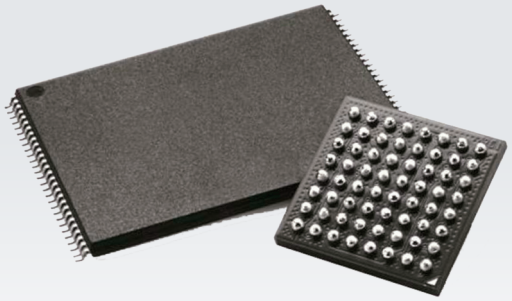
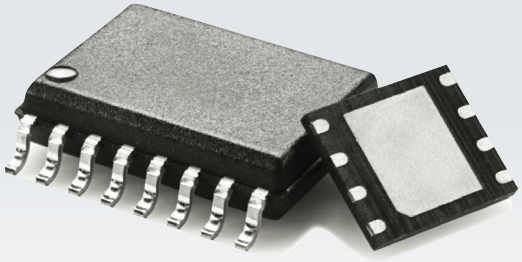
# Spansion® Product Selector Guide
# January 2014



**Parallel NOR Flash**



**Serial NOR Flash**


**SLC NAND Flash**

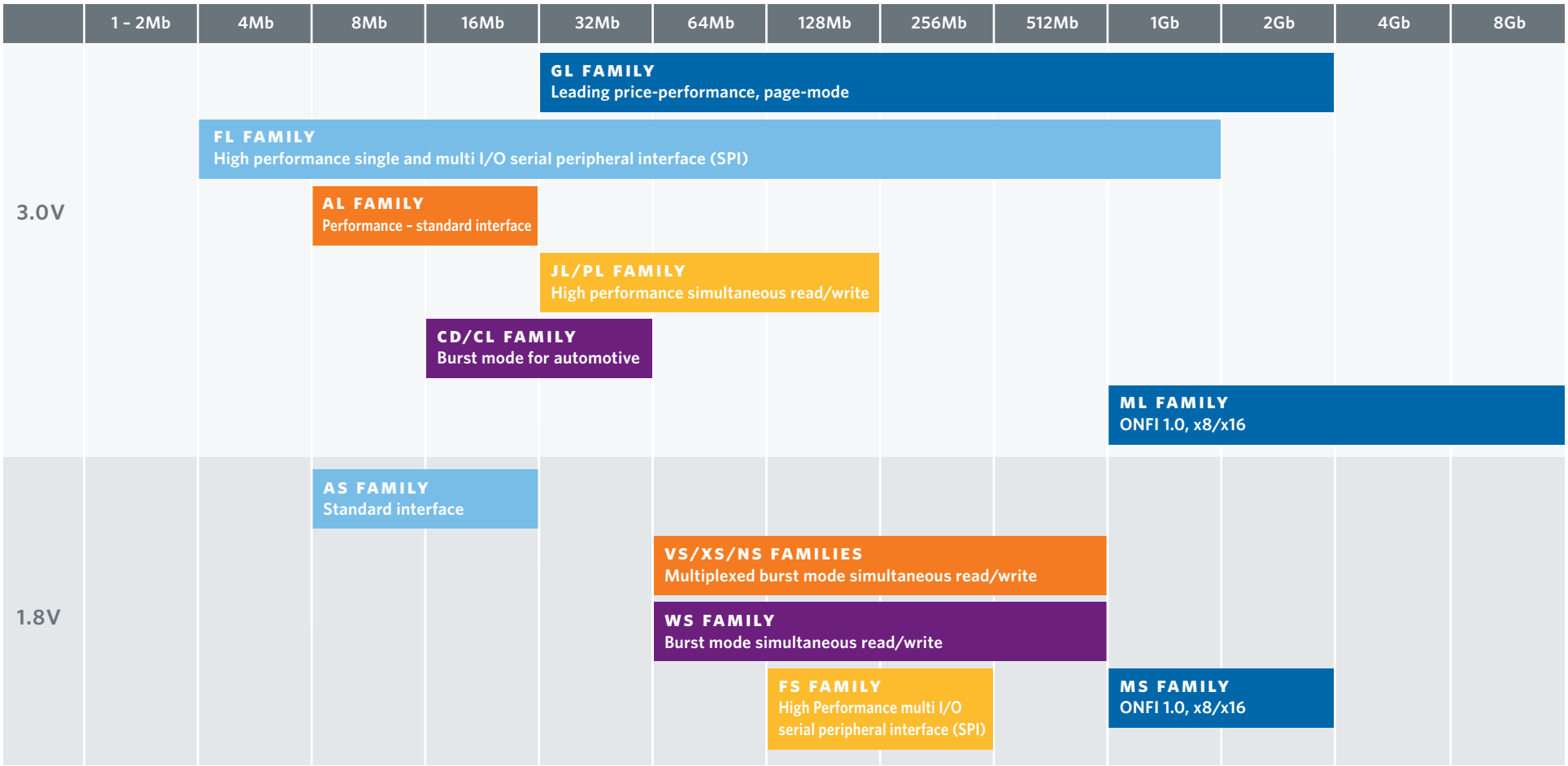
SPANSION®

# Spansion® Products Portfolio

Spansion offers a wide range of NOR Flash memory solutions in multiple voltages, densities and packages expressly designed and optimized for embedded and mobile applications, including:

- → Automotive
- → Consumer electronics
- → Gaming
- → Industrial equipment
- → Machine-to-Machine
- → Networking
- → PC and peripherals
- → Set-top box
- → Telecom
- → Wireless

**BROAD FLASH PORTFOLIO: 1Mb TO 8Gb; 3V AND 1.8V SOLUTIONS**



# Spansion Flash Memory Guide

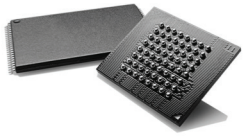
| PROCESS NODE | 110nm | 110nm | 90nm | 90nm | 65nm | 65nm | 48nm | 41nm | 32nm |
|---|---|---|---|---|---|---|---|---|---|
| **ARCHITECTURE** | **Floating Gate** | **MirrorBit®** | **Floating Gate** | **MirrorBit** | **MirrorBit** | **MirrorBit Eclipse™** | **Floating Gate NAND** | **Floating Gate NAND** | **Floating Gate NAND** |
| **FEATURES** | **PRODUCT NOMENCLATURE** | | | | | | | | |
| 1.8V, burst mode, SRW[1], de-multiplex ADP interface | | | | WS-P | WS-R | | | | |
| 1.8V, burst mode, SRW, multiplex ADM interface | | | | NS-P | VS-R | | | | |
| 1.8V, burst mode, SRW, AADM interface | | | | | XS-R | | | | |
| 1.8V, standard NOR, de-multiplex ADP interface | AS-J | | | | | | | | |
| 2.5V, burst mode, de-multiplex ADP interface | CD-J | | | | | | | | |
| 3.0V, burst mode, de-multiplex ADP interface | CL-J | | | | | | | | |
| 3.0V, SRW, de-multiplex ADP interface | JL-J | | | | | | | | |
| 3.0V, page mode, SRW, de-multiplex ADP interface | PL-J | | | | | | | | |
| 3.0V, page mode, de-multiplex ADP interface | | GL-N | | GL-P | | GL-S | | | |
| 3.0V, standard NOR, de-multiplex ADP interface | AL-J | | | | | | | | |
| 3.0V, Serial Pheripheral Interface (SPI) | | | FL1-K<br>FL2-K | FL-P | | FL-S | | | |
| 1.8V Serial Peripheral Interface (SPI) | | | | | | FS-S | | | |
| 1.8V, ONFI 1.0, x8/x16 | | | | | | | MS-1 | MS-1 | MS-2 |
| 3.0V, ONFI 1.0, x8/x16 | | | | | | | ML-1 | ML-1 | ML-2 |

Bus Types – ADP: Address Data Parallel, ADM: Address Data Multiplexed, AADM: Address high, Address low, Data Multiplexed, SPI: Serial Peripheral Interface

1) SRW: Simultaneous Read/Write

# Spansion GL Family

## 32Mb – 2Gb, 3V NOR FLASH MEMORY



Spansion GL family is optimized for the voltage, density, cost-per-bit, reliability, performance and scalability needs of a wide variety of embedded applications. With densities from 32Mb to 2Gb, each device requires only a single 3.0V power supply for read and write functions and is entirely command set compatible with the JEDEC Flash standards. The Spansion GL family supports Spansion's Universal Footprint, which provides one footprint across all densities, product families and process technologies allowing manufacturers to design a single platform and simply scale Flash memory capacity up or down, depending on the features and functionality of the target end system.

