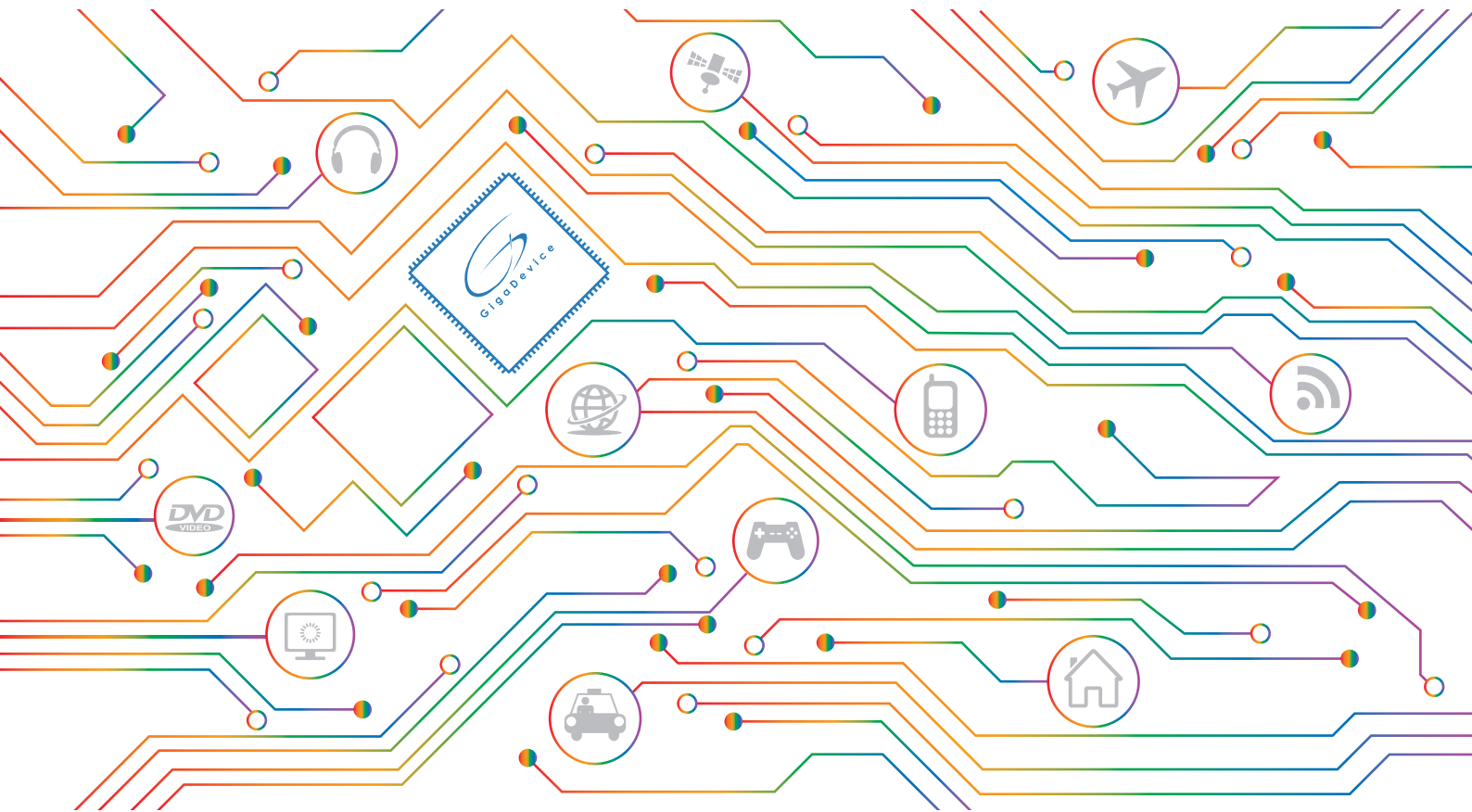




# PRODUCT SELECTION GUIDE

GD32 MCU  
SPI NOR FLASH  
SPI NAND FLASH



## About Us



GigaDevice, established in 2005, is a leading fabless company engaged in advanced memory technology and IC solutions. GigaDevice provides a wide range of high performance Flash memory and 32-bit general-purpose MCU products. GigaDevice is among the companies that pioneered SPI NOR Flash memory and is currently ranked number three in the world in this market segment with more than 1 billion units shipped every year.

Since 2007, GigaDevice is ISO9001 and ISO14001 certified by SGS. GigaDevice has filed 300+ patent applications with 81 patents granted. More than 55% employees are in research and development, which continues to differentiate our products from competitors in the market. The GigaDevice management team embodies leading semiconductor industry experience from renowned memory companies in California's Silicon Valley, Korea, and Taiwan.

