of the available 16 Power Banks.

**Note:** if the EVB is powered up by a PD port, the Power Bank is automatically set to Bank #2.

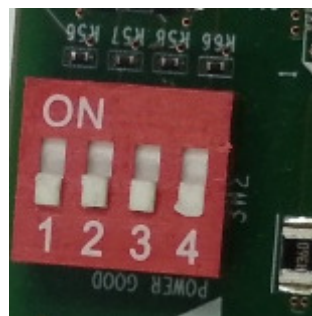


Figure 4: Reset Push Button (SW1)

### 3.2 Connectors

The following sections provide a general and detailed description of the board connectors.

#### 3.2.1 Connectors Table

The Evaluation system's connectors are listed in Table 1.

Table 1: Connector List

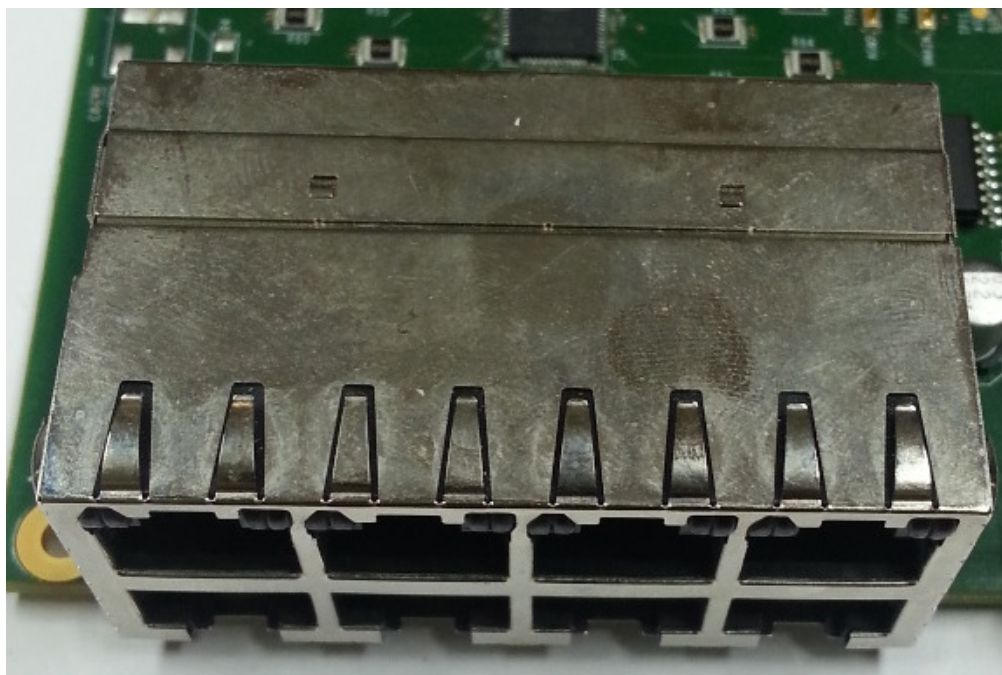
Number	Connector	Name	Description
1	U14	RJ45 Connector	8 'RJ45' ports connecting EVB to Powered Device load
2	U11	Vin Connector	DC in ( $V_{main}$ ) connection used to power EVB
3	CON1	PD Connector	RJ45 for connecting a PSE port to deliver power to EVB (EVB behaves as a PD).



Number	Connector	Name	Description
4	U3	Isolated USB	USB communication coming from hosting system (U3), converted to UART and directed to PoE controller

### 3.2.2 Connectors Detailed Explanation

The numbering is in reference to the numbers given in Table 1.



#### 1. RJ45 Connector (see

Figure 5)

A single dedicated RJ45 connector that contains 8 RJ45 ports + light pipe.

Pin No. (Each RJ45)	Signal Name	Description
4, 5	Alt B – Vport_Pos	PoE's Positive.
7, 8	Alt B – Vport_Neg	PoE's Negative.
1, 2	N.C	
3, 6	N.C	

