SK hynix e-NAND Product Family
eMMC5.1 Compatible

Revision History

Revision No.	History	Date	Remark
1.0	- 1st Official release	Aug. 31, 2015	

Table of Contents

1. Introduction

1.1 General Description

SK hynix e-NAND consists of NAND flash and MMC controller.
e-NAND has the built-in intelligent controller which manages interface protocols, wear leveling, bad block management, garbage collection, and ECC. e-NAND protects the data contents from the host sudden power off failure.
e-NAND is compatible with JEDEC standard eMMC5.1 specification. (Except CMD queue)

1.2 Product Line-up

Density	Part Number	NAND Stack	PKG Size (mm)	Package Type
8GB	H26M41204HPR	64Gb x 1	11.5x13x0.8	153FBGA

1.3 Key Features

- **eMMC5.1 compatible**
  (Backward compatible to eMMC4.5 & eMMC5.0)

- **Bus mode**
  - Data bus width : 1bit(default), 4bits, 8bits
  - Data transfer rate: up to 400MB/s (HS400)
  - MMC I/F Clock frequency : 0~200MHz
  - MMC I/F Boot frequency : 0~52MHz

- **Operating Voltage Range**
  - V_{cc} (NAND) : 2.7V - 3.6V
  - V_{ccq} (Controller) : 1.7V - 1.95V / 2.7V ~ 3.3V

- **Temperature**
  - Operation (-25℃ ~ +85℃)
  - Storage without operation (-40℃ ~ +85℃)

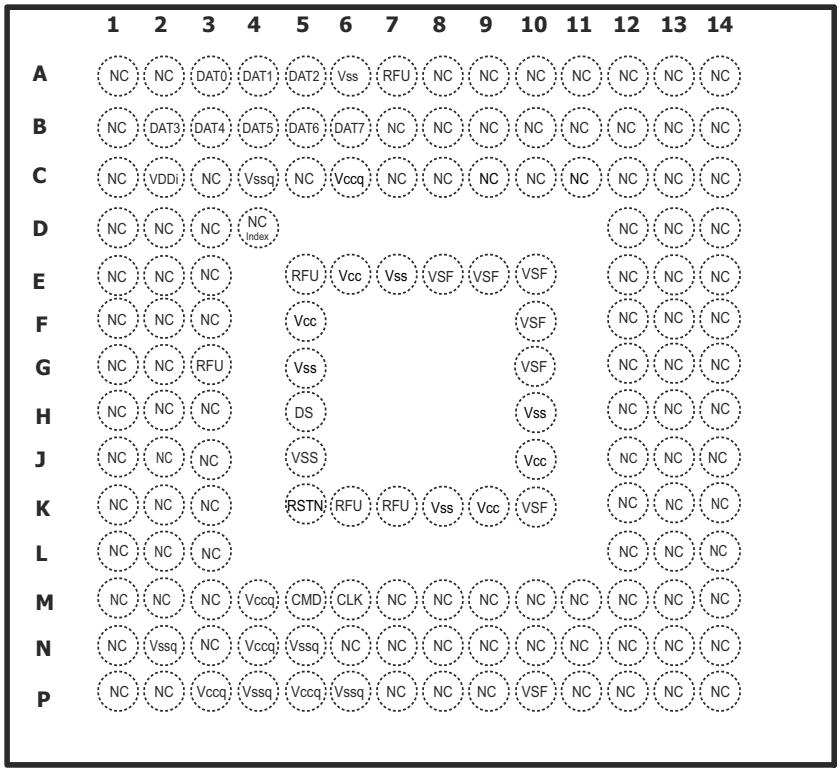
- **Others**
  - This product is compliance with the RoHS directive