### KEY APPLICATIONS

- Automotive navigation
- Communications infrastructure equipment
- Gaming
- Industrial control
- Handsets
- Set-top box
- Consumer

### PACKAGES
### UNIVERSAL FOOTPRINT

- RoHS-compliant lead-free available
- 56-pin TSOP package
- 56-ball FBGA*
- 64-ball fortified BGA package
- Wafer and die form

| KEY DEVICE FEATURES | |
|---|---|
| VOLTAGE | 3.0V |
| DENSITIES | 32Mb – 2Gb |
| INTERFACE | Page mode |
| BUS | x8 or x16, x16 only* |
| SECTOR TYPE | Uniform |
| ACCESS TIME | 70** – 130ns |
| PAGE MODE ACCESS MODE | 15-30ns, 8 word/16 word* |
| TEMPERATURE RANGE | 0°C to +70°C<br>-40°C to +85°C<br>-40°C to +105°C* |
| SECURITY | Advanced sector protection |

* For GL-S
**For GL064S

# Spansion FL Family

## 4Mb – 1Gb, 3V SERIAL FLASH MEMORY

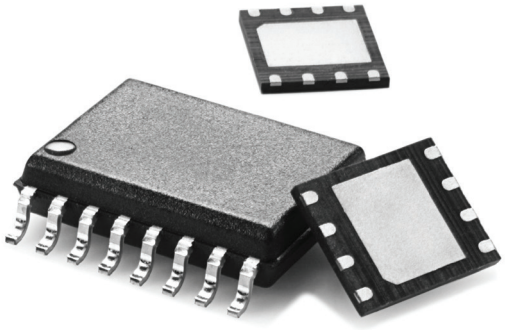
Spansion FL Serial Flash family offers the highest density SPI flash and supports lower pin counts, enables lower overall system cost and offers fast read/write performance. These benefits coupled with a flexible sector architecture makes the Spansion FL family an ideal solution for a variety of industrial, consumer electronics and automotive applications, with performance that matches or in some cases, exceeds conventional parallel I/O NOR flash memory. The Spansion FL-S SPI family offers increased levels of read/write performance and functionality with an enhanced feature set, delivering an effective data throughput of up to 80MBytes/sec while maintaining backward compatibility with legacy solutions, enabling easy migrations.

### KEY APPLICATIONS

- Digital TV
- DVD players/recorders
- Set-top box
- High-end printers
- DSL modems
- Optical disk drives
- Wireless LANs
- Automotive Infotainment/Clusters

### PACKAGES

- Industry standard, SOIC, USON/WSON and BGA
- Wafer and die form



| KEY DEVICE FEATURES | |
|---|---|
| VOLTAGE | 2.7-3.6V Vcc (All)<br>1.65-3.6V $V_{IO}$ (FL-S) |
| DENSITIES | 4Mb – 1Gb |
| INTERFACE | x1, x2, x4 |
| SECTOR TYPE | Uniform 4KB, Uniform 64KB, Uniform 256KB (128Mb – 1Gb FL-S) |
| PERFORMANCE | Up to 133MHz (Single I/O)<br>Up to 104MHz (Dual/Quad I/O)<br>Up to 80MHz (DDR) |
| TEMPERATURE RANGE | -40°C to +85°C<br>-40°C to +105°C |
| SECURITY | Advanced sector protection, OTP region, Security registers with OTP lock down, software/hardware protection modes, Unique ID |

# Spansion FS Family

## 128Mb – 256Mb, 1.8V SERIAL FLASH MEMORY

Spansion FS Serial Flash memory offers a reduced pin count for lower system cost while providing optimal read/write performance for a variety of networking, mobile, consumer electronics and industrial applications. With read speeds up to 133 MHz clock speed in Single/Dual/Quad I/O mode and 80 MHz for double data rate (DDR) modes, the FS family delivers up to 80 MBytes/sec of read throughput. In addition, industry leading Programming performance of up to 1.08 MBytes/s speeds manufacturing throughput and lowers programming costs dramatically.

### KEY APPLICATIONS

- Network Storage
- FPGAs
- Smart Meters
- Automotive
- Printers
- Medical
- Digital Cameras
- Feature phones
- Bluetooth

### PACKAGES

- Industry standard SOIC, WSON and BGA
- Wafer and die form

| KEY DEVICE FEATURES | |
|---|---|
| VOLTAGE | 1.70 – 2.0V |
| DENSITIES | 128Mb – 256Mb |
| INTERFACE | x1, x2, x4 |
| SECTOR TYPE | 8x4kB and 1x32kB at top/bottom with all remaining sectors 64kB; option of uniform 256KB or uniform 64kB |
| TEMPERATURE RANGE | -40°C to +85°C<br>-40°C to +105°C* |
| SECURITY | Advance sector protection, OTP region, Security registers with OTP lock down, software/hardware protection modes, Unique ID |

# Spansion CD/CL Families

## 32Mb – 64Mb, 2.5/3.0V BURST MODE NOR FLASH MEMORY

Spansion's burst NOR CD and CL families are optimized to withstand harsh under-the-hood automotive environments while maintaining high reliability and high performance. In addition to burst frequency support of up to 75 MHz, the Spansion CD and CL families offer a wide x32 data bus and extended temperature support. These features and a high-reliability technology node can help enable the next generation of infotainment and navigation/telematic devices.

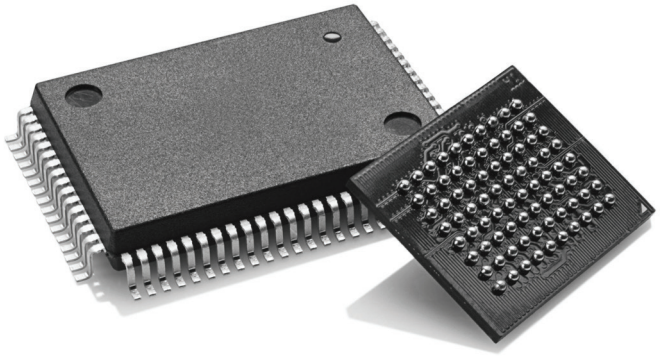
### KEY APPLICATIONS

- Automotive under-the-hood
- Automotive in-cabin

### PACKAGES

- 80-pin PQFP
- 80-ball Fortified BGA
- Wafer and die form

| KEY DEVICE FEATURES | |
|---|---|
| VOLTAGE | 2.5V (CD) and 3.0V (CL) |
| DENSITIES | 16Mb – 32Mb |
| BUS | x32 |
| SECTOR TYPE | Top/Bottom boot |
| BURST FREQUENCY | Up to 75 MHz |
| TEMPERATURE RANGE | -40°C to +125°C, -40°C to +145°C (on die/wafer products) |
| SECURITY | OTP region, advanced sector protection |



# Spansion AL/JL/PL Families

## 8Mb – 128Mb, 3.0V NOR FLASH MEMORY

Spansion offers a broad line of 3V parallel NOR devices on a high-reliability technology node with an array of features to meet the needs of a wide variety of embedded applications. The 3.0V Spansion AL family devices are standard mode Flash with low density offerings and extended temperature support. The 3.0V Spansion JL family devices offer two and four bank memory configurations to allow performance gains via simultaneous read-write operations. The 3.0V Spansion PL family devices not only provide the benefits of a four-bank configuration, but also support page mode operations which further increases data throughput to improve system performance.