- Manufacturer: Molex
- Manufacture part number: 44170-0001

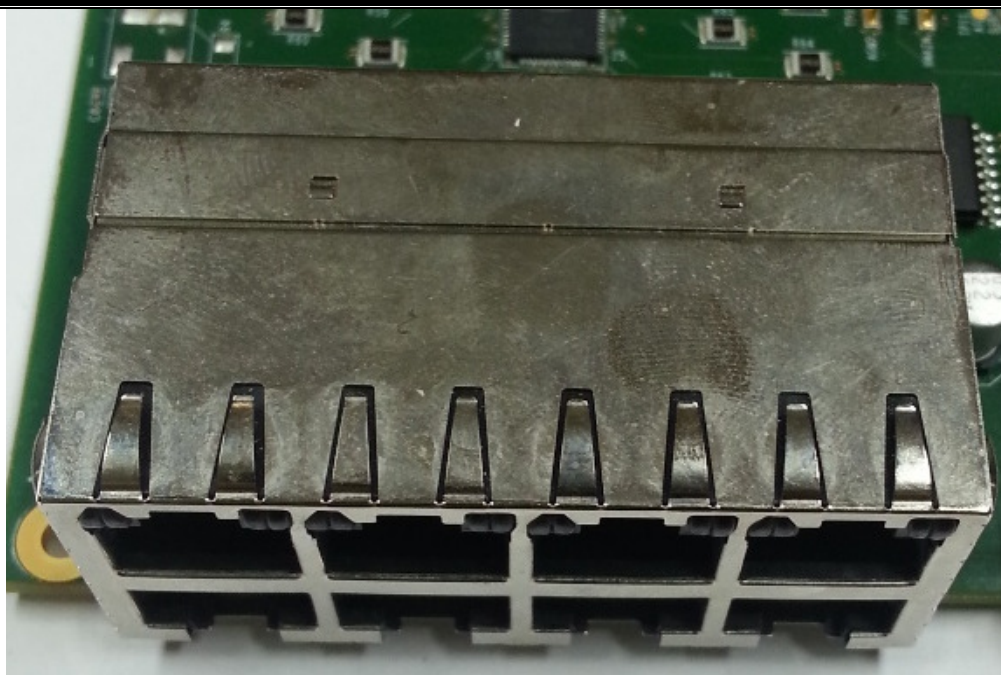


Figure 5: RJ45 Connectors

## 2. $V_{in}$ Connector (see Figure 6)

DC in ( $V_{main}$ ) connection, used for powering the EVB.  $44VDC < V_{main} < 57VDC$ .

Pin No.	Signal Name	Description
1	$V_{main} (V_{in} +)$	Main positive voltage (referenced to AGND)
2	AGND ( $V_{in} -$ )	Analog ground
3	RJ45_AGND	Analog ground coming from the PD IC. When DC-Jack is not connected, this signal is shorted to the AGND net via the connector

- Manufacturer: Shogyo International Corp.
- Manufacture part number: MJ-179P

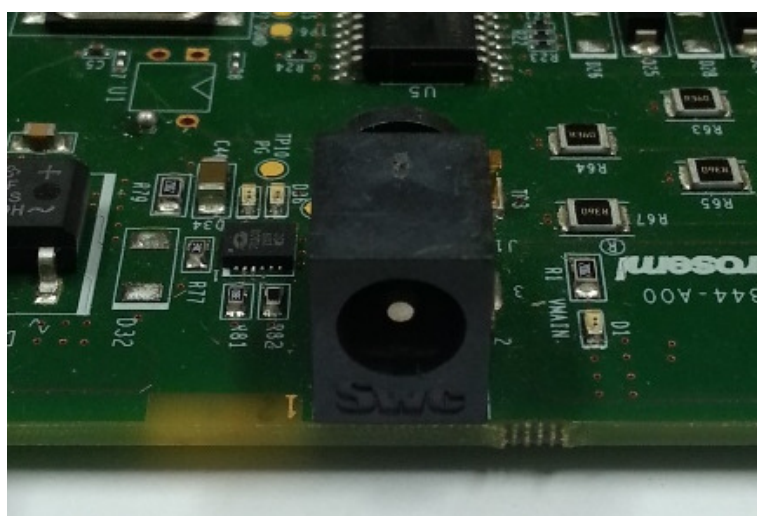
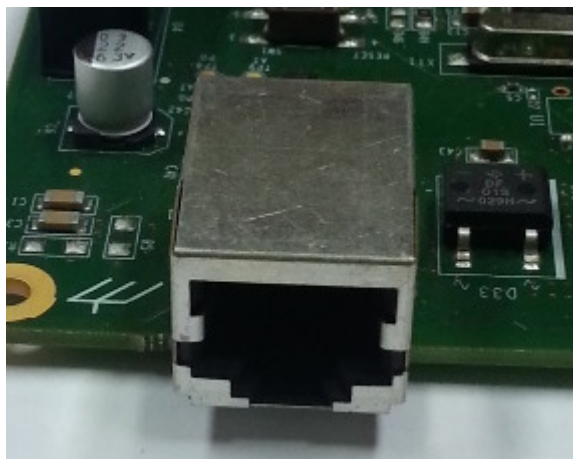


Figure 6:  $V_{in}$  Connector

## 3. PSE Connector (see Figure 7)

Another way to power up the EVB is by using a 4 pairs PSE port (EVB supports the usage of either 2pair or 4pair PSE port, for enhanced performance it is recommended to use 4 pairs).

