

GS202

产品规格书

- 支持 SATA 6 Gb/s 接口标准
- 高性能和低功耗
- 支持动态电源管理和 SMART
- 支持 TRIM 指令

版本历史

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1. 简介

1.1 概述

佰维GS202系列固态硬盘由使用NAND闪存的半导体器件组成，为存储介质提供高可靠性和高性能。该系列产品支持断电数据保护。为了满足断电保护的要求，该GS202系列固态硬盘采用钽电容器和监控IC，在仪器突然关闭电源时不会丢失数据。该系列产品非常适合想要以最简单的方式提高系统性能的计算机爱好者。

GS202系列固态硬盘符合SATA-III标准并与串行ATA磁盘驱动器兼容。为了满足高质量的要求，本系列产品使用了高性能SATA-III控制器和工业级TLC NAND闪存。为了提高数据的完整性和可靠性，主控采用了很多先进的技术，如，动态坏块管理、全局磨损均衡技术和先进的错误校验技术。另外，GS202系列也提供了工业PC在极端环境下的高平均无故障时间的耐用性能。

1.2 产品信息

型号	PN	容量
GS202	IMA59K38300-512	512GB
	IMA59K38300-1TB	1TB

1.3 产品特点

- 高性能
- 低功耗
- 增加系统响应能力
- 高可靠性
- 小尺寸
- 重量轻
- 高耐用性

2. 模块框图

佰维GS202系列固态硬盘搭载高性能的佰维SATA-to-NAND控制器，在4个通道上管理多个NAND闪存设备的同时，与主机一起形成一个完整的 SATA 6Gb/s带宽。

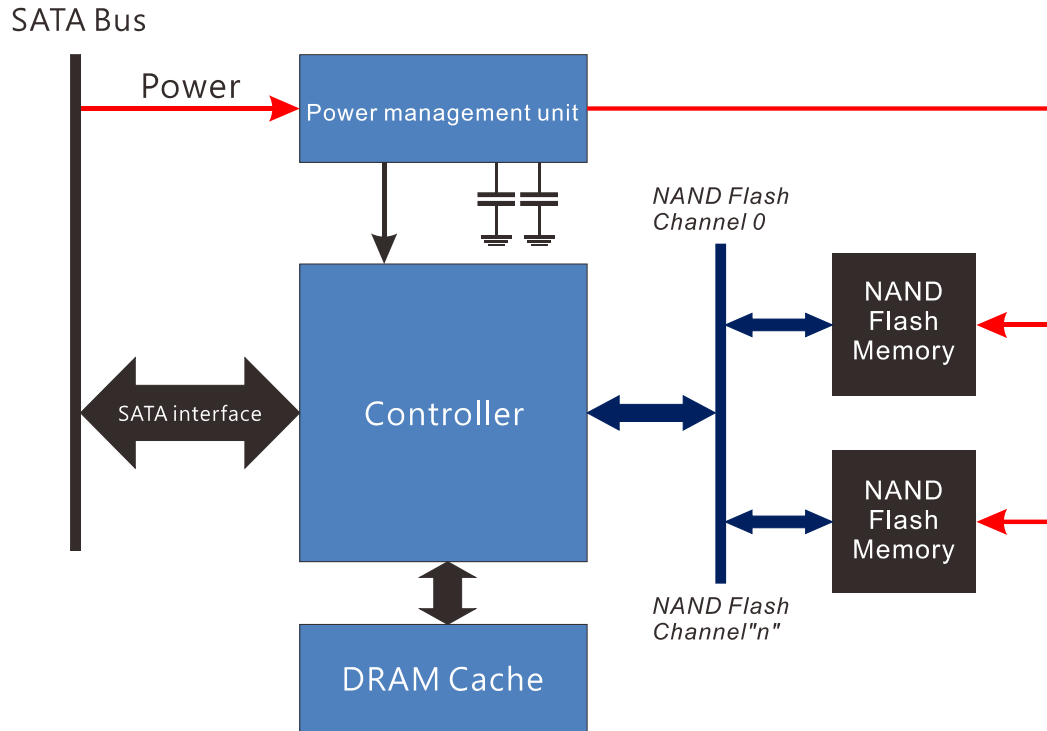


图1. 模块框图

3. 产品规格

这部分详细描述佰维mSATA GS202系列固态硬盘产品的规格参数。

3.1 容量

未格式化容量 ¹	512GB	1TB
在LBA模式下的总用户可寻址扇区	1,000,215,216	2,000,409,264

表1. 用户可寻址扇区

注: 1GB = 1,000,000,000 字节; 1 sector = 512字节。显示的LBA计数表示用户总存储容量, 并且在驱动器的整个生命周期中保持不变。SSD的总可用容量可能小于总物理容量, 因为一小部分容量用于NAND闪存管理和维护。

