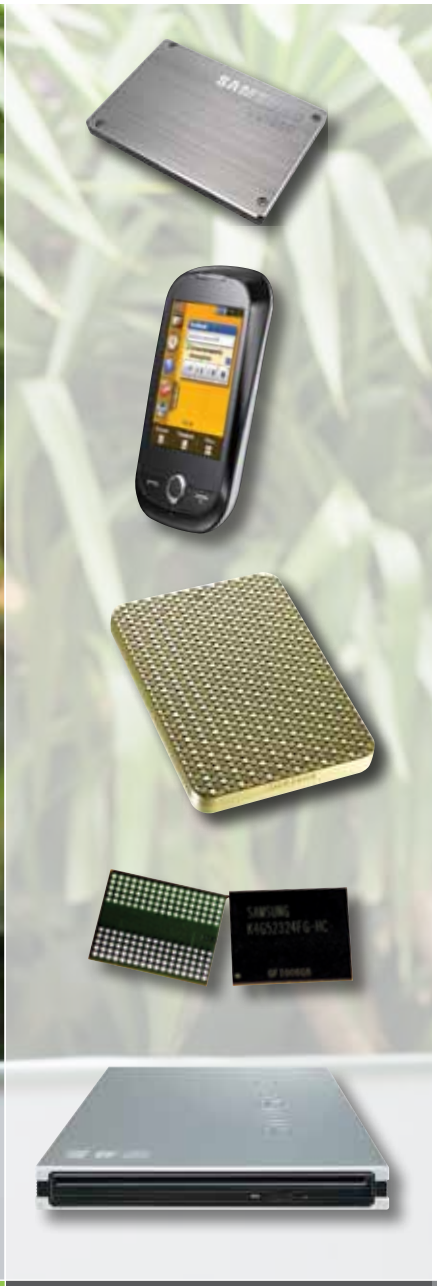




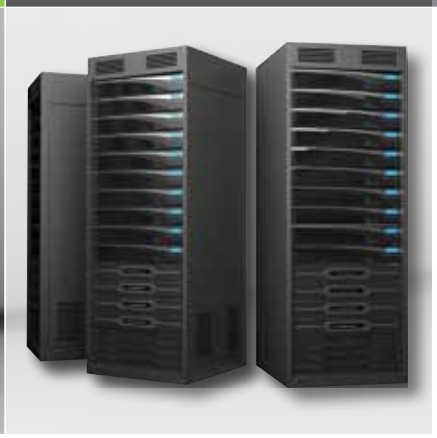
PRODUCT SELECTION GUIDE

Samsung Semiconductor, Inc.

MEMORY & STORAGE

2H 2010





Samsung Semiconductor, Inc.

Samsung offers the industry's broadest memory portfolio and has maintained its leadership in memory technology for 16 straight years. Its DRAM, flash and SRAM products are found in computers—from ultra-mobile portables to powerful servers—and in a wide range of handheld devices such as smartphones and MP3 players. Samsung also delivers the industry's widest line of storage products. These include optical and hard disk drives as well as flash storage, such as the all-flash Solid State Drive and a range of embedded and removable flash storage products.

Markets	DRAM	SRAM	FLASH	ASIC	LOGIC	TFT/LCD	ODD/HDD
Mobile/Wireless 	■	■	■	■	■	■	■
Notebook PCs 	■		■	■	■	■	■
Desktop PCs/Workstations 	■	■	■	■	■	■	■
Servers 	■	■	■	■	■	■	■
Networking/ Communications 	■	■	■	■	■		■
Consumer Electronics 	■	■	■	■	■	■	■

www.samsung.com/us/business/components



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www.samsung.com/semi/dram
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- DDR SDRAM
- SDRAM
- Mobile SDRAM
- RDRAM
- Graphics DDR SDRAM
- DRAM Ordering Information

FLASH — Pages 14-16

www.samsung.com/semi/flash
- SLC Flash
- MLC Flash
- SD and microSD Cards
- Flash Ordering Information

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www.samsung.com/semi/sram
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- Synchronous
- NtRAM™
- Late-Write R-R SRAM
- DDR / II / II+ SRAM
- QDR / II / II+ SRAM

MULTI-CHIP PACKAGE — Pages 21-22

www.samsung.com/semi/mcp
- NAND & DRAM
- OneNAND & DRAM
- Flex-OneNAND & DRAM
- OneNAND & DRAM & OneDRAM
- moviNAND & NAND & DRAM
- NOR & UtRAM
- NOR & DRAM

Fusion Memory — Pages 23

www.samsung.com/semi/fusion
- moviNAND™
- OneDRAM™

STORAGE — Pages 24-27

SSD
www.samsungssd.com
- SATA SSD

Hard Drive
www.samsung.com/hdd

Optical Disc
www.samsungodd.com

DDR3 SDRAM REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
1GB	1.5V	128Mx72	M393B2873FH0-C(F8/H9/K0*)(04/05)	1Gb (128M x8) * 9	Lead Free & Halogen Free	1066/1333	1	Now
2GB	1.5V	256Mx72	M393B5673FH0-C(F8/H9/K0*)(04/05)	1Gb (128M x8) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M393B5670FH0-C(F8/H9/K0*)(04/05)	1Gb (256M x4) * 18	Lead Free & Halogen Free	1066/1333	1	Now
4GB	1.5V	512Mx72	M393B5173FH0-CF8(04/05)	1Gb (128M x8) * 36	Lead Free & Halogen Free	1066/1333	4	Now
			M393B5170FH0-C(F8/H9/K0*)(04/05)	1Gb (256M x4) * 36	Lead Free & Halogen Free	1066/1333	2	Now
			M393B5273CH0-C(F8/H9/K0*)(04/05)	2Gb (256M x8) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M393B5270CH0-C(F8/H9/K0*)(04/05)	2Gb (512M x4) * 18	Lead Free & Halogen Free	1066/1333	1	Now
8GB	1.5V	1Gx72	M393B1K73CH0-CF8(04/05)	2Gb (256M x8) * 36	Lead Free & Halogen Free	1066/1333	4	Now
			M393B1K70CH0-C(F8/H9/K0*)(04/05)	2Gb (512M x4) * 36	Lead Free & Halogen Free	1066/1333	2	Now
16GB	1.5V	2Gx72	M393B2K70CM0-CF8(04/05)	4Gb DDP (1024M x4) * 36	Lead Free & Halogen Free	1066/1333	4	Now
32GB	1.5V	4Gx72	M393B4G70AM0-CF8(04/05)	8Gb DDP (2048M x4) * 36	Lead Free & Halogen Free	1066/1333	4	Now
1GB	1.35V	128Mx72	M393B2873FH0-Y(F8/H9/K0*)(04/05)	1Gb (128M x8) * 9	Lead Free & Halogen Free	1066/1333	1	Now
2GB	1.35V	256Mx72	M393B5673FH0-Y(F8/H9/K0*)(04/05)	1Gb (128M x8) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M393B5670FH0-Y(F8/H9/K0*)(04/05)	1Gb (256M x4) * 18	Lead Free & Halogen Free	1066/1333	1	Now
4GB	1.35V	512Mx72	M393B5173FH0-YF8(04/05)	1Gb (128M x8) * 36	Lead Free & Halogen Free	1066/1333	4	Now
			M393B5170FH0-Y(F8/H9/K0*)(04/05)	1Gb (256M x4) * 36	Lead Free & Halogen Free	1066/1333	2	Now
			M393B5273CH0-Y(F8/H9/K0*)(04/05)	2Gb (256M x8) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M393B5270CH0-Y(F8/H9/K0*)(04/05)	2Gb (512M x4) * 18	Lead Free & Halogen Free	1066/1333	1	Now
8GB	1.35V	1Gx72	M393B1K73CH0-YF8(04/05)	2Gb (256M x8) * 36	Lead Free & Halogen Free	1066/1333	4	Now
			M393B1K70CH0-Y(F8/H9/K0*)(04/05)	2Gb (512M x4) * 36	Lead Free & Halogen Free	1066/1333	2	Now
16GB	1.35V	2Gx72	M393B2K70CM0-YF8(04/05)	4Gb DDP (1024M x4) * 36	Lead Free & Halogen Free	1066/1333	4	Now
32GB	1.35V	4Gx72	M393B4G70AM0-YF8(04/05)	8Gb DDP (2048M x4) * 36	Lead Free & Halogen Free	1066/1333	4	Now

NOTES:
F7 = DDR3-800 (6-6-6)
F8 = DDR3-1066 (7-7-7)
H9 = DDR3-1333 (9-9-9)
K0 = DDR3-1600 (11-11-11)

04 = IDT B0 register
05 = Inphi C0 register
* K0 (1600Mbps) available in ES only

DDR3 SDRAM VLP REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
1GB	1.5V	128Mx72	M392B2873FH0-C(F8/H9)(04/05)	1Gb (128M x8) * 9	Lead Free & Halogen Free	1066/1333	1	Now
2GB	1.5V	256Mx72	M392B5673FH0-C(F8/H9)(04/05)	1Gb (128M x8) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M392B5670FH0-C(F8/H9)(04/05)	1Gb (256M x8) * 18	Lead Free & Halogen Free	1066/1333	1	Now
4GB	1.5V	512Mx72	M392B5170FM0-C(F8/H9)(04/05)	2Gb DDP (512M x4) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M392B5273CH0-C(F8/H9)(04/05)	2Gb (256M x8) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M392B5270CH0-C(F8/H9)(04/05)	2Gb (512M x4) * 18	Lead Free & Halogen Free	1066/1333	1	Now
8GB	1.5V	1Gx72	M392B1K73CM0-CF8(04/05)	4Gb DDP (512M x8) * 18	Lead Free & Halogen Free	1066/1333	4	Now
			M392B1K70CM0-C(F8/H9)(04/05)	4Gb DDP (1024M x4) * 18	Lead Free & Halogen Free	1066/1333	2	Now
16GB	1.5V	2Gx72	M392B2G70AM0-C(F8/H9)(04/05)	8Gb DDP (2048M x4) * 18	Lead Free & Halogen Free	1066/1333	2	Now
1GB	1.35V	128Mx72	M392B2873FH0-Y(F8/H9)(04/05)	1Gb (128M x8) * 9	Lead Free & Halogen Free	1066/1333	1	Now
2GB	1.35V	256Mx72	M392B5673FH0-Y(F8/H9)(04/05)	1Gb (128M x8) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M392B5670FH0-Y(F8/H9)(04/05)	1Gb (256M x8) * 18	Lead Free & Halogen Free	1066/1333	1	Now
4GB	1.35V	512Mx72	M392B5170FM0-Y(F8/H9)(04/05)	2Gb DDP (512M x4) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M392B5273CH0-Y(F8/H9)(04/05)	2Gb (256M x8) * 18	Lead Free & Halogen Free	1066/1333	2	Now
			M392B5270CH0-Y(F8/H9)(04/05)	2Gb (512M x4) * 18	Lead Free & Halogen Free	1066/1333	1	Now
8GB	1.35V	1Gx72	M392B1K73CM0-YF8(04/05)	4Gb DDP (512M x8) * 18	Lead Free & Halogen Free	1066/1333	4	Now
			M392B1K70CM0-Y(F8/H9)(04/05)	4Gb DDP (1024M x4) * 18	Lead Free & Halogen Free	1066/1333	2	Now
16GB	1.35V	2Gx72	M392B2G70AM0-Y(F8/H9)(04/05)	8Gb DDP (2048M x4) * 18	Lead Free & Halogen Free	1066/1333	2	Now

