
OM30PS

**USB+PS/2
MCU+Sensor 2-in-1
Optical Mouse IC**

Product Specification

DOC. VERSION 1.1

ELAN MICROELECTRONICS CORP.

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1 General Description

The OM30PS IC is integrated with a USB+PS/2 Micro-controller Unit (MCU) for computer optical mouse utilization. It is housed in a unique 16 pins staggered dual in-line DIP like package for 3D3K application, or designated as “OMD16.” The chip has a resolution of 800 dots per inch (DPI) and catches the surfaces images at 3200 times per second. Its tracking speed is up to 20 inches per second (IPS).

2 Features

- Optical sensor and USB+PS/2 MCU are integrated into a single chip
- Comply with USB version 1.1 protocol
- Up to 20 IPS high speed motion detection
- Frame rate is up to 3200 frames per second
- 5 volt power supply
- Built-in 3.3V and 1.8V voltage regulators
- 16-pin staggered DIP
- Supports USB+PS/2 or USB only by pin option (refer to Section 9, *Application Circuit*).
- Supports 3D3K and Z/2 mouse scrolling
- Three operating modes, Active, Standby, and Power Down modes
- Automatic Standby mode (takes effect after no motion elapses for more than 1 second)
- Enters power down mode when USB device goes to suspend mode
- Conform with Green Products protocol

NOTE

These are all Green Products which do not contain hazardous substances

3 Pin Configuration (Package)

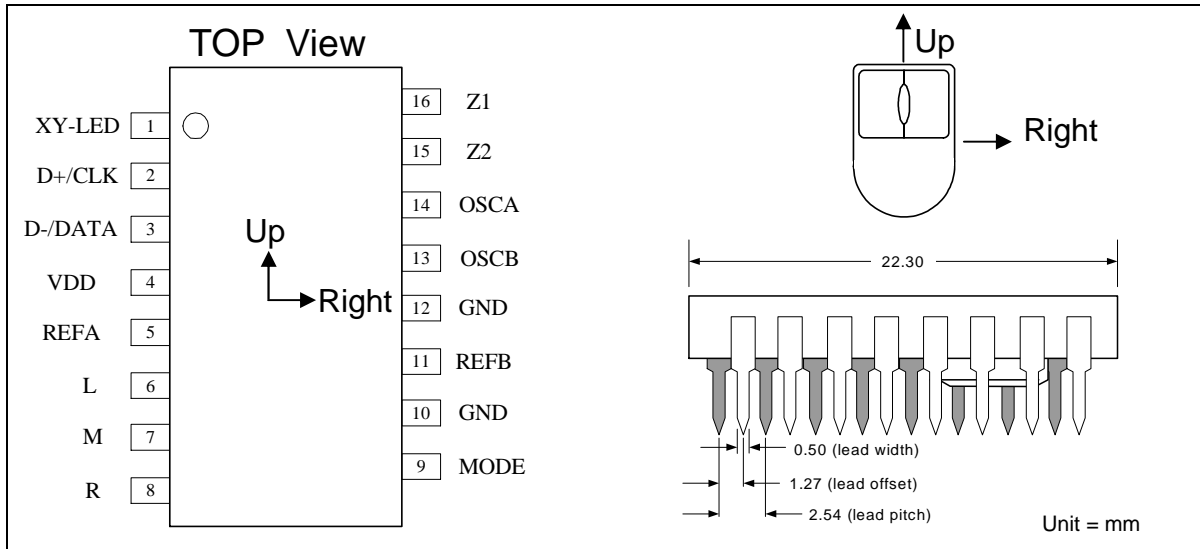


Figure 3-1a OM30PS Pin Configuration (Top View)

