Nor-Flash Memory

ISO 9001:2015 CERTIFIED

Product Description

LHM 128/256MB is a high-temperature and high reliability NOR universal memory operated by SPI serial interface. It has the characteristics of fast read and write at high and low temperature, high reliability and excellent performance. It can work in the harsh environmental of -45℃-200℃ for a long time.

Item No.	Voltage range	Structure	Pin
LHM128MB	2.7~3.6V	128M x 8bit	DIP16
LHM256MB	2.7~3.6V	256M x 8bit	DIP16

Technical parameters

Operating temperature range: -45℃ ~ +200℃ (Erasure：15℃ ~ 85℃)

Max operating current: 50mA write; 40mA read; Standby current: ＜100μA

Power voltage Vcc (V): 2.7 V ~ 3.6 V

Input high level voltage (V): 0.8Vcc ~ Vcc+0.3

Input low level voltage (V): -0.3 ~ 0.2Vcc

Output high level voltage (V): 2.4 ~ Vcc

Output low level voltage (V): -0.3 ~ 0.4Vcc

Read& Write speed: 5MB/s read; 128KB/s write

Package: 16 PIN DIP PB free

Pin Description

No.	Symbol	Definition
1	F1_SI	Input data
2	F1_SCK	Clock
3	3.3VD	Power
4	NC	Blank
5	F2_CS	Enable pin
6	F2_SO	Output data
7	NC	Blank
8	GND	GND
9	F2_SI	Input data
10	F2_SCK	Clock
11	3.3VD	Power
12	NC	Blank
13	F1_CS	Enable pin
14	F1_SO	Output data
15	NC	Blank
16	GND	GND

Table 1: LHM128MB

No.	Symbol	Definition
1	MISO1	Output data
2	CS1	Enable pin
3	CS2	Enable pin
4	CS3	Enable pin
5	VCC	Power
6	GND	GND
7	MOSI2	Input data
8	SCLK2	Clock
9	VCC	Power
10	GND	GND
11	MISO2	Output data
12	CS4	Enable pin
13	GND	GND
14	VCC	Power
15	SCLK1	Clock
16	MOSI1	Input data