GigaDevice currently produces a wide range of SPI NOR Flash, SPI NAND Flash and MCU for use in embedded, consumer, and mobile communications applications. GigaDevice operates a manufacturing model based on strong relationships with: foundry, assembly, and test subcontractor partners. GigaDevice believes this well-defined fabless manufacturing model provides us with a competitive advantage over the conventional fabrication-based Integrated Device Manufacturers because the capital equipment expenditure to maintain advanced memory process technologies is beyond the market return of many IC memory market segments. The consistent investment in advanced equipment by our foundry partners and their rapid growth in 12" wafer capacity are key factors in our success over our competitors.

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# GD32 MCU

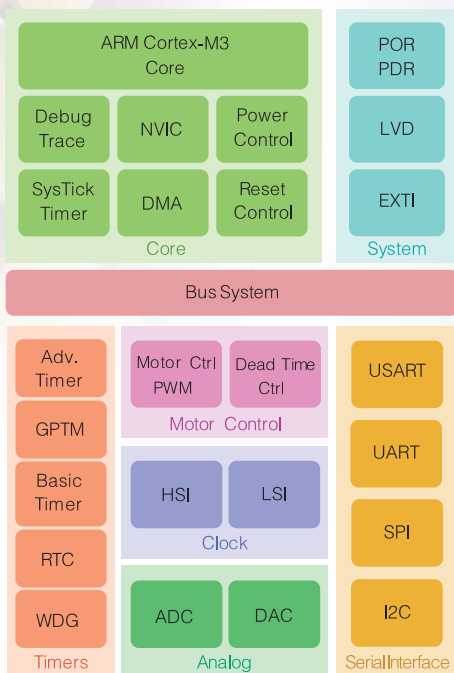
GD32™ is a new 32-bit high-performance, low-power-consumption universal microcontroller family powered by the ARM® Cortex™-M3 RISC core, which is targeted at various MCU application areas. The GD32™ family integrates features that simplify system design and provides customers with a wide range of cost-effective MCU options, each designed with proven technology and great innovation. Building on GigaDevice's advanced patented "gFlash" memory technology and mass production experience, the GD32™ family provides new form of MCUs which offers customer high functionality and quality. GD32™ family includes GD32F103 series of performance line, GD32F101 series of entry line and GD32F105/GD32F107 series of connectivity line currently.

GD32™ MCU incorporates the 32-bit ARM® Cortex™-M3 processor core operating at 108 MHz max frequency with Flash accesses zero wait states to obtain maximum efficiency. It provides up to 3072 KB on-chip Flash memory and up to 96 KB SRAM memory. An extensive range of enhanced I/Os and peripherals connected to two APB buses. The device offers up to three 12-bit 1MSPS ADCs, up to ten general-purpose 16-bit timers plus two PWM advanced timer, as well as standard and advanced communication interfaces: up to three SPIs, two I2Cs, five USARTs, two I2Ss, an USBOTG FS, a SDIO and two CANs. The device operates from a 2.6 to 3.6 V power supply and available in -40 to +85 °C temperature range. Three power saving modes provide the flexibility for maximum optimization between wakeup latency and power consumption, an especially important consideration in low power applications.

GD32™ series of MCUs also brings other advantages to the end-user. The max speed of GD32™ MCU has increased 50% over competing products. Code execution efficiency at the same frequency has enhanced 30%~40%. Current consumption at the same frequency is reduced 20%~30%. This performance provides maximum capability and bandwidth options for numerous market requirements.

The above features make the GD32™ MCUs suitable for a wide range of applications. It is ideal for use in industrial control, user interface, motor drives, power monitor and alarm systems, consumer and handheld equipment, solar photovoltaic control, touch panel, PC peripherals and so on.

## GD32F1 Configuration



### GD32F107 Connectivity Line

108 MHz Frequency	Up to 1 MB Flash	Up to 96KB SRAM	CAN 2.0B	USB 2.0 FS OTG	Ethernet
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### GD32F105 Connectivity Line

108 MHz Frequency	Up to 1 MB Flash	Up to 96KB SRAM	CAN 2.0B	USB 2.0 FS OTG
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### GD32F103 Mainstream Line

108 MHz Frequency	Up to 3 MB Flash	Up to 96KB SRAM	CAN 2.0B	USB 2.0 FS	SDIO
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### GD32F101 Basic Line

56 MHz Frequency	Up to 3 MB Flash	Up to 80KB SRAM
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### GD32F150 Value Line