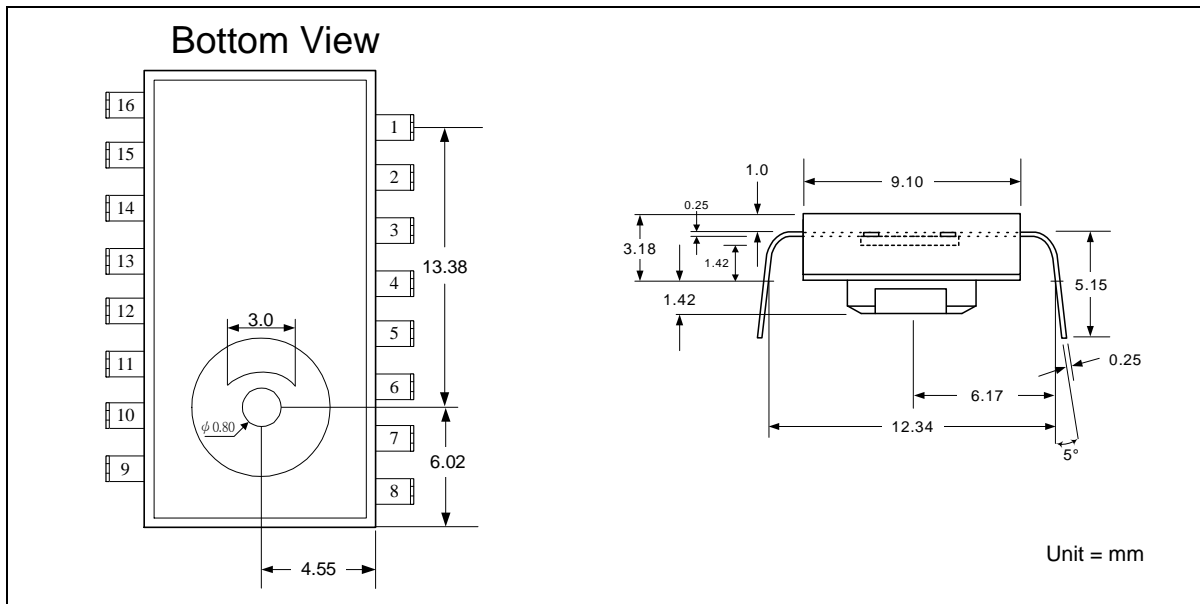


Figure 3-1b OM30PS Pin Configuration (Bottom View)

NOTE

- Dimension in millimeter.
- Dimension tolerance is +/- 0.1 mm.
- Coplanarity of leads is 0.1 mm.
- Lead pitch tolerance is +/- 0.15 mm.
- Cumulative pitch tolerance is +/- 0.15 mm.
- Angular tolerance is +/- 3°.
- Maximum flash is +0.2 mm.
- Chamfer (25° X 2) on the taper side of the lead.