Table 2: LHM256MB

Packages
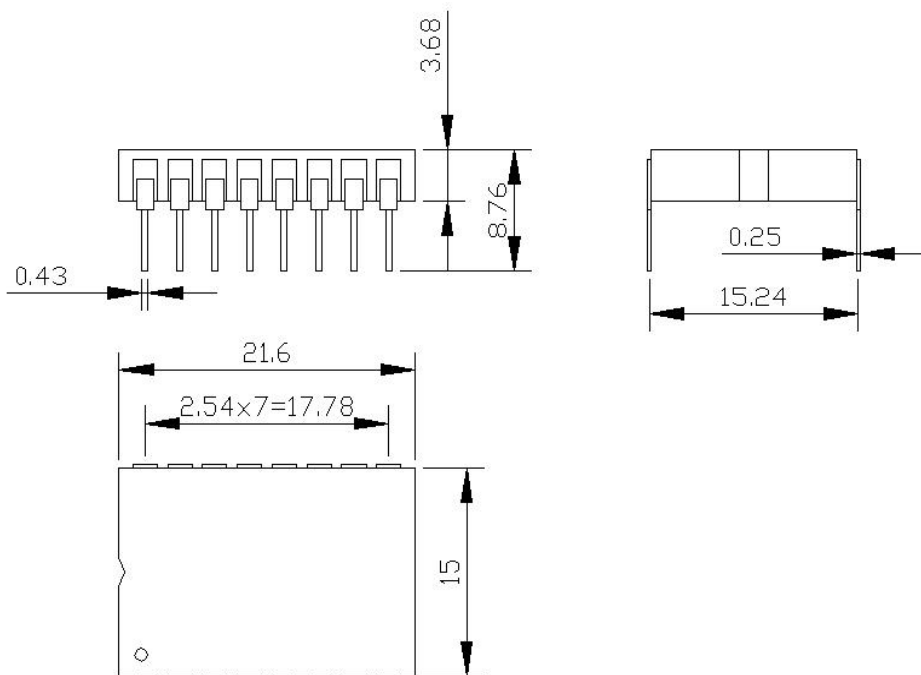
Figure 1: LHM 128MB
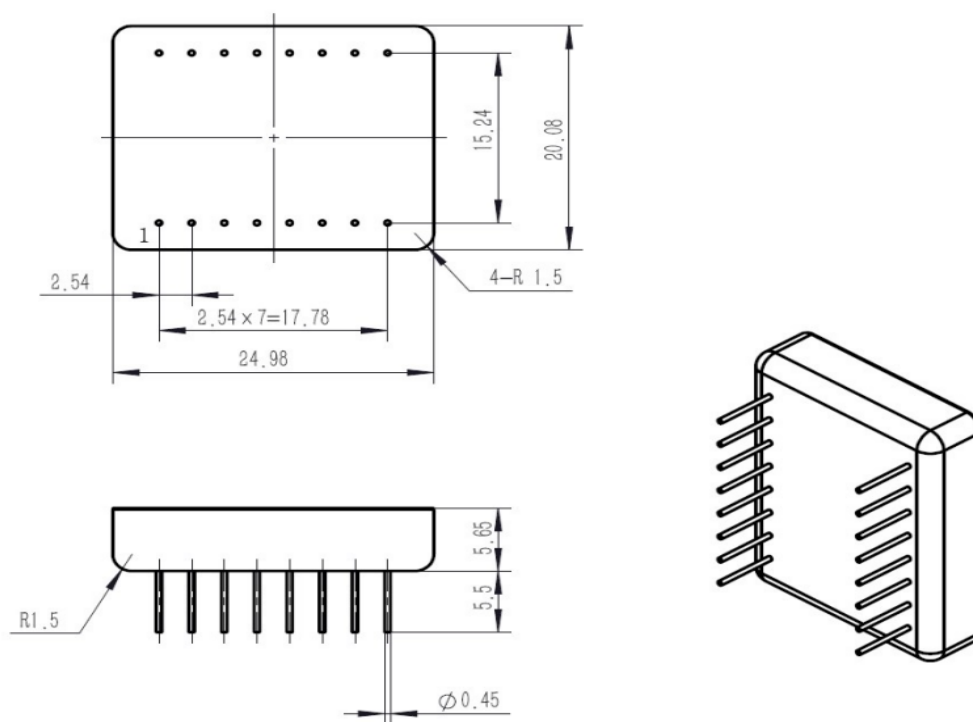
Figure 2: LHM 256MB

Instruction List

| Instruction name	Instruction code
WRITE ENABLE	0 x06
WRITE DATA	0 x12
READ DATA	0 x13
READ STATUS	0 x05
READ STATUS 2	0 x2B
READ CONFIGURATION	0 x15
PRODUCT ENABLE	0 x B7
ERASE	0 x21
RESET ENABLE	0 x66
RESET INSTRUCTION	0 x99

Notes:

a. Read status register before operating, to ensure that the product is in the appropriate status.

b. After wrong WRITE command, the product enters standby mode till next CS# failing edge, The F*_SO pin in the impedance status.

c. After correct WRITE command, the product processes the specified status till CS# rising edge comes.

d. Input data is latched on the rising edge of F*_SCK and shifted output on the falling edge.

e. Set enable mode before operating the product.

f. Bytes is the minimum unit of data operation.

Operation instructions:

● WRITE ENABLE

Set the FLASH to allow write status. Set allow write operation before write operation and erase operation.

