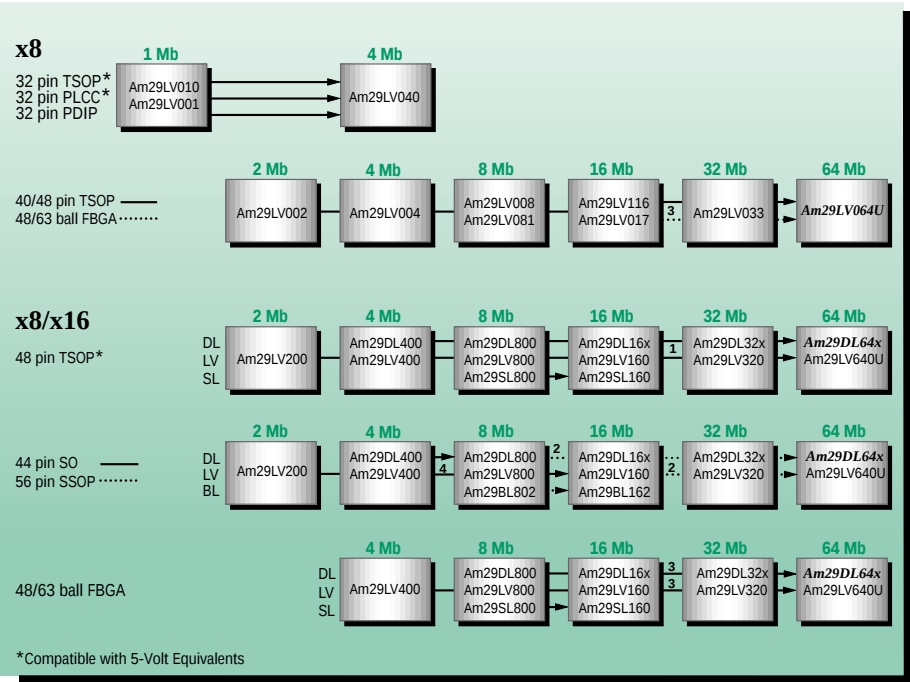


Flash Memory

Quick Reference Guide Spring '99

Low-Voltage Package Migration



- (1) 3 pin change to accommodate new features
- (2) 44-56 pin migration
- (3) 48-63 pin migration
- (4) 1 pin change

Products and packages in *italic* are on AMD's roadmap, but have not yet been introduced or released in a particular package. Dotted lines indicate same pin count as previous density, but different pin out.

1.8 Volt-only Flash

Density	Part Number	Access Time (ns)	Organization	Temperature Range	Package Type	KGD	Pin Count	Supply Voltage
8Mb	Am29SL800	100,120,150	1M x 8 / 512K x 16	C,I	E,F,WB		48	1.8 - 2.2V
16Mb	Am29SL160	100,120,150	2M x 8 / 1M x 16	C,I	E,W,C		48	1.8 - 2.2V

