SKM2308DR 规格书

多系统组合导航定位模块/

SKM2308DR Datasheet

Multi-system integrated navigation module

文档信息/Document information		
标题/Title	SKM2308DR 双频组合导航模块规格书 SKM2308DR Multi-system integrated navigation module	
文档类型/Document type	规格书/Datasheet	
文档编号/Document number	SL-22100294	
修订和日期/Revision and date	V1.02	24-Nov-2022
公开限制/Disclosure restriction	公开/Public	

版本历史/Revision History

版本/Version	描述/Description	制定/Make	日期/Date
V1.01	初始版本/The initial version	George	20220817
V1.02	补充参数/Stray parameter	Wendy	20221124

目录/Contents

1 产品简介/Product Introduction

SKM2308DR 是一款针对车载导航应用推出的 GNSS+MEMS 组合导航模块。模块基于完全自主知识产权的多系统、低功耗、高性能 SOC 芯片-UFirebirdR 设计，内置 6 轴 MEMS 器件，支持多系统联合定位或单系统独立定位，直接输出 GNSS 与 MEMS 组合定位结果，即使在隧道、地下车库也能够实现连续定位。

SKM2308DR is a combined GNSS + MEMS combined navigation module for in-board navigation applications. The module is based on the multi-system, low-power consumption and high-performance SOC chip-UFirebirdR design with fully independent intellectual property rights. The built-in 6-axis MEMS device, which supports multi-system joint positioning or single-system independent positioning, directly outputs GNSS and MEMS combined positioning results, and continuous positioning can be realized even in the tunnel and underground garage.

图 1：SKM2308DR 正视图/Top view

2 典型应用/Applications

- 车辆高精度导航/ High precision vehicle navigation
- 公交车智能交通/ Intelligent transportation of buses
- 车辆远程监控/ Remote vehicle monitoring
- 个人导航设备/ Personal navigation equipment

3 产品特点/Features

- 支持 BDS、GPS、GLONASS、Galileo、QZSS 系统/ Support for BDS, GPS, GLONASS, Galileo, and QZSS systems
- 每个产品标定参数均不一致防盗版/Each product calibration parameters are inconsistent anti-piracy
- 紧凑模块化设计可节省用户产品空间/Compact modular design can save user product space
- 无安装角度要求方便用户车载安装/No installation Angle is required to facilitate vehicle-mounted installation
- 支持 RTCM2.3-3.3 协议/Supports RTCM2.3-3.3 protocols
- 符合 RoHS, FCC, CE /Compliance with RoHS, FCC, CE
- IP67 级防水外壳，具有 6 级防尘和 7 级防水能力

