



## 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°C to 125°C
- ◆ Automotive qualified package options



3V/1.8V



65nm/55nm



2Mb~2Gb



-40°C~125°C

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°C to 105°C
- ◆ WSON8 8x6mm package
- ◆ Built-in 4bit ECC



3V/1.8V



38nm



1Gb~4Gb



-40°C~105°C

SPI NOR Flash density expansion solution

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





# High Performance Quad & OctalSPI NOR Flash



## Quad LT/T Product Series

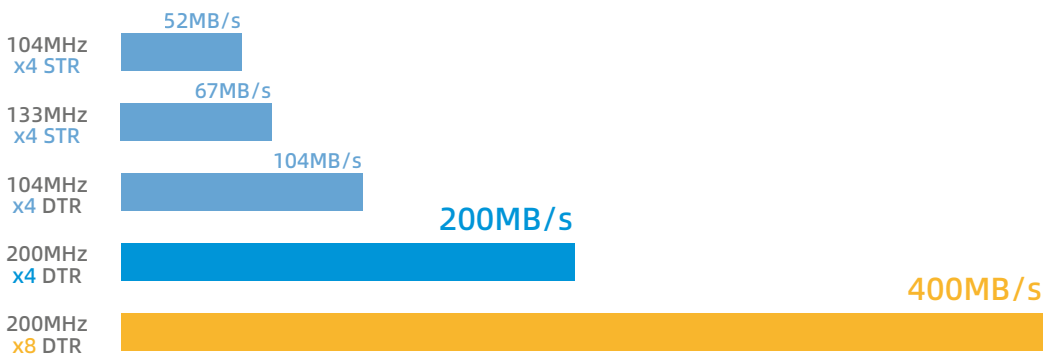
- ◆ 1.8V 256Mb~2Gb, 3V 512Mb~2Gb
- ◆ Single SPI & Quad DTR SPI interface
- ◆ Quad SPI-compatible command set
- ◆ Industry-best Quad I/O read performance with 200MB/s data throughput rate
- ◆ Support "Execute-In-Place"(XIP)
- ◆ DQS and DLP features improve high speed performance
- ◆ ECC and CRC features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

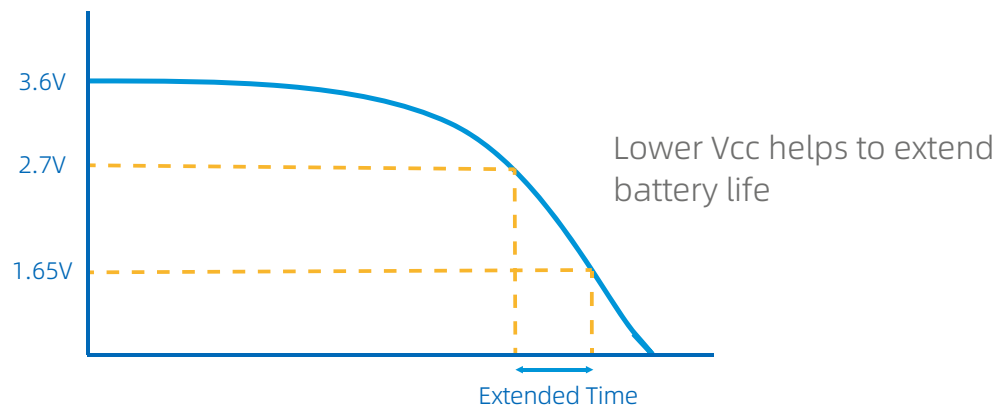
## SPI NOR Flash Read Performance





## 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.



### Main Features



1.65V  
~  
3.6V



Zero standby  
current  
0.1  $\mu$ A (typical)



Single  
Dual  
Quad  
SPI Mode



Read current  
3.5mA



Program current  
15mA



512Kb  
~  
256Mb



USON6 & WLSCP  
Package





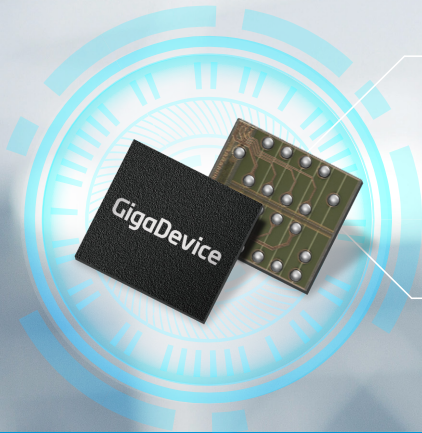
# SPI NOR Flash Memory

## 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 (0.1 $\mu$ A 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





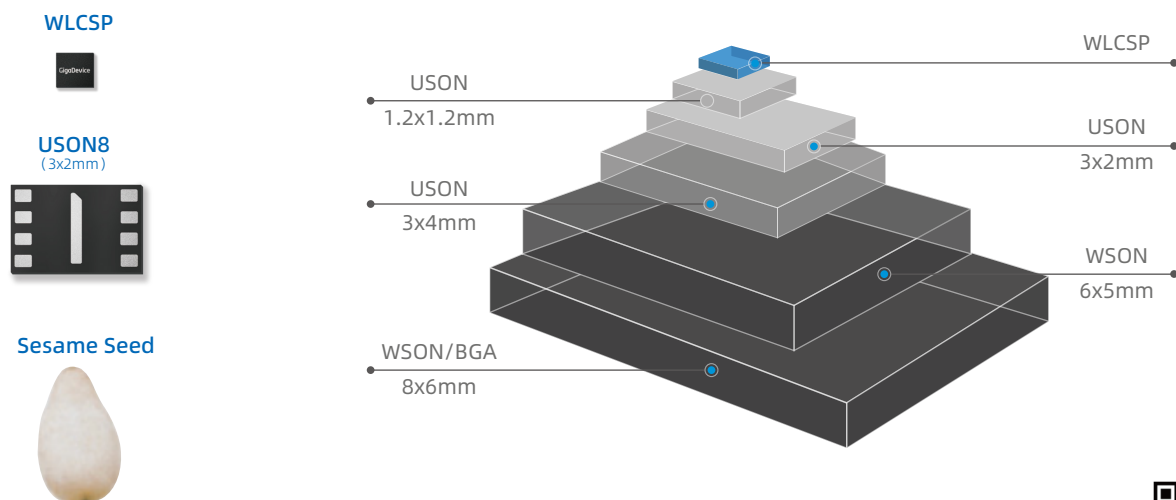
# WLCSP Package

## 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.





## 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°C~85°C

### 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°C~85°C/-40°C~105°C

### 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

