







# PRODUCT SELECTION GUIDE

DISPLAYS, MEMORY AND STORAGE  
1H 2015

# Samsung Semiconductor, Inc.

Samsung continues to lead the industry with the broadest portfolio of memory products and display technology. Its display panels, 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 TV 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	TFT/LCD	ODD
 MOBILE/WIRELESS	●	N/A	●	●	●	●	●
 NOTEBOOK PCs/ ULTRABOOKS™	●	●	●	●	●	●	●
 DESKTOP PCs/ WORKSTATIONS	●	●	●	●	●	●	●
 SERVERS	●	●	●	●	●	●	●
 NETWORKING/ COMMUNICATIONS	●	●	●	●	●	N/A	●
 CONSUMER ELECTRONICS	●	N/A	●	●	●	●	●

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[www.samsung.com/us/oem-solutions](http://www.samsung.com/us/oem-solutions)



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- Sales Representatives and Distributors
- To access our online sales portal, visit: <https://smarttools.ssi.samsung.com>

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## 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	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	2400/2133	7.5x11mm	Now
		256M x 16	K4A4G165WD-BCRC/PB	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	2400/2133	7.5x13.3mm	Now
8Gb	1.2V	2G x 4	K4A8G045WB-BCRC/PB	78 ball FBGA	Lead Free & Halogen Free, Flip Chip	2400/2133	7.5x11mm	Now
		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	Lead Free & Halogen Free, Flip Chip	2400/2133	7.5x13.3mm	CS: '15, 1Q

## DDR4 SDRAM REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.2V	1G x 72	M393A1G40DB0-CPB	4Gb (1G x4) * 18	Lead Free & Halogen Free, Flip Chip	2133	1	Now
			M393A1G40DB1-CRC	4Gb (1G x4) * 18	Lead Free & Halogen Free, Flip Chip	2400	1	CS: '15, Mar
			M393A1G43DB0-CPB	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	2133	2	Now
			M393A1G43DB1-CRC	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	2400	2	CS: '15, Apr
16GB	1.2V	2G x 72	M393A2G40DB0-CPB	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	2133	2	Now
			M393A2G40DB1-CRC	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	2400	2	CS: '15, Feb
			M393A2K40BB0-CPB	8Gb (2G x4) * 18	Lead Free & Halogen Free, Flip Chip	2133	1	Now
			M393A2K40BB1-CRC	8Gb (2G x4) * 18	Lead Free & Halogen Free, Flip Chip	2400	1	1Q'15
			M393A2K43BB1-CPB/CRC	8Gb (1G x8) * 18	Lead Free & Halogen Free, Flip Chip	2133/2400	2	CS: '15, Apr
32GB	1.2V	4G x 72	M393A4K40BB0-CPB	8Gb (2G x4) * 36	Lead Free & Halogen Free, Flip Chip	2133	2	Now
			M393A4K40BB1-CRC	8Gb (2G x4) * 36	Lead Free & Halogen Free, Flip Chip	2400	2	CS: '15, Mar
64GB TSV	1.2V	8G x 72	M393A8G40D40-CRB	4Gb (4G x4) * 36	Lead Free & Halogen Free, 4High TSV	2133	8	Now
			M393A8G40D41-CTC	4Gb (4G x4) * 36	Lead Free & Halogen Free, 4High TSV	2400	8	CS: '15, 2Q

Notes: DDR4 4Gb based 0 = IDT 2 = Montage PB = DDR4-2133(15-15-15) RB = DDR4-2133(17-15-15)  
 0 = IDT 4 = Montage RC = DDR4-2400(17-17-17) TC = DDR4-2400(19-17-17)  
 DDR4 8Gb based 0 = IDT 4 = Montage PB = DDR4-2133(15-15-15) RB = DDR4-2400(17-15-15)  
 0 = IDT 4 = Montage RC = DDR4-2400(17-17-17) TC = DDR4-2400(19-17-17)

## DDR4 SDRAM LOAD REDUCED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
32GB	1.2V	4G x 72	M386A4G40DM0-CPB	4Gb DDP (2Gx4) * 36	Lead Free & Halogen Free, DDP	2133	4	Now
			M386A4G40DM1-CRC	4Gb DDP (2Gx4) * 36	Lead Free & Halogen Free, DDP	2400	4	CS: '15, May
64GB	1.2V	8G x 72	M386A8K40BM1-CPB	8Gb DDP (4Gx4) * 36	Lead Free & Halogen Free, DDP	2133	4	CS: '15, Mar
			M386A8K40BM1-CRC	8Gb DDP (4Gx4) * 36	Lead Free & Halogen Free, DDP	2400	4	CS: '15, May

