

# SPECIFICATION

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**MX8732**

**USB/PS2 Single Chip Optical Mouse Sensor**

**VERSION 1.0**



## TABLE OF CONTENTS

<b>1. General Description.....</b>	<b>3</b>
<b>2. Features.....</b>	<b>3</b>
<b>3. Pin Assignment.....</b>	<b>4</b>
<b>4. Absolute Maximum Rating.....</b>	<b>6</b>
<b>5. Electrical Characteristic.....</b>	<b>6</b>
<b>6. DC Electrical Characteristic.....</b>	<b>6</b>
<b>7. Application Circuit.....</b>	<b>7</b>
<b>8. Package (Dimension In mm/inch).....</b>	<b>8</b>
<b>9. Revision History.....</b>	<b>8</b>

## 1. General Description

The MX8732 chip is a low cost single chip optical mouse solution used to implement a non-mechanical tracking engine for computer mice. It is based on optical navigation technology with USB/PS2 combo MCU bundled. Which measures changes in position by optically acquiring sequential surface images(frames) and mathematically determining the direction and magnitude of movement. The single chip optical mouse sensor provides a complete and compact mouse solution, There are no moving parts, and precision optical alignment is not required, few outside components use and facilitate high volume assembly. It is a true crystal-less and ultra low cost solution.

## 2. Features

- Optical Navigation Technology
- Low-cost and powerful solution for PS/2 and low-speed USB combo mouse
- Microsoft 3D Intellimouse and IBM PS/2 mouse compatible
- Internal switch for USB DP/DM and PS2 CLK/Data I/O
- Universal Serial Bus Specification, version 2.0
- USB HID Specification, version 1.1
- USB-IF and WHQL compliable
- 5V Power Supply
- Power Saving During No Motion
- On Chip LED Drive with Regulated Current
- Crystal-less
- Low EMI radiation
- Supports 3D (X, Y, Z) input
- Supports 3 buttons and mechanical wheel encoding
- Option for sensor angular rotation (0 degree, 90 degrees or 180 degrees)

### 3. Pin Assignment

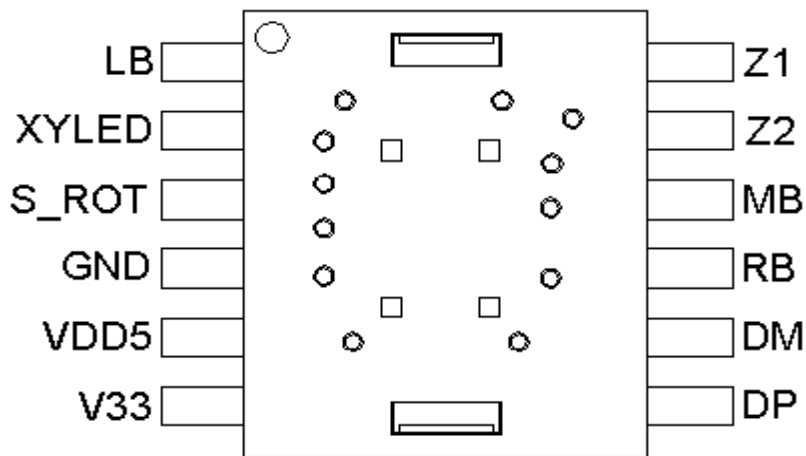


Chart 1 **Pin Assignment**

Pin No.	Symbol	I/O	Function
1	LB	I	Left button input
2	XYLED	O	LED control (sink current)
3	S_ROT	I	Option for sensor clockwise rotation angle.
4	GND	P	GND
5	VDD5	P	5V Power Input
6	V33	P	3.3V DC voltage output from internal regulator, This pin need to be tied to a 10UF/104 capacitor.
7	DP/CLK	I/O	USB D+ / PS2 CLK
8	DM/DATA	I/O	USB D- / PS2 DATA
9	RB	I	Right button input
10	MB	I	Middle button input
11	Z2	I	Z axis Input 1
12	Z1	I	Z axis Input 2

**Note:**

1. Sensor angular rotation is 0 degrees while S\_ROT is under input floating state;
2. Sensor angular rotation is 90 degrees while S\_ROT is connected to VDD;
3. Sensor angular rotation is 180 degree while S\_ROT is connected to GND.

