SAMSUNG

PRODUCT SELECTION GUIDE

DISPLAYS, MEMORY AND STORAGE

1H 2017

Samsung Semiconductor, Inc.

Samsung continues to lead the industry with the broadest portfolio of memory products and display technology. Its DRAM, flash, mobile and graphics memory are found in many computers — from ultrabooks to powerful servers — and in a wide range of handheld devices such as smartphones and tablets. Samsung is also a leader in display panels for smartphones, TVs and monitors and public information displays. In addition, Samsung provides the industry's widest line of storage products from the consumer to enterprise levels. These include optical disc drives as well as flash storage, such as Solid State Drives, and a range of embedded flash storage products.

Markets

	DRAM	SSD	FLASH	ASIC	LOGIC	LFD/OLED
MOBILE/WIRELESS	●	N/A	●	●	●	●
NOTEBOOK PCs/ ULTRABOOKS™	●	●	●	●	●	●
DESKTOP PCs/ WORKSTATIONS	●	●	●	●	●	●
SERVERS	●	●	●	●	●	●
NETWORKING/ COMMUNICATIONS	●	●	●	●	●	N/A
CONSUMER ELECTRONICS	●	N/A	●	●	●	●

www.samsung.com/us/samsungsemiconductor

SAMSUNG

TABLE OF CONTENTS

//

DDR4 SDRAM COMPONENTS

Density	Voltage	Organization	Part Number	# Pins-Package	Compliance	Speed (Mbps)	Dimensions	Production
4Gb	1.2V	1G x 4	K4A4G045WD-BCRC/PB	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	2400/2133	7.5x11mm	Now
		512M x 8	K4A4G085WD-BCRC/PB					
		256M x 16	K4A4G165WD-BCRC/PB	96 Ball -FBGA			7.5x13.3mm	
		1G x 4	K4A4G045WE-BCRC/PB	78 Ball -FBGA			7.5x11mm	
		512M x 8	K4A4G085WE-BCRC/PB					
		256M x 16	K4A4G165WE-BCRC/PB	96 Ball -FBGA			7.5x13.3mm	
8Gb	1.2V	1G x 8	K4A8G085WB-BCRC/PB	78 Ball FBGA	Lead Free & Halogen Free, Flip Chip	2400/2133	7.5x11mm	Now
		512M x16	K4A8G165WB-BCRC/PB	96 Ball -FBGA			7.5x13.3mm	
16Gb (8Gb DDP)	1.2V	2Gx8	K4AAG085WB-MCPB/RC	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	2133/2400	7.5x13.3mm	Now
			K4AAG165WB-MCPB/RC					

DDR4 SDRAM REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.2V	1G x 72	M393A5143DB0-CPB	4Gb (512M x8) * 9	Lead Free & Halogen Free, Flip Chip	2133	1	Now
			M393A5143DB0-CRC			2400		
8GB	1.2V	1G x 72	M393A1G40DB0-CPB	4Gb (1G x4) * 18	Lead Free & Halogen Free, Flip Chip	2133	1	Now
			M393A1G40DB1-CRC			2400		
			M393A1G43DB0-CPB	4Gb (512M x8) * 18		2133	2	
			M393A1G43DB1-CRC			2400		
			M393A1G40EB1-CPB	4Gb (1G x4) * 18		2133	1	
			M393A1G40EB1-CRC			2400		
			M393A1G43EB1-CPB	4Gb (512M x8) * 18		2133	2	
			M393A1G43EB1-CRC			2400		
16GB	1.2V	2G x 72	M393A2G40DB0-CPB	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	2133	2	Now
			M393A2G40DB1-CRC			2400		
			M393A2G40EB1-CPB			2133		
			M393A2G40EB1-CRC			2400		
			M393A2K40BB0-CPB	8Gb (2G x4) * 18		2133	1	
			M393A2K40BB1-CRC			2400		
			M393A2K43BB1-CPB/CRC	8Gb (1G x8) * 18		2133/2400	2	
32GB	1.2V	4G x 72	M393A4K40BB0-CPB	8Gb (2G x4) * 36	Lead Free & Halogen Free, Flip Chip	2133	2	Now
			M393A4K40BB1-CRC			2400		
64GB TSV	1.2V	8G x 72	M393A8G40D40-CRB	4Gb 4H TSV (4G x4) * 36	Lead Free & Halogen Free, 4High TSV	2133	8	Now
			M393A8K40B21-CRB	8Gb 2H TSV (4G x4) * 36	Lead Free & Halogen Free, 2High TSV	2133	4	
			M393A8K40B21-CTC			2400		
128GB TSV	1.2V	16G x 72	M393AAK40B41-CTC	8Gb 4H TSV (8G x4) * 36	Lead Free & Halogen Free, 4High TSV	2400	8	Now

Notes:

DDR4 4Gb (D die) based	0 = IDT	2 = Montage	3 = Inphi	PB = DDR4-2133(15-15-15)
	0 = IDT	4 = Montage		RC = DDR4-2400(17-17-17)
DDR4 4Gb (E die) based	0 = IDT	4 = Montage	3 = Inphi	PB = DDR4-2133(15-15-15)
	0 = IDT	4 = Montage	3 = Inphi	RC = DDR4-2400(17-17-17)
DDR4 (B Die) 8Gb based	0 = IDT	4 = Montage		PB = DDR4-2133(15-15-15)
	0 = IDT	4 = Montage	3 = Inphi	RC = DDR4-2400(17-17-17)

DDR4 SDRAM Load Reduced REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
32GB	1.2V	4G x 72	M386A4G40DM0-CPB	4Gb DDP (2G x4) * 36	Lead Free & Halogen Free, DDP	2133	4	Now
			M386A4G40DM1-CRC			2400		
			M386A4K40BB0-CRC5	8G (2Gx4)*36	Lead Free & Halogen Free, Flip Chip		2	
64GB	1.2V	8G x 72	M386A8K40BM1-CPB/CRC	8Gb DDP (4G x4) * 36	Lead Free & Halogen Free, DDP	2133/2400	4	Now
128GB	1.2V	16G x 72	M386AAK40B40-CUC	8Gb 4H TSV (8G x4) * 36	Lead Free & Halogen Free, DDP	2400	8	Now

Notes:

DDR4 4Gb (D die) based	0 = IDT	2 = Montage		PB = DDR4-2133(15-15-15)
	5 = IDT	4 = Montage		RC = DDR4-2400(17-17-17)
DDR4 (B Die) 8Gb based	0 = IDT	4 = Montage		PB = DDR4-2133(15-15-15)
	5 = IDT	4 = Montage		RC = DDR4-2400(17-17-17)