3.0 Volt-only Flash

Density	Part Number	Access Time (ns)	Organization	Temperature Range	Package Type	KGD	Pin Count	Supply Voltage
1Mb	Am29LV001	45R	128K x 8	C	E,F,J		32	3.0 - 3.6V
		55,70,90	128K x 8	C,I,E	E,F,J		32	2.7 - 3.6V
1Mb	Am29LV010*	45R	128K x 8	C	E,F,J		32	3.0 - 3.6V
		55,70,120	128K x 8	C,I,E	E,F,J		32	2.7 - 3.6V
2Mb	Am29LV002*	55R	256K x 8	C,I	E,F		40	3.0 - 3.6V
		70,90,120	256K x 8	C,I,E	E,F		40	2.7 - 3.6V
2Mb	Am29LV200	50R,55R	256K x 8 / 128 x 16	C,I	E,F,S		44/48	3.0 - 3.6V
		70	256K x 8 / 128 x 16	C,I	E,F,S		44/48	2.7 - 3.6V
		90,120	256K x 8 / 128 x 16	C,I,E	E,F,S		44/48	2.7 - 3.6V
4Mb	Am29LV004	70	512K x 8	C,I	E,F		40	2.7 - 3.6V
		90,120	512K x 8	C,I,E	E,F		40	2.7 - 3.6V
4Mb	Am29LV400	50R, 55R	512K x 8	C,I	E,F,J,WA		44/48	3.0 - 3.6V
		70,90,120	512K x 8	C,I,E	E,F,J,WA		44/48	2.7 - 3.6V
4Mb	Am29LV040*	55R	512K x 8	C,I	E,F,J		32	3.0 - 3.6V
		70,90,120	512K x 8	C,I,E	E,F,J		32	2.7 - 3.6V
8Mb	Am29LV008	70R	1M x 8	C,I	E,F		40	3.0 - 3.6V
		80,90,120	1M x 8	C,I,E	E,F		40	2.7 - 3.6V
8Mb	Am29LV800	70,90,120	1M x 8 / 512K x 16	C,I,E	E,F,S,WB	Now	44/48	2.7 - 3.6V
8Mb	Am29LV081*	70	1M x 8	C,I	E,F		40	2.7 - 3.6V
		90,120	1M x 8	C,I,E	E,F		40	2.7 - 3.6V
16Mb	Am29LV160	70R	2M x 8 / 1M x 16	C	E,F,S,W,C		44/48	3.0 - 3.6V
		80,90,120	2M x 8 / 1M x 16	C,I,E	E,F,S,W,C		44/48	2.7 - 3.6V
16Mb	Am29LV116	70R	2M x 8	C	E,F		40	3.0 - 3.6V
		80,90,120	2M x 8	C,I,E	E,F		40	2.7 - 3.6V
16Mb	Am29LV017*	70R	2M x 8	C	E,F,W,C		40/48	3.0 - 3.6V
		80,90,120	2M x 8	C,I,E	E,F,W,C		40/48	2.7 - 3.6V
32Mb	Am29LV033*	70R	4M x 8	I	E,F,WX		40/63	3.0 - 3.6V
		90,120	4M x 8	I,E	E,F,WX		40/63	2.7 - 3.6V
32Mb	Am29LV320 (5V!)	70	2M x 16	C,I,E	E,F,Z,W,C		48/56	2.7 - 3.6V
32Mb	Am29LV320U*(5V!)	70	2M x 16	C,I,E	E,F,Z,W,C		48/56	2.7 - 3.6V
64Mb	Am29LV064U*(5V!)	90,120	8M x 8	C,I,E	E,Z,WX		48/56/63	2.7 - 3.6V
64Mb	Am29LV640U*(5V!)	90,120	4M x 16	C,I,E	E,Z,WX		48/56/63	2.7 - 3.6V

3.0 Volt-only Simultaneous Read/Write Flash

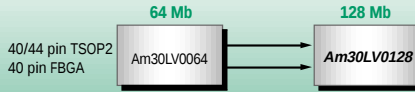
Density	Part Number	Access Time (ns)	Organization	Temperature Range	Package Type	KGD	Pin Count	Supply Voltage
4Mb	Am29DL400	70	512K x 8 / 256K x 16	C,I	E,F,S		44/48	2.7 - 3.6V
		80,90,120	512K x 8 / 256K x 16	C,I,E	E,F,S		44/48	2.7 - 3.6V
8Mb	Am29DL800	70	1M x 8 / 512K x 16	C,I	E,F,S,WB		44/48	2.7 - 3.6V
		90,120	1M x 8 / 512K x 16	C,I,E	E,F,S,WB		44/48	2.7 - 3.6V
16Mb	Am29DL162/ Am29DL163	70,90	2M x 8 / 1M x 16	I	E,Z,W,C		48/56	2.7 - 3.6V
		120	2M x 8 / 1M x 16	I,E	E,Z,W,C		48/56	2.7 - 3.6V
32Mb	Am29DL322/ Am29DL323	90	4M x 8 / 2M x 16	I	E,Z,W,D		48/56/63	2.7 - 3.6V
		120	4M x 8 / 2M x 16	I,E	E,Z,W,D		48/56/63	2.7 - 3.6V

