# PAW3552DB : USB/PS2 Optical Mouse SoC

## General Description

The PAW3552DB is a highly integrated CMOS processed entry-level optical mouse single chip with USB and PS2 interfaces that serves as a non-mechanical motion estimation engine for implementing a computer mouse. The PAW3552DB also includes an internal RC oscillator to replace an external resonator for BOM cost reduction. The internal OTPs provides customers with flexibility of different configurations at manufacture side.

## Key Features

- USB or PS2 interface (Programmable via OTP)
- Optical motion estimation technology
- Accurate motion estimation over a wide range of surfaces
- High speed motion detection up to 30 inches/sec
- Power saving mode during times of no movement
- Supports three buttons (L, M, R) and three axes (X, Y, Z) output
- Z-axis support mechanical input
- Internal RC oscillation without external resonator
- USB spec
  - Compliant to the USB specification version 2.00
  - Complete USB HID specs V1.11 compatibility
  - Integrated USB transceiver and 1.5Mbps USB serial interface engine
- OTP flexible configurations
  - Interface: USB / PS2
  - Sensor orientation: 0, +90, -90, 180
  - USB report format: 8bit / 16bit
  - USB P_string: xxxxxxxxxx USB Optical Mouse
  - USB PID/VID: xxxx / xxxx
  - CPI resolution : 800~2400

## Applications

- Wired optical mouse applications
- Optical navigation systems

## Key Parameters

| Parameter | Value |
|---|---|
| Power Supply (V) | 4.25V ~ 5.5V (from USB VBus) |
| Interface | USB or PS2 |
| Speed | Up to 30 inches/sec |
| Acceleration | Up to 8g |
| Resolution (cpi) | 800/1000(default)/1200/1600/ 2000/2400 |
| Frame Rate (fps) | 3300 frames/sec |
| Operating Current | 10mA @Mouse moving (Normal)<br>5mA @Mouse not moving (Sleep)<br>480uA @USB suspend (Suspend) |
| Package | Staggered DIP8 type |

## Ordering Information

| Part Number | Interface |
|---|---|
| PAW3552DB-VJXT | USB+PS2 |
| PAW3552DB-VJWT | USB Only |

Lead (Pb) Free RoHS 6 fully compliant

For any additional inquiries, please contact us at http://www.pixart.com/contact.asp



Preliminary: This product is still under product development where the product specifications are subjected to change upon product release.

# 1.0 Introduction

## 1.1 Overview

The PAW3552DB supports three axes output of X, Y and Z, and three input buttons for Left (L), Middle (M) and Right (R) under USB and PS2 mode. It is a CMOS optical mouse single-chip sensor with USB or PS2 interface that serves as a non-mechanical motion estimation engine for implementing a computer mouse.

The PAW3552DB is housed in an 8-pin DIP package forming a complete navigation system with an optical lens assembly. It can track at the speed of motion up to 30 inches per second and comes with the programmable options of resolution which the default is 1000 counts per inch (CPI). The USB and PS2 mouse controller is built into the sensor as direct interface to the USB host, thus no external mouse controller is needed. The PAW3552DB can receive command and echo status or data format for both complete Universal Serial Bus (USB) Specifications V2.0 and USB HID Specifications V1.11 compatibility. The PAW3552DB is offering all the needs for a cost effective solution to support USB and PS2 mouse application.

Figure 1 shows the block diagram of PAW3552DB.

