

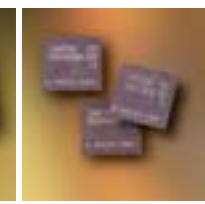
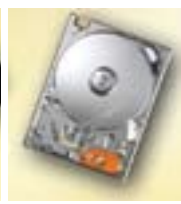
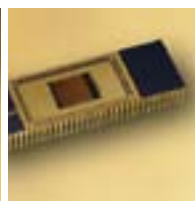
SAMSUNG



Samsung Semiconductor, Inc.

Product Selection Guide

Memory and Storage
April 2008



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.

SAMSUNG PRODUCT OFFERINGS

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



SAMSUNG MARKET LEADERSHIP

1992 2007

MEMORY: #1 Position for 15 Years

DRAM: #1 Position for 16 Years

SRAM: #1 Position for 13 Years

NAND: #1 Position for 5 Years

FLASH: #1 Position for 4 Years

MCP: 3 Years

LCD: #1 Position for 5 Years

DRAM

Pages 4-13

www.samsung.com/semi/dram

- DDR3 SDRAM
- DDR2 SDRAM
- DDR
- SDRAM
- Mobile SDRAM
- RDRAM

- Graphics DDR SDRAM
- DRAM Ordering Information
- OneDRAM™: see Fusion

DRAM

FLASH

Pages 14-16

www.samsung.com/semi/flash

- SLC Flash
- MLC Flash
- SD and microSD Cards
- Flash Product Ordering Information
- Solid State Drive: see Storage

- OneNAND™: see Fusion
- moviNAND™: see Fusion
- Flex-OneNAND™: see Fusion

FLASH

SRAM

Pages 17-22

www.samsung.com/semi/sram

- UtRAM
- Asynchronous SRAM
- NtRAM
- Late-write R-R SRAM
- DDR / II / II+ SRAM
- QDR / II / II+ SRAM

- Synchronous SRAM Ordering Information

SRAM

MULTI-CHIP PACKAGE & FUSION MEMORY Pages 23-25

www.samsung.com/semi/mcp

- NAND/DRAM
- NOR/SRAM & NOR/UtRAM
- OneNAND/DRAM
- NOR/DRAM
- Most Common MCPs

FUSION MEMORY

www.samsung.com/semi/fusion

- OneNAND™
- moviNAND™
- Flex-OneNAND™
- OneDRAM™

MCP & FUSION

STORAGE

Pages 26-33

Solid State Drives

www.samsungssd.com

- Flash Solid State Drives
- Hard Disk Drives

Hard Disk Drives

www.samsung.com/hdd

- Hard Disk Drives

Optical Disk Drives

www.samsungodd.com

- External DVD
- Internal DVD
- Internal COMBO
- Internal CD

STORAGE

WHERE TO BUY

Pages 34-35

- Manufacturers Reps
- Distributors

CONTACTS

DDR3 SDRAM UNBUFFERED MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)	Banks
512MB	64Mx64	M378B6474DZ1-C(F7/F8/H9)	1Gb (64M x16) * 4	800/1066/1333	1
1GB	128Mx64	M378B2873DZ1-C(F7/F8/H9)	1Gb (128M x8) * 8	800/1066/1333	1
2GB	256Mx64	M378B5673DZ1-C(F7/F8/H9)	1Gb (128M x8) * 16	800/1066/1333	2

NOTES: All parts are lead free

DDR3 SDRAM REGISTERED MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)	Banks
1GB	128Mx72	M393B2873DZ1-C(F7/F8/H9)	1Gb (128M x8) * 9	800/1066/1333	1
2GB	256Mx72	M393B5673DZ1-C(F7/F8/H9)	1Gb (128M x8) * 18	800/1066/1333	2
		M393B5670DZ1-C(F7/F8/H9)	1Gb (256M x8) * 18	800/1066/1333	1
4GB	512Mx72	M393B5173DZ1-C(F7/F8/H9)	1Gb (128M x8) * 36	800/1066/1333	4
		M393B5170DZ1-C(F7/F8/H9)	1Gb (256M x4) * 36	800/1066/1333	2
8GB	1Gx72	M393B1G70DJ1-C(F7/F8/H9)	1Gb (128M x8) * 16	800/1066/1333	4

NOTES: All parts are lead free

DDR3 SDRAM SODIMM

Density	Organization	Part Number	Composition	Speed (Mbps)	Banks
512MB	64Mx64	M471B6474DZ1-C(F7/F8/H9)	1Gb (64M x16) * 4	800/1066/1333	1
1GB	128Mx64	M471B2874DZ1-C(F7/F8/H9)	1Gb (64M x16) * 8	800/1066/1333	2
2GB	256Mx64	M471B5673DZ1-C(F7/F8/H9)	1Gb (128M x8) * 16	800/1066/1333	2

NOTES: All parts are lead free
 E7=DDR3-800 (5-5-5)
 G9 = DDR3-1333 (8-8-8)
 F8 = DDR3-1066 (7-7-7)
 Voltage = 1.5V

DDR3 SDRAM COMPONENTS

Density	Organization	Part Number	Package	Dimensions	Speed (Mbps)
1Gb	256M x4	K4B1G0446D-HC(F7/F8/H9)	82 Ball -FBGA	9x11mm	800/1066/1333
	128M x8	K4B1G0846D-HC(F7/F8/H9)	82 Ball -FBGA	9x11mm	800/1066/1333
	64M x16	K4B1G1646D-HC(F7/F8/H9)	100 Ball -FBGA	9x13mm	800/1066/1333

NOTES: All DDR3 components are RoHS compliant: lead free and halogen free
 E7 = DDR3-800 (6-6-6)
 F8 = DDR3-1066 (7-7-7)
 G9 = DDR3-1333 (9-9-9)
 F8 = DDR3-1066 (7-7-7)
 Voltage = 1.5V

DDR2 SDRAM REGISTERED MODULES

Density	Organization	Part Number	Module		Parity	
			Composition	Speed (Mbps)	Register	Rank
512MB	64Mx72	M393T6553G(E)ZA-C(E6/F7)	(64M x8)*9	667/800	Y	1
		M393T6553G(E)Z3-C(CC/D5)	(64M x8)*9	400/533	N	1
1GB	128Mx72	M393T2950G(E)ZA-C(E6/F7)	(128M x4)*18	667/800	Y	1
		M393T2950G(E)Z3-C(CC/D5)	(128M x4)*18	400/533	N	1
		M393T2953G(E)ZA-C(E6/F7)	(64M x8)*18	667/800	Y	2
		M393T2953G(E)Z3-C(CC/D5)	(64M x8)*18	400/533	N	2
		M393T2863QZA-C(E6/F7)	(128Mx8)*9	667/800	Y	1
		M393T2863QZ3-C(CC/D5)	(128Mx8)*9	400/533	N	1
	256Mx72	M393T5750EZA-C(E6/F7)	(128M x4)*36	667/800	Y	2
		M393T5750GZA-C(E6/F7)	(128M x4)*36	667/800	Y	2
		M393T5750G(E)Z3-C(CC/D5)	(128M x4)*36	400/533	N	2
		M393T5660QZA-C(E6/F7)	(256M x4)*18	667/800	Y	1
		M393T5660QZ3-C(CC/D5)	(256M x4)*18	400/533	N	1
		M393T5663QZA-C(E6/F7)	(128M x8)*18	667/800	Y	2
4GB	512Mx72	M393T5160QZA-C(E6/F7)	st. (512M x4)*18	667/800	Y	2
		M393T5160QZ3-C(CC/D5)	st. (512M x4)*18	400/533	N	2
8GB	1Gx72	M393T1G60QJA-C(D5/E6)	st. (512Mx4)*36	533/667	Y	4
		M393T1K66AZA-C(D5/E6/F7)	st. (1Gx4)*18	533/667/800	Y	2

NOTES: All parts are lead free

CC=PC2-3200 (DDR2-400 @ CL=3)
E6=PC2-5300 (DDR2-667 @ CL=5)
F7=PC2-6400 (DDR2-800 @ CL=6)

E7=PC2-6400 (DDR2-800 @ CL=5)
D5=PC2-4200 (DDR2-533 @ CL=4)

Voltage = 1.8V
Module Height = 1.2"

DDR2 SDRAM VLP REGISTERED MODULES

Density	Organization	Part Number	Module		Parity	
			Composition	Speed (Mbps)	Register	Rank
512MB	64Mx72	M392T6553GZA-C(E6/F7)	(64M x8)*9	667/800	Y	1
1GB	128Mx72	M392T2953GZA-C(E6/F7)	(64Mx8)*18	667/800	Y	2
		M392T2950GZA-C(E6/F7)	(128Mx4)*18	667/800	Y	1
		M392T2863QZA-C(E6/F7)	(128Mx8)*9	667/800	Y	1
2GB	256Mx72	M392T5660QZA-C(E6/F7)	(256M x4)*18	667/800	Y	1
		M392T5663QZA-C(E6/F7)	(128Mx8)*18	667/800	Y	2
4GB	512Mx72	M392T5160QJA-C(E6/F7)	DDP (512Mx4)*18	667/800	Y	2