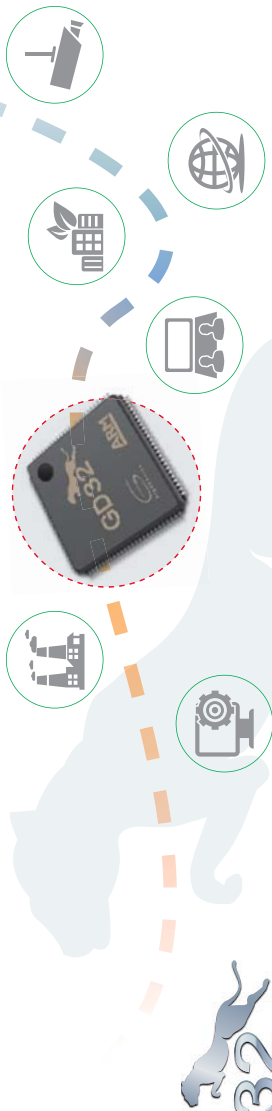
72 MHz Frequency	Up to 64KB Flash	Up to 8KB SRAM	HDMI-CEC	USB 2.0 FS	TSI
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### GD32F130 Value Line

48 MHz Frequency	Up to 64KB Flash	Up to 8KB SRAM
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# GD32 MCU

## GD32F1 series of 32-bit ARM® Cortex™-M3 MCUs Selection Guide



Series	Part No.	Max Speed (MHz)	Memory (Bytes)		I/O	Timer				Connectivity							Analog Interface		Package	
			Flash	SRAM		Advanced TM (16bit)	Basic TM (16bit)	SysTick (24bit)	WDG	RTC	USART (UART)	i2C	SPI	CAN 2.0B/2.0FS	USB	i2S	SDIO	Ether-net		EXMC
GD32F103	GD32F103T4U6	108	16K	6K	up to 26	2	1	1	2	1	2	1	1	1	1	1	1	1	2(10)	QFN36
	GD32F103T6U6	108	32K	10K	up to 26	2	1	1	2	1	2	1	1	1	1	1	1	1	2(10)	QFN36
	GD32F103T8U6	108	64K	20K	up to 26	3	1	1	2	1	2	1	1	1	1	1	1	1	2(10)	QFN36
	GD32F103TBU6	108	128K	20K	up to 26	3	1	1	2	1	2	1	1	1	1	1	1	1	2(10)	QFN36
	GD32F103C4T6	108	16K	6K	up to 37	2	1	1	2	1	2	1	1	1	1	1	1	1	2(10)	LQFP48
	GD32F103C6T6	108	32K	10K	up to 37	2	1	1	2	1	2	1	1	1	1	1	1	1	2(10)	LQFP48
	GD32F103C8T6	108	64K	20K	up to 37	3	1	1	3	1	3	2	2	1	1	1	1	1	2(10)	LQFP48
	GD32F103CBT6	108	128K	20K	up to 37	3	1	1	3	2	3	2	2	1	1	1	1	1	2(16)	LQFP64
	GD32F103R4T6	108	16K	6K	up to 51	2	1	1	2	1	2	1	1	1	1	1	1	1	2(16)	LQFP64
	GD32F103R6T6	108	32K	10K	up to 51	2	1	1	2	1	2	1	1	1	1	1	1	1	2(16)	LQFP64
	GD32F103R8T6	108	64K	20K	up to 51	3	1	1	3	2	3	2	2	1	1	1	1	1	2(16)	LQFP64
	GD32F103RBT6	108	128K	20K	up to 51	3	1	1	3	2	3	2	2	1	1	1	1	1	2(16)	LQFP64
	GD32F103RC16	108	256K	48K	up to 51	4	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP64
	GD32F103RD16	108	384K	64K	up to 51	4	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP64
	GD32F103RE16	108	512K	64K	up to 51	4	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP64
	GD32F103RF16	108	768K	96K	up to 51	10	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP64
	GD32F103RG16	108	1024K	96K	up to 51	10	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP64
	GD32F103RH16	108	2048K	96K	up to 51	10	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP64
	GD32F103RK16	108	3072K	96K	up to 51	10	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP64
	GD32F103V8T6	108	64K	20K	up to 80	3	1	1	3	2	2	1	1	1	1	1	1	1	2(16)	LQFP100
GD32F103V8T6	108	128K	20K	up to 80	3	1	1	3	2	2	1	1	1	1	1	1	1	2(16)	LQFP100	
GD32F103VC16	108	256K	48K	up to 80	4	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP100	
GD32F103VD16	108	384K	64K	up to 80	4	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP100	
GD32F103VF16	108	512K	64K	up to 80	4	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP100	
GD32F103VF16	108	768K	96K	up to 80	10	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP100	
GD32F103VG16	108	1024K	96K	up to 80	10	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP100	
GD32F103VT16	108	2048K	96K	up to 80	10	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP100	
GD32F103VK16	108	3072K	96K	up to 80	10	2	2	5	2	3	1	1	2	1	1	1	1	3(16)	LQFP100	
GD32F103ZC16	108	256K	48K	up to 112	4	2	2	5	2	3	1	1	2	1	1	1	1	3(21)	LQFP144	
GD32F103ZD16	108	384K	64K	up to 112	4	2	2	5	2	3	1	1	2	1	1	1	1	3(21)	LQFP144	
GD32F103ZE16	108	512K	64K	up to 112	4	2	2	5	2	3	1	1	2	1	1	1	1	3(21)	LQFP144	
GD32F103ZF16	108	768K	96K	up to 112	10	2	2	5	2	3	1	1	2	1	1	1	1	3(21)	LQFP144	
GD32F103ZG16	108	1024K	96K	up to 112	10	2	2	5	2	3	1	1	2	1	1	1	1	3(21)	LQFP144	
GD32F103ZH16	108	2048K	96K	up to 112	10	2	2	5	2	3	1	1	2	1	1	1	1	3(21)	LQFP144	
GD32F105R8T6	108	64K	20K	up to 51	4	1	1	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP64	
GD32F105RB16	108	128K	20K	up to 51	4	1	1	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP64	
GD32F105RC16	108	256K	48K	up to 51	4	1	1	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP64	
GD32F105RD16	108	384K	64K	up to 51	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP64	
GD32F105RE16	108	512K	64K	up to 51	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP64	
GD32F105RF16	108	768K	96K	up to 51	10	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP64	
GD32F105RG16	108	1024K	96K	up to 51	10	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP64	
GD32F105V8T6	108	64K	20K	up to 80	4	1	1	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105V8T6	108	128K	20K	up to 80	4	1	1	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VB16	108	256K	48K	up to 80	4	1	1	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VBT6	108	384K	64K	up to 80	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VCT6	108	512K	64K	up to 80	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VDT6	108	768K	96K	up to 80	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VFT6	108	1024K	96K	up to 80	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VGT6	108	256K	48K	up to 80	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VHT6	108	384K	64K	up to 80	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VIT6	108	512K	64K	up to 80	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105VJT6	108	768K	96K	up to 80	4	2	2	5	2	2	1	1	2	1	1	1	1	2(16)	LQFP100	
GD32F105ZG16	108	1024K	96K	up to 112	10	2	2	5	2	2	1	1	2	1	1	1	1	3(21)	LQFP144	
GD32F107R816	108	128K	96K	up to 51	4	1	1	5	2	1	1	1	2	1	1	1	1	2(16)	LQFP64	



