GigaDevice

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GD25/55
SPI NOR Flash

# Automotive Grade SPI NOR Flash

◆ 3V/1.8V SPI NOR Flash

◆ 65nm/55nm process, 2Mb-2Gb density

◆ AEC-Q100 Grade 1 Qualified

◆ Support PPAP& PSW

◆ Defect rate less than 10ppm

◆ Wide operating temperature range:-40℃ to 125℃

◆ Automotive qualified package options

| 3V/1.8V | 65nm/55nm | 2Mb~2Gb | -40℃~125℃ |

## Consistency. Reliability. Ruggedness
## Get them all in our new AEC-Q100 Qualified GD25/55 SPI NOR Flash

# Automotive Grade SPI NAND Flash

- ◆ 3V/1.8V SPI NAND Flash
- ◆ 38nm process, 1Gb~4Gb density
- ◆ AEC-Q100 grade 2 Qualified
- ◆ Support PPAP& PSW

- ◆ Defect rate less than 10ppm
- ◆ Wide operating temperature range : -40℃ to 105℃
- ◆ WSON8 8x6mm package
- ◆ Built-in 4bit ECC

| 3V/1.8V | 38nm | 1Gb~4Gb | -40℃~105℃ |

SPI NOR Flash density expansion solution

Get them all in our AEC-Q100 Qualified SPI NAND Flash

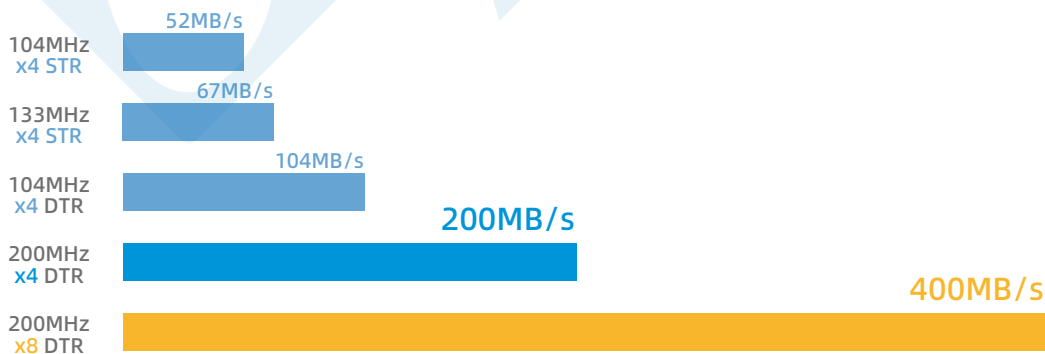# High Performance Quad & Octal SPI NOR Flash

## Quad LT/T Product Series

- ◆ 1.8V 256Mb~2Gb, 3V 512Mb~2Gb
- ◆ Single SPI & Quad DTR SPI interface
- ◆ Quad SPI-compatible command set
- ◆ Industry-best Quad I/O read performance with 200MB/s data throughput rate
- ◆ Support "Execute-In-Place"(XIP)
- ◆ DQS and DLP features improve high speed performance
- ◆ ECC and CRC features improve reliability and I/O integrity
- ◆ Standard TFBGA24, SOP16, WSON8 packages

## Octal LX/X Product Series

- ◆ 1.8V 256Mb~2Gb, 3V 512Mb~2Gb
- ◆ Single SPI & Octal DTR SPI interface
- ◆ Compatible with JEDEC xSPI standard
- ◆ Xccela™ Flash Consortium Member
- ◆ High read performance with 400MB/s data throughput rate
- ◆ Support "Execute-In-Place"(XIP)
- ◆ DQS and DLP features improve high speed performance
- ◆ ECC and CRC features improve reliability and I/O integrity
- ◆ Standard TFBGA24, SOP16, and WLCSP packages

## SPI NOR Flash Read Performance

| | |
|---|---|
| 104MHz x4 STR | 52MB/s |
| 133MHz x4 STR | 67MB/s |
| 104MHz x4 DTR | 104MB/s |
| 200MHz x4 DTR | 200MB/s |
| 200MHz x8 DTR | 400MB/s |

# Ultra-Low Power, Wide Vcc SPI NOR Flash

The GigaDevice latest GD25Wx Series is an ultra-low power SPI NOR Flash memory with a wide Vcc range, ideal for wearables, IoT and battery-operated applications.