Notes: DDR4 4Gb based 0 = IDT 2 = Montage PB = DDR4-2133(15-15-15)  
 5 = IDT 4 = Montage RC = DDR4-2400(17-17-17)  
 DDR4 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	M392A2G40DM0-CPB	4Gb DDP (2G x4) * 18	Lead Free & Halogen Free, DDP	2133	2	Now
			M392A2K43BB1-CPB/RC	8Gb (1G x8) * 18	Lead Free & Halogen Free, Flip Chip	2133/2400	2	CS: '15, July
32GB	1.2V	4G x 72	M392A4K40BM0-CPB/RC	8Gb DDP (4G x4) * 18	Lead Free & Halogen Free, DDP	2133/2400	2	CS: '15, Apr

## 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
			M378A5143DB1-CRC	4Gb (512M x8) *8	Lead Free & Halogen Free	2400	1	CS: '15, Apr
8GB	1.2V	1G x 64	M378A1G43DB0-CPB	4Gb (512M x8) *16	Lead Free & Halogen Free	2133	2	Now
			M378A1G43DB1-CRC	4Gb (512M x8) *16	Lead Free & Halogen Free	2400	2	CS: '15, Apr
16GB	1.2V	2G x 64	M378A2K43BB1-CPB/CRC	8Gb (1G x8) * 16	Lead Free & Halogen Free	2133/2400	2	CS: '15, Feb

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

## DDR4 SDRAM ECC UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.2V	1G x72	M391A1G43DB0-CPB	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	2133	2	Now
			M391A1G43DB1-CRC	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	2400	2	CS: '15, May
16GB	1.2V	2G x72	M391A2K43BB1-CPB/CRC	8Gb (1G x8) * 18	Lead Free & Halogen Free, Flip Chip	2133/2400	2	CS: '15, Mar

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
			M471A5143DB1-CRC	4Gb (512M x8) * 8	Lead Free & Halogen Free	2400	1	CS: '15, Apr
8GB	1.2V	1G x 64	M471A1G43DB0-CPB	4Gb (512M x8) * 16	Lead Free & Halogen Free	2133	2	Now
			M471A1G43DB1-CRC	4Gb (512M x8) * 16	Lead Free & Halogen Free	2400	2	CS: '15, Apr
16GB	1.2V	2G x 64	M471A2K43BB1-CPB/CRC	8Gb (1G x8) * 16	Lead Free & Halogen Free	2133/2400	2	CS: '15, Feb

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	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	2400	2	CS: '15, May
16GB	1.2V	2G x 72	M474A2K43BB1-CPB/RC	8Gb (1G x8) * 18	Lead Free & Halogen Free, Flip Chip	2133/2400	2	CS: '15, Mar

## DDR3 SDRAM REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1G x 72	M393B1K70QB0-CMA (08/09)	2Gb (512M x4) * 36	Lead Free & Halogen Free, Flip Chip	1866	2	Now
			M393B1G70QH0-CMA (08/09)	4Gb (1G x4) * 18	Lead Free & Halogen Free	1866	1	Now
			M393B1G73QH0-CMA (08/09)	4Gb (512M x8) * 18	Lead Free & Halogen Free	1866	2	Now
16GB	1.5V	2G x 72	M393B2G70QH0-CMA (08/09)	4Gb (1G x4) * 36	Lead Free & Halogen Free	1866	2	Now
			M393B2G70DB0-CMA (02/03)	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	1866	2	Now
			M393B2G70EB0-CMA (02/03)	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	1866	2	Now
8GB	1.35V	1G x 72	M393B1K70QB0-YK0 (08/09)	2Gb (512M x4) * 36	Lead Free & Halogen Free, Flip Chip	1600	2	Now
			M393B1G70QH0-YK0 (08/09)	4Gb (1G x4) * 18	Lead Free & Halogen Free	1600	1	Now
16GB	1.35V	2G x 72	M393B2G70QH0-YK0 (08/09)	4Gb (1G x4) * 36	Lead Free & Halogen Free	1600	2	Now
			M393B2G70DB0-YK0 (02/03)	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	1600	2	Now
			M393B2G70EB0-YK0 (02/03)	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	1600	2	Now
32GB	1.35V	4G x 72	M393B4G70DM0-YH9(02/03)	4Gb DDP (2G x4) * 36	Lead Free & Halogen Free. DDP	1333	4	Now