NOTES: All parts are lead free

DDR2 SDRAM FULLY BUFFERED MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)	Rank
512MB	64Mx72	M395T6553EZ4-CE6/F7/E7(10/50/60)	(64M x8)*9	667/800	1
		M395T6553GZ4-CE6/F7/E7(50/60)	(64M x8)*9	667/800	1
1GB	128Mx72	M395T2953EZ4-CE6/F7/E7(10/50/60)	(64M x8)*18	667/800	2
		M395T2953GZ4-CE6/F7/E7(50/60)	(64M x8)*18	667/800	2
		M395T2863QZ4-C(Y*)E6/F7/E7(50/60/80/90)	(128M x8)*9	667/800	1
2GB	256Mx72	M395T5750G(E)Z4-CE6/F7/E7(50/60)	(128M x4)*36	667/800	2
		M395T5663QZ4-C(Y*)E6/F7/E7(50/60/80/90)	(128M x8)*18	667/800	2
4GB	512Mx72	M395T5160QZ4-C(Y*)E6/F7/E7(50/60/80/90)	(256M x4)*36	667/800	2
		M395T5163QZ4-C(Y*)E6/F7(80/90)	(128M x8)*36	667/800	4
		M395T5263AZ4-C(Y*)E6/F7(60/80/90)	(256M x8)*18	667/800	2
8GB	1Gx72	M395T1G60QJ4-C(Y*)E6/F7(80/90)	st. (512Mx8)*18	667/800	4
		M395T1K66AZ4-C(Y*)E6/F7(60/80/90)	st. (1Gx4)*18	667/800	2

NOTES: All parts are lead free

C: AMB Voltage = 1.5V
C: DRAM Voltage = 1.8V
Y*: AMB Voltage = 1.5V (Available only with CE6)
Y*: DRAM Voltage = 1.55V (Available only with CE6)

50: Intel C1 AMB
60: IDT D1 AMB
80 : IDT L4 AMB
90: Montage D1 AMB
800 Speed option would be limited along with AMB type.
Module Height=1.2"

DDR2 SDRAM SODIMM MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)	Rank
512MB	64Mx64	M470T6554GZ3-C(E6/F7/E7)	(32Mx16)*8	667/800	2
		M470T6464QZ3-C(E6/F7/E7)	(64Mx16)*4	667/800	1
1GB	128Mx64	M470T2953GZ3-C(E6/F7/E7)	(64Mx8)*16	667/800	2
		M470T2864QZ3-C(E6/F7/E7)	(64Mx16)*8	667/800	2
2GB	256Mx64	M470T5663QZ3-C(E6/F7/E7)	(128M x8)*8	667/800	2
4GB	512Mx64	M470T5267AZ3-C(E6/F7/E7)	st.(512Mx8)*8	667/800	2

NOTES: All parts are lead free

E6=PC2-5300 (DDR2-667 @ CL=5)
E7=PC2-6400 (DDR2-800 @ CL=5)
F7=PC2-6400 (DDR2-800 @ CL=6)

Voltage = 1.8V
Module Height=1.2"

DDR2 SDRAM UNBUFFERED MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)	Rank
512MB	64Mx64	M378T6553GZS-C(E6/E7/F7)	(64Mx8)*8	667/800	1
		M378T6464QZ3-C(E6/E7/F7)	(64Mx16)*4	667/800	1
1GB	128Mx64	M378T2953GZ3-C(E6/E7/F7)	(64Mx8)*16	667/800	2
		M378T2863QZ3-C(E6/E7/F7)	(128MX8)*8	667/800	1
2GB	256Mx64	M378T5663QZ3-C(E6/E7/F7)	(128Mx8)*16	667/800	2
4GB	512Mx64	M378T5263AZ3-C(E6/E7/F7)	(256MX8)*16	667/800	2

NOTES: All parts are lead free

E6=PC2-5300 (DDR2-667 @ CL=5)
E7=PC2-6400 (DDR2-800 @ CL=5)
F7=PC2-6400 (DDR2-800 @ CL=6)

Voltage = 1.8V
Module Height =1.2"

DDR2 SDRAM UNBUFFERED MODULES (ECC)

Density	Organization	Part Number	Composition	Speed (Mbps)	Rank
512MB	64Mx72	M391T6553(G)EZ3-C(E6/E7/F7)	(64Mx8)*9	667/800	1
1GB	128Mx72	M391T2863QZ3-C(E6/E7/F7)	(128Mx8)*9	667/800	1
2GB	256Mx64	M391T5663QZ3-C(E6/E7/F7)	(128Mx8)*18	667/800	2
4GB	512Mx64	M391T5263AZ3-C(E6/E7/F7)	(256MX8)*18	667/800	2
NOTES:	All parts are lead free	E6=PC2-5300 (DDR2-667 @ CL=5) E7=PC2-6400 (DDR2-800 @ CL=5) F7=PC2-6400 (DDR2-800 @ CL=6)	Voltage = 1.8V Module Height =1.2"		

DDR2 SDRAM COMPONENTS

Density	Organization	Part Number	Package	Dimensions	Speed (Mbps)
256Mb	16Mx16	K4T56163QI-HC(E6/E7/F7)	84-FBGA	9x13mm	667/800
512Mb	128Mx4	K4T51043QG-HC(E6/E7/F7)	60-FBGA	10x11mm	667/800
	64Mx8	K4T51083QG-HC(E6/E7/F7)	60-FBGA	10x11mm	667/800
	32Mx16	K4T51163QG-HC(E6/E7/F7)	84-FBGA	11x13mm	667/800
1Gb	256Mx4	K4T1G044QQ-HC(E6/E7/F7)	68-FBGA	11x18mm	667/800
	128Mx8	K4T1G084QQ-HC(E6/E7/F7)	68-FBGA	11x18mm	667/800
	64Mx16	K4T1G164QQ-HC(E6/E7/F7)	84-FBGA	11x18mm	667/800
2Gb	512Mx4	K4T2G044QA-HC(E6/E7/F7)	68-FBGA	11x18mm	667/800
	256Mx8	K4T2G084QA-HC(E6/E7/F7)	68-FBGA	11x18mm	667/800
NOTES:	All DDR3 components are RoHS compliant: lead free and halogen free	E6=DDR2-667 (5-5-5) F7=DDR2-800 (6-6-6) E7=DDR2-800 (5-5-5)	Voltage = 1.8V		

DDR SDRAM 1U REGISTERED DIMM MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)	Rank
512MB	64Mx72	M312L6523DZ3-CB3/CCC	(64Mx8)*9	333/400	1
1GB	128Mx72	M312L2920DZ3-CB3/CCC	(128Mx4)*18	333/400	1
2GB	256Mx72	M312L5720DZ3-CB3/CCC	(128Mx4)*36	333/400	2
NOTES:	All parts are lead free	B0 = DDR266 (133MHz @ CL=2.5) A2 = DDR266 (133MHz @ CL=2) Type: 184-pin 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	M470L6524DU0-CB300	(32M x 16)*4	333
1GB	128MX64	M470L2923DV0-CB300	(64M x 8)*16	333
NOTES:	All parts are lead free	B0 = DDR266 (133MHz @ CL=2.5) CC = DDR400 (200MHz @ CL=3) B3 = DDR333 (166MHz @ CL=2.5)	A2 = DDR266 (133MHz @ CL=2) Type: 200-pin, Double Sided Height(in): 1.25	

DDR SDRAM DIMM UNBUFFERED MODULES

Density	Organization	Part Number	Composition	Speed (Mbps)
512MB	64MX64	M368L6523DUS-CB3/CCC	(64M x8) *8	333/400
1GB	128Mx64	M368L2923DUN-CB3/CCC	(64M x 8)*16	333/400
NOTES:	All parts are lead free	B0 = DDR266 (133MHz @ CL=2.5) A2 = DDR266 (133MHz @ CL=2) Type: 184-pin B3 = DDR333 (166MHz @ CL=2.5) CC = DDR400 (200MHz @ CL=3)	Package: TSOP components Voltage: 2.5V Type: 184-pin	

