

1.0 GENERAL DESCRIPTION

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

1.1 Optimized PATA NANDrive

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

1.1.1 Microcontroller Unit (MCU)

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

1.1.2 Internal Direct Memory Access (DMA)

PATA 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 PATA NANDrive. The PMU dramatically reduces the power consumption of PATA 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 PATA NANDrive's data integrity. For regular power management, the host must send an IDLE_IMMEDIATE command and wait for command ready before powering down PATA NANDrive.

1.1.4 Embedded Flash File System

The embedded flash file system is an integral part of PATA 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 the flash writes across all memory address space to increase the longevity of flash media
3. Keeps track of data file structures
4. Manages system security for the selected protection zones
5. Stores the data in flash media upon completion of a Write command (PATA NANDrive does not perform Post-Write operations, except for when the write cache is enabled)

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, sustained write performance by allowing concurrent Read, Program and Erase operations to multiple flash media.

1.2 SMT Reflow Consideration

The PATA NANDrive family utilizes standard NAND flash for data storage. Because the high temperature in a surface-mount soldering reflow process can alter the content on NAND flash, do not program PATA NANDrive before the reflow process.

1.3 Advanced NAND Management

PATA 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

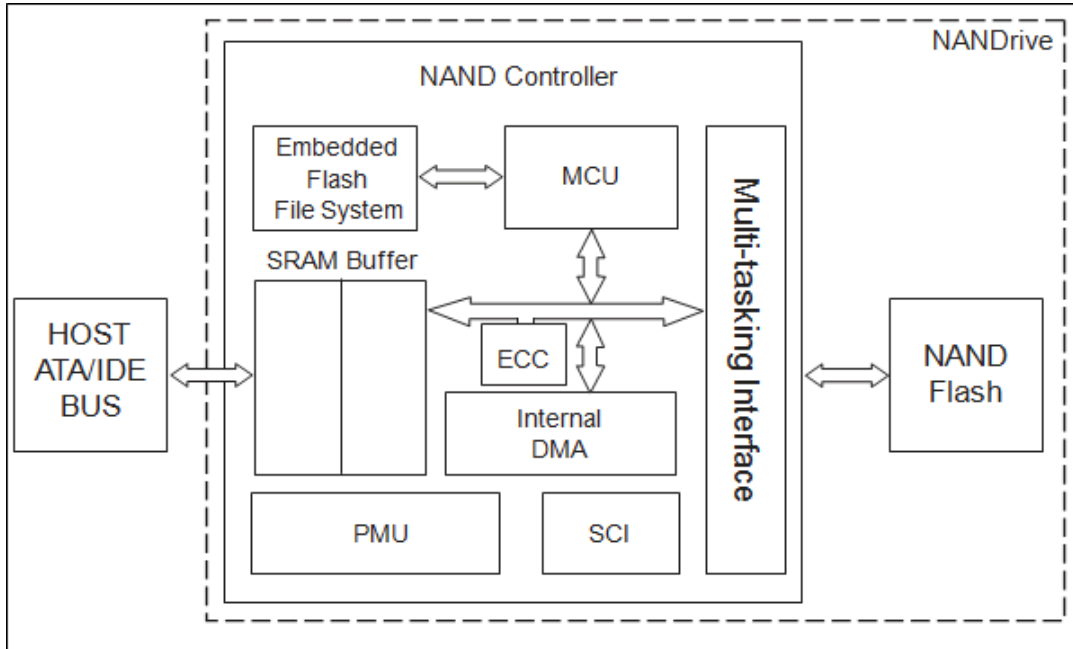
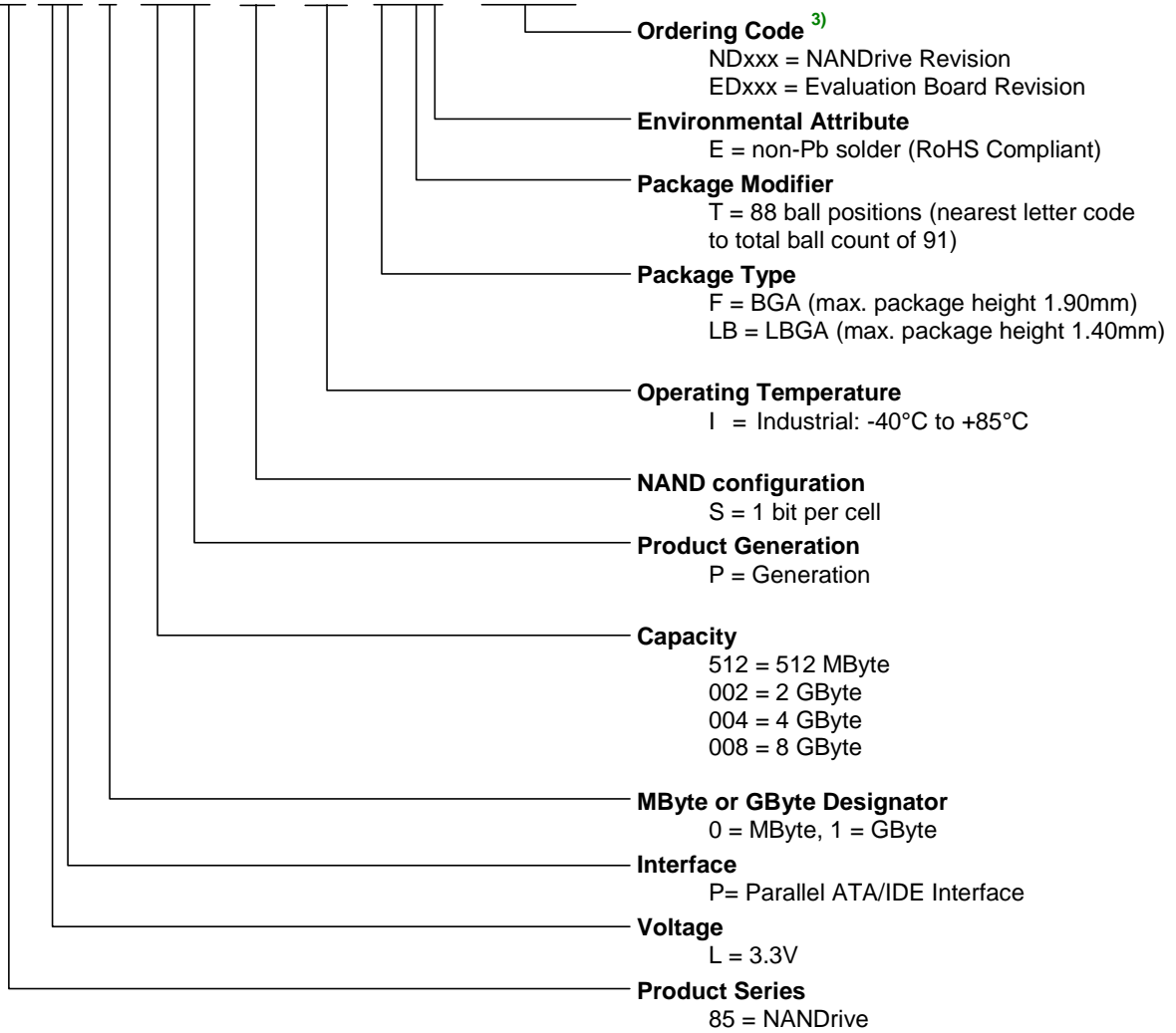


Figure 2-1: PATA NANDrive Block Diagram

3.0 PRODUCT ORDERING INFORMATION

GLS 85 LP 1 xxxP - S - I - FTE - NDxxx
XX XX X XXXX - X - X - XXXX - XXXXX



3) For legacy NANDrive products, no ordering code is required. Note that the top side marking on the package typically does not include ordering codes (e.g. NDxxx), unless it is a special C-SPEC (custom specification) which is 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: PATA NANDrive Product Valid Ordering Numbers