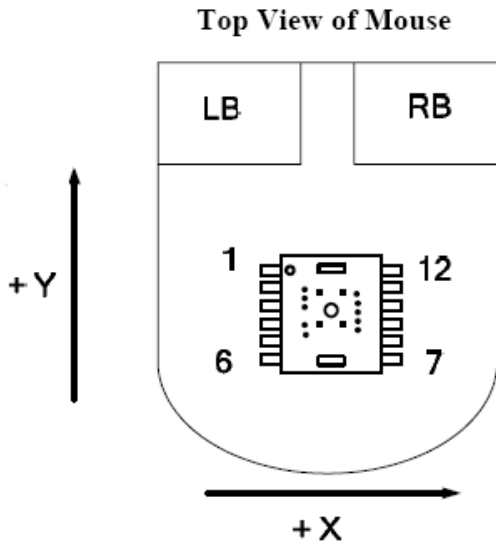


Chart 2 **Package pinout at 0°**

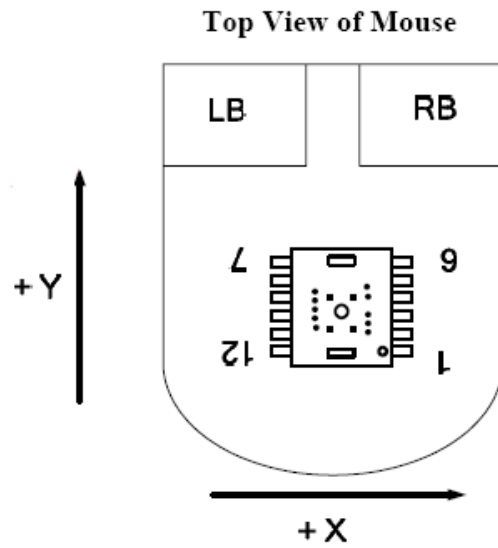


Chart 3 **Package pinout at 180°**

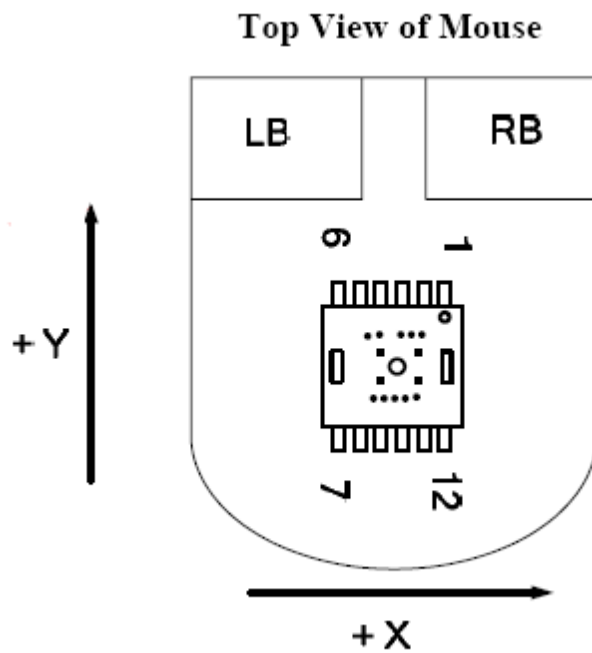


Chart 4 **Package pinout at 90°**

## 4. Absolute Maximum Rating

Symbol	Min.	Max.	Unit
Operating Temperature	0	70	°C
Storage Temperature	-65	150	°C
Input voltage	-0.5	6.0	V
Output voltage	-0.5	6.0	V

## 5. Electrical Characteristic

Test Condition: T = 25°C, VDD=5.0V, VSS=0V

Parameters	Sym.	Min.	Typ.	Max.	Unit
Operating voltage	VDD	4.5	5.0	5.5	V
Operating Current (normal operation)	IOP	-	-	10	mA
Operating Current (Sleep mode)	Isleep	-	6.0	-	mA
USB suspend current	Isuspend	-	-	320	uA
Output voltage of 3.3V regulator	Vreg	3.0	3.3	3.6	V
L, M, R, debounce time	Tb	17	-	-	ms
Z-axis debounce time	Tz	700	-	-	µs