DDR SDRAM COMPONENTS

Density	Organization	Part Number	Package	Speed (Mbps)	Notes
128Mb	8Mx16	K4H281638L-LCCC/CD	66-TSOP	400/500	Lead free
256Mb	64Mx4	K4H560438J-LC(L)B3/B0	66-TSOP	266	RoHS
	32Mx8	K4H560838J-LC(L)CC/B3	66-TSOP	333/400	RoHS
	16Mx16	K4H561638J-LC(L)CC/B3	66-TSOP	333/400	RoHS
512Mb	128Mx4	K4H510438D-UC(L)B0/CB3	66-TSOP	266/333	Lead free
		K4H510438D-ZC(L)B3/CCC	60-FBGA	333/400	Lead free
		K4H510438D-ZC(L)B3/CCC	60-FBGA	333/400	Lead free
	64Mx8	K4H510838D-UC(L)B3/CCC	66-TSOP	333/400	Lead free
		K4H510838D-ZC(L)B3/CCC	60-FBGA	333/400	Lead free
		K4H510838D-UC(L)B3/CCC	66-TSOP	333/400	Lead free
		K4H510838D-ZC(L)B3/CCC	66-TSOP	333/400	Lead free
	32Mx16	K4H511638D-UC(L)B3/CCC	66-TSOP	333/400	Lead free
		K4H511638D-ZC(L)B3/CCC	60-FBGA	333/400	Lead free
		K4H511638D-UC(L)B3/CCC	66-TSOP	333/400	RoHS

NOTES: All SDRAM Components are lead free;
RoHS product are lead free and halogen free

B0 = DDR266 (133MHz @ CL=2.5)
A2 = DDR266 (133MHz @ CL=2)

B3 = DDR333 (166MHz @ CL=2.5)
CC = DDR400 (200MHz @ CL=3)

SDRAM COMPONENTS

Density	Organization	Part Number	Package	Speed (Mbps)	Refresh	Remarks
64Mb	8Mx8	K4S640832N-UC(75)000	54-TSOP	133	4K	K-die changing to N-die
	4Mx16	K4S641632N-UC(L)(75/60)000	54-TSOP	133/143/166	4K	K-die changing to N-die
128Mb	16Mx8	K4S280832K-UC(L)(75)000	54-TSOP	133	4K	I-die changing to K-die
	8Mx16	K4S281632K-UC(L)(75/60)000	54-TSOP	133/166	4K	I-die changing to K-die
256Mb	64Mx4	K4S560432J-UC(L)(75)000	54-TSOP	133	8K	H-die changing to J-die
	32Mx8	K4S560832J-UC(L)(75)000	54-TSOP	133	8K	H-die changing to J-die
	16Mx16	K4S561632J-UC(L)(75/60)000	54-TSOP	133/166	8K	H-die changing to J-die
512Mb	128Mx4	K4S510432D-UC(L)(75)000	54-TSOP	133	8K	
	64Mx8	K4S510832D-UC(L)(75)000	54-TSOP	133	8K	
	32Mx16	K4S511632D-UC(L)(75)000	54-TSOP	133	8K	

NOTES: All SDRAM components are lead free.

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

Voltage: 3.3V
Speed: PC133 (133MHz CL=3/PC100 CL2)

MOBILE DRAM COMPONENTS

Density	Type	Organization	Part Number	Package	Refresh	Power
64Mb	MSDR	4Mx16	K4M64163PK-(1)(2)(3)(4)	54-FBGA	4K	1.8V
128Mb	MSDR	4Mx32	K4M28323PH-(1)(2)(3)(4)	90-FBGA	4K	1.8V
		8Mx16	K4M28163PH-(1)(2)(3)(4)	54-FBGA	4K	1.8V
256Mb	MDDR	8Mx32	K4X56323PI-(1)(2)(3)(4)	90-FBGA	8K	1.8V
	MSDR	8Mx32	K4M56323PI-(1)(2)(3)(4)	90-FBGA	8K	1.8V
	MDDR	16Mx16	K4X56163PI-(1)(2)(3)(4)	60-FBGA	8K	1.8V
	MSDR	16Mx16	K4M56163PI-(1)(2)(3)(4)	54-FBGA	8K	1.8V
512Mb	MDDR	16Mx32	K4X51323PE-(1)(2)(3)(4)	90-FBGA	8K	1.8V
	MSDR	16Mx32	K4M51323PE-(1)(2)(3)(4)	90-FBGA	8K	1.8V
	MDDR	32Mx16	K4X51163PE-(1)(2)(3)(4)	60-FBGA	8K	1.8V
	MSDR	32Mx16	K4M51163PE-(1)(2)(3)(4)	54-FBGA	8K	1.8V
1Gb	MDDRDDP	64Mx16	K4X1G153PE-(1)(2)(3)(4)	60-FBGA	8K	1.8V
	MDDR	32Mx32	K4X1G323PC-(1)(2)(3)(4)	90-FBGA	8K	1.8V
		64Mx16	K4X1G163PC-(1)(2)(3)(4)	60-FBGA	8K	1.8V

NOTES:

(1) Package:

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

(2) Temp & Power:

C: Commercial (-25 ~ 70°C), Normal

L: 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 (-40~85°C), Normal

P: Industrial, Low

H: Industrial, Low, i-TCSR & PASR & DS

(3)~(4) Speed:

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

RDRAM COMPONENTS

Density	Organization	Part Number	Speed (Mbps)	Package	Refresh
288M	x18	K4R881869I-DC(M8/T9)	800/1066	92-FBGA	16K/32ms

NOTES:

Voltage: 2.5 V

All products are Lead Free

GRAPHICS DRAM COMPONENTS

Type	Density	Organization	Part Number	Package	VDD/VDDQ	Speed Bin (MHz)
GDDR5	512Mb	16Mx32	K4G52324FG-HC(1)	170-FBGA	1.5/1.5V	1600/1800/2000
GDDR3	1Gb	32Mx32	K4J10324QD-HC(1)	136-FBGA	1.8V/1.8V	700/800
			K4J10324QD-HJ(1)	136-FBGA	1.85V/1.85V	1000
	512Mb	16Mx32	K4J52324QH-HC(1)	136-FBGA	1.8/1.8V	700/800
			K4J52324QH-HJ(1)	136-FBGA	1.9/1.9V	1000
			K4J52324QH-HJ(1)	136-FBGA	2.05/2.05V	1200
gDDR2	1Gb	64Mx16	K4N1G164QQ-ZC(1)	84-FBGA	1.8/1.8V	400/500
	512Mb	32Mx16	K4N51163QG-ZC(1)	84-FBGA	1.8/1.8V	400/500
	256Mb	16Mx16	K4N56163QI-ZC(1)	84-FBGA	1.8/1.8V	350/400/450/500
GDDR1	128Mb	4Mx32	K4D263238K-VC(1)	144-FBGA	2.5/2.5V	200/250
			K4D263238K-UC(1)	100-TQFP	2.5/2.5V	200/250
		8Mx16	K4D261638K-LC(1)	66-TSOPII	2.5/2.5V	200/250

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 (Hologen Free & Lead Free)
 E: 100 FBGA (Hologen Free & Lead Free)

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

05: 0.5ns (2000MHz)	1A: 1ns (1000MHz)	22: 2.2ns (450MHz)
5C: 0.555 (1800MHz)	11: 1.1ns (900MHz)	25: 2.5ns (400MHz)
06: 0.625 (1600MHz)	12: 1.25ns (800MHz)	2A: 2.86ns (350MHz)
07: 0.71ns (1400MHz)	14: 1.429ns (700MHz)	33: 3.3ns (300MHz)
08: 0.83ns (1200MHz)	16: 1.667ns (600MHz)	40: 4.0ns (240MHz)
09: 0.90ns (1100MHz)	20: 2.0ns (500MHz)	50: 5.0ns (200MHz)

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
SAMSUNG Memory											Speed
DRAM											Temp & Power
DRAM Type											Package Type
Density											Revision
Bit Organization											Interface (VDD, VDDQ)
											Number of Internal Banks

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: gDDR2 SDRAM
S: SDRAM
T: DDR SDRAM
U: GDDR4 SDRAM
V: Mobile DDR SDRAM Power Efficient Address
W: gDDR3 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: LVTTTL, 3.3V, 3.3V
4: LVTTTL, 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: LVTTTL, 1.8V, 1.5V
N: LVTTTL, 1.5V, 1.5V
P: LVTTTL, 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(Halogen Free & Lead Free)
E: 100 FBGA(Halogen 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
SAMSUNG Memory										Speed
DRAM										Temp & Power
DRAM Type										Package Type
Density										Revision
Bit Organization										Interface (VDD, VDDQ)
										Number of Internal Banks

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

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

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"

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
SAMSUNG Memory													AMB Vendor
DIMM													Speed
Data bits													Temp & Power
DRAM Component Type													PCB Revision
Depth													Package
Number of Banks													Component Revision
Bit Organization													

