CYPRESS PRODUCT SELECTOR GUIDE
FLASH MEMORY

February 2016

PARALLEL NOR FLASH • SERIAL NOR FLASH • SLC NAND FLASH • e.MMC NAND FLASH • HYPERFLASH™

CYPRESS
PERFORM

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CYPRESS FLASH MEMORY

Cypress offers a broad portfolio of reliable high-performance Flash Memories for program-code and data storage. Cypress is No. 1 in NOR Flash Memory and has more than 20 years of experience. We are committed to providing highly-reliable, AEC-Q100 qualified products that meet the most rigorous automotive standards. We continue to invest heavily to bring new, innovative Flash Memory products to market, and assure long-term supply for our portfolio. Cypress complements all its products with world-class customer support.

CYPRESS NOR FLASH MEMORY

Cypress NOR Flash provides the fast, low-latency random access and high read bandwidth required by high-performance systems to access program memory and data as fast as possible. Cypress offers a full portfolio of NOR Flash including parallel interface and low-pin-count serial interface products. Cypress NOR Flash Memories offer the industry's fastest program and sector erase times.

NOR FLASH PORTFOLIO SUMMARY				
Interface	Parallel	Quad SPI	Dual-Quad SPI	HyperBus™
Density	8Mb - 2Gb	16Mb - 1Gb	256Mb - 1Gb	128Mb - 512Mb
Read Bandwidth (max)	102 MBps	80 MBps	160 MBps	333 MBps
Voltage	3.0V, 2.5V, 1.8V	3.0V, 1.8V	3.0V	3.0V, 1.8V
Temperature Ranges	Industrial: -40°C to +85°C Industrial-plus: -40°C to +105°C Extended: -40°C to +125°C Hot: -40°C to +145°C	Industrial: -40°C to +85°C Industrial-plus: -40°C to +105°C Extended: -40°C to +125°C		
Automotive Support	AEC-Q100, PPAP			

CYPRESS NAND FLASH MEMORY

Cypress's portfolio of NAND Flash products complements its NOR Flash portfolio for embedded applications. Cypress applies stringent processes for qualification and testing across an extended operating temperature range for its NAND products. All of Cypress's NAND products are backed by Cypress's world-class customer support and commitment for longevity of supply. Cypress's NAND products include SLC NAND and e.MMC NAND Flash Memories.

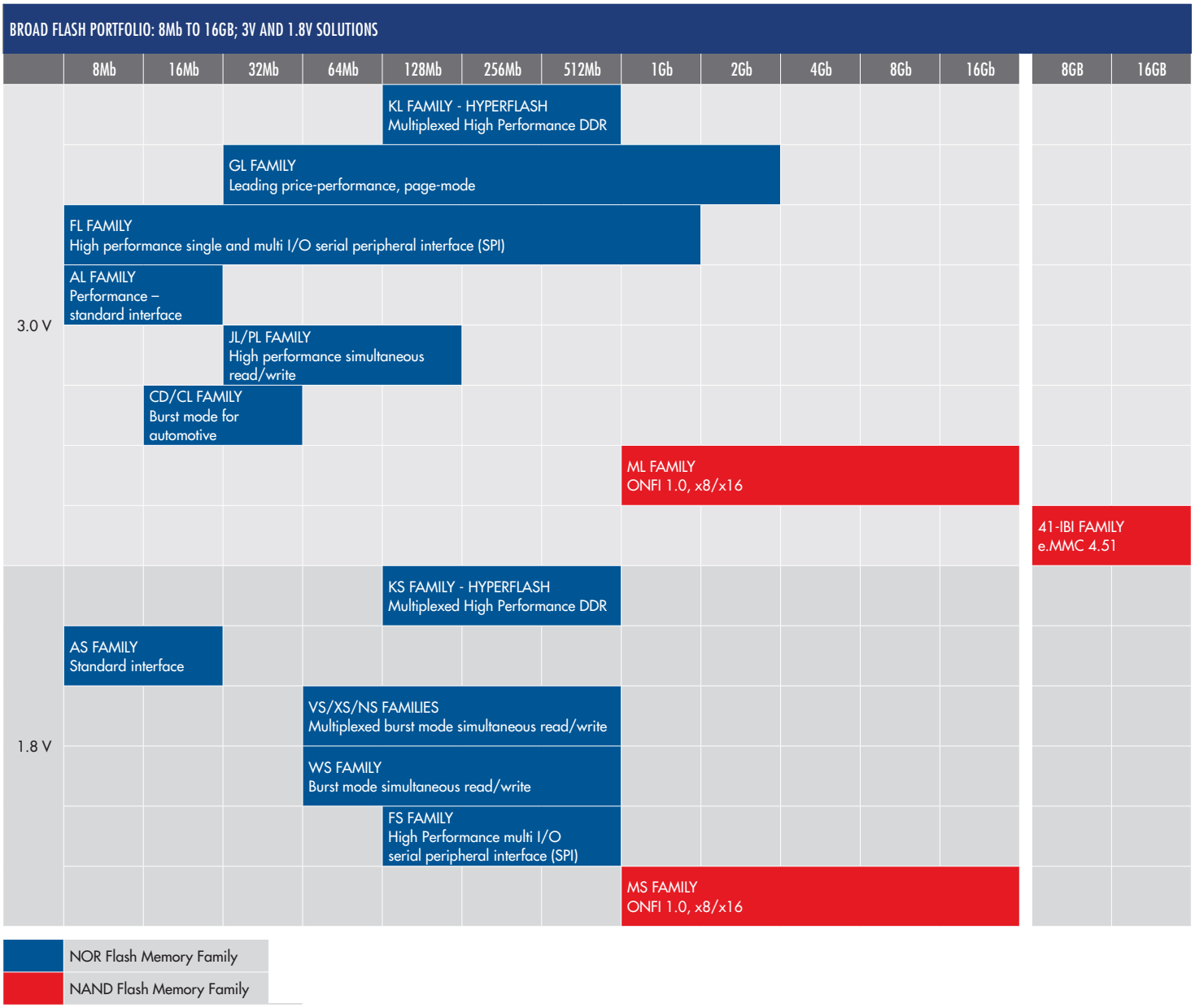
SLC NAND FLASH PORTFOLIO SUMMARY	
Density	1Gb - 16Gb
Interface	ONFI 1.0
Bandwidth	40 MBps
Endurance	100,000 P/E cycles (typical)
Voltage	3.0V, 1.8V
Temperature Ranges	Industrial: -40°C to +85°C Industrial Plus: -40°C to +105°C
Automotive Support	AEC-Q100, PPAP
ECC Requirement	1-bit, 4-bit

e.MMC NAND FLASH PORTFOLIO SUMMARY	
Density	8GB - 16GB
Interface	e.MMC 4.51
Bandwidth	200 MBps
Voltage	3.0V
Temperature Ranges	Embedded: -25°C to +85°C Industrial: -40°C to +85°C
Features	Health Monitoring