4 接口定义/Interface definition

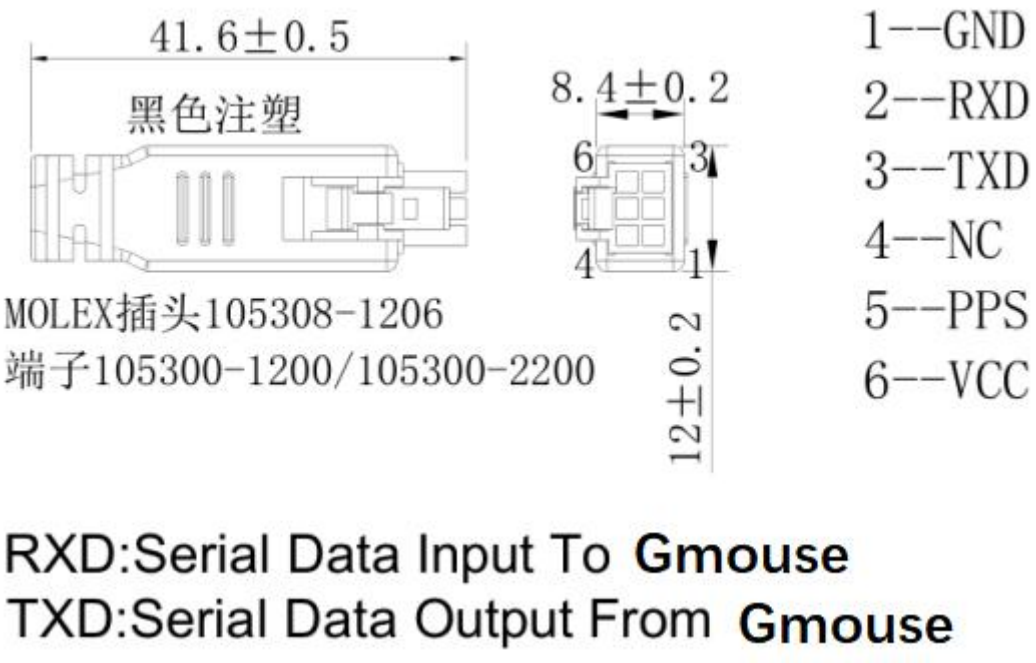


图 2：SKM2308DR 接口定义/Interface definition

5 接口描述/Interface description

电源：SKM2308DR 系列输入电压 VCC 范围为 3.5 V~ 5.5V，电流要求大于 100mA。靠近接口电源的地方请放置去耦电容（10uF 和 1uF）。

Power supply: SKM2308DR series input voltage VCC range is 3.5V ~ 5.5V, current requirement is greater than 100mA.Place decoupling capacitors (10uF and 1uF) close to the interface power supply.

UART 端口：SKM2308DR 系列支持一个完整的双工系列通道 UART。

UART port: The SKM2308DR series supports a complete duplex series channel UART.

RS232 电平：SKM2308DR 系列使用单芯片 RS232 到 UART bridge，它是 3.3V 驱动的 EIA / TIA-232 和 V.28/V.24。

RS232 level: The SKM2308DR series uses a single-chip RS232 to UART bridge, which is 3.3V driven EIA/TIA-232 and V.28/V.24.

序号/Pin No.	名称/Pin name	I/O	描述/Description	备注/Remark
MOLEX 连接头 105308-1206/ MOLEX connector 105308-1206				
1	GND	G	电源接地/Power Ground	参考接地/Reference Ground
2	RXD	I	UART 串行数据输入到 SKM2305/ UART Serial Data Input To SKM2305	RS232
3	TXD	O	来自 SKM2305 的 UART 串行数据输出/ UART Serial Data Output From SKM2305	RS232
4	NC	/	/	/
5	PPS	O	时间脉冲信号(默认 100ms)/ Time Pulse Signal (Default 100ms)	
6	VCC	P	电源/ Power Supply	VCC:3.5V~5.5V