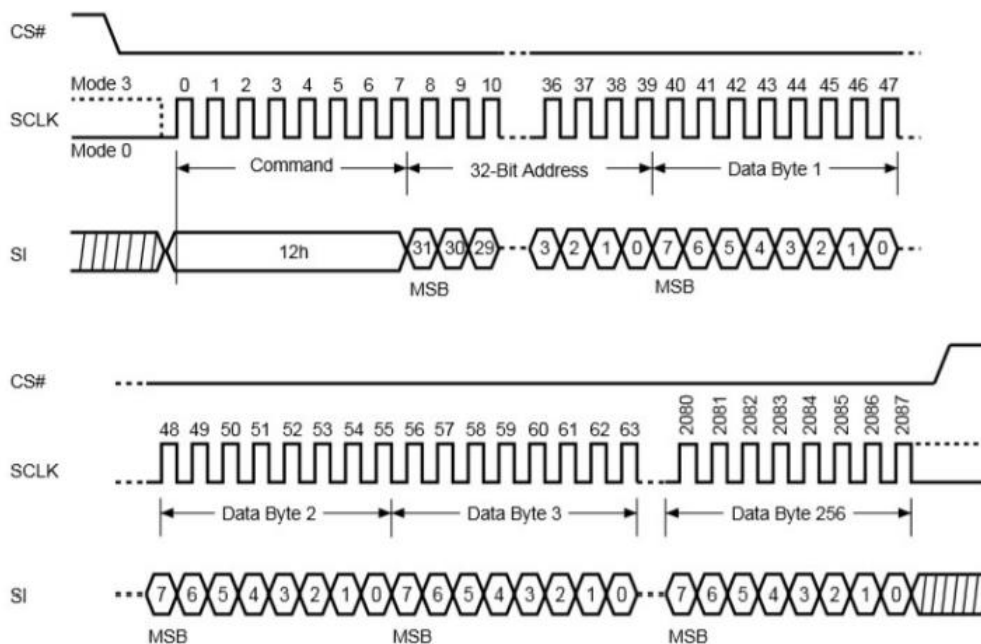Operation procedures: Pull down CS# - Send WRITE ENABLE command - Pull up CS#
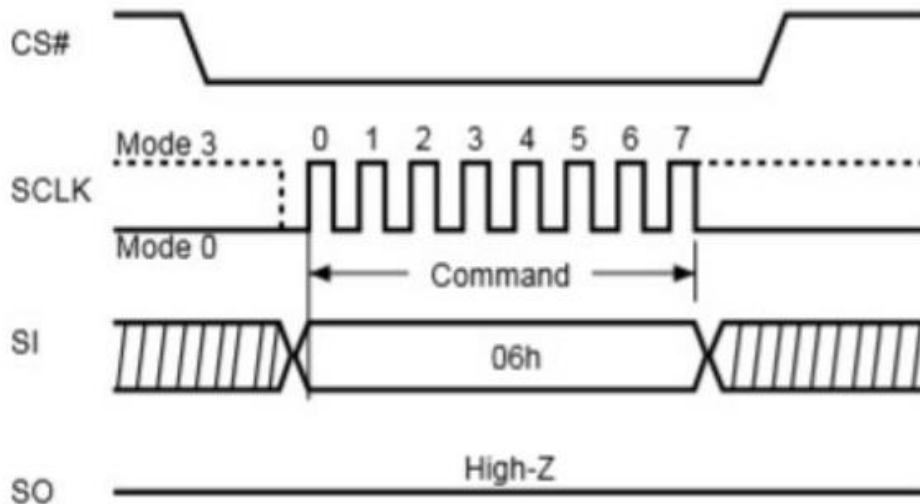
- **WRITE DATA**

Write data to the FLASH storage area; first, set the FLASH to allow write status before write

operation, then set write address, finally write the data into specified address page. The

maximum write is 256 Byte at a time. Set low 8 bit of 32-Bit address to "0" if write 256Byte at a

time, if do not set to "0", it will write data from current page address, the situation will out of

control at that time. If write over 256Byte at a time, the product will write the last 256Byte into

current address, and former data will be ignored; If write data less than 256Byte, it will write from
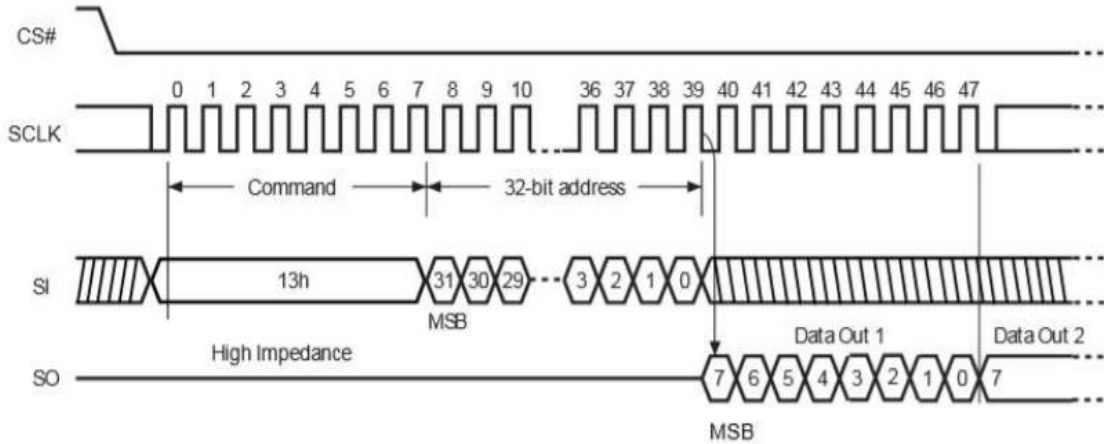
before address.