NOTES: F7 = DDR3-800 (6-6-6)
F8 = DDR3-1066 (7-7-7)
H9 = DDR3-1333 (9-9-9)
04 = IDT B0 register
05 = Inphi C0 register

DDR3 SDRAM UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
1GB	1.5V	128Mx64	M378B2873FH0-C(F8/H9/K0*)	1Gb (128M x8) * 8	Lead Free & Halogen Free	1066/1333/1600	1	Now
2GB	1.5V	256Mx64	M378B5673FH0-C(F8/H9/K0*)	1Gb (128M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now
			M378B5773FH0-C(F8/H9/K0*)	2Gb (256M x8) * 8	Lead Free & Halogen Free	1066/1333/1600	1	Now
4GB	1.5V	512Mx64	M378B5273CH0-C(F8/H9/K0*)	2Gb (256M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now
8GB	1.5V	1024Mx64	M378B1G73AH0-C(F8/H9/K0*)	4Gb (512M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now

DDR3 SDRAM UNBUFFERED MODULES (ECC)

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
1GB	1.5V	128Mx72	M391B2873FH0-C(F8/H9/K0*)	1Gb (128M x8) * 9	Lead Free & Halogen Free	1066/1333/1600	1	Now
2GB	1.5V	256Mx72	M391B5673FH0-C(F8/H9/K0*)	1Gb (128M x8) * 18	Lead Free & Halogen Free	1066/1333/1600	2	Now
			M391B5773FH0-C(F8/H9/K0*)	2Gb (256M x8) * 9	Lead Free & Halogen Free	1066/1333/1600	1	Now
4GB	1.5V	512Mx72	M391B5273CH0-C(F8/H9/K0*)	2Gb (256M x8) * 18	Lead Free & Halogen Free	1066/1333/1600	2	Now
8GB	1.5V	1024Mx72	M391B1G73AH0-C(F8/H9/K0*)	4Gb (512M x8) * 18	Lead Free & Halogen Free	1066/1333/1600	2	Now
1GB	1.35V	128Mx72	M391B2873FH0-Y(F8/H9/K0*)	1Gb (128M x8) * 9	Lead Free & Halogen Free	1066/1333/1600	1	Now
2GB	1.35V	256Mx72	M391B5673FH0-Y(F8/H9/K0*)	1Gb (128M x8) * 18	Lead Free & Halogen Free	1066/1333/1600	2	Now
			M391B5773FH0-Y(F8/H9/K0*)	2Gb (256M x8) * 9	Lead Free & Halogen Free	1066/1333/1600	1	Now
4GB	1.35V	512Mx72	M391B5273CH0-Y(F8/H9/K0*)	2Gb (256M x8) * 18	Lead Free & Halogen Free	1066/1333/1600	2	Now
8GB	1.35V	1024Mx72	M391B1G73AH0-Y(F8/H9/K0*)	4Gb (512M x8) * 18	Lead Free & Halogen Free	1066/1333/1600	2	Now

NOTES: F7 = DDR3-800 (6-6-6)
F8 = DDR3-1066 (7-7-7)
H9 = DDR3-1333 (9-9-9)
K0 = DDR3-1600 (11-11-11)
* K0 (1600Mbps) available in ES only

DDR3 SDRAM SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
1GB	1.5V	128Mx64	M471B2873FHS-C(F8/H9/K0*)	1Gb (128M x8) * 8	Lead Free & Halogen Free	1066/1333/1600	1	Now
2GB	1.5V	256Mx64	M471B5673FH0-C(F8/H9/K0*)	1Gb (128M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now
			M471B5773FHS-C(F8/H9/K0*)	2Gb (256M x8) * 8	Lead Free & Halogen Free	1066/1333/1600	1	Now
4GB	1.5V	512Mx64	M471B5273CH0-C(F8/H9/K0*)	2Gb (256M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now
8GB	1.5V	1024Mx64	M471B1G73AH0-C(F8/H9/K0*)	4Gb (512M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now
1GB	1.35V	128Mx64	M471B2873FHS-Y(F8/H9/K0*)	1Gb (128M x8) * 8	Lead Free & Halogen Free	1066/1333/1600	1	Now
2GB	1.35V	256Mx64	M471B5673FH0-Y(F8/H9/K0*)	1Gb (128M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now
			M471B5773FHS-Y(F8/H9/K0*)	2Gb (256M x8) * 8	Lead Free & Halogen Free	1066/1333/1600	1	Now
4GB	1.35V	512Mx64	M471B5273CH0-Y(F8/H9/K0*)	2Gb (256M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now
8GB	1.35V	1024Mx64	M471B1G73AH0-Y(F8/H9/K0*)	4Gb (512M x8) * 16	Lead Free & Halogen Free	1066/1333/1600	2	Now

NOTES: F7 = DDR3-800 (6-6-6)
F8 = DDR3-1066 (7-7-7)
H9 = DDR3-1333 (9-9-9)
K0 = DDR3-1600 (11-11-11)
* K0 (1600Mbps) available in ES only

DDR3 SDRAM COMPONENTS

Density	Voltage	Organization	Part Number	# Pins-Package	Compliance	Speed (Mbps)	Dimensions	Production
1Gb	1.5V	256M x4	K4B1G0446F-HC(F8/H9)	78 Ball -FBGA	Lead Free & Halogen Free	1066/1333	7.5x11mm	Now
		128M x8	K4B1G0846F-HC(F8/H9/K0*)	78 Ball -FBGA	Lead Free & Halogen Free	1066/1333/1600	7.5x11mm	Now
2Gb	1.5V	512M x4	K4B2G0446C-HC(F8/H9)	78 Ball -FBGA	Lead Free & Halogen Free	1066/1333	7.5x11mm	Now
		256M x8	K4B2G0846C-HC(F8/H9/K0*)	78 Ball -FBGA	Lead Free & Halogen Free	1066/1333/1600	7.5x11mm	Now
		128M x16	K4B2G1646C-HC(F8/H9/K0*/MA*/NB*)	96 Ball -FBGA	Lead Free & Halogen Free	1066/1333/1600	7.5x13.3mm	Now
1Gb	1.35V	256M x4	K4B1G0446F-HC(F8/H9)	78 Ball -FBGA	Lead Free & Halogen Free	1066/1333	7.5x11mm	Now
		128M x8	K4B1G0846F-HC(F8/H9/K0*)	78 Ball -FBGA	Lead Free & Halogen Free	1066/1333/1600	7.5x11mm	Now
2Gb	1.35V	512M x4	K4B2G0446C-HC(F8/H9)	78 Ball -FBGA	Lead Free & Halogen Free	1066/1333	7.5x11mm	Now
		256M x8	K4B2G0846C-HC(F8/H9/K0*)	78 Ball -FBGA	Lead Free & Halogen Free	1066/1333/1600	7.5x11mm	Now

NOTES: F7 = DDR3-800 (6-6-6)
F8 = DDR3-1066 (7-7-7)
H9 = DDR3-1333 (9-9-9)
K0 = DDR3-1600 (11-11-11)
MA = DDR3-1866 (13-13-13)
NB = DDR3-2133 (14-14-14)
* K0, MA, and NB are available in ES only

DDR2 SDRAM REGISTERED MODULES

Density	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Register	Rank	Production
1GB	128Mx72	M393T2863FBA-C(E6/F7)	(128M x8)*9	Lead free	667/800	Y	1	Now
2GB	256Mx72	M393T5660FBA-C(E6/F7)	(256M x4)*18	Lead free	667/800	Y	1	Now
		M393T5663FBA-C(E6/E7)	(128M x8)*18	Lead free	667/800	Y	2	Now
4GB	512Mx72	M393T5160FBA-C(E6/F7)	(256M x4)*36	Lead free	667/800	Y	2	Now

NOTES: E6=PC2-5300 (DDR2-667 @ CL=5)
F7=PC2-6400 (DDR2-800 @ CL=6)
E7=PC2-6400 (DDR2-800 @ CL=5)
Voltage = 1.8V

DDR2 SDRAM VLP REGISTERED MODULES

Density	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Register	Rank	Production
2GB	256Mx72	M392T5660FBA-CE6	(256M x4)*18		Lead free	667	Y	1

DDR2 SDRAM FULLY BUFFERED MODULES

Density	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Voltage	Rank	Production
2GB	256Mx72	M395T5663FB4-CE68	(128M x8)*18	Lead free	667	1.8V	2	Now
4GB	512Mx72	M395T5160FB4-CE68	(256M x4)*36	Lead free	667	1.8V	2	Now
	512Mx72	M395T5163FB4-CE68	(128M x8)*36	Lead free	667	1.8V	4	Now

NOTES:
E6 = PC2-5300 (DDR2-667 @ CL=5)
AMB = IDT L4
Voltage = 1.8V (AMB Voltage = 1.5V)

DDR2 SDRAM UNBUFFERED MODULES

Density	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Rank	Production
1GB	128Mx64	M378T2863FBS-C(E6/F7/E7)	(128M x8)*8	Lead free	667/800	1	Now
2GB	256Mx64	M378T5663FB3-C(E6/F7/E7)	(128M x8)*16	Lead free	667/800	2	Now

NOTES:
E6=PC2-5300 (DDR2-667 @ CL=5)
E7=PC2-6400 (DDR2-800 @ CL=5)
F7=PC2-6400 (DDR2-800 @ CL=6)
Voltage = 1.8V

DDR2 SDRAM UNBUFFERED MODULES (ECC)

Density	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Rank	Production
1GB	128Mx72	M391T2863FB3-C(E6/F7)	(128Mx8)*9	Lead free	667/800	1	Now
2GB	256Mx64	M391T5663FB3-C(E6/F7)	(128Mx8)*18	Lead free	667/800	2	Now

NOTES:
E6=PC2-5300 (DDR2-667 @ CL=5)
E7=PC2-6400 (DDR2-800 @ CL=5)
F7=PC2-6400 (DDR2-800 @ CL=6)
Voltage = 1.8V

DDR2 SDRAM SODIMM MODULES

Density	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Rank	Production
1GB	128Mx64	M470T2863FB3-C(E6/F7/E7)	(64Mx16)*8	Lead free	667/800	2	Now
2GB	256Mx64	M470T5663FB3-C(E6/F7/E7)	(128M x8)*8	Lead free	667/800	2	Now