CYPRESS FLASH PRODUCT PORTFOLIO

Cypress offers a wide range of NOR and NAND 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



CYPRESS FLASH MEMORY GUIDE

	PROCESS NODE	110nm "J"	90nm "K"	65nm "L"	110nm "N"	90nm "P"	65nm "R"	65nm "S"	45nm "T"	4Xnm "1"	3Xnm "2"	1Xnm "1"
	ARCHITECTURE	Floating Gate NOR			MirrorBit® NOR			MirrorBit Eclipse™		NAND		
	Voltage, Interface	Product Nomenclature										
HyperFlash NOR	3.0V, HyperBus							KL-S				
	1.8V, HyperBus							KS-S				
Parallel NOR	3.0V, Page-mode				GL-N	GL-P		GL-S	GL-T			
	3.0V, Standard-mode	AL-J										
	3.0V, Standard-mode, SRW	JL-J										
	3.0V, Page-mode, SRW	PL-J										
	3.0V, Burst-mode, Multiplex ADP											
	3.0V/2.5V, Burst-mode, SRW, De-multiplex ADP	CL-J CD-J										
	1.8V, Burst-mode, SRW, De-multiplex ADP					WS-P	WS-R					
	1.8V, Burst-mode, SRW, Multiplex ADM				NS-N	NS-P	NS-R VS-R					
	1.8V, Burst-mode, SRW, AADM						XS-R					
	1.8V, Standard-mode	AS-J										
Serial NOR	3.0V, Serial Peripheral Interface		FL-K FL1-K FL2-K	FL-L		FL-P		FL-S	FL-T			
	1.8V, Serial Peripheral Interface			FS-L				FS-S	FS-T			
NAND	3.0V, ONFI 1.0, SLC NAND									ML-1	ML-2	
	1.8V, ONFI 1.0, SLC NAND									MS-1	MS-2	
e.MMC	3.0V e.MMC 4.51, MLC NAND											41-1B1

Legacy products under obsolescence New products in planning / development

CYPRESS KL/KS FAMILIES
128Mb – 512Mb 3V/1.8V HyperFlash Memory

Cypress's KL/KS HyperFlash™ family consists of high-speed CMOS, MirrorBit™ NOR flash devices implementing the low pin-count Cypress HyperBus™ interface that achieves the industry's highest read bandwidth, up to 333 megabytes per second – more than five times faster than ordinary Quad SPI flash with one-third the pin-count of parallel flash. The combination of high performance and low pin count makes HyperFlash memories especially attractive for systems needing instant-on operation and interactive Graphical User Interfaces (GUI). HyperFlash is offered in a 24-Ball BGA package which provides an easy migration from Cypress's single and dual-QSPI (2xQSPI) packages. This package allows performance scalability from a QSPI device to a dual-QSPI device to the highest performance HyperFlash.

KEY DEVICE FEATURES	
Voltage	2.7 - 3.6V (KL) 1.7 - 1.95V (KS)
Densities	128Mb – 512Mb
Interface	HyperBus
Bus Width	x8
Sector Type	Uniform
Clock Rate	100MHz (KL) 166MHz (KS)
Temperature Ranges	-40°C to +85°C -40°C to +105°C -40°C to +125°C
Automotive Support	AEC-Q100 PPAP

Key Applications
- Automotive instrument clusters
- Automotive infotainment systems
- Hand-held displays
- Digital cameras
- Projectors
- Factory automation
- Medical diagnostic equipment
- Home automation appliances

Packages
- 24-Ball FBGA

CYPRESS GL FAMILY
32Mb – 2Gb, 3V NOR Flash Memory

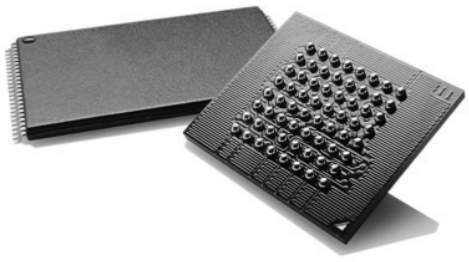
The Cypress GL family is optimized for the voltage, density, cost-per-bit, reliability, performance and scalability needs of a wide variety of embedded applications. With densities from 32Mb to 2Gb, each device requires only a single 3.0V power supply for read and write functions and is entirely command set compatible with the JEDEC flash standards. The Cypress GL family supports Cypress'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 DEVICE FEATURES	
Voltage	3.0V
Densities	32Mb – 2Gb
Interface	Page mode
Bus Width	x8 or x16, x16 only*
Sector Type	Uniform
Access Time	70** – 130ns
Page Access Mode	15-30ns, 8 word/16 word*
Temperature Ranges	0°C to +70°C -40°C to +85°C -40°C to +105°C*
Security	Advanced sector protection
Automotive Support	AEC-Q100 PPAP

* For GL-S
**For GL064S

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



CYPRESS AL/JL/PL FAMILIES
8Mb – 128Mb, 3.0V Parallel NOR Flash Memory

Cypress offers a broad line of 3.0V Parallel NOR devices on a high-reliability technology with an array of features to meet the needs of a wide variety of embedded applications. The 3.0V Cypress AL family devices are standard mode flash with low density offerings and extended temperature support. The 3.0V Cypress JL family devices offer two and four-bank memory configurations to allow performance gains via simultaneous read/write operations. The 3.0V Cypress PL family devices not only provide the benefits of a four-bank configuration, but also support page mode operations which further increases read bandwidth 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 Width	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 Access Time (Mode)	N/A	N/A	25 – 30ns, (8 word)
Banks	1	2 – 4	4
Temperature Ranges	-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
Automotive Support	AEC-Q100, PPAP	AEC-Q100, PPAP	AEC-Q100, PPAP*

