

IM23

Inertial Measurement Unit

V1.0



REVISED RECORD

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Table of Contents

I.Product Overview	1
1. Features	1
2. Applications	1
II.Technical Parameters	2
III.Hardware Definitions	3
1. Pin Definitions	3
2. Reference circuit	3
3. Module Packing and Applications	4
3.1 Dimensions	4
3.2 Module Pin Specifications	6
3.3 Base Plate Female Sockets Specifications	6

I.Product Overview

IM23 is a miniaturized (25*25*9.1 mm) inertial measurement unit (IMU) and controller designed by Feyman Technology. It is built on the foundation of our popular IM19 module which has been successfully deployed in various industrial applications with over 100K units (by 2023) in active use. IM23 is an upgraded version of IM19 and it is designed to meet the demands of harshest industrial application environment.

With built-in 9-axis sensor and a powerful Cortex M7 processor running at 480MHz with double precision support, it enables diverse applications such as IMU measurement, AHRS, tilt surveys, agriculture and machine control, and integrated navigation. IM23 has been factory calibrated in the whole temperature range to enable reliable operation under a wide range of industrial applications.

1. Features

- 3-axis gyroscope, 3-axis accelerometer and 3-axis magnetometer
- Temperature compensation and calibration
- Miniaturization, adapting to a variety of complex scenarios
- Shock-resistant and highly reliable
- Multi-role function
 - Compass
 - Tilt monitoring
 - AHRS
 - RTK tilt surveys
 - Machine control
 - Integrated navigation (with GNSS, odometer, vision etc)

2. Applications

- Industrial precision instruments
- Structure monitoring
- Aerospace
- Autonomous Driving
- Robots
- Machine control

II. Technical Parameters

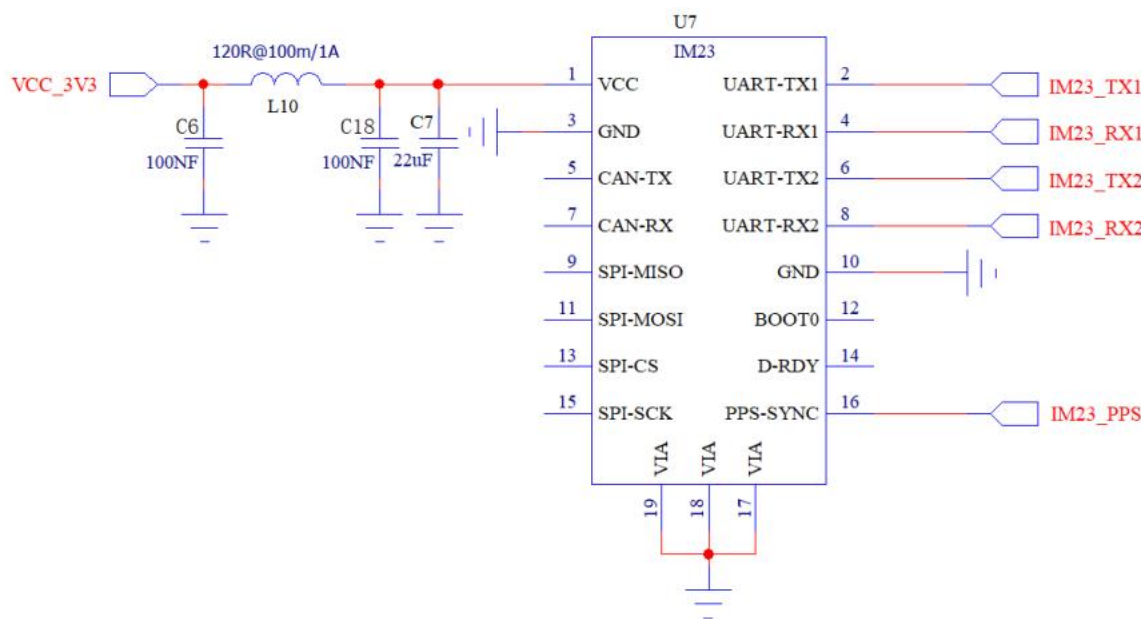
Gyroscope	
Output range	± 1000 deg/s
Bias instability (Allan's variance)	3 deg/h
Bias stability (10s 10)	15 deg/h
Bias repeatability (1σ)	15 deg/h
Angular random walk	0.3 deg / $\sqrt{h}$
Scale factor nonlinearity	500ppm
G-sensitive	0.005 deg/s /g
bandwidths	200Hz
Accelerometer	
Output range	$\pm 8g$
Bias instability (Allan's variance)	30 ug
Bias stability (10s 10)	0.2 mg
Bias repeatability (1xigem)	0.4 mg
Velocity random walk	0.05 m/s/ $\sqrt{h}$
Scale factor nonlinearity	300 ppm
bandwidths	200 Hz
Magnetometer	
Output range	$\pm 500uT$
resolution	0.15uT
temperature drift	0.027uT / $^{\circ}C$
System specifications	
Supply Voltage	3.3 $\pm$ 0.1V
Typical Power Consumption	$\leq 0.3W$
Size	25.0mm x 25.0mm x 9.1mm
Operating temperature	-40 $^{\circ}C$ ~+85 $^{\circ}C$
Starting time	<1s
Shock tolerant	5000g@0.1ms
Vibratory	20Hz~2000Hz 6.06g
Output frequency	1000Hz (configurable)