NOTES:
E6=PC2-5300 (DDR2-667 @ CL=5)
E7=PC2-6400 (DDR2-800 @ CL=5)
F7=PC2-6400 (DDR2-800 @ CL=6)
Voltage = 1.8V

DDR2 SDRAM COMPONENTS

Density	Organization	Part Number	# Pins-Package	Dimensions	Package	Speed (Mbps)	Production
256Mb	16Mx16	K4T56163QN-HC(E6/F7/E7/F8)	84-FBGA	7.5x12.5mm	Lead free & Halogen free	667/800/1066	Now
512Mb	128M x4	K4T51043QI-HC(E6/F7/E7)	60-FBGA	7.5x9.5mm	Lead free & Halogen free	667/800	Now
	64M x8	K4T51083QI-HC(E6/F7/E7/F8)	60-FBGA	7.5x9.5mm	Lead free & Halogen free	667/800/1066	Now
	32M x16	K4T51163QI-HC(E6/F7/E7/F8)	84-FBGA	7.5x12.5mm	Lead free & Halogen free	667/800/1066	Now
	128M x4	K4T51043QJ-HC(E6/F7/E7)	60-FBGA	7.5x9.5mm	Lead free & Halogen free	667/800	Q3
	64M x8	K4T51083QJ-HC(E6/F7/E7/F8)	60-FBGA	7.5x9.5mm	Lead free & Halogen free	667/800/1066	Q3
	32M x16	K4T51163QJ-HC(E6/F7/E7/F8)	84-FBGA	7.5x12.5mm	Lead free & Halogen free	667/800/1066	Q3
1Gb	256M x4	K4T1G044QF-BC(E6/F7/E7)	68-FBGA	7.5x9.5mm	Lead free & Halogen free	667/800	Now
	128M x8	K4T1G084QF-BC(E6/F7/E7/F8)	68-FBGA	7.5x9.5mm	Lead free & Halogen free	667/800/1066	Now
	64M x16	K4T1G164QF-BC(E6/F7/E7/F8)	84-FBGA	7.5x12.5mm	Lead free & Halogen free	667/800/1066	Now

NOTES:
E6=DDR2-667 (5-5-5)
F7=DDR2-800 (6-6-6)
E7=DDR2-800 (5-5-5)
F8=DDR2-1066 (7-7-7)
Voltage = 1.8V

DDR SDRAM 1U REGISTERED MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)
1GB	128Mx72	M312L2920GH3-CB3	(128Mx4)*18	333/400
2GB	256Mx72	M312L5720GH3-CB3	(128Mx4)*36	333/400

NOTES:
B0 = DDR266 (133MHz @ CL=2.5)
A2 = DDR266 (133MHz @ CI=2)
B3 = DDR333 (166MHz @ CL=2.5)
CC = DDR400 (200MHz @ CL=3)
Type: 184-pin

DDR DRAM SODIMM MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)
512MB	64Mx64	M470L6524GL0-CB300	(32M x 16)*8	333

NOTES:
B0 = DDR266 (133MHz @ CL=2.5)
CC = DDR400 (200MHz @ CL=3)
B3 = DDR333 (166MHz @ CL=2.5)
A2 = DDR266 (133MHz @ CI=2)

DDR SDRAM COMPONENTS

Density	Organization	Part Number	# Pins - Package	Speed (Mbps)
256Mb	64Mx4	K4H560438N-LCB3/B0	66-TSOP	266/333
	32Mx8	K4H560838N-LCCC/B3	66-TSOP	333/400
	16Mx16	K4H561638N-LCCC/B3	66-TSOP	333/400
512Mb	128Mx4	K4H510438G-LCB3/B0	66-TSOP	266/333
		K4H510438G-HCCC/B3	60-FBGA	333/400
	64Mx8	K4H510838G-LCCC/B3	66-TSOP	333/400
		K4H510838G-HCCC/B3	60-FBGA	333/400
	32Mx16	K4H511638G-LCCC/B3	66-TSOP	333/400
128Mb	8Mx16	K4H281638O-LCCC	66-TSOP	400

NOTES:
B0 = DDR266 (133MHz @ CL=2.5)
A2 = DDR266 (133MHz @ CI=2)
B3 = DDR333 (166MHz @ CL=2.5)
CC = DDR400 (200MHz @ CL=3)

SDRAM COMPONENTS

Density	Organization	Part Number	# Pins - Package	Speed (Mbps)	Refresh	Remarks
64Mb	8Mx8	K4S640832N-LC75000	54-TSOP	133	4K	EOL with no replacement
	4Mx16	K4S641632N-LC(L)(75/60)000	54-TSOP	133/166	4K	EOL with no replacement
128Mb	16Mx8	K4S2808320-LC(L)75000	54-TSOP	133	4K	
	8Mx16	K4S2816320-LC(L)(75/60)000	54-TSOP	133/166	4K	
256Mb	64Mx4	K4S560432N-LC(L)75000	54-TSOP	133	8K	
	32Mx8	K4S560832N-LC(L)75000	54-TSOP	133	8K	
	16Mx16	K4S561632N-LC(L)(75/60)000	54-TSOP	133/166	8K	
512Mb	128Mx4	K4S510432D-UC(L)(75)000	54-TSOP	133	8K	EOL with no replacement
	64Mx8	K4S510832D-UC(L)(75)000	54-TSOP	133	8K	EOL with no replacement
	32Mx16	K4S511632D-UC(L)(75)000	54-TSOP	133	8K	EOL with no replacement

NOTES:
L = Commercial Temp., Low Power
For Industrial Temperature, check with SSI Marketing
Banks: 4

All products are Lead Free
Voltage: 3.3V
Speed: PC133 (133MHz CL=3/PC100 CL2)

RDRAM COMPONENTS

Density	Organization	Part Number	Speed (Mbps)	# Pins-Package	Refresh	Note
288M	x18	K4R881869I-DCT9000	1066	92-FBGA	16K/32ms	EOL in Aug'10

NOTES: All products are lead free

GRAPHICS DRAM COMPONENTS

Type	Density	Organization	Part Number	Package	VDD/VDDQ	Speed Bin (MHz)	Status
GDDR5	1Gb	32Mx32	K4G10325FE-HC(1)	170-FBGA	1.5/1.5V	1800/2000/2500	
GDDR3	1Gb	32Mx32	K4J10324KE-HC(1)	136-FBGA	1.8V/1.8V	700/800/1000/1200	
	512Mb	16Mx32	K4J52324QH-HC(1)	136-FBGA	1.8/1.8V	700/800	EOL Mar '10
			K4J52324QH-HJ(1)	136-FBGA	1.9/1.9V	1000	EOL Mar '10
			K4J52324QH-HJ(1)	136-FBGA	2.05/2.05V	1200	EOL Mar '10
GDDR2	1Gb	64Mx16	K4N1G164QE-HC(1)	84-FBGA	1.8/1.8V	400/500	EOL Mar '10
	512Mb	32Mx16	K4N51163QG-HC(1)	84-FBGA	1.8/1.8V	400/500	EOL Mar '10
GDDR1	128Mb	4Mx32	K4D263238K-VC(1)	144-FBGA	2.5/2.5V	200/250	CuSmpl Oct '09
			K4D263238K-UC(1)	100-TQFP	2.5/2.5V	200/250	
		8Mx16	K4D261638K-LC(1)	66-TSOPII	2.5/2.5V	200/250	EOL Sep '10

NOTES:

Package:

Q: TQFP
U: TQFP (Lead Free)
G: 84/144 FBGA
V: 144 FBGA (Lead Free)
Z: 84 FBGA (Lead Free)
T: TSOP
L: TSOP (Lead Free)
A: 136 FBGA
B: 136 FBGA (Lead Free)
H: FBGA (Halogen Free & Lead Free)
E: 100 FBGA (Halogen Free & Lead Free)

(1) Speeds (clock cycle - speed bin):

04: 0.4ns (2500MHz)
05: 0.5ns (2000MHz)
5C: 0.555 (1800MHz)
07: 0.71ns (1400MHz)
08: 0.83ns (1200MHz)
09: 0.90ns (1100MHz)
1A: 1ns (1000MHz)
11: 1.1ns (900MHz)
12: 1.25ns (800MHz)
14: 1.429ns (700MHz)
16: 1.667ns (600MHz)
20: 2.0ns (500MHz)
22: 2.2ns (450MHz)
25: 2.5ns (400MHz)
2A: 2.86ns (350MHz)
33: 3.3ns (300MHz)
40: 4.0ns (240MHz)
50: 5.0ns (200MHz)

MOBILE-SDR/DDR

Density	Type	Organization	Part Number	Package	Power	Production
256Mb	MSDR	16Mx16	K4M56163PN-BG(1)	54-FBGA	1.8V	Now
		8Mx32	K4M56323PN-HG(1)	90-FBGA	1.8V	Now
	MDDR	16Mx16	K4X56163PN-FG(1)	60-FBGA	1.8V	Now
		8Mx32	K4X56323PN-8G(1)	90-FBGA	1.8V	Now
512Mb	MSDR	32Mx16	K4M51163PI-BG(1)	54-FBGA	1.8V	Now
		16Mx32	K4M51323PI-HG(1)	90-FBGA	1.8V	Now
	MDDR	32Mx16	K4X51163PI-FG(1)	60-FBGA	1.8V	Now
		16Mx32	K4X51323PI-8G(1)	90-FBGA	1.8V	Now
1Gb	MDDR	64Mx16	K4X1G163PE-FG(1)	60-FBGA	1.8V	Now
		32Mx32	K4X1G323PE-8G(1)	90-FBGA	1.8V	Now
		64Mx16	K4X1G163PF-FG(1)	60-FBGA	1.8V	MP Q1'11
		32Mx32	K4X1G323PF-8G(1)	90-FBGA	1.8V	MP Q1'11
2Gb	MDDR	128Mx16	K4X2G163PC-FG(1)	60-FBGA	1.8V	Now
		64Mx32	K4X2G323PC-8G(1)	90-FBGA	1.8V	Now
4Gb	MDDR	x32 (2CS, 2CKE)	K4X4G303PB-AG(1)	168-FBGA, 12x12 PoP, DDP	1.8V	Now
		x32 (2CS, 2CKE)	K4X4G303PB-AG(1)	168-FBGA, 12x12 PoP, DDP	1.8V	Now
		x32 (2CS, 2CKE)	K4X4G303PB-7G(1)	240-FBGA, 14x14 PoP, DDP	1.8V	Now

LPDDR2

Density	Type	Organization	Part Number	Package	Power	Production
512Mb	LPDDR2	1CH x32	K4P51323EI-AG(1)	168-FBGA, 12x12 PoP	1.8V	Now
1Gb	LPDDR2	1CH x32	K4P1G324EE-AG(1)	168-FBGA, 12x12 PoP	1.2V	Now
2Gb	LPDDR2	1CH x32	K4P2G324EC-AG(1)	168-FBGA, 12x12 PoP	1.2V	Now
		2CH x32/ch	K3PE3E300M-XG(1)	216-FBGA, 12x12 PoP	1.2V	Now
			K3PE3E300A-XG(1)	240-FBGA, 14x14 PoP	1.2V	Now
4Gb	LPDDR2	1CH x32	K4P4G304EC-AG(1)	168-FBGA, 12x12 PoP, DDP	1.2V	Now
		2CH x32/ch	K3PE4E400M-XG(1)	216-FBGA, 12x12 PoP, DDP	1.2V	Now
			K3PE4E400M-XG(1)	216-FBGA, 12x12 PoP, DDP	1.2V	Now
			K3PE4E400A-XG(1)	240-FBGA, 14x14 PoP, DDP	1.2V	Now

NOTES: All products offered at Extended, Low, i-TCSR & PASR & DS (Temp, Power)

(1) Speed:

Mobile-SDR
60: 166MHz, CL3
75: 133MHz, CL3

Mobile-DDR
D8: 200MHz, CL3
C6: 166MHz, CL3

LPDDR2
C0: 667Mbps
C1: 800Mbps

COMPONENT DRAM ORDERING INFORMATION

1	2	3	4	5	6	7	8	9	10	11
K	4	T	XX	XX	X	X	X	X	X	XX

1	SAMSUNG Memory
2	DRAM
3	DRAM Type
4	Density
5	Bit Organization
6	Number of Internal Banks
7	Interface (VDD, VDDQ)
8	Revision
9	Package Type
10	Temp & Power
11	Speed