Data write procedures:

Pull down CS# - Send WRITE DATA command - write 4byte address - Pull up CS#

- READ DATA

  Read data from the FLASH. Data read procedures:

 Pull down CS# - Send READ DATA command - write 4byte address – data output - Pull up CS#

- READ STATUS AND STATUS REGISTER

  The register can read data at any time (include data read, write, and erase conditions), main

  information as follows:

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
*	*	*	*	*	*	WEL	WIP
						1. write enable is effective 2. write enable is ineffective	1. write operation mode 2. non-write operation mode

  Procedures: Pull down CS# - Send READ STATUS command – data output - Pull up CS#
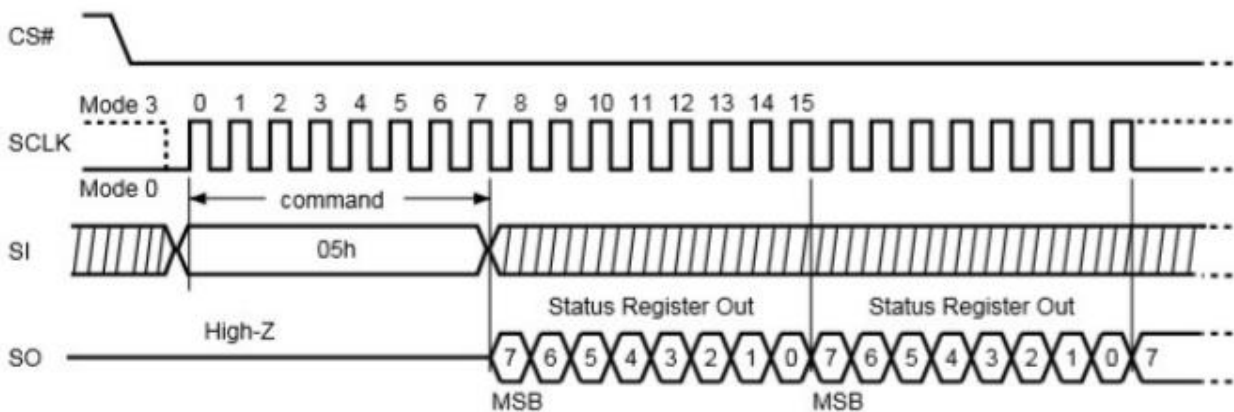
- READ STATUS 2

  The register can read data at any time (include data read, write, and erase conditions), main

  information as follows:

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
*	E_Fail	P_Fail	*	ESB	PSB	*	*
	0=Erase success	0=Write success		0=Erase without pause	0=Write without pause		
	1=Erase fail	1=Write fail		1=erase with pause	1=Write with pause		

Procedures: Pull down CS# - Send READ STATUS command 2 – data output - Pull up CS#

- **READ CONFIGURATION**

Read data from the status register, to instruct the current product operating status, main

information as follows:

| bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
*	*	4 BYTE	*	*	*	*	*
		0=product enable mode					
		1=product disable mode					

Procedures: Pull down CS# - Send READ CONFIGURATION command – data output - Pull up

CS#

- **ERASE**

Erase 4kbyte data each time. Before setting ERASE command, set FLASH to allow to write,

then set the erase address. It should be noted that erase 4kbyte each time, the erase address

can be any address in 4kbyte space. It means set any address in the 4kbyte space, all data in

the 4kbyte space will be erased.