Notes: 8 = IDT A1 Evergreen 2 = IDT Alpine F8 = DDR3-1066 (7-7-7) K0 = DDR3-1600 (11-11-11)  
9 = Inphi UVGS02 3 = Inphi XV-GS02 H9 = DDR3-1333 (9-9-9) 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(3/4)	4Gb DDP (2G x4) * 36	Lead Free & Halogen Free, DDP	1600	4	Now
	1.5V		M386B4G70DM0-CMA(3/4)	4Gb DDP (2G x4) * 36	Lead Free & Halogen Free, DDP	1866	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)	4Gb QDP (4G x4) * 36	Lead Free & Halogen Free, QDP	1600	8	Now

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 (03/04)	4Gb (1Gx4) * 18	Lead Free & Halogen Free, Flip Chip	1866	1	Now
	1.35V		M392B1G70DB0-YK0 (03/04)	4Gb (1Gx4) * 18	Lead Free & Halogen Free, Flip Chip	1600	1	Now
	1.5V		M392B1G73DB0-CMA (03/04)	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	1866	2	Now
	1.35V		M392B1G73DB0-YK0 (03/04)	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	1600	2	Now
16GB	1.5V	2G x 72	M392B2G70DM0-CMA (03/04)	4Gb DDP (2G x4) * 18	Lead Free & Halogen Free, DDP	1866	2	Now
	1.35V		M392B2G70DM0-YK0 (03/04)	4Gb DDP (2G x4) * 18	Lead Free & Halogen Free, DDP	1600	2	Now
32GB	1.35V	4G x 72	M392B4G70DE0-YH9 (03/04)	4Gb QDP (4G x4) * 18	Lead Free & Halogen Free, QDP	1333	4	Now

Notes: 2 = IDT Alpine      3 = Inphi XV-GS02      K0 = DDR3-1600 (11-11-11)      MA = DDR3-1866 (13-13-13)

## DDR3 SDRAM UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
2GB	1.5V	256M x 64	M378B5773QB0-CK0/MA	2Gb (256M x8) * 8	Lead Free & Halogen Free	1600/1866	1	Now
4GB	1.5V	512M x 64	M378B5173QH0-CK0/MA	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600/1866	1	Now
			M378B5173DB0-CK0/MA	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600/1866	1	Now
			M378B5173EB0-CK0/MA	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600/1866	1	Now
	1.35V		M378B5173QH0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	2Q'15
			M378B5173EB0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	2Q'15
8GB	1.5V	1024M x 64	M378B1G73QH0-CK0/MA	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600/1866	2	Now
			M378B1G73DB0-CK0/MA	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600/1866	2	Now
			M378B1G73EB0-CK0/MA	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600/1866	2	Now
	1.35V		M378B1G73QH0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	2Q'15
			M378B1G73EB0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	2Q'15

Notes: K0 = DDR3-1600 (11-11-11)      MA = DDR3-1866 (13-13-13)

## DDR3 SDRAM UNBUFFERED MODULES (ECC)

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1024M x 72	M391B1G73QH0-CMA	4Gb (512M x8) * 18	Lead Free & Halogen Free	1866	2	Now
	1.35V		M391B1G73QH0-YK0	4Gb (512M x8) * 18	Lead Free & Halogen Free	1600	2	Now

Notes: H9 = DDR3-1333 (9-9-9)      K0 = 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
2GB	1.35V	256M x 64	M471B5674QH0-YK0	4Gb (256M x16) * 4	Lead Free & Halogen Free	1600	1	Now
4GB	1.35V	512M x 64	M471B5173QH0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	Now
			M471B5173DB0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	Now
			M471B5173EB0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	Now
8GB	1.35V	1024M x 64	M471B1G73QH0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	Now
			M471B1G73DB0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	Now
			M471B1G73EB0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	Now

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

## DDR3 SDRAM ECC SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1024M x 72	M474B1G73QH0-CMA	4Gb (512M x8) * 18	Lead Free & Halogen Free	1866	2	Now
	1.35V		M474B1G73QH0-YK0	4Gb (512M x8) * 18	Lead Free & Halogen Free	1600	2	Now