3.6V

2.7V

Lower Vcc helps to extend battery life

1.65V

Extended Time
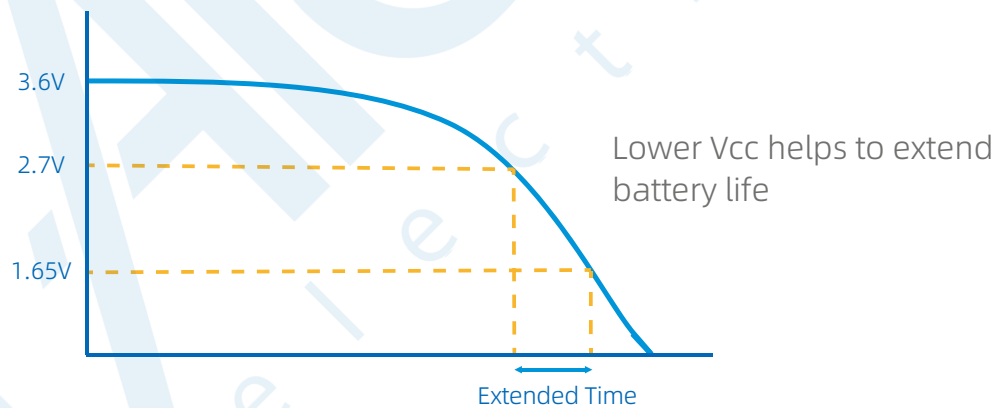
## Main Features

| 1.65V ~ 3.6V | Zero standby current 0.1µA(typical) | Single Dual Quad SPI Mode | Read current 3.5mA | Program current 15mA | 512Kb ~ 256Mb | USON6 & WLSCP Package |

USON6 1.2mmx1.2mm

USON8 3mmx2mm

USON8 3mmx4mm

# SPI NOR Flash Memory
## Wide Voltage Range with Industry's Smallest Package

The GigaDevice Low-Power SPI NOR Flash memory series featuring the industry's smallest USON6 (1.2mm x 1.2mm) and WLCSP package, providing maximum design flexibility for IOT devices, wearables, smartphones and other compact battery-operated applications.

◆ 1.65V -3.6V operating voltage range

◆ Single, Dual, Quad I/O SPI modes

◆ Density range from 512Kb to 256Mb

◆ Industry's smallest 1.2mm x 1.2mm USON6 package

◆ Operating frequency up to 104MHz

◆ High reliability with 20-year data retention and 100,000 program/erase cycles

◆ Low power consumption:
  zero standby current (0.1µA typical)
  low read current (Less than 3mA@ 40MHz)