* PPAP available on select PL family part numbers

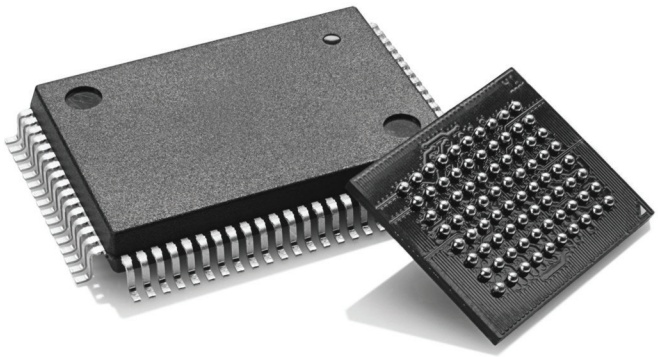
CYPRESS CD/CL FAMILY
32Mb – 64Mb, 2.5/3.0V Burst Mode NOR Flash Memory

Cypress'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 Cypress CD and CL families offer a wide x32 data bus and extended temperature support. These features and a high-reliability technology can help enable the next generation of automotive infotainment and navigation systems.

KEY DEVICE FEATURES	
Voltage	2.5V (CD) and 3.0V (CL)
Densities	16Mb – 32Mb
Bus Width	x32
Sector Type	Top/Bottom boot
Burst Frequency	Up to 75 MHz
Temperature Ranges	-40°C to +125°C, -40°C to +145°C (on die/wafer products)
Security	OTP region, advanced sector protection
Automotive Support	AEC-Q100 PPAP

Key Applications
- Automotive under-the-hood
- Automotive instrument clusters
- Automotive infotainment systems

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



CYPRESS AS FAMILY

8Mb – 16Mb, 1.8V NOR Flash Memory

The 1.8V Cypress 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 DEVICE FEATURES	
Voltage	1.8V
Densities	8Mb - 16Mb
Interface	Standard NOR
Bus Width	x8/x16
Sector Type	Top/Bottom boot
Access Time	70ns
Temperature Ranges	-40°C to +85°C -40°C to +105°C (16Mb)
Security	Secured Silicon Region, 256-byte OTP sector for permanent, secure identification
Automotive Support	AEC-Q100

Key Applications

- Handheld navigation
- Bluetooth
- Personal media players

Packages

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

CYPRESS WS/NS/VS/XS FAMILIES

64Mb – 512Mb, 1.8V, Burst Mode, Simultaneous Read/Write, NOR Flash Memory

Cypress's 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 Cypress 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.

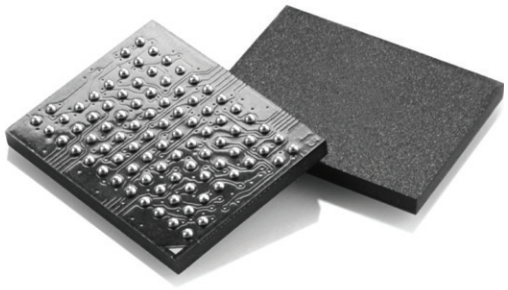
KEY DEVICE FEATURES	
Voltage	1.8V
Densities	64Mb – 512Mb
Interface	WS: (ADP), NS/VS: (ADM), XS: (AADM)
Bus Width	x16
Sector Type	Top/Bottom/Dual boot
Initial Access Time	80ns
Page Mode Access Time	15ns (WS only)
Burst Frequency	Up to 108MHz
Temperature Ranges	-25°C to +85°C, -40°C to +85°C (select products)
Security	Secured Silicon Region, 256-word OTP sector for permanent, secure identification

Key Applications

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

Packages

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



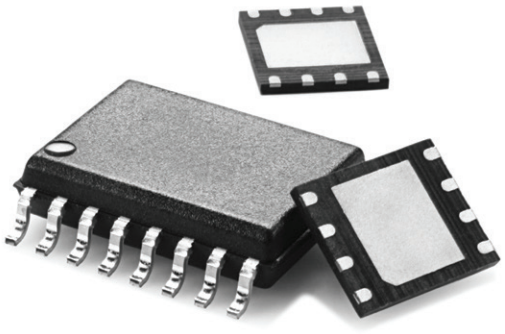
CYPRESS FL FAMILY
8Mb – 1Gb, 3V Serial Flash Memory

The Cypress FL Serial flash family offers the highest density SPI flash with lower pin counts, enabling lower overall system cost and fast read/write performance. These benefits, coupled with a flexible sector architecture, make the Cypress 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 Cypress FL-S SPI family offers increased levels of read/write performance and functionality with an enhanced feature set, delivering an effective read bandwidth of up to 80MBps while maintaining backward compatibility with legacy solutions, enabling easy migrations.

KEY DEVICE FEATURES	
Voltage	2.7-3.6V Vcc (All) 1.65-3.6V V_{IO} (FL-S)
Densities	8Mb – 1Gb
Interface	SPI
Bus Width	x1, x2, x4
Sector Type	Uniform 4KB, Uniform 64KB, Uniform 256KB (128Mb – 1Gb FL-S)
Performance	Up to 133MHz (Single I/O) Up to 104MHz (Dual/Quad I/O) Up to 80MHz (DDR)
Temperature Ranges	-40°C to +85°C -40°C to +105°C
Security	Advanced sector protection, OTP region, Security registers with OTP lock down, software/hardware protection modes, Unique ID
Automotive Support	AEC-Q100 PPAP

Key Applications
- Digital TV
- DVD players/recorders
- Set-top box
- High-end printers
- DSL modems
- Optical disk drives
- Wireless LANs
- Automotive instrument clusters
- Automotive infotainment systems

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



CYPRESS FS FAMILY
128Mb – 512Mb, 1.8V Serial Flash Memory

Cypress's 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 MBps of read bandwidth. In addition, industry leading programming performance of up to 1.08 MBps increases manufacturing throughput and lowers programming costs dramatically. In addition, the available Deep Power Down mode enables the device to operate in the lowest possible power consumption state.

