

**PI5USB2546 / PI5USB2546A  
PI5USB2546/PI5USB2546A EVB Rev.B User Manual**  
by Noyes Mok

## Table of Contents

<b>1. Introduction</b>	<b>2</b>
<b>2. Overview</b>	<b>2</b>
<b>3. Quick Start</b>	<b>4</b>
<b>4. Detail Description</b>	<b>5</b>
Functionality of Header Pins	5
Current Limit	6
Switches Setting	6
<b>5. Board Design Information:</b>	<b>7</b>
PI5USB2546 EVB Schematic	7
PI5USB2546A EVB Schematic	8
PCB Layout	9
PCB Layout Requirements	10
BOM List	10

## 1. Introduction

Pericom's PI5USB2546 and PI5USB2546A are the USB charging port controller which integrated the USB2.0 signal switch. Both parts not only support the devices that follow Chinese Telecommunication Industry standard UD/T1591-2009 and Battery Charging Specification Rev. 1.2 (BC1.2) but also the non-compliance devices.

PI5USB2546A supports additional Apple 2.4A charging mode compare with PI5USB2546.

The PI5USB2546 series evaluation board (EVB) is designed to demonstrate the benefits, performance and key features of PI5USB2546 and PI5USB2546A. This user manual describes the usage of this EVB and it will be divided into following sections:

- **Overview**
- **Quick start**
- **Details description**
- **Board Design information**
  - **PI5USB2546 / PI5USB2546A EVB Schematic**
  - **PCB Layout**
  - **PCB Layout Requirements**
  - **BOM List**

## 2. Overview

Figure 1 is the block diagrams of Pericom PI5USB2546/PI5USB2546A Evaluation board (EVB) and Figures 2a & 2b are the EVB photos. JP2 on PI5USB2546 / PI5USB2546A EVB is USB plug connector which is plugged into the USB port of PC or Notebook. JP1 is USB receptacle connector which is used to connect the mobile device.

PI5USB2546 / PI5USB2546A EVB can be powered by USB port through the USB Plug (JP3 shorted) or external power supply (applied to header pin JP6 - +5V and JP5 – GND and JP3 open).

SW1 is used to control the mode setting of PI5USB2546 / PI5USB2546A and JP13 is used to enable or power down PI5USB2546 / PI5USB2546A.

The LED D1 is the fault signal (/FAULT) which will active when the circuit is over-current or over-temperature. LED D2 is load detection signal (/STATUS) which can be used as indication signal on power wake feature or port power management feature. /STATUS pin is active with different condition under Auto-detect mode and CDP mode.

The current limit of the board is controlled by RILIM\_LO and RILIM\_HI. For details please refer to session 4.