6 设计原理/Design diagram

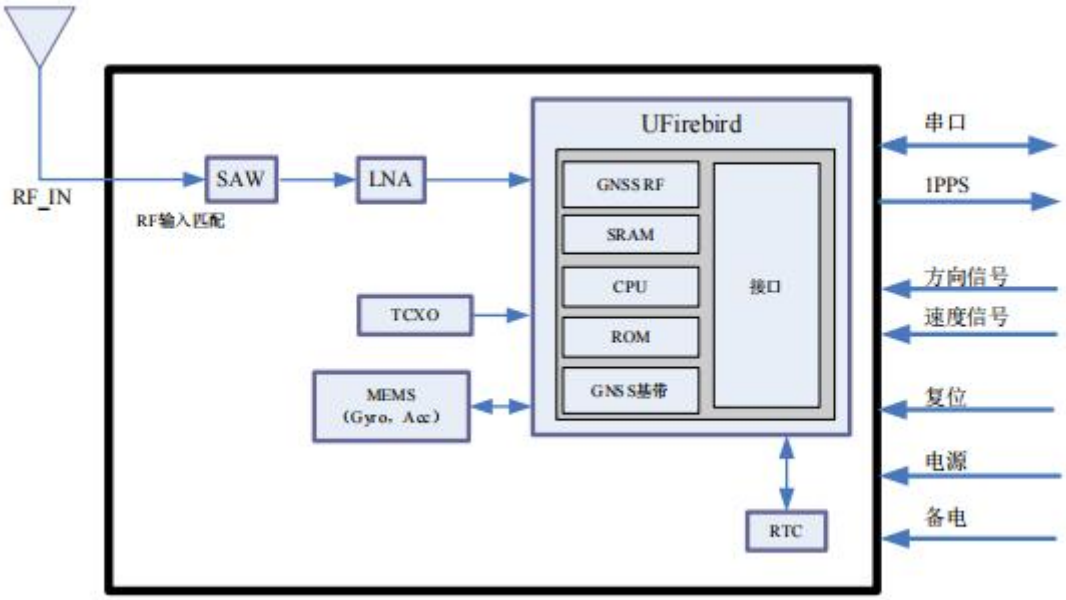


图 3：SKM2308DR 设计原理框图/Design diagram

7 电气特性

7.1 电气特性

表 7-1 绝对最大值

参数	符号	最小值	最大值	单位	说明
供电电压 (VCC)	VCC	-0.5	5.5	V	模块主供电电压
备用电池	V_BCKP	-0.5	3.6	V	RTC 后备电池供电电压
数字信号管脚电压	--	-0.5	3.6	V	数字信号管脚电压
存储温度	Tstg	-45	90	℃	存储温度
回流焊温度	--	--	+260	℃	回流焊温度

7.2 运行条件

表 7-2 运行条件

参数	符号	最小值	典型值	最大值	单位	条件
供电电压(VCC)	Vcc	3.5	5	5.5	V	
电压波纹	Vp-p			50	mV	
峰值电流/Peak Current	Iccp			52	mA	VCC=3.0V
跟踪平均电流	I_{ACQ}	28	30	32	mA	VCC=3.0V
输入管脚低电平	Vin_low	-0.3		0.2Vcc	V	

输入管脚高电平	Vin_high	0.7Vcc		Vcc+0.3	V	
输出管脚低电平	Vout_low	0		0.4	V	Iout=-2mA
输出管脚高电平	Vout_high	VCC-0.4		Vcc	V	Iout=2mA
天线增益	Gant	15	20	30	dB	
接收机链路噪声系数	Nftot		1.9		dB	
工作温度	Topr	-40		85	℃	

8 性能指标/Performance evaluation

参数/Parameter	描述/Description
接收机类型/Receiver type	BDS B1:1561.098MHZ GPS L1:1575.42MHZ GLONASS L1: 1602+0.5625*k MHz Galileo E1: 1575.42 MHz
首次定位时间/TTFF	冷启动/Cold Start：30s
	热启动/Hot Start：1s
	重捕获/Reacquisition：1s
灵敏度/Sensitivity	跟踪/Tracking：-161dBm CEP,50%
	捕获/Acquisition：-147dBm CEP,50%
水平定位精度/Horizontal positioning precision	定位/Positioning：2m
	速度/Velocity： 0.1m/s
授时精度/Timing precision	PPS：30ns
航向精度/Course accuracy	0.3degrees
NMEA 输出频率/ NMEA output frequency	1Hz(默认)，可配置成 10Hz/ 1Hz (default) and can be configured to 10Hz
操作限制/Operational constraint	动态/Dynamic<=4g
	高度/Altitude<=50,000m
	速度/Speed<=515m/s
天线指标/Antenna design	
外型尺寸/External dimension	35x35x4.0mm
阻抗/Impedance	50Ω±10%
轴比/Axial ratio	3 dB max
极化/Polarization	右极化(RHCP) /Right polarization (RHCP)
机械特性/Mechanical characteristics	
尺寸/Size	50.7* 48.5 * 18.5mm