3.2 性能

性能	512GB	1TB
随机读/写IOPS (每秒输入输出操作)(CDM)		
4K 随机读可达	94K	96K
4K 随机写可达	85K	84K
最大持续读写带宽 (CDM)		
连续读可达	553MB/s	560MB/s
连续写可达	470MB/s	474MB/s
时延 (AS SSD)		
读	0.034ms	0.032ms
写	0.165ms	0.154ms

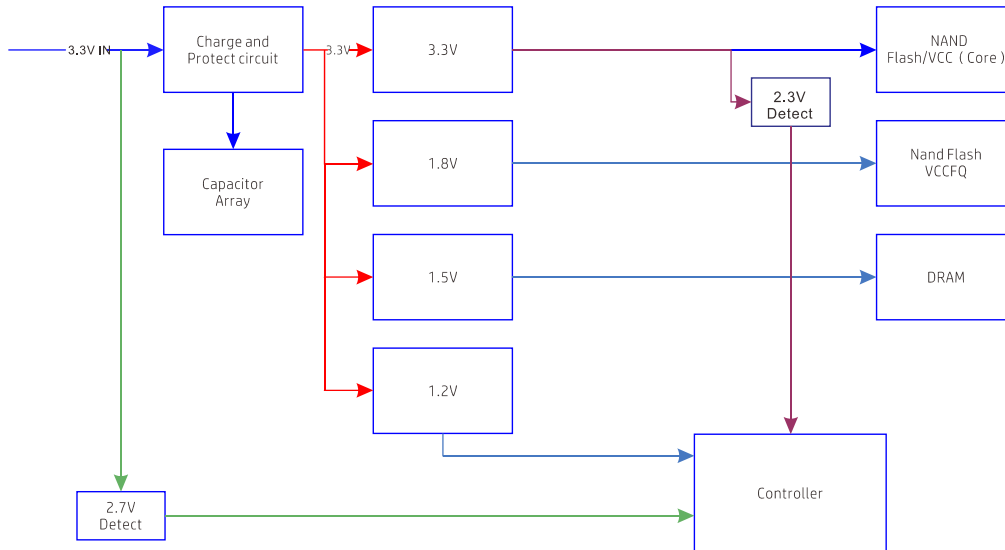
表 2 读/写 IOPS, 带宽, 时延

注:

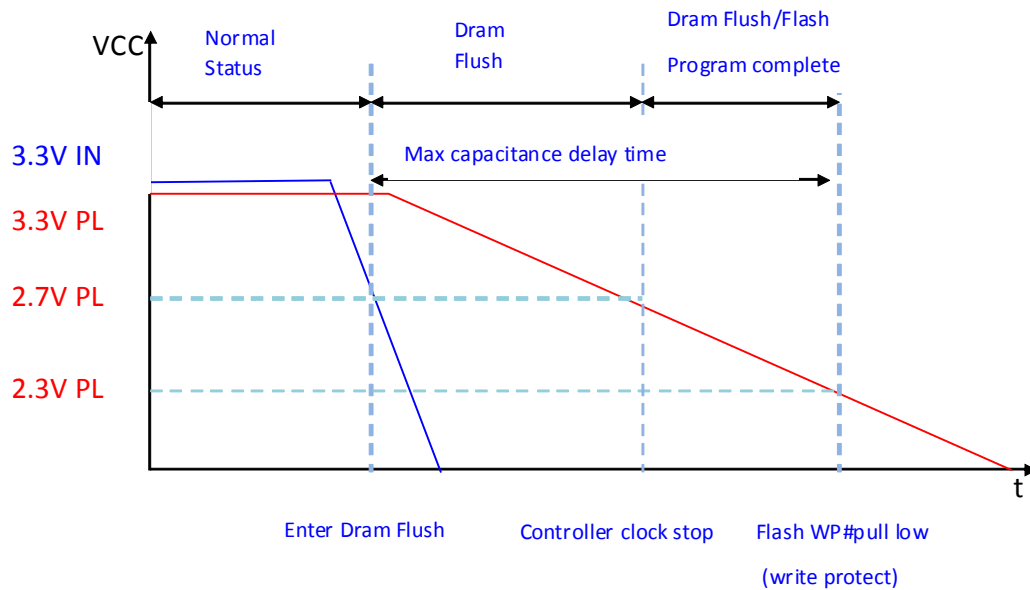
- 性能会根据 SSD 的固件版本、系统硬件和配置的不同而有所变化;