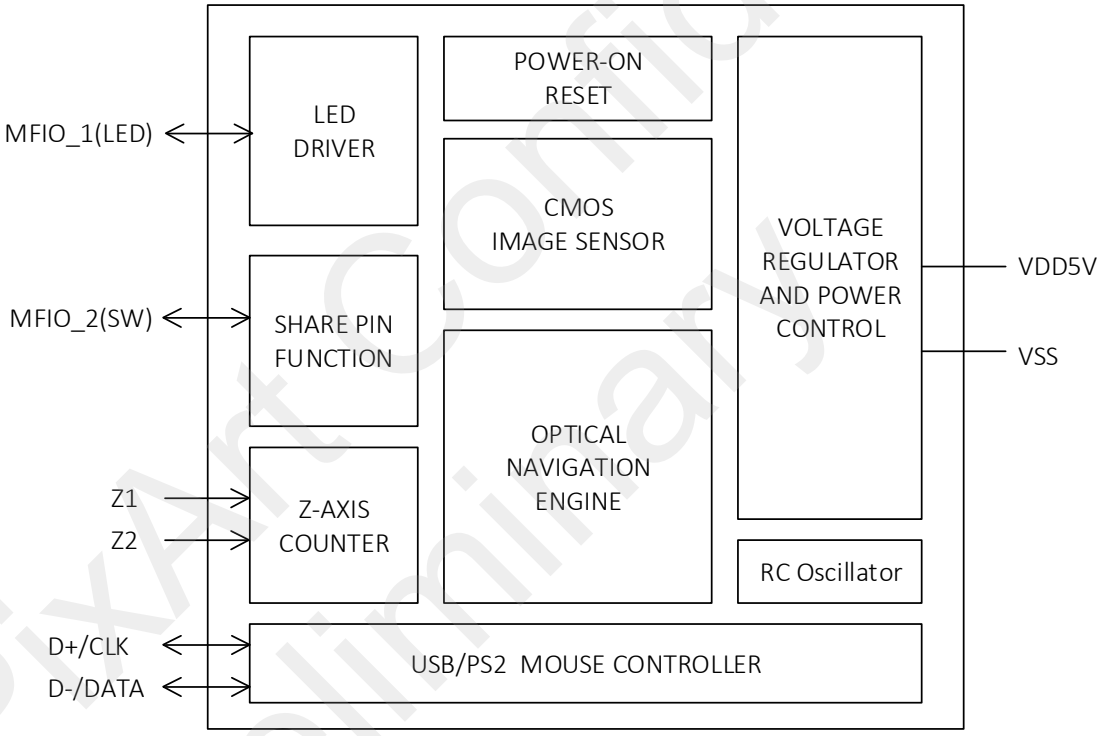



Figure 1. Block Diagram

## 1.2 Pin Description

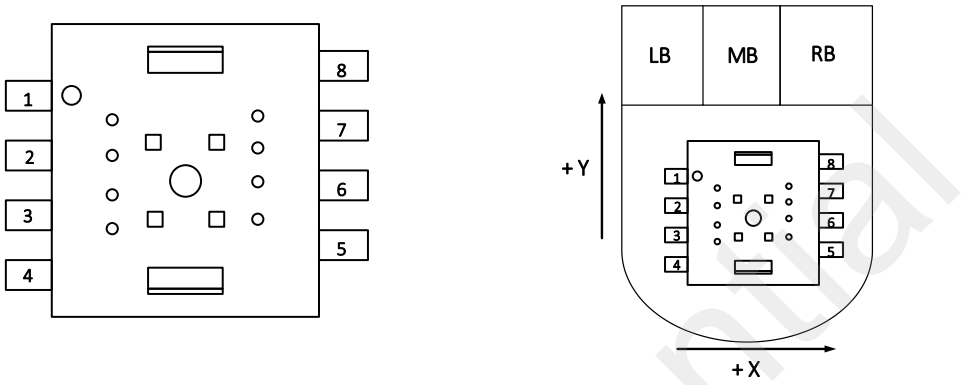



Figure 1. Top View Pinout

Table 1. Signal Pin Description

| Pin # | Signal Name | Type | Definition |
|---|---|---|---|
| 1 | MFIO_1 (LED) | I/O | Share pin for LED power/BM |
| 2 | VDD5V | PWR | Chip power VDD, 5.0V |
| 3 | Z1 | I/O | Z axis, support mechanical scroller input |
| 4 | Z2 | I/O | Z axis, support mechanical scroller input |
| 5 | MFIO_2 (SW) | I/O | Share pin for LED control pin/BL/BR |
| 6 | VSS | GND | Chip ground |
| 7 | D-/DATA | I/O | USB D- or PS/2 mouse data line |
| 8 | D+/CLK | I/O | USB D+ or PS/2 mouse clock line |