电源功耗/Power Consumption	
电压/Voltage	3.5V~5.5V
电流/Electric current	53mA(typical)
工作环境/Operating environment	
工作温度范围/Operating temperature	-40 ~ +85 ℃ （不包括备份电池）
存储温度/storage temperature	-40 ~ +105 ℃
湿度/ Humidity	≦95%

9 模块尺寸/Module size

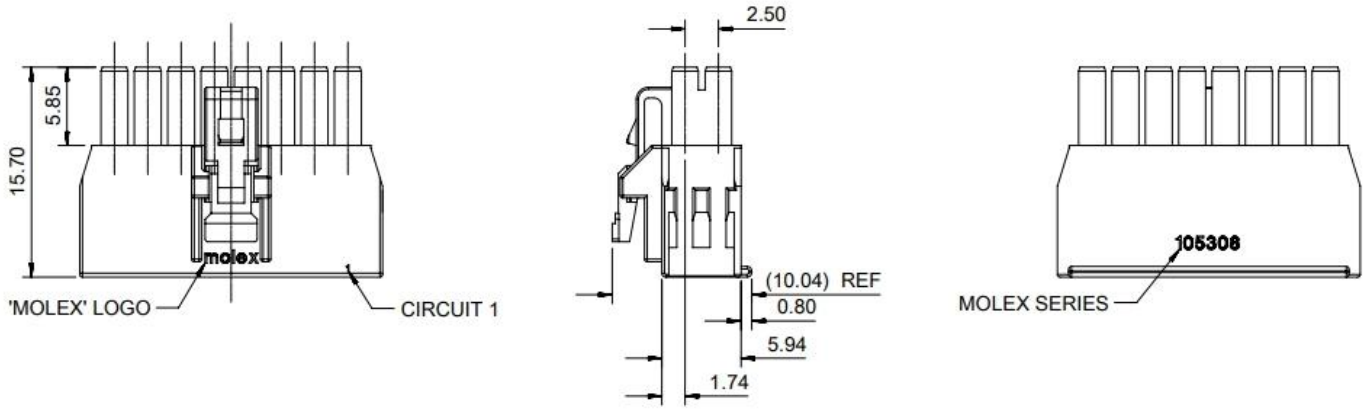
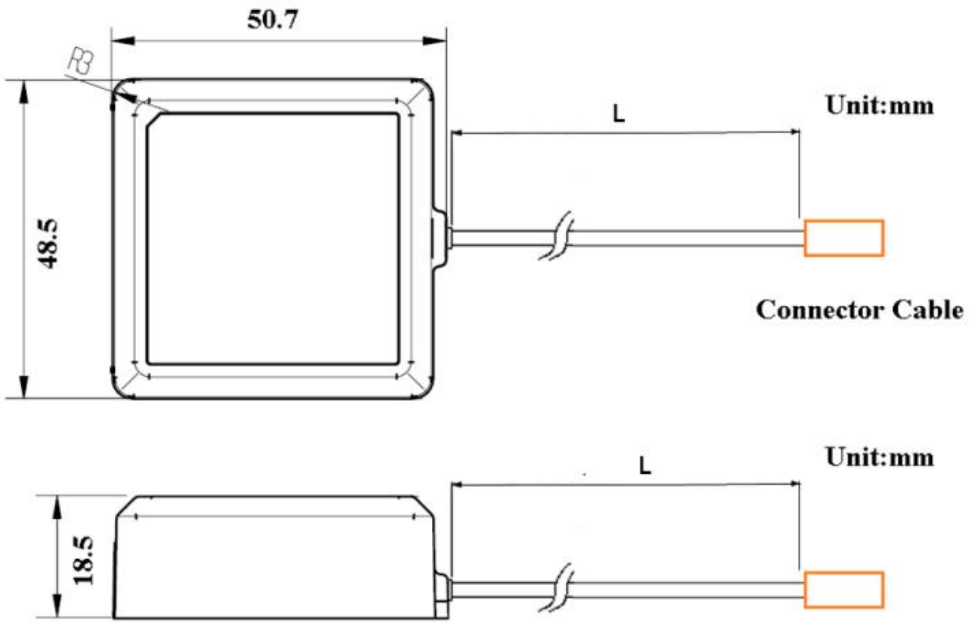