## DDR3 SDRAM COMPONENTS

Density	Voltage	Organization	Part Number	# Pins-Package	Compliance	Speed (Mbps)	Dimensions	Production
1Gb	1.5V	128M x 8	K4B1G0846G-BC(H9/K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600/1866	7.5x11mm	Now
		128M x 16	K4B1G1646G-BC(H9/K0/MA/NB)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600/1866/2133	7.5x13.3mm	Now
2Gb	1.5V	256M x 8	K4B2G0846Q-BC(K0/MA/NB)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x11mm	Now
		128M x 16	K4B2G1646Q-BC(K0/MA/NB)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x13.3mm	Now
		512M x 8	K4B4G0846D-BC(K0/MA/NB)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x11mm	Now
		256M x 16	K4B4G1646D-BC(K0/MA/NB)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x13.3mm	Now
		512M x 8	K4B4G0846E-BC(K0/MA/NB)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x11mm	Now
		256M x 16	K4B4G1646E-BC(K0/MA/NB)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x13.3mm	Now
8Gb	1.5V	512M x 16	K4B8G1646Q-MCK0/MA	96 Ball -FBGA	Lead Free & Halogen Free	1600/1866	11x13.3mm	Now
1Gb	1.35V	128M x 8	K4B1G0846G-BY(H9/K0)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600	7.5x11mm	Now
		128M x 16	K4B1G1646G-BY(H9/K0)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600	7.5x13.3mm	Now
2Gb	1.35V	512M x 4	K4B2G0446Q-BYK0	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600	7.5x11mm	Now
		256M x 8	K4B2G0846Q-BYK0/MA	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x11mm	Now
		128M x 16	K4B2G1646Q-BYK0/MA	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x13.3mm	Now
4Gb	1.35V	1G x 4	K4B4G0446Q-HYK0	78 Ball -FBGA	Lead Free & Halogen Free	1600	10x11mm	Now
		512M x 8	K4B4G0846Q-HYK0	78 Ball -FBGA	Lead Free & Halogen Free	1600	10x11mm	Now
		256M x 16	K4B4G1646Q-HYK0	96 Ball -FBGA	Lead Free & Halogen Free	1600	10x13.3mm	Now
		1G x 4	K4B4G0446D-BYK0	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600	7.5x11mm	Now
		512M x 8	K4B4G0846D-BYK0	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600	7.5x11mm	Now
		256M x 16	K4B4G1646D-BYK0/MA	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x13.3mm	Now
		1G x 4	K4B4G0446E-BY(K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600	7.5x11mm	Now
		512M x 8	K4B4G0846E-BY(K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x11mm	Now
256M x 16	K4B4G1646E-BY(K0/MA)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x13.3mm	Now		
8Gb	1.35V	512M x 16	K4B8G1646Q-MYK0	96 Ball -FBGA	Lead Free & Halogen Free	1600	11x13.3mm	Now

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	K4T51083QQ-BC(E6/F7/E7/F8)	60-FBGA	7.5x9.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now
	32M x 16	K4T51163QQ-BC(E6/F7/E7/F8)	84-FBGA	7.5x12.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now
1Gb	128M x 8	K4T1G084QG-BC(E6/F7/E7/F8)	60-FBGA	7.5x9.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now
	64M x 16	K4T1G164QG-BC(E6/F7/E7/F8)	84-FBGA	7.5x12.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now

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(04/03/28/25)	170-FCFBGA	1.5V/1.5V	5000/6000/7000/8000	CS: '15,2Q	
			K4G80325FB-HC(04/03/28/25)	170-FCFBGA	1.35V/1.35V	4000/5000/6000/(TBD)	CS: '15,2Q	
	4Gb	128M x 32	K4G41325FC-HC(04/03/*28)	170-FCFBGA	1.5V/1.5V(*1.55V/1.55V)	5000/6000/*7000	Now	*HC28 is 1.55V
			K4G41325FC-HC(04/03/28)	170-FCFBGA	1.35V/1.35V	4000/5000/5500	Now	
	2Gb	64M x 32	K4G20325FS-HC(04/03)	170-FBGA	1.5V/1.5V	5000/6000	Now	
			K4G20325FS-HC(04/03)	170-FBGA	1.35V/1.35V	4000/5000	Now	
			K4G20325FD-FC(04/03/*28)	170-FBGA	1.5V/1.5V(*1.6V/1.6V)	5000/6000/*7000	Now	*HC28 is 1.6V
K4G20325FD-FC(04/03)	170-FBGA	1.35V/1.35V	4000/5000	Now				
gDDR3	4Gb	256M x 16	K4W4G1646E-BC(1A/1B)	96-FCFBGA	1.5V/1.5V	2133/2400	Now	
			K4W4G1646E-BC(1A/1B)	96-FCFBGA	1.35V/1.35V	1866/2133	Now	
			K4W4G1646D-BC(12/11/1A)	96-FCFBGA	1.5V/1.5V	1600/1866/2133	Now	
			K4W4G1646D-BC(1A)	96-FCFBGA	1.35V/1.35V	1866	Now	
			K4W4G1646D-BY(12)	96-FCFBGA	1.35V/1.35V	1600	Now	
	2Gb	128M x 16	K4W2G1646Q-BC(12/11/1A)	96-FCFBGA	1.5V/1.5V	1600/1866/2133	Now	
			K4W2G1646Q-BC(1A)	96-FCFBGA	1.35V/1.35V	1866	Now	
			K4W2G1646Q-BY(12)	96-FCFBGA	1.35V/1.35V	1600	Now	