## 1.3 Sensor Orientations

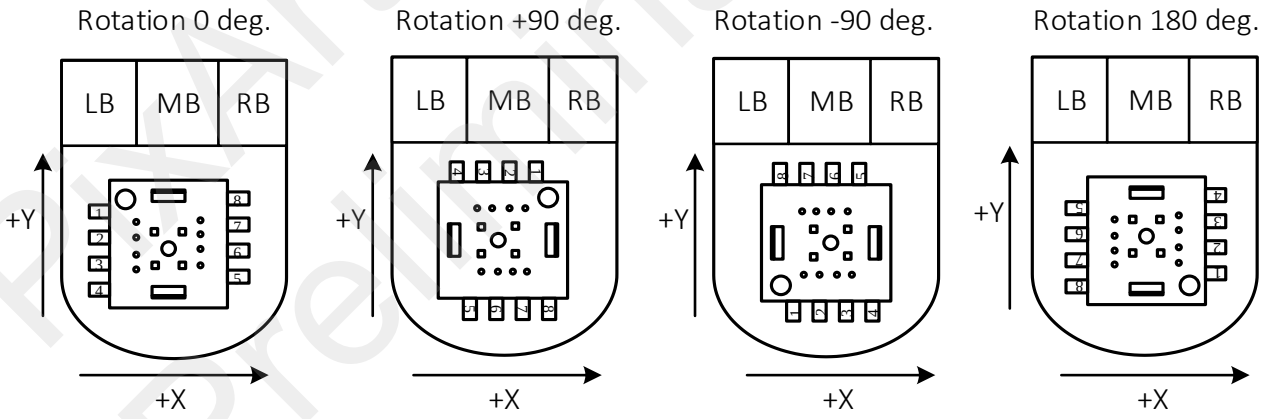
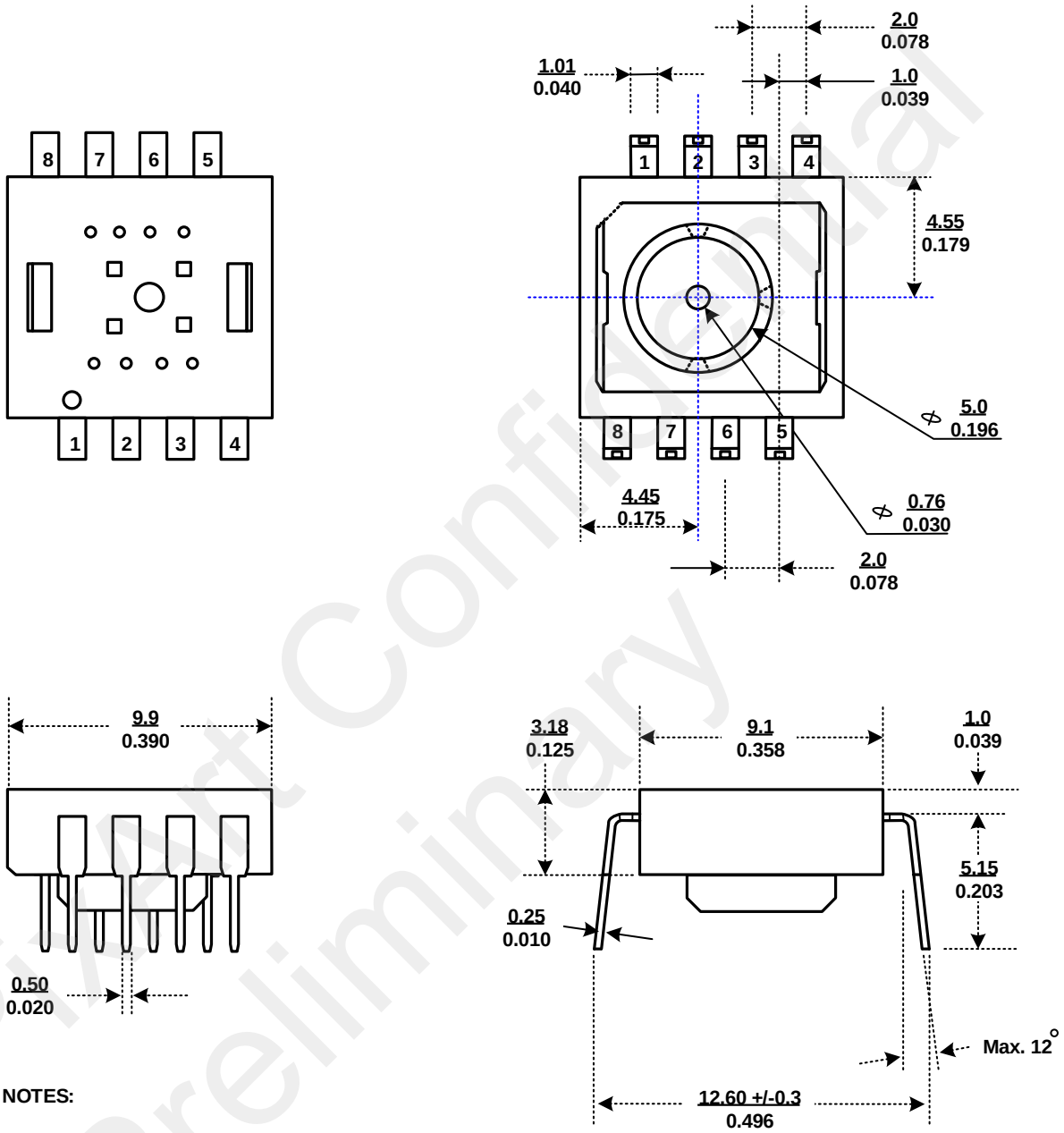