3.0 Volt-only Burst/Page Mode Flash

Density	Part Number	Access Time (ns)	Organization	Temperature Range	Package Type	KGD	Pin Count	Supply Voltage
8Mb	Am29BL802(5V!)	65(18),70(20)	512K x 16	I,E	Z		56	2.7 - 3.6V
16Mb	Am29BL162(5V!)	65R(22),70R(22)	2M x 8 / 1M x 16	I,E	Z		56	3.0 - 3.6V
		70(26),90(26),120(26)	2M x 8 / 1M x 16	I,E	Z		56	2.7 - 3.6V
16Mb	Am29PL160(5V!)	60R(25),70R(25)	2M x 8 / 1M x 16	I	E,S		44/48	3.0 - 3.6V
		70(30),90(30),120(30)	2M x 8 / 1M x 16	I	E,S		44/48	2.7 - 3.6V

3.0 Volt UltraNAND Package Migration

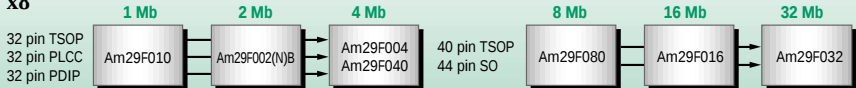
x8



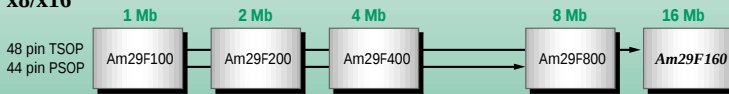
Density	Part Number	Access Time (ns)	Organization	Temperature Range	Package Type	KGD	Pin Count	Supply Voltage
64Mb	Am30LV0064(5V!)	50ns Sequential	8M x 8	C,I,E	E2,F2,WG		40/44	2.7-3.6V
128Mb	Am30LV0128(5V!)	50ns Sequential	16M x 8	C,I,E	E2,F2,WG		40/44	2.7-3.6V

5.0 Volt-only Flash Package Migration

x8



x8/x16



Density	Part Number	Access Time (ns)	Organization	Temperature Range	Package Type	KGD	Pin Count	Supply Voltage
1Mb	Am29F100	70,90,120,150	128K x 8 / 64K x 16	C,I,E	E,F,S	Now	44/48	5V ±10%
1Mb	Am29F010*	45	128K x 8	C,I,E	E,F,J		32	5V ± 5%
		55,70,90,120	128K x 8	C,I,E	E,F,J	Now	32	5V ±10%
2Mb	Am29F200	45	256K x 8 / 128K x 16	C,I	E,F,S		44/48	5V ± 5%
		50,55	256K x 8 / 128K x 16	C,I,E	E,F,S	Now	44/48	5V ± 5%
		70,90,120,150	256K x 8 / 128K x 16	C,I,E	E,F,S	Now	44/48	5V ±10%
2Mb	Am29F002/	55	256K x 8	C,I	P,J,E		32	5V ± 5%
	Am29F002N+	70	256K x 8	C,I	P,J,E		32	5V ±10%
		90,120	256K x 8	C,I,E	P,J,E		32	5V ±10%
4Mb	Am29F400	45	512K x 8 / 256K x 16	C,I	E,F,S		44/48	5V ± 5%
		50,55	512K x 8 / 256K x 16	C,I,E	E,F,S	Now	44/48	5V ± 5%
		55	512K x 8 / 256K x 16	C,I	E,F,S		44/48	5V ±10%
		70,90,120,150	512K x 8 / 256K x 16	C,I,E	E,F,S	Now	44/48	5V ±10%
4Mb	Am29F040*	55	512K x 8	C,I,E	E,F,J		32	5V ± 5%
		70	512K x 8	C,I,E	E,F,J		32	5V ±10%
		90,120,150	512K x 8	C,I,E	E,F,J,P		32	5V ±10%
4Mb	Am29F004	55	512K x 8	I	J,P		32	5V ± 5%
		70,90,120	512K x 8	I,E	J,P		32	5V ±10%
8Mb	Am29F800	55,70,90,120,150	1M x 8 / 512K x 16	C,I,E	E,F,S	Now	44/48	5V ±10%
8Mb	Am29F080*	75	1M x 8	C,I	E,F,S		40/44	5V ± 5%
		90,120,150	1M x 8	C,I,E	E,F,S		40/44	5V ±10%
16Mb	Am29F160	55	2M x 8 / 4M x 16	C,I	E,F		48	5V ± 5%
		55,70	2M x 8 / 4M x 16	C,I	E,F		48	5V ±10%
		90,120	2M x 8 / 4M x 16	C,I,E	E,F		48	5V ±10%
16Mb	Am29F016*	70	2M x 8	C,I	E,F,S		40/44/48	5V ± 5%
		90,120,150	2M x 8	C,I,E	E,F,S	Now	40/44/48	5V ±10%
16Mb	Am29F017*	70	2M x 8	C,I	E,F		40/48	5V ± 5%
		90,120,150	2M x 8	C,I,E	E,F		40/48	5V ±10%
32Mb	Am29F032*	70	4M x 8	C,I	E,F,S		40/44	5V ± 5%
		90,120,150	4M x 8	C,I,E	E,F,S		40/44	5V ±10%