图 4：MOLEX 连接头 105308-1206 尺寸



线长/Line length	长度/Length（mm）
L	3000±50
L	5000±50
L	8000±50

图 5：SKM2308DR 尺寸

10 模块校准及使用注意事项/Module calibration and use precautions

10.1.1 模块自校准/Module self-calibration

在 SKM2308DR 系列模块安装之后需要等待模块完成自校准以确保模块精确地输出。在自校准过程中，模块将会对自身安装状态参数和传感器参数进行估计。在自校准完成之前，定位为纯卫导模式;在自校准完成之后，定位为卫导与惯导紧组合模式。

After installing the SKM2308DR series module, you need to wait for the module to complete the self-calibration to ensure that the module is output accurately. During the self-calibration process, the module estimates the self-installation status parameters and the sensor parameters. Positioning as the pure guard guide mode before the self-calibration, and as the tight combination mode of guard guide and inertial navigation.

10.1.2 模块完成自校准条件/Module completed the self-calibration conditions

- 上电后，自校准开始，停车不少于三分钟；/After the power is on, stop for no less than three minutes from the calibration start;
- 自校准过程中保证良好的卫星可见性(可见卫星数不少于 6 颗，且 Cn0 在 30dB 以上)，卫星观测质量越好，校准越快；/ In the self-calibration process, to ensure good satellite visibility (visible satellites are not less than 6, and Cn0 is above 30dB), the better the satellite observation quality, the faster the calibration;
- 在正常行驶的前提下，进行不少于 5 次的 90 度转弯机动（固定安装无需此项操作）；/ No less than 590 degree turn maneuver under normal driving (this operation is not required for fixed installation);
- 在正常行驶的前提下，直行机动下加速度行驶，行驶速度保持在 36km/h 以上，加减速次数越多(加速度>05m/s^2，加速次数不少于 10 次)，高速行驶时间越长，校准越快。/ Under the premise of normal driving, the straight motor drives under the acceleration, the driving speed remains above 36 km/h, the more the acceleration and deceleration times (the acceleration is> 05 m/s2, the acceleration times is not less than 10 times), the longer the high-speed driving time, the faster the calibration.
- 惯性导航第一次对准后(insstatus 为 3)，仍需在正常开阔环境下行驶 15 分钟左右，使惯导器件训练充足，如第一次对准后立即进入隧道、车库等复杂环境，有可能会导致导航精度略差。/ After the first alignment of inertial

navigation (insstatus is 3), it still needs to drive in a normal open environment for about 15 minutes, so that the training of inertial navigation devices is sufficient. If the tunnel and garage and other complex environments enter immediately after the first alignment, it may lead to slightly poor navigation accuracy.

- 模块的正常使用仅需要完成一次自校准过程。/ Normal use of the module only requires one complete self-calibration process.

  惯导模组完成校准后，需要完全断电后，才可以进行移动，包括主电 VCC 以及备电 V_BACKUP。

After the calibration of the inertial guide module is completed, it can be completely powered off, including the main power VCC and the standby power V_BACKUP.

11 联系方式/ Contact Information

Skylab M&C Technology Co., Ltd.

深圳市天工测控技术有限公司

地址: 深圳市龙华区龙华街道工业东路利金城科技工业园 9#厂房 6 楼

电话: 86-755 8340 8210（Sales Support）

电话: 86-755 8340 8510（Technical Support）

传真: 86-755-8340 8560

邮箱: technicalsupport@skylab.com.cn

网站: www.skylab.com.cn　　www.skylabmodule.com