Pin No. (RJ45)	Signal Name	Description
4, 5, 7, 8	ALT B – POE input	Not polarity sensitive
1, 2, 3, 6	ALT A – POE input	Not polarity sensitive



**Figure 7: PSE Connector**

- Manufacturer: Bel Stewart
- Manufacture part number: SS71800-007F

#### 4. Isolated USB Interface (see Figure 8)

This interface supplies USB communication coming from hosting system (U3), converted to UART communication and directed to PoE controller.

Pin No.	Signal Name	Description
1	V <sub>bus</sub>	Voltage supply from USB bus
2	D-	Dedicated USB signal
3	D+	Dedicated USB signal
4	GND_F	Floating ground

- Manufacturer: Samtec
- Manufacture part number: USB-B-S-S-B-TH

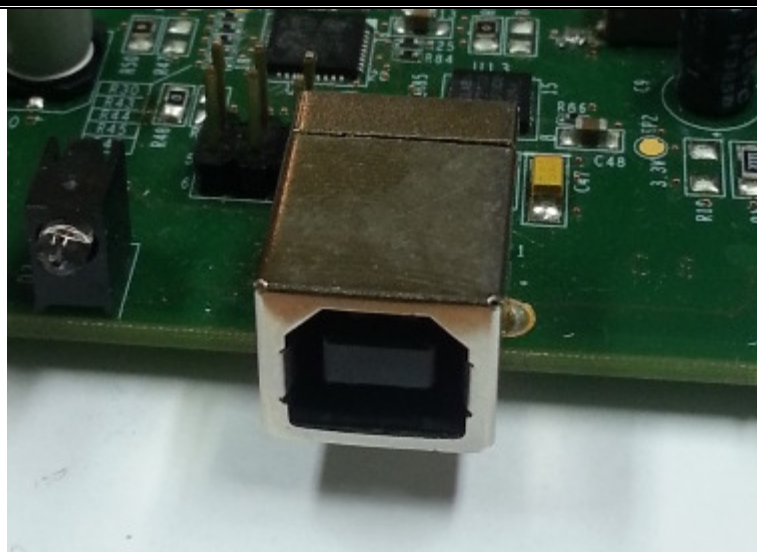


Figure 8: Isolated USB Interface

### 3.3 Led Indications

The following sections provide description of the board LED indicators.

The Evaluation system's LEDs are listed in Table 2.

Table 2: Connector List

Number	LED	Name	Description
1	D1	V <sub>main</sub>	Indication that V <sub>main</sub> (POE domain) is present
2	D2	3.3V_CPU	Indication that 3.3V of the Host domain is present
3	D3	System_OK	System_OK indication LED (driven by PD39100)
4	D4-D11	PortX_LED	Indication LED per port: ON, OFF, PM, OVL/UDL (driven by PD39100)
5	D31, D34	PD_PGOODx_LED	Indication that the EVB is powered up from either 2pair or 4pair PSE port (driven by PD70200)
6	D53, D36	ATx_LED	Indication that the PSE is either AT or AF PSE (ON is AT, driven by PD70200)

## 4 Electrical Characteristics

Evaluation system's electrical characteristics are described below:

Parameter	Symbol	Min.	Max.	Units
Main DC supply $V_{\text{main}}$		44	57	V
Port Isolation to chassis		-	1.5	kVrms

## 5 Installation

This chapter describes the steps required for installing and operating PD-IM-7508 Evaluation Board. Some necessary precautions:

- Power up the EVB via external PSU or a PSE port, before connecting the USB cable to the EVB.
- In some PCs or laptop, the user will be required to install the UART/USB driver (**CP210x USB to UART Bridge VCP Drivers**), which can be taken free from Silabs website, <http://www.silabs.com>





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#### Revision History

Revision Level / Date	Para. Affected	Description
0.1 / 04 Aug 2013		Initial revision

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