1. Memory (K)

2. DRAM: 4

3. DRAM Type

- B: DDR3 SDRAM
- D: GDDR SDRAM
- G: GDDR5 SDRAM
- H: DDR SDRAM
- J: GDDR3 SDRAM
- M: Mobile SDRAM
- N: SDDR2 SDRAM
- S: SDRAM
- T: DDR SDRAM
- U: GDDR4 SDRAM
- V: Mobile DDR SDRAM Power Efficient Address
- W: SDDR3 SDRAM
- X: Mobile DDR SDRAM
- Y: XDR DRAM
- Z: Value Added DRAM

4. Density

- 10: 1G, 8K/32ms
- 16: 16M, 4K/64ms
- 26: 128M, 4K/32ms
- 28: 128M, 4K/64ms
- 32: 32M, 2K/32ms
- 50: 512M, 32K/16ms
- 51: 512M, 8K/64ms
- 52: 512M, 8K/32ms
- 54: 256M, 16K/16ms
- 55: 256M, 4K/32ms
- 56: 256M, 8K/64ms
- 62: 64M, 2K/16ms
- 64: 64M, 4K/64ms
- 68: 768M, 8K/64ms
- 1G: 1G, 8K/64ms
- 2G: 2G, 8K/64ms
- 4G: 4G, 8K/64ms

5. Bit Organization

- 02: x2
- 04: x4
- 06: x4 Stack (Flexframe)
- 07: x8 Stack (Flexframe)
- 08: x8
- 15: x16 (2CS)
- 16: x16
- 26: x4 Stack (JEDEC Standard)
- 27: x8 Stack (JEDEC Standard)
- 30: x32 (2CS, 2CKE)
- 31: x32 (2CS)
- 32: x32

6. # of Internal Banks

- 2: 2 Banks
- 3: 4 Banks
- 4: 8 Banks
- 5: 16 Banks

7. Interface (VDD, VDDQ)

- 2: LVTTL, 3.3V, 3.3V
- 4: LVTTL, 2.5V, 2.5V
- 5: SSTL-2 1.8V, 1.8V
- 6: SSTL-15 1.5V, 1.5V
- 8: SSTL-2, 2.5V, 2.5V
- A: SSTL, 2.5V, 1.8V
- F: POD-15 (1.5V,1.5V)
- H: SSTL_2 DLL, 3.3V, 2.5V
- M: LVTTL, 1.8V, 1.5V
- N: LVTTL, 1.5V, 1.5V
- P: LVTTL, 1.8V, 1.8V
- Q: SSTL-2 1.8V, 1.8V
- R: SSTL-2, 2.8V, 2.8V
- U: DRSL, 1.8V, 1.2V

8. Revision

- A: 2nd Generation
- B: 3rd Generation
- C: 4th Generation
- D: 5th Generation
- E: 6th Generation
- F: 7th Generation
- G: 8th Generation
- H: 9th Generation
- I: 10th Generation
- J: 11th Generation
- K: 12th Generation
- M: 1st Generation
- N: 14th Generation
- Q: 17th Generation

9. Package Type

DDR SDRAM

- L: TSOP II (Lead-free & Halogen-free)
- H: FBGA (Lead-free & Halogen-free)
- F: FBGA for 64Mb DDR (Lead-free & Halogen-free)
- 6: sTSOP II (Lead-free & Halogen-free)
- T: TSOP II
- N: sTSOP II
- G: FBGA
- U: TSOP II (Lead-free)
- V: sTSOP II (Lead-free)
- Z: FBGA (Lead-free)

DDR2 SDRAM

- Z: FBGA (Lead-free)
- J: FBGA DDP (Lead-free)
- Q: FBGA QDP (Lead-free)
- H: FBGA (Lead-free & Halogen-free)
- M: FBGA DDP (Lead-free & Halogen-free)
- E: FBGA QDP (Lead-free & Halogen-free)
- T: FBGA DSP (Lead-free & Halogen-free, Thin)

DDR3 SDRAM

- Z: FBGA (Lead-free)
- H: FBGA (Halogen-free & Lead-free)

Graphics Memory

- Q: TQFP
- U: TQFP (Lead Free)
- G: 84/144 FBGA
- V: 144 FBGA (Lead Free)
- Z: 84 FBGA(Lead Free)
- T: TSOP
- L: TSOP (Lead Free)
- A: 136 FBGA
- B: 136 FBGA(Lead Free)
- H: FBGA(Hologen Free & Lead Free)
- E: 100 FBGA(Hologen Free & Lead Free)

SDRAM

- L TSOP II (Lead-free & Halogen-free)
- N: STSOP II
- T: TSOP II
- U: TSOP II (Lead-free)
- V: sTSOP II (Lead-free)

COMPONENT DRAM ORDERING INFORMATION

1	2	3	4	5	6	7	8	9	10	11
K	4	T	XX	XX	X	X	X	X	X	XX

- 1: SAMSUNG Memory
- 2: DRAM
- 3: DRAM Type
- 4, 5: Density, Bit Organization
- 6: Number of Internal Banks
- 7: Interface (VDD, VDDQ)
- 8: Revision
- 9: Package Type
- 10: Temp & Power
- 11: Speed

XDR DRAM

J: BOC(LF) P: BOC

Mobile DRAM

Leaded / Lead Free

G/A: 52balls FBGA Mono
R/B: 54balls FBGA Mono
X /Z: 54balls BOC Mono
J /V: 60(72)balls FBGA Mono 0.5pitch
L /F: 60balls FBGA Mono 0.8pitch
S/D: 90balls FBGA

Monolithic (11mm x 13mm)

F/H: Smaller 90balls FBGA Mono
Y/P: 54balls CSP DDP
M/E: 90balls FBGA DDP

10. Temp & Power - COMMON (Temp, Power)

C: Commercial, Normal (0'C – 95'C) & Normal Power
C: (Mobile Only) Commercial (-25 ~ 70'C), Normal Power
J: Commercial, Medium
L: Commercial, Low (0'C – 95'C) & Low Power
L: (Mobile Only) Commercial, Low, i-TCSR
F: Commercial, Low, i-TCSR & PASR & DS
E: Extended (-25~85'C), Normal
N: Extended, Low, i-TCSR
G: Extended, Low, i-TCSR & PASR & DS
I: Industrial, Normal (-40'C – 85'C) & Normal Power
P: Industrial, Low (-40'C – 85'C) & Low Power
H: Industrial, Low, i-TCSR & PASR & DS

11. Speed (Wafer/Chip Biz/BGD: 00)

DDR SDRAM

CC: DDR400 (200MHz @ CL=3, tRCD=3, tRP=3)
B3: DDR333 (166MHz @ CL=2.5, tRCD=3, tRP=3) *1
A2: DDR266 (133MHz @ CL=2 , tRCD=3, tRP=3)
B0: DDR266 (133MHz @ CL=2.5, tRCD=3, tRP=3)

Note 1: "B3" has compatibility with "A2" and "B0"

DDR2 SDRAM

CC: DDR2-400 (200MHz @ CL=3, tRCD=3, tRP=3)
D5: DDR2-533 (266MHz @ CL=4, tRCD=4, tRP=4)
E6: DDR2-667 (333MHz @ CL=5, tRCD=5, tRP=5)
F7: DDR2-800 (400MHz @ CL=6, tRCD=6, tRP=6)
E7: DDR2-800 (400MHz @ CL=5, tRCD=5, tRP=5)

DDR3 SDRAM

F7: DDR3-800 (400MHz @ CL=6, tRCD=6, tRP=6)
F8: DDR3-1066 (533MHz @ CL=7, tRCD=7, tRP=7)
G8: DDR3-1066 (533MHz @ CL=8, tRCD=8, tRP=8)
H9: DDR3-1333 (667MHz @ CL=9, tRCD=9, tRP=9)
K0: DDR3-1600 (800MHz @ CL=11, tRCD=11, tRP=11)

Graphics Memory

18: 1.8ns (550MHz)
04: 0.4ns (2500MHz)
20: 2.0ns (500MHz)
05: 0.5ns (2000MHz)
22: 2.2ns (450MHz)
5C: 0.56ns (1800MHz)
25: 2.5ns (400MHz)
06: 0.62ns (1600MHz)
2C: 2.66ns (375MHz)
6A: 0.66ns (1500MHz)
2A: 2.86ns (350MHz)
07: 0.71ns (1400MHz)
33: 3.3ns (300MHz)
7A: 0.77ns (1300MHz)
36: 3.6ns (275MHz)
08: 0.8ns (1200MHz)
40: 4.0ns (250MHz)
09: 0.9ns (1100MHz)
45: 4.5ns (222MHz)
1 : 1.0ns (1000MHz)
50/5A: 5.0ns (200MHz)
1 : 1.1ns (900MHz)
55: 5.5ns (183MHz)
12: 1.25ns (800MHz)
60: 6.0ns (166MHz)
14: 1.4ns (700MHz)
16: 1.6ns (600MHz)

SDRAM (Default CL=3)

50: 5.0ns (200MHz CL=3)
60: 6.0ns (166MHz CL=3)
67: 6.7ns
75: 7.5ns PC133 (133MHz CL=3)

XDR DRAM

A2: 2.4Gbps, 36ns, 16Cycles
B3: 3.2Gbps, 35ns, 20Cycles
C3: 3.2Gbps, 35ns, 24Cycles
C4: 4.0Gbps, 28ns, 24Cycles
DS: Daisychain Sample

Mobile-SDRAM

60: 166MHz, CL 3
75: 133MHz, CL 3
80: 125MHz, CL 3
1H: 105MHz, CL 2
1L: 105MHz, CL 3
15: 66MHz, CL 2 & 3

Mobile-DDR

C3: 133MHz, CL 3
C2: 100MHz, CL 3
C0: 66MHz, CL 3

Note: All of Lead-free or Halogen-free product are in compliance with RoHS

MODULE DRAM ORDERING INFORMATION

1	2	3	4	5	6	7	8	9	10	11	12	13
M	X	XX	T	XX	X	X	X	X	X	X	XX	X

- 1: SAMSUNG Memory
- 2: DIMM
- 3: Data bits
- 4: DRAM Component Type
- 5: Depth
- 6: Number of Banks
- 7: Bit Organization
- 8: Component Revision
- 9: Package
- 10: PCB Revision
- 11: Temp & Power
- 12: Speed
- 13: AMB Vendor

1. Memory Module: M

2. DIMM Type

3: DIMM
4: SODIMM

3. Data bits

12: x72 184pin Low Profile Registered DIMM
63: x63 PC100 / PC133 µSODIMM with SPD for 144pin
64: x64 PC100 / PC133 SODIMM with SPD for 144pin (Intel/JEDEC)
66: x64 Unbuffered DIMM with SPD for 144pin/168pin (Intel/JEDEC)
68: x64 184pin Unbuffered DIMM
70: x64 200pin Unbuffered SODIMM
71: x64 204pin Unbuffered SODIMM
74: x72 /ECC Unbuffered DIMM with SPD for 168pin (Intel/JEDEC)
77: x72 /ECC PLL + Register DIMM with SPD for 168pin (Intel PC100)
78: x64 240pin Unbuffered DIMM
81: x72 184pin ECC unbuffered DIMM
83: x72 184pin Registered DIMM
90: x72 /ECC PLL + Register DIMM
91: x72 240pin ECC unbuffered DIMM
92: x72 240pin VLP Registered DIMM
93: x72 240pin Registered DIMM
95: x72 240pin Fully Buffered DIMM with SPD for 168pin (JEDEC PC133)