◆ Advanced security feature:
  factory preset 128-bit unique ID

◆ Wide operating temperature range:
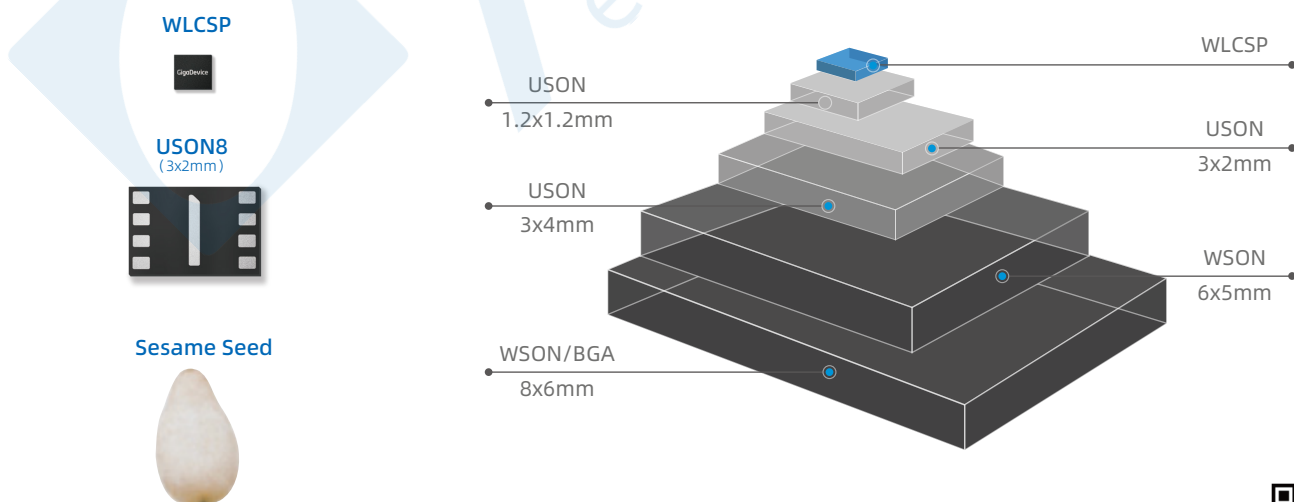  -40°C to 85°C, -40°C to 105°C, -40°C to 125°C
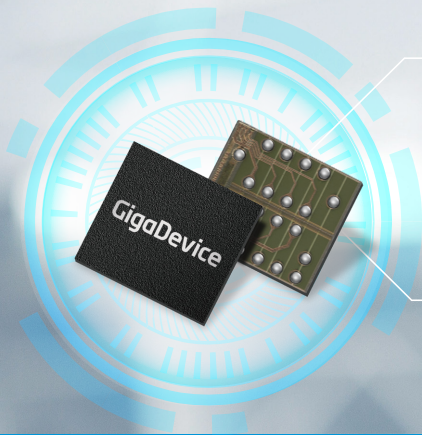
# WLCSP Package

## Small size, low power, unleashing your creative design for compact embedded systems

Small die sizes and packages are highly sought after as smart wearables including wearable bracelets, smartwatches and TWS headsets are gaining popularity.

GigaDevice WLCSP package pushes the envelope to allow designers to maximize the PCB real estate. With dimensions from 1 x 1mm and 0.25mm thickness, this is about 1/10 of the USON8(3 x 2mm) package.

The GigaDevice WLCSP Flash product supports both 1.8V and 1.2V low-voltage supply. The minimum power consumption at 166MHz read operation is only 7~10mA for 1.8V product, reducing 45% compared to the industry average. The 1.2V product supports two operating modes: Normal Mode and Low Power Mode. In Normal Mode, the lowest power consumption is 6mA at 120MHz x4I/O Read. In Low Power Mode, the lowest power consumption is 0.4mA at 1MHz x4I/O Read, the power consumption for Erase operation is as low as 8mA. Deep Power-Down Current is only 0.1uA, fully meet the needs of the current mobile devices, to achieve the purpose of small size,low power,unleashing your creative design for compact embedded systems.

WLCSP

USON8
（3x2mm）

Sesame Seed

WLCSP

USON
1.2x1.2mm

USON
3x2mm

USON
3x4mm

WSON
6x5mm

WSON/BGA
8x6mm

# Advanced Technology 24nm SLC NAND Flash

GigaDevice 24nm SLC NAND Flash product provides 1Gb, 2Gb, 4Gb and 8Gb density options, supports Parallel and SPI interface, and has been successfully mass-produced. SPI NAND Flash has an internal 8-bit ECC algorithm to improve reliability and extend product lifespan. GigaDevice provides a kind of large density and high cost-effective solution for 5G, IoT, network, surveillance and consumer applications such as wearable devices.