# SPI NOR Flash

## GD SPI NOR Flash Features

### 3.0V

- ◆ **Single Power Supply Voltage**
  - Voltage range: 2.7V~3.6V
- ◆ **High Speed Clock Frequency**
  - Maximum 120MHz for fast read with 30pF load\*
  - Dual I/O Data transfer up to 240Mbits/s
  - Quad I/O Data transfer up to 480Mbits/s
- ◆ **Flexible Memory Architecture**
  - Sector Size: 4K Bytes
  - Block Size: 32/64K Bytes

### 2.5V

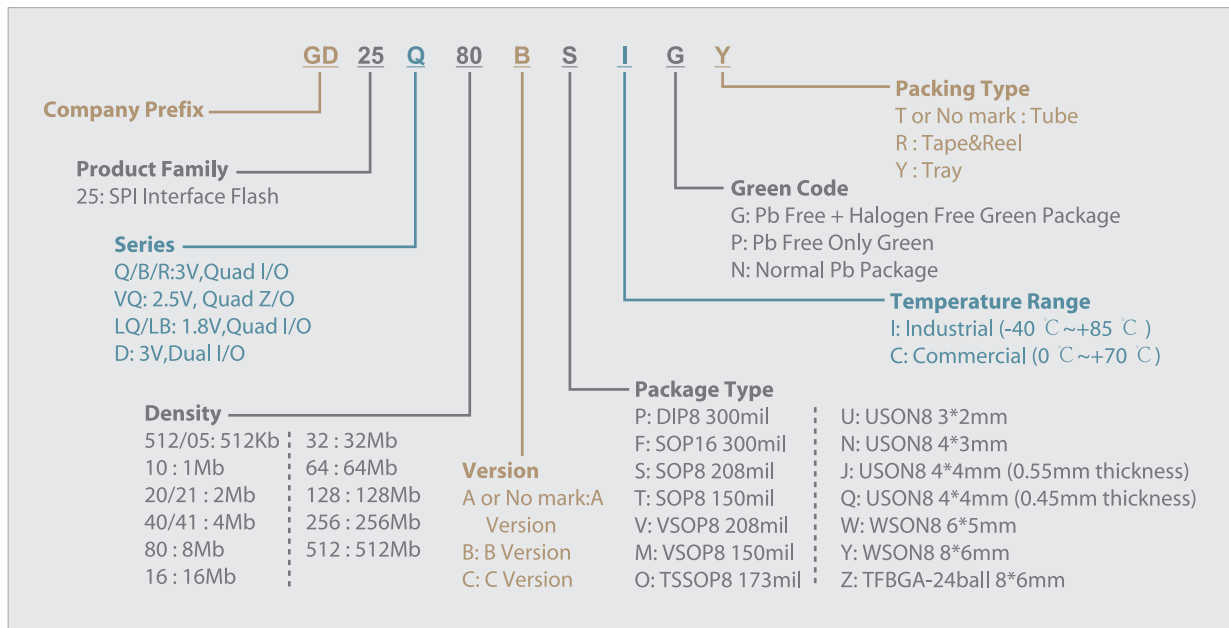
- ◆ **Single Power Supply Voltage**
  - Voltage range: 2.3V~3.6V
- ◆ **High Speed Clock Frequency**
  - Maximum 104MHz for fast read with 30pF load
  - Dual I/O Data transfer up to 208Mbits/s
  - Quad I/O Data transfer up to 416Mbits/s
- ◆ **Flexible Memory Architecture**
  - Sector Size: 4K Bytes
  - Block Size: 32/64K Bytes