**KEY DEVICE FEATURES**

| | AL | JL | PL |
|---|---|---|---|
| VOLTAGE | 3.0V | 3.0V | 3.0V |
| DENSITIES | 8Mb – 16Mb | 32Mb – 64Mb | 32Mb – 128Mb |
| BUS | x8/x16 | x8/x16 | x16 |
| SECTOR TYPE | Top/Bottom/ Uniform boot | Top/Bottom boot | Dual boot |
| ACCESS TIME | 55 – 90ns | 55 – 70ns | 55 – 70ns |
| PAGE MODE ACCESS TIME | N/A | N/A | 25 – 30ns, (8 word) |
| BANKS | 1 | 2 – 4 | 4 |
| TEMPERATURE RANGE | -40°C to +85°C, -40°C to +125°C | -40°C to +85°C | -25°C to +85°C, -40°C to +85°C |
| SECURITY | OTP region | OTP region | OTP region |
| PACKAGES | 48-ball 64-ball BGA 48-pin TSOP Wafer and die form | 48-pin TSOP 48-ball BGA Wafer and die form | 48-ball 56-ball 64-ball 80-ball BGA 56-pin TSOP |

# Spansion AS Family

## 8Mb – 16Mb, 1.8V NOR FLASH MEMORY

The 1.8V Spansion AS family is optimized for performance and reliability. In addition to a fast initial access time of 70ns, the AS family offers low power consumption and a fast program speed which is ideal for a wide variety of embedded applications. Based on a proven 110nm Floating Gate process technology, the reliability of the AS family also makes it suitable for use in automotive-grade applications.

### KEY APPLICATIONS

- Handheld navigation
- Bluetooth
- Personal media players

### PACKAGES

- 48-pin TSOP
- 48-ball BGA (0.8mm pitch and 0.5mm pitch)
- Wafer and die form

**KEY DEVICE FEATURES**

| | |
|---|---|
| VOLTAGE | 1.8V |
| DENSITIES | 8Mb – 16Mb |
| INTERFACE | Standard NOR |
| BUS | x8/x16 |
| SECTOR TYPE | Top/Bottom boot |
| ACCESS TIME | 70ns |
| TEMPERATURE RANGE | -40°C to +85°C |
| SECURITY | Secured Silicon Region, 256-byte OTP sector for permanent, secure identification |

# Spansion WS/NS/VS/XS Families

## 64Mb – 512Mb, 1.8V, BURST MODE, SIMULTANEOUS READ/WRITE, NOR FLASH MEMORY

Spansion WS/NS/VS/XS Flash memory families offer high density, high reliability and performance-enhancing features making them the ideal solution for multimedia rich mobile applications. The product lines feature 1.8V, multi-bank, fast access with burst mode, and simultaneous read/write operation with product density scaling from 64Mb to 512Mb. The Spansion WS/NS/VS/XS product families support burst speeds up to 108MHz as well as page mode interface which can improve read transfer rates by up to 50%, compared to standard asynchronous Flash products.

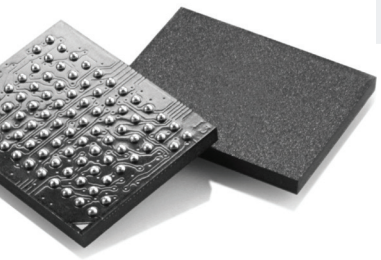
### KEY APPLICATIONS

- Entry level, mainstream and high-end handsets
- High-performance mobile applications

### PACKAGES

- 44-ball
- 64-ball
- 84-ball BGA
- Wafer and die form

| KEY DEVICE FEATURES | |
|---|---|
| VOLTAGE | 1.8V |
| DENSITIES | 64Mb – 512Mb |
| INTERFACE | WS: (ADP), NS/VS: (ADM), XS: (AADM) |
| BUS | x16 |
| SECTOR TYPE | Top/Bottom/Dual boot |
| INITIAL ACCESS TIME | 80ns |
| PAGE MODE ACCESS TIME | 15ns (WS only) |
| BURST FREQUENCY | Up to 108MHz |
| TEMPERATURE RANGE | -25°C to +85°C, -40°C to +85°C on select products |
| SECURITY | Secured Silicon Region, 256-word OTP sector for permanent, secure identification |



# Spansion ML/MS Family

## 1 – 8Gb NAND 3V/1.8V NAND FLASH MEMORY

Spansion NAND products complement the parallel and serial NOR offerings from Spansion for embedded applications. Spansion applies its stringent process for qualification, testing, extended temperature support and packaging to its line of SLC NAND products. Spansion's high performance and high reliability SLC NAND product portfolio will be available in 1 Gb, 2 Gb, 4 Gb and 8Gb (DDP) densities. These products will work with systems that support 1-bit ECC and 4-bit ECC. All of Spansion's NAND products will be backed by Spansion's world-class customer support and commitment for longevity of supply. 4Xnm (1-bit ECC) 1/2/4Gb 3V x8 TSOP/BGA and 32nm (4-bit ECC) 1/4/Gb 3V x8 TSOP/BGA are in production currently. Also, a few 1.8V configurations are available in X16 and X8 BGA package. 4Xnm 1Gb/2Gb/4Gb are also available with AEC-Q100 and GT-Grade @ 85°C as well as high temperature of 105°C (1Gb @105°C requires 2-bit ECC correction instead of 1-bit ECC). Other configurations are coming soon.

### KEY APPLICATIONS

- Digital TVs
- Set-top Boxes
- Network memory modules
- Industrial meters
- Industrial sensors
- Game Consoles
- Printers
- Digital Camera
- Automotive infotainment
- GPS Navigation
- Toys

### PACKAGES

- Industry Standard 48-Pin TSOP, 63-Ball BGA


| KEY DEVICE FEATURES | |
|---|---|
| VOLTAGE | 3V/1.8V |
| TECHNOLOGY | 4x/3x nm SLC FG NAND |
| DENSITIES | 1 – 8Gb |
| INTERFACE | ONFI 1.0 |
| BUS | x8/x16 |
| CYCLING | 100K (typ.) |
| PERFORMANCE[1] | Cache Programming, Multi-plane commands support, OTP, and 25uS Random access, 25 ns Seq. access, 200-300uS tprog, 2-3.5ms tbers |
| TEMPERATURE RANGE | -40°C to +85°C, -40°C to +105°C |
| PACKAGES | 48-Pin TSOP<br>63-Ball BGA<br>67-Ball BGA |
| SOFTWARE SUPPORT | Complimentary Drivers and Spansion FFS |

[1] Different parts have varied performance, please refer to page 12 for exact details on a particular part.

# Spansion's Universal Footprint

## CONSISTENT PACKAGES AND PINOUTS SPEEDS TIME-TO-MARKET AND REDUCES DESIGN

Spansion's Universal Footprint with consistent packaging and pinouts across product families, process technologies, and densities allows design engineers to swap devices at any point in the design or product life cycle without affecting board design.

Designers can manage differentiated end product models based on a single platform design thanks to Spansion's Universal Footprint. The platform design concept, used by makers of DVD players, industrial equipment, and network routers, saves design time and minimizes cost. Coupled with our cost-effective system software and drivers, you have a complete Flash solution to manage the changing design needs of your products.