4. DRAM Component Type

B: DDR3 SDRAM (1.5V VDD)
L: DDR SDRAM (2.5V VDD)
S: SDRAM
T: DDR2 SDRAM (1.8V VDD)

5. Depth

09: 8M (for 128Mb/512Mb)
17: 16M (for 128Mb/512Mb)
16: 16M
28: 128M
29: 128M (for 128Mb/512Mb)
32: 32M
33: 32M (for 128Mb/512Mb)
51: 512M
52: 512M (for 512Mb/2Gb)
56: 256M
57: 256M (for 512Mb/2Gb)
59: 256M (for 128Mb/512Mb)
64: 64M
65: 64M (for 128Mb/512Mb)
1G: 1G
1K: 1G (for 2Gb)

6. # of Banks in Comp. & Interface

1: 4K/64mxRef., 4Banks & SSTL-2
2 : 8K/ 64ms Ref., 4Banks & SSTL-2
2: 4K/ 64ms Ref., 4Banks & LVTTL (SDR Only)
5: 8K/ 64ms Ref., 4Banks & LVTTL (SDR Only)
5: 4Banks & SSTL-1.8V
6: 8Banks & SSTL-1.8V

7. Bit Organization

0: x 4
3: x 8
4: x16
6: x 4 Stack (JEDEC Standard)
7: x 8 Stack (JEDEC Standard)
8: x 4 Stack
9: x 8 Stack

8. Component Revision

A: 2nd Gen.
B: 3rd Gen.
C: 4th Gen.
D: 5th Gen.
E: 6th Gen.
F: 7th Gen.
G: 8th Gen.
M: 1st Gen.
Q: 17th Gen.

9. Package

E: FBGA QDP (Lead-free & Halogen-free)
G: FBGA
H: FBGA (Lead-free & Halogen-free)
J: FBGA DDP (Lead-free)
M: FBGA DDP (Lead-free & Halogen-free)
N: sTSOP
Q: FBGA QDP (Lead-free)
T: TSOP II (400mil)
U: TSOP II (Lead-Free)
V: sTSOP II (Lead-Free)
Z: FBGA(Lead-free)

10. PCB Revision

0: Mother PCB
1: 1st Rev
2: 2nd Rev.
3: 3rd Rev.
4: 4th Rev.
A: Parity DIMM
S: Reduced PCB
U: Low Profile DIMM

11. Temp & Power

C: Commercial Temp. (0°C ~ 95°C) & Normal Power
L: Commercial Temp. (0°C ~ 95°C) & Low Power

12. Speed

CC: (200MHz @ CL=3, tRCD=3, tRP=3)
D5: (266MHz @ CL=4, tRCD=4, tRP=4)
E6: (333MHz @ CL=5, tRCD=5, tRP=5)
F7: (400MHz @ CL=6, tRCD=6, tRP=6)
E7: (400MHz @ CL=5, tRCD=5, tRP=5)
F8: (533MHz @ CL=7, tRCD=7, tRP=7)
G8: (533MHz @ CL=8, tRCD=8, tRP=8)
H9: (667MHz @ CL=9, tRCD=9, tRP=9)
K0: (800MHz @ CL=10, tRCD=10, tRP=10)
7A: (133MHz CL=3/PC100 CL2)

13. AMB Vendor for FBDIMM

0, 5: Intel
1, 6, 8: IDT
9: Montage

Note: All of Lead-free or Halogen-free product are in compliance with RoHS

SLC FLASH

Family	Density	Part Number	Package Type	Org.	Vol(V)	MOQ		Status
						Tray -xxxx0xx	T/R -xxx0Txx	
16Gb Based	16Gb Mono	K9FAG08U0M-HCB0	BGA	X8	3.3	960	1000	E/S
		K9FAG08S0M-HCB0	BGA	X8	1.8	960	1000	E/S
	32Gb DDP	K9KBG08U1M-HCB0	BGA	X8	3.3	960	1000	E/S
		K9KBG08S1M-HCB0	BGA	X8	1.8	960	1000	E/S
	64Gb QDP	K9WCG08U5M-HCB0	BGA	X8	3.3	960	1000	E/S
		K9WCG08S5M-HCB0	BGA	X8	1.8	960	1000	E/S
	128Gb ODP	K9QDG08U5M-HCB0	BGA	X8	3.3	960	1000	E/S
		K9QDG08S5M-HCB0	BGA	X8	1.8	960	1000	E/S
8Gb Based	64Gb DSP	K9NCG08U5M-PCK0	TSOP1	x8	3.3	960	1000	M/P
	32Gb QDP	K9WBG08U1M-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9WBG08U1M-PIB0	TSOP1	x8	3.3	960	1000	M/P
	16Gb DDP	K9KAG08U0M-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9KAG08U0M-PIB0	TSOP1	x8	3.3	960	1000	M/P
	8Gb Mono	K9F8G08U0M-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9F8G08U0M-PIB0	TSOP1	x8	3.3	960	1000	M/P
4Gb Based	16Gb QDP	K9WAG08U1D-SCB0	TSOP1 HF&LF	x8	3.3	960	1000	C/S
		K9WAG08U1D-SIB0	TSOP1 HF&LF	x8	3.3	960	1000	C/S
		K9WAG08U1B-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9WAG08U1B-PIB0	TSOP1	x8	3.3	960	1000	M/P
		K9WAG08U1B-KIB0	ULGA HF & LF	x8	3.3	960	2000	M/P
	8Gb DDP	K9K8G08U0D-SCB0	TSOP1 HF&LF	X8	3.3	960	1000	C/S
		K9K8G08U0D-SIB0	TSOP1 HF&LF	x8	3.3	960	1000	C/S
		K9K8G08U0B-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9K8G08U0B-PIB0	TSOP1	x8	3.3	960	1000	M/P
		K9K8G08U1B-KIB0	ULGA HF & LF	x8	3.3	960	2000	M/P
	4Gb Mono	K9F4G08U0D-SCB0	TSOP1 HF & LF	x8	3.3	960	1000	C/S
		K9F4G08U0D-SIB0	TSOP1 HF& LF	X8	3.3	960	1000	C/S
		K9F4G08U0B-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9F4G08U0B-PIB0	TSOP1	x8	3.3	960	1000	M/P
		K9F4G08U0B-KIB0	ULGA HF & LF	x8	3.3	960	2000	M/P
2Gb Based	2Gb Mono	K9F2G08U0C-SCB0	TSOP-LF/HF	x8	3.3	960	1000	C/S
		K9F2G08U0C-SIB0	TSOP-LF/HF	x8	3.3	960	1000	C/S
		K9F2G08U0B-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9F2G08U0B-PIB0	TSOP1	x8	3.3	960	1000	M/P
1Gb Based	1Gb Mono	K9F1G08U0D-SCB0	TSOP-LF/HF	x8	3.3	960	1000	C/S
		K9F1G08U0D-SIB0	TSOP-LF/HF	x8	3.3	960	1000	C/S
		K9F1G08U0C-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9F1G08U0C-PIB0	TSOP1	x8	3.3	960	1000	M/P
512Mb Based	512Mb Mono	K9F1208U0C-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9F1208U0C-PIB0	TSOP1	x8	3.3	960	1000	M/P
		K9F1208R0C-JIB0	63 FBGA(8.5x13)	x8	1.8	1120	-	M/P
		K9F1208U0C-JIB0	63 FBGA(8.5x13)	x8	3.3	1120	-	M/P
256Mb Based	256Mb Mono	K9F5608U0D-PCB0	TSOP1	x8	3.3	960	1000	M/P
		K9F5608U0D-PIB0	TSOP1	x8	3.3	1000	1000	M/P
		K9F5608R0D-JIB0	63 FBGA(9x11)	x8	1.8	1280	2000	M/P
		K9F5608U0D-JIB0	63 FBGA(9x11)	x8	3.3	1280	2000	M/P

Please contact your local Samsung sales representative for latest product offerings.

Note: All parts are lead free

MLC FLASH

Type	Family	Density	Technology	Part Number	Package Type	Org.	Vol(V)	MOQ		Comments
								Tray -xxxx0xx	T/R -xxx0Txx	
2bit	32Gb Based	32Gb Mono	27nm	K9HDG08U1A-SCB0	TSOP - Lead free & Halogen free	x8	3.3	960	1000	
		64Gb DDP	27nm	K9LCG08U0A-SCB0	TSOP - Lead free & Halogen free	x8	3.3	960	1000	
		128Gb QDP	27nm	K9GBG08U0A-SCB0	TSOP - Lead free & Halogen free	x8	3.3	960	1000	
	16Gb Based	16Gb Mono	32nm	K9GAG08U0E-SCB0	TSOP - Lead free & Halogen free	x8	3.3	960	1000	
		32Gb DDP	32nm	K9LBG08U0E-SCB0	TSOP - Lead free & Halogen free	x8	3.3	960	1000	
		64Gb QDP	32nm	K9HCG08U1E-SCB0	TSOP - Lead free & Halogen free	x8	3.3	960	1000	
	8Gb Based	8Gb Mono	32nm	K9G8G08U0C-SCB0	TSOP - Lead free & Halogen free	x8	3.3	960	1000	
3bit	32Gb Based	32Gb mono	32nm	K9CDG08U5A-MCB0001	LGA - Lead free & Halogen free	x8	3.3	840	-	Moving to 2xnm Q3'10
		64Gb DDP	32nm	K9BCG08U1A-MCB0001	LGA - Lead free & Halogen free	x8	3.3	840	-	Moving to 2xnm Q3'10
		128Gb QDP	32nm	K9ABG08U0A-MCB0001	LGA - Lead free & Halogen free	x8	3.3	840	-	Moving to 2xnm Q3'10

Please contact your local Samsung sales representative for latest product offerings.
Note: All parts are lead free

SD and MicroSD FLASH CARDS

Application	Density	Controller
SD Card	2GB	Contact your local Samsung rep for availability and ordering information
	4GB	
	8GB	
	16GB	
MicroSD Card	2GB	Contact your local Samsung rep for availability and ordering information
	4GB	
	8GB	
	16GB	
	32GB	

Please contact your local Samsung sales representative for latest product offerings.
Note: All parts are lead free

SOLID STATE DRIVES (SSD)

Interface	Size	Connector	Controller	Comp.	Capacity	Part Number
SATA II (Native)	2.5"	Thin SATA	MAX	16Gb	64GB	MZ5PA064HMCD-0A000
					128GB	MZ5PA128HMCD-0A000
					256GB	MZ5PA256HMDR-0A000
			TMDDR Controller	32Gb Toggle-Mode DDR NAND	512GB	Contact Sales
SATA II (Native)	mSATA	mSATA	MAX	16Gb	32GB	MZMPA032HMCD-00000
					64GB	MZMPA064HMDR-00000
					128GB	MZMPA128HMFU-00000

Please contact your local Samsung sales representative for latest product offerings.
Note: All parts are lead free

FLASH PRODUCT ORDERING INFORMATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
K	9	X	X	X	X	X	X	X	X	-	X	X	X	X

- 1 : SAMSUNG Memory
- 2 : NAND Flash
- 3 : Small Classification
- 4 : Density
- 5 : Density
- 6 : Organization
- 7 : Organization
- 8 : Vcc
- 9 : Mode
- 10 : Generation
- 11 : ---
- 12 : Package
- 13 : Temp
- 14 : Customer Bad Block
- 15 : Pre-Program Version

