GLS85VM1016B / 1032B / 1064B
Industrial Temp **eMMC NANDrive™**

1.0   GENERAL DESCRIPTION

Each eMMC NANDrive contains an integrated eMMC NAND flash memory controller and NAND flash die in a BGA package. Refer to Figure 2-1 for the eMMC NANDrive block diagram.

1.1   Optimized eMMC NANDrive

The heart of the eMMC NANDrive is the eMMC NAND flash memory controller, which translates standard eMMC signals into flash media data and control signals. The following components contribute to the eMMC NANDrive's operation.

1.1.1 Microcontroller Unit (MCU)

The MCU transfers the eMMC commands into data and control signals required for flash media operation.

1.1.2 Internal Direct Memory Access (DMA)

The eMMC NANDrive uses internal DMA allowing instant data transfer from/to buffer to/from flash media. This implementation eliminates microcontroller overhead associated with the traditional, firmware-based approach, thereby increasing the data transfer rate.

1.1.3 Power Management Unit (PMU)

The PMU controls the power consumption of the eMMC NANDrive. The PMU dramatically reduces the power consumption of the eMMC NANDrive by putting the part of the circuitry that is not in operation into Sleep mode.

The Flash File System handles inadvertent power interrupts and has auto-recovery capability to ensure the eMMC NANDrive's data integrity.

1.1.4 Embedded Flash File System

The embedded flash file system is an integral part of the eMMC NANDrive. It contains MCU firmware that performs the following tasks:

1. Translates host side signals into flash media writes and reads
2. Provides flash media wear leveling to spread flash writes across all memory address space to increase the longevity of flash media
3. Keeps track of the data file structure
4. Manages system security for the selected protection zones

1.1.5 Error Correction Code (ECC)

High performance is achieved through optimized hardware error detection and correction.

1.1.6 Serial Communication Interface (SCI)

The Serial Communication Interface (SCI) is designed for error reporting. During the product development stage, it is recommended to provide the SCI port on the PCB to aid in design validation.

1.1.7 Multi-tasking Interface

The multi-tasking interface enables fast, sequential write performance by allowing concurrent Read, Program and Erase operations to multiple flash media.

1.2   SMT Reflow Consideration

The eMMC NANDrive family utilizes standard NAND flash for data storage. Because the high temperature in a surface-mount soldering reflow process may alter the content on NAND flash, it is recommended to program the eMMC NANDrive after the reflow process.