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 & LVTTTL (SDR Only)
- 5: 8K/ 64ms Ref., 4Banks & LVTTTL (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	T/R	
						-xxxx0xx	-xxx0Txx	
8Gb-based 4KB/page	64Gb DSP	K9NCG08U5M-PCB0	TSOP1	x8	3.3	960	1,000	
	32Gb QDP	K9WBG08U1M-PCB0	TSOP1	x8	3.3	960	1,000	
		K9WBG08U1M-PIB0	TSOP1	x8	3.3	960	1,000	
	16Gb DDP	K9KAG08U0M-PCB0	TSOP1	x8	3.3	960	1,000	
		K9KAG08U0M-PIB0	TSOP1	x8	3.3	960	1,000	
	8G mono	K9F8G08U0M-PCB0	TSOP1	x8	3.3	960	1,000	
		K9F8G08U0M-PIB0	TSOP1	x8	3.3	960	1,000	
4Gb-based 2KB/page	16Gb QDP	K9WAG08U1A-PCB	TSOP1	x8	3.3	960	1,000	Available for existing designs only. Qualify 8Gb-based parts for new designs (see above for part #s).
		K9WAG08U1A-PIB	TSOP1	x8	3.3	960	1,000	
		K9WAG08U1A-IIB	ULGA	x8	3.3	960	2,000	
	8Gb DDP	K9K8G08U0A-PCB	TSOP1	x8	3.3	960	1,000	
		K9K8G08U0A-PIB	TSOP1	x8	3.3	960	1,000	
		K9K8G08U1A-IIB	ULGA	x8	3.3	960	2,000	
	4Gb	K9F4G08U0A-PCB	TSOP1	x8	3.3	960	1,000	
		K9F4G08U0A-PIB	TSOP1	x8	3.3	960	1,000	
		K9F4G08U0A-IIB	ULGA	x8	3.3	960	2,000	
2Gb	2Gb	K9F2G08U0A-PCB	TSOP1	x8	3.3	960	1,000	
		K9F2G08U0A-PIB	TSOP1	x8	3.3	960	1,000	
1Gb	1Gb	K9F1G08U0B-PCB	TSOP1	x8	3.3	960	1,000	
		K9F1G08U0B-PIB	TSOP1	x8	3.3	960	1,000	
		K9F1G08R0B-JIB	63 FBGA(9.5x12)	x8	1.8	1,120	2,000	
512Mb	512Mb	K9F1208U0C-PCB	TSOP1	x8	3.3	960	1,000	
		K9F1208U0C-PIB	TSOP1	x8	3.3	960	1,000	
		K9F1208R0C-JIB	63 FBGA(8.5x13)	x8	1.8	1,120	-	
		K9F1208U0C-JIB	63 FBGA(8.5x13)	x8	3.3	1,120	-	
256Mb	256Mb	K9F5608U0D-PCB	TSOP1	x8	3.3	960	1,000	
		K9F5608U0D-PIB	TSOP1	x8	3.3	1,000	1,000	
		K9F5608R0D-JIB	63 FBGA(9x11)	x8	1.8	1,280	-	
		K9F5608U0D-JIB	63 FBGA(9x11)	x8	3.3	1,280	-	

MLC FLASH

Family	Density	Part Number	Package Type	Org.	Vol(V)	MOQ	
						Tray	T/R
						-xxxx0xx	-xxx0Txx
16Gb-based [51nm] 4KB/page	128Gb DSP	K9MDG08U5M-PCB0	TSOP1	x8	3.3	960	1,000
	64Gb QDP	K9HCG08U1M-PCB0	TSOP1	x8	3.3	960	1,000
	32Gb DDP	K9LBG08U0M-PCB0	TSOP1	x8	3.3	960	1,000
		K9LBG08U1M-IIB0	ULGA	x8	3.3	960	2,000
	16Gb mono	K9GAG08U0M-PCB0	TSOP1	x8	3.3	960	1,000
		K9GAG08U0M-IIB0	ULGA	x8	3.3	960	2,000
8Gb-based 2KB/page	64Gb DSP	K9MCG08U5M-PCB0	TSOP1	x8	3.3	960	1,000
	32Gb QDP	K9HBG08U1A-PCB0	TSOP1	x8	3.3	960	1,000
	16Gb DDP	K9LAG08U0A-PCB0	TSOP1	x8	3.3	960	1,000
	8Gb mono	K9G8G08U0A-PCB0	TSOP1	x8	3.3	960	1,000
		K9G8G08U0A-IIB0	ULGA	x8	3.3	960	2,000
4Gb	4Gb mono	K9G4G08U0A-PCB0	TSOP1	x8	3.3	960	1,000
		K9G4G08U0A-IIB0	ULGA	x8	3.3	960	2,000
2Gb	2Gb mono	K9G2G08U0M-PCB0	TSOP1	x8	3.3	960	1,000

FLASH

SD and MicroSD FLASH CARDS

Type	Density	Controller	Manuf. Site	Part Number
SD	1GB	SMI	ATP	MM8GF01GWMCU-2PA00
	2GB	SKYMEDI	STS	MMAGF02GWMCA-2NA00
	4GB	SKYMEDI	STS	MMAGF04GWMCA-2NA00
MicroSD	512MB	SMI	SPIL	MM4GR512UACY-2PA00
	1GB	SKYMEDI	SPIL	MM8GR01GUACY-2NA00
	2GB	SKYMEDI	SPIL	MM8GR02GUACY-2NA00
	4GB	SKYMEDI	SPIL	MM8GR04GUACY-2NA00

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
SAMSUNG Memory														Pre-Program Version
NAND Flash														Customer Bad Block
Small Classification														Temp
Density														Package
Density														---
Organization														Generation
Organization														Mode
Vcc														

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)

UtRAM

Type	Density	Organization	Part Number	Package	Vcc (V)	Speed (ns)	Operating Temp.	Operating Current (mA)	Standby Current (uA)	Production Status
UtRAM	64Mb	4Mx16	K1S6416BCD	48-FBGA	1.8	70	I	40	180	Mass Production
		4Mx16	K1S64161CD	48-FBGA	3.0	70	I	40	180	Mass Production
		4Mx16	K1B6416B2D	54-FBGA	1.8	104Mhz	I	40	180	Mass Production
	32Mb	2Mx16	K1S3216BCE	48-FBGA	1.8	70	I	35	120	Mass Production
		2Mx16	K1S32161CE	48-FBGA	3.0	70	I	35	100	Mass Production
		2Mx16	K1B3216B2E	54-FBGA	1.8	104Mhz	I	35	100	Mass Production
	16Mb	1Mx16	K1S1616B1B	48-FBGA	1.8	70	I	35	80	Mass Production
		1Mx16	K1S161611B	48-FBGA	3.0	70	I	35	95	Mass Production
UtRAM2	64Mb	4Mx16	K1C6416B2D	54-FBGA	1.8	104Mhz	I	40	180	Mass Production
		4Mx16	K1C6416B8D	54-FBGA	1.8	104Mhz	I	40	180	Mass Production
	32Mb	2Mx16	K1C3216B2E	54-FBGA	1.8	104Mhz	I	35	100	Mass Production
		2Mx16	K1C3216B8E	54-FBGA	1.8	104Mhz	I	35	100	Mass Production
	16Mb	1Mx16	K1C1616B2B	54-FBGA	1.8	104Mhz	I	35	100	Mass Production
		1Mx16	K1C1616B8B	54-FBGA	1.8	104Mhz	I	35	100	Mass Production

HIGH-SPEED ASYNCHRONOUS SRAM

Density	Organization	Part Number	Package	Vcc (V)	Speed (ns)	Operating Temp.	Operating Current (mA)	Standby Current (uA)	Production Status
4Mb	256Kx16	K6R4016C1D	44-SOJ, 44-TSOP2	5	10	I	65, 55	20, 5	Mass Production
		K6R4016V1D	44-SOJ, 44-TSOP2	3.3	10	I	80, 65	20, 5 (1.2)	Mass Production
	512Kx8	K6R4008C1D	36-SOJ, 44-TSOP2	5	10	I	65, 55	20, 5	Mass Production
		K6R4008V1D	36-SOJ, 44-TSOP2	3.3	10	I	80, 65	20, 5	Mass Production