1. Memory (K)

2. NAND Flash : 9

3. Small Classification

(SLC : Single Level Cell, MLC : Multi Level Cell)

7 : SLC moviNAND
8 : MLC moviNAND
F : SLC Normal
G : MLC Normal
H : MLC QDP
K : SLC DDP
L : MLC DDP
M : MLC DSP
N : SLC DSP
P : MLC 8 Die Stack
Q : SLC 8 Die Stack
S : SLC Single SM
T : SLC SINGLE (S/B)
U : 2 Stack MSP
W : SLC 4 Die Stack

4~5. Density

12 : 512M
56 : 256M
1G : 1G
2G : 2G
4G : 4G
8G : 8G
AG : 16G BG :
32G CG : 64G
DG : 128G
EG : 256G
LG : 24G
NG : 96G
ZG : 48G
00 : NONE

6~7. Organization

00 : NONE
08 : x8
16 : x16

8. Vcc

A : 1.65V~3.6V
B : 2.7V (2.5V~2.9V)
C : 5.0V (4.5V~5.5V)
D : 2.65V (2.4V~2.9V)
E : 2.3V~3.6V
R : 1.8V (1.65V~1.95V)
Q : 1.8V (1.7V~1.95V)
T : 2.4V~3.0V
U : 2.7V~3.6V
V : 3.3V (3.0V~3.6V)
W : 2.7V~5.5V, 3.0V~5.5V
0 : NONE

9. Mode

0 : Normal
1 : Dual nCE & Dual R/nB
3 : Tri /CE & Tri R/B
4 : Quad nCE & Single R/nB
5 : Quad nCE & Quad R/nB
9 : 1st block OTP
A : Mask Option 1
L : Low grade

10. Generation

M : 1st Generation
A : 2nd Generation
B : 3rd Generation
C : 4th Generation
D : 5th Generation

11. " ----"

12. Package

A : COB
B : FBGA (Halogen-Free, Lead-Free)
C : CHIP BIZ D : 63-TBGA
F : WSOP (Lead-Free) G : FBGA
H : TBGA (Lead-Free)
I : ULGA (Lead-Free) (12*17)
J : FBGA (Lead-Free)
L : ULGA (Lead-Free) (14*18)
M : TLGA N : TLGA2
P : TSOP1 (Lead-Free)
Q : TSOP2 (Lead-Free)
S : TSOP1 (Halogen-Free, Lead-Free)
T : TSOP2 U : COB (MMC)
V : WSOP W : Wafer
Y : TSOP1 Z : WELP (Lead-Free)

13. Temp

C : Commercial I : Industrial
0 : NONE (Containing Wafer, CHIP, BIZ, Exception handling code)

14. Customer Bad Block

B : Include Bad Block
D : Daisychain Sample
L : 1~5 Bad Block
N : ini. 0 blk, add. 10 blk
S : All Good Block
0 : NONE (Containing Wafer, CHIP, BIZ, Exception handling code)

15. Pre-Program Version

0 : None
Serial (1~9, A~Z)

NtRAM

Type	Density	Organization	Part Number	Package	Operating Mode	Vdd (V)	Access Time tCD (ns)	Speed tCYC (MHz)	I/O Voltage (V)	Production Status
NtRAM	72Mb	2Mx36	K7N643645M	100-TQFP, 165FBGA	SPB	2.5	2.6, 3.5	250, 167	2.5	Mass Production
		4Mx18	K7N641845M	100-TQFP, 165FBGA	SPB	2.5	2.6, 3.5	250, 167	2.5	Mass Production
	36Mb	1Mx36	K7N323635C	100-TQFP, 165FBGA	SPB	3.3, 2.5	2.6, 3.5	250, 167	3.3, 2.5	Mass Production
		2Mx18	K7N321835C	100-TQFP, 165FBGA	SPB	3.3, 2.5	2.6, 3.5	250, 167	3.3, 2.5	Mass Production
		1Mx36	K7M323635C	100-TQFP	FT	3.3, 2.5	7.5	118	3.3, 2.5	Mass Production
		2Mx18	K7M321835C	100-TQFP	FT	3.3, 2.5	7.5	118	3.3, 2.5	Mass Production
	18Mb	1Mx18	K7N161831B	100-TQFP, 165FBGA	SPB	3.3, 2.5	2.6, 3.5	250, 167	3.3, 2.5	Mass Production
		512Kx36	K7N163631B	100-TQFP, 165FBGA	SPB	3.3, 2.5	2.6, 3.5	250, 167	3.3, 2.5	Mass Production
		1Mx18	K7M161835B	100-TQFP	FT (SB)	3.3	6.5	133	3.3, 2.5	Mass Production
		512Kx36	K7M163635B	100-TQFP	FT (SB)	3.3	6.5	133	3.3, 2.5	Mass Production
	8Mb	256Kx36	K7N803601B	100-TQFP	SPB	3.3	3.5	167	3.3,2.5	Not for new designs
		512Kx18	K7N801801B	100-TQFP	SPB	3.3	3.5	167	3.3,2.5	Not for new designs
		256Kx36	K7N803609B	100-TQFP	SPB	3.3	2.6	250	3.3,2.5	Not for new designs
		512Kx18	K7N801809B	100-TQFP	SPB	3.3	2.6	250	3.3,2.5	Not for new designs
		256Kx36	K7N803645B	100-TQFP	SPB	2.5	3.5	167	2.5	Not for new designs
		512Kx18	K7N801845B	100-TQFP	SPB	2.5	3.5	167	2.5	Not for new designs
		256Kx36	K7N803649B	100-TQFP	SPB	2.5	2.6	250	2.5	Not for new designs
		512Kx18	K7N801849B	100-TQFP	SPB	2.5	2.6	250	2.5	Not for new designs
		512Kx18	K7M801825B	100-TQFP	FT	3.3	6.5	133	3.3, 2.5	Not for new designs
		256Kx36	K7M803625B	100-TQFP	FT	3.3	6.5	133	3.3, 2.5	Not for new designs
	4Mb	128Kx36	K7N403609B	100-TQFP	SPB	3.3	3	200	3.3,2.5	Not for new designs
		256Kx18	K7N401809B	100-TQFP	SPB	3.3	3	200	3.3,2.5	Not for new designs
SPB and FT	4Mb	256Kx18	K7B401825B	100-TQFP	SB	3.3	6.5	133	3.3, 2.5	Not for new designs

NOTES: All TQFP products are lead free
NtRAM speed recommendations: For 200MHz use 250MHz; For 133MHz use 167MHz
NtRAM speed recommendation: Use 7.5ns Access Time use 6.5ns Access Time
Recommended SPB speeds are 250MHz and 167MHz Recommended SB Acess Speed is 7.5ns

Late-Write RR SRAM

Density	Organization	Part Number	Package	Operating Mode	Vdd (V)	Access Time tCD (ns)	Speed tCYC (MHz)	I/O Voltage (V)	Production Status
32Mb	1Mx36	K7P323674C	119-BGA	SP	1.8 / 2.5V	1.6, 2.0	300,250	1.5 (Max 1.8)	Mass Production
	2Mx18	K7P321874C	119-BGA	SP	1.8 / 2.5V	1.6, 2.0	300,250	1.5 (Max 1.8)	Mass Production
8Mb	256Kx36	K7P803611B	119-BGA	SP	3.3	1.6	300	1.5 (Max.2.0)	Mass Production
	512Kx18	K7P801811B	119-BGA	SP	3.3	1.6	300	1.5 (Max.2.0)	Mass Production
	256Kx36	K7P803666B	119-BGA	SP	2.5	2	250	1.5 (Max.2.0)	Mass Production
	512Kx18	K7P801866B	119-BGA	SP	2.5	2	250	1.5 (Max.2.0)	Mass Production

DDR SYNCHRONOUS SRAM

Type	Density	Organization	Part Number	Package	Vdd (V)	Access Time tCD (ns)	Cycle Time (MHz)	I/O Voltage (V)	Production Status	Comments
DDR	16Mb	512Kx36	K7D163674B	153-BGA	1.8~2.5	2.3	330, 300	1.5~1.9	Mass Production	
		1Mx18	K7D161874B	153-BGA	1.8~2.5	2.3	330, 300	1.5~1.9	Mass Production	
	8Mb	256Kx36	K7D803671B	153-BGA	2.5	1.7/1.9/2.1	333, 330, 250	1.5 (Max 2.0)	Not for new designs	
		512Kx18	K7D801871B	153-BGA	2.5	1.7/1.9/2.1	333, 330, 250	1.5 (Max 2.0)	Not for new designs	
DDR II CIO/ SIO	72Mb	4Mx18	K7I641882M	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	CIO-2B
			K7I641884M	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	CIO-4B
			K7J641882M	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	SIO-2B
		2Mx36	K7I643682M	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	CIO-2B
			K7I643684M	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	CIO-4B
			K7J643682M	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	SIO-2B
	36Mb	2Mx18	K7I321882C	165-FBGA	1.8	0.45	300,250	1.5,1.8	Mass Production	CIO-2B
			K7I321884C	165-FBGA	1.8	0.45	300,250	1.5,1.8	Mass Production	CIO-4B
			K7J321882C	165-FBGA	1.8	0.45	300,250	1.5,1.8	Mass Production	SIO-2B
		1Mx36	K7I323682C	165-FBGA	1.8	0.45	300,250	1.5,1.8	Mass Production	CIO-2B
			K7I323684C	165-FBGA	1.8	0.45	300,250	1.5,1.8	Mass Production	CIO-4B
			K7J323682C	165-FBGA	1.8	0.45	300,250	1.5,1.8	Mass Production	SIO-2B
	18Mb	1Mx18	K7I161882B	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	CIO-2B
			K7I161884B	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	CIO-4B
			K7J161882B	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	SIO-2B
		512Kx36	K7J163682B	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	SIO-2B
			K7I163682B	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	CIO-2B
			K7I163684B	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	CIO-4B
DDR II+ CIO	36Mb	2Mx18	K7K3218T2C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	DDRII + CIO-2B, 2 clocks latancy
			K7K3218U2C	165-FBGA	1.8	0.45	400, 334	2.5	Mass Production	DDRII + CIO-2B, 2.5 clocks latancy
		1Mx36	K7K3236T2C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	DDRII + CIO-2B, 2 clocks latancy
			K7K3236U2C	165-FBGA	1.8	0.45	400, 334	2.5	Mass Production	DDRII + CIO-2B, 2.5 clocks latancy
	18Mb	1Mx18	K7K1618T2C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	DDRII + CIO-2B, 2 clocks latancy
			K7K1618U2C	165-FBGA	1.8	0.45	400, 334	2.5	Mass Production	DDRII + CIO-2B, 2.5 clocks latancy
		512Kx36	K7K1636T2C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	DDRII + CIO-2B, 2 clocks latancy
			K7K1636U2C	165-FBGA	1.8	0.45	400, 334	2.5	Mass Production	DDRII + CIO-2B, 2.5 clocks latancy

NOTES:
2B = Burst of 2
4B = Burst of 4
SIO = Separate I/O
CIO = Common I/O

For DDR II CIO/SIO: C-die use 330, 300, or 250MHz instad of 200MHz or 167MHz using a stable DLL circuit
For DDR II+ CIO: 2-clock latency is available. A 2.5-clock latency can be supported on 18Mb at 500Mhz and 36Mb at 450MHz