Figure 2. Types of Sensor Orientation

## 2.0 Mechanical Specifications

### 2.1 Package Mechanical Dimension




**NOTES:**

1. All dimensions in MM/INCH.
2. All dimensions tolerance: +/- 0.10mm
3. Maxmumflash: +0.2mm
4. Angular tolerance: +/- 3.0degress

Figure 3. Package Outline Drawing

## 2.2 Assembly Drawing

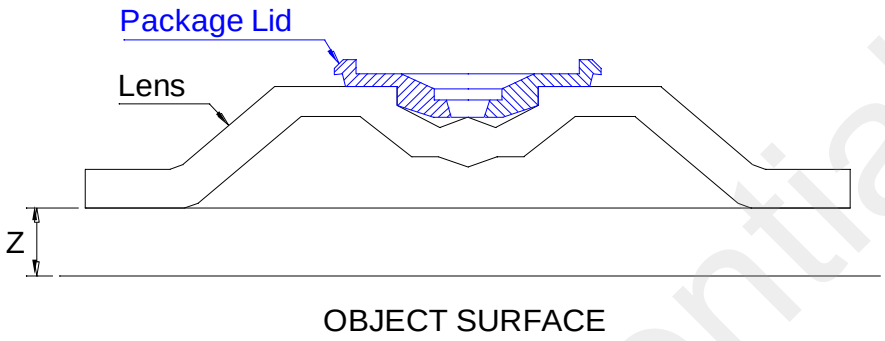