SYNCHRONOUS SRAM SPB & SB

Density	Organization	Part Number	Package	Operating Mode	Vdd (V)	Access Time tCD(ns)	Speed tCYC (MHz)	I/O Voltage (V)	Production Status	Comments
36Mb	2Mx18	K7A321830C	100-TQFP	SPB	3.3, 2.5	3.1	200	3.3, 2.5	Mass Production	2E1D
		K7B321835C	100-TQFP	SB	3.3, 2.5	7.5	118	3.3, 2.5	Mass Production	Ind Temp only
	1Mx36	K7A323630C	100-TQFP	SPB	3.3, 2.5	3.1	200	3.3, 2.5	Mass Production	2E1D
		K7B323635C	100-TQFP	SB	3.3, 2.5	7.5	118	3.3, 2.5	Mass Production	Ind Temp only
18Mb	1Mx36	K7A163630B	100-TQFP	SPB	3.3, 2.5	2.6, 3.5	250, 167	3.3, 2.5	Mass Production	2E1D
		K7A163631B	100-TQFP	SPB	3.3, 2.5	3.1	200	3.3, 2.5	Mass Production	2E2D
		K7B163635B	100-TQFP	SB	3.3, 2.5	7.5	117	3.3, 2.5	Mass Production	
	1Mx18	K7A161830B	100-TQFP	SPB	3.3, 2.5	2.6, 3.5	250, 167	3.3, 2.5	Mass Production	2E1D
		K7A161831B	100-TQFP	SPB	3.3, 2.5	3.1	200	3.3, 2.5	Mass Production	2E2D
		K7B161835B	100-TQFP	SB	3.3, 2.5	7.5	117	3.3, 2.5	Mass Production	
8Mb	256Kx36	K7A803609B	100-TQFP	SPB	3.3	2.6	250	3.3,2.5	Not for new designs	2E1D
		K7A803600B	100-TQFP	SPB	3.3	3.5	167	3.3,2.5	Not for new designs	2E1D
		K7B803625B	100-TQFP	SB	3.3	6.5	133	3.3,2.5	Not for new designs	
	512Kx18	K7A801809B	100-TQFP	SPB	3.3	2.6	250	3.3,2.5	Not for new designs	2E1D
		K7A801800B	100-TQFP	SPB	3.3	3.5	167	3.3,2.5	Not for new designs	2E1D
		K7B801825B	100-TQFP	SB	3.3	6.5	133	3.3,2.5	Not for new designs	
4Mb	128Kx36	K7A403609B	100-TQFP	SPB	3.3	2.4	250	3.3, 2.5	Not for new designs	2E1D
		K7A403600B	100-TQFP	SPB	3.3	3.5	167	3.3, 2.5	Not for new designs	2E1D
		K7B403625B	100-TQFP	SB	3.3	6.5	133	3.3, 2.5	Not for new designs	
		K7A403200B	100-TQFP	SPB	3.3	3.5	167	3.3, 2.5	Not for new designs	2E1D
	256Kx18	K7A401809B	100-TQFP	SPB	3.3	2.4	250	3.3, 2.5	Not for new designs	2E1D
		K7A401800B	100-TQFP	SPB	3.3	3.5	167	3.3, 2.5	Not for new designs	2E1D
		K7B401825B	100-TQFP	SB	3.3	6.5	133	3.3, 2.5	Not for new designs	

NOTES: All TQFP products are Lead Free
 2E1D = 2-cycle Enable and 1-cycle Disable
 2E2D = 2-cycle Enable and 2-cycle Disable

SPB speed recommendations: For 200MHz use 250MHz; For 133MHz use 167MHz
 SB speed recommendation: Use 7.5ns Access Time use 6.5ns Access Time

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	3.0	200	3.3,2.5	Not for new designs
		256Kx18	K7N401809B	100-TQFP	SPB	3.3	3.0	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 Access 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)	C/S
	2Mx18	K7P321874C	119-BGA	SP	1.8 / 2.5V	1.6, 2.0	300,250	1.5 (Max 1.8)	C/S
8Mb	256Kx36	K7P803611B	119-BGA	SP	3.3	1.6	300	1.5 (Max.2.0)	Not for new designs
	512Kx18	K7P801811B	119-BGA	SP	3.3	1.6	300	1.5 (Max.2.0)	Not for new designs
	256Kx36	K7P803666B	119-BGA	SP	2.5	2.0	250	1.5 (Max.2.0)	Not for new designs
	512Kx18	K7P801866B	119-BGA	SP	2.5	2.0	250	1.5 (Max.2.0)	Not for new designs
4Mb	128Kx36	K7P403622B	119-BGA	SP	3.3	2.5,2.7,3.0	250,200,167	2.5/3.3	Not for new designs
	256Kx18	K7P401822B	119-BGA	SP	3.3	2.5,2.7,3.0	250,200,167	2.5/3.3	Not for new designs
	256Kx18	K7P401823B	119-BGA	SP	3.3	6.5	167	2.5/3.3	Not for new designs

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	333,300,250	1.5,1.8	Mass Production	CIO-2B
			K7I321884C	165-FBGA	1.8	0.45	333,300,250	1.5,1.8	Mass Production	CIO-4B
			K7J321882C	165-FBGA	1.8	0.45	333,300,250	1.5,1.8	Mass Production	SIO-2B
		1Mx36	K7I323682C	165-FBGA	1.8	0.45	333,300,250	1.5,1.8	Mass Production	CIO-2B
			K7I323684C	165-FBGA	1.8	0.45	333,300,250	1.5,1.8	Mass Production	CIO-4B
			K7J323682C	165-FBGA	1.8	0.45	333,300,250	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	450, 400, 333	1.5	Mass Production	DDRII + CIO-2B
		1Mx36	K7K3236T2C	165-FBGA	1.8	0.45	450, 400, 333	1.5	Mass Production	DDRII + CIO-2B
	18Mb	1Mx18	K7K1618T2C	165-FBGA	1.8	0.45	450, 400, 333	1.5	Mass Production	DDRII + CIO-2B
		512Kx36	K7K1636T2C	165-FBGA	1.8	0.45	450, 400, 333	1.5	Mass Production	DDRII + CIO-2B

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 (MHz)	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
			K7R641882M	165-FBGA	1.8	0.45, 0.45, 0.50	250, 200, 167	1.5, 1.8	Mass Production	QDR II-2B
		4Mx18	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
			K7R643682M	165-FBGA	1.8	0.45, 0.45, 0.50	250, 200, 167	1.5, 1.8	Mass Production	QDR II-2B
		2Mx36	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	300, 250, 200	1.5, 1.8	Mass Production	QDR II-2B
			K7R321882C	165-FBGA	1.8	0.45	300, 250, 200	1.5, 1.8	Mass Production	QDR II-2B
		2Mx18	K7R321884C	165-FBGA	1.8	0.45	333, 300, 250	1.5, 1.8	Mass Production	QDR II-4B
			K7R323682C	165-FBGA	1.8	0.45	300, 250, 200	1.5, 1.8	Mass Production	QDR II-2B
		1Mx36	K7R323684C	165-FBGA	1.8	0.45	333, 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
			K7R161882B	165-FBGA	1.8	0.45, 0.45, 0.50	250, 200, 167	1.5, 1.8	Mass Production	QDR II - 2B
		1Mx18	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
			K7R163682B	165-FBGA	1.8	0.45, 0.45, 0.50	250, 200, 167	1.5, 1.8	Mass Production	QDR II - 2B
		512Kx36	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	K7S3218T4C	165-FBGA	1.8	0.45	450, 400, 333	1.5	Mass Production	QDR II + 4B
		2Mx18	K7S3236T4C	165-FBGA	1.8	0.45	450, 400, 333	1.5	Mass Production	QDR II + 4B
	18Mb	1Mx18	K7S1618T4C	165-FBGA	1.8	0.45	450, 400, 333	1.5	Mass Production	QDR II + 4B
		512Kx36	K7S1636T4C	165-FBGA	1.8	0.45	450, 400, 333	1.5	Mass Production	QDR II + 4B

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
 40: 4M
 64: 72M

6~7. Organization

08: x8
 18: x18
 36: x36

8~9. Vcc, Interface, Mode

00: 3.3V, LVTTTL, 2E1D WIDE
 01: 3.3V, LVTTTL, 2E2D WIDE
 08: 3.3V, LVTTTL, 2E2D Hi SPEED
 09: 3.3V, LVTTTL, 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, LVTTTL, R-R
 23: 3.3V, LVTTTL, R-L
 25: 3.3V, LVTTTL, SB-FT WIDE
 30: 1.8/2.5/3.3V, LVTTTL, 2E1D
 31: 1.8/2.5/3.3V, LVTTTL, 2E2D
 35: 1.8/2.5/3.3V, LVTTTL, SB-FT
 44: 2.5V, LVTTTL, 2E1D
 45: 2.5V, LVTTTL, 2E2D