QDR SYNCHRONOUS SRAM

Type	Density	Organization	Part Number	Package	Vdd (V)	Access Time tCD (ns)	Cycle Time	I/O Voltage (V)	Production Status	Comments
QDR I	18Mb	1Mx18	K7Q161862B	165-FBGA	1.8v / 2.5v	2.5	167	1.5,1.8	Mass Production	QDR I - 2B
			K7Q161864B	165-FBGA	1.8v / 2.5v	2.5	167	1.5,1.8	Mass Production	QDR I - 4B
		512Kx36	K7Q163662B	165-FBGA	1.8v / 2.5v	2.5	167	1.5,1.8	Mass Production	QDR I - 2B
			K7Q163664B	165-FBGA	1.8v / 2.5v	2.5	167	1.5,1.8	Mass Production	QDR I - 4B
QDR II	72Mb	8Mx9	K7R640982M	165-FBGA	1.8	0.45,0.45,0.50	250,200,167	1.5,1.8	Mass Production	QDR II-2B
		4Mx18	K7R641882M	165-FBGA	1.8	0.45,0.45,0.50	250,200,167	1.5,1.8	Mass Production	QDR II-2B
			K7R641884M	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	QDR II-4B
		2Mx36	K7R643682M	165-FBGA	1.8	0.45,0.45,0.50	250,200,167	1.5,1.8	Mass Production	QDR II-2B
			K7R643684M	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	QDR II-4B
	36Mb	4Mx9	K7R320982C	165-FBGA	1.8	0.45	167, 250, 200	1.5,1.8	Mass Production	QDR II-2B
		2Mx18	K7R321882C	165-FBGA	1.8	0.45	167, 250, 200	1.5,1.8	Mass Production	QDR II-2B
			K7R321884C	165-FBGA	1.8	0.45	200, 300, 250	1.5,1.8	Mass Production	QDR II-4B
		1Mx36	K7R323682C	165-FBGA	1.8	0.45	300, 250, 200	1.5,1.8	Mass Production	QDR II-2B
			K7R323684C	165-FBGA	1.8	0.45	200, 300, 250	1.5,1.8	Mass Production	QDR II-4B
	18Mb	2Mx9	K7R160982B	165-FBGA	1.8	0.45,0.45,0.50	250,200,167	1.5,1.8	Mass Production	QDR II - 2B
		1Mx18	K7R161882B	165-FBGA	1.8	0.45,0.45,0.50	250,200,167	1.5,1.8	Mass Production	QDR II - 2B
			K7R161884B	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	QDR II - 4B
		512Kx36	K7R163682B	165-FBGA	1.8	0.45,0.45,0.50	250,200,167	1.5,1.8	Mass Production	QDR II - 2B
			K7R163684B	165-FBGA	1.8	0.45,0.45,0.45,0.50	300,250,200,167	1.5,1.8	Mass Production	QDR II - 4B
QDR II+	36Mb	1Mx36	K7S3236T4C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	QDR II + 4B, 2 clocks latancy
			K7S3236U4C	165-FBGA	1.8	0.45	400, 334	2.5	Mass Production	QDR II + 4B, 2.5 clocks latancy
		2Mx18	K7S3218T4C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	QDR II + 4B, 2 clocks latancy
			K7S3218U4C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	QDR II + 4B, 2.5 clocks latancy
	18Mb	1Mx18	K7S1618T4C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	QDR II + 4B, 2 clocks latancy
		512Kx36	K7S1636U4C	165-FBGA	1.8	0.45	400, 333	1.5	Mass Production	QDR II + 4B, 2.5 clocks latancy

NOTES: For QDR I, QDR II: 2B = Burst of 2, 4B = Burst of 4
For QDR II (36Mb): C-die use 300, 250MHz or 200MHz instead of 167MHz using a stable DLL circuit
For QDR II (72Mb): 2B = Burst of 2 and 250MHz or 200MHz is recommended, 4B = Burst of 4 and 300MHz or 250MHz is recommended
For QDR II+: 2-clock latency supported. 2.5-clock latency can be supported with 450MHz speed

SYNCHRONOUS SRAM ORDERING INFORMATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
K	7	X	X	X	X	X	X	X	X	-	X	X	X	X	X

SAMSUNG Memory	Packaging Type
Sync SRAM	Speed
Small Classification	Speed
Density	Temp, Power
Density	Package
Organization	---
Organization	Generation
Vcc, Interface, Mode	Vcc, Interface, Mode

1. Memory (K)

2. Sync SRAM: 7

3. Small Classification

A: Sync Pipelined Burst
B: Sync Burst
D: Double Data Rate
I: Double Data Rate II, Common I/O
J: Double Data Rate, Separate I/O
K: Double Data II+, Common I/O
M: Sync Burst + NtRAM
N: Sync Pipelined Burst + NtRAM
P: Sync Pipe
Q: Quad Data Rate I
R: Quad Data Rate II
S: Quad Data Rate II+

4~5. Density

80: 8M
16: 18M
40: 4M
32: 36M
64: 72M

6~7. Organization

08: x8
09: x9
18: x18
32: x32
36: x36

8~9. Vcc, Interface, Mode

00: 3.3V,LVTTL,2E1D WIDE
01: 3.3V,LVTTL,2E2D WIDE
08: 3.3V,LVTTL,2E2D Hi SPEED
09: 3.3V,LVTTL,Hi SPEED
11: 3.3V,HSTL,R-R
12: 3.3V,HSTL,R-L
14: 3.3V,HSTL,R-R Fixed ZQ
22: 3.3V,LVTTL,R-R
23: 3.3V,LVTTL,R-L
25: 3.3V,LVTTL,SB-FT WIDE
30: 1.8/2.5/3.3V,LVTTL,2E1D
31: 1.8/2.5/3.3V,LVTTL,2E2D
35: 1.8/2.5/3.3V,LVTTL,SB-FT
44: 2.5V,LVTTL,2E1D
45: 2.5V,LVTTL,2E2D
49: 2.5V,LVTTL,Hi SPEED
52: 2.5V,1.5/1.8V,HSTL,Burst2
54: 2.5V,1.5/1.8V,HSTL,Burst4
62: 2.5V/1.8V,HSTL,Burst2
64: 2.5V/1.8V,HSTL,Burst4
66: 2.5V,HSTL,R-R
74: 1.8V,2.5V,HSTL,All
82: 1.8V,HSTL,Burst2
84: 1.8V,HSTL,Burst4
88: 1.8V,HSTL,R-R
T2: 1.8V,2Clock Latency,Burst2
T4: 1.8V,2Clock Latency,Burst4
U2: 1.8V,2.5Clock Latency,Burst2
U4: 1.8V,2.5Clock Latency,Burst4

10. Generation

M: 1st Generation
A: 2nd Generation
B: 3rd Generation
C: 4th Generation
D: 5th Generation

11. "--"

12. Package

H: BGA,FCBGA,PBGA
G: BGA, FCBGA, FBGA (LF)
F: FBGA
E: FBGA (LF)
Q: (L)QPF
P: (L)QFP(LF)
C: CHIP BIZ
W: WAFER

13. Temp, Power

COMMON (Temp,Power)
0: NONE,NONE (Containing of error handling code)
C: Commercial,Normal
E: Extended,Normal
I: Industrial,Normal

WAFER, CHIP BIZ Level Division
0: NONE,NONE
1: Hot DC sort
2: Hot DC, selected AC sort

14~15. Speed

Sync Burst,Sync Burst + NtRAM
< Mode is R-L > (Clock Accesss Time)
65: 6.5ns
70: 7ns
75: 7.5ns
80: 8ns
85: 8.5ns

Other Small Classification (Clock Cycle Time)
10: 100MHz
11: 117MHz
13: 133MHz
14: 138MHz
16: 166MHz
20: 200MHz
25: 250MHz
26: 250MHz(1.75ns)
27: 275MHz
30: 300MHz
33: 333MHz
35: 350MHz
37: 375MHz
40: 400MHz(t-CYCLE)
42: 425MHz
45: 450MHz
50: 500MHz (except Sync Pipe)

16. Packing Type (16 digit)

- Common to all products, except of Mask ROM
- Divided into TAPE & REEL (In Mask ROM, divided into TRAY, AMMO packing separately)

Type	Packing Type	New Marking
Component	TAPE & REEL	T
	Other (Tray, Tube, Jar)	0 (Number)
	Stack	S
Component	TRAY	Y
(Mask ROM)	AMMO PACKING	A
Module	MODULE TAPE & REEL	P
	MODULE Other Packing	M

MCP: NAND/DRAM

Memory	NAND Density	DRAM Density (Org.)	Voltages (NAND-DRAM)	MCP Package	PoP Package
NAND & DRAM	1Gb	256Mb (x16,x32)	3.0V/1.8V - 1.8V	107/137FBGA	152FBGA
		512Mb (x16,x32)	2.7V/1.8V - 1.8V	107/137FBGA	119/152FBGA
		1Gb (x32)	1.8V - 1.8V	137FBGA	-
	2Gb	512Mb (x16,x32)	1.8V - 1.8V	107/137FBGA	119/152FBGA
		1Gb (x16,x32)	1.8V - 1.8V	107/137FBGA	152/160/168FBGA
	4Gb	1Gb (x32)	2.7V - 1.8V	137FBGA	-

MCP: OneNAND/DRAM

Memory	OneNAND Density	DRAM Density (Org.)	Voltages (NAND-DRAM)	MCP Package	PoP Package
OneNAND & DRAM	512Mb	256Mb (x32)	3.3V/1.8V - 1.8V	188FBGA	152FBGA
		512Mb (x16,x32)	1.8V - 1.8V	167/202FBGA	152FBGA
	1Gb	512Mb (x16,x32)	1.8V - 1.8V	167/202FBGA	168FBGA
		1Gb (x32)	1.8V - 1.8V	-	168FBGA
	2Gb	512Mb (x16,x32)	1.8V - 1.8V	-	152/160/168FBGA
		1Gb (x16,x32)	1.8V - 1.8V	167/202FBGA	152/160/168FBGA
		2Gb (x32)	1.8V - 1.8V	-	152/168FBGA
	4Gb	1Gb (x16)	1.8V - 1.8V	202FBGA	-

MCP: Flex-OneNAND/DRAM

Memory	Flex-OneNAND Density	DRAM Density (Org.)	Voltages (NAND-DRAM)	MCP Package	PoP Package
Flex-OneNAND & DRAM	8Gb	2Gb (x32)	1.8V - 1.8V	202FBGA	-

MCP: OneNAND/DRAM/OneNAND

Memory	Flex-OneNAND Density	DRAM Density (Org.)	Voltages (NAND-DRAM)	MCP Package	PoP Package
OneNAND & DRAM & OneDRAM	2Gb	1Gb (x16)	1.8V - 1.8V		216FBGA

MCP: moviNAND/NAND/DRAM

Memory	movi & NAND Density	DRAM Density (Org.)	Voltages (NAND-DRAM)	MCP Package	Remark
moviNAND & NAND & DRAM	512Mb	256Mb(x16,x32)	2.7V/1.8V - 1.8V	107/137FBGA	
		512Mb (x16,x32)	2.7V/1.8V - 1.8V	107/137FBGA	
	1Gb	256Mb (x16,x32)	3.0V/1.8V - 1.8V	107/137FBGA	
		512Mb (x16,x32)	2.7V/1.8V - 1.8V	107/137FBGA	
		1Gb (x32)	1.8V - 1.8V	137FBGA	
	2Gb	512Mb (x16,x32)	1.8V - 1.8V	107/137FBGA	
		1Gb (x16,x32)	1.8V - 1.8V	107/137FBGA	
	4Gb	1Gb (x32)	2.7V - 1.8V	137FBGA	

MCP: NOR/UtRAM

Memory	NOR Density	UtRAM Density (Org.)	Voltages (NOR-UtRAM)	MCP Package	Remark
NOR & UtRAM	512Mb	128Mb	1.8V - 1.8V	107FBGA	
	256Mb	128Mb	1.8V - 1.8V	107FBGA	
			1.8V - 1.8V	56FBGA	
	128Mb	64Mb	1.8V - 1.8V	84/88FBGA	
		32Mb	1.8V - 1.8V	84/88FBGA	

MCP: NOR/DRAM

Memory	NOR Density	DRAM Density (Org.)	Voltages (NOR-DRAM)	Package	Remark
NOR & DRAM	512Mb	128Mb (x16)	1.8V - 1.8V	103FBGA	
		256Mb (x16)	1.8V - 1.8V	103FBGA	

Please contact your local Samsung sales representative for latest product offerings.
Note: All parts are lead free

moviNAND™

moviNAND combines high-density MLC NAND Flash with an MMC controller in a single chip that has an MMC interface. moviNAND delivers dense, cost-effectice storage for embedded applications.