DDR4 SDRAM VLP REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
16GB	1.2V	2G x 72	M392A4K40BM0-CPB/RC	4Gb DDP (2G x4) * 18	Lead Free & Halogen Free, DDP	2133	2	Now
			M392A2K43BB0-CPB/RC	8Gb (1G x8) * 18	Lead Free & Halogen Free, Flip Chip	2133/2400		
32GB	1.2V	4G x 72	M392A4K40BM0-CPB/RC	8Gb DDP (4G x4) * 18	Lead Free & Halogen Free, DDP	2133/2400	2	Now

DDR4 SDRAM UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.2V	512M x 64	M378A5143DB0-CPB	4Gb (512M x8) *8	Lead Free & Halogen Free	2133	1	Now
			M378A5143EB1-CPB			2133		
			M378A5143EB2-CRC			2400		
			M378A5244CB0-CPB			2133		
			M378A5244CB0-CRC			2400		
8GB	1.2V	1G x 64	M378A1G43DB0-CPB	4Gb (512M x8) *16	Lead Free & Halogen Free	2133	2	Now
			M378A1G43EB1-CRC			2400		
			M378A1K43BB1-CPB	8Gb (1G x8) *8		2133		
			M378A1K43BB2-CRC			2400		
		1R x 8	M378A1K43CB2-CPB			2133	1	
			M378A1K43CB2-CRC					
16GB	1.2V	2G x 64	M378A2K43BB1-CPB	8Gb (1G x8) * 16	Lead Free & Halogen Free	2133	2	Now
			M378A2K43BB1-CRC			2400		
			M378A2K43CB1-CPB			2133		
			M378A2K43CB1-CRC			2400		

Notes: PB = DDR4-2133(15-15-15) RC = DD R4-2400(17-17-17)

DDR4 SDRAM ECC UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.2V	512M x72	M391A5143EB1-CPB/CRC	M391A5143EB1-CPB/CRC	Lead Free & Halogen Free, Flip Chip	2133/2400	1	Now
8GB	1.2V	1G x72	M391A1G43DB0-CPB/CRC	M391A1G43DB0-CPB/CRC	Lead Free & Halogen Free, Flip Chip	2133/2400	2	Now
			M391A1K43BB1-CPB/CRC	M391A1K43BB1-CPB/CRC				
16GB	1.2V	2G x72	M391A2K43BB1-CPB/CRC	M391A2K43BB1-CPB/CRC	Lead Free & Halogen Free, Flip Chip	2133/2400	2	Now

Notes: PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

DDR4 SDRAM SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.2V	512M x 64	M471A5143DB0-CPB	4Gb (512M x8) * 8	Lead Free & Halogen Free	2133	1	Now
			M471A5143EB0-CPB/RC			2133/2400		
			M471A5244CB0-CPB/RC					
8GB	1.2V	1G x 64	M471A1G43DB0-CPB	4Gb (512M x8) * 16	Lead Free & Halogen Free	2133	2	Now
			M471A1G43EB1-CPB/CRC			2133/2400		
			M471A1K43BB1-CPB/CRC	8Gb (1Gx8)*8			1	
			M471A1K43CB1-CPB/CRC					
16GB	1.2V	2G x 64	M471A2K43BB1-CPB/RC	8Gb (1G x8) * 16	Lead Free & Halogen Free	2133/2400	2	Now
			M471A2K43CB1-CPB/RC					

Notes: PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

DDR4 SDRAM ECC SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.2V	1G x 72	M474A1G43DB0-CPB	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	2133	2	Now
			M474A1G43DB1-CRC			2400		
			M474A1G43EB1-CPB/CRC			2133/2400		
16GB	1.2V	2G x 72	M474A2K43BB1-CPB/RC	8Gb (1G x8) * 18	Lead Free & Halogen Free, Flip Chip	2133/2400	2	Now

DDR3 SDRAM REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1G x 72	M393B1G70EB0-CMA	4Gb (1G x4) * 18	Lead Free & Halogen Free, Flip Chip	1866	1	Now
			M393B1G73EB0-CMA	4Gb (512M x8) * 18			2	
	1.35V		M393B1G70EB0-YK0	4Gb (1G x4) * 18		1600	1	
			M393B1G73EB0-YK0	4Gb (2R x8) * 18			2	
16GB	1.5V	2G x 72	M393B2G70DB0-CMA	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	1866	2	Now
			M393B2G70EB0-CMA					
	1.35V		M393B2G70DB0-YK0			1600		
			M393B2G70EB0-YK0					
32GB	1.35V	4G x 72	M393B4G70DM0-YH9	4Gb DDP (2G x4) * 36	Lead Free & Halogen Free. DDP	1333	4	Now

Notes: 8 = IDT A1 Evergreen 9 = Inphi UVGS02 2 = IDT (E-die) 3 = Inphi (E-die) YK = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13)

DDR3 SDRAM Load Reduced REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
32GB	1.35V	4G x 72	M386B4G70DM0-YK0	4Gb DDP (2G x4) * 36	Lead Free & Halogen Free, DDP	1600	4	Now
64GB	1.35V	8G x 72	M386B8G70DE0-YH9(4)	4Gb QDP (4G x4) * 36	Lead Free & Halogen Free, QDP	1333	8	Now
	1.5V		M386B8G70DE0-CK0(4)			1600		

Notes: 3 = Inphi iMB GS02B 4 = Montage C1

DDR3 SDRAM VLP REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1G x 72	M392B1G70DB0-CMA	4Gb (1Gx4) * 18	Lead Free & Halogen Free, Flip Chip	1866	1	Now
			M392B1G73DB0-CMA	4Gb (512M x8) * 18			2	
	1.35V		M392B1G70DB0-YK0	4Gb (1Gx4) * 18		1600	1	
			M392B1G73DB0-YK0	4Gb (512M x8) * 18			2	
16GB	1.5V	2G x 72	M392B2G70DM0-CMA	4Gb DDP (2G x4) * 18	Lead Free & Halogen Free, DDP	1866	2	Now
	1.35V		M392B2G70DM0-YK0			1600		
32GB	1.35V	4G x 72	M392B4G70DE0-YH9	4Gb QDP (4G x4) * 18	Lead Free & Halogen Free, QDP	1333	4	Now

Notes: 2 = IDT 3 = Inphi YK = DDR3-1600 MA = DDR3-1866 (13-13-13)