KEY DEVICE FEATURES	
Voltage	1.70 – 2.0V
Densities	128Mb – 512Mb
Interface	x1, x2, x4
Sector Type	8x4KB and 1x32KB at top/bottom with all remaining sectors 64KB (128/256Mb); 8x4KB and 1x224KB at top/bottom with all remaining sectors 256KB; option of uniform 256KB (512Mb)
Temperature Ranges	-40°C to +85°C -40°C to +105°C
Security	Advance sector protection, OTP region, Security registers with OTP lock down, software/hardware protection modes, Unique ID
Automotive Support	AEC-Q100 PPAP

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

CYPRESS ML/MS FAMILIES

1Gb – 16Gb NAND 3V/1.8V NAND Flash Memory

Cypress NAND products complement the parallel and serial NOR offerings from Cypress for embedded applications. Cypress applies its stringent process for qualification, testing, extended temperature support and packaging to its line of SLC NAND products. Cypress's high performance and high reliability SLC NAND product portfolio is available in 1Gb, 2Gb, 4Gb, 8Gb (DDP) and 16Gb (QDP) densities. These products will work with systems that support 1-bit ECC and 4-bit ECC. All of Cypress's NAND products are backed by Cypress's world-class customer support and commitment for longevity of supply.

KEY DEVICE FEATURES	
Voltage	3V/1.8V
Technology	4x/3x nm SLC FG NAND
Densities	1Gb – 16Gb
Interface	ONFI 1.0
Bus Width	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 Ranges	-40°C to +85°C, -40°C to +105°C
Packages	48-Pin TSOP 63-Ball BGA 67-Ball BGA
Software Support	Complimentary Drivers and Cypress FFS
Automotive Support	AEC-Q100 PPAP

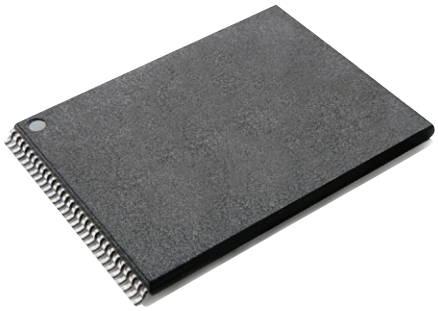
[1] Performance varies by product. Please refer to product tables for more information.

Key Applications

- Digital TVs
- Set-top boxes
- Network memory modules
- Industrial meters
- Industrial sensors
- Game consoles
- Printers
- Digital camera
- Automotive instrument clusters
- Automotive infotainment systems
- GPS navigation
- Toys

Packages

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



CYPRESS 41-IBI FAMILY

8GB – 16GB, 3.0V e.MMC NAND Flash Memory

Cypress e.MMC products are tailored for embedded platforms. These products complement Cypress's NOR and SLC NAND product offerings. The integrated controller on Cypress e.MMC products perform complex flash management, error correction and wear leveling to reduce the complexities that come with designing in a NAND solution. The controller and its custom Cypress firmware boost the overall performance and quality of the product.

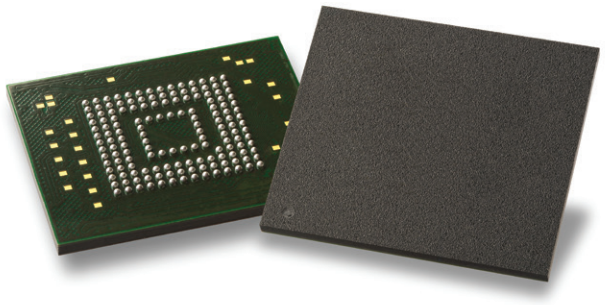
Cypress e.MMC products come with tools, collateral and qualification data that will simplify design cycles and expedite time to market. They also offer features such as direct boot, configurability of pseudo-SLC and MLC partitions, protection from power loss and health monitoring.

Cypress's e.MMC product portfolio is compatible with the JEDEC e.MMC 4.51 (JESD84-B451) specifications. They are available in 8GB and 16GB densities, and 153-ball VFBGA (0.5mm ball pitch) and 100-ball LBGA (1.0mm ball pitch) package options. These products are qualified and tested through stringent processes to meet Cypress's world class quality requirements.

KEY DEVICE FEATURES	
Densities	8GB - 16GB
Compliant	e.MMC 4.51 (JESD84-B451)
Power Supply	3.0V Core 3.0V/1.8V IO
Industry Standard Packages	153-ball VFBGA (0.5mm ball pitch) 100-ball LBGA (1.0mm ball pitch)
Temperature Options	Embedded (-25°C to +85°C) Industrial (-40°C to +85°C)
Sequential Performance	Read up to 125MB/sec Write up to 20MB/sec *Based on 16GB configuration

Key Applications

- Consumer
- Industrial
- Medical
- Networking
- Printers



(S) CYPRESS ORDERING PART NUMBER CONSTRUCTION

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

Controller (e.MMC)
B1 = e.MMC 4.51

Product Series
25 = Serial Peripheral Interface (SPI) Flash Memory
26 = HyperFlash Memory
29 = Sector Erase NOR Flash Memory
34 = Floating Gate NAND
40 = Controller-based Solution
70 = Dual Die Flash Package
79 = x8 SPI Dual Die Flash Package

Density
001 - 512 = 1Mb - 512Mb
208 - 216 = 8Mb - 16Mb*
116 - 164 = 16Mb - 64Mb**
01G - 16G = 1Gb - 16Gb****
008 - 016 = 8GB - 16GB***

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 = Industrial-plus (-40° to +105°C)
N = Extended (-40° to +125°C)
H = Hot (-40° to +145°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	K
Burst (AADM)	X	
Serial (SPI)		F
Automotive Burst (Demux)	C	
NAND		M
e.MMC		4

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

Core Voltage
L = 3.0V VCC
D = 2.5V VCC
S = 1.8V VCC
1 = 3.0V 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)
1 = MLC NAND Revision 1 (1X nm)

Package Type (Family)
A = BGA - 0.5mm pitch
B = BGA - 0.8mm pitch
C = CSOP
D = Fortified BGA, 9x9mm
E= Super CSP
F = Fortified BGA, 11x13mm
M = SOIC/SOP
N = SON
P = PLCC
Q = PQFP
S = SSOP
T = TSOP
G = BGA - 0.8mm pitch
B = BGA***