Density	Package Type	Org.	Vol (V)	Remarks
2GB	FBGA	x8	1.8/3.3	MMC 4.3 & MMC 4.4
4GB	FBGA	x8	1.8/3.3	Contact your local Samsung rep for availability and ordering information.
8GB	FBGA	x8	1.8/3.3	
16GB	FBGA	x8	1.8/3.3	
32GB	FBGA	x8	1.8/3.3	
64GB	FBGA	x8	1.8/3.3	

Please contact your local Samsung sales representative for the latest product offerings.
Note: All parts are lead free

OneDRAM™

OneDRAM is a dual-port, low-power DRAM with an SRAM buffer interface and is optimal for high-performance, high-density mobile applications.

Density	Part Number	Package Type	Org.	Vol (V)	Temp.	Speed
512Mb	KJA51Z23PC-AA0	216FBGA (14x14)	A-port: x16 (SDR/DDR)	1.8V	extended	133MHz
			B-port: x16 (SDR/DDR)			
	KJA51Y23PC-AA0	152FBGA (14x14)	A-port: x16 (SDR/DDR)			
			B-port: x16 (SDR/DDR)			
1Gb	KJA1GW25PD-EA0	240FBGA (14x14)	A-port: x32SDR	1.8V	extended	166MHz
			B-port: x32DDR"			
	KJA1GZ45PD-EA0		A-port: x16DDR			
			B-port: x32DDR"			
	KJA1GZ45PD-EA0		A-port: x16DDR			
			B-port: x16DDR"			
	KJA1GY25PD-EA0		A-port: x16SDR			
			B-port: x32DDR"			

Please contact your local Samsung sales representative for the latest product offerings.
Note: All parts are lead free

3.5" Hard Disk Drives

Family	Capacity (GB)	RPM	Interface	Buffer	Sector	Model
F1DT	80	7200	SATA 3.0 Gbps	8	512	HD083GJ
	80	7200	SATA 3.0 Gbps	16	512	HD084GJ
	160	7200	SATA 3.0 Gbps	8	512	HD161GJ
	160	7200	SATA 3.0 Gbps	16	512	HD162GJ
	250	7200	SATA 3.0 Gbps	8	512	HD251HJ
	250	7200	SATA 3.0 Gbps	16	512	HD252HJ
	320	7200	SATA 3.0 Gbps	8	512	HD321HJ
	320	7200	SATA 3.0 Gbps	16	512	HD322HJ
	500	7200	SATA 3.0 Gbps	8	512	HD501IJ
	500	7200	SATA 3.0 Gbps	16	512	HD502IJ
	640	7200	SATA 3.0 Gbps	16	512	HD642JJ
	750	7200	SATA-2	16	512	HD752LJ
	750	7200	SATA 3.0 Gbps	32	512	HD753LJ
	1 TB	7200	SATA 3.0 Gbps	16	512	HD102UJ
	1 TB	7200	SATA 3.0 Gbps	32	512	HD103UJ
F2EG	500	5400	SATA 3.0 Gbps	16	512	HD502HI
	1 TB	5400	SATA 3.0 Gbps	32	512	HD103SI
	1.5 TB	5400	SATA 3.0 Gbps	32	512	HD154UI
F3	160	7200	SATA 3.0 Gbps	8	512	HD164GJ
	250	7200	SATA 3.0 Gbps	8	512	HD254GJ
	320	7200	SATA 3.0 Gbps	8	512	HD324HJ
	160	7200	SATA 3.0 Gbps	16	512	HD163GJ
	250	7200	SATA 3.0 Gbps	16	512	HD253GJ
	320	7200	SATA 3.0 Gbps	16	512	HD323HJ
	500	7200	SATA 3.0 Gbps	16	512	HD502HJ
	750	7200	SATA 3.0 Gbps	32	512	HD754JJ
	1TB	7200	SATA 3.0 Gbps	32	512	HD103SJ
F3EG	250	-	SATA 3.0 Gbps	16	512	HD253GI
	320	-	SATA 3.0 Gbps	16	512	HD324HI
	500	-	SATA 3.0 Gbps	16	512	HD503HI
	750	-	SATA 3.0 Gbps	32	512	HD754JI
	1TB	-	SATA 3.0 Gbps	32	512	HD105SI
	1.5 TB	-	SATA 3.0 Gbps	32	512	HD153WI
	2 TB	-	SATA 3.0 Gbps	32	512	HD203WI
F4	160	7200	SATA 3.0 Gbps	8	512	HD165GJ
	160	7200	SATA 3.0 Gbps	16	512	HD166GJ
	250	7200	SATA 3.0 Gbps	8	512	HD255GJ
	250	7200	SATA 3.0 Gbps	16	512	HD255GJ
	320	7200	SATA 3.0 Gbps	16	512	HD323HJ

3.5" Enterprise RAID Drives

Family	Capacity (GB)	RPM	Interface	Buffer	Sector	Model
F1R	250	7200	SATA 3.0 Gbps	16	512	HE252HJ
	320	7200	SATA 3.0 Gbps	16	512	HE322HJ
	500	7200	SATA 3.0 Gbps	16	512	HE502IJ
	640	7200	SATA 3.0 Gbps	16	512	HE642JJ
	750	7200	SATA 3.0 Gbps	32	512	HE753LJ
	1 TB	7200	SATA 3.0 Gbps	32	512	HE103UJ
F3R	250	7200	SATA 3.0 Gbps	16	512	HE253GJ
	500	7200	SATA 3.0 Gbps	16	512	HE502HJ
	750	7200	SATA 3.0 Gbps	32	512	HE754JJ
	1 TB	7200	SATA 3.0 Gbps	32	512	HE103SJ

2.5" Hard Disk Drives

Family	Capacity (GB)	RPM	Interface	Buffer	Sector	Model
M7E	160	5400	SATA 3.0 Gbps	8	512	HM161GI
	250	5400	SATA 3.0 Gbps	8	512	HM251HI
	320	5400	SATA 3.0 Gbps	8	512	HM321HI
	500	5400	SATA 3.0 Gbps	8	512	HM501JI
	640	5400	SATA 3.0 Gbps	8	512	HM641JI
M7	120	5400	SATA 3.0 Gbps	8	512	HM120JI
	160	5400	SATA 3.0 Gbps	8	512	HM161JI
	250	5400	SATA 3.0 Gbps	8	512	HM250II
	320	5400	SATA 3.0 Gbps	8	512	HM320HI
	400	5400	SATA 3.0 Gbps	8	512	HM400HI
	500	5400	SATA 3.0 Gbps	8	512	HM500GI
MP4	250	7200	SATA 3.0 Gbps	16	512	HM250HJ
	320	7200	SATA 3.0 Gbps	16	512	HM320HJ
	500	7200	SATA 3.0 Gbps	16	512	HM500JJ
	640	7200	SATA 3.0 Gbps	16	512	HM640JJ
MT2	750	5400	SATA 3.0 Gbps	8	512	HM750LI
	1 TB	5400	SATA 3.0 Gbps	8	512	HM100UI

BD-COMBO

Interface	Speed	Type	Loading	Lightscribe	Medel
SATA	BD ROM READ 8X	H/H	Tray	X	TS-HB33A / SH-B083A
				O	TS-HB33L / SH-B083L
	BD ROM READ 12X	H/H	Tray	X	TS-HB43A / SH-B123A
				O	TS-HB43L / SH-B123L
	BD-ROM READ 4X	Slim	Tray	X	TS-LB23A / SN-B043A
					TS-LB23B
					TS-LB23D
				O	TS-LB23L / SN-B043L
					TS-LB23P
			Slot	O	TS-TB23L

DVD-W

Interface	Speed	Type	Loading	Lightscribe	Medel
SATA	DVD Write 22X	H/H	Tray	X	TS-H653G
	DVD Write 20X	H/H	Tray	X	TS-H653H
	DVD Write 20X	H/H	Tray	X	TS-H653J
PATA	DVD Write 22X	H/H	Tray	X	TS-H662A / SH-S222A
SATA	DVD Write 22X	H/H	Tray	X	TS-H663C / SH-S223C
	DVD Write 24X	H/H	Tray	X	TS-H663D / SH-S243D
	DVD Write 22X	H/H	Tray	O	TS-H653R
	DVD Write 16X	H/H	Tray	O	TS-H653T
PATA	DVD Write 22X	H/H	Tray	O	TS-H662L / SH-S222L
SATA	DVD Write 22X	H/H	Tray	O	TS-H663L / SH-S223L
	DVD Write 24X	H/H	Tray	O	TS-H663N / SH-S243N
SATA	DVD Write 8X	Slim	Tray	X	TS-L633B / SN-S083B
					TS-L633C / SH-S083C
					TS-L633F / SN-S083F
					TS-L633J
				O	TS-L633N / SN-S083N
					TS-L633R / SN-S083R
					TS-L633Y
			Slot	X	TS-T633C / SN-T083C
				O	TS-T633P
		Ultra Slim	Tray	X	TS-U633F
					TS-U633J / SU-S083J
			Slot	X	TS-D633A
					TS-D633C

DVD-W Slim External

Interface	Speed	Type	Loading	Lightscribe	Medel
USB 2.0	DVD Write 8X	Slim	Tray	X	SE-S084C
		Ultra Slim	Tray	X	SE-S084D
		Slim	Tray	X	SE-S084F
			Slot	O	SE-T084P

DVD-ROM

Interface	Speed	Type	Loading	Lightscribe	Medel
SATA	DVD 16X	H/H	Tray	X	TS-H353C / SH-D163J
	DVD 8X	Slim	Tray	X	TS-L333B
					TS-L333D
	DVD 8X	Utra Slim	Tray	X	TS-U333A

DVD-W Loader

Interface	Speed	Type	Loading	Lightscribe	Medel
PATA	DVD 8X	H/H	Tray	X	TS-P632F



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