1.3   Advanced NAND Management

eMMC NANDrive's integrated controller uses advanced wear-leveling algorithms to substantially increase the longevity of NAND flash media. Wear caused by data writes is evenly distributed in all or select blocks in the device that prevents "hot spots" in locations that are programmed and erased extensively. This effective wear-leveling technique results in optimized device endurance, enhanced data retention and higher reliability required by long-life applications.
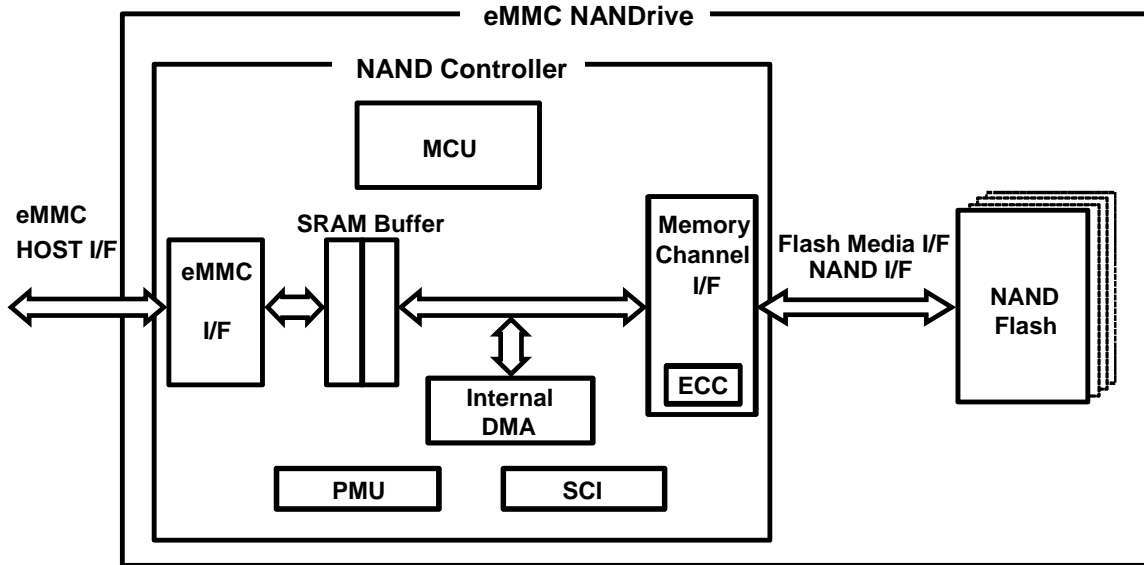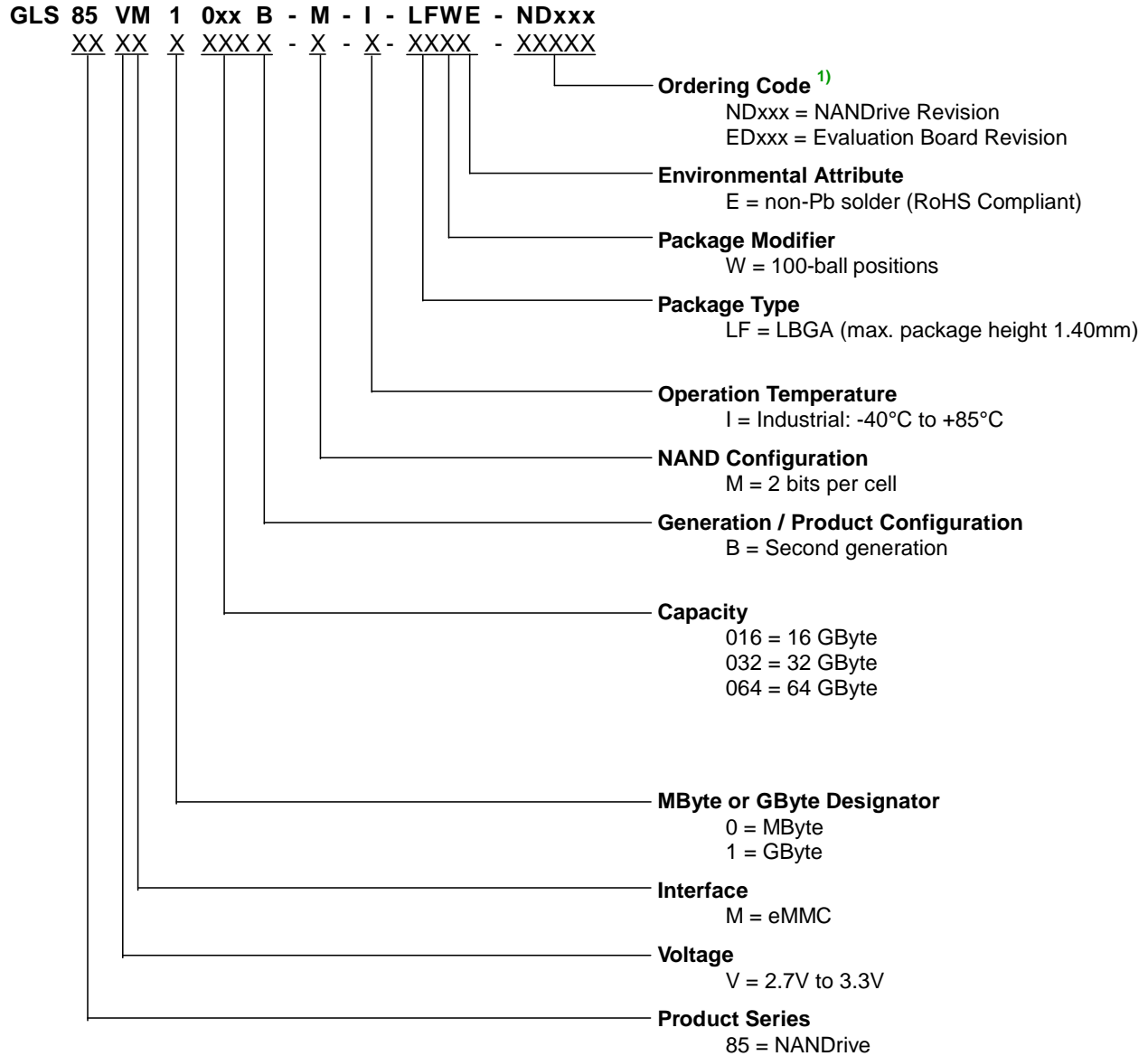
2.0   FUNCTIONAL BLOCKS