DDR3 Non ECC UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.5V	512M x 64	M378B5173DB0-CK0/CMA	4Gb (512M x8) * 8	Lead Free & Halogen Free. Flip Chip	1600/1866	1	Now
			M378B5173EB0-CK0/CMA					
			M378B5173EB0-YK0/*CMA					
8GB	1.5V	1G x 64	M378B1G73DB0-CK0/MA	4Gb (512M x8) * 16	Lead Free & Halogen Free. Flip Chip	1600/1866	2	Now
			M378B1G73EB0-CK0/CMA					
	1.35V		M378B1G73EB0-YK0/*CMA					

Notes: YK = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13) * 1.35V is compatible to 1.5V

DDR3 SDRAM UNBUFFERED MODULES (ECC)

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.5V	512Mx72	M391B5173EB0-CMA	4Gb (512M x8) * 9	Lead Free & Halogen Free	1866	1	Now
	1.35V		M391B5173EB0-YK0			1600		
8GB	1.5V	1G x 72	M391B1G73EB0-CMA	4Gb (512M x8) * 18	Lead Free & Halogen Free	1866	2	Now
	1.35V		M391B1G73EB0-YK0			1600		

Notes: YK0 = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13)

DDR3 SDRAM SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.35V	512M x 72	M474B5173EB0-YK0	4Gb (512M x8) * 9	Lead Free & Halogen Free, Flip Chip	1866	1	Now
8GB	1.5V	1G x 72	M474B1G73EB0-CMA	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	1866	2	Now
	1.35V		M474B1G73EB0-YK000			1600		

DDR3 SDRAM COMPONENTS

Density	Voltage	Organization	Part Number	# Pins- Package	Compliance	Speed (Mbps)	Dimensions	Production
1Gb	1.5V	128M x 8	K4B1G0846I-BCK0/MA/NB	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x11mm	Now
		128M x 16	K4B1G1646I-BCK0/MA/NB	96 Ball -FBGA			7.5x13.3mm	
	1.35V	128M x 8	K4B1G0846I-BYK0/MA	78 Ball -FBGA		1600/1800	7.5x11mm	
		128M x 16	K4B1G1646I-BYK0/MA	96 Ball -FBGA			7.5x13.3mm	
2Gb	1.5V	512M x 8	K4B2G0846F-BCK0/MA/NB	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x11mm	Now
		256M x 16	K4B2G1646F-BCK0/MA/NB	96 Ball -FBGA			7.5x13.3mm	
	1.35V	256M x 8	K4B2G0846F-BK0/MA	78 Ball -FBGA		1600/1866	7.5x11mm	
		128M x 16	K4B2G1646F-BK0/MA	96 Ball -FBGA			7.5x13.3mm	
4Gb	1.5V	512M x 8	K4B4G0846D-BCK0/MA/NB	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x11mm	Now
		256M x 16	K4B4G1646D-BCK0/MA/NB	96 Ball -FBGA			7.5x13.3mm	
		512M x 8	K4B4G0846E-BCK0/MA/NB	78 Ball -FBGA			7.5x11mm	
		256M x 16	K4B4G1646E-BCK0/MA/NB	96 Ball -FBGA			7.5x13.3mm	
	1.35V	1G x 4	K4B4G0446D-BYK0	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600	7.5x11mm	Now
		512M x 8	K4B4G0846D-BYK0				7.5x11mm	
		256M x 16	K4B4G1646D-BYK0/MA	96 Ball -FBGA		1600/1866	7.5x13.3mm	
		1G x 4	K4B4G0446E-BYK0/MA	78 Ball -FBGA			7.5x11mm	
		512M x 8	K4B4G0846E-BYK0/MA				7.5x11mm	
		256M x 16	K4B4G1646E-BYK0/MA	96 Ball -FBGA			7.5x13.3mm	
8Gb	1.5V	512M x 16	K4B8G1646Q-MCK0/MA	96 Ball -FBGA	Lead Free & Halogen Free	1600/1866	11x13.3mm	Now
			K4G8G1646D-MCK0/MA					
	1.35V	512M x 16	K4G8G1646D-MCK0/MA					
			K4G8G1646D-MYK0/ (MA)					

Notes: H9 = DDR3-1333 (9-9-9) K0 = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13) NB = DDR3-2133 (14-14-14)

DDR2 SDRAM COMPONENTS

Density	Organization	Part Number	# Pins-Package	Dimensions	Package	Speed (Mbps)	Production
512Mb	64M x 8	K4T51083QN-BCE7	60-FBGA	7.5x9.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now
	32M x 16	K4T51163QN-BCE7	84-FBGA	7.5x12.5mm			
1Gb	128M x 8	K4T1G084QJ-BCE7	60-FBGA	7.5x9.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now
	64M x 16	K4T1G164QJ-BCE7	84-FBGA	7.5x12.5mm			

Notes: E6 = DDR2-667 (5-5-5) E7 = DDR2-800 (5-5-5) F7 = DDR2-800 (6-6-6) F8 = DDR2-1066 (7-7-7)

GRAPHICS DRAM COMPONENTS

Type	Density	Organization	Part Number	Package	VDD/VDDQ	Speed Bin (MHz)	Production
GDDR5	8Gb	256M x 32	K4G80325FB-HC(03/28/25/22)	170-FCFBGA	1.5V/1.5V	6000/7000/8000*/9000*	Now
			K4G80325FB-HC(03/28/25/22)		1.35V/1.35V	5000/6000/6500/TBD	
	4Gb	128M x 32	K4G41325FE-HC2(03/28/25/22)		1.5V/1.5V	6000/7000/8000*/9000*	
			K4G41325FE-HC2(03/28/25/22)		1.35V/1.35V	5000/6000/6500/TBD	
gDDR3	4Gb	256M x 16	K4W4G1646E-BC(1A/1B)	96-FCFBGA	1.5V/1.5V	2133/2400	Now
			K4W4G1646E-BC(1A/1B)		1.35V/1.35V	1866/2133	

Notes: Package & Speed Bin Codes

H: FBGA (Halogen Free & Lead Free) (DDR3)
B: FCFBGA (Halogen Free & Lead Free) (DDR3)
H: FCFBGA (Halogen Free & Lead Free) (GDDR5)
F: FBGA (Halogen Free & Lead Free) (GDDR5)
22: 0.22ns (9000Mbps)
25: 0.25ns (8000Mbps)

28: 0.28ns (7000Mbps)
03: 0.3ns (6000Mbps)
04: 0.4ns (5000Mbps)
1B: 8.3ns (2400Mbps gDDR3)
1A: 1.0ns (2133Mbps gDDR3)
11: 1.1ns (1866Mbps)

