Loongtion®

PATA DOM Solid-State Storage Module

Product Specification

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Version History

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1. Introduction

1.1 Document Purpose

1) This document provides a detailed and comprehensive introduction to the parameters and electrical performance of the PATA DOM series solid-state storage module, and gives a general description of the product's environmental adaptability and reliability.

2) This document provides reference for engineering and technical personnel in product selection from aspects such as capacity, product grade, etc.

1.2 Document Scope

This document is mainly intended for engineering and technical personnel for product selection.

1.3 Terms and Abbreviations

TBW: Total Bytes Written

ECC: Error Correction & Control

MTBF: Mean Time Between Failures

1.4 Operating Conditions

Unless otherwise specified, the recommended operating ambient temperature and storage temperature for modules developed or manufactured in accordance with this series are as follows:

Table 1

Grade	Category	Operating Temperature	Storage Temperature
I	Industrial Grade	-40℃~85℃	-45℃~90℃

2. Product Overview

The PATA DOM series solid-state storage module complies with the IDE protocol and uses a Samtec standard IDE interface 2.5-inch 2×22-pin female connector, with industrial-grade SLC NAND Flash as the storage medium, offering excellent stability and fast maintainability.

2.1 Typical Applications

- Embedded devices and systems;
- Industrial and medical equipment;
- Ruggedized computers.

2.2 Product Features

- Adopts IDE interface, supporting up to UDMA Mode 6;
- Flash memory type: SLC NAND Flash;
- P/E Cycle: 30,000 ;
- SLC: 2GB~64GB;

- MLC: 2GB~128GB ;

2.3 System Configuration Requirements

- Supply voltage: +5 V DC;
- Interface: Standard IDE interface;

2.4 Operating Principle

The main function of the PATA DOM series solid-state storage module is to provide read/write storage of user data. The storage module's main controller communicates with the host port via the IDE interface. After parsing valid data through the UDMA protocol and performing link verification, the data is distributed to the NAND Flash chip array for storage management. The internal functional block diagram of the product is shown in Figure 1.

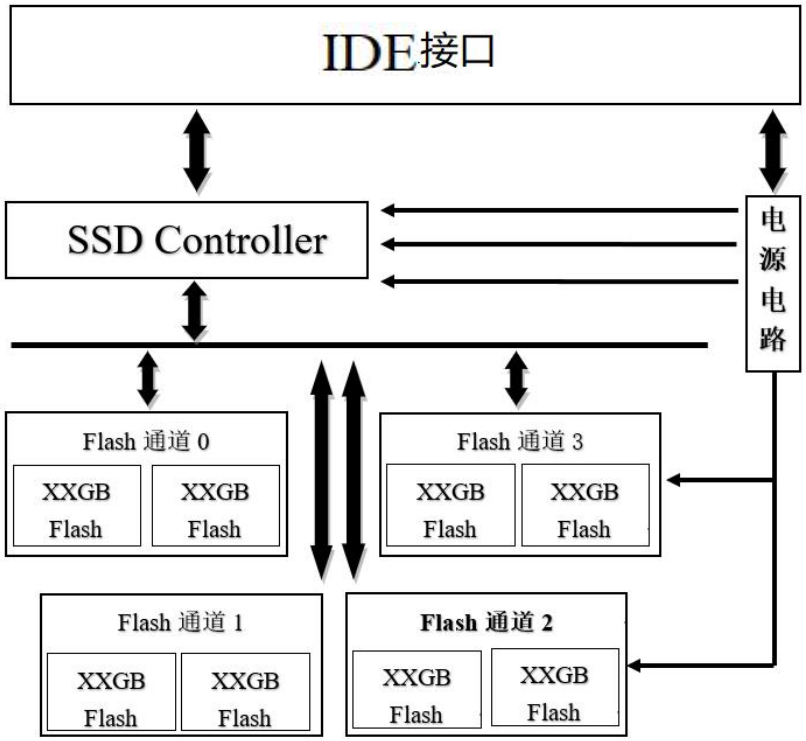


Figure 1. IDE Interface Solid-State Storage Module Internal Block Diagram

3. Physical Characteristics

3.1 Interface Definition

The pin diagram of the IDE interface is shown in Figure 2:

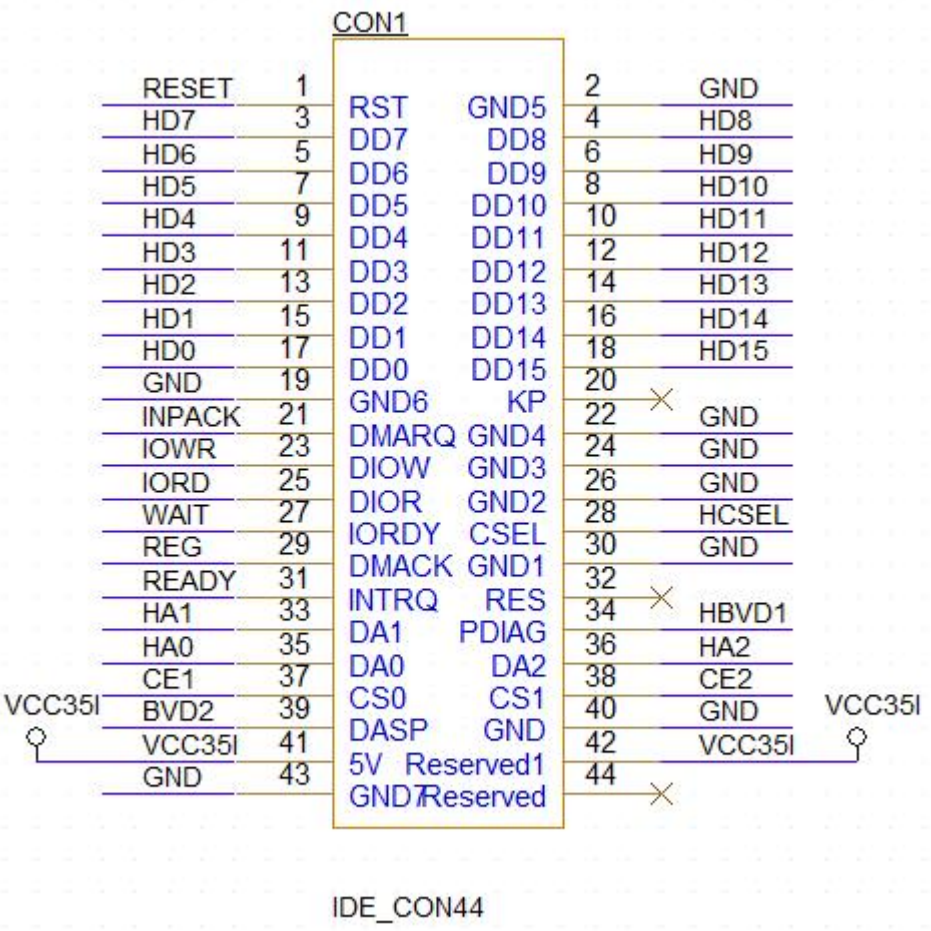


Figure 2. Pin Diagram

This product uses a standard IDE interface, and its electrical characteristics comply with the IDE protocol specifications. The interface signal definitions are listed in Table 2.

Table 2. IDE Interface Solid-State Storage Module Interface Definition

Pin No.	Function	Description
1	RST	Reset, active low
2	GND5	Ground
3	DD7	Data Bus bit 7, bidirectional
4	DD8	Data Bus bit 8, bidirectional
5	DD6	Data Bus bit 6, bidirectional
6	DD9	Data Bus bit 9, bidirectional
7	DD5	Data Bus bit 5, bidirectional
8	DD10	Data Bus bit 10, bidirectional
9	DD4	Data Bus bit 4, bidirectional
10	DD11	DATA BUS (Data bus bit 11, bidirectional)
11	DD3	DATA BUS (Data bus bit 3, bidirectional)
12	DD12	DATA BUS (Data bus bit 12, bidirectional)
13	DD2	DATA BUS (Data bus bit 2, bidirectional)