Capacity	Operating Temperature	Part Number	Package
512MB	Industrial (-40°C to 85°C)	GLS85LP0512P-S-I-LBTE	LBTE, 12x24x1.40mm
2GB	Industrial (-40°C to 85°C)	GLS85LP1002P-S-I-FTE	FTE, 14x24x1.90mm
		GLS85LP1002P-S-I-FTE-ND001	FTE, 14x24x1.90mm
		GLS85LP1002P-S-I-FTE-ND004	FTE, 14x24x1.90mm
4GB	Industrial (-40°C to 85°C)	GLS85LP1004P-S-I-FTE	FTE, 14x24x1.90mm
		GLS85LP1004P-S-I-FTE-ND001	FTE, 14x24x1.90mm
		GLS85LP1004P-S-I-FTE-ND004	FTE, 14x24x1.90mm
8GB	Industrial (-40°C to 85°C)	GLS85LP1008P-S-I-FTE	FTE, 14x24x1.90mm
		GLS85LP1008P-S-I-FTE-ND001	FTE, 14x24x1.90mm
		GLS85LP1008P-S-I-FTE-ND004	FTE, 14x24x1.90mm

Table 3-2: PATA NANDrive Evaluation Board Valid Ordering Numbers

Capacity	Operating Temperature	Part Number	Form Factor
512MB	Industrial (-40°C to 85°C)	GLS85LP0512P-S-I-40CN-K	Module with 40-pin ATA connector
		GLS85LP0512P-S-I-44CN-K	Module with 44-pin ATA connector
2GB	Industrial (-40°C to 85°C)	GLS85LP1002P-S-I-40CN-K	Module with 40-pin ATA connector
		GLS85LP1002P-S-I-44CN-K	Module with 44-pin ATA connector
		GLS85LP1002P-S-I-40CN-ED001	Module with 40-pin ATA connector
		GLS85LP1002P-S-I-40CN-ED004	Module with 40-pin ATA connector
4GB	Industrial (-40°C to 85°C)	GLS85LP1004P-S-I-40CN-K	Module with 40-pin ATA connector
		GLS85LP1004P-S-I-44CN-K	Module with 44-pin ATA connector
		GLS85LP1004P-S-I-40CN-ED001	Module with 40-pin ATA connector
		GLS85LP1004P-S-I-40CN-ED004	Module with 40-pin ATA connector
8GB	Industrial (-40°C to 85°C)	GLS85LP1008P-S-I-40CN-K	Module with 40-pin ATA connector
		GLS85LP1008P-S-I-44CN-K	Module with 44-pin ATA connector
		GLS85LP1008P-S-I-40CN-ED001	Module with 40-pin ATA connector
		GLS85LP1008P-S-I-40CN-ED004	Module with 40-pin ATA connector