III. Hardware Definitions

1. Pin Definitions

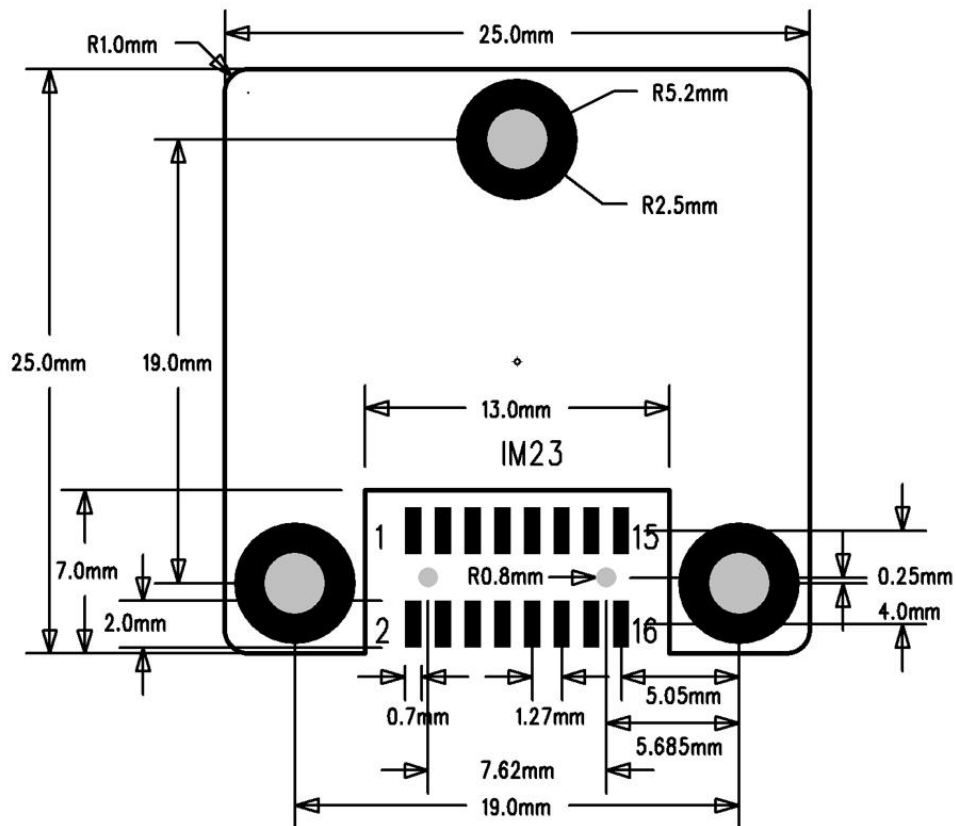
Pin number	Functional definition	I/O	Power domain
1	VCC	-	3.3V
2	UART-TX1	O	3.3V
3	GND	-	GND
4	UART-RX1	I	3.3V
5	CAN-TX	o	3.3V
6	UART-TX2	o	3.3V
7	CAN-RX	I	3.3V
8	UART-RX2	I	3.3V
9	SPI-MISO	o	3.3V
10	GND	-	GND
11	SPI-MOSI	I	3.3V
12	BOOT0	I	3.3V
13	SPI-CS	I	3.3V
14	D-RDY	O	3.3V
15	SPI-SCK	I	3.3V
16	PPS-SYNC	I	3.3V