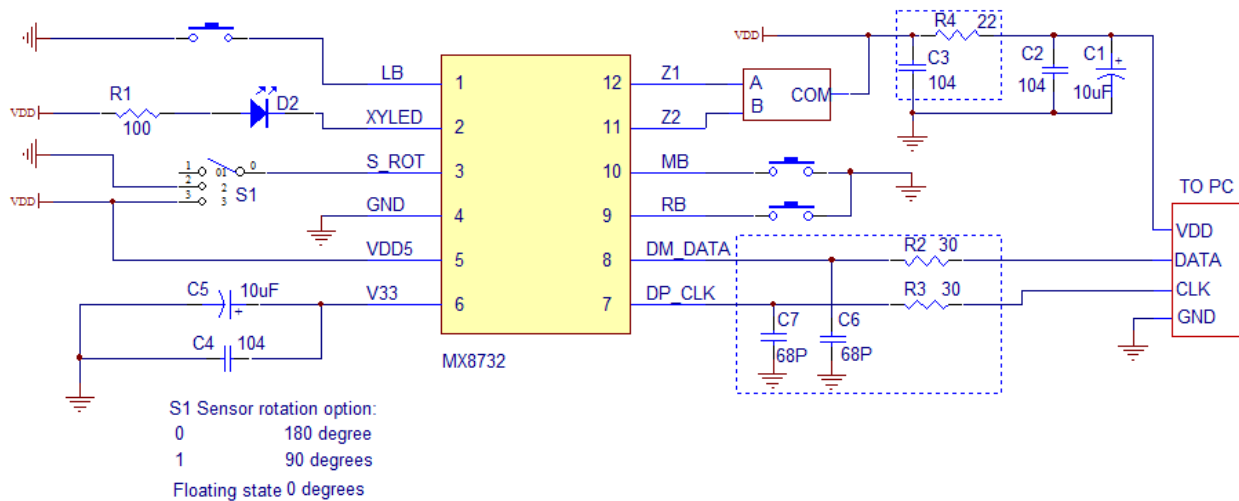
## 6. DC Electrical Characteristic

(T=25°C, Vdd=5V, Vss=0V)

Symbol	Parameter	Condition	Min	Type	Max	Unit
<b>3.3V Regulator</b>						
Vreg	Output voltage of 3.3v Regulator	Vdd=4.4V~5.25V	3.0	3.3	3.6	V
VresetL	Low Power Reset detecting low Voltage	-	-	-	3.3	V
VresetH	Low Power Reset detecting high Voltage	-	3.6	-	-	V
<b>MCU operation</b>						
Iil	Input Leakage Current for input pins	VIN=VDD, VSS	-	-	±1	uA
Icc	VDD operating supply	Output pins	-	-	10	mA

	current Normal frequency operation mode	floating				
<b>USB Interface</b>						
Voh	Static Output High	USB operation Mode	2.8	-	3.6	V
Vol	Static Output Low		-	-	0.3	V
Vdi	Differential Input Sensitivity		0.2	-	-	V
Vcm	Differential Input Command Mode Range		0.8	-	2.5	V
Vse	Single Ended Receiver Threshold		0.8	-	2.0	V
Cin	Transceiver Capacitance		-	-	20	PF
Vrg	Output Voltage of internal Regulator		3.0	-	3.6	V