MOBILE DRAM COMPONENTS

Type	Density	Organization	Part Number	Package	Power	Production
LPDDR3	8Gb	1CH x 32	K4E8E324EB-EGCF	178-FBGA, 11x11.5, SDP, 1866Mbps	1.8V/1.2V/1.2V	Now
			K4E8E324EB-AGCF	168-FBGA, 12x12, SDP, 1866Mbps		
	12Gb	1CH x32	K4E2E304EA-AGCF	168-FBGA, 12x12, DDP, 1866Mbps		
	16Gb	1CH x 32	K4E6E304EB-EGCF	178-FBGA, 11x11.5, DDP, 1866Mbps		
			K4E6E304EB-AGCF	168-FBGA, 12x12, DDP, 1866Mbps		
		2CH x 32	K3QF2F20BM-AGCF	253-FBGA, 11x11.5, DDP, 1866Mbps		
			K3QF3F30BM-FGCF	256-FBGA, 14x14, DDP, 1866Mbps		
	24Gb	1CH x32	K4EHE304EA-AGCF	168-FBGA, 12x12, QDP, 1866Mbps		
		2CH x32	K3QF6F60AM-FGCF	256-FBGA, 14x14, QDP, 1866Mbps		
	32Gb	1CH x32	K4EBE304EB-EGCF	178-FBGA, 11x11.5, QDP, 1866Mbps		
		2CH x32	K3QF4F40BM-AGCF	253-FBGA, 11x11.5, QDP, 1866Mbps		
			K3QF4F40BM-FGCF	256-FBGA, 14x14, QDP, 1866Mbps		
LPDDR4	8Gb	2CH x16	K4F8E304HB-MGCJ	200-FBGA, 10x15, SDP, 3733Mbps	1.8V/1.1V/1.1V	Now
	16Gb		K4F6E304HB-MGCJ	200-FBGA, 10x15, DDP, 3733Mbps		
	24Gb		K4FHE3D4HM-MFCJ	200-FBGA, 10x15, DDP, 3733Mbps		
			K3RG4G40MM-MGCJ	366-FBGA, 15x15, DDP, 3733Mbps		
	32Gb	4CH x16	K3RG2G20CA-MGCJ	366-FBGA, 15x15, QDP, 3733Mbps		CS
			K3RG2G20CM-FGCJ	432-FBGA, 15x15, QDP, 3733Mbps		ES
	48Gb	4CH x16	K3RG6G60MM-MGCJ	366-FBGA, 15x15, QDP, 3733Mbps		Now
LPDDR4X	32Gb	4CH x16	K3UH5H50MM-NGCJ	366-FBGA, 12x12.7 DDP, 3733Mbps	1.8V/1.1V/1.1V	CS
	48Gb		K3UH6H60AM-NGCJ	366-FBGA, 12x12.7 QDP, 3733Mbps		

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: Generation
- 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: x 2
04: x 4
06: x 4 Stack (Flexframe)
07: x 8 Stack (Flexframe)
08: x 8
15: x 16 (2CS)
16: x 16
26: x 4 Stack (JEDEC Standard)
27: x 8 Stack (JEDEC Standard)
30: x 32 (2CS, 2CKE)
31: x 32 (2CS)
32: x 32

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. Generation

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

DDR2 DRAM

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 Density
5 Bit Organization
6 Number of Internal Banks
7 Interface (VDD, VDDQ)
8 Generation
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)
MA: DDR3-1866 (933MHz @ CL=13, tRCD=13, tRP=13)
NB: DDR3-2133 (1067MHz @ CL=14, tRCD=14, tRP=14)

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 Lead-free and Halogen-free products 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: Generation
- 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: x 72 184pin Low Profile Registered DIMM
63: x 63 PC100/PC133 µSODIMM with SPD for 144pin
64: x 64 PC100/PC133 SODIMM with SPD for 144pin (Intel/JEDEC)
66: x 64 Unbuffered DIMM with SPD for 144pin/168pin (Intel/JEDEC)
68: x 64 184pin Unbuffered DIMM
70: x 64 200pin Unbuffered SODIMM
71: x 64 204pin Unbuffered SODIMM
74: x 72/ECC Unbuffered DIMM with SPD for 168pin (Intel/JEDEC)
77: x 72/ECC PLL + Register DIMM with SPD for 168pin (Intel PC100)
78: x 64 240pin Unbuffered DIMM
81: x 72 184pin ECC unbuffered DIMM
83: x 72 184pin Registered DIMM
90: x 72/ECC PLL + Register DIMM
91: x 72 240pin ECC unbuffered DIMM
92: x 72 240pin VLP Registered DIMM
93: x 72 240pin Registered DIMM
95: x 72 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. Generation

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

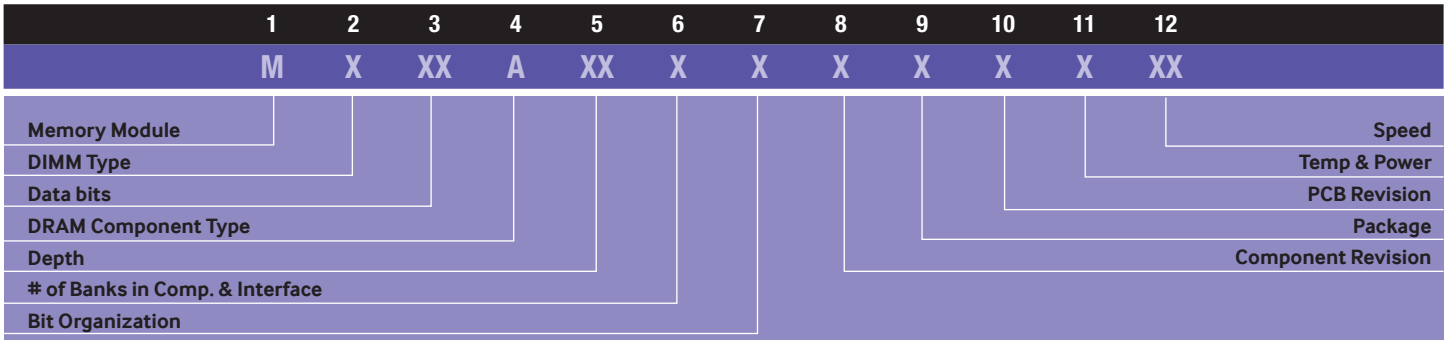
CC: (200MHz @ CL=3, tRCD=3, tRP=3)
D5: (266MHz @ CL=4, tRCD=4, tRP=4)
E6: (333MHz @ CL=5, tRCD=5, tRP=5)
F7: (400MHz @ CL=6, tRCD=6, tRP=6)
E7: (400MHz @ CL=5, tRCD=5, tRP=5)
F8: (533MHz @ CL=7, tRCD=7, tRP=7)
G8: (533MHz @ CL=8, tRCD=8, tRP=8)
H9: (667MHz @ CL=9, tRCD=9, tRP=9)
K0: (800MHz @ CL=10, 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 Lead-free and Halogen-free products are in compliance with RoHS