Figure 2-1: eMMC NANDrive Block Diagram

3.0   Product Ordering Information

GLS 85 VM 1 0xx B - M - I - LFWE - NDxxx
XX XX X XXX X - X - X - XXXX - XXXXX

Ordering Code [1)]
- NDxxx = NANDrive Revision
- EDxxx = Evaluation Board Revision

Environmental Attribute
- E = non-Pb solder (RoHS Compliant)

Package Modifier
- W = 100-ball positions

Package Type
- LF = LBGA (max. package height 1.40mm)

Operation Temperature
- I = Industrial: -40°C to +85°C

NAND Configuration
- M = 2 bits per cell

Generation / Product Configuration
- B = Second generation

Capacity
- 016 = 16 GByte
- 032 = 32 GByte
- 064 = 64 GByte

MByte or GByte Designator
- 0 = MByte
- 1 = GByte

Interface
- M = eMMC

Voltage
- V = 2.7V to 3.3V

Product Series
- 85 = NANDrive

1) Note that the top side marking on the package typically does not include ordering codes (e.g. NDxxx), unless it is a special custom specification (C-SPEC) required by the end-customer to be marked on the device.

Valid Combinations

Valid product combinations are those that are in the mass production or will be in the mass production. Consult your Greenliant sales representative to confirm availability of the valid combinations and to determine availability of new product combinations.