### LEVERAGING THE SPANSION UNIVERSAL FOOTPRINT

#### DESIGN SIMPLICITY

- One footprint across densities, product families, and process technologies
- Scaleable, seamless

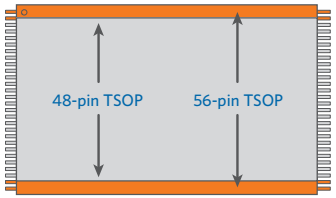
#### TIME-TO-MARKET

- Minimize board rework and re-spin Price
- Interoperable between high performance and price-performance products to optimize BOM

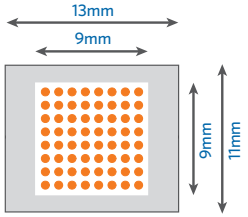
#### SUPPLY CHAIN

- Service multiple platforms with one footprint
- Minimize reliance on one product by qualifying multiple products in the same footprint

### PARALLEL NOR

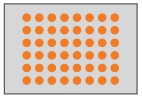



**48-PIN AND 56-PIN TSOP**
For extreme design flexibility
8Mb – 1Gb



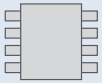

**64-BALL FORTIFIED BGA**
For highest flexibility
11x13mm, 9x9mm
16Mb – 2Gb

**56-BALL BGA**
For small form factor
for high densities
128Mb – 512Mb

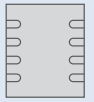


**48-BALL FINE PITCH BGA**
For small form factor
for low densities
8Mb – 64Mb

### SPI NOR



**8-PIN SOIC 150 MIL**
4Mb – 32Mb



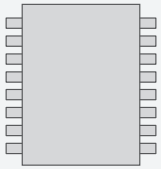
**8-PAD WSON 6X5 mm**
16Mb – 128Mb

**150 MIL SOIC AND 6X5 WSON**

**8-PIN SOIC 208 MIL**
4Mb – 128Mb

**8-PAD WSON 6X8 mm**
32Mb – 256Mb

**208 MIL SOIC AND 6X8 WSON**
Single footprint,
widest density range



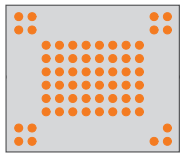
**16-PIN SOIC 300 MIL**
32Mb – 1Gb

**24-BALL BGA 6X4 BALL ARRAY**
16Mb – 512Mb

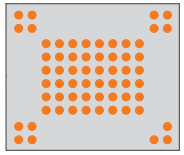
**24-BALL BGA 5X5 BALL ARRAY**
16Mb – 512Mb

### NAND

**48-PIN TSOP**
1Gb – 8Gb



**63-BALL BGA**
1Gb – 8Gb



**67-BALL BGA**
1Gb

# (S) Spansion Ordering Part Number Construction

## SINGLE-DIE PRODUCTS

**Generic OPN** | **Ordering Options**

### Speed Option

**Asynchronous (no CLK input)** "Speed Option" represents random access time (ns). If greater than 100ns, use the two leftmost digits.

**Synchronous (CLK input)** "Speed Option" represents clock frequency (MHz). First character represents the data rate, combined with the speed in 100s of MHz:

**0** SDR, <100 MHz **A** SDR, >=100 MHz **D** DDR, <100 MHz

Second character represents the speed between 0 and 99 MHz:

| | | | | | | |
|---|---|---|---|---|---|---|
| **A** 0-4 | **D** 15-19 | **G** 30-34 | **K** 45-49 | **N** 60-64 | **R** 75-79 | **U** 90-94 |
| **B** 5-9 | **E** 20-24 | **H** 35-39 | **L** 50-54 | **P** 65-69 | **S** 80-84 | **W** 95-99 |
| **C** 10-14 | **F** 25-29 | **J** 40-44 | **M** 55-59 | **Q** 70-74 | **T** 85-89 | **X** 100-108 |

### Bus Width (NAND)

00 = x8 NAND, single die 04 = x16 NAND, single die

### Product Series

25 = Serial Peripheral Interface (SPI) Flash memory
29 = Sector Erase NOR Flash memory
34 = Floating Gate NAND
70 = Dual Die Flash Package

### Density

001 - 512 = 1 Mb-512 Mb
204 - 216 = 4 Mb-16 Mb*
116 - 164 = 16 Mb-64 Mb**

### Temperature Grade

C = Commercial (0° to +70°C)
S = Extended Commercial (0° to +85°C)
W = Wireless (-25° to +85°C)
I = Industrial (-40° to +85°C)
V = Automotive in-cabin (-40° to +105°C)
N = Extended (-40° to +125°C)

### Packaging Type

0 = Tray
1 = Tube
2 = 7" Tape & Reel
3 = 13" Tape & Reel

| Prefix | Series | | Family | | G Density | | | Tech | Speed | | Package | | Temp | Model Number | | Pack type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 2 | 9 | G | L | 0 | 1 | G | S | 1 | 0 | D | H | I | 0 | 1 | 3 |

### Prefix

S = Spansion

### Flash Interface and Simultaneous Read-write

| | SRW | NO SRW |
|---|---|---|
| Standard | J | A |
| Page | P | G |
| Burst (ADP) | W | |
| Burst (ADM) | N/V | |
| Burst (AADM) | X | |
| Serial (SPI) | | F |
| Automotive Burst (Demux) | C | |
| NAND | | M |

ADP = Address data parallel
ADM = Address data mux
AADM = Address – address data mux

### Core Voltage

L = 3-volt VCC
D = 2.5-volt VCC
S = 1.8-volt VCC

### Process Technology

J = 110nm, Floating Gate Technology
K = 90nm, Floating Gate Technology
N = 110nm, MirrorBit Technology
P = 90nm, MirrorBit Technology
R = 65nm, MirrorBit Technology
S = 65nm, MirrorBit Technology (Eclipse)
1 = NAND Revision 1 (4X nm)
2 = NAND Revision 2 (3X nm)

### Package Type (Family)

A = BGA - 0.5mm pitch
B = BGA - 0.8mm pitch
C = CSOP
D = Fortified BGA, 9mm x 9mm
E = Super CSP
F = Fortified BGA, 11mm x 13mm
M = SOIC/SOP
N = SON
P = PLCC
Q = PQFP
S = SSOP
T = TSOP
G = BGA - 0.8mm pitch

### Package Material Set (Varies by Package Type)

A = Leaded
F = Lead (Pb)-Free
H = Low Halogen Lead (Pb)-Free

### Additional Ordering Options

Varies for each generic OPN (characters 1-9). Meaning is defined in each datasheet.