2. 4K 随机读/写由 Iometer V1.1.0 测得；
3. 顺序读/写由 CrystalDiskMark (CDM)V7.0 测得；
4. 读/写延迟由 AS SSD Benchmark V2.0 测得。

3.3 断电保护



Functional Block Diagram



Power Loss Protect Process

3.4 电性

电特性	512GB	1TB
3.3V (+/- 10%)工作电压		
工作电压最小值	3.0V	
工作电压最大值	3.6V	
功耗 (典型值)		
工作功耗 (读)	1.98W	2.10W
工作功耗 (写)	3.04W	3.16W
闲时功耗	0.53W	0.55W

表 3 工作电压及功耗

3.5 环境条件

规格	佰维 GS202	
温度	温度	
	工作温度	-40 to 85 °C
	存储温度	-55 to 95 °C
	温度梯度	2 °C/min
湿度	湿度	20-95%
冲击与震动	冲击	1000G(0.5ms)
	震动	6.0667GRMS(20-2000Hz)

表 4 温度, 冲击, 震动

注:

1. 冲击数据由FSY-50设备测得。
2. 震动数据由FT-100设备测得。

3.6 可靠性

参数	值
<p>不可纠正的误码率 (UBER)</p> <p>在一个指定的位读次数中, 不可恢复的读位错误率不会超过一个扇区大小。在概率极小的不可恢复的读错误事件中, SSD将把它作为读失败报告给主机;故障扇区被认为是损坏的, 不会返回给主机。</p>	<p>1 sector in 10¹⁶ bits read, max</p>
<p>平均故障间隔时间 (MTBF)</p> <p>利用Telcordia SR-332电子设备可靠性预测程序中引用的方法, 可以根据部件可靠性数据预测SSD的平均故障间隔时间(MTBF)。</p>	<p>2,000,000 hours</p>
<p>电源开/关周期</p> <p>电源开/关周期定义为从佰维GS202固态硬盘上断开电源, 然后恢复供电。大多数主机系统在挂起和休眠状态, 以及系统关闭时都会在固态硬盘上断开电源。</p>	<p>3,000 cycles</p>
<p>最小有效寿命</p> <p>佰维AP303固态硬盘在典型的客户机工作负载下至少有3年的使用寿命。</p>	<p>3 years</p>

