



深圳市海本电子科技有限公司

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# SD NAND DATASHEET

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## 1. Introduction

Shenzhen haiben Technology Co., Ltd founded in November 2013, is a national key high-tech enterprise focusing on chip research and development, chip sealing and testing, product manufacturing and sales service. The company's main products include memory chip, SD NAND, BGA, Fingerprint module, SSD, EMMC and a series of ultra-thin carrier chip products.

SD NAND is a type of embedded storage technology which is similar to the SD card as an industry standard. The SD NAND solution provided by haiben consists of the NAND flash and the high-performance controller with the LGA 8 package. A 3.3V supply voltage (VCC) is required for the NAND area. The SD NAND is fully compliant with SD2.0 interface which is utilized by most of general CPU. The advantages of the SD NAND include high quality, low power consumption and cost performance.



## 2. Product List

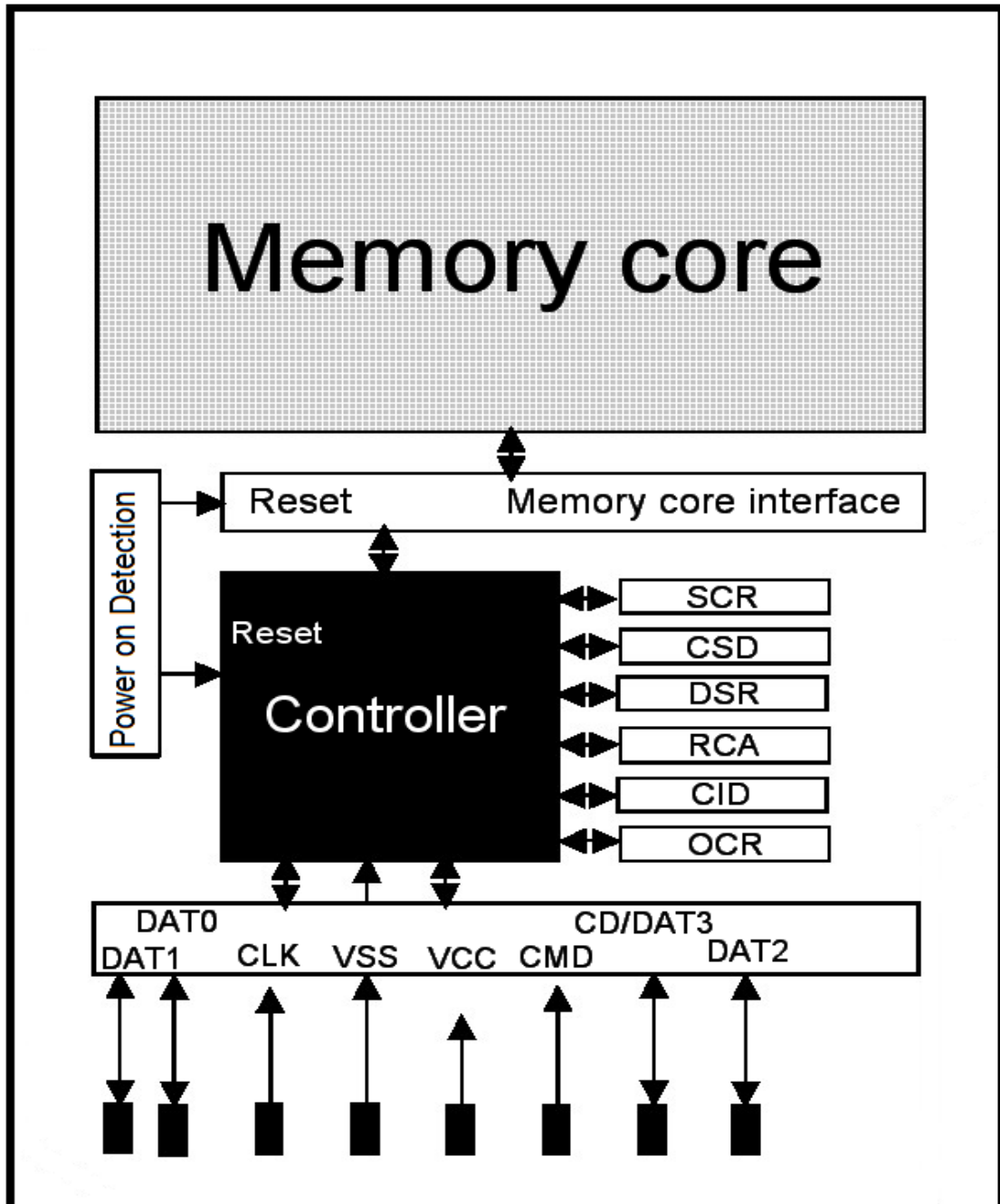
Capacity	Part Number	Package	Size
1Gb	HBSD01GREAG	LGA8	8X6mm
2Gb	HBSD02GREAG	LGA8	8x6mm
4Gb	HBSD04GREAG	LGA8	8x6mm
8Gb	HBSD08GREAG	LGA8	8x6.2mm
16Gb	HBSD16GREAG	LGA8	8x6.2mm
32Gb	HBSD32GREAG	LGA8	8x6.2mm
...	...	...	...