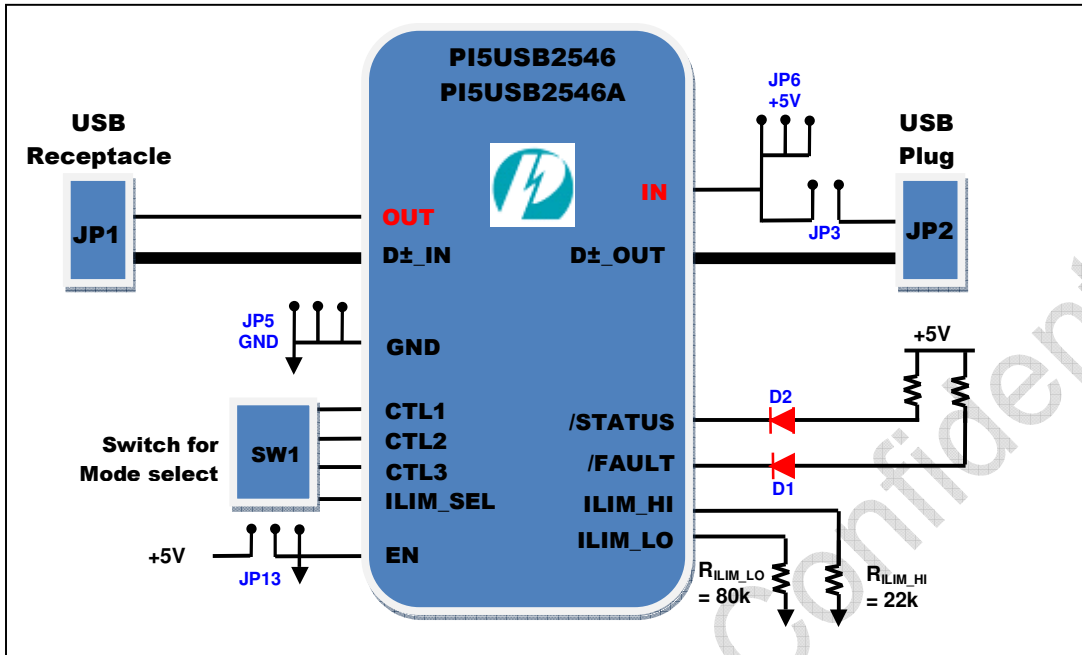


Figure 1, block diagram of PI5USB2546 / PI5USB2546A EVB

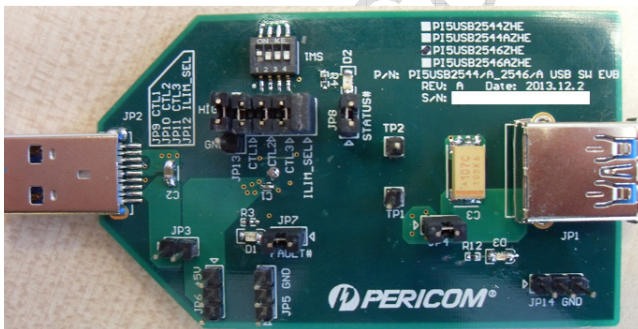


Figure 2a, Front view of PI5USB2546/PI5USB2546A EVB

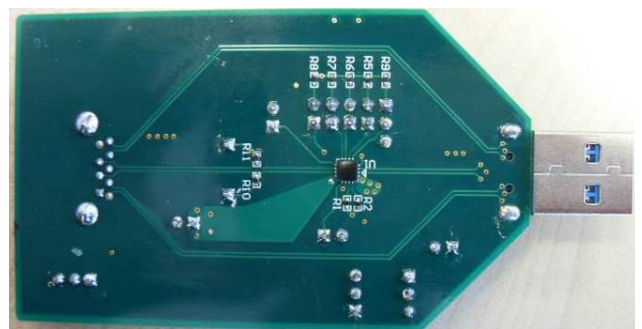


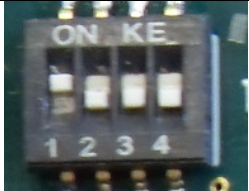
Figure 2a, Bottom view of PI5USB2546/PI5USB2546A EVB

### 3. Quick Start

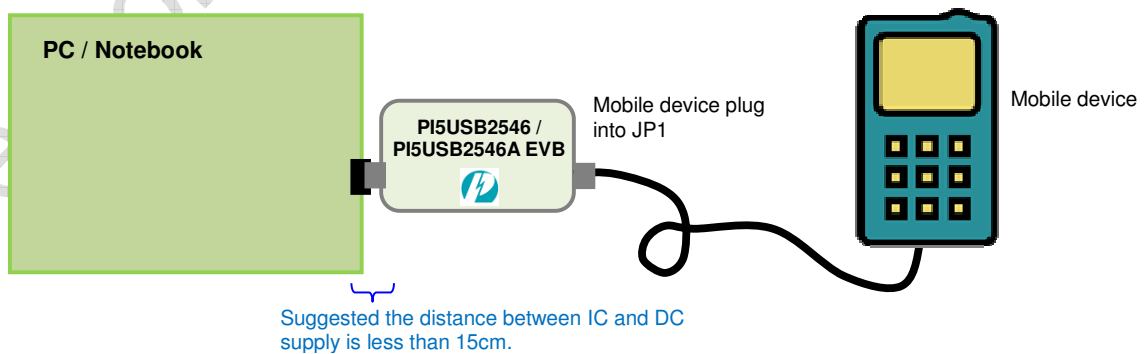
To start-up the PI5USB2546 / PI5USB2546A EVB, complete the following steps:

1. Set the jumper and switch of PI5USB2546 / PI5USB2546A EVB according to the Table 1
2. Connect the EVB between the USB port of PC or Notebook and mobile device as Figure 3
3. Power up the EVB with external power supply (+5V connect to JP2, GND connect to JP3)
4. Plug the portable device into EVB USB connector J1

**Table 1, Default Header pin and Switch settings on EVB (header pins location refers to Figure 4)**

Header pin #	Pin name for PI5USB2546_46A	Header pin status	Remark
JP3	IN	Open	
JP4	OUT	Short	
JP5	GND	Connect to the GND of the power supply	
JP6	+5V	Connect to +5V power supply	
JP7	/FAULT	Short	
JP8	/STATUS	Short	
JP9	CTL1	Short	
JP10	CTL2	Short	
JP11	CTL3	Short	
JP12	ILIM_SEL	Short	
JP13	EN	Short to HIGH	
SW1 – 1	CTL1*	ON	
SW1 – 2	CTL2*	OFF	
SW1 – 3	CTL3*	OFF	
SW1 – 4	ILIM_SEL*	OFF	

\* Default setting of PI5USB2546/PI5USB2546A EVB is "Auto Detect mode" (CTL1/2/3, ILIM\_SEL = 0111)



**Figure 3, Connection of PI5USB2546 / PI5USB2546A EVB**

## 4. Detail Description

The functionality of switch, header pins are detail described in this section.

Header Pin	Pin Name	Remark
SW1 – 1	CTL1	OFF = HIGH ON = LOW
SW1 – 2	CTL2	
SW1 – 3	CTL3	
SW1 – 4	CTL4	

**Table 2, Detail description of the Switch SW1**

### Functionality of Header Pins

Header Pin	Pin assignment	Remark
JP3	Pin 1 = Vbus pin of JP2 Pin 2 = IN of PI5USB2546/2546A	Short = Powered by USB connector Open = Powered by external power supply
JP4	Pin 1 = OUT of PI5USB2546/2546A Pin 1 = Vbus pin of JP1	Short = Connect the OUT signal to the USB Receptacle connector (JP1)
JP5	GND of PI5USB2546/2546A	Need to connect to GND of external power supply (JP3 must be floated)
JP6	IN of PI5USB2546/2546A	Need to connect to +5V of external power supply (JP3 must be floated)
JP7	Pin 1 = /FAULT of PI5USB2546/2546A Pin 2 = LED D1	Short = LED shows the /FAULT signal
JP8	Pin 1 = /STATUS of PI5USB2546/2546A Pin 2 = LED D2	Short = LED shows the /STATUS signal
JP9	Pin 1 = CTL1 of PI5USB2546/2546A Pin 2 = SW1 - 1	Short = Controlled by SW1 Open = Apply external control signal
JP10	Pin 1 = CTL2 of PI5USB2546/2546A Pin 2 = SW1 - 2	
JP11	Pin 1 = CTL3 of PI5USB2546/2546A Pin 2 = SW1 - 3	
JP12	Pin 1 = ILIM_SEL of PI5USB2546/2546A Pin 2 = SW1 - 4	
JP13	Pin 1 = VDD Pin 2 = EN of PI5USB2546/2546A Pin 3 = GND	Pin 1 & 2 short = IC enable Pin 2 & 3 short = IC power down
TP1	D- with 100kΩ	D+ & D- Signal monitoring <i>/* remove the 100kΩ when do the eye diagram measurement */</i>
TP2	D+ with 100kΩ	

**Table 3, Detail description of the header pins**

## Current Limit

Two current limit values can be set by the external resistor on ILIM\_LO (Pin 15) & ILIM\_HI (Pin 16)