Package Material Set
(Varies by Package Type)
A = Leaded
F = Lead (Pb)-Free
H = Low Halogen Lead (Pb)-Free
1 = 153-BGA Low Halogen Lead (Pb)-Free***
2 = 100-BGA 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
*** For e.MMC
**** For SLC NAND

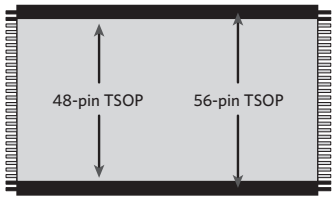
CYPRESS'S UNIVERSAL FOOTPRINT

Consistent Packages And Pinouts Speeds Time-To-Market And Reduces Design

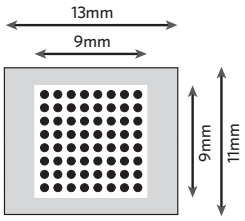
Cypress's universal footprint with consistent packaging and pinouts across product families, process technologies and densities allows design engineers to swap devices at any point in the design or product life-cycle without affecting board design.

Designers can manage differentiated end product models based on a single platform design thanks to Cypress'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.

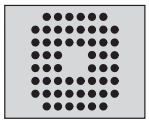
Parallel NOR



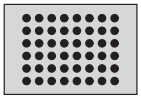
48-PIN AND 56-PIN TSOP
For extreme design flexibility
8Mb – 1Gb



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

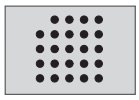


56-BALL BGA
For small form factor for high densities
128Mb – 512Mb



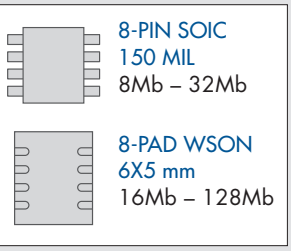
48-BALL
FINE PITCH BGA
For small form factor for low densities
8Mb – 64Mb

HyperFlash



24-BALL BGA
5X5 BALL ARRAY
128Mb – 512Mb

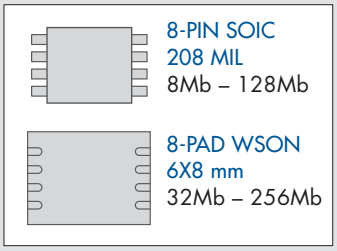
SPI NOR



8-PIN SOIC
150 MIL
8Mb – 32Mb

8-PAD WSON
6X5 mm
16Mb – 128Mb

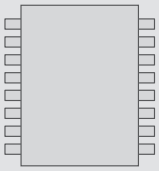
150 MIL SOIC AND 6X5 WSON



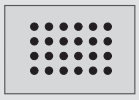
8-PIN SOIC
208 MIL
8Mb – 128Mb

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

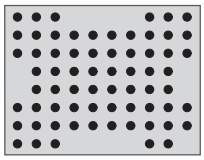


24-BALL BGA
6X4 BALL ARRAY
16Mb – 512Mb

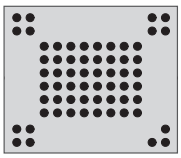
24-BALL BGA
5X5 BALL ARRAY
16Mb – 1Gb

NAND

48-PIN TSOP
1Gb – 16Gb

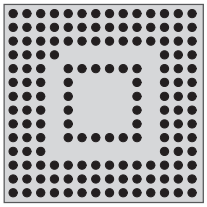


67-BALL BGA
1Gb – 2Gb

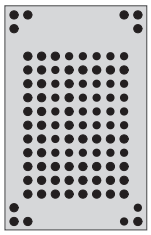


63-BALL BGA
1Gb – 16Gb

e.MMC



153-BALL BGA
8GB – 16GB



100-BALL BGA
8GB – 16GB

LEVERAGING THE CYPRESS UNIVERSAL FOOTPRINT

Design Simplicity

- One footprint across densities, product families and process technologies
- Scalable, 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

3.0V HYPERFLASH 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
512Mb			•	S26KL512S	100 MHz	24-Ball FBGA	-40° to +85°C, -40° to +105°C, -40° to +125°C	2.7-3.6	2.7-3.6	x8	U	Footprint compatible with Cypress's Single and Dual-Quad-SPI (2xQSPI) packages
256Mb			•	S26KL256S	100 MHz	24-Ball FBGA	-40° to +85°C, -40° to +105°C, -40° to +125°C	2.7-3.6	2.7-3.6	x8	U	Footprint compatible with Cypress's Single and Dual-Quad-SPI (2xQSPI) packages
128Mb			•	S26KL128S	100 MHz	24-Ball FBGA	-40° to +85°C, -40° to +105°C, -40° to +125°C	2.7-3.6	2.7-3.6	x8	U	Footprint compatible with Cypress's Single and Dual-Quad-SPI (2xQSPI) packages

1.8V HYPERFLASH 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
512Mb			•	S26KS512S	166 MHz	24-Ball FBGA	-40° to +85°C, -40° to +105°C, -40° to +125°C	1.70 - 1.95	1.70 - 1.95	x8	U	Footprint compatible with Cypress's Single and Dual-Quad-SPI (2xQSPI) packages
256 Mb			•	S26KS256S	166 MHz	24-Ball FBGA	-40° to +85°C, -40° to +105°C, -40° to +125°C	1.70 - 1.95	1.70 - 1.95	x8	U	Footprint compatible with Cypress's Single and Dual-Quad-SPI (2xQSPI) packages
128 Mb			•	S26KS128S	166 MHz	24-Ball FBGA	-40° to +85°C, -40° to +105°C, -40° to +125°C	1.70 - 1.95	1.70 - 1.95	x8	U	Footprint compatible with Cypress's Single and Dual-Quad-SPI (2xQSPI) packages