Figure 4. Distance from Lens Reference Plane to Surface

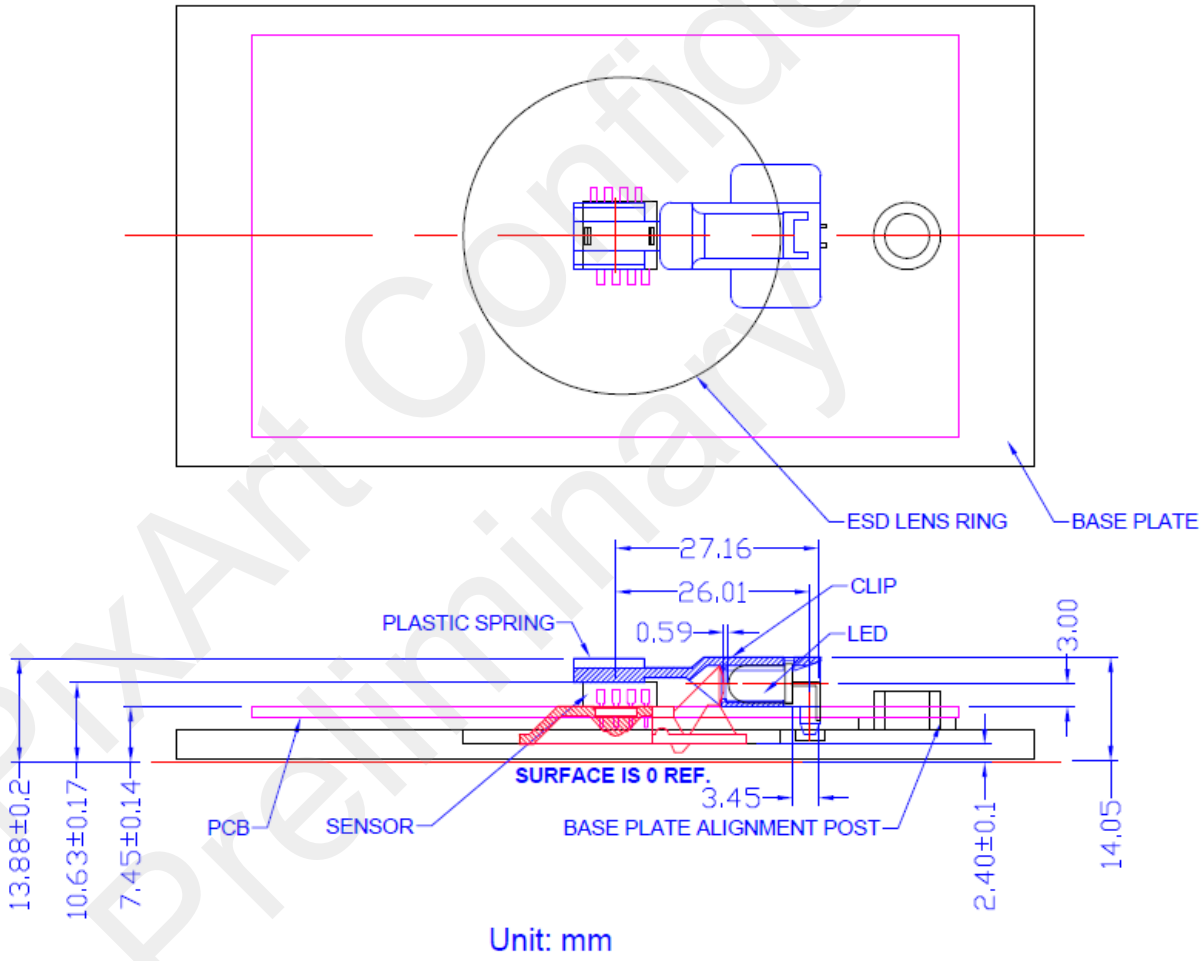



Figure 5. 2D Assembly

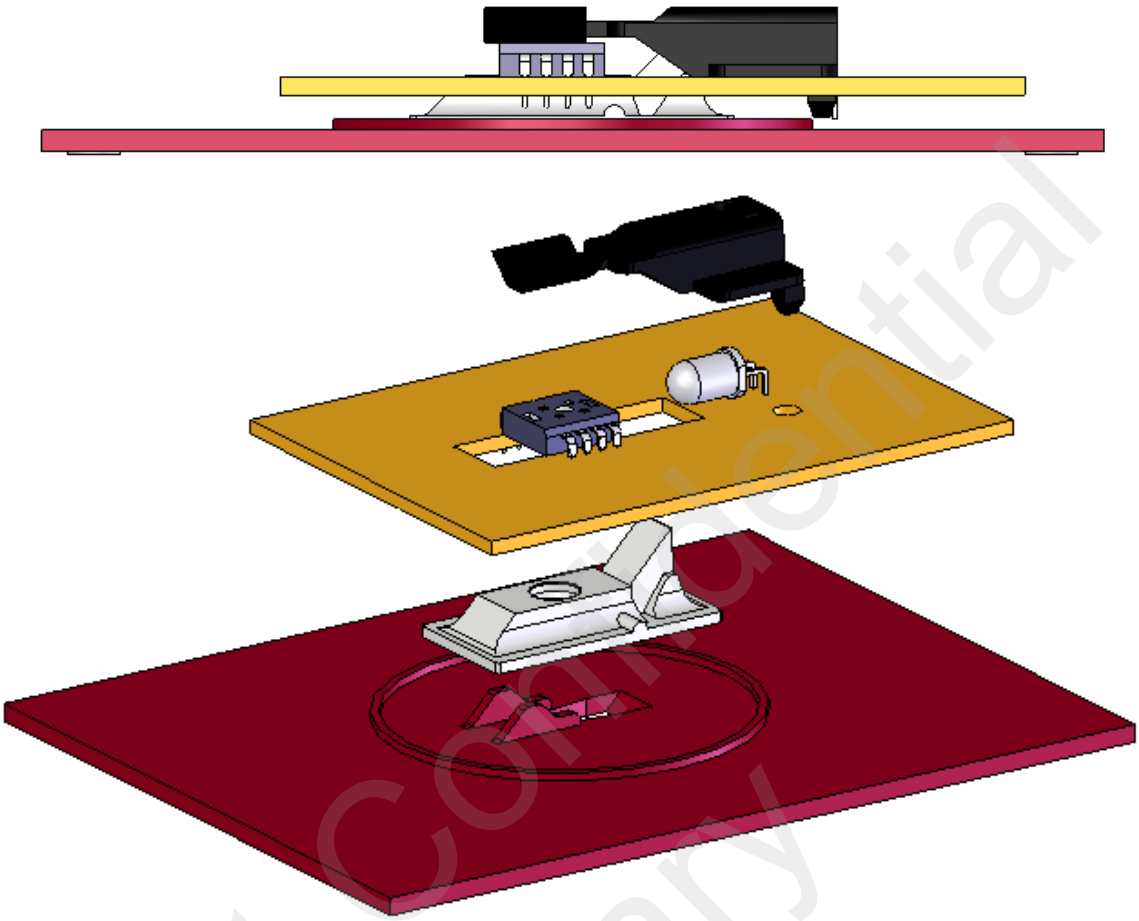
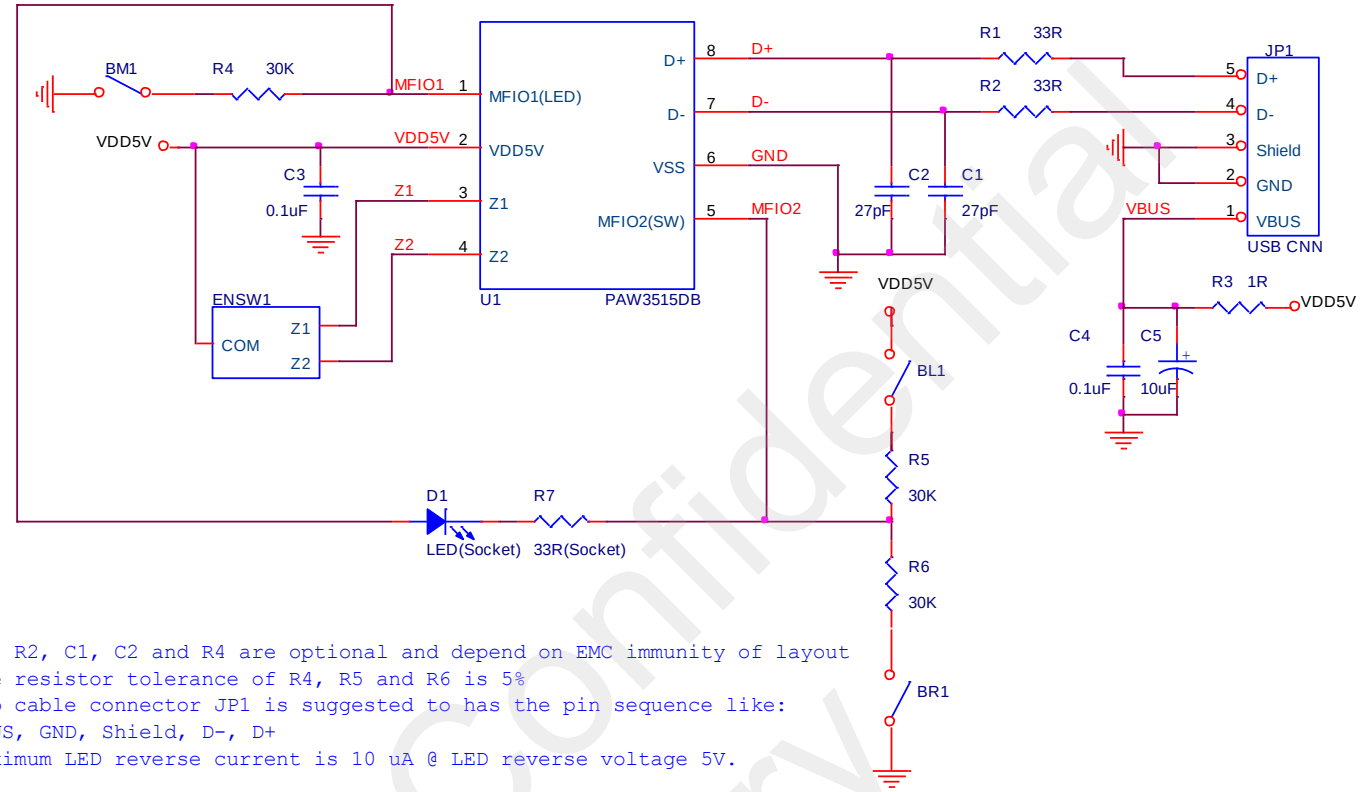