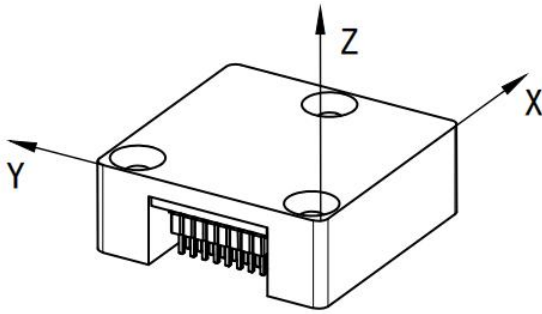
2. Reference circuit



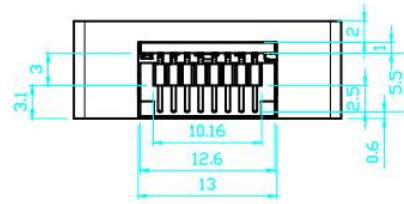
3. Module Packing and Applications

3.1 Dimensions

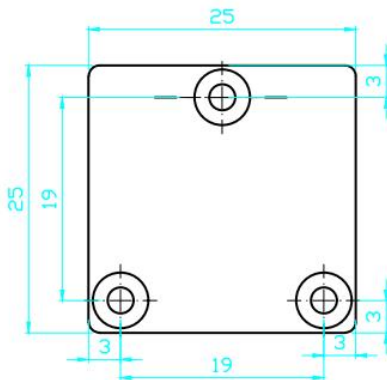




axis view



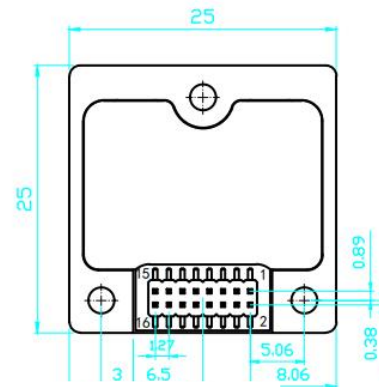
front view



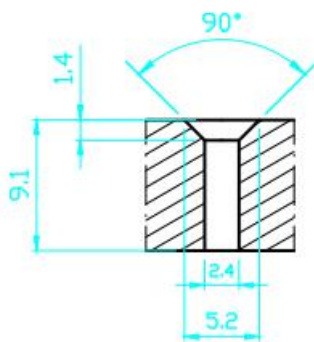
front view



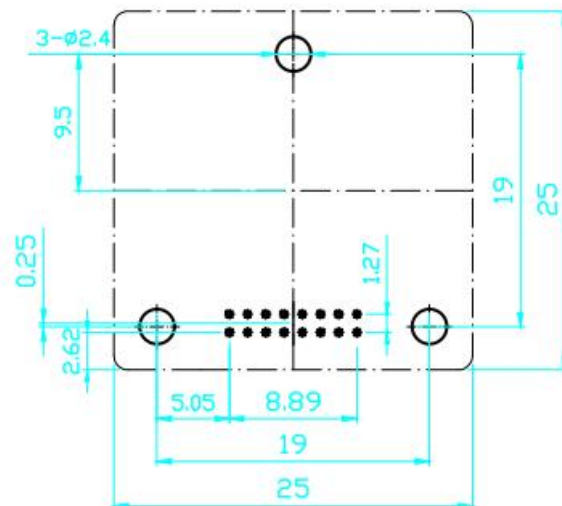
left view



top view

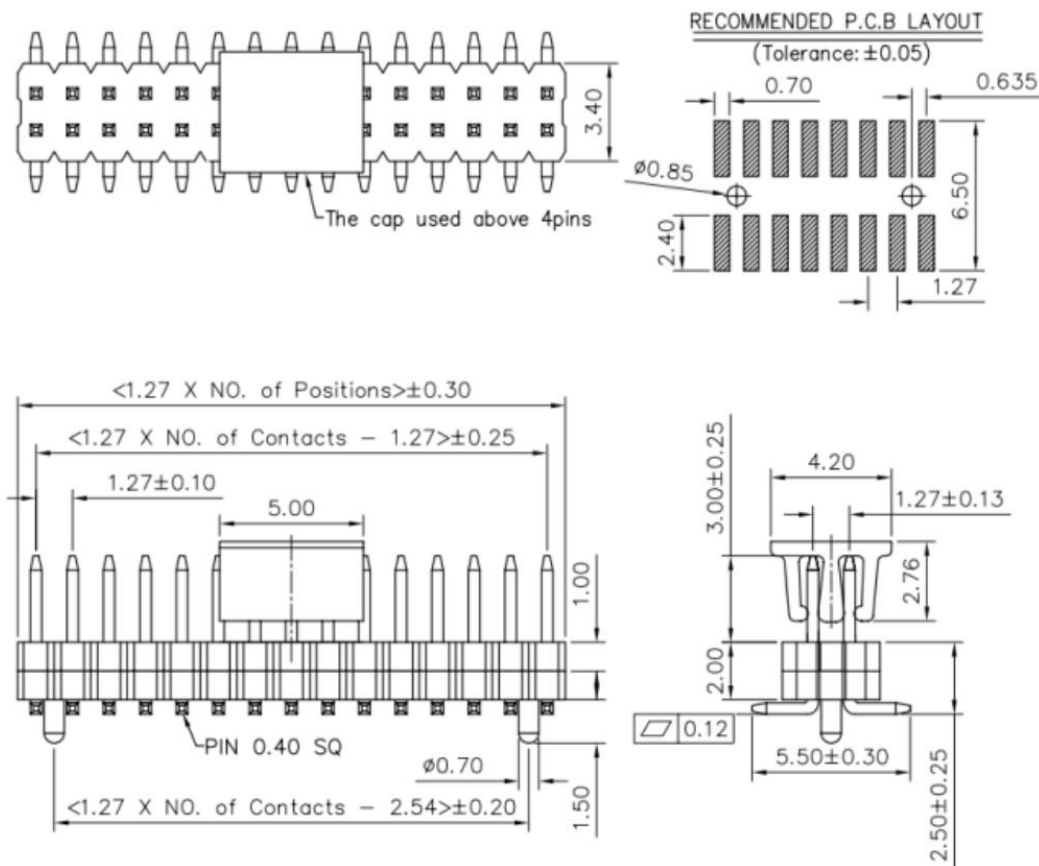


Sectional view of holes



Dimensional Drawing

3.2 Module Pin Specifications



3.3 Base Plate Female Sockets Specifications