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 -40° to +125°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, Versatile I/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, Versatile I/O, 32-word write buffer.
1 Gb	•			S29GL01GT	100 (15), 110 (20)	56-pin TSOP, 56-Ball FBGA, 64-Ball FBGA	-40° to +85°C, -40° to +105°C, -40° to +125°C	2.7-3.6	2.7-3.6, 1.65-Vcc	x8/ x16	H, L	Sectors: 1024x128KB; 32-Byte Page Mode Read; WP# Pin; Secured Silicon Region; Advanced Sector Protection, Versatile I/O, 512-byte 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, Versatile I/O, 512-byte write buffer.
1 Gb	•			S29GL01GP	110 (25), 120 (25), 130 (25)	56-Pin TSOP, 64-Ball FBGA, 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, Versatile I/O, 32-word write buffer.
512Mb	•			S29GL512T	100 (15), 110 (20)	56-pin TSOP, 56-Ball FBGA, 64-Ball FBGA	-40° to +85°C, -40° to +105°C, -40° to +125°C	2.7-3.6	2.7-3.6, 1.65-Vcc	x8/ x16	H, L	Sectors: 512x128KB; 32-Byte Page Mode Read; WP# Pin; Secured Silicon Region; Advanced Sector Protection, Versatile I/O, 512-byte write buffer.
512Mb	•			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, Versatile I/O, 512-byte write buffer.
512Mb	•			S29GL512P	100 (25), 110 (25), 120 (25)	56-Pin TSOP, 64-Ball FBGA,	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, Versatile I/O, 32-word write buffer.
256Mb	•			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, Versatile I/O, 512-byte write buffer.
256Mb	•			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, Versatile I/O; 32-word write buffer.
128Mb	•			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, Versatile I/O, 512-byte write buffer.
128Mb	•			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, Versatile I/O, 32-word write buffer.
128Mb	•	•		S29PL127J	60(25), 65(25), 70(30)	56-Pin TSOP, 80-Ball FBGA, KTW	-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.
64Mb	•			S29GL064S	70 (15), 80 (25)	48-Pin TSOP, 56-Pin TSOP, 48-Ball FBGA, 64-Ball FBGA	-40° to +85°C, -40° to +105°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; Versatile I/O; 256-word write buffer.
64Mb	•			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; Versatile I/O; 16-word write buffer.
64Mb	•	•		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.
64Mb		•		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.
32Mb	•			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; Versatile I/O; 16-word write buffer.
32Mb	•	•		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.
32Mb		•		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.
32Mb		•	•	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.
16Mb				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.
16Mb		•	•	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.
8Mb				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

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, KGD	-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 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 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.

3.0V & 1.8V SPI 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
1 Gb				S70FL01GS	133MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)1	16-Pin SO, 24-ball BGA (6x8mm)	-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.
512Mb				S25FS512S	33MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)	16-pin SO, 24-ball BGA (6x8 mm), WSON 6x8 mm	-40° to +85°C, -40° to +105°C	1.7-2.0		x1, x2, x4	U	Sectors: uniform 256KB with eight 4KB sub-sectors and one 224KB sub-sector top/bottom; or all uniform 256KB sectors.
512Mb				S25FL512S	133MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)1	16-Pin SO, 24-ball BGA (6x8mm)	-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.
256Mb				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.
256Mb				S25FL256S	133MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)1	16-Pin SO, 8-contact WSON (6x8 mm), 24-ball BGA (6x8mm)	-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.
256Mb				S70FL256P	104MHz (Single I/O), 80MHz (Multi I/O)	16-Pin SO, 24-ball BGA (6x8mm)	-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.
128Mb				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.
128Mb				S25FL127S	108MHz (Single I/O), 108MHz (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		x1, x2, x4	U	Sectors: uniform 256KB or uniform 64KB with 16 top/bottom 4KB sub-sectors; H/W & S/W write protect; OTP sector.
128Mb				S25FL128S	133MHz (Single I/O), 104MHz (Multi I/O), 80MHz (DDR)1	16-Pin SO, 8-contact WSON (6x8mm), 24-ball BGA (6x8mm)	-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.
128Mb				S25FL129P	104MHz (Single I/O), 80MHz (Multi I/O)	16-Pin SO, 8-contact WSON (6x8mm), 24-ball BGA (6x8mm)	-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.
128Mb				S25FL128P	104MHz (Single I/O)	16-Pin SO, 8-contact WSON (6x8mm)	-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.
64Mb				S25FL064P	104MHz (Single I/O), 80MHz (Multi I/O)	16-Pin SO, 8-contact WSON (6x8mm), 24-ball BGA (6x8mm), 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.
64Mb				S25FL164K	108MHz (Multi I/O)	8-Pin SO 208mil, 16-Pin SO, 8-contact WSON (5x6mm), 24-ball BGA (6x8mm), 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.
32Mb				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.
32Mb				S25FL132K	108MHz (Multi I/O)	8-Pin SO 208mil, 8-Pin SO 150mil, 8-contact WSON (5x6mm), 24-ball BGA (6x8mm), 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.
16Mb				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.
16Mb				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.
8Mb				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.

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

3.0V NAND FLASH MEMORY

Density	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	Part Number	Packages	Temp	V_{CC}(V)	Features
1Gb	x8	1024	2048+64	25	25	200	2	1	S34ML01G100	TSOP 48, BGA 63	-40° to +85°C, -40° to +105°C	2.7-3.6	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 105°C available with *2-bit ECC instead of 1-bit ECC.
1Gb	x8	1024	2048+64	25	25	300	3	4	S34ML01G200	TSOP 48, BGA 63, BGA 67	-40° to +85°C, -40° to +105°C	2.7-3.6	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
1Gb	x16	1024	2048+64	25	25	300	3	4	S34ML01G204	TSOP 48	-40° to +85°C	2.7-3.6	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.
2Gb	x8	2048	2048+64	25	25	200	3.5	1	S34ML02G100	TSOP 48, BGA 63	-40° to +85°C, -40° to +105°C	2.7-3.6	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 105°C available now.
2Gb	x16	2048	2048+64	25	25	200	3.5	1	S34ML02G104	TSOP 48,	-40° to +85°C	2.7-3.6	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.
2Gb	x8	2048	2048+64	25	30	300	3.5	4	S34ML02G200	TSOP 48, BGA 63	-40° to +85°C	2.7-3.6	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.
4Gb	x8	4096	2048+64	25	25	200	3.5	1	S34ML04G100	TSOP 48, BGA 63	-40° to +85°C, -40° to +105°C	2.7-3.6	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 105°C available now.
4Gb	x16	4096	2048+64	25	25	200	3.5	1	S34ML04G104	TSOP 48, BGA 63	-40° to +85°C, -40° to +105°C	2.7-3.6	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 105°C available now.
4Gb	x8	4096	2048+64	25	30	300	3.5	4	S34ML04G200	TSOP 48, BGA 63	-40° to +85°C, -40° to +105°C	2.7-3.6	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.
8Gb	x8	8192	2048+64	25	25	200	3.5	1	S34ML08G101	TSOP 48, BGA 63	-40° to +85°C	2.7-3.6	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).
8Gb	x8	8192	2048+64	25	30	300	3.5	4	S34ML08G201	TSOP 48, BGA 63	-40° to +85°C	2.7-3.6	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.
16Gb	x8	16384	2048+64	25	30	300	3.5	4	S34ML16G202	TSOP 48, BGA 63	-40° to +85°C	2.7-3.6	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 FLASH MEMORY