◆ Available in 1.8V and 3.3V power supply options

◆ 2KB/4KB cache for fast random read

◆ 10-year data retention and Typical 80,000 program/ erase cycles

◆ Enhanced access performance with 2KBytes/4KBytes cache for fast random read

◆ Advanced NAND function, SPI NAND can support internal 8-bit ECC

◆ Quad I/O SPI interface, data transfer up to 532 Mbit/s

◆ Up to 133MHz SPI clock frequency

◆ Standard WSON8 8x6mm, WSON8 6x5mm packages Standard TSOP48, BGA63 packages

◆ Industrial temperature range of -40℃~85℃

## SPI NAND

| Part No. | Density | Voltage | Frequency | I/O Bus | Page Size | ECC Requirement | Package |
|---|---|---|---|---|---|---|---|
| GD5F1GM7UE | 1Gb | 3V | 133MHZ | x1/x2/x4 | 2KB | Internal 8bit/512B | WSON8 8x6mm/WSON8 6x5mm |
| GD5F1GM7RE | 1Gb | 1.8V | 104MHZ | x1/x2/x4 | 2KB | Internal 8bit/512B | WSON8 8x6mm/WSON8 6x5mm |
| GD5F2GM7UE | 2Gb | 3V | 133MHZ | x1/x2/x4 | 2KB | Internal 8bit/512B | WSON8 8x6mm/WSON8 6x5mm |
| GD5F2GM7RE | 2Gb | 1.8V | 104MHZ | x1/x2/x4 | 2KB | Internal 8bit/512B | WSON8 8x6mm/WSON8 6x5mm |
| GD5F4GM8UE | 4Gb | 3V | 133MHZ | x1/x2/x4 | 2KB | Internal 8bit/512B | WSON8 8x6mm/WSON8 6x5mm |
| GD5F4GM8RE | 4Gb | 1.8V | 104MHZ | x1/x2/x4 | 2KB | Internal 8bit/512B | WSON8 8x6mm/WSON8 6x5mm |

## Parallel NAND

| Part No. | Density | Voltage | Sequential Access Time | I/O Bus | Page Size | ECC Requirement | Package |
|---|---|---|---|---|---|---|---|
| GD9FU1G8F2D | 1Gb | 3V | 12ns | x8 | 2KB+128B | 8bit/512B | TSOP48 20x12mm/BGA63 9x11mm |
| GD9FS1G8F2D | 1Gb | 1.8V | 20ns | x8 | 2KB+128B | 8bit/512B | TSOP48 20x12mm/BGA63 9x11mm |
| GD9FU4GxF4B | 4Gb | 3V | 25ns | x8/x16 | 4KB+256B | 8bit/512B | TSOP48 20x12mm/BGA63 9x11mm |
| GD9FU8GxE4B | 8Gb | 3V | 25ns | x8/x16 | 4KB+256B | 8bit/512B | TSOP48 20x12mm/BGA63 9x11mm |

# 38nm SLC NAND Flash with Mature Technology
## Industry-proven, leading and Reliable

GigaDevice 38nm SLC NAND Flash product provides 1Gb, 2Gb, 4Gb and 8Gb density options, supports Parallel and SPI interface, and has excellent software and hardware compatibility. Users can easily replace other ordinary standard SLC NAND Flash memory in GigaDevice products. SPI NAND Flash has an internal 4-bit ECC algorithm to improve reliability and extend product lifespan, and offers up to 100,000 program/erase cycles and 10-year data retention. GigaDevice provides high-capacity and high-performance storage solutions for industrial control, base station, Internet of Things (IoT), automotive infotainment, smart TV and wearable devices.