DDR4 SDRAM MODULE ORDERING INFORMATION



1. Memory Module: M

2. DIMM Type

3: R/LRDIMM
4: SODIMM

3. Data bits

74: x 72 260pin SODIMM
86: x 72 288pin Load Reduced DIMM
93: x 72 288pin Registered DIMM

4. DRAM Component Type

A: DDR4 SDRAM (1.2V VDD)

5. Depth

1G: 1G
2G: 2G
4G: 4G
8G: 8G
1K: 1G (for 8Gb)
2K: 2G (for 8Gb)

6. # of Banks in Comp. & Interface

4: 16Banks & POD-1.2V

7. Bit Organization

0: x 4
3: x 8

8. Component Revision

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

9. Package

B: FBGA (Halogen-free & Lead-free, Flip Chip)
M: FBGA (Halogen-free & Lead-free, DDP)

10. PCB Revision

0: None
1: 1st Rev.
2: 2nd Rev.
3: 3rd Rev.
4: 4th Rev.

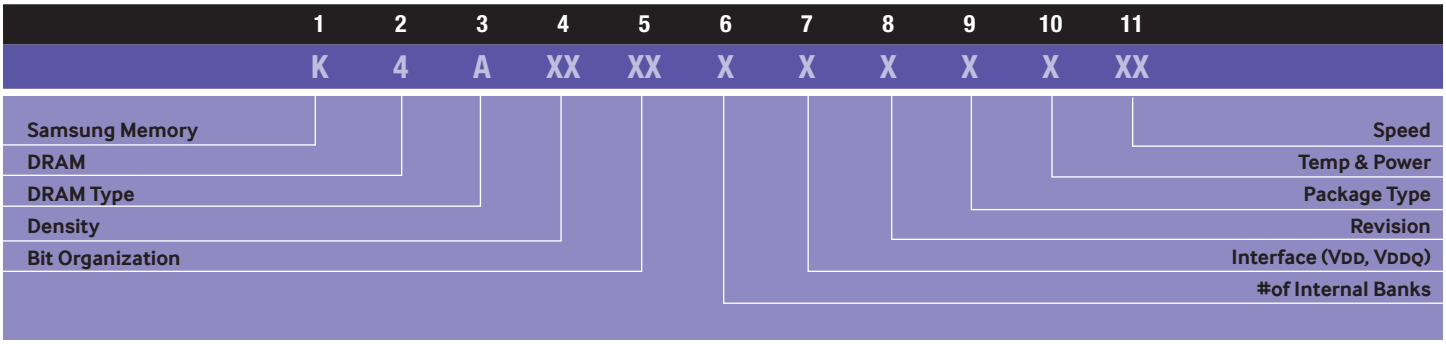
11. Temp & Power

C: Commercial Temp. (0°C ~ 85°C) &
Normal Power

12. Speed

PB: DDR4-2133
(1066MHz @ CL=15, tRCD=15, tRP=15)

DDR4 SDRAM MEMORY ORDERING INFORMATION



1. Samsung Memory: K

2. DRAM: 4

3. DRAM Type

A: DDR4 SDRAM

4. Density

4G: 4Gb
8G: 8Gb

5. Bit Organization

04: x 4
08: x 8

6. # of Internal Banks

5: 16Banks

7. Interface (V_{DD}, V_{DDQ})

W: POD (1.2V, 1.2V)

8. Revision

M: 1st Gen.
A: 2nd Gen.
B: 3rd Gen.
C: 4th Gen.
D: 5th Gen.
E: 6th Gen.
F: 7th Gen.
G: 8th Gen.
H: 9th Gen.

9. Package Type

B: FBGA (Halogen-free & Lead-free, Flip Chip)
M: FBGA (Halogen-free & Lead-free, DDP)

10. Temp & Power

C: Commercial Temp. (0°C ~ 85°C) &
Normal Power

11. Speed

PB: DDR4-2133
(1066MHz @ CL=15, tRCD=15, tRP=15)

RC: DDR4-2400
(1200MHz @ CL=17, tRCD=17, tRP=17)

MOBILE STORAGE

Application	Product	Density	Org	Type	Flash Die	Part Number	Seq R/W MB/s	Random R/W IOPS	mm Pkg Size (X,Y,Z)	Status
High-End	UFS v2.1 (Gear 3 x 2 lanes)	256GB	256Gb*8	TLC	M-die	KLUEG8U1EM-B0C10**	890/260	48K / 42K	11.5 x 13.0 x 1.0	CS
		128GB	128Gb*8		E-die	KLUDG8V1EE-B0C10**	880/230	40K / 33K		
		64GB	128Gb*4	MLC	D-die	KLUCG4J1ED-B0C10**	880/200	48K / 35K		
	UFS v2.0 (Gear 3 x 2 lanes)	256GB	256Gb*8	TLC	M-die	KLUEG8U1EM-B0B10**	850/260	45K / 40K	11.5 x 13.0 x 1.2	MP
Mainstream	UFS 2.0 (Gear 3 x 1 lane)	128GB	128Gb*8	MLC	B-die	KLUDG8J1CB-B0B10**	460/160	20K / 14K	11.5 x 13.0 x 1.2	MP
		64GB	128Gb*4			KLUCG4J1CB-B0B10**			11.5 x 13.0 x 1.0	
		32GB	64Gb*4		E-die	KLUBG4G1CE-B0B10**				
	eMMC v5.1 (Gear 3 x 1 lane)	256GB	256Gb*8	TLC	M-die	KLMEG8UERM-C0410**	320/150	22K / 18K		CS
		128GB	256Gb*4			KLMDG4UERM-B0410**				CS in Dec / Jan
		64GB	128Gb*4	MLC	D-die	KLMCG4JETD-B0410**				
		32GB	128Gb*2			KLMBG2JETD-B0410**			11.5 x 13.0 x 0.8	
		16GB	128Gb*1			KLMAG1JETD-B0410**				
		8GB	64Gb*1		F-die	KLM8G1GETF-B0410**				