* For FL2-K
** For FL1-K

# 3.0V Parallel Flash Memory

| DENSITY | PAGE MODE | SIMUL-OP | BURST MODE | PART NUMBER | ACCESS TIMES (NS)/ CLOCK FREQUENCY | PACKAGES | TEMP | $V_{cc}$(V) | $V_{IO}$(V) | ORG | SECTOR | FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 Gb | ▪ | | | S70GL02GS | 110 (20), 120 (30) | 64-Ball FBGA | -40° to +85°C | 2.7-3.6 | 2.7-3.6, 1.65-Vcc | x16 | H, L | Sectors: 2048x128KB; 32-byte Page Mode Read; WP# Pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 512-byte write buffer |
| 2 Gb | ▪ | | | S70GL02GP | 110 (25) | 64-Ball FBGA | 0° to +85°C, -40° to +85°C | 3.0-3.6 | 3.0-3.6 | x8/x16 | H, L | Sectors: 2048x128KB; WP#/ACC Pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 32-word write buffer |
| 1 Gb | ▪ | | | S29GL01GS | 100 (15), 110 (20) | 56-Pin TSOP, 64-Ball FBGA, KGW | -40° to +85°C, -40° to +105°C | 2.7-3.6 | 2.7-3.6, 1.65-Vcc | x16 | H, L | Sectors: 1024x128KB; 32-byte Page Mode Read; WP# Pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 512-byte write buffer |
| 1 Gb | ▪ | | | S29GL01GP | 110 (25), 120 (25), 130 (25) | 56-Pin TSOP, 64-Ball FBGA, KGD, KTW | 0° to +85°C, -40° to +85°C | 3.0-3.6, 2.7-3.6 | 3.0-3.6, 2.7-3.6, 1.65-Vcc | x8/x16 | H, L | Sectors: 1024x128KB; WP#/ACC Pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 32-word write buffer |
| 512 Mb | ▪ | | | S29GL512S | 100 (15), 110 (20) | 56-Pin TSOP, 56-Ball FBGA, 64-Ball FBGA, KGW | -40° to +85°C -40° to +105°C | 2.7-3.6 | 2.7-3.6, 1.65-Vcc | x16 | H, L | Sectors: 512x128KB; 32-byte Page Mode Read; WP# Pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 512-byte write buffer |
| 512 Mb | ▪ | | | S29GL512P | 100 (25), 110 (25), 120 (25) | 56-Pin TSOP, 64-Ball FBGA, KTD, KTW | 0° to +85°C, -40° to +85°C | 3.0-3.6, 2.7-3.6 | 3.0-3.6, 2.7-3.6, 1.65-Vcc | x8/x16 | H, L | Sectors: 512x128KB; WP#/ACC Pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 32-word write buffer |
| 256 Mb | ▪ | | | S29GL256S | 90 (15), 100 (20) | 56-Pin TSOP, 56-Ball FBGA, 64-Ball FBGA, KGW | -40° to +85°C, -40° to +105°C | 2.7-3.6 | 2.7-3.6, 1.65-Vcc | x16 | H, L | Sectors: 256x128KB; 32-byte Page Mode Read; WP# Pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 512-byte write buffer |
| 256 Mb | ▪ | | | S29GL256P | 90 (25), 100 (25), 110 (25) | 56-Pin TSOP, 64-Ball FBGA, KGD, KGW | 0° to +85°C, -40° to +85°C | 3.0-3.6, 2.7-3.6 | 3.0-3.6, 2.7-3.6, 1.65-Vcc | x8/x16 | H, L | Sectors: 256x128KB; WP#/ACC pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O; 32-word write buffer |
| 128 Mb | ▪ | | | S29GL128S | 90 (15), 100 (20) | 56-Pin TSOP, 56-Ball FBGA, 64-Ball FBGA, KGW | -40° to +85°C, -40° to +105°C | 2.7-3.6 | 2.7-3.6, 1.65-Vcc | x16 | H, L | Sectors: 128x128KB; 32-byte Page Mode Read; WP# Pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 512-byte write buffer |
| 128 Mb | ▪ | | | S29GL128P | 90 (25), 100 (25), 110 (25) | 56-Pin TSOP, 64-Ball FBGA, KGD, KGW | 0° to +85°C, -40° to +85°C | 3.0-3.6, 2.7-3.6 | 3.0-3.6, 2.7-3.6, 1.65-Vcc | x8/x16 | H, L | Sectors: 128x128KB; WP#/ACC pin; Secured Silicon Region; Advanced Sector Protection, VersatileI/O, 32-word write buffer |
| 128 Mb | ▪ | ▪ | | S29PL127J | 60 (25), 65 (25), 70 (30) | 56-Pin TSOP, 80-Ball FBGA | -40° to +85°C, -25° to +85°C | 2.7-3.6 | 2.7-3.6, 1.65-1.95 | x16 | D | Banks: 16/48/48/16Mb; WP#/ACC pin; Secured Silicon Region; Advanced Sector Protection |
| 64 Mb | ▪ | | | S29GL064S | 70 (15), 80 (25) | 48-Pin TSOP, 56-Pin TSOP, 48-Ball FBGA, 64-Ball FBGA | 0 to +85C, -40 to +85C | 2.7-3.6 | 2.7-3.6, 1.65-3.6 | x16, x8/x16 | T, B, U | Sectors: 8x8KB, 127x64KB or 128x64KB; WP#/ACC Pin or separate WP# and ACC pins; Secured Silicon Region; VersatileI/O; 256-word write buffer |
| 64 Mb | ▪ | | | S29GL064N | 90 (25), 110 (30) | 48-Pin TSOP, 56-Pin TSOP, 48-Ball FBGA, 64-Ball FBGA, KGD, KGW | -40° to +85°C | 2.7-3.6 | 2.7-3.6, 1.65-3.6 | x16, x8/x16 | T, B, U | Sectors: 8x8KB, 127x64KB or 128x64KB; WP#/ACC Pin or separate WP# and ACC pins; Secured Silicon Region; VersatileI/O; 16-word write buffer |
| 64 Mb | ▪ | ▪ | | S29PL064J | 55 (20), 60 (25), 65 (25), 70 (30) | 48-Ball FBGA, 56-Ball FBGA | -40° to +85°C, -25° to +85°C | 2.7-3.6 | 2.7-3.6 | x16 | D | Banks: 8/24/24/8Mb; WP#/ACC pin; Secured Silicon Region; Advanced Sector Protection |
| 64 Mb | | ▪ | | S29JL064J | 55, 60, 70 | 48-Pin TSOP, 48-Ball FBGA, KGW | -40° to +85°C | 2.7-3.6 | NA | x8/x16 | D | Banks: 8/24/24/8Mb; WP#/ACC pin; Secured Silicon Region |
| 32 Mb | ▪ | | | S29GL032N | 90 (25), 110 (30) | 48-Pin TSOP, 56-pin TSOP, 48-Ball FBGA, 64-Ball FBGA, KGW | -40° to +85°C | 2.7-3.6 | 2.7-3.6, 1.65-3.6 | x8/x16 | T, B, U | Sectors: 8x8KB, 63x64KB or 64x64KB; WP#/ACC Pin; Secured Silicon Region; VersatileI/O; 16-word write buffer |
| 32 Mb | ▪ | ▪ | | S29PL032J | 55 (20), 60(25), 65 (25), 70 (30) | 48-Ball FBGA, 56-Ball FBGA | -40° to +85°C, -25° to +85°C | 2.7-3.6 | 2.7-3.6 | x16 | D | Banks: 4/12/12/4Mb; WP#/ACC pin; Secured Silicon Region; Advanced Sector Protection |
| 32 Mb | | ▪ | | S29JL032J | 60, 70 | 48-Pin TSOP, 48-Ball FBGA | -40° to +85°C | 2.7-3.6 | NA | x8/x16 | T, B | Banks: 4/12/12/4Mb, 4/28, 8/24, 16/16; WP#/ACC pin; Secured Silicon Region |
| 32 Mb | | ▪ | ▪ | S29CL032J | 75, 66, 56, 40MHz | 80-Pin PQFP, 80-Ball BGA | -40° to +85°C, -40° to +125°C, -40° to +145°C | 3.0-3.6 | 1.65-3.6 | x32 | D | Banks: 8/24Mb or 24/8Mb; WP#, ACC pins, Secured Silicon Region; Advanced Sector Protection, Versatile I/O |
| 16 Mb | | | | S29AL016J | 55, 70 | 48-Pin TSOP, 48-Ball FBGA, 64-Ball FBGA, 56-Pin SSOP, KGD, KGW | -40° to +85°C, -40° to +125°C | 3.0-3.6, 2.7-3.6 | NA | x8/x16 | T, B | Sectors: 1x16KB,2x8KB,1x32KB,31x64KB |
| 16 Mb | | ▪ | ▪ | S29CL016J | 66, 56, 40MHz | 80-Pin PQFP, 80-Ball BGA, KGD | -40° to +85°C, -40° to +125°C, -40° to +145°C | 3.0-3.6 | 1.65-3.6 | x32 | D | Banks: 4/12Mb or 12/4Mb; WP#, ACC pins, Secured Silicon Region; Advanced Sector Protection, Versatile I/O |
| 8 Mb | | | | S29AL008J | 55, 70 | 48-Pin TSOP, 48-Ball FBGA, 56-Pin SSOP, KGD, KGW | -40° to +85°C, -40° to +125°C | 3.0-3.6, 2.7-3.6 | NA | x8/x16 | T, B | Sectors: 1x16KB, 2x8KB, 1x32KB, 15x64KB |