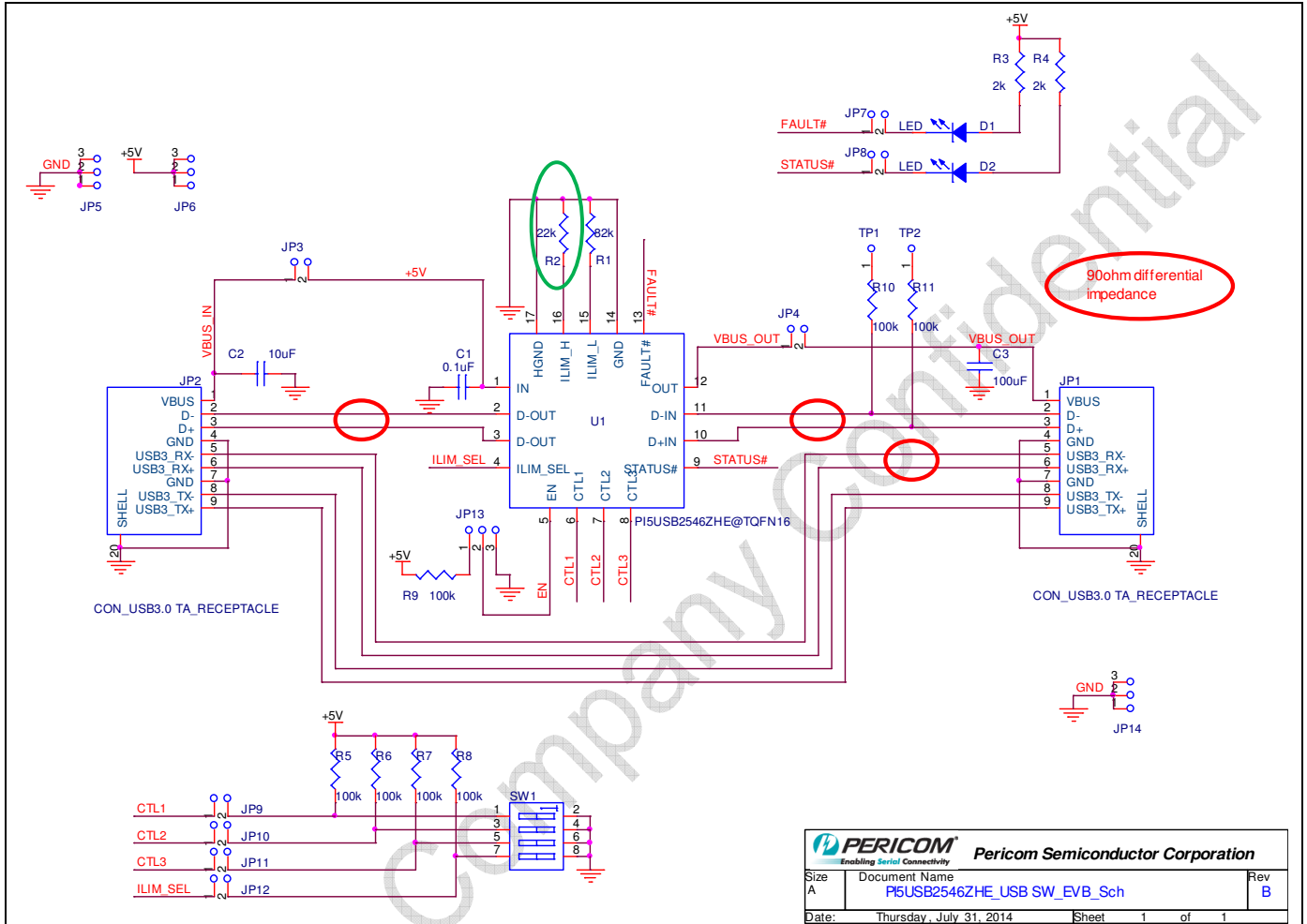
ILIM_SEL	RILIM_X	Current Limit (Typ.)	Unit
0	R <sub>ILIM_LO</sub> = 210kΩ	240	mA
0	R <sub>ILIM_LO</sub> = 80.6kΩ	625	
0	R <sub>ILIM_LO</sub> = 22.1kΩ	2275	
1	R <sub>ILIM_HI</sub> = 20kΩ	2510	
1	R <sub>ILIM_HI</sub> = 16.9kΩ	2970	