MMC5.1 is backwards compatible with 5.0 & 4.5
*Denotes bucket code for latest firmware patch

eMCP: eMMC + LPDDR3

Memory	eMMC Density	DRAM Density/Organization	Voltage (eMMC-DRAM)	Package
eMMC & MDRAM	8GB	8Gb (x32)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
	16GB	8Gb (x32)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
		8Gb*2 (x32)		
		6Gb*4 (x32)		
	32GB	8Gb*2 (x32)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
		6Gb*4 (x32)		
		8Gb*4 (x32)		
	64GB	6Gb*4 (x32)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
		8Gb*4 (x32)		
	128GB	8Gb*4 (x32)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm

eMCP: eMMC + LPDDR4X

Memory	eMMC Density	DRAM Density/Organization	Voltage (eMMC-DRAM)	Package
eMMC & MDRAM	32GB	12Gb*2 (x32)	3.3V/1.8V - 1.8V/1.2V/0.6V	254FBGA 11.5 x 13mm
		8Gb*4 (x32)		
	64GB	12Gb*2 (x32)	3.3V/1.8V - 1.8V/1.2V/0.6V	254FBGA 11.5 x 13mm
		8Gb*4 (x32)		
		12Gb*4 (x32)		
	128GB	12Gb*4 (x32)	3.3V/1.8V - 1.8V/1.2V/0.6V	254FBGA 12 x 15mm

ePoP: eMMC + LPDDR3

Memory	eMMC Density	DRAM Density/Organization	Voltage (eMMC-DRAM)	Package
eMMC & MDRAM	4GB	4Gb (x32)	3.3V/1.8V - 1.8V/1.2V	168FBGA 12x12mm
		6Gb (x32)		
	4GB	4Gb (x32)	3.3V/1.8V - 1.8V/1.2V	136FBGA 10x10mm
		6Gb (x32)		
	8GB	8Gb (x32)	3.3V/1.8V - 1.8V/1.2V	136FBGA 10x10mm

Solid State Drives (SSDs)

	Server & Cloud Datacenter		Enterprise		
	LEGACY SERVERS	HIGH-DENSITY SERVERS	ALL FLASH PRIMARY STORAGE Hard Disk Drive Replacement	LOW LATENCY PRIMARY STORAGE Next-Generation All Flash Array	EXTREME PERFORMANCE SERIES Server-side Caching
	PM863a	**PM963**	**PM1633a**	**PM1725a**	**PM1725a**
Host Interface	SATA 3.0 @ 6 Gbit/s	PCIe Gen 3 x4 @ 32Gbit/s (NVMe)	SAS 3.0 @ 12 Gbit/s	PCIe Gen 3 x4 @ 32Gbit/s (NVMe)	PCIe Gen 3 x8 @ 64Gbit/s (NVMe)
Form Factor	2.5"	M.2 (22x110mm)	2.5"	2.5" / U.2	Add-in Card (HHHL)
Capacity (GB)	240/480/960/ 1920/3840	960/1920	480/960/1920/ 3840/7680/15360	3840/7680/15360	1600/3200/6400
Endurance (up to)	1.3 DWPD for 3 Years	1.3 DWPD for 3 Years	1-3 DWPD for 5 Years	5 DWPD for 5 Years	5 DWPD for 5 Years
Power Consumption (Active)	4 W	7.5 W	13 W	25 W	23 W
Power Consumption (Idle)	1.3 W	2.5 W	7 W	7 W	7.7 W
Random Reads (up to)	99,000 IOPS	430,000 IOPS	205,000 IOPS	740,000 IOPS	1,080,000 IOPS
Random Writes (up to)	18,000 IOPS	40,000 IOPS	39,000 IOPS	70,000 IOPS	170,000 IOPS
Sequential Reads (up to)	520 MB/s	2,000 MB/s	1,300 MB/s	3,100 MB/s	6,400 MB/s
Sequential Writes (up to)	480 MB/s	1,800 MB/s	1,400 MB/s	3,000 MB/s	3,000 MB/s
MTBF	2.0 Million Hours	2.0 Million Hours	2.0 Million Hours	2.0 Million Hours	2.0 Million Hours
Uncorrectable Bit Error Rate (UBER)	1 in 10^{17}	1 in 10^{17}	1 in 10^{17}	1 in 10^{17}	1 in 10^{17}
Physical Dimensions	100 x 70 x 7mm	22 x 110 x 4.15 mm	100 x 70 x 15 mm	100 x 70 x 15 mm	168 x 70 x 19 mm (HHHL)
Weight	55 g	20 g	160 g	160 g	330 g

SOLID STATE DRIVES (SSD)

Drive Type	Power-loss Protection	Form Factor	Interface	Connector	Product Family	Write Endurance	Capacity (GB)	Part Number
Client PC/ Embedded	No	M.2 22 x 80 mm	SATA 3.0 @ 6 Gbit/s	M.2	PM871a	PC Workload	256	MZNLN256HMHQ-00000
							512	MZNLN512HMJP-00000
							1024	MZNLN1T0HMLH-00000
			PCIe Gen 3 x4 @ 32Gbit/s (NVMe)		PM951		128	MZVLV128HCGR-00000
							256	MZVLV256HCHP-00000
							512	MZVLV512HCJH-00000
Datacenter	Yes	2.5" 7mmT	SATA 3.0 @ 6 Gbit/s	SFF-8223	PM863a	0.8 DWPD for 5 Years	240	MZ7LM240HMHQ-00005
							480	MZ7LM480HMHQ-00005
							960	MZ7LM960HMJP-00005
							1920	MZ7LM1T9HMJP-00005
							3840	MZ7LM3T8HMLP-00005
					SM863	3.6 DWPD for 5 Years	120	MZ7KM120HAFD-00005
							240	MZ7KM240HAGR-00005
							480	MZ7KM480HAHP-00005
							960	MZ7KM960HAHP-00005
							1920	MZ7KM1T9HAJM-00005
						10 DWPD for 5 Years	100	MZ7KM120HAFD-00005
							200	MZ7KM240HAGR-00005
							400	MZ7KM480HAHP-00005
							800	MZ7KM960HAHP-00005
							1600	MZ7KM1T9HAJM-00005
			PCIe Gen 3x4 @ 32Gbit/s (NVMe)	U.2 (SFF-8639)	PM963	0.8 DWPD for 5 Years	480	MZQLW480HMHQ-00003
							960	MZQLW960HMJP-00003
							1920	MZQLW1T9HMJP-00003
							3840	MZQLW3T8HMLP-00003
					SM963	3.6 DWPD for 5 Years	960	MZQKW960HMJP-00003
							1920	MZQKW1T9HMJP-00003
							3840	MZQKW3T8HMLH-00003
						10 DWPD for 5 Years	800	MZQKW960HMJP-00003
							1600	MZQKW1T9HMJP-00003
							3200	MZQKW3T8HMLH-00003
		M.2 22 x 110 mm		M.2	PM963	0.8 DWPD for 5 Years	480	MZ1LW480HMHQ-00003
							960	MZ1LW960HMJP-00003
							1920	MZ1LW1T9HMLS-00003
					SM963	3.6 DWPD for 5 Years	960	MZ1KW960HMJP-00003
							1920	MZ1KW1T9HMJP-00003
						10 DWPD for 5 Years	800	MZ1KW960HMJP-00003
							1600	MZ1KW1T9HMJP-00003