**Sector:** T: Top Boot, B: Bottom Boot, D: Dual Boot, U: Uniform Sectors, H: High-Protect, L: Low-Protect

# 3.0V SPI Flash Memory

| DENSITY | PAGE MODE | SIMUL-OP | BURST MODE | PART NUMBER | ACCESS TIMES (NS)/ CLOCK FREQUENCY | PACKAGES | TEMP | $V_{cc}$(V) | $V_{I/O}$(V) | ORG | SECTOR | FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Gb | | | | S70FL01GS | 133MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)[1] | 16-Pin SO | -40° to +85°C, -40° to +105°C | 2.7-3.6 | | x1, x2, x4 | U | Dual Die stack; Sectors: uniform 256KB; H/W & S/W write protect; OTP sector |
| 512 Mb | | | | S25FL512S | 133MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)[1] | 16-Pin SO, 24-ball BGA (6x8 mm) | -40° to +85°C, -40° to +105°C | 2.7-3.6 | 1.65-3.6 | x1, x2, x4 | U | Sectors: uniform 256KB; H/W & S/W write protect; OTP sector |
| 256 Mb | | | | S25FS256S | 133MHz (Single I/O, Multi I/O), 80MHz (DDR) | 16-pin SO, 8-contact WSON (6x8mm), 24-ball BGA (6x8mm) | -40° to +85°C, -40° to +105°C | 1.7-2.0 | | x1, x2, x4 | U | Sectors: uniform 256KB or uniform 64KB with eight 4KB sub-sectors and one 32KB sub-sector top/bottom, all remaining sectors 64KB ; H/W & S/W write protect; OTP sector |
| 256 Mb | | | | S25FL256S | 133MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)[1] | 16-Pin SO, 8-contact WSON (6x8 mm), 24-ball BGA (6x8 mm) | -40° to +85°C, -40° to +105°C | 2.7-3.6 | 1.65-3.6 | x1, x2, x4 | U | Sectors: uniform 256KB or uniform 64KB with 32 top/bottom 4KB sub-sectors; H/W & S/W write protect; OTP sector |
| 256 Mb | | | | S70FL256P | 104MHz (Single I/O), 80MHz (Multi I/O) | 16-Pin SO, 24-ball BGA (6x8 mm) | -40° to +85°C | 2.7-3.6 | | x1, x2, x4 | U | Sectors: uniform 256KB or uniform 64KB with 32 top/bottom 4KB sub-sectors; H/W & S/W write protect; OTP sector; ACC pin |
| 128 Mb | | | | S25FS128S | 133MHz (Single I/O, Multi I/O), 80MHz (DDR) | 8-pin SO 208mil, 8-contact WSON (6x5mm), 24-ball BGA (6x8mm) | -40° to +85°C, -40° to +105°C | 1.7-2.0 | | x1, x2, x4 | U | Sectors: uniform 256KB or uniform 64KB with eight 4KB sub-sectors and one 32KB sub-sector top/bottom, all remaining sectors 64KB ; H/W & S/W write protect; OTP sector |
| 128 Mb | | | | S25FL127S | 108MHz (Single I/O, Multi I/O) | 16-Pin SO 8-pin SO 208mil 8-contact WSON (6x5mm) 24-ball BGA (6x8mm) | -40° to +85°C, -40° to +105°C | 2.7-3.6 (for Vcc) | | x1, x2, x4 (for ORG) | U (for sector) | Sectors: uniform 256KB or uniform 64KB with 16 top/bottom 4KB sub-sectors, all remaining sectors 64KB; H/W & S/W write protect; OTP sectors |
| 128 Mb | | | | S25FL128S | 133MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)1 | 16-Pin SO, 8-contact WSON (6x8 mm), 24-ball BGA (6x8 mm) | -40° to +85°C, -40° to +105°C | 2.7-3.6 | 1.65-3.6 | x1, x2, x4 | U | Sectors: uniform 256KB or uniform 64KB with 32 top/bottom 4KB sub-sectors; H/W & S/W write protect; OTP sector |
| 128 Mb | | | | S25FL129P | 104MHz (Single I/O), 80MHz (Multi I/O) | 16-Pin SO, 8-contact WSON (6x8 mm), 24-ball BGA (6x8 mm) | -40° to +85°C, -40° to +105°C | 2.7-3.6 | | x1, x2, x4 | U | Sectors: uniform 256KB or uniform 64KB with 32 top/bottom 4KB sub-sectors; H/W & S/W write protect; OTP sector; ACC pin |
| 128 Mb | | | | S25FL128P | 104MHz (Single I/O) | 16-Pin SO, 8-contact WSON (6x8 mm) | -40° to +85°C | 2.7-3.6 | | x1 | U | Sectors: uniform 256KB or uniform 64KB; H/W & S/W write protect; x8 Parallel Program Mode; ACC pin |
| 64 Mb | | | | S25FL064P | 104MHz (Single I/O), 80MHz (Multi I/O) | 16-Pin SO, 8-contact WSON (6x8 mm), 24-ball BGA (6x8 mm), KGW | -40° to +85°C, -40° to +105°C | 2.7-3.6 | | x1, x2, x4 | U | Sectors: uniform 64KB with 32 top/bottom 4KB sub-sectors, H/W & S/W write protect; OTP sector; ACC pin |
| 64 Mb | | | | S25FL164K | 108MHz (Multi I/O) | 8-Pin SO 208mil, 16-Pin SO, 8-contact WSON (5x6 mm), 24-ball BGA (6x8 mm), KGW | -40° to +85°C, -40° to +105°C | 2.7-3.6 | | x1, x2, x4 | U | Sectors: uniform 4KB with 64KB block erase; H/W & S/W write protect; OTP sector; Program/erase suspend/resume |
| 64 Mb | | | | S25FL064K* | 80MHz (Single I/O), 80MHz (Multi I/O) | 8-Pin SO 208mil, 16-Pin SO | -40° to +85°C | 2.7-3.6 | | x1, x2, x4 | U | Sectors: uniform 4KB with 64KB block erase; H/W & S/W write protect; OTP sector; Program/erase suspend/resume. |
| 32 Mb | | | | S25FL032P | 104MHz (Single I/O), 80MHz (Multi I/O) | 8-Pin SO 208mil, 16-Pin SO, 8-contact USON (5x6 mm), 8-contact WSON (6x8 mm), 24-ball BGA (6x8 mm), KGW | -40° to +85°C, -40° to +105°C | 2.7-3.6 | | x1, x2, x4 | U | Sectors: uniform 64KB with 32 top/bottom 4KB sub-sectors, H/W & S/W write protect; OTP sector; ACC pin |
| 32 Mb | | | | S25FL132K | 108MHz (Multi I/O) | 8-Pin SO 208mil, 8-Pin SO 150mil, 8-contact WSON (5x6 mm), 24-ball BGA (6x8 mm), KGW | -40° to +85°C, -40° to +105°C | 2.7-3.6 | | x1, x2, x4 | U | Sectors: uniform 4KB with 64KB block erase; H/W & S/W write protect; OTP sector; Program/erase suspend/resume |
| 16 Mb | | | | S25FL116K | 108MHz (Multi I/O) | 8-Pin SO 208mil, 8-Pin SO 150mil, 8-contact WSON (5x6 mm), 24-ball BGA (6x8 mm), KGW | -40° to +85°C, -40° to +105°C | 2.7-3.6 | | x1, x2, x4 | U | Sectors: uniform 4KB with 64KB block erase; H/W & S/W write protect; OTP sector; Program/erase suspend/resume |
| 16 Mb | | | | S25FL216K | 65MHz (Single I/O, Dual Output) | 8-Pin SO 208mil, 8-Pin SO 150mil | -40° to +85°C | 2.7-3.6 | | x1, x2 | U | Sectors: uniform 4KB with 64KB block erase; H/W & S/W write protect |
| 8 Mb | | | | S25FL208K | 76MHz (Single I/O, Dual Output) | 8-Pin SO 208mil, 8-Pin SO 150mil | -40° to +85°C | 2.7-3.6 | | x1, x2 | U | Sectors: uniform 4KB with 64KB block erase; H/W & S/W write protect |
| 4 Mb | | | | S25FL204K | 85MHz (Single I/O, Dual Output) | 8-Pin SO 208mil, 8-Pin SO 150mil | -40° to +85°C | 2.7-3.6 | | x1, x2 | U | Sectors: uniform 4KB with 64KB block erase; H/W & S/W write protect |