4 Functional Block Diagram

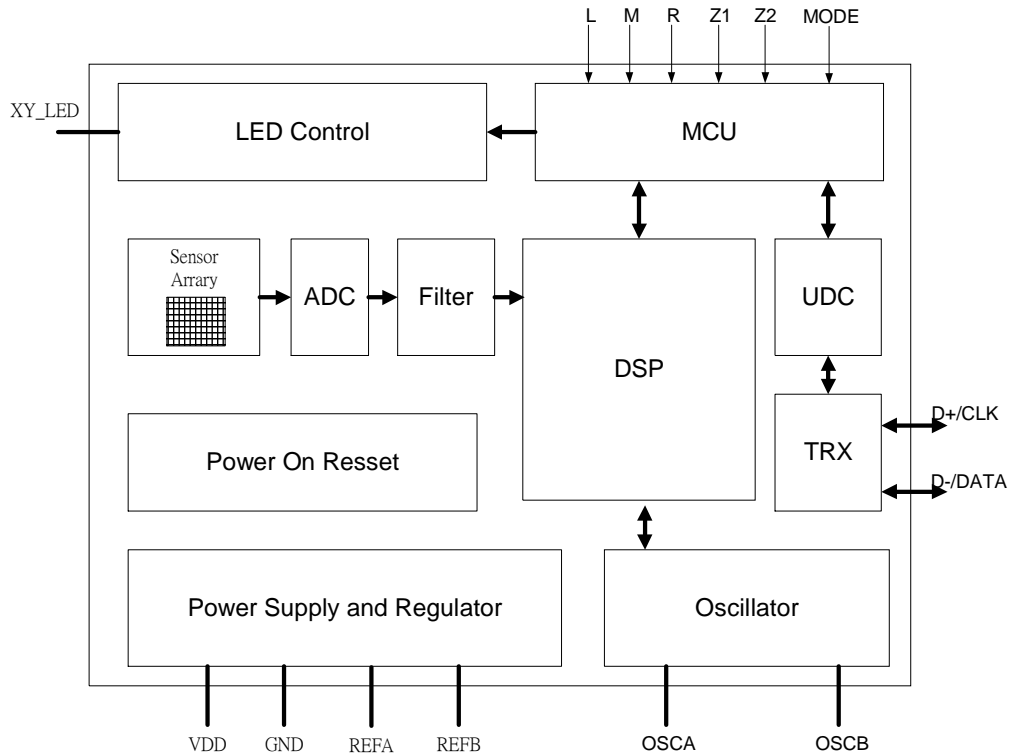


Figure 4-1 OM30PS Functional Block Diagram

5 Pin Descriptions

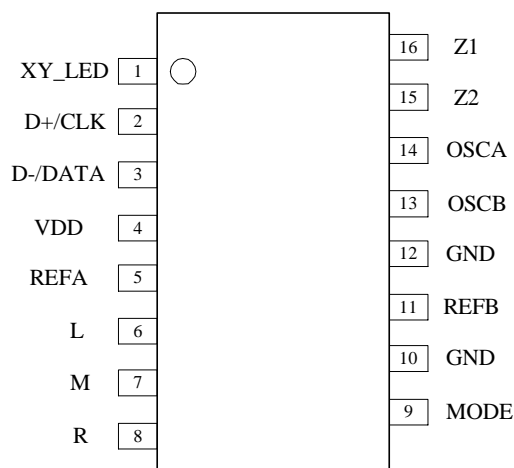


Figure 5-1 OM30PS Pin Assignments

| Pin No. | Symbol | I/O | Description |
|---------|---------|-----|---------------------|
| 1 | XY_LED | O | LED control |
| 2 | D+/CLK | I/O | USB D+ or PS/2 CLK |
| 3 | D-/DATA | I/O | USB D- or PS/2 DATA |
| 4 | VDD | - | 5 V DC power supply |
| 5 | REFA | - | 3.3V Reference |
| 6 | L | I | Left key |
| 7 | M | I | Middle key |
| 8 | R | I | Right key |
| 9 | MODE | - | U+P or U Only |
| 10 | GND | - | Ground |
| 11 | REFB | - | 1.8V Reference |
| 12 | GND | - | Ground |
| 13 | OSCB | - | Oscillator |
| 14 | OSCA | - | |
| 15 | Z2 | I | Scroller |
| 16 | Z1 | I | |

6 Absolute Maximum Rating

| Parameter | Symbol | Min. | Max | Unit | Notes |
|---|--------|------|-----|------|--|
| Storage Temperature Range | Tstr | -40 | 85 | °C | - |
| Operating Temperature Range | Totr | -15 | 40 | °C | - |
| Lead Solder Temperature | - | - | 245 | °C | For 10 seconds, 1.6mm below seating plane |
| Supply Voltage | VDD | -0.5 | 5.5 | V | - |
| Input Voltage | Vin | -0.5 | 5.5 | V | Pin1, Pin2, Pin3 |
| | | -0.5 | 3.6 | V | All GPIO pins except Pin1, Pin2, Pin3 |
| ESD | ESD | - | 2 | KV | All pins, human body model |
| Distance from Lens Reference Plane to Surface Plane | D | 2.2 | 2.4 | mm | This distance actually depends on the lens. 2.2 to 2.4 mm is just the most popular design range. Verify and confirm with your lens supplier for the best distance. |