Italic = Products and packages in **italic** are on AMD's roadmap, but have not yet been introduced or released in a particular package.

R = Regulated Voltage

* = Uniform sector architecture (All other Am29xxxxx Flash devices are available with either Top (T) or Bottom (B) Boot Sectors.)

+ = This device has a NC instead of RESET, thus RESET# and Temporary Sector Unprotect are unavailable.

(5V!) = 5.0 Volt Input/Output Tolerant

Building an Ordering Part Number (OPN)

The full OPN is formed by a combination of terms as shown in the example below. Reference your AMD Flash Memory Products Data Book, or Web CD, or visit the AMD web site, www.amd.com for valid combinations.

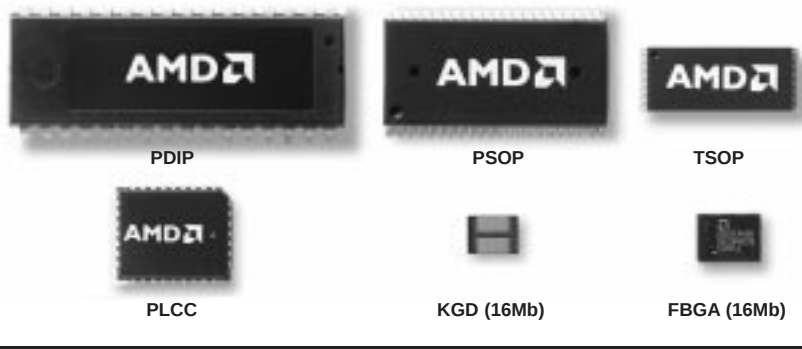
	Am29	DL	800	B	T	-100	E	C		1	IT
DEVICE NUMBER											
29 = Single voltage operation (5.0V/3.0V/1.8V read and write)											
30 = 3.0 Volt-only flash memory with UltraNAND technology											
DEVICE DESCRIPTION											
F = Flash											
LV = 3.0 Volt-only flash											
DL = 3.0 Volt-only simultaneous read/write flash											
PL = 3.0 Volt-only page mode flash											
BL = 3.0 Volt-only burst mode flash											
SL = 1.8 Volt-only program/erase/read											
DENSITY AND ORGANIZATION (see previous tables)											
PROCESS TECHNOLOGY											
B = 0.35 μ m technology											
C = 0.32 μ m technology											
D = 0.25 μ m technology											
Blank = 0.85 or 0.5 μ m technology											
BOOT CODE SECTOR ARCHITECTURE											
T = Top Sector											
B = Bottom Sector											
(Available for many Flash devices. Refer to your AMD Flash Memory Data Book, or WebCD, the AMD web site, or previous tables)											
PERFORMANCE RANGE (for UltraNAND products)											
J40 = 1024 (100%) usable sectors											
K40 = 1014 - 1024 (99 - 100%) usable sectors											
SPEED OPTIONS											
t_{ACC} in nanoseconds											
PACKAGING TYPES											
P = Plastic DIP											
J = Rectangular Plastic Leaded Chip Carrier (PLCC)											
E = Thin Small Outline Package (TSOP) Standard Pinout											
E2 = Thin Small Outline Package (TSOPII) Standard Pinout											
F = Thin Small Outline Package (TSOP) Reverse Pinout											
F2 = Thin Small Outline Package (TSOPII) Reverse Pinout											
S = Small Outline Package (SO)											
Z = Shrink Small Outline Package (SSOP)											
WA = 6 x 8mm Package Size, Fine-Pitch Ball Grid Array (FBGA)*											
WB = 6 x 9mm Package Size, Fine-Pitch Ball Grid Array (FBGA)*											