SOLID STATE DRIVES (SSD) *continued*

Drive Type	Power-loss Protection	Form Factor	Interface	Connector	Product Family	Write Endurance	Capacity (GB)	Part Number
Enterprise	Yes	2.5" 15mmT	SAS 3.0 @ 12 Gbit/s	SFF-8680	PM1633	1 DWPD for 5 Years	480	MZILS480HCGR-00003
							960	MZILS960HCHP-00003
							1920	MZILS1T9HCHP-00003
							3840	MZILS3T8HCJM-00003
						3 DWPD for 5 Years	400	MZILS480HCGR-00003
							800	MZILS960HCHP-00003
							1600	MZILS1T9HCHP-00003
							3200	MZILS3T8HCJM-00003
					PM1633a	1 DWPD for 5 Years	480	MZILS480HEGR-00007
							960	MZILS960HEHP-00007
							1920	MZILS1T9HEJH-00007
							3840	MZILS3T8HMLH-00007
							7680	MZILS7T6HMLS-00007
							15360	MZILS15THMLS-00007
			PCIe Gen 3x4 @ 32Gbit/s (NVMe)	U.2 (SFF-8639)	PM1725a	5 DWPD for 5 Years	800	MZWLL800HEHP-00003
							1600	MZWLL1T6HEHP-00003
							3200	MZWLL3T2HMJP-00003
							6400	MZWLL6T4HMLS-00003
		Add-in Card (HHHL)	PCIe Gen 3 x8 @ 64Gbit/s (NVMe)	Edge Connector			1600	MZPLL1T6HEHP-00003
							3200	MZPLL3T2HMJP-00003
							6400	MZPLL6T4HMLT-00003

Public Information Display (PID) Product Classification

Super Narrow Bezel (SNB)/ Ultra Narrow Bezel (UNB)	» Video Wall	» SNB: 5.9mm A-to-A	» UNB: 3.9mm A-to-A
Indoor PID	» Narrow Bezel	» 40"/46"/55"/75"	» 700 nits Brightness
E-Board PID	» Landscape Orientation	» 55"/70"/82" Edge LED	» AGAR Surface Treatment
Outdoor PID	» High Brightness	» Full High Definition	» 110°C Clearing Point

Why PID instead of TV?

	COMMERCIAL (PID)	CONSUMER (TV)
WARRANTY	18 months to 2 years	90 days to 1 year
RELIABILITY	Public environments 20+ hours daily duty cycle Variety of temperatures & location	5-8 hour daily duty cycle Designed for in-home use in controlled environment In-home living room
PRODUCTION LIFECYCLE	24-36 months	12-15 months
PICTURE QUALITY	Designed to resist image retention LCD backlight covers a wider color spectrum necessary for PC source integration, giving better picture quality AGAR coating for public viewing	120Hz / 240Hz for full-motion video Designed for TV signals Gloss surface treatment
LOCATION	Most models portrait capable	Can only be oriented in landscape mode

Product Segmentation

HEAVY USE

LIGHT USE

SNB / UNB

Professional	Indoor Events	Billboard
• Control Room • Simulation	• Scoreboard • Sports Broadcasting	• Dynamic Signage

Indoor PID

Entertainment	Transportation	Communication
• Casino • Theatre • Menu	• Airport • Train/Bus Station	• Conference Room

E-Board PID

Commercial	Education	Hospitality
• Kiosk • Conference Systems	• Interactive FPD	• Hotel Signage

Outdoor PID

Commercial	Education	Hospitality
• Kiosk • Conference Systems	• Interactive FPD	• Hotel Signage

Product Segmentation

Type	Class	Warranty	Bezel	Suggested Run Time	Brightness	Usage	Applications	Value Tier
ENB / UNB / SNB	Ultra / Super Narrow Bezel	2 years	1.9mm - 5.9mm A-to-A	20+ hours	500-700 nits	Heavy	Video Walls	Premium commercial range
Indoor PID	Indoor Commercial Panels	2 years	Narrow	20+ hours	600/700 nits	Medium	Semi-Outdoor	Mid-price range
E-Board	Value, Large Format	18 months	Normal	12 hours	450 nits	Daily	Indoor, e-Board	High-value commercial range
Outdoor PID	High Bright, Wide Temp	2 years	Normal	20+ hours	2500-5000 nits	Heavy	Outdoor	Premium commercial range
Specialty	Value, Large Format	2 years	Narrow	20+ hours	500/ 1500 nits	Medium	specialty	