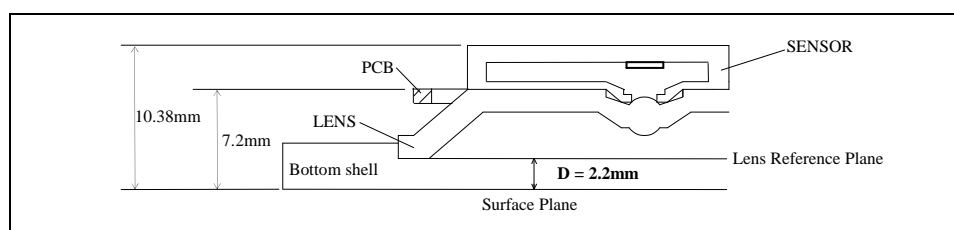


Figure 6-1 Distance from Lens Reference Plane to Surface Plane

7 DC Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max | Unit | Notes |
|-----------------------|--------------------|--------|------|------|------------|--|
| Supply Voltage | VDD | 4.0 | 5.0 | 5.5 | V | |
| DC Reference A | VrefA | 3.0 | 3.3 | 3.6 | V | |
| DC Reference B | VrefB | 1.6 | 1.8 | 2.0 | V | |
| Input Low Voltage | V _{IL} | - | - | 0.8 | V | |
| Input High Voltage | V _{IH} | 2.0 | - | - | V | |
| Output Low Voltage | V _{OL} | - | 0 | 0.5 | V | |
| Output High Voltage | V _{OH} | 2.8 | 3.3 | 3.6 | V | |
| Output Low Current | I _{OL} | | 10 | | mA | |
| Output High Current | I _{OH} | - | -10 | - | mA | |
| Resolution | Res | - | 800 | - | DPI | |
| Speed | S | - | 20 | - | in/sec | |
| Clock Frequency | FCLK | - | 24 | - | MHz | |
| Resonator | Res | - | 6 | - | MHz | |
| Sensor Frame Rate | f _{frame} | - | 3000 | 3200 | frames/sec | |
| LED Current (Average) | I _{LED} | 2.0 | - | 17 | mA | P_Bin LED R_LED=51Ω |
| DC Supply Current | Mouse Active | IDDACT | - | 5.5 | mA | No load on GPIO. Excluding LED current. |
| | Standby | IDDSTB | - | 3 | mA | |
| | Power Down | IDDPD | - | 340 | uA | |

8 Application Circuit

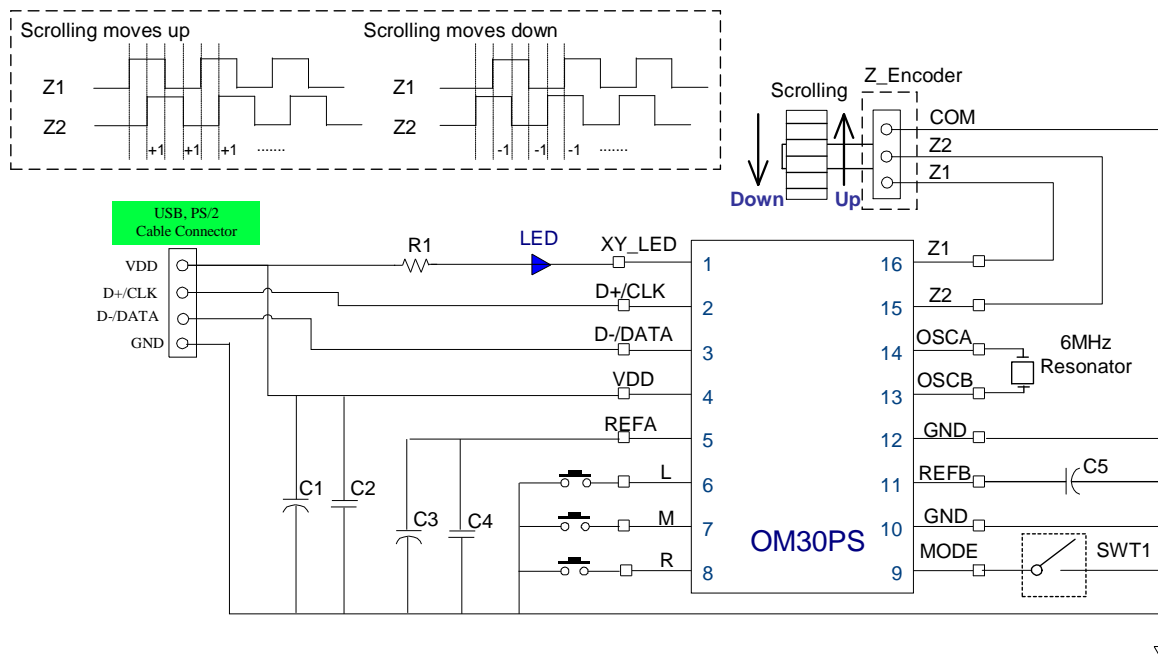


Figure 8-1 MODE-I for Basic Circuit

Where: **R1**: 33 ~51 Ohm, **C1**: 10uF, **C2**: 0.1uF, **C3**: 10uF, **C4**: 0.1uF, **C5**: 4.7uF,
SWT1: Open for USB+PS/2, short for USB only (one time detection after power on).