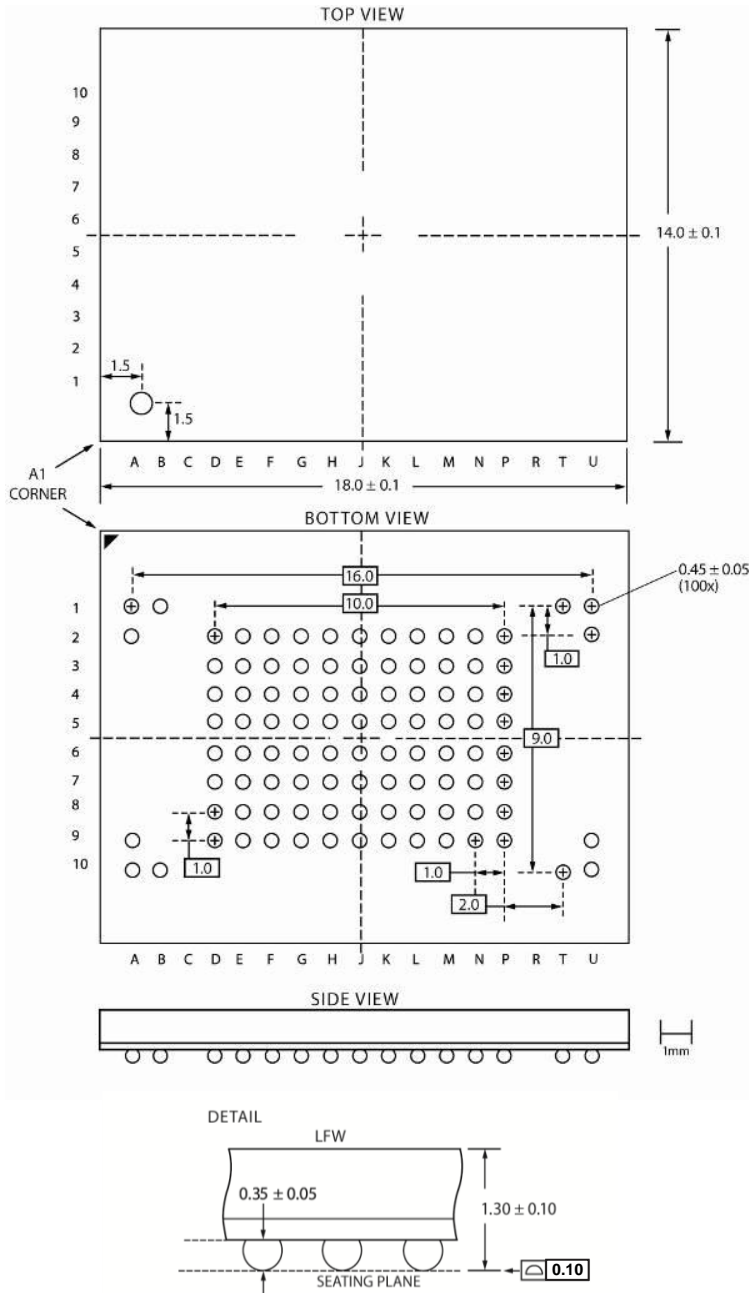**Table 3-1: eMMC NANDrive Product Valid Ordering Numbers**

Capacity	Operating Temperature	Part Number	Package
16GB	Industrial (-40°C to 85°C)	GLS85VM1016B-M-I-LFWE-ND204	LFWE, 14x18x1.40mm
16GB	Industrial (-40°C to 85°C)	GLS85VM1016B-M-I-LFWE-ND208	LFWE, 14x18x1.40mm
16GB	Industrial (-40°C to 85°C)	GLS85VM1016B-M-I-LFWE-ND212	LFWE, 14x18x1.40mm
32GB	Industrial (-40°C to 85°C)	GLS85VM1032B-M-I-LFWE-ND204	LFWE, 14x18x1.40mm
32GB	Industrial (-40°C to 85°C)	GLS85VM1032B-M-I-LFWE-ND208	LFWE, 14x18x1.40mm
32GB	Industrial (-40°C to 85°C)	GLS85VM1032B-M-I-LFWE-ND212	LFWE, 14x18x1.40mm
64GB	Industrial (-40°C to 85°C)	GLS85VM1064B-M-I-LFWE-ND204	LFWE, 14x18x1.40mm
64GB	Industrial (-40°C to 85°C)	GLS85VM1064B-M-I-LFWE-ND208	LFWE, 14x18x1.40mm
64GB	Industrial (-40°C to 85°C)	GLS85VM1064B-M-I-LFWE-ND212	LFWE, 14x18x1.40mm

Table 3-2: eMMC Evaluation Board Valid Ordering Numbers

| Capacity	Operating Temperature	Part Number	Form Factor
16GB	Industrial (-40°C to 85°C)	GLS85VM1016B-M-I-E2-ED212	JEDEC MO-277
32GB	Industrial (-40°C to 85°C)	GLS85VM1032B-M-I-E2-ED212	JEDEC MO-277
64GB	Industrial (-40°C to 85°C)	GLS85VM1064B-M-I-E2-ED212	JEDEC MO-277