## 3. Features

- 1) Capacity : 128MB/256MB/512MB/1GB/4GB.
- 2) SD system specification version 1.1 / 2.0.
- 3) Correction of memory field errors.
- 4) Voltage range:  
Basic communication (CMD0, CMD15, CMD55, ACMD41): 2.0 - 3.6V.  
Other command and memory access: 2.7 - 3.6V.
- 5) Low power consumption, with the standby energy saving management mode automatically.
- 6) High Speed model, Speed class 4/class 6/class 8 supported.
- 7) SD/SPI mode supported.
- 8) Copyrights Protection Mechanism—Compling with highest security of SDMI standard.
- 9) Operating Temperature : 0°C to 70°C. It is the case surface temperature on the center/top side of the NAND.
- 10) High-speed Flash Controller inside.
- 11) Dimension : L/W/H 8X6X0.8(Type A)、8X6.2X0.8mm(Type B).
- 12) Smaller package LGA 8 (Land Grid Array).



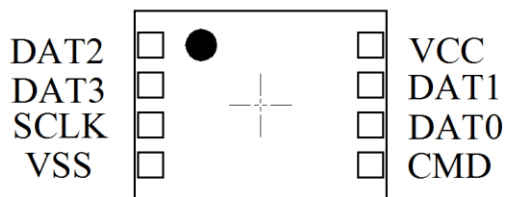
#### 4. Block Diagram



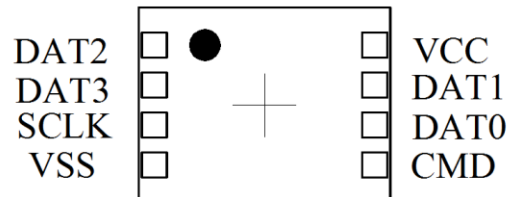


## 5. Pin Assignments (Top View)

Type A



Type B



PIN #	SD MODE			SPI MODE		
	NAME	TYPE <sup>1</sup>	DESCRIPTION	NAME	TYPE	DESCRIPTION
1	DAT2	I/O/PP	Data Line[Bit2]	RSV		Reserved
2	CD/DAT3 <sup>2</sup>	I/O/PP <sup>3</sup>	Card Detect/ Data Line[Bit3]	CS	I <sup>3</sup>	Chip Select(Neg True)
3	SCLK	I	Clock	SCLK	I	Clock
4	VSS	S	Supply Voltage Ground	VSS	S	Supply Voltage Ground
5	CMD	PP	Command/Response	DI	I	Data In
6	DAT0	I/O/PP	Data Line[Bit0]	DO	O/PP	Data Out
7	DAT1	I/O/PP	Data Line[Bit1]	RSV		Reserved
8	VCC	S	Supply Voltage	VCC	S	Supply Voltage

Table 1: SD NAND Contact Pad Assignment

- **S**: power supply; **I**: input; **O**: output using push-pull drivers; **PP**: I/O using push-pull drivers;
- The extended **DAT** lines (DAT1-DAT3) are input on power up. They start to operate as DAT lines after **SET\_BUS\_WIDTH** command. The **Host** shall keep its own DAT1-DAT3 lines in input mode, as well, while they are not used. It is defined so, in order to keep compatibility to **MultiMediaCards**.
- After power up this line is input with **50KOhm** pull-up (can be used for card detection or SPI mode selection). The pull-up should be disconnected by the user, during regular data transfer, with **SET\_CLR\_CARD\_DETECT (ACMD42)** command.



## 6. Product Characteristics Value

### 6-1.

Parameter	Range				
Capacity	1Gb	2Gb	4Gb	32Gb	...
	121MB	241MB	481MB	TBD	...
Write Speed	5MB/S	5MB/s	6MB/s	TBD	...
Read Speed	12MB/S	15MB/s	15MB/s	TBD	...
Thenstandbycurrent	60 uA	60 uA	60 uA	TBD	...
Work current	55mA	55 mA	55 mA	TBD	...
MTBF	1,000,000hours				
R/W Cycle	SLC(100000) MLC(6000)				
Controller	---				
Controller details	---				

\* Test condition :2.66G CPU, 1GB DDR, winXP OS, GL827 Card Reader, Voltage 3.3V.