### 1.8V

- ◆ **Single Power Supply Voltage**
  - Voltage range: 1.65V~1.95V
- ◆ **High Speed Clock Frequency**
  - 120MHz for fast read with 30pF load
  - Dual I/O Data transfer up to 240Mbits/s
  - Quad I/O Data transfer up to 480Mbits/s
  - QPI Data transfer up to 480Mbits/s
  - Continuous Read With 8/16/32/64-Byte Wrap
- ◆ **Flexible Memory Architecture**
  - Sector Size: 4K Bytes
  - Block Size: 32/64K Bytes

\* This feature is not available on GD25Q128C and GD25B128C.

## GD SPI NOR Flash Example





## GD SPI NOR Flash Feature list

Flash Type	3.0V									2.5V	1.8V			
Family	GD25Q				GD25B		GD25R		GD25D	GD25VQ	GD25LQ		GD25LB	
Part No.	xx	x1B	xxB	xxC	xxB	xxC	xxB	xxC	xxB	x1B	xx/ xxB	xxC	xx	xxC
Single I/O (1-1-1)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Dual Output (1-1-2)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Dual I/O (1-2-2)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Quad Output (1-1-4)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Quad I/O (1-4-4)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
QPI (4-4-4)				•*		•*		•*				•	•	•
HOLD# Pin	•	•	•	•						•	•	•		
H/W Reset (RESET Pin)				•*										
S/W Reset				•		•		•				•	•	•
H/W Write Protection (WP# Pin)	•	•	•	•					•	•	•	•		
S/W Write Protection	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Enhanced Block Protection		•	•	•	•	•	•	•		•	•	•	•	•
Volatile & Non-volatile Status Register Bits		•		•		•		•		•	•	•	•	•
Output Driver Strength				•		•		•						
Security Registers with OTP locks		•	•	•		•		•		•	•	•	•	•
SFDP Register				•	•	•	•	•				•	•	•

\* Only available in 128Mb device.