## Switches Setting

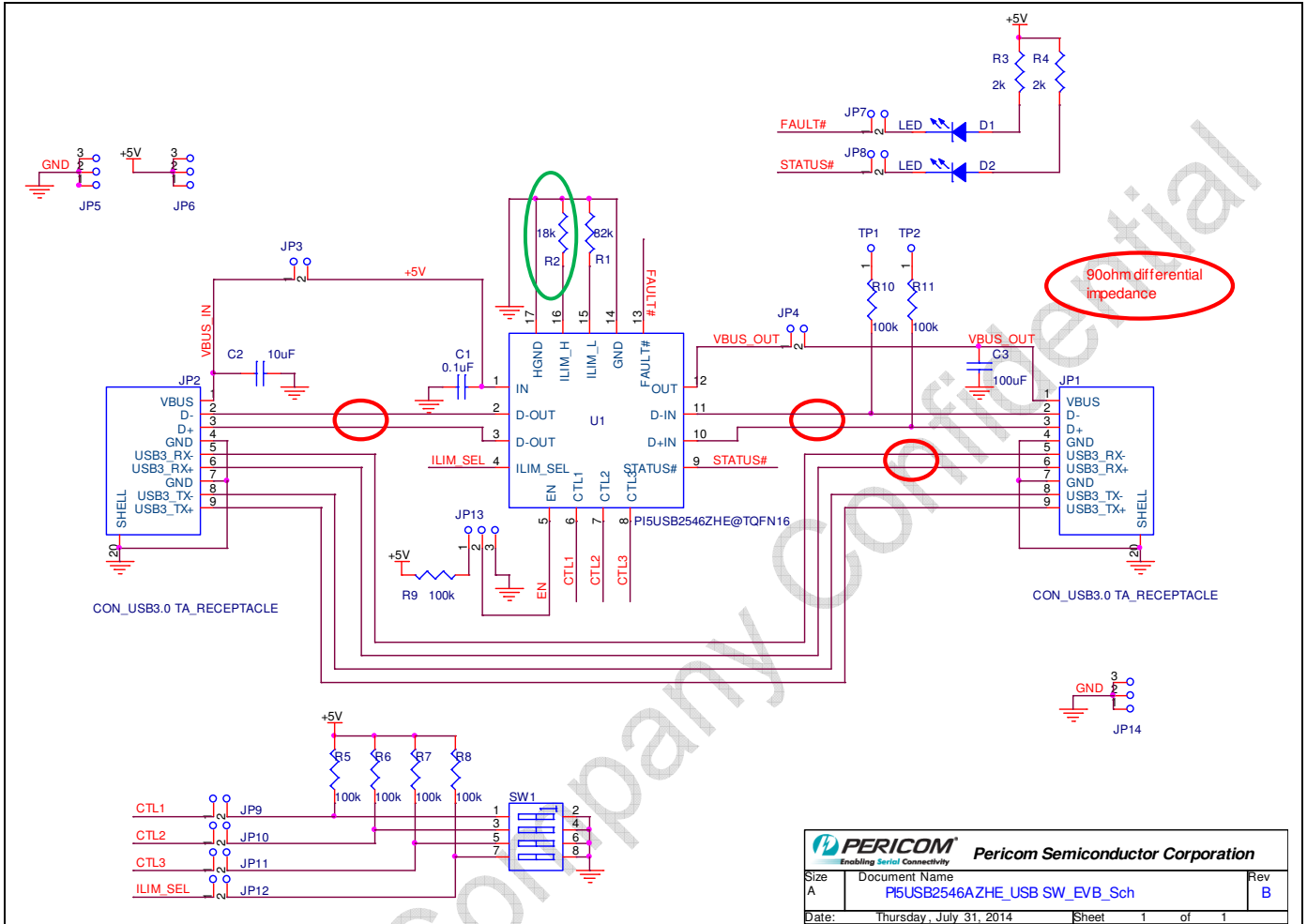
SW1-1	SW1-2	SW1-3	SW1-4	MODE	Current Limit Setting	Status Output (Active low)	Comment
CTL1	CTL2	CTL3	ILIM_SEL				
0	0	0	0	Discharge	NA	OFF	OUT held low
0	0	0	1	Discharge	NA	OFF	
0	0	1	0	DCP_Auto	ILIM_HI	OFF	Data lines disconnected
0	0	1	1	DCP_Auto	los_PW & ILIM_HI <sup>(1)</sup>	DCP load present <sup>(2)</sup>	Data lines disconnected and load detect function active
0	1	0	0	SDP1	ILIM_LO	OFF	Data lines connected
0	1	0	1	SDP1	ILIM_HI	OFF	
0	1	1	0	DCP_Auto	ILIM_HI	OFF	Data lines disconnected
0	1	1	1	DCP_Auto	ILIM_HI	DCP load present <sup>(3)</sup>	Data lines disconnected and load detect function active
1	0	0	0	DCP_Shorted	ILIM_LO	OFF	Device forced to stay in DCP BC1.2 charging mode
1	0	0	1	DCP_Shorted	ILIM_HI	OFF	
1	0	1	0	DCP/Divider1	ILIM_LO	OFF	Device forced to stay in DCP Divider1 charging mode
1	0	1	1	DCP/Divider1	ILIM_HI	OFF	
1	1	0	0	SDP1	ILIM_LO	OFF	Data lines connected
1	1	0	1	SDP1	ILIM_HI	OFF	
1	1	1	0	SDP2 <sup>(4)</sup>	ILIM_LO	OFF	
1	1	1	1	CDP <sup>(4)</sup>	ILIM_HI	CDP load present <sup>(5)</sup>	Data lines connected and load detect active