### 6-2.

Parameter	Range	
Temperature	Work Model	0 ~ 70°C
Humidity	Work Model	8% to 95%, Non-condensing
	Storage Model	8% to 95%, Non-condensing



7. Physical Specifications (Top View)

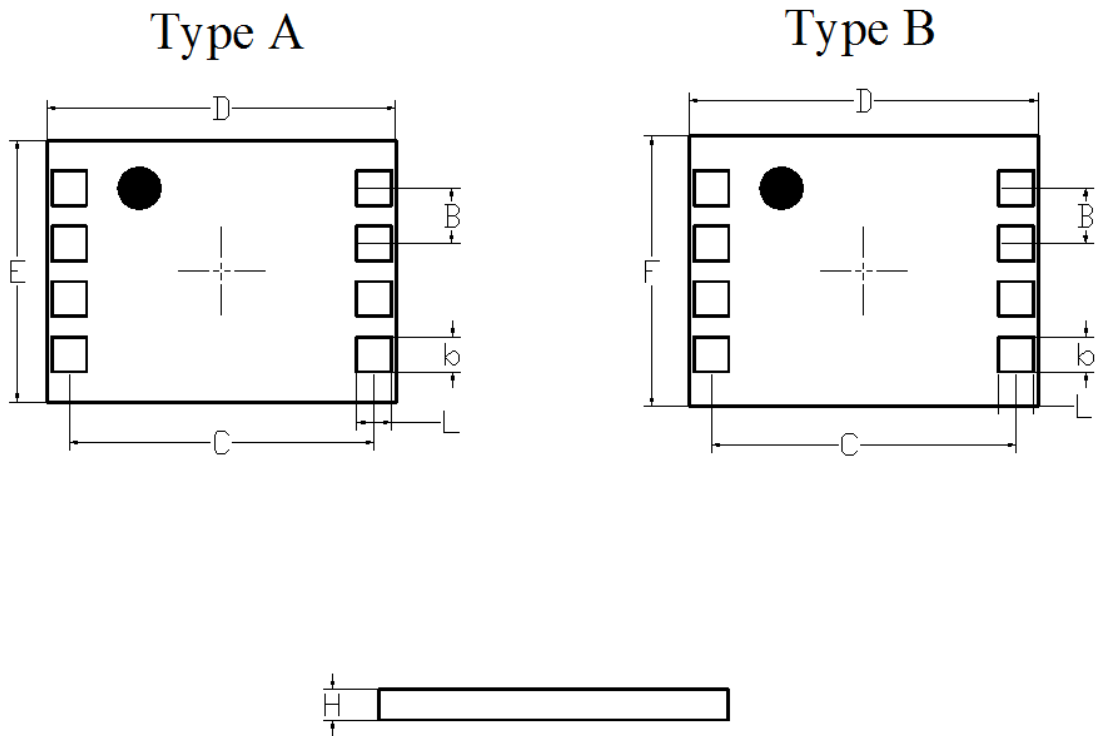


Figure F-1: Mechanical Description

Common Dimensions				
Symbol	Min	Nom	Max	Note
b	0.65	0.70	0.75	
L	0.75	0.80	0.85	
B	-	1.27(Typ)	-	
C	6.90	7.00	7.10	
D	7.90	8.00	8.10	
E	5.90	6.00	6.10	
F	6.10	6.20	6.30	
H	0.70	0.80	0.90	

Table 2: SD NAND Package Dimensions (Units: mm)