3.1 Package Diagrams

3.1.1 FTE Package

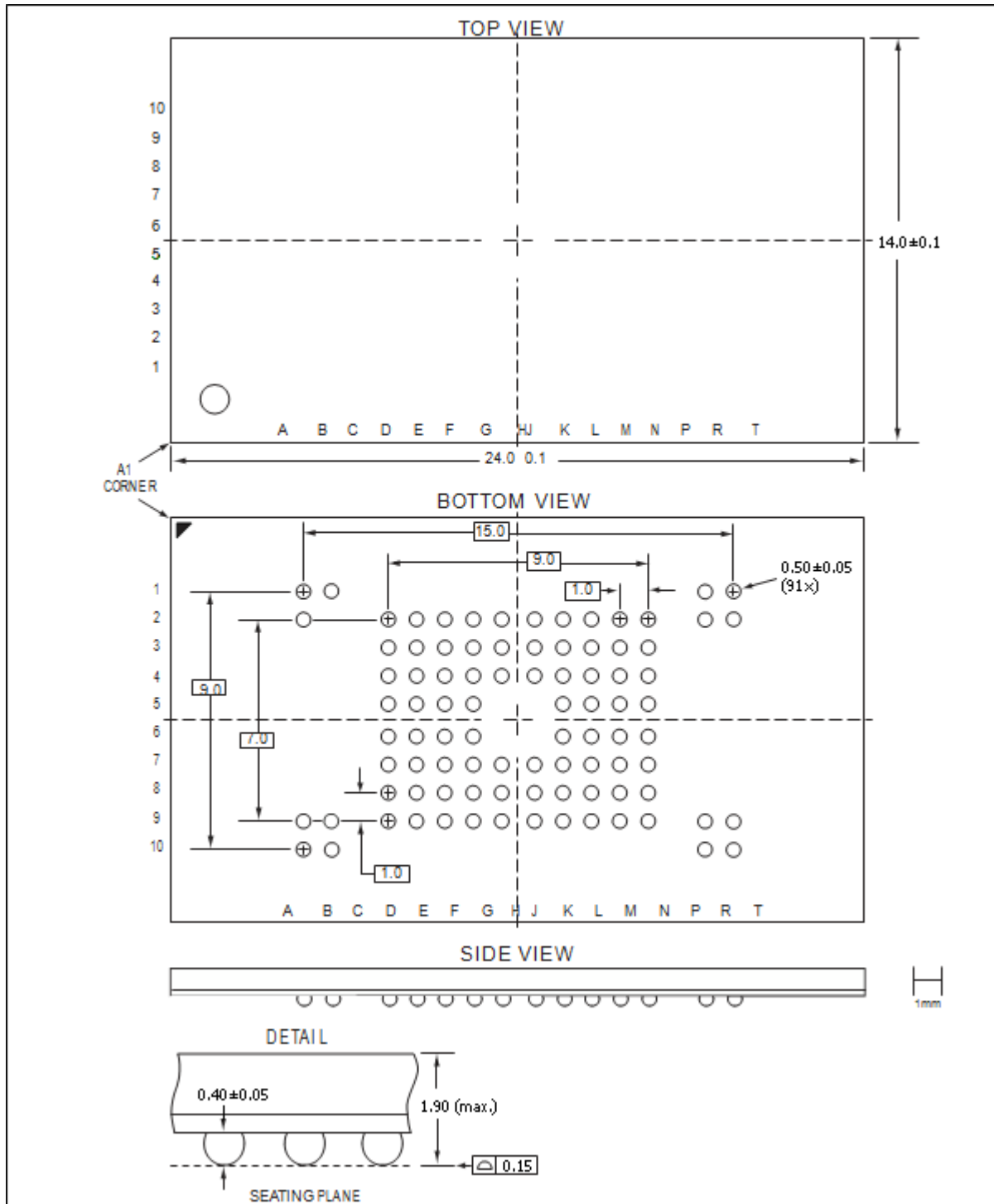


Figure 3-1: PATA NANDrive 91-Ball, Ball Grid Array (BGA) Greenliant Package Code: FTE

Note: All linear dimensions are in millimeters.
 Un-tolerance dimensions are nominal target values.
 Co-planarity: 0.15 mm.
 Ball opening size is 0.40 mm (± 0.05 mm).