表 5 可靠性说明

4. 结构信息

图 2 展示了佰维GS202系列固态硬盘的实际尺寸。所有尺寸以毫米为单位。

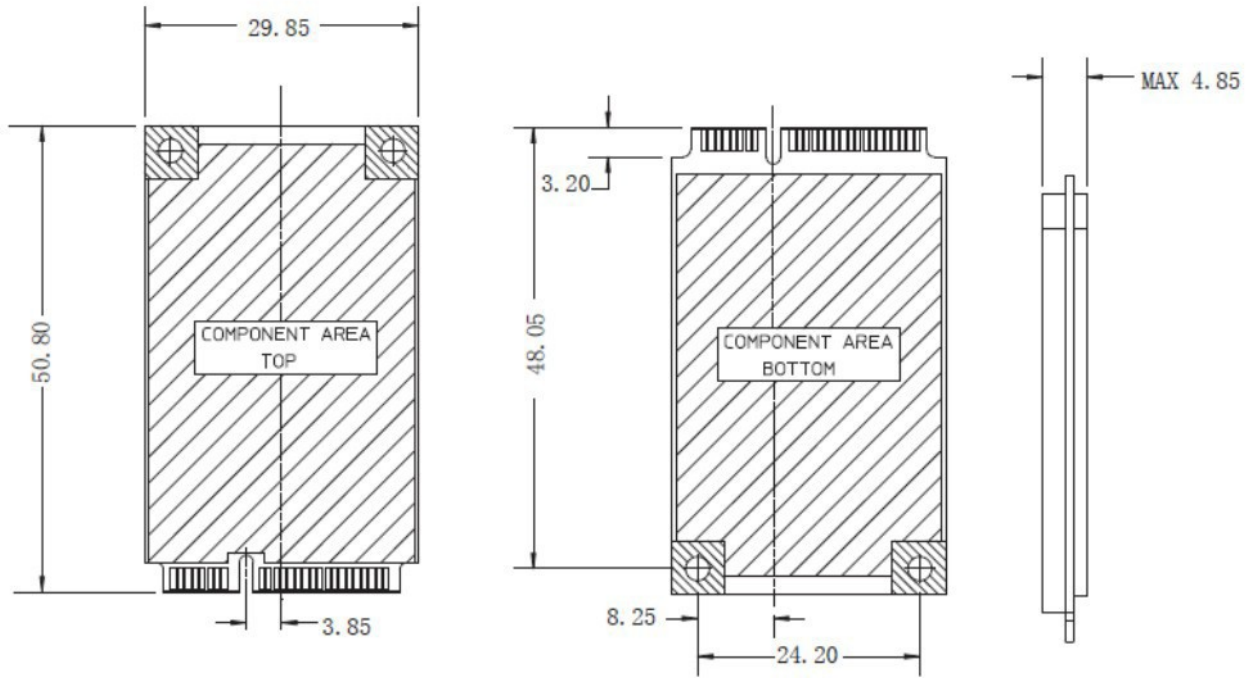
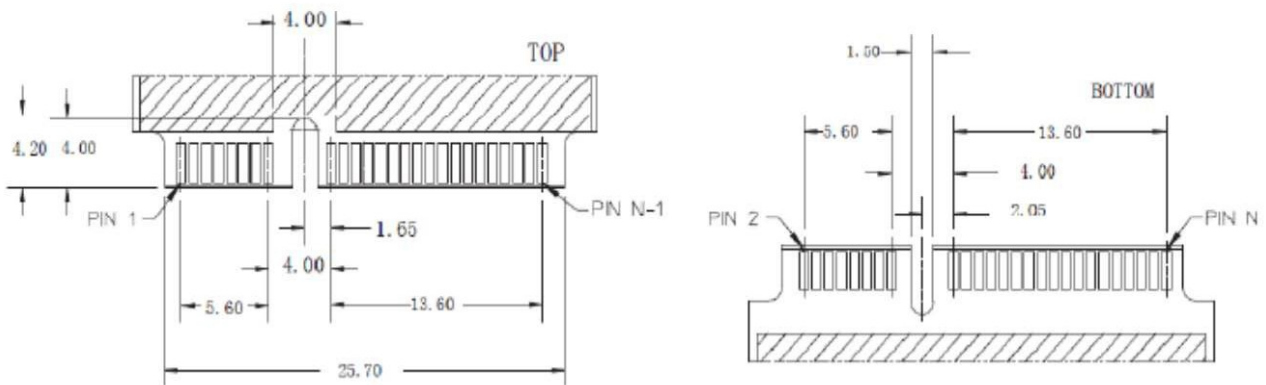


图 2. 佰维 GS202 尺寸图

5. 针脚和信号描述

5.1 针脚位置



5.2 信号描述

管脚编号	信号名称	功能定义	管脚编号	信号名称	功能定义
1	N/A	N/A	27	GND	Return Current Path
2	+3.3V	3.3V source	28	N/A	N/A
3	N/A	N/A	29	GND	Return Current Path
4	GND	Return Current Path	30	N/A	N/A
5	N/A	N/A	31	-A(port1)	SATA differential RX- based on SSD
6	N/A	N/A	32	N/A	N/A
7	N/A	N/A	33	+A(port1)	SATA differential RX+ based on SSD
8	N/A	N/A	34	GND	Return Current Path
9	GND	Return Current Path	35	GND	Return Current Path
10	N/A	N/A	36	Reserved	No Connect
11	N/A	N/A	37	GND	Return Current Path
12	N/A	N/A	38	Reserved	No Connect
13	N/A	N/A	39	+3.3V	3.3V source
14	N/A	N/A	40	N/A	N/A
15	GND	Return Current Path	41	+3.3V	3.3V source
16	N/A	N/A	42	N/A	N/A

17	N/A	N/A	43	GND	Return Current Path
18	GND	Return Current Path	44	N/A	N/A
19	Detection Pin	Connect to GND	45	Reserved	No Connect
20	N/A	N/A	46	N/A	N/A
21	GND	Return Current Path	47	N/A	N/A
22	N/A	N/A	48	N/A	N/A
23	+B(port1)	SATA differential TX+ based on SSD	49	N/A	N/A
24	+3.3V	3.3V source	50	GND	Return Current Path
25	-B(port1)	SATA differential TX- based on SSD	51	GND	Return Current Path
26	GND	Return Current Path	52	+3.3V	3.3V source