**Sector:** T: Top Boot, B: Bottom Boot, D: Dual Boot, U: Uniform Sectors, H: High-Protect, L: Low-Protect
1) 3.0-3.6V. *Not recommended for new designs.

# 3.0V NAND Memory

| PART NUMBER | DENSITY (GBITS) | I/O BUS WIDTH | NUMBER OF BLOCKS | PAGE SIZE (BYTES) | SEQUENTIAL ACCESS (NS) | RANDOM ACCESS (US) | PAGE PROGRAM TIME (US) | BLOCK ERASE TIME (MS) | ECC BITS REQUIRED | PACKAGES | TEMP | $V_{cc}$(V) | $V_{I/O}$(V) | FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S34ML01G100 | 1 | x8 | 1024 | 2048+64 | 25 | 25 | 200 | 2 | 1 | TSOP 48, BGA 63 | -40° to +85°C (Ind), -40° to +105°C (Auto) | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read Cache. Temp support up to 105C available with *2-bit ECC instead of 1-bit ECC. |
| S34ML02G100 | 2 | x8 | 2048 | 2048+64 | 25 | 25 | 200 | 3.5 | 1 | TSOP 48, BGA 63 | -40° to +85°C (Ind), -40° to +105°C (Auto) | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support. Now AEC-Q100, GT-Grade available. Temp support up to 105C available now. |
| S34ML02G104 | 2 | x16 | 2048 | 2048+64 | 25 | 25 | 200 | 3.5 | 1 | TSOP 48 | -40° to +85°C | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support. |
| S34ML04G100 | 4 | x8 | 4096 | 2048+64 | 25 | 25 | 200 | 3.5 | 1 | TSOP 48, BGA 63 | -40° to +85C (Ind), -40° to +105°C (Auto) | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support. Now AEC-Q100, GT-Grade available. Temp support up to 105C available now. |
| S34ML04G104 | 4 | x16 | 4096 | 2048+64 | 25 | 25 | 200 | 3.5 | 1 | TSOP 48, BGA 63 | -40° to +85°C (Ind), -40° to 105°C (Auto) | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support. Now AEC-Q100, GT-Grade available. Temp support up to 105C available now. |
| S34ML08G101 | 8 | x8 | 8192 | 2048+64 | 25 | 25 | 200 | 3.5 | 1 | TSOP 48, BGA 63 | -40° to +85°C | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support (TSOP-Two Chip Enables, BGA-Single Chip Enable). |
| S34ML01G200 | 1 | x8 | 1024 | 2048+64 | 25 | 25 | 300 | 3 | 4 | TSOP 48, BGA 63, BGA 67 | -40° to +85°C | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support. Unique ID support. |
| S34ML01G204 | 1 | x16 | 1024 | 2048+64 | 25 | 25 | 300 | 3 | 4 | TSOP_48 | -40° to +85°C | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support. Unique ID support. |
| S34ML04G200 | 4 | x8 | 4096 | 2048+64 | 25 | 30 | 300 | 3.5 | 4 | TSOP_48, BGA_63 | -40° to +85°C | 2.7-3.6 | -0.6-4.6 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support. Unique ID support. |

# 1.8V NAND Memory

| PART NUMBER | DENSITY (GBITS) | I/O BUS WIDTH | NUMBER OF BLOCKS | PAGE SIZE (BYTES) | SEQUENTIAL ACCESS (NS) | RANDOM ACCESS (US) | PAGE PROGRAM TIME (US) | BLOCK ERASE TIME (MS) | ECC BITS REQUIRED | PACKAGES | TEMP | $V_{cc}$(V) | $V_{I/O}$(V) | FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S34MS01G100 | 1 | x8 | 1024 | 2048+64 | 45 | 25 | 250 | 2 | 1 | BGA 63 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read Cache |
| S34MS01G104 | 1 | x16 | 1024 | 2048+64 | 45 | 25 | 250 | 3.5 | 1 | BGA 63 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read Cache |
| S34MS02G100 | 2 | x8 | 2048 | 2048+64 | 45 | 25 | 250 | 3.5 | 1 | BGA 63 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support |
| S34MS02G104 | 2 | x16 | 2048 | 2048+64 | 45 | 25 | 250 | 3.5 | 1 | BGA 63 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support |
| S34MS04G100 | 4 | x8 | 4096 | 2048+64 | 25 | 25 | 200 | 3.5 | 1 | TSOP 48, BGA 63 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read and Write Cache with Multi-plane support |
| S34MS01G200 | 1 | x8 | 1024 | 2048+64 | 45 | 25 | 300 | 3 | 4 | BGA 63, BGA 67 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read Cache and Write Cache with Multiplane support. Unique ID support |
| S34MS01G204 | 1 | x16 | 1024 | 2048+64 | 45 | 25 | 300 | 3 | 4 | BGA 63 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read Cache and Write Cache with Multiplane support. Unique ID support |
| S34MS04G200 | 4 | x8 | 4096 | 2048+64 | 45 | 30 | 300 | 3.5 | 4 | BGA 63 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read Cache and Write Cache with Multiplane support. Unique ID support |
| S34MS04G204 | 4 | x16 | 4096 | 2048+64 | 45 | 30 | 300 | 3.5 | 4 | TSOP 48, BGA 63 | -40° to +85°C | 1.7-1.95 | -0.6-2.7 | ONFI 1.0 compliant, OTP, HW protection for involuntary pgm/erase during power transition, Block zero valid up to 1K cycles, Supports Read Cache and Write Cache with Multiplane support. Unique ID support |

# 2.5V Parallel Flash Memory

| DENSITY | PAGE MODE | SIMUL-OP | BURST MODE | PART NUMBER | ACCESS TIMES (NS)/ CLOCK FREQUENCY | PACKAGES | TEMP | $V_{cc}$(V) | $V_{I/O}$(V) | ORG | SECTOR | FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32Mb | | ▪ | ▪ | S29CD032J | 75, 66, 56, 40MHz | 80-Pin PQFP, 80-Ball BGA | -40° to +85°C, -40° to +125°C, -40° to +145°C | 2.5-2.75 | 1.65-2.75 | x32 | D | Banks: 8/24Mb or 24/8Mb; WP#, ACC pins, Secured Silicon Region; Advanced Sector Protection, Versatile I/O |
| 16Mb | | ▪ | ▪ | S29CD016J | 66, 56, 40MHz | 80-Pin PQFP, 80-Ball BGA, KGD | -40° to +85°C, -40° to +125°C, -40° to +145°C | 2.5-2.75 | 1.65-2.75 | x32 | D | Banks: 4/12Mb or 12/4Mb; WP#, ACC pins, Secured Silicon Region; Advanced Sector Protection, Versatile I/O |