49: 2.5V, LVTTTL, 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)QFP
 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 Access 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/ Organization	Voltage (NAND-DRAM)	MCP Package	PoP Package
NAND & DRAM	512Mb	256Mb(x16,x32)	2.7V/1.8V - 1.8V	107/137FBGA	120FBGA
		512Mb (x16,x32)	2.7V/1.8V - 1.8V	107/137FBGA	120/136FBGA
	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/ Organization	Voltage (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
		768Mb (x32)	1.8V - 1.8V	-	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/ Organization	Voltage (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/ Organization	Voltage (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/Organization	Voltage	MCP Package
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/Organization	Voltage	Package
NOR & UtRAM	512Mb	128Mb	1.8V - 1.8V	107FBGA
	256Mb	128Mb	1.8V - 1.8V	107FBGA
			3.0V - 3.0V	84FBGA
		64Mb	3.0V - 3.0V	84FBGA
			1.8V - 1.8V	56FBGA
	128Mb	64Mb	1.8V - 1.8V	84/88FBGA
		32Mb	1.8V - 1.8V	84/88FBGA
			3.0V - 3.0V	64FBGA
	64Mb	32Mb	3.0V - 3.0V	56FBGA

MCP: NOR/DRAM

Memory	NOR Density	DRAM Density/Organization	Voltage	Package
NOR & DRAM	512Mb	128Mb (x16)	1.8V - 1.8V	103FBGA
		256Mb (x16)	1.8V - 1.8V	103FBGA

OneNAND

OneNAND is a monolithic IC that combines a NAND flash array with a NOR flash interface plus an SRAM buffer. It's ideal for high-performance, high-density applications.

Density	Part Number	Package	Org.	Voltage(V)	Temp.	Speed	MOQ (Tray)	Remarks
256Mb	KFG5616U1A-PIB5000	48TSOP (12x20)	X16	3.3	Industrial	54Mhz	960	
	KFG5616Q1A-DEB5000	67FBGA (7x9)	X16	1.8	extended	54Mhz	1,600	
	KFG5616U1A-DIB5000	67FBGA (7x9)	X16	3.3	Industrial	54Mhz	1,600	
512Mb	KFG1216Q2B-DEB8000	63FBGA (9.5x12)	X16	1.8	extended	83Mhz	1,120	
	KFG1216U2B-DIB6000	63FBGA (9.5x12)	X16	3.3	Industrial	66Mhz	1,120	
	KFG1216Q2B-SEB8000	67FBGA (7x9)	X16	1.8	extended	83Mhz	1,120	
	KFG1216U2B-SIB6000	67FBGA (7x9)	X16	3.3	Industrial	66Mhz	1,120	
1Gb	KFG1G16U2B-DIB6000	63 FBGA(10x13)	X16	1.8v	Industrial	66Mhz	1,120	
	KFG1G16Q2B-DEB8000	63 FBGA(10x13)	X16	1.8v	extended	83Mhz	1,120	
2Gb	KFG2G16Q2M-DEB8000	63 FBGA (10x13)	X16	1.8v	extended	83Mhz	1,120	No further Design-In.
	KFG2G16Q2A-DEB8000	63 FBGA (10x13)	X16	1.8v	extended	83Mhz	1,120	
4Gb DDP	KFH4G16Q2M-DEB8000	63 FBGA (10x13)	X16	1.8v	extended	83Mhz	1,120	No further Design-In.

* T&R MOQ 2Kpcs

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

NOTE: All parts are lead free

Flex-OneNAND

A monolithic IC with a NAND flash array using a NOR flash interface, Flex-OneNAND enables partitioning into SLC and MLC areas so the chip can be configured for storage or high-speed access.

Density	Part Number	Package	Org.	Voltage(V)	Temp.	Speed	MOQ (Tray)	Remarks
4Gb Flex-OneNAND	KFG4GH6Q4M-DEB8000	63 FBGA (10x13)	X16	1.8v	extended	83Mhz	1,120	FSR software required
	KFG4GH6U4M-DIB6000	63 FBGA (10x13)	X16	3.3V	Industrial	66Mhz	1,120	FSR software required
8Gb DDP Flex-OneNAND	KFH8GH6U4M-DIB6000	63 FBGA (10x13)	X16	3.3V	Industrial	66Mhz	1,120	FSR software required

* T&R MOQ 2Kpcs

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

NOTE: All parts are lead free

moviNAND

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

moviNAND Densities	Vol(V)	Package	Package Size	Org.
1GB	1.8/3.3	FBGA	12.0x18x1.2t	x8
2GB	1.8/3.3	FBGA	12.0x18x1.2t	x8
4GB	1.8/3.3	FBGA	12.0x18x1.2t	x8
8GB	1.8/3.3	FBGA	12.0x18x1.3t	x8
16GB	1.8/3.3	FBGA	14.0X18.0	x8

Please contact your local Samsung sales representative for 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	Org.	Voltage (V)	Temp.	Speed	MOQ (Tray)	Remarks
512Mb	KJA51Z23PC-AAO	216FBGA (14x14)	A-port:x16(SDR/DDR) B-port:x16(SDR/DDR)	1.8V	extended	133MHz		PKG Combination : 2G OneNAND + 512Mb MDDR + 512Mb OneDRAM MCP P/N : KAC00F00JM
	KJA51Y23PC-AAO	152FBGA (14x14)	A-port:x16(SDR/DDR) B-port:x16(SDR/DDR)	1.8V	extended	133MHz		PKG Combination : 2G NAND + 512Mb MDDR + 512Mb OneDRAM MCP P/N : KAR00900GM

NOTE: All parts are lead free

Solid State Drives (SSD)

Interface	Size	Connector	Den.	Comp.	Controller	Part Number
SATA II (Native)	1.8"	SATA	32GB	8Gbit	RBX	MCBQE32G8MPP-0VA00
			64GB			MCCOE64G8MPP-0VA00
	2.5"	SATA	32GB	8Gbit	RBX	MCBQE32G5MPP-0VA00
			64GB			MCCOE64G5MPP-0VA00

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

3.5" Hard Disk Drives

Family	Capacity (GB)	RPM	Interface	Buffer	Model
F1	1TB	7200	SATA-2	32MB	HD103UJ
	750	7200	SATA-2	32MB	HD753LJ
	750	7200	SATA-2	16MB	HD752LJ
	640	7200	SATA-2	16MB	HD642JJ
	500	7200	SATA-2	16MB	HD502IJ
	500	7200	SATA-2	8MB	HD501IJ
	320	7200	SATA-2	16MB	HD322HJ
	250	7200	SATA-2	16MB	HD252HJ
	250	7200	SATA-2	8MB	HD251HJ
	160	7200	SATA-2	16MB	HD162GJ
	160	7200	SATA-2	8MB	HD161GJ
T166S	500	7200	SATA-2	8	HD500LJ
	500	7200	SATA-2	16	HD501LJ
	320	7200	SATA-2	8	HD320KJ
	320	7200	SATA-2	16	HD321KJ
T133S	400	7200	SATA-2	8	HD400LI
	400	7200	SATA-2	16	HD401LI
	300	7200	SATA-2	8	HD300LI
T133	400	7200	PATA	8	HD400LD
	300	7200	PATA	8	HD300LD
S250	250	7200	SATA-2	8	HD250HJ
S166S	160	7200	SATA-2	8	HD161HJ
	120	7200	SATA-2	8	HD120HJ
	80	7200	SATA-2	2	HD081GJ
	80	7200	SATA-2	8	HD082GJ
	40	7200	SATA-2	2	HD041GJ
	40	7200	SATA-2	8	HD042GJ
P120S	250	7200	SATA-2	8	SP2504C
	250	7200	SATA-2	8	SP2004C
P120	250	7200	PATA	8	SP2514N
	200	7200	PATA	8	SP2014N
P80SD	160	7200	SATA-2	8	HD160JJ
	120	7200	SATA-2	8	HD120IJ
	80	7200	SATA-2	8	HD080HJ
P80SD	160	7200	PATA	2	SP1644N
	160	7200	PATA	8	SP1654N
	120	7200	PATA	2	SP1243N
	120	7200	PATA	8	SP1253N
	80	7200	PATA	2	SP0842N

3.5" Enterprise RAID Drives

Family	Capacity (GB)	RPM	Interface	Buffer	Model
F1R	1TB	7200	SATA-2	32	HE103UJ
	750	7200	SATA-2	32	HE753LJ
	500	7200	SATA-2	16	HE502IJ
	320	7200	SATA-2	16	HE322HJ
	250	7200	SATA-2	16	HE252HJ