3.1   Package Diagram

GLS85VM1016B/1032B-M-I-LFWE

Figure 3-1: eMMC NANDrive 100-Ball, Ball Grid Array (BGA) Greenliant Package Code: LFWE
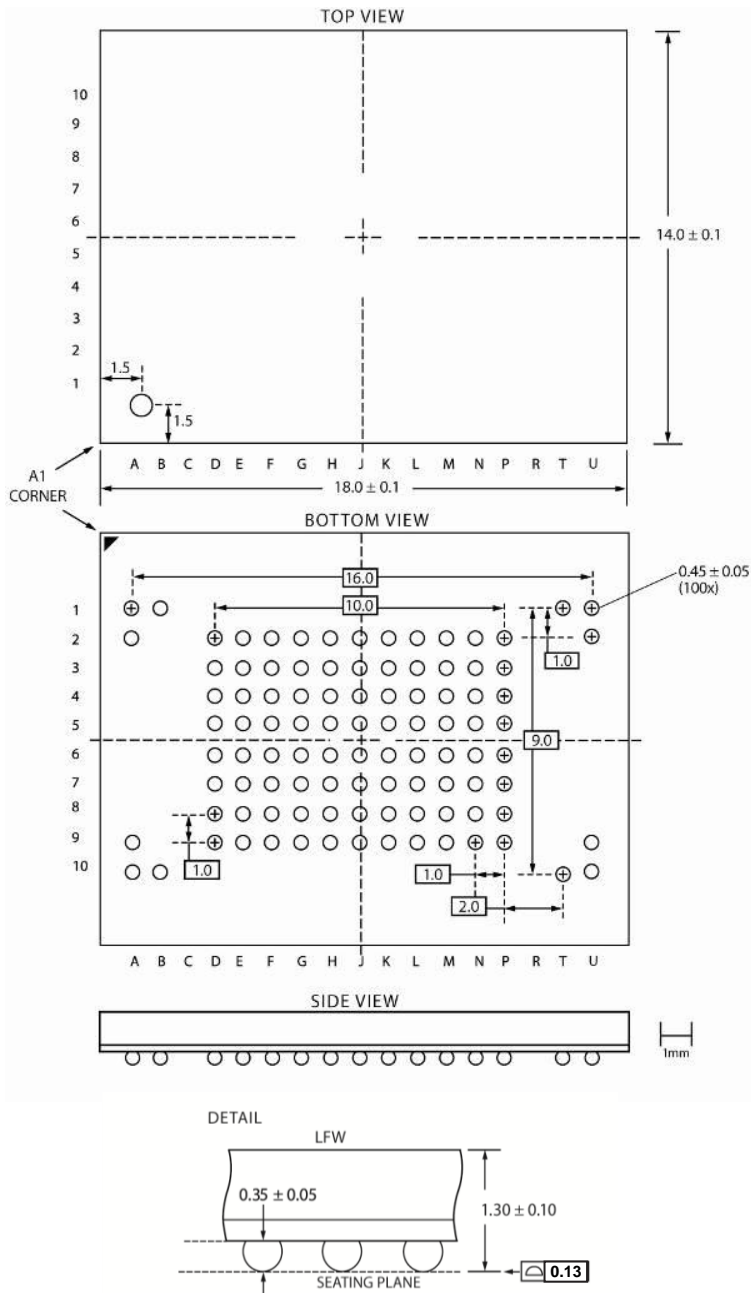
GLS85VM1064B-M-I-LFWE

Figure 3-2: eMMC NANDrive 100-Ball, Ball Grid Array (BGA) Greenliant Package Code: LFWE

Revision History

Number	Description	Date
01.000	Initial release as Fact Sheet for GLS85VM1016B / 1032B / 1064B	August 10, 2015
02.000	Added Ordering codes ND208/ED208	June 15, 2016
03.000	Added Ordering Codes ND212, ED212, Removed ED208	March 9, 2017

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