14	DD13	DATA BUS (Data bus bit 13, bidirectional)
15	DD1	DATA BUS (Data bus bit 1, bidirectional)
16	DD14	DATA BUS (Data bus bit 14, bidirectional)
17	DD0	DATA BUS (Data bus bit 0, bidirectional)
18	DD15	DATA BUS (Data bus bit 15, bidirectional)
19	GND6	Ground
20	KP	NC
21	DMARQ	DMA Request, output
22	GND4	Ground
23	DIOW	I/O Write, input, active low
24	GND3	Ground
25	DIOR	I/O Read, input, active low
26	GND2	Ground
27	IORDY	I/O Channel Ready, output
28	CSEL	Master/Slave Device Identification
29	DMACK	DMA Acknowledge, input, active low
30	GND1	Ground
31	INTRQ	Interrupt Request, Output
32	RES	NC
33	DA1	Address Bit 1, Input
34	PDIAG	Passed Diagnostics / 80-Conductor Cable Detection
35	DA0	Address Bit 0, Input
36	DA2	Address Bit 2, Input
37	CS0	Chip Select 0, Input, Active Low
38	CS1	Chip Select 1, Input, Active Low
39	DASP	DASP– (Drive Active/Slave Present, Output, Active Low, can connect to HDD activity LED)
40	GND	Ground
41	5V	5V Power
42	Reserved	5V Power
43	GND	Ground
44	Reserved	NC

3.2 **Weight**

Total weight < 9 g.

3.3 Mechanical Dimensions

The dimensions are: 65 mm (length) × 28 mm (width), with total height ≤ 6.4 mm. Tolerances for length and width are ±0.2 mm. See Figure 3 for dimensions (unit: mm):