Figure 6. 3D Assembly for Mounting Instructions

## 3.0 Reference Schematics




Note:
1. R1, R2, C1, C2 and R4 are optional and depend on EMC immunity of layout
2. The resistor tolerance of R4, R5 and R6 is 5%
3. USb cable connector JP1 is suggested to has the pin sequence like:
   VBUS, GND, Shield, D-, D+
4. Maximum LED reverse current is 10 uA @ LED reverse voltage 5V.

Figure 7. Application Circuit for PAW3552DB

## 4.0 OTPs for Flexible Configurations

The PAW3552DB supports specific function programmable by using PixArt's provided programmer. This can speed up project production to meet time to market.

Table 2. Programmable Configurations

| Programmable Item | Specific Function | Remark |
|---|---|---|
| Interface | USB or PS2 | |
| CPI resolution | 800, 1000 (default), 1200, 1600, 2000, 2400 | |
| Sensor rotation | 0 (default), +90, -90, 180 | |
| USB report format | 8bit /16bit (default) | |
| USB P_string | USB Optical Mouse(default), xxxxxxxxxx USB Optical Mouse | x: Support 10 words totally.<br>Specific character as<br>0~9, a~z, A~Z, ., space |
| USB PID | 2510 (default), xxxx (custom PID) | x: Support any Hex code except FFFF. |
| USB VID | 093A (default), xxxx (custom VID) | x: Support any Hex code except FFFF. |