◆ Available in 1.8V and 3V power supply options

◆ 2KB cache for fast random read

◆ High reliability with 10-year data retention and 100,000 program/erase cycles

◆ Enhanced access performance with 2KBytes cache for fast random read

◆ Advanced NAND functions, SPI NAND can support internal 4-bit ECC

◆ Quad I/O SPI interface, data transfer up to 532 Mbit/s

◆ Up to 133MHz SPI clock frequency

◆ Standard WSON8 8x6mm, WSON8 6x5mm packages Standard TSOP48, BGA63 packages

◆ Industrial temperature range of -40℃~85℃/-40℃~105℃

## SPI NAND

| Part No. | Density | Voltage | Frequency | I/O Bus | Page Size | ECC Requirement | Package |
|---|---|---|---|---|---|---|---|
| GD5F1GQ5U | 1Gb | 3V | 133MHz | x1/x2/x4 | 2KB | Internal 4bit/512B | WSON8 8x6/ WSON8 6x5 |
| GD5F1GQ5R | 1Gb | 1.8V | 104MHz | x1/x2/x4 | 2KB | Internal 4bit/512B | WSON8 8x6/ WSON8 6x5 |
| GD5F2GQ5U | 2Gb | 3V | 104MHz | x1/x2/x4 | 2KB | Internal 4bit/512B | WSON8 8x6 |
| GD5F2GQ5R | 2Gb | 1.8V | 80MHz | x1/x2/x4 | 2KB | Internal 4bit/512B | WSON8 8x6 |
| GD5F4GQ6U | 4Gb | 3V | 104MHz | x1/x2/x4 | 2KB | Internal 4bit/512B | WSON8 8x6 |
| GD5F4GQ6R | 4Gb | 1.8V | 80MHz | x1/x2/x4 | 2KB | Internal 4bit/512B | WSON8 8x6 |

## Parallel NAND

| Part No. | Density | Voltage | Sequential Access Time | I/O Bus | Page Size | ECC Requirement | Package |
|---|---|---|---|---|---|---|---|
| GD9FU1GxFxA | 1Gb | 3V | 25ns | x8/x16 | 2KB+128B/64B | 4bit/512B | TSOP48/BGA63 |
| GD9FS1GxFxA | 1Gb | 1.8V | 45ns | x8/x16 | 2KB+128B/64B | 4bit/512B | TSOP48/BGA63 |
| GD9FU2GxFxA | 2Gb | 3V | 20ns | x8/x16 | 2KB+128B/64B | 4bit/512B | TSOP48/BGA63 |
| GD9FS2GxFxA | 2Gb | 1.8V | 25ns | x8/x16 | 2KB+128B/64B | 4bit/512B | TSOP48/BGA63 |
| GD9FU4GxFxA | 4Gb | 3V | 20ns | x8/x16 | 2KB+128B/64B | 4bit/512B | TSOP48/BGA63 |
| GD9FS4GxFxA | 4Gb | 1.8V | 25ns | x8/x16 | 2KB+128B/64B | 4bit/512B | TSOP48/BGA63 |
| GD9FU8GxExA | 8Gb | 3V | 20ns | x8/x16 | 2KB+128B/64B | 4bit/512B | TSOP48/BGA63 |
| GD9FS8GxExA | 8Gb | 1.8V | 25ns | x8/x16 | 2KB+128B/64B | 4bit/512B | TSOP48/BGA63 |
| GD9AU2GxF3A* | 2Gb | 3V | 20ns | x8/x16 | 2KB+64B | Internal 4bit/512B | TSOP48/BGA63 |
| GD9AS2GxF3A* | 2Gb | 1.8V | 25ns | x8/x16 | 2KB+64B | Internal 4bit/512B | TSOP48/BGA63 |
| GD9AU4GxF3A* | 4Gb | 3V | 20ns | x8/x16 | 2KB+64B | Internal 4bit/512B | TSOP48/BGA63 |
| GD9AS4GxF3A* | 4Gb | 1.8V | 25ns | x8/x16 | 2KB+64B | Internal 4bit/512B | TSOP48/BGA63 |
| GD9AU8GxE3A* | 8Gb | 3V | 20ns | x8/x16 | 2KB+64B | Internal 4bit/512B | TSOP48/BGA63 |
| GD9AS8GxE3A* | 8Gb | 1.8V | 25ns | x8/x16 | 2KB+64B | Internal 4bit/512B | TSOP48/BGA63 |