NOTE

1. For the P bin LED (3600- 4700mcd), the LED maximum average current (when working on black surfaces) of LED is about 17mA and the LED minimum average current (when working on white surfaces) is 2mA with R1=51 Ohm.
2. If the LED illumination is less than P bin, then R1=33 Ohm is recommended. It will allow the LED maximum average current to reach 25mA.
3. The cable connector is better located at the left side of the sensor to shorten the track length of D+ and D-.
4. C1, C2, C3, C4, C5 and 6MHz Resonator must be as close to sensor as possible.
5. A Large and complete ground is better than several small and separated grounds. If necessary, to add 0 or 1 ohm resistor jumps to make ground as large (or completed) as possible.

OM30PS

USB + PS/2 MCU + Sensor 2-in-1 Optical Mouse IC

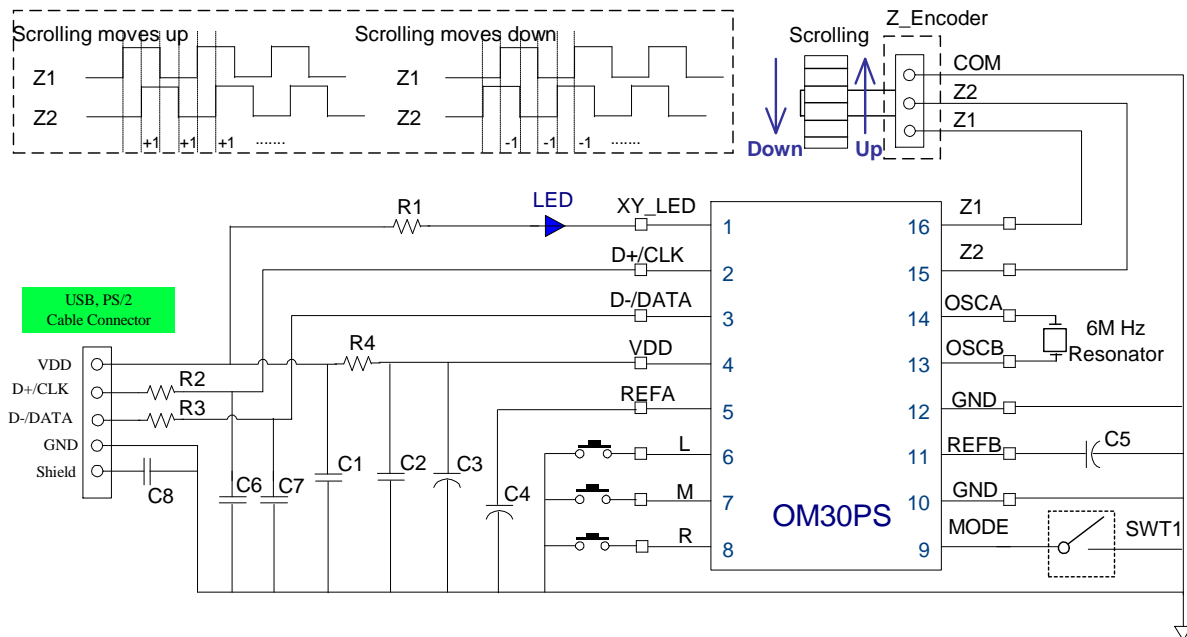


Figure 8-2 MODE-I I for Better EMC performance.

Where: **R1**: 33 ~51 Ohm, **R2**: 33 Ohm, **R3**: 33 Ohm, **R4**: 10 Ohm,
C1: 0.1uF, **C2**: 0.1uF, **C3**: 10uF, **C4**: 10uF, **C5**: 4.7uF, **C6**: 150pF, **C7**: 150pF, **C8**: 10nF(103)
SWT1: Open for USB+PS/2, short for USB only (one time detection after power on).

NOTE

1. For the P bin LED (3600- 4700mcd), the LED maximum average current (when working on black surfaces) of LED is about 17mA and the LED minimum average current (when working on white surfaces) is 2mA with R1=51 Ohm.
2. If the LED illumination is less than P bin, then R1=33 Ohm is recommended. It will allow the LED maximum average current to reach 25mA.
3. The cable connector is better located at the left side of the sensor to shorten the track lengths of D+ and D-.
4. R2, R3, R4, C1, C2, C6, C7 and C8 must be as close to the cable connector as possible.
5. R2 should be placed near C6 to form a R-C low pass filter to reduce EMI noises and the same with R3 and C7.
6. R4 should be placed between C1 and C2, besides, C1, C2 and R4 must be very close to each other to form a π -type filter to reduce EFT noises.
7. C3, C4, C5 and 6MHz Resonator must be as close to the sensor as possible.
8. A Large and complete ground is better than several small and separated grounds. If necessary, add 0 ohm resistor jumps on the quiet I/O pins (L, M, R, Z1, and Z2) to make the ground as large (or completed) as possible.
9. Must choose the cable which is with the shield.