3.1.2 LBTE Package

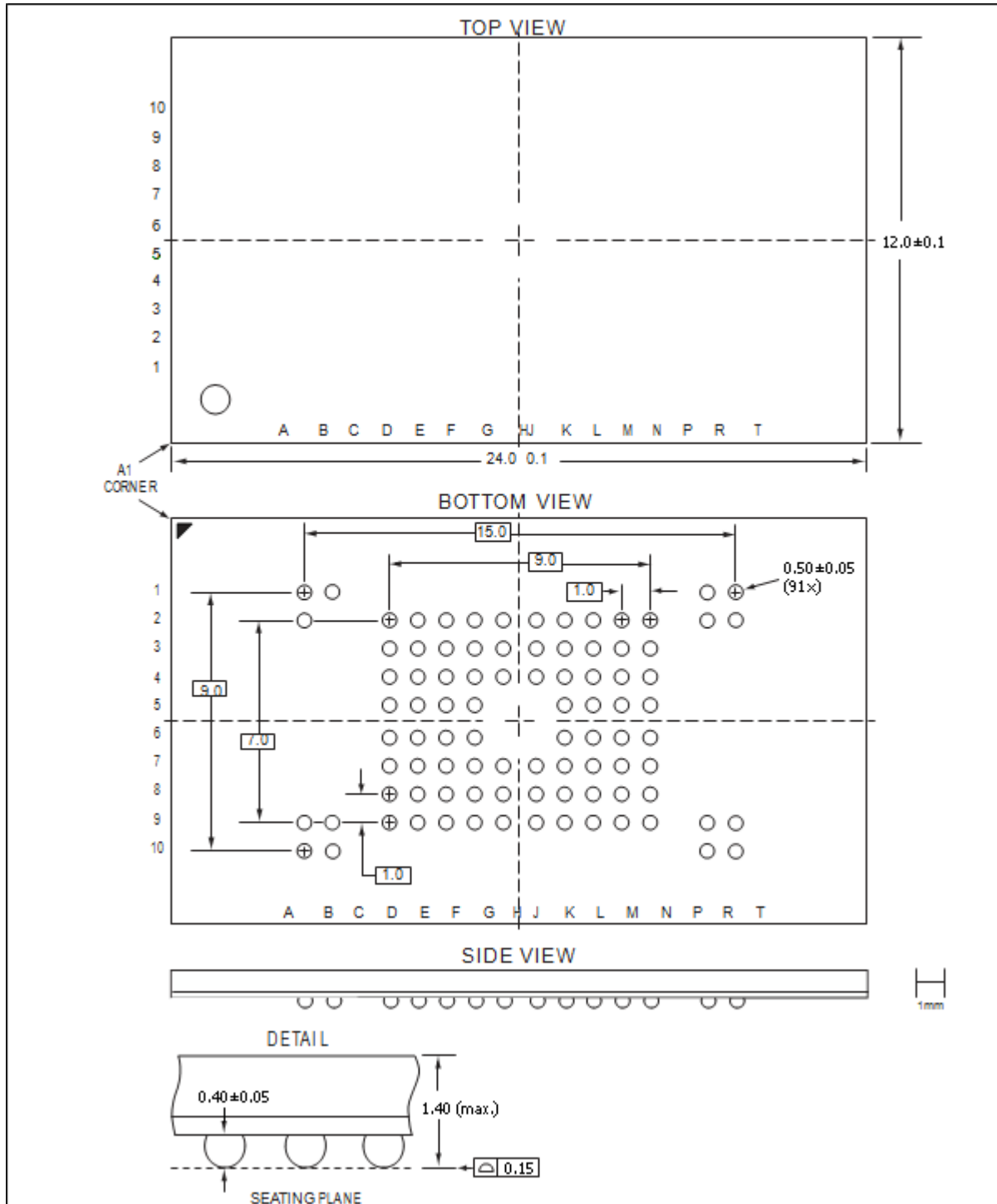


Figure 3-2: PATA NANDrive 91-Ball, Ball Grid Array (LBGA) Greenliant Package Code: LBTE

Note: All linear dimensions are in millimeters.
 Un-tolerance dimensions are nominal target values.
 Co-planarity: 0.15 mm.
 Ball opening size is 0.40 mm (± 0.05 mm).

Revision History

Revision	Description	Date
01.000	Initial release of datasheet	June 15, 2011
02.000	Added Total program/erase cycle count Updated Power specification, Initialization time and Purge time	June 1, 2012
03.000	Updated first page and Section 1.0; Removed Pin Assignments and Updated section numbering; Placed Valid Combinations into table format and Updated Section 3.0	February 19, 2014
03.100	Added part numbers to Tables 3-1, 3-2	June 28, 2019

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Specifications are subject to change without notice. Memory sizes denote raw storage capacity; actual usable capacity may be less.

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[ND004](#) [GLS85LP1004P-S-I-FTE-ND004](#) [GLS85LP1008P-S-I-FTE-ND004](#)