# 1.8V Parallel ADP Flash Memory

| DENSITY | PAGE MODE | SIMUL-OP | BURST MODE | PART NUMBER | ACCESS TIMES (NS)/ CLOCK FREQUENCY | PACKAGES | TEMP | $V_{cc}$(V) | $V_{I/O}$(V) | ORG | SECTOR | FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 512Mb | ▪ | ▪ | ▪ | S29WS512P | 54, 66, 80, 104MHz | 84-Ball FBGA | -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | D | Banks: 16x32Mb; WP#, ACC Pins; Secured Silicon Region; Advanced Sector Protection; 32-word write buffer |
| 256Mb | ▪ | ▪ | ▪ | S29WS256P | 54, 66, 80, 104MHz | 84-Ball FBGA | -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | D | Banks: 16x16Mb; WP#, ACC Pins; Secured Silicon Region; Advanced Sector Protection; 32-word write buffer |
| 128Mb | ▪ | ▪ | ▪ | S29WS128P | 54, 66, 80, 104MHz | 84-Ball FBGA, KTD, KGW | -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | D | Banks: 16x8Mb; WP#, ACC Pins; Secured Silicon Region; Advanced Sector Protection; 32-word write buffer |
| 64Mb | ▪ | ▪ | ▪ | S29WS064R | 66, 83, 108MHz | 84-Ball FBGA | -40° to +85°C, -25° to +25°C | 1.70-1.95 | 1.70-1.95 | x16 | T, B | Banks: 4x16Mb; ACC Pin; Secured Silicon Region; Advanced Sector Protection; 32-word write buffer |
| 16Mb | | | | S29AS016J | 70 | 48-Pin TSOP, 48-Ball FBGA, KGD, KGW | -40° to +85°C | 1.65-1.95 | NA | x8/x16 | T, B | Sectors: 8x8KB, 31x64KB; WP# pin, RY/BY# pin |
| 8Mb | | | | S29AS008J | 70 | 48-Pin TSOP, 48-Ball FBGA, KGD, KGW | -40° to +85°C | 1.65-1.95 | NA | x8/x16 | T, B | Sectors: 8x8KB, 15x64KB; WP# pin, RY/BY# pin |

# 1.8V Parallel ADP MCP Solutions

| PRODUCT | TECHNOLOGY (NM) | CODE FLASH (MB) | PSRAM (MB) | DRAM (MB) | FLASH/RAM SPEED (MHZ)[1] | MCP/POP | PACKAGE (MM) | PACKAGE FOOTPRINT |
|---|---|---|---|---|---|---|---|---|
| S71WS256PC0 | 90 | 256 | 64 | | 104/104 | MCP | 11.6 x 8.0 | 84-ball |

**Sector:** T: Top Boot, B: Bottom Boot, D: Dual Boot, U: Uniform Sectors, H: High-Protect, L: Low-Protect

1) Maximum targeted frequency noted for each product – lower speed grades may also be offered.

# 1.8V Muxed AADM Flash Memory

| DENSITY | PAGE MODE | SIMUL-OP | BURST MODE | PART NUMBER | ACCESS TIMES (NS)/ CLOCK FREQUENCY | PACKAGES | TEMP | $V_{cc}$(V) | $V_{I/O}$(V) | ORG | SECTOR | FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 256Mb | | ▪ | ▪ | S29XS256R | 83, 104, 108MHz | 44-Ball FBGA | -40° to +85°C, -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | T, B | Banks: 8x32Mb; WP#, ACC Pins; Secured Silicon Region; 32-word write buffer |
| 128Mb | | ▪ | ▪ | S29XS128R | 83, 104, 108MHz | 44-Ball FBGA | -40° to +85°C, -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | T, B | Banks: 8x16Mb; WP#, ACC Pins; Secured Silicon Region; 32-word write buffer |
| 64Mb | | ▪ | ▪ | S29XS064R | 66, 83, 108MHz | 44-Ball FBGA | -40° to +85°C, -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | T, B | Banks: 8x16Mb; WP#, ACC Pins; Secured Silicon Region; Advanced Sector Protection; 32-word write buffer |

# 1.8V Muxed AADM MCP Solutions

| PRODUCT | TECHNOLOGY (NM) | CODE FLASH (MB) | PSRAM (MB) | DRAM (MB) | FLASH/RAM SPEED (MHZ)[1] | MCP/POP | PACKAGE (MM) | PACKAGE FOOTPRINT |
|---|---|---|---|---|---|---|---|---|
| S72XS256RE0 | 65 | 256 | | 256 | 108/166 | MCP | 8.0 x 8.0 | 133-ball |

# 1.8V Muxed ADM Flash Memory

| DENSITY | PAGE MODE | SIMUL-OP | BURST MODE | PART NUMBER | ACCESS TIMES (NS)/ CLOCK FREQUENCY | PACKAGES | TEMP | $V_{cc}$(V) | $V_{I/O}$(V) | ORG | SECTOR | FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 512Mb | | ▪ | ▪ | S29NS512P | 66, 83MHz | 64-Ball BGA | -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | T | Banks: 16x32Mb; WP#, ACC Pins; Secured Silicon Region; Advanced Sector Protection; 32-word write buffer |
| 256Mb | | ▪ | ▪ | S29VS256R | 83, 104, 108MHz | 44-Ball FBGA | -40° to +85°C, -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | T, B | Banks: 8x32Mb; WP#, ACC Pins; Secured Silicon Region; 32-word write buffer |
| 128Mb | | ▪ | ▪ | S29VS128R | 83, 104, 108MHz | 44-Ball FBGA | -40° to +85°C, -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | T, B | Banks: 8x16Mb; WP#, ACC Pins; Secured Silicon Region; 32-word write buffer |
| 64Mb | | ▪ | ▪ | S29VS064R | 66, 83, 108MHz | 44-Ball FBGA | -40° to +85°C, -25° to +85°C | 1.70-1.95 | 1.70-1.95 | x16 | T, B | Banks: 4x16Mb; ACC Pin; Secured Silicon Region; Advanced Sector Protection; 32-word write buffer |

# 1.8V Muxed ADM MCP Solutions

| PRODUCT | TECHNOLOGY (NM) | CODE FLASH (MB) | PSRAM (MB) | DRAM (MB) | FLASH/RAM SPEED (MHZ)[1] | MCP/POP | PACKAGE (MM) | PACKAGE FOOTPRINT |
|---|---|---|---|---|---|---|---|---|
| S71VS064RB0 | 65 | 64 | 32 | | 108 / 108 | MCP | 7.5 x 5.0 | 52-ball |
| S71VS128RB0 | 65 | 128 | 32 | | 108 / 108 | MCP | 7.7 x 6.2 | 56-ball |
| S71VS128RC0 | 65 | 128 | 64 | | 108 / 108 | MCP | 7.7 x 6.2 | 56-ball |
| S71VS256RC0 | 65 | 256 | 64 | | 108/108 | MCP | 7.7 x 6.2 | 56-ball |
| S71VS256RD0 | 65 | 256 | 128 | | 108/108 | MCP | 9.2 x 8.0 | 56-ball |
| S72VS256RE0 | 65 | 256 | | 256 | 108/166 | MCP | 8.0 x 8.0 | 133-ball |

**Sector:** T: Top Boot, B: Bottom Boot, D: Dual Boot, U: Uniform Sectors, H: High-Protect, L: Low-Protect

1) Maximum targeted frequency noted for each product – lower speed grades may also be offered.

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## ABOUT SPANSION

Spansion's (NYSE: CODE) technology is at the heart of electronics systems, powering everything from the internet of today to the smart grid of tomorrow, positively impacting people's daily lives at work and play. Spansion's broad Flash memory product portfolio, smart innovation and industry leading service and support are enabling customers to achieve greater efficiency and success in their target markets. For more information, visit http://www.spansion.com.


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