9 PCB Through-Holes (Vias) Layout

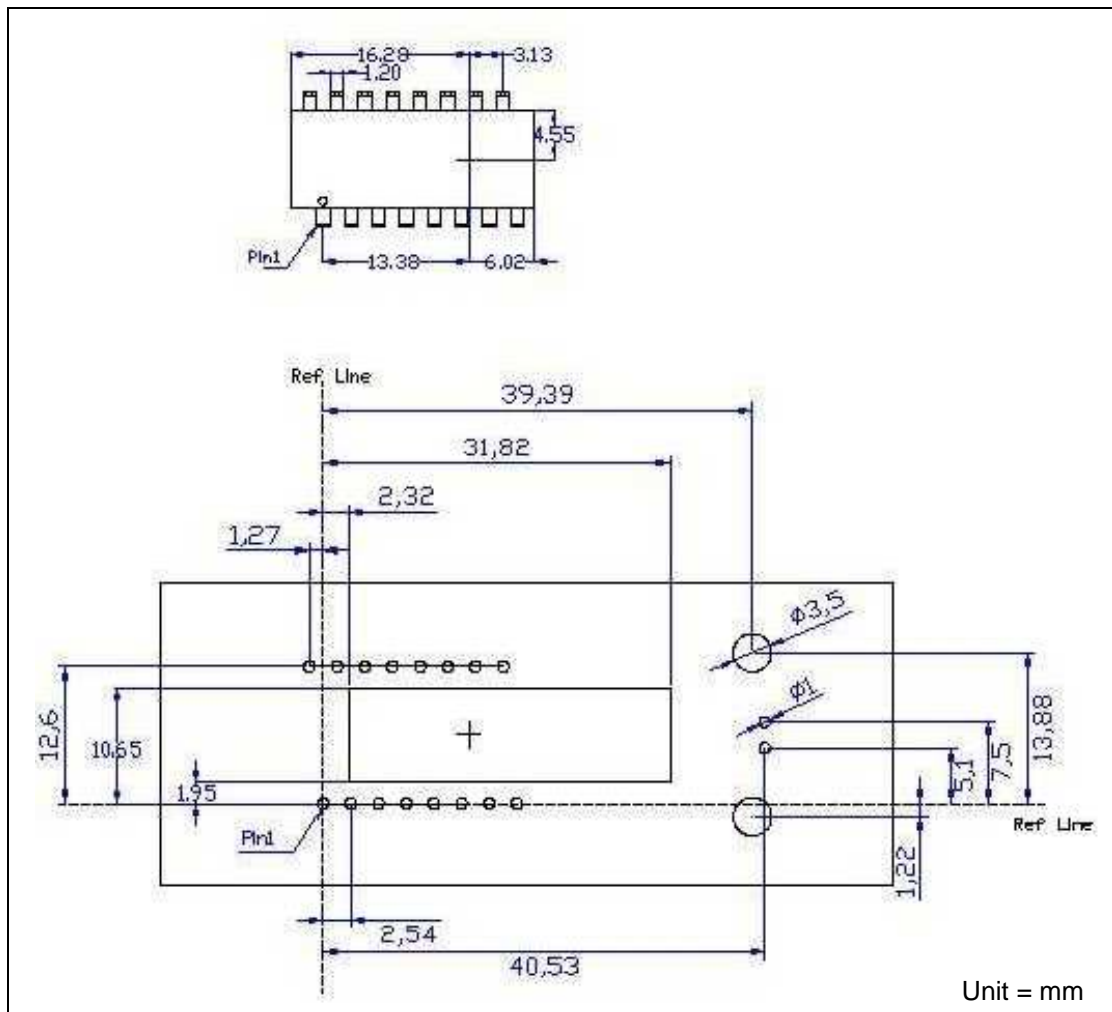


Figure 10-1 PCB Vias Layout for OM30PS

10 Package Type

| MCU+Sensor 2-in-1 Optical Mouse IC | Package Type | Pin Count |
|------------------------------------|--------------|-----------|
| OM30PS | OMD16 | 16 pins |

Where: **“P”** stands for “OMD16” package type

“S” stands for compliance with Sony SS-00259 standard