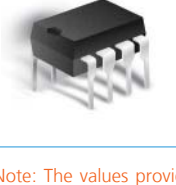
## GD SPI NOR Flash Product list

Part No.	Density	Voltage	Organization	I/O Bus	Frequency (MHz)	Packages
GD25Q512MC	512Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	WS0N8 8x6mm
GD25Q256C	256Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP16 300mil WS0N8 8x6mm
GD25Q128C	128Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 208mil VSOP8 208mil DIP8 300mil TFBGA -24ball 8x6mm (4x6ball array) SOP16 300mil WS0N8 6x5mm WS0N8 8x6mm
GD25B128C	128Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 208mil WS0N8 6x5mm DIP8 300mil
GD25R128C	128Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 208mil
GD25Q64B*	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil TFBGA -24ball 8x6mm (4x6ball array) SOP16 300mil WS0N8 6x5mm
GD25Q64C	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil TFBGA -24ball 8x6mm (4x6ball array) SOP16 300mil WS0N8 6x5mm
GD25B64B*	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil WS0N8 6x5mm
GD25B64C	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil WS0N8 6x5mm
GD25R64B*	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25R64C	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25Q32B*	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil TFBGA -24ball 8x6mm (4x6ball array) WS0N8 6x5mm
GD25Q32C	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil TFBGA -24ball 8x6mm (4x6ball array) WS0N8 6x5mm
GD25B32B*	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil WS0N8 6x5mm
GD25B32C	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil WS0N8 6x5mm
GD25R32B*	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25Q16B	16Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil SOP8 208mil DIP8 300mil US0N8 4x4mm WS0N8 6x5mm
GD25B16B	16Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil WS0N8 6x5mm
GD25Q80B	8Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil SOP8 208mil DIP8 300mil US0N8 3x2mm
GD25Q41B	4Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil TSSOP8 173mil SOP8 208mil US0N8 3x2mm
GD25Q21B	2Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil TSSOP8 173mil SOP8 208mil US0N8 3x2mm
GD25Q10*	1Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil TSSOP8 173mil US0N8 3x2mm
GD25D10B	1Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual Output	80MHz(x1, x2)	SOP8 150mil TSSOP8 173mil US0N8 3x2mm
GD25Q512*	512Kb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil TSSOP8 173mil US0N8 3x2mm
GD25D05B	512Kb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual Output	80MHz(x1, x2)	SOP8 150mil TSSOP8 173mil US0N8 3x2mm
GD25VQ41B	4Mb	2.3V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil TSSOP8 173mil SOP8 208mil US0N8 3x2mm VSOP8 150mil
GD25VQ21B	2Mb	2.3V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil TSSOP8 173mil SOP8 208mil US0N8 3x2mm VSOP8 150mil
GD25LQ256C	256Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	WS0N8 6x5mm
GD25LQ128C	128Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	WS0N8 6x5mm VSOP8 208mil
GD25LB128C	128Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25LQ64C	64Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	133MHz(x1, x2, x4)	VSOP8 208mil SOP8 208mil WS0N8 6x5mm
GD25LB64C	64Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	133MHz(x1, x2, x4)	SOP8 208mil
GD25LQ32C	32Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	133MHz(x1, x2, x4)	VSOP8 208mil SOP8 208mil WS0N8 6x5mm US0N8 4x4mm
GD25LB32C	32Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	133MHz(x1, x2, x4)	SOP8 208mil
GD25LQ16	16Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	VSOP8 150mil SOP8 150mil SOP8 208mil VSOP8 208mil US0N8 4x3mm WS0N8 6x5mm
GD25LB16	16Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25LQ80	8Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	VSOP8 150mil SOP8 150mil SOP8 208mil VSOP8 208mil US0N8 4x3mm WS0N8 6x5mm
GD25LQ40	4Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	VSOP8 150mil SOP8 150mil SOP8 208mil VSOP8 208mil US0N8 4x3mm WS0N8 6x5mm

\* Not recommended for new design



# Flash Package Options

	<b>SOP8 150mil</b> Length(Normal)   4.90 Width(Normal)   6.00 Thickness(Max)   1.75 Pitch(Normal)   1.27   mm
	<b>SOP8 208mil</b> Length(Normal)   5.23 Width(Normal)   7.90 Thickness(Max)   2.16 Pitch(Normal)   1.27   mm
	<b>VSOP8 150mil</b> Length(Normal)   4.90 Width(Normal)   6.00 Thickness(Max)   0.90 Pitch(Normal)   1.27   mm
	<b>VSOP8 208mil</b> Length(Normal)   5.28 Width(Normal)   7.90 Thickness(Max)   1.00 Pitch(Normal)   1.27   mm
	<b>TSSOP8 173mil</b> Length(Normal)   2.96 Width(Normal)   6.40 Thickness(Max)   1.20 Pitch(Normal)   0.65   mm
	<b>SOP16 300mil</b> Length(Normal)   10.30 Width(Normal)   10.35 Thickness(Max)   2.75 Pitch(Normal)   1.27   mm
	<b>DIP8 300mil</b> Length(Normal)   9.32 Width(Normal)   7.94 Thickness(Max)   3.50 Pitch(Normal)   2.54   mm

	<b>USON8 3*2mm</b> Length(Normal)   3.00 Width(Normal)   2.00 Thickness(Max)   0.60 Pitch(Normal)   0.50   mm
	<b>USON8 4*3mm</b> Length(Normal)   4.00 Width(Normal)   3.00 Thickness(Max)   0.60 Pitch(Normal)   0.80   mm
	<b>USON8 4*4mm (0.55mm)</b> Length(Normal)   4.00 Width(Normal)   4.00 Thickness(Max)   0.60 Pitch(Normal)   0.80   mm
	<b>USON8 4*4mm (0.45mm)</b> Length(Normal)   4.00 Width(Normal)   4.00 Thickness(Max)   0.50 Pitch(Normal)   0.80   mm
	<b>WSON8 6*5mm</b> Length(Normal)   6.00 Width(Normal)   5.00 Thickness(Max)   0.80 Pitch(Normal)   1.27   mm
	<b>WSON8 8*6mm</b> Length(Normal)   8.00 Width(Normal)   6.00 Thickness(Max)   0.80 Pitch(Normal)   1.27   mm
	<b>TFBGA-24ball 8*6mm</b> Length(Normal)   8.00 Width(Normal)   6.00 Thickness(Max)   1.20 Pitch(Normal)   1.00   mm

Note: The values provided are the normal values for length, width and pitch, as well as the max values for thickness.