2.5" Hard Disk Drives

Family	Capacity (GB)	RPM	Interface	Buffer	Model
M6	320	5400	SATA	8	HM320JI
	250	5400	SATA	8	HM251JI
M5S	250	5400	SATA	8	HM250JI
	160	5400	SATA	8	HM160HI
	120	5400	SATA	8	HM121HI
	80	5400	SATA	8	HM080GI
	60	5400	SATA	8	HM061GI
M5P	160	5400	PATA	8	HM160HC
	120	5400	PATA	8	HM121HC
	80	5400	PATA	8	HM080GC
M80S	160	5400	SATA	8	HM160JI
	120	5400	SATA	8	HM120II
	80	5400	SATA	8	HM080HI
M80	160	5400	PATA	8	HM160JC
	120	5400	PATA	8	HM120IC
	80	5400	PATA	8	HM080HC
M60S	120	5400	SATA	8	HM120JI
	100	5400	SATA	8	HM100JI
	60	5400	SATA	8	HM060HI
M60	120	5400	PATA	8	HM120JC
	100	5400	PATA	8	HM100JC
	60	5400	PATA	8	HM060HC

1.8" Hard Disk Drives

Family	Capacity (GB)	RPM	Interface	Buffer	Model
N1 (3600rpm)	60	3600	PATA	2	HS061HA
			CEATA	2	HS061HP
	40		PATA	2	HS041HA
			CEATA	2	HS041HP
	30		PATA	2	HS031GA
			CEATA	2	HS031GP
	20		PATA	2	HS021GA
			CEATA	2	HS021GP
N1 (4200rpm)	60	4200	PATA	2	HS060HB
			CEATA	2	HS060HQ
	40		PATA	2	HS040HB
			CEATA	2	HS040HQ
	30		PATA	2	HS030GB
			CEATA	2	HS030GQ
	20		PATA	2	HS020GB
			CEATA	2	HS020GQ

20X External DVD Writer, TruDirect™ SE-S204S

KEY FEATURES

Fast, easy-to-use DVD Recorder

- True real-time recording: Easy to make DVD titles
- Creating DVD title from 1hr video stream: about 1hr 5min
- Creating DVD title from 1hr HDD camcorder file(4.1GB): 30min

Append titles as you want: 99 titles available after rewritable media recording finished

- True direct recording: No HDD required, direct recording to ODD
- Videos, photos and data can be recorded on the same DVD media

WriteMaster™ Technology

Powerful high-speed recording

- Low noise and vibration control system for high speed
- Optimized algorithm for fastest speed

Direct disc labeling: LightScribe

GENERAL SPECIFICATIONS

Data Transfer Rate	Media Type	Write	Read
	DVD+R	20X (27MB/sec)	16X (21.6MB/sec)
	DVD+R DL	16X (21.6MB/sec)	12X (16.2MB/sec)
	DVD+RW	8X (10.8MB/sec)	12X (16.2MB/sec)
	DVD-R	20X (27MB/sec)	16X (21.6MB/sec)
	DVD-R DL	12X (16.2MB/sec)	12X (16.2MB/sec)
	DVD-RAM	12X (16.2MB/sec)	12X (16.2MB/sec)
	DVD-RW	6X (8.1MB/sec)	12X (16.2MB/sec)
	DVD-ROM	-	16X (21.6MB/sec)
	CD-ROM	-	48X (7.2MB/sec)
	CD-R	48X (7.2MB/sec)	40X (6.0MB/sec)
	CD-RW	32X (4.8MB/sec)	40X (6.0MB/sec)
Supported Disc	DVD-RAM, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW, DVD-ROM, DVD-Video, CD-R, CD-RW, CD-ROM/XA, CD-ROM, Text		
Buffer Memory	2 MB		
Dimensions (WxHxD mm)	163 x 50 x 232		
Weight (kg)	1.2		
Interface	USB 2.0		
Direct Disc Labeling	LightScribe		

22X External DVD Writer SE-S224Q

KEY FEATURES

WriteMaster™ Technology

Powerful high-speed recording

- Low noise and vibration control system for high speed
- Optimized algorithm for fastest speed

Direct disc labeling: LightScribe

GENERAL SPECIFICATIONS

Data Transfer Rate	Media Type	Write	Read
	DVD+R	22X (29.7MB/sec)	16X (21.6MB/sec)
	DVD+R DL	16X (21.6MB/sec)	12X (16.2MB/sec)
	DVD+RW	8X (10.8MB/sec)	12X (16.2MB/sec)
	DVD+RW DL	2X(2.7MB/sec)	6X(8.1MB/sec)
	DVD-R	22X (29.7MB/sec)	16X (21.6MB/sec)
	DVD-R DL	12X (16.2MB/sec)	12X (16.2MB/sec)
	DVD-RAM	12X (16.2MB/sec)	12X (16.2MB/sec)
	DVD-RW	6X (8.1MB/sec)	12X (16.2MB/sec)
	DVD-ROM	-	16X (21.6MB/sec)
	CD-ROM	-	48X (7.2MB/sec)
	CD-R	48X (7.2MB/sec)	40X (6.0MB/sec)
	CD-RW	32X (4.8MB/sec)	40X (6.0MB/sec)
Supported Disc	DVD-RAM, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW, DVD-RW DL, DVD-ROM, DVD-Video, CD-R, CD-RW, CD-ROM/XA, CD-ROM, CD-Audio, Video-CD, CD-I(FMV), Photo CD, CD-Extra, CD-TEXT		
Buffer Memory	2 MB		
Dimensions (WxHxD mm)	163 x 50 x 232		
Weight (kg)	1.2		
Interface	USB 2.0		

20X EXTERNAL DVD WRITER SE-S204N

KEY FEATURES	GENERAL SPECIFICATIONS			
WriteMaster™ Technology Powerful high-speed recording <ul style="list-style-type: none"> - Low noise and vibration control system for high speed - Optimized algorithm for fastest speed Direct disc labeling: LightScribe	Data Transfer Rate	Media Type	Write	Read
		DVD+R	20X (27MB/sec)	16X (21.6MB/sec)
		DVD+R DL	16X (21.6MB/sec)	12X (16.2MB/sec)
		DVD+RW	8X (10.8MB/sec)	12X (16.2MB/sec)
		DVD-R	20X (27MB/sec)	16X (21.6MB/sec)
		DVD-R DL	12X (16.2MB/sec)	12X (16.2MB/sec)
		DVD-RAM	12X (16.2MB/sec)	12X (16.2MB/sec)
		DVD-RW	6X (8.1MB/sec)	12X (16.2MB/sec)
		DVD-ROM	-	16X (21.6MB/sec)
		CD-ROM	-	48X (7.2MB/sec)
		CD-R	48X (7.2MB/sec)	40X (6.0MB/sec)
		CD-RW	32X (4.8MB/sec)	40X (6.0MB/sec)
	Supported Disc	DVD-RAM, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW, DVD-ROM, DVD-Video, CD-R, CD-RW, CD-ROM/XA, CD-ROM, CD-Audio, Video-CD, CD-I(FMV), Photo CD, CD-Extra, CD-TEXT		
	Buffer Memory	2 MB		
	Dimensions (WxHxD mm)	163 x 50 x 232		
	Weight (kg)	1.2		
	Interface	USB 2.0		
	Direct Disc Labeling	LightScribe		

SLOT-IN SLIM EXTERNAL TRUDIRECT™ SE-T084M

KEY FEATURES	GENERAL SPECIFICATIONS			
Support disc burning from USB bus power Supports both 12cm and 8cm discs Manual disc eject function to eject discs without power Easy-to-use, fast DVD recorder <ul style="list-style-type: none"> - True real-time recording: Easy to make DVD titles - Creating DVD title from 1hr video stream: about 1hr 5min - Creating DVD title from 1hr HDD camcorder file(4.1GB): 30min - Fastest speed in transfer files to a DVD title - Append title as you want: 99 titles available after rewritable media recording finished - True direct recording: No need for space in HDD, direct recording to ODD - Video, photo and data can be recorded on the same DVD media 	Data Transfer Rate	Media Type	Write	Read
		DVD+R	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD+R DL	6X (8.1MB/sec)	8X (10.8MB/sec)
		DVD+RW	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD-R	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD-R DL	6X (8.1MB/sec)	8X (10.8MB/sec)
		DVD-RAM	5X (6.75MB/sec)	5X (6.75MB/sec)
		DVD-RW	6X (8.1MB/sec)	8X (10.8MB/sec)
		DVD-ROM	-	8X (10.8MB/sec)
		CD-ROM	-	24X (3.6MB/sec)
		CD-R	24X (3.6MB/sec)	24X (3.6MB/sec)
		CD-RW	24X (3.6MB/sec)	24X (3.6MB/sec)
	Supported Disc	DVD-RAM, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW, DVD-ROM, DVD-Video, CD-R, CD-RW, CD-ROM/XA, CD-ROM, CD-Audio, Video-CD, CD-I(FMV), Photo CD, CD-Extra, CD-TEXT		
	Buffer Memory	2 MB		
	Dimensions (WxHxD mm)	141x 19 x 157		
	Weight (kg)	0.42		
	Interface	USB 2.0		
	Direct Disc Labeling	LightScribe		