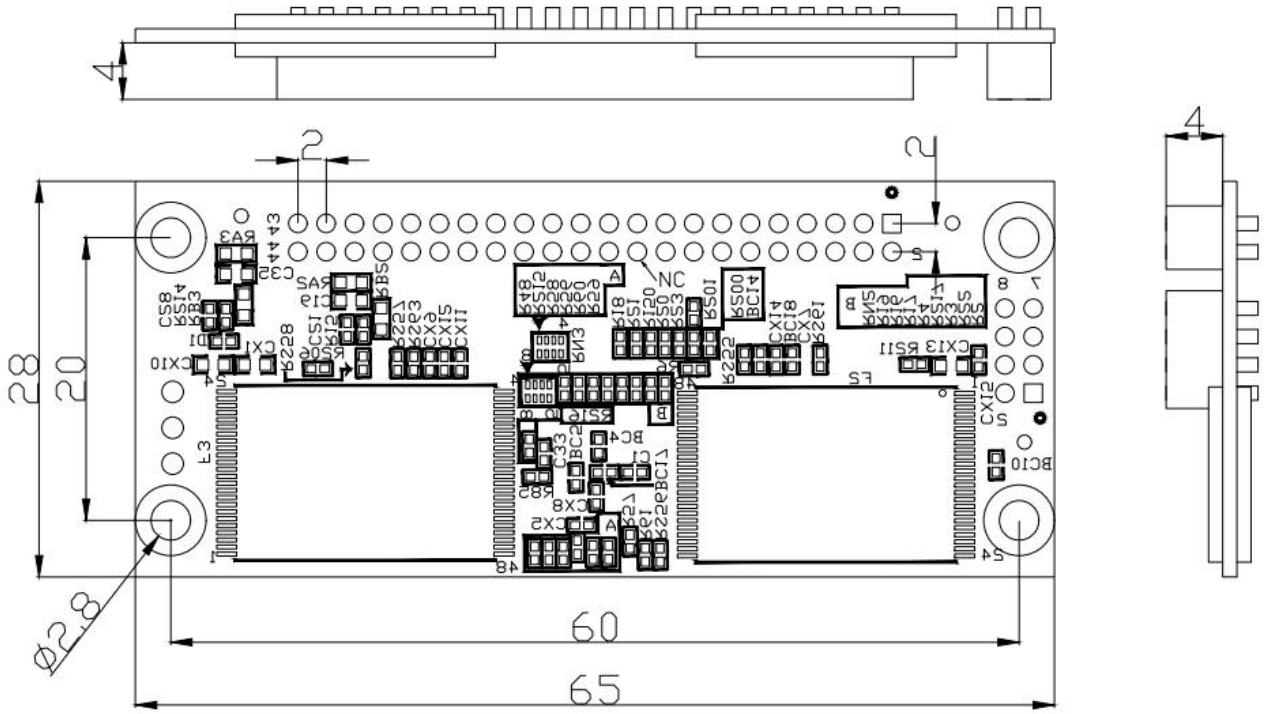


Figure 3. Dimensions of PATA DOM Solid-State Storage Module

4. Performance Specifications

4.1 Interface

- Uses a standard 44-pin IDE connector;
- Standard IDE (ATA/ATAPI) protocol.

4.2 Supply Voltage

Table 3 Supply Voltage Parameters

Parameter	Reference Value
Supply Voltage Range	DC 4.75 V – 5.25 V
Noise/Ripple Range	50 mV p-p or less

4.3 Product Capacity

Table 4 Product Capacity

Capacity	Actual Capacity
8 GB	7.43 GB

*The tolerance range between nominal capacity and actual capacity is ±10%.

4.4 Transfer Speed

Performance Test at Room Temperature (25 °C)

Table 5 Performance Test at Room Temperature (25 °C)

Empty Drive	Performance		
	MAX	MIN	AVG
512K Seq W	29.18	22.98	28.29
512K Seq R	25.73	12.25	24.95
512K Sequential Write/Read	26.21	9.42	18.42
4K Random Write	414.07	40.93	74.06
4K Random Read	1972.71	1664.68	1805.69
4K Random Write/Read	520.90	33.60	125.48

Note: The unit for sequential read/write is MB/s; the unit for random read/write is IOPS.

*Test speed is for reference only, test result from CrystalDiskMark (CDM) under x86.

4.5 Power Consumption

Table 6 Power Consumption Parameters

Capacity	8GB
Standby Power Consumption	0.83 W
Max Sequential Read Power Consumption	1.07 W
Max Sequential Write Power Consumption	1.42 W

*Test data is for reference only.

5. Inspection and Test

5.1 Product Marking

The identification label on the solid-state storage module shall be affixed at the appropriate location, and shall be accurate, clear, and placed correctly. The label shall contain the following information:

a) Model number or code of the solid-state storage module;

b) Production year, batch number, and serial number;

c) Company code.

Special requirements, if any, shall be determined per the relevant documentation.

5.2 Appearance Quality

The surface of the solid-state storage module casing shall be free from burrs, deformation, contamination, and corrosion;

The casing fasteners shall be complete, secure, and free from damage;

The labeling on the solid-state storage module shall be clearly legible.

5.3 Performance Test

5.3.1 Performance Test Requirements

Table 7 Electrical Performance Test Requirements

No.	Test Item	Requirement	Remarks
1	Nominal Capacity, Actual Capacity	Per Section 4.3	
2	Average Sequential Read Speed	Per Section 4.4	
3	Average Sequential Write Speed	Per Section 4.4 requirements	
4	Power Consumption	Per Section 4.5 requirements	

5.3.2 Endurance (TBW)

Table 8 Product Endurance

Capacity	Total Bytes Written
8GB	100TB

*Total Bytes Written tolerance: ±10%

5.4 Ordering Information

Table 9 Ordering Information

Grade	Capacity	Product Model (Standard)
Industrial Grade (I)	8GB	YIDQ008PCS-S

*For models not listed, please contact our sales representative.

6. Delivery Preparation

6.1 Storage

Products shall be stored in a dedicated warehouse with temperature between 0°C and 35°C, relative humidity not exceeding 80%, and no strong magnetic fields. Products must not be stored together with acids, alkalis, or corrosive substances.