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	Part Number	Packages	Temp	V_{cc} (V)	Features
1Gb	x8	1024	2048+64	45	25	250	2	1	S34MS01G100	BGA 63	-40° to +85°C	1.7-1.95	ONFI 1.0 compliant, HW protection for involuntary pgm/erase during power transition, block zero valid up to 1K cycles, supports read cache.
1Gb	x8	1024	2048+64	45	25	300	3	4	S34MS01G200	TSOP 48, BGA 63, BGA 67	-40° to +85°C	1.7-1.95	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.
1Gb	x16	1024	2048+64	45	25	300	3	4	S34MS01G204	BGA 63	-40° to +85°C	1.7-1.95	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.
1Gb	x16	1024	2048+64	45	25	250	3.5	1	S34MS01G104	BGA 63	-40° to +85°C	1.7-1.95	ONFI 1.0 compliant, HW protection for involuntary pgm/erase during power transition, block zero valid up to 1K cycles, supports read cache.
2Gb	x8	2048	2048+64	45	25	250	3.5	1	S34MS02G100	TSOP 48, BGA 63	-40° to +85°C	1.7-1.95	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.
2Gb	x8	2048	2048+128	45	30	300	3.5	4	S34MS02G200	TSOP 48, BGA 63, BGA 67	-40° to +85°C	1.7-1.95	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.
2Gb	x16	2048	2048+64	45	25	250	3.5	1	S34MS02G104	BGA 63	-40° to +85°C, -40° to +105°C	1.7-1.95	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.
2Gb	x16	2048	2048+128	45	30	300	3.5	4	S34MS02G204	TSOP 48, BGA 63,	-40° to +85°C	1.7-1.95	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.
4Gb	x8	4096	2048+64	25	25	200	3.5	1	S34MS04G100	TSOP 48, BGA 63	-40° to +85°C	1.7-1.95	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.
4Gb	x8	4096	2048+64	45	30	300	3.5	4	S34MS04G200	BGA 63	-40° to +85°C	1.7-1.95	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.
4Gb	x16	4096	2048+64	45	30	300	3.5	4	S34MS04G204	TSOP 48, BGA 63	-40° to +85°C	1.7-1.95	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.
8Gb	x8	8192	2048+64	45	30	300	3.5	4	S34MS08G201	BGA 63	-40° to +85°C	1.7-1.95	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.
16Gb	x8	16384	2048+64	45	30	300	3.5	4	S34MS16G202	BGA 63	-40° to +85°C	1.7-1.95	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.

1.8V NAND MCP SOLUTIONS

Product	Technology (nm)	Code Flash (Mb)	PSRAM (Mb)	DRAM (Mb)	Flash/RAM Speed (MHz)[1]	MCP/POP	Package (mm)	Package Footprint
S76MSA90222AHD000	32nm NAND/46nm LPDDR1 DRAM	1Gb	N/A	512Mb	200	MCP	9 x 8	130-Ball

3.0V e.MMC NAND FLASH MEMORY

Density	I/O Bus Width	e.MMC Interface	Part Number	e.MMC Bandwidth	Package	Package Size (mm)	Temp (C)	V_{cc}(V)	V_{ccq}(V)	Features
8GB	x8	4.51	S40410081B1B1	Up to 200MB/sec	153-ball BGA	11.5 x 13	-25° to +85°C, -40° to +85°C	2.7-3.6	1.7-1.95, 2.7-3.6	e.MMC 4.51 compliant, protection against power loss, health monitoring, HS200 mode, MLC/pSLC partitions.
8GB	x8	4.51	S40410081B1B2	Up to 200MB/sec	100-ball BGA	14 x 18	-25° to +85°C, -40° to +85°C	2.7-3.6	1.7-1.95, 2.7-3.6	e.MMC 4.51 compliant, protection against power loss, health monitoring, HS200 mode, MLC/pSLC partitions.
16GB	x8	4.51	S40410161B1B1	Up to 200MB/sec	153-ball BGA	11.5 x 13	-25° to +85°C, -40° to +85°C	2.7-3.6	1.7-1.95, 2.7-3.6	e.MMC 4.51 compliant, protection against power loss, health monitoring, HS200 mode, MLC/pSLC partitions.
16GB	x8	4.51	S40410161B1B2	Up to 200MB/sec	100-ball BGA	14 x 18	-25° to +85°C, -40° to +85°C	2.7-3.6	1.7-1.95, 2.7-3.6	e.MMC 4.51 compliant, protection against power loss, health monitoring, HS200 mode, MLC/pSLC partitions.