- **Supported Features**
  - HS400, HS200
  - HPI, BKOPS, **BKOP operation control**
  - Packed CMD
  - Cache, **Cache barrier, Cache flushing report**
  - Partitioning, RPMB, RPMB throughput improve
  - Discard, Trim, Erase, Sanitize
  - Write protect, Secure write protection
  - Lock/Unlock
  - PON, Sleep/Awake
  - Reliable Write
  - Boot feature, Boot partition
  - HW/SW Reset
  - Field Firmware Update
  - Configurable driver strength
  - Health(Smart) report
  - Production state awareness
  - Secure removal type
  - Data Strobe pin, **Enhanced data strobe**

  (Bold features are added in eMMC5.1)

2. Package Configurations

2.1 Pin connection



[Figure 1] FBGA153 Package Connection (Top view through Package)

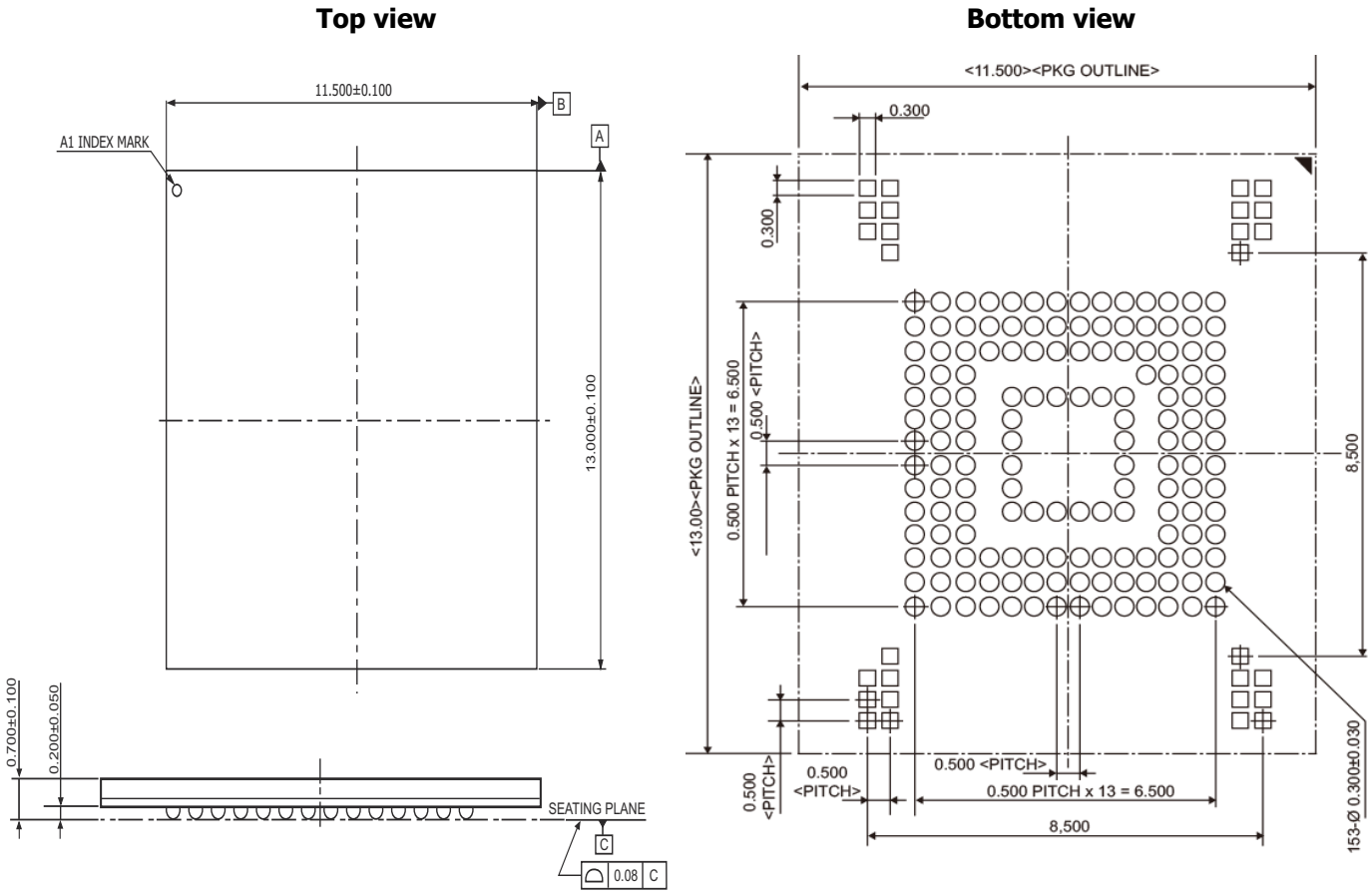
Pin number	Name	Pin number	Name	Pin number	Name	Pin number	Name
A3	DAT0	**C4**	V_{ssq}	**G10**	VSF	**M5**	CMD
A4	DAT1	**C6**	V_{ccq}	**H5**	DS	**M6**	CLK
A5	DAT2	**E6**	V_{cc}	**H10**	V_{ss}	**N2**	V_{ssq}
A6	V_{ss}	**E7**	V_{ss}	**J5**	V_{ss}	**N4**	V_{ccq}
B2	DAT3	**E8**	VSF	**J10**	V_{cc}	**N5**	V_{ssq}
B3	DAT4	**E9**	VSF	**K5**	RSTN	**P3**	V_{ccq}
B4	DAT5	**E10**	VSF	**K8**	V_{ss}	**P4**	V_{ssq}
B5	DAT6	**F5**	V_{cc}	**K9**	V_{cc}	**P5**	V_{ccq}
B6	DAT7	**F10**	VSF	**K10**	VSF	**P6**	V_{ssq}
C2	VDDi	**G5**	V_{ss}	**M4**	V_{ccq}	**P10**	VSF