6. 支持的指令集

这部分介绍了佰维NP201系列固态硬盘支持的ATA指令集。

6.1 ATA General Feature Command Set

The BIWIN SSD GS202 Series supports the ATA General Feature command set (non-PACKET), which consists of:

- EXECUTE DEVICE DIAGNOSTIC
- FLUSH CACHE
- IDENTIFY DEVICE
- READ DMA
- READ SECTOR(S)
- READ VERIFY SECTOR(S)
- SEEK
- SET FEATURES
- WRITE DMA
- WRITE SECTOR(S)
- READ MULTIPLE

- SET MULTIPLE MODE
- WRITE MULTIPLE

The BIWIN SSD GS202 Series also supports the following optional commands:

- READ BUFFER
- WRITE BUFFER
- NOP
- DOWNLOAD MICROCODE

6.2 Power Management Command Set

The BIWIN SSD GS202 Series supports the Power Management command set, which consists of:

- CHECK POWER MODE
- IDLE
- IDLE IMMEDIATE
- SLEEP
- STANDBY
- STANDBY IMMEDIATE

6.3 Security Mode Feature Set

The BIWIN SSD GS202 Series supports the Security Mode command set, which consists of:

- SECURITY SET PASSWORD
- SECURITY UNLOCK
- SECURITY ERASE PREPARE
- SECURITY ERASE UNIT
- SECURITY FREEZE LOCK
- SECURITY DISABLE PASSWORD

6.4 SMART Command Set

The BIWIN SSD GS202 Series supports the SMART command set, which consists of:

- SMART ENABLE OPERATIONS
- SMART DISABLE OPERATIONS
- SMART ENABLE/DISABLE AUTOSAVE
- SMART RETURN STATUS

The BIWIN SSD mSATA GS202 Series also supports the following optional commands:

- SMART EXECUTE OFF-LINE IMMEDIATE
- SMART READ DATA
- SMART READ LOG
- SMART WRITE LOG

6.5 Data Set Management Command Set

The BIWIN SSD GS202 Series supports the Data Set Management command set Trim attribute, which consists of:

- DATA SET MANAGEMENT EXT

6.6 Host Protected Area Command Set

The BIWIN SSD GS202 Series supports the Host Protected Area command set, which consists of:

- READ NATIVE MAX ADDRESS
- SET MAX ADDRESS
- READ NATIVE MAX ADDRESS EXT
- SET MAX ADDRESS EXT

The BIWIN SSD mSATA GS202 Series also supports the following optional commands:

- SET MAX SET PASSWORD
- SET MAX LOCK
- SET MAX FREEZE LOCK
- SET MAX UNLOCK

6.7 48-Bit Address Command Set

The BIWIN SSD GS202 Series supports the 48-bit Address command set, which consists of:

- FLUSH CACHE EXT
- READ DMA EXT
- READ NATIVE MAX ADDRESS EXT
- READ SECTOR(S) EXT
- READ VERIFY SECTOR(S) EXT
- SET MAX ADDRESS EXT
- WRITE DMA EXT
- WRITE MULTIPLE EXT
- WRITE SECTOR(S) EXT
- WRITE UNCORRECTABLE EXT

6.8 Device Configuration Overlay Command Set

The BIWIN SSD GS202 Series supports the Device Configuration Overlay command set, which consists of:

- DEVICE CONFIGURATION FREEZE LOCK
- DEVICE CONFIGURATION IDENTITY
- DEVICE CONFIGURATION RESTORE
- DEVICE CONFIGURATION SET

6.9 General Purpose Log Command Set

The BIWIN SSD GS202 Series supports the General Purpose Log command set, which consists of:

- READ LOG EXT
- WRITE LOG EXT

6.10 Native Command Queuing

The BIWIN SSD GS202 Series supports the Native Command Queuing (NCQ) command set, which includes:

- READ FPDMA QUEUED
- WRITE FPDMA QUEUED

Note: With a maximum queue depth equal to 32.

6.11 Software Settings Preservation

The BIWIN SSD GS202 Series supports the SET FEATURES parameter to enable/disable the preservation of software settings.

6.12 Device Initiated Power Management (DIPM)

The BIWIN SSD GS202 Series supports the SET FEATURES parameter to enable Device Initiated Power Management.

7. 认证和声明

认证	描述
CE 认证	遵照欧洲健康标准，以及低电压及EMC指标。
RoHS 认证	电气、电子设备中限制使用某些有害物质认证。