WC = 8 x 9mm Package Size, Fine-Pitch Ball Grid Array (FBGA)*											
WD = 8 x 14mm Package Size, Fine-Pitch Ball Grid Array (FBGA)*											
WG = 8 x 15mm Package Size, Fine-Pitch Ball Grid Array (FBGA)*											
WH = 12 x 11mm Package Size, Fine-Pitch Ball Grid Array (FBGA)*											
*All FBGA packages have an 8x6 input/output ball grid array with an 0.8 μ m ball pitch.											
Known Good Die (KGD)											
DP = Waffle Pack											
DG = Gel-Pak [®] Die Tray											
DT = Surftape [™] (Tape and Reel)											
DW = Gel Pak [®] Wafer Tray (sawn wafer on frame)											
TEMPERATURE											
C = Commercial (0°C to +70°C)											
I = Industrial (-40°C to +85°C)											
E = Extended (-55°C to +125°C)											
OPTIONAL PROCESSING											
Blank = Standard Processing											
B = Burn-In											
KGD DIE REVISION											
This number refers to the specific AMD manufacturing process and product technology. For KGD products only.											
SHIPPING OPTION											
IT = Tape and reel option (not needed for KGD DT option)											
Blank = Standard shipping option											

Chip-Scale Packaging Options

Package	Features	Benefits
KGD (Known Good Die)	Existing AMD flash fully tested at temperature and speed. Same quality and reliability as packaged devices. Both 5.0 Volt-only and 3.0 Volt-only products in x8 or x8 / x16 configuration.	A small form-factor ideal for use in multi-chip modules or hybrids. Fits small form-factor applications.
FBGA (Fine-Pitch Ball Grid Array)	Chip-scale package. Same input/output ball footprint (8 x 6 balls, 0.8mm ball pitch) for all densities, regardless of package size.* No manufacturing or handling equipment changes required if the die size is changed.	FBGA chip-scale packaging requires only about 1/3 the board space of the TSOP package for densities up to 16 Mb. No board layout changes required to migrate to a higher or lower density memory.* Lowest cost chip-scale package.

* = 32 Megabits FBGA uses additional balls for stability

Packaging Options



Socket Vendors

For more information on sockets, contact the following vendors:

Yamaichi Electronics
2235 Zanker Road
San Jose, CA 95131
(408) 456-0797 Fax (408) 456-0799

Wells Electronics, Inc.
226 Airport Parkway, Suite 300
San Jose, CA 95110
(408) 452-4290 Fax: (408) 452-4291

Loranger Intl. Corp.
3000 Scott Boulevard Suite 201
Santa Clara, CA 95054
(408) 727-4234 Fax (408) 727-5842
email: loranger@inow.com

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