Procedures: Pull down CS# - Send ERASE command – write erase address - Pull up CS#

During the erasing period, WIP of status register shown "1" till erase finished.
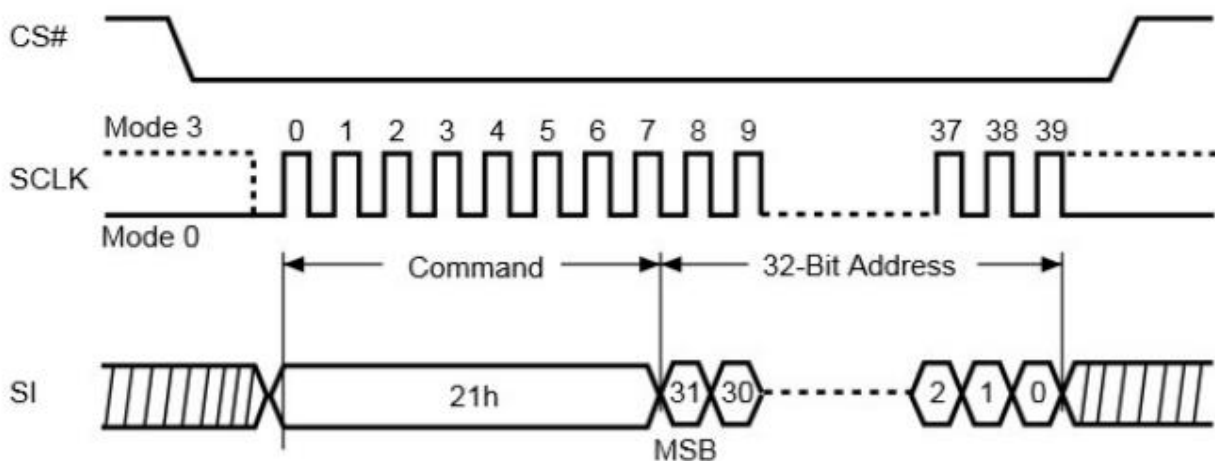
- **RESET**

Reset include RESET command and RESET ENABLE instructions, it can make product

recovery to initialization status, all settings are cleared. Caution use this instruction, if write this

instruction during erasing and writing period, it may cause the erase fail and write data lost.

Reset sequence as follows:
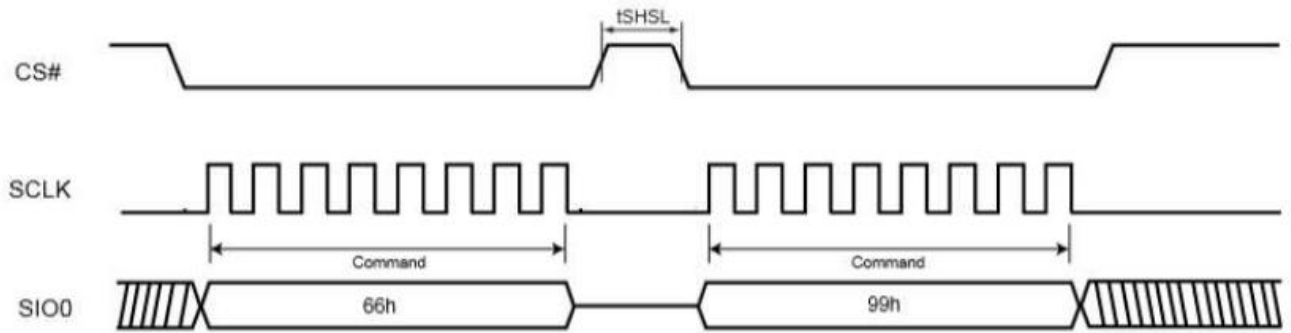
Erasing spatial distribution:

Sector	Address Range	
16383	3FFF000h	3FFFFFFh
⋮	⋮	⋮
16376	3FF8000h	3FF8FFFh
16375	3FF7000h	3FF7FFFh
⋮	⋮	⋮
16368	3FF0000h	3FF0FFFh
16367	3FEF000h	3FEFFFFh
⋮	⋮	⋮
16360	3FE8000h	3FE8FFFh
16359	3FE7000h	3FE7FFFh
⋮	⋮	⋮
16352	3FE0000h	3FE0FFFh
16351	3FDF000h	3FDFFFFh
⋮	⋮	⋮
16344	3FD8000h	3FD8FFFh
16343	3FD7000h	3FD7FFFh
⋮	⋮	⋮
16336	3FD0000h	3FD0FFFh

individual 16 sectors lock/unlock unit:4K-byte

47	002F000h	002FFFFh
⋮	⋮	⋮
40	0028000h	0028FFFh
39	027000h	0027FFFh
⋮	⋮	⋮
32	0020000h	0020FFFh
31	001F000h	001FFFFh
⋮	⋮	⋮
24	0018000h	0018FFFh
23	0017000h	0017FFFh
⋮	⋮	⋮
16	0010000h	0010FFFh
15	000F000h	000FFFFh
⋮	⋮	⋮
8	0008000h	0008FFFh
7	0007000h	0007FFFh
⋮	⋮	⋮
0	0000000h	0000FFFh

individual 16 sectors lock/unlock unit:4K-byte

System operating instructions

a. WRITE operation

To enter the write enable status first, read the product status register and ensure that setting is effective; Send WRITE command first, then write data; Send READ STATUS command after writing, read current status and ensure that the products exit writing data status; Send READ STATUS 2 REGISTER command to the product, ensure that the product write passed, operation done.
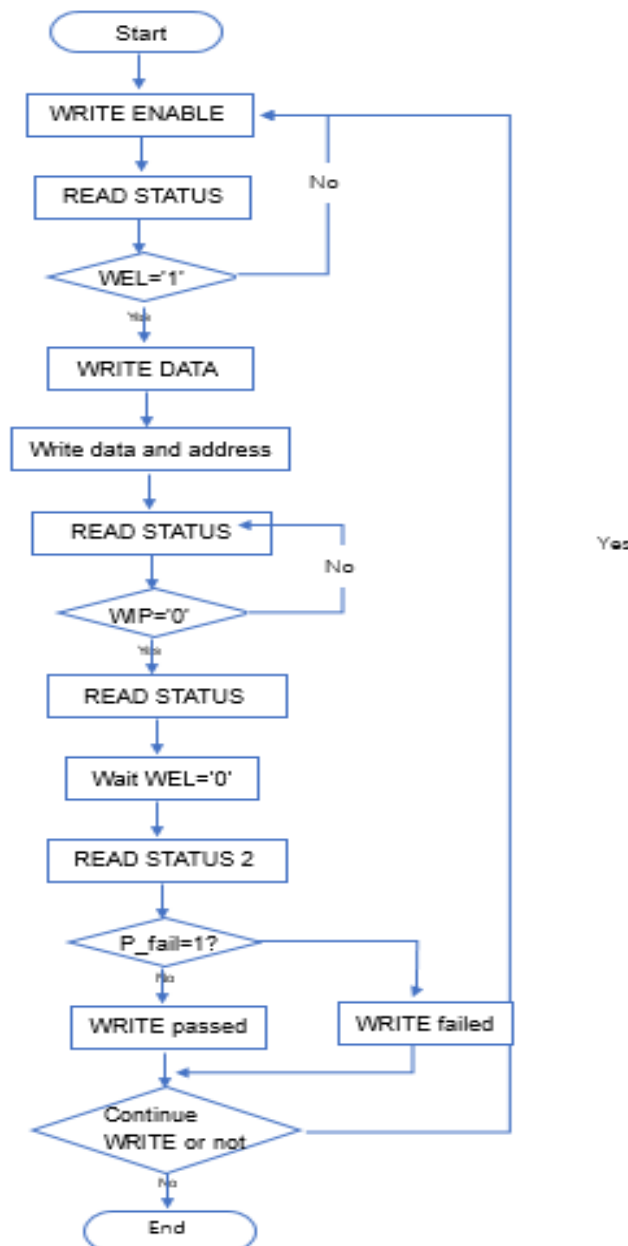
b. READ operation

Reference to the read data operating procedures.

c. ERASE operation

To enter the write enable status first, read the product status register and ensure that setting is effective; Send ERASE command to the product, then write erase the address; Send the READ STATUS command to the product after writing data, read the current status of the product, ensure that the product exit erase status; Send READ STATUS 2 REGISTER command to the product, ensure that the product erase passed, operation done.