Name	Type	Ball No.	Description
CLK	Input	M6	Clock: Each cycle directs a 1-bit transfer on the command and DAT lines.
CMD	Input	M5	Command: A bidirectional channel used for device initialization and command transfers. Command has two operating modes: 1) Open-drain for initialization. 2) Push-pull for fast command transfer.
DAT0	I/O	A3	Data I/O0: Bidirectional channel used for data transfer.
DAT1	I/O	A4	Data I/O1: Bidirectional channel used for data transfer.
DAT2	I/O	A5	Data I/O2: Bidirectional channel used for data transfer.
DAT3	I/O	B2	Data I/O3: Bidirectional channel used for data transfer.
DAT4	I/O	B3	Data I/O4: Bidirectional channel used for data transfer.
DAT5	I/O	B4	Data I/O5: Bidirectional channel used for data transfer.
DAT6	I/O	B5	Data I/O6: Bidirectional channel used for data transfer.
DAT7	I/O	B6	Data I/O7: Bidirectional channel used for data transfer.
RSTN	Input	K5	Reset signal pin
V_{cc}	Supply	E6,F5,J10,K9	V_{cc}: Flash memory I/F and Flash memory power supply.
V_{ccq}	Supply	C6,M4,N4,P3,P5	V_{ccq}: Memory controller core and MMC interface I/O power supply.
Vss	Supply	A6,E7,G5,H10,J5,K8	V_{ss}: Flash memory I/F and Flash memory ground connection.
Vssq	Supply	C4,N2,N5,P4,P6	V_{ssq}: Memory controller core and MMC I/F ground connection
VDDi		C2	VDDi: Connect 0.1uF capacitor from VDDi to ground.
DS	Out put	H5	DS: Data Strobe
VSF	Supply	E8,E9,E10,F10, G10, K10, P10	VSF: Vendor Specific Function SK hynix use E9, E10 Pin as VSF Pin
RFU	Reserved for future use		

[Table 1] FBGA153 Ball Description

2.2 Package Mechanical Drawing

2.2.1 11.5mm x13.0mm x0.8mm



[Figure 2] 11.5mm x 13.0mm x 0.8mm Package dimension


SK hynix
H26M41204HPR
e-NAND 626A