## 5. Board Design Information:

### PI5USB2546 EVB Schematic



## PI5USB2546A EVB Schematic



PERICOM Enabling Serial Connectivity		
Pericom Semiconductor Corporation		
Size A	Document Name PI5USB2546AZHE_USB SW_EVb_Sch	Rev B
Date:	Thursday, July 31, 2014	Sheet 1 of 1



## PCB Layout

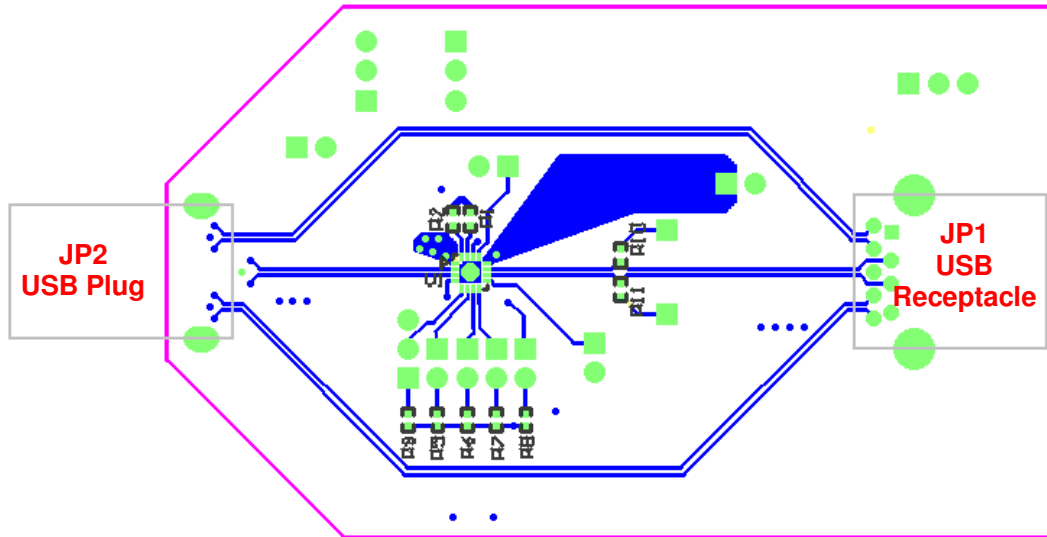
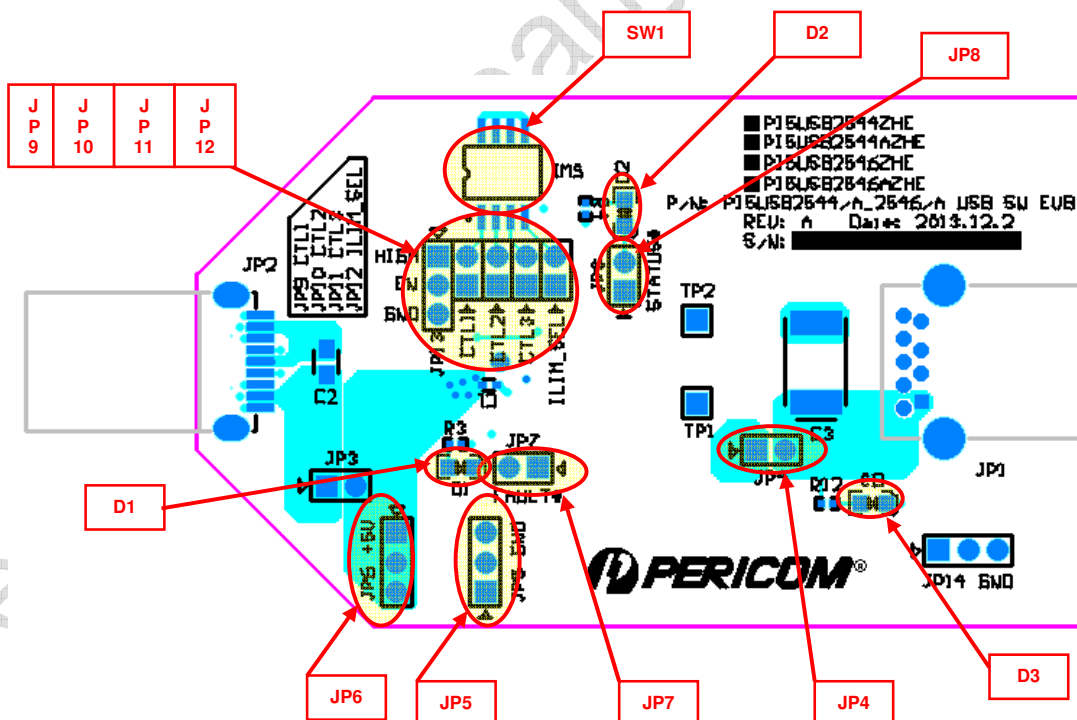


Figure 4, Top view of PI5USB2546/PI5USB2546A EVB Layout



## PCB Layout Requirements

### a. Stack Up:

Layer #	Plane	Material Type	Thickness (mil)
	Solder Mask		0.4
Layer 1	Signal		1.2
	Prepreg	FR4 1080 FR4 2216	7.3
Layer 2	GND		1.2
	Core		44
Layer 3	Power		1.2
	Prepreg	FR4 2216 FR4 1080	7.3
Layer 4	Signal		1.2
	Solder Mask		0.4

b. Isolation Spacing = 30 mil

c. Width & Spacing (W/S) of 90Ω Differential Trace = 11 / 10 / 11 mil

## BOM List

Item	Quantity	Reference	Description
1	1	C1	0.1uF Capacitor
2	1	C2	10uF Capacitor
3	1	C3	100uF Capacitor
4	3	D1, D2, D3	LED
5	1	JP1	USB3.0 Receptacle connector
6	1	JP12	2 x 1 header pins
7	1	JP2	USB3.0 Plug connector
8	8	JP3, JP4, JP7, JP8, JP9, JP10, JP11, JP12	2 x 1 header pins
9	4	JP5, JP6, JP13, JP14	3 x 1 header pins
10	1	R1	82kohm Resistor
11	1	R2	22kohm Resistor PI5USB2546 18kohm Resistor PI5USB2546A
12	3	R3, R4, R12	2.2kohm Resistor
13	7	R5, R6, R7, R8, R9, R10, R11	100kohm Resistor
14	1	SW1	Switch
15	2	TP3, TP4	1 x 1 header pin
16	1	U1	PI5USB2546 / PI5USB2546A