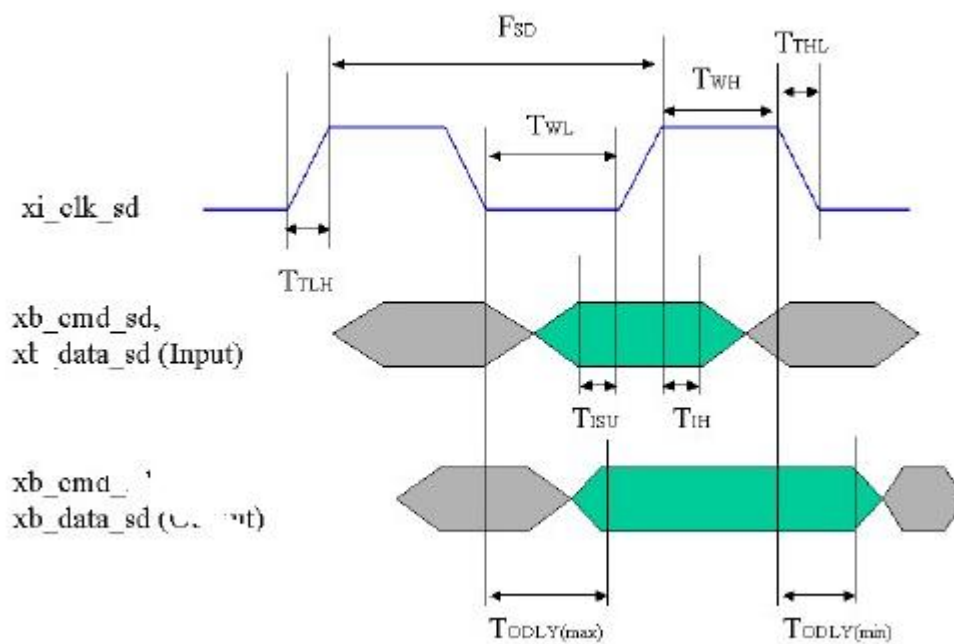
## 8. DC Characteristics

Symbol	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
VIL	Input low voltage		VSS-0.3		0.25VCC	V
VIH	Input high voltage		0.625VCC		VCC+0.3	V
VOL	Output low voltage	IOL=100μA @VCC_min			0.125VCC	V
VOH	Output high voltage	IOH=100μA @VCC_min	0.75VCC			V
IIN	Input leakage current	VIN=VCC or 0	-10	+/-1	10	μA
IOUT	Tri-state output leakage current		-10	+/-1	10	μA
ISTBY	Standby current	<a href="#">3.3V@clock stop</a>		0.3	0.6	mA
IOP	Operation current	<a href="#">3.3v@25MHz (Write)</a>		15	25	mA
		<a href="#">3.3v@25MHz (Read)</a>		15	25	mA
IOP	Operation current	<a href="#">3.3v@50MHz (Write)</a>		30	45	mA
		<a href="#">3.3v@50MHz (Read)</a>		30	45	mA



## 9. AC Characteristic

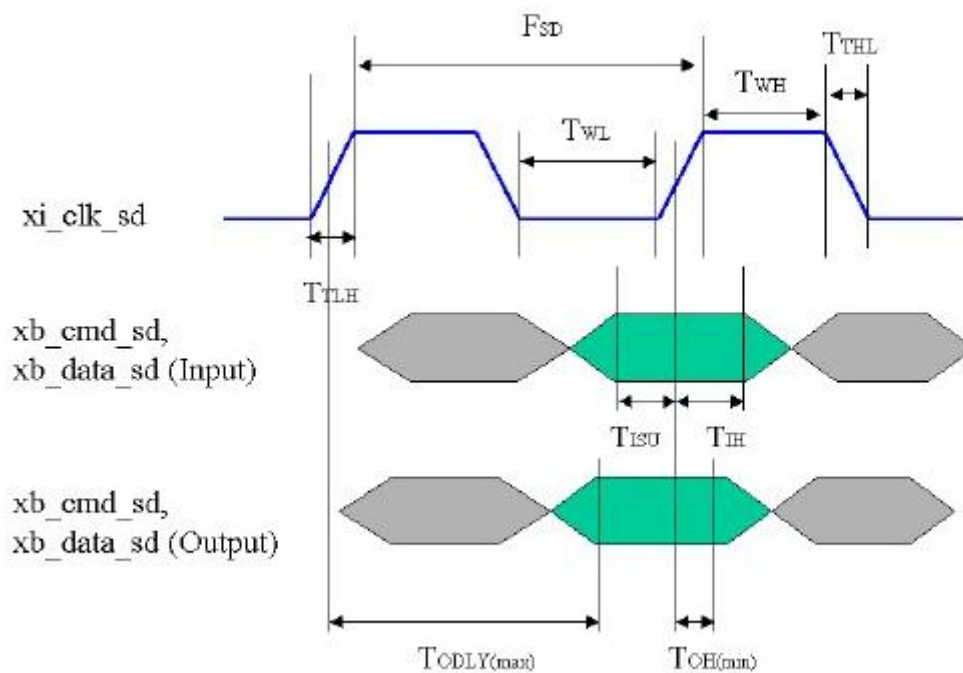
### 9-1 Bus Timing (Default Mode)



SYMBOL	PARAMETER	MIN	MAX	UNIT	NOTE
FSD	SD clock frequency	0	25	MHz	
tWL	Clock low time	10		ns	
tWH	Clock high time	10		ns	
tTLH	Clock rise time		10	ns	
tTHL	Clock fall time		10	ns	
tISU	Input setup time	5		ns	
tIH	Input hold time	5		ns	
tODLY	Output delay time	0	14	ns	



9-2 Bus Timing (High-speed Mode)



SYMBOL	PARAMETER	MIN	MAX	UNIT	NOTE
$F_{SD}$	SD clock frequency	0	25	MHz	
$t_{WL}$	Clock low time	10		ns	
$t_{WH}$	Clock high time	10		ns	
$t_{TLH}$	Clock rise time		10	ns	
$t_{THL}$	Clock fall time		10	ns	
$t_{ISU}$	Input setup time	5		ns	
$t_{IH}$	Input hold time	5		ns	
$t_{ODLY}$	Output delay time	0	14	ns	
$t_{oH}$	Output hold time	2.5		ns	



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