3.0V PARALLEL ADP MCP SOLUTIONS

Product	Technology (nm)	Code Flash (Mb)	PSRAM (Mb)	Initial Access / Page Read Times (ns)	MCP/POP	Package (mm)	Package Footprint
S98GL064NB0	110	64	32	90/25	MCP	9 x 7	56-ball BGA

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
S98WS064RA0	65	64	16		Asynchronous	MCP	10.0 x 8.0	88-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 ADM MCP SOLUTIONS

Product	Technology (nm)	Code Flash (Mb)	PSRAM (Mb)	DRAM (Mb)	Flash/RAM Speed (MHz)[1]	MCP/POP	Package (mm)	Package Footprint
S72VS256RE0	65	256		256	108/166	MCP	8.0 x 8.0	133-ball
S71VS256RD0	65	256	128		108/108	MCP	9.2 x 8.0	56-ball
S71VS256RC0	65	256	64		108/108	MCP	7.7 x 6.2	56-ball
S71VS128RC0	65	128	64		108/108	MCP	7.7 x 6.2	56-ball
S71VS128RB0	65	128	32		108/108	MCP	7.7 x 6.2	56-ball
S71VS064RB0	65	64	32		108/108	MCP	7.5 x 5.0	52-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 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

CYPRESS LONG-TERM MEMORY PORTFOLIO

The Cypress Long-Term Memory longevity program allows for the exact OPN or an OPN with a compatible set of "Core Features" for 10 years for NOR products (five years for NAND and HyperFlash Memory products). "Core Features" will be forward compatible with newer technology nodes: command set, mechanical package and pin-out, density, voltage range and temperature range.

Recommended Part Numbers						
Density	Serial NOR Flash Memory			Parallel NOR Flash Memory		
	OPN		10 Start Date	OPN		10 Start Date
16Mb	S25FL116K0XMFI010		09/01/13			
32Mb	S25FL132K0XMFI010		09/01/13	S29GL032N90BFI03 S29GL032N90BFI04 S29GL032N90FFI01 S29GL032N90FFI02 S29GL032N90FFI03	S29GL032N90FFI04 S29GL032N90TFI01 S29GL032N90TFI02 S29GL032N90TFI03 S29GL032N90TFI04	05/01/13
64Mb	S25FL164K0XMFI000 S25FL164K0XMFI010		09/01/13	S29GL064N90BFI03 S29GL064N90BFI04 S29GL064N90FFI01 S29GL064N90FFI02 S29GL064N90FFI03 S29GL064N90FFI04	S29GL064N90TFI01 S29GL064N90TFI02 S29GL064N90TFI03 S29GL064N90TFI04 S29GL064N90TFI06 S29GL064N90TFI07	05/01/13
128Mb	S25FL128SAGBHI200 S25FL128SAGBHI300 S25FL128SAGBHI310 S25FL128SAGBHIA10 S25FL128SAGBHIZ00 S25FL127SABMFI000 S25FL127SABMFI100	S25FL128SAGMFI000 S25FL128SAGMFI010 S25FL128SAGMFIR00 S25FL128SAGMFIR10	06/01/12 09/01/13	S29GL128S10DHI010 S29GL128S10DHI020 S29GL128S10DHIV10 S29GL128S10DHIV20 S29GL128S10TFI010 S29GL128S90DHI020 S29GL128S90TFI010 S29GL128S90TFI020	S29GL128S10TFI020 S29GL128S10TFIV10 S29GL128S10TFIV20 S29GL128S90DHI010	06/01/12
256Mb	S25FL256SAGBHI200 S25FL256SAGBHI210 S25FL256SAGBHI300 S25FL256SAGBHI310 S25FL256SAGBHIA00 S25FL256SAGBHIA10	S25FL256SAGBHIT00 S25FL256SAGMFI000 S25FL256SAGMFI010 S25FL256SAGMFIR00 S25FL256SAGMFIR10 S25FS256SAGBHI203	06/01/12	S29GL256S10DHI010 S29GL256S10DHI020 S29GL256S10DHIV10 S29GL256S10DHIV20 S29GL256S10TFI010 S29GL256S10TFI020	S29GL256S10TFIV10 S29GL256S10TFIV20 S29GL256S90DHI010 S29GL256S90DHI020 S29GL256S90TFI010 S29GL256S90TFI020	06/01/12
512Mb	S25FL512SAGMFI010 S25FL512SDSBHI210 S25FL512SAGBHIC10 S25FL512SAGBHVC10		09/01/13 09/25/15	S29GL512S10DHI010 S29GL512S10DHI020 S29GL512S10TFI010 S29GL512S10TFI020 S29GL512S11DHI010 S29GL512S11DHI020	S29GL512S11DHIV10 S29GL512S11DHIV20 S29GL512S11TFI010 S29GL512S11TFI020 S29GL512S11TFIV10 S29GL512S11TFIV20	06/01/12
1Gb				S29GL01GS10DHI010 S29GL01GS10DHI020 S29GL01GS10TFI010 S29GL01GS10TFI020 S29GL01GS11DHI010 S29GL01GS11DHI020	S29GL01GS11DHIV10 S29GL01GS11DHIV20 S29GL01GS11TFI010 S29GL01GS11TFI020 S29GL01GS11TFIV10 S29GL01GS11TFIV20	06/01/12
2Gb	S70GL02GS11FHI010					

Recommended Part Numbers			
Density	SLC NAND Flash Memory		
	OPN		+5 Start Date
1Gb	S34ML01G100BHI000 S34ML01G100TFI000 S34ML01G200BHI000 S34ML01G200TFI000	S34MS01G100BHI000 S34MS01G104BHI010 S34MS01G200BHI000 S34MS01G204BHI010	12/01/12
2Gb	S34ML02G100BHI000 S34ML02G100TFI000 S34ML02G200BHI000 S34ML02G200TFI000	S34MS02G104BHI010 S34MS02G200BHI000 S34MS02G204BHI010	12/01/12
4Gb	S34ML04G100BHI000 S34ML04G100TFI000 S34ML04G200BHI000 S34ML04G200TFI000	S34MS04G100BHI000 S34MS04G200BHI000 S34MS04G204BHI010 S34MS04G204TFI010	12/01/12
8Gb	S34ML08G101BHI000 S34ML08G101TFI000		12/01/12

Recommended Part Numbers			
Density	Hyper Flash Memory		
	OPN		+5 Start Date
128Mb	S26KL128SDABHI020 S26KL128SDABHV020	S26KS128SDPBHI020 S26KS128SDPBHV020	10/12/15
256Mb	S26KL256SDABHI020 S26KL256SDABHV020	S26KS256SDPBHI020 S26KS256SDPBHV020	10/12/15
512Mb	S26KL512SDABHI020 S26KL512SDABHV020	S26KS512SDPBHI020 S26KS512SDPBHV020	10/12/15

* Contact your local sales representative for additional Long-term commitments

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