22X S-ATA DVD WRITER SH-S223F(Q)

KEY FEATURES	GENERAL SPECIFICATIONS			
WriteMaster™ Technology Powerful high-speed recording <ul style="list-style-type: none"> - Low noise and vibration control system for high speed - Optimized algorithm for fastest speed Direct disc labeling: LightScribe	Data Transfer Rate	Media Type	Write	Read
		DVD+R	22X (29.7MB/sec)	16X (21.6MB/sec)
		DVD+R DL	16X (21.6MB/sec)	12X (16.2MB/sec)
		DVD+RW	8X (10.8MB/sec)	12X (16.2MB/sec)
		DVD+RW DL	2X(2.7MB/sec)	6X(8.1MB/sec)
		DVD-R	22X (29.7MB/sec)	16X (21.6MB/sec)
		DVD-R DL	12X (16.2MB/sec)	12X (16.2MB/sec)
		DVD-RAM	12X (16.2MB/sec)	12X (16.2MB/sec)
		DVD-RW	6X (8.1MB/sec)	12X (16.2MB/sec)
		DVD-ROM	-	16X (21.6MB/sec)
		CD-ROM	-	48X (7.2MB/sec)
		CD-R	48X (7.2MB/sec)	40X (6.0MB/sec)
		CD-RW	32X (4.8MB/sec)	40X (6.0MB/sec)
	Supported Disc	DVD-RAM, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW, DVD-RW DL, DVD-ROM, DVD-Video, CD-R, CD-RW, CD-ROM/XA, CD-ROM, CD-Audio, Video-CD, CD-I(FMV), Photo CD, CD-Extra, CD-TEXT		
	Buffer Memory	2 MB		
	Dimensions (WxHxD mm)	163 x 50 x 232		
	Weight (kg)	1.2		
	Interface	S-ATA		

20X DVD WRITER SH-S202J(N)

KEY FEATURES	GENERAL SPECIFICATIONS			
WriteMaster™ Technology Powerful high-speed recording <ul style="list-style-type: none"> - Low noise and vibration control system for high speed - Optimized algorithm for fastest speed Direct disc labeling: LightScribe	Data Transfer Rate	Media Type	Write	Read
		DVD+R	20X (27MB/sec)	16X (21.6MB/sec)
		DVD+R DL	16X (21.6MB/sec)	12X (16.2MB/sec)
		DVD+RW	8X (10.8MB/sec)	12X (16.2MB/sec)
		DVD-R	20X (27MB/sec)	16X (21.6MB/sec)
		DVD-R DL	12X (16.2MB/sec)	12X (16.2MB/sec)
		DVD-RAM	12X (16.2MB/sec)	12X (16.2MB/sec)
		DVD-RW	6X (8.1MB/sec)	12X (16.2MB/sec)
		DVD-ROM	-	16X (21.6MB/sec)
		CD-ROM	-	48X (7.2MB/sec)
		CD-R	48X (7.2MB/sec)	40X (6.0MB/sec)
		CD-RW	32X (4.8MB/sec)	40X (6.0MB/sec)
	Supported Disc	DVD-RAM, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW, DVD-ROM, DVD-Video, CD-R, CD-RW, CD-ROM/XA, CD-ROM, CD-Audio, Video-CD, CD-I(FMV), Photo CD, CD-Extra, CD-TEXT		
	Buffer Memory	2 MB		
	Dimensions (WxHxD mm)	163 x 50 x 232		
	Weight (kg)	1.2		
	Interface	P-ATA		
	Direct Disc Labeling	LightScribe		

SATA SLIM DVD WRITER SN-S083A

KEY FEATURES	GENERAL SPECIFICATIONS			
Slim form factor Direct disc labeling: LightScribe Manual disc eject function Supports both 8cm and 12cm discs WriteMaster™ technology (for slim DVD writer) <ul style="list-style-type: none"> - Double OPC technology - Tilt actuator compensation technology - Buffer-under-run-free technology - Firmware live update - RoHS: Eco-product 	Data Transfer Rate	Write Speed	Write	Read
		DVD+R	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD+R DL	6X (8.1MB/sec)	8X (10.8MB/sec)
		DVD+RW	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD-R	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD-R DL	4X (5.4MB/sec)	8X (10.8MB/sec)
		DVD-RW	6X (8.1MB/sec)	8X (10.8MB/sec)
		DVD-RAM	5X (6.75MB/sec)	5X (6.75MB/sec)
		DVD-ROM	-	8X (10.8MB/sec)
		CD-ROM	-	24X (3.6MB/sec)
		CD-R	24X(3.6MB/sec)	24X (3.6MB/sec)
		CD-RW	24X(3.6MB/sec)	24X (3.6MB/sec)
	Supported Disc	DVD Title Creation: DVD-RAM, DVD+R Double-layer, DVD+R, DVD+RW, DVD-R Double-layer, DVD-R, DVD-RW Data Back-up: DVD-RAM, DVD+R Double-layer, DVD+R, DVD+RW, DVD-R Double-layer, DVD-R, DVD-RW		
	Buffer Memory	2MB		

SLOT-IN-SLIM DVD WRITER SN-T082A(L)

KEY FEATURES	GENERAL SPECIFICATIONS			
Slot-in-Slim form factor Direct disc labeling: LightScribe DVD-RAM 5X Double-layer DVD+R 6X, DVD-R 4X Manual disc eject function Supports both 8cm and 12cm discs WriteMaster™ technology (for slim DVD writer) <ul style="list-style-type: none"> - Double OPC technology - Tilt actuator compensation technology - Buffer-under-run-free technology - Firmware live update - RoHS: Eco-product 	Data Transfer Rate	Media Type	Write	Read
		DVD+R	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD+R DL	6X (8.1MB/sec)	8X (10.8MB/sec)
		DVD+RW	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD-R	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD-R DL	4X (5.4MB/sec)	8X (10.8MB/sec)
		DVD-RW	6X (8.1MB/sec)	8X (10.8MB/sec)
		DVD-RAM	5X (6.75MB/sec)	5X (6.75MB/sec)
		DVD-ROM	-	8X (10.8MB/sec)
		CD-ROM	-	24X (3.6MB/sec)
		CD-R	24X (3.6MB/sec)	24X (3.6MB/sec)
		CD-RW	24X (3.6MB/sec)	24X (3.6MB/sec)
	Supported Disc	DVD Title Creation: DVD-RAM, DVD+R Double-layer, DVD+R, DVD+RW, DVD-R Double-layer, DVD-R, DVD-RW Data Back-up: DVD-RAM, DVD+R Double-layer, DVD+R, DVD+RW, DVD-R Double-layer, DVD-R, DVD-RW		
	Buffer Memory	2MB		

SLIM DVD WRITER SN-S082N

KEY FEATURES	GENERAL SPECIFICATIONS			
Slim form factor Direct disc labeling: LightScribe DVD-RAM 5X Double-layer DVD+R 6X, DVD-R 4X Manual disc eject function Supports both 8cm and 12cm discs WriteMaster™ technology (for slim DVD writer) <ul style="list-style-type: none"> - Double OPC technology - Tilt actuator compensation technology - Buffer-under-run-free technology - Firmware live update - RoHS: Eco-product 	Data Transfer Rate	Write Speed	Write	Read
		DVD+R	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD+R DL	6X (8.1MB/sec)	6X (8.1MB/sec)
		DVD+RW	8X (10.8MB/sec)	8X (8.1MB/sec)
		DVD-R	8X (10.8MB/sec)	8X (10.8MB/sec)
		DVD-R DL	6X (8.1MB/sec)	6X (8.1MB/sec)
		DVD-RW	6X (8.1MB/sec)	6X (8.1MB/sec)
		DVD-RAM	5X (6.75MB/sec)	5X (6.75MB/sec)
		DVD-ROM	-	8X (10.8MB/sec)
		CD-ROM	-	24X (3.6MB/sec)
		CD-R	24X (3.6MB/sec)	24X (3.6MB/sec)
		CD-RW	24X (3.6MB/sec)	24X (3.6MB/sec)
	Supported Disc	DVD Title Creation: DVD-RAM, DVD+R Double-layer, DVD+R, DVD+RW, DVD-R Double-layer, DVD-R, DVD-RW Data Back-up: DVD-RAM, DVD+R Double-layer, DVD+R, DVD+RW, DVD-R Double-layer, DVD-R, DVD-RW		
	Buffer Memory	2MB		
	Dimensions (WxHxD mm)	128 x 12.7 x 129 (mm)		
	Weight (kg)	0.17Kg		
	Interface	EIDE/ATAPI		
	Direct Disc Labeling	LightScribe		

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