SAMSUNG DIGITAL INFORMATION DISPLAY (DID) PANEL LINEUP

Category	Model	Size	Model Resolution	Bezel	Backlight	Brightness (typical)	Contrast Ratio	Response Time	Frequency	MP*	Comment
SNB / UNB / ENB	LTI460HN09-0	46"	FHD	Super narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Now	5.9mm Active to Active, LED
	LTI460HN11-A			Ultra narrow		500 nits					3.9mm Active to Active, LED
	LTI460HN12-V					700 nits					
	LTI460HN13-V			Extreme narrow		700 nits				Feb., '17	2.0mm Active to Active, LED
	LTI460HN14-V					500 nits				Q2, '17	
	LTI550HN11-V	55"		Ultra narrow		500 nits				Now	3.9mm Active to Active, LED
	LTI550HN12-V					700 nits					
Indoor PID	LTI550HN13-V (Broadcast)	55"	FHD	Ultra narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	3.9mm Active to Active, LED
	LTI550HN14-V				55"						
	LTI550HN17-V					55"					
	LTI460HN08	46"			eLED	700 nits	4,000:1				
	LTI480HN01-0	48"			Slim eLED						Slim eLED,Landscape / Portrait
	LTI480HN02-0					500 nits					
	LTI550HN06	55"			eLED	700 nits					eLED, Landscape / Portrait
	LTI550HN07-0					450 nits					E-Board; Landscape/Portrait
	LTI550FN01-N		UHD		Slim eLED	500 nits					Slim eLED, Landscape / Portrait
	LTI750HF02-0	75"	FHD	Normal	D-LED	400 nits	3,500:1		120Hz		Landscape / Portrait
	LTI750FJ01-N		UHD			500 nits	5,000:1				
	LTI750FN01-V				eLED	600 nits	4,000:1		60Hz	16. Q2	eLED Landscape / Portrait
	LTI980FN01-V	98"				500 nits				Jan., '17	
E-Board	LTI550HN15-0	55"	FHD	Narrow	eLED	380 nits	4,000:1	8ms	60Hz	Now	Value PID
	LTI700HA02-0	70"		Normal		350 nits					E-Board; Landscape mode only
	LTI750HF02-0	75"			D-LED	450 nits					
	LTI750FN02-N				eLED	350 nits					E-Board; Landscape mode only
Outdoor	LTI460HZ01-V	46"	FHD	Narrow	D-LED	5,000 nits	4,000:1	8ms	60Hz	Now	High Bright, Hi Temp LC, 1/4λ Pol.
	LTI460HF01-V					2,500 nits	3,000:1		120Hz		
	LTH550HF04-V(A)	55"									
	LTI750HF01-V	75"				3,500 nits					
Specialty	LTI290LN01-0	29"	Half FHD	Narrow	eLED	500 nits	4,000:1	16ms	60Hz	Now	Stretched, 40"/2, Hi Temp LC
	LTI290LN02-0					700 nits					
	LTI370LN03-V	37"									Stretched, 46"/2, Hi Temp LC
	LTI370LN02-V					1500 nits				Q1, '17	

Contacts

Feel free to contact your local distributor or sales representative with any Samsung sales inquiries.

Adelsa | www.adetronics.com.mx

PRODUCTS	ADDRESS		MAIN PHONE	FAX
Memory, SLSI, LCD	**MEXICO**	Hacienda Corralejo #80, Bosque de Echegaray, Naucalpan, Mexico 53310	52-555-560-5002	
	GUADALAJARA OFFICE		52-333-122-3054	
	MONTERREY OFFICE		52-818-214-0011	
	CD. JUAREZ OFFICE		52-656-613-3517	
	REYNOSA OFFICE		52-899-922-5540	

ATMI Sales | www.atmisales.com

PRODUCTS	ADDRESS		MAIN PHONE	FAX
Memory, SLSI, LCD	**OREGON**	4900 S.W. Griffith Drive, Suite 253 Beaverton, OR 97005	1-800-898-2446, 503-643-8307	503-643-4364
	WASHINGTON	8581 154th Avenue NE Redmond WA 98052	425-869-7636	425-869-9841

Bear VAI Technology | www.bearvai.com

PRODUCTS	ADRRESS		MAIN PHONE	FAX
Memory, SLSI, LCD	**MAIN OFFICE - BRECKSVILLE, OHIO**	6910 Treeline Drive, Unit H Brecksville, OH 44141	440-526-1991	440-526-5426
	MAIN OFFICE - INDIANA	11451 Overlook Drive Fishers, IN 46037	440-832-7637	317-845-8650
	MICHIGAN	5506 Alpine Ridge Stevensville, MI 49127	440-526-1991	440-526-5426

Crestone Technology Group | www.crestonegroup.com

PRODUCTS	ADDRESS		MAIN PHONE	FAX
Memory, SLSI, LCD	**COLORADO**	7108 S. Alton Way, Building L, Suite A Centennial, CO 80112	303-280-7202	720-482-2220
	UTAH		801-973-8909	

Customer 1st | www.customer1st.com

PRODUCTS	ADDRESS		MAIN PHONE	FAX
Memory, SLSI, LCD	**MINNESOTA**	2950 Metro Drive, Suite 101 Bloomington, MN 55425	952-851-7909	952-851-7907
	KANSAS	2111 E. Crossroad Lane, #202 Olathe, KS 66062		

→ For all product information please visit: **www.samsung.com/us/samsungsemiconductor**

InTELaTECH | www.intelatech.com

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory, SLSI	2113 St. Regis, Suite 240, Dollard Des Ormeaux, QC Canada H9B 2M9	905-629-0082	905-629-1795
	5225 Orbitor Drive, Mississauga, Ont, Canada L4W 4Y8	905-629-0082	905-624-6909

I-Squared Incorporated | www.isquared.com

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory, SLSI, LCD	2635 N. 1st Street, Suite 128, San Jose, CA 95134	408-988-3400	408-988-2079
	1250 B Street, Petaluma, CA 94952	707-773-3108	

IRI Rep | www.irirep.com

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory, SLSI, LCD	320 W. Frontage Rd, Northfield, IL 60093	847-967-8430	847-967-5903

IRI WEST | www.iriwest.com

PRODUCTS	ADDRESS		MAIN PHONE	FAX
Memory, SLSI, LCD	**AUSTIN**	810 Hesters Crossing Rd, Suite 200 Round Rock, TX 78681	512-343-1199	512-343-1922
	DALLAS	2745 Dallas Pkwy, Suite 460 Plano, TX 75093	972-680-2800	972-699-0330
	HOUSTON	24624 Interstate 45 North, Suite 200 Spring, TX 77386	832-940-9600	512-343-1922

Neptune Electronics (necco) | www.neccoelect.com

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory, SLSI, LCD	11 Oval Drive, Suite 169, Islandia, NY 11749	631-234-2525	631-234-2707

New Tech Solutions

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory, SLSI, LCD	26 Ray Avenue, Burlington, MA 01803	781-229-8888	781-229-1614

Rep One Associates, Inc. | www.repone.com

PRODUCTS	ADDRESS		MAIN PHONE	FAX
Memory, SLSI, LCD	**ALABAMA**	403 Madison St. Huntsville, AL 3580	256-539-7371	256-533-4509
	FLORIDA		704 516-0242	
	GEORGIA	3000 Langford Road, Building 300 Norcross, GA 30071	770-209-9242 678-591-6753	770-209-9245
	NORTH & SOUTH CAROLINA	912 Oleander Lane Waxhaw, NC 28173	704 516-0242	

Tech Coast Sales | www.tc-sales.com

PRODUCTS	ADDRESS	MAIN PHONE	EMAIL
Memory, SLSI, LCD	23121 Verdugo Drive, Suite 101, Laguna Hills, CA 92653	949-305-6869	sales@tc-sales.com

Notes

SAMSUNG

Samsung Semiconductor, Inc.
3655 North First Street
San Jose, CA 95134-1713

samsung.com/us/oem-solutions

BR-16-ALL-001 | Printed 3/16