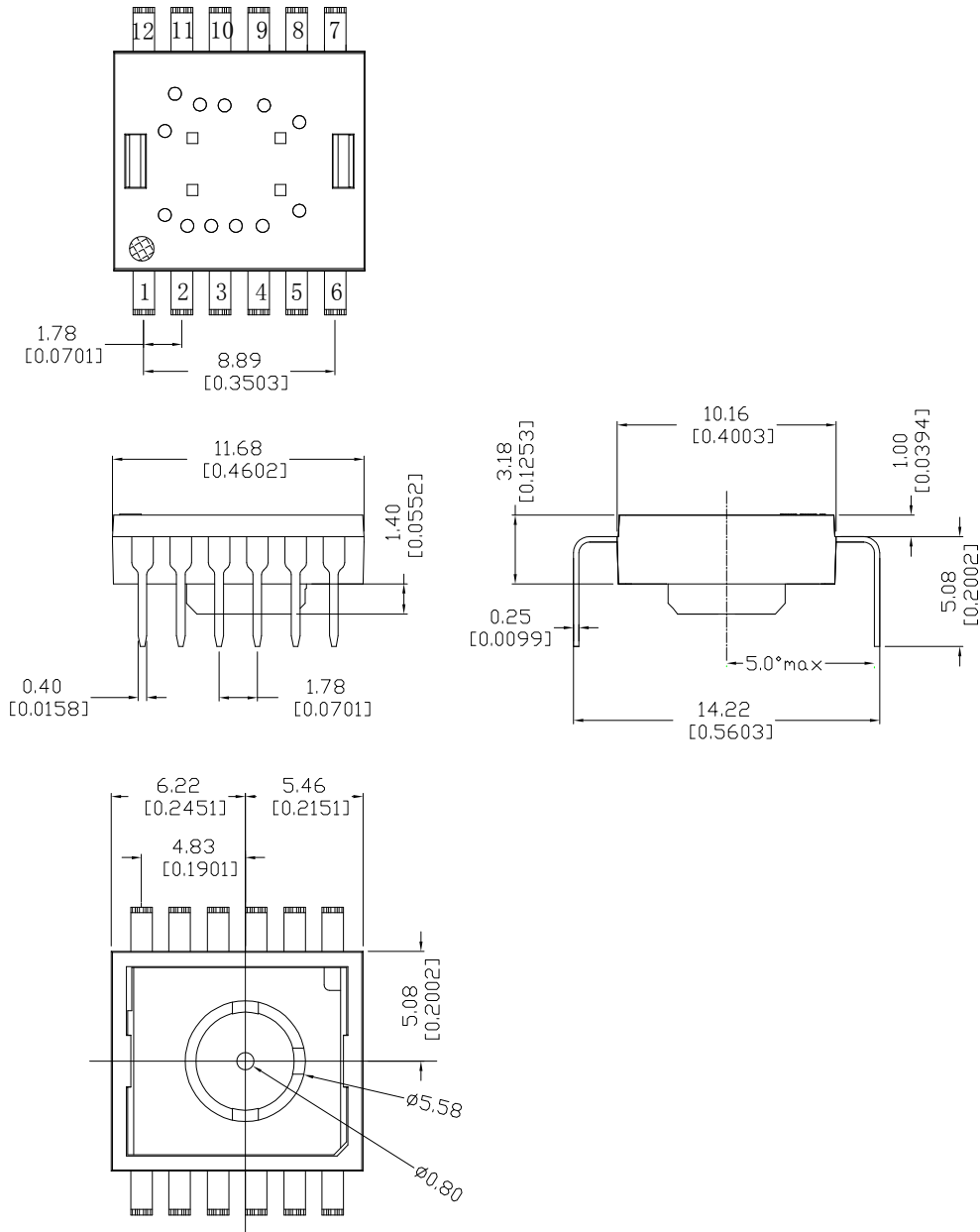
## 7. Application Circuit



### Note:

1. C3, R4 as close USB/PS2 line solder pad on PCB as possible, PCB layout should be designed in such a way as to ensure that the VDD is stable and pass through RC filter.
2. The capacitance C1, C2, C4 & C5 have to close to IC.
3. D+/CLK and D-/DATA signal line have the short trace to IC.
4. Recommend to have ground grid on the PCB periphery.
5. Components in dotted line are used for EMC issue.
6. MX8732 has an option for sensor clockwise angular rotation (0 degree, 90 degrees, 180 degrees).

## 8. Package (Dimension In mm/inch)



## 9. Revision History

Version	Update date	Revised Content	Revised by	Confirmed by
V1.0	2011-4-19	Original	LiuXing	Alan