# MCU Package Options

<b>LQFP144 (20x20mm)</b>	<b>LQFP100 (14x14mm)</b>	<b>LQFP64 (10x10mm)</b>	<b>LQFP48 (7x7mm)</b>	<b>QFN36 (6x6mm)</b>	<b>QFN32 (5x5mm)</b>	<b>QFN28 (4x4mm)</b>	<b>TSSOP20 (6.5x4.4mm)</b>
							

# SPI NAND Flash

## GD SPI NAND Flash Features

### 3.0V

- ◆ Power Supply Voltage: 2.7V~3.6V
- ◆ High Speed Clock Frequency
  - 120MHz for fast read with 30PF load
  - Quad I/O Data transfer up to 480Mbits/s
- ◆ Flexible Memory Architecture
  - 1Gbit & 2Gbit:**
    - 2048-Byte page for read and program, spare area 128-Byte
    - (128K + 8K)-Byte per block for erase
  - 4Gbit:**
    - 4096-Byte page for read and program, spare area 256-Byte
    - (256K + 16K)-Byte per block for erase
- ◆ Enhanced Access Performance
  - 2K-Byte cache for fast random read for 1G & 2G
  - 4K-Byte cache for fast random read for 4G
  - Cache read and cache program
- ◆ Advanced Feature for NAND
  - Internal ECC option
  - Internal data move by page with ECC
  - Promised good block0 with ECC

### 1.8V

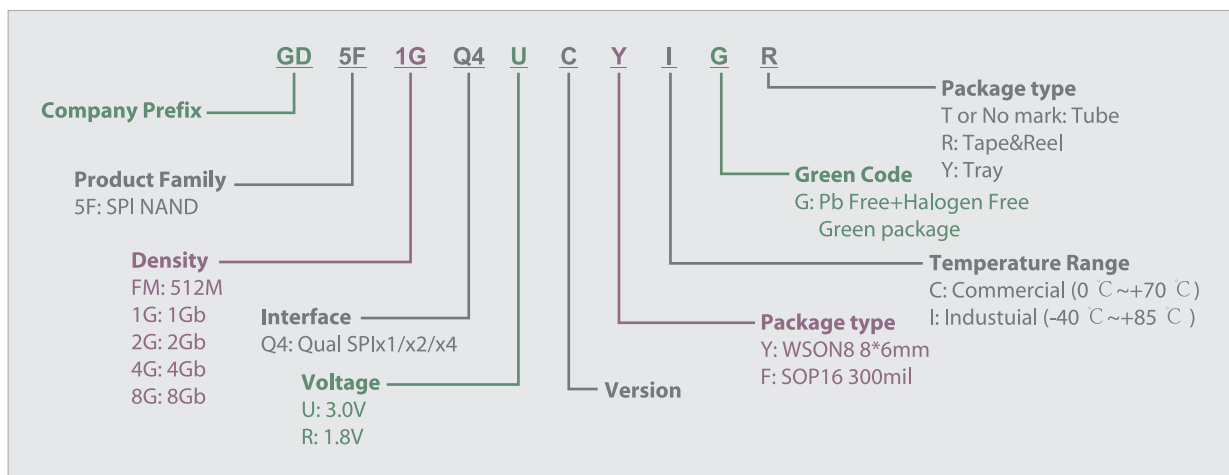
- ◆ Power Supply Voltage: 1.7V~2.0V
- ◆ High Speed Clock Frequency
  - 120MHz for fast read with 30PF load
  - Quad I/O Data transfer up to 480Mbits/s
- ◆ Flexible Memory Architecture
  - 1Gbit & 2Gbit:**
    - 2048-Byte page for read and program, spare area 128-Byte
    - (128K + 8K)-Byte per block for erase
  - 4Gbit:**
    - 4096-Byte page for read and program, spare area 256-Byte
    - (256K + 16K)-Byte per block for erase
- ◆ Enhanced Access Performance
  - 2K-Byte cache for fast random read for 1G & 2G
  - 4K-Byte cache for fast random read for 4G
  - Cache read and cache program
- ◆ Advanced Feature for NAND
  - Internal ECC option
  - Internal data move by page with ECC
  - Promised good block0 with ECC

## GD SPI NAND Flash Product List

Part No.	Density	Package
		WSON8 8*6mm
GD5F4GQ4UCYIG	4Gb	•
GD5F2GQ4UCYIG	2Gb	•
GD5F1GQ4UCYIG	1Gb	•

Part No.	Density	Package
		WSON8 8*6mm
GD5F4GQ4RCYIG	4Gb	•
GD5F2GQ4RCYIG	2Gb	•
GD5F1GQ4RCYIG	1Gb	•

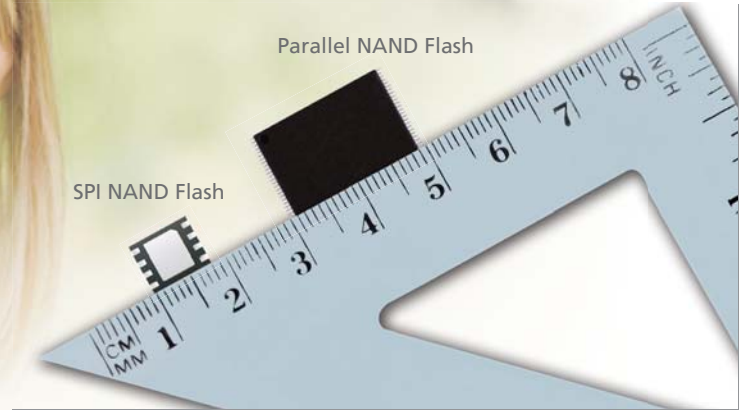
## GD SPI NAND Flash Example





### Advantages – Small Size

Reduce Package cost



### Advantages – Less Pin

Reduce Core Chip Cost

Fewer pins required by SPI NAND reduces the Core Chip pin count.



SPI NAND Flash

27/48

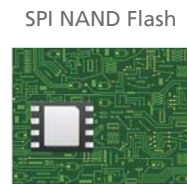


Parallel NAND Flash

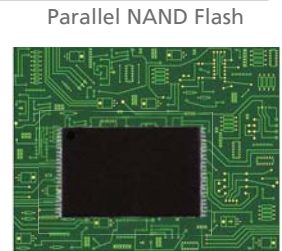
### Advantages – PCB cost

Reduced pin count Core Chip and small SPI NAND Flash chip result in smaller PCB area and cost reduction.

Reduce PCB Cost



SPI NAND Flash



Parallel NAND Flash

### Advantages – Design

Reduce PCB difficulty  
Cut down design cycles

Less pins than Parallel NAND Flash, help make it easier for layout, reduce PCB design difficulty, Cut down design cycles of electronic products.

Design based on SPI NAND Flash



Design based on Parallel NAND Flash



## GigaDevice Semiconductor (Beijing) Inc.

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### Beijing Headquarter

Add: A12, USTB Techart Plaza, Xueyuan Road 30,  
Haidian District, Beijing, China  
Tel: +86-10-82881666  
Fax: +86-10-82881668  
E-mail: [info@gigadevice.com](mailto:info@gigadevice.com)

### Shanghai Office

Add: Room 603, Tianshan Road 18, Zhaoyi Science  
Zone, Shanghai, China  
Tel: +86-21-32567770  
Fax: +86-21-32567770-803  
E-mail: [info@gigadevice.com](mailto:info@gigadevice.com)

Add: Room 1515, 5F, Building 1, Guoshoujing Road  
498, Zhangjiang High-Tech Park, Pudong New Area,  
Shanghai, China  
Tel: +86-21-50395591  
Fax: +86-21-50395591-803  
E-mail: [info@gigadevice.com](mailto:info@gigadevice.com)

### Shenzhen Office

Add: 2209 Main Building of Tianan Cyber Times,  
Chegongmiao, Futian District, Shenzhen, China  
Tel: +86-775-83438655  
Fax: +86-775-83438655-801  
E-mail: [info@gigadevice.com](mailto:info@gigadevice.com)

### Hefei Office

Add: Fanhua Avenue 266, Economic & Technological  
Development Area, Hefei, Anhui, China  
Tel: +86-551-68999734  
E-mail: [info@gigadevice.com](mailto:info@gigadevice.com)

### Taiwan Office

Add: Room 3, 9F., Songde Rd 65., Xinyi Dist., Taipei  
City 11075, Taiwan (R.O.C.)  
Tel: +886-2-27277210  
Fax: +886-2-27277216  
E-mail: [info@gigadevice.com](mailto:info@gigadevice.com)

### USA Office

Add: 2975 Bowers Ave, Suite 323, Santa Clara, CA  
95051 USA  
Tel: +1-408-596-3166  
E-mail: [info@gigadevice.com](mailto:info@gigadevice.com)

### Korea Office

WingCore Technology Inc.  
Add: Room 109, Business Incubator Center, Korea  
Electronics Technology Institute (KETI), Yatap-dong 68,  
Bundang-gu, Seongnam, Gyeonggi-do, Korea,  
463-816  
Tel: +82-31-701-0824  
Fax: +82-31-705-0824  
E-mail: [robert@wingcore.com](mailto:robert@wingcore.com)

### Japan Office

Add: No.15 Yokohama World Business Support Center  
6th Floor, Yokohama World Porters, 2-2-1 Shinkou,  
Naka-ku, Yokohama, 231-0001, Japan  
Tel: +81-45-319-4268  
Fax: +81-45-319-4268  
E-mail: [info@gigadevice.com](mailto:info@gigadevice.com)