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

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)  
 25: 0.25ns (8000Mbps)  
 28: 0.28ns (7000Mbps)  
 03: 0.3ns (6000Mbps)  
 04: 0.4ns (5000Mbps)

05: 0.5ns (4000Mbps)  
 1B: 8.3ns (2400Mbps gDDR3)  
 1A: 1.0ns (2133Mbps gDDR3)  
 11: 1.1ns (1866Mbps)  
 12: 1.25ns (1600Mbps)

## MOBILE DRAM COMPONENTS

Type	Density	Organization	Part Number	Package	Power	Production
LPDDR3	8Gb	1CH x 32	K4E8E304EE-EGCE	178-FBGA, 11x11.5, DDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K4E8E304EE-AGCE	168-FBGA, 12x12, DDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K3QF1F10EM-AGCE	253-FBGA, 11x11.5, DDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K3QF1F10EM-BGCE	216-FBGA, 12x12, DDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K3QF1F10EM-FGCE	256-FBGA, 14x14, DDP, 1600Mbps	1.8V/1.2V/1.2V	Now
	12Gb	1CH x 32	K4E2E304EE-AGCE	168-FBGA, 12x12, TDP, 1600Mbps	1.8V/1.2V/1.2V	Now
	16Gb	1CH x 32	K4E6E304EE-EGCE	178-FBGA, 11x11.5, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K4E6E304EE-AGCE	168-FBGA, 12x12, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K3QF2F20EM-AGCE	253-FBGA, 11x11.5, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K3QF2F20EM-BGCE	216-FBGA, 12x12 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K3QF2F20EM-FGCE	256-FBGA, 14x14 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
			K3QF2F20EM-QGCE	216-FBGA, 15x15 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
	24Gb	2CH x 32	K3QF6F60MM-BGCE	216-FBGA, 12x12 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	ES
			K3QF6F60MM-FGCE	256-FBGA, 14x14 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
K3QF6F60MM-QGCE			216-FBGA, 15x15 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now	
K3MF9F90MM-MGCE			504-FBGA, 15x15 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now	
LPDDR4	24Gb	x 64	K3RG3G30MM-MGCH	366-FBGA, 15x15, QDP, 3200Mbps	1.8V/1.1V/1.1V	Now
	32Gb	x 64	K3RG2G20BM-MGCH	366-FBGA, 15x15, QDP, 3200Mbps	1.8V/1.1V/1.1V	ES



# 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											Generation
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: 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: 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. 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
SAMSUNG Memory											Speed
DRAM											Temp & Power
DRAM Type											Package Type
Density											Generation
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

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

## 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: sTSSOP
- Q: FBGA QDP (Lead-free)
- T: TSOP II (400mil)
- U: TSOP II (Lead-Free)
- V: sTSSOP 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	2	3	4	5	6	7	8	9	10	11	12
	M	X	XX	A	XX	X	X	X	X	X	X	XX
Memory Module											Speed	
DIMM Type											Temp & Power	
Data bits											PCB Revision	
DRAM Component Type											Package	
Depth											Component Revision	
# of Banks in Comp. & Interface												
Bit Organization												

## 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	2	3	4	5	6	7	8	9	10	11
	K	4	A	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)
											#of Internal Banks

## 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 (VDD, VDDQ)

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)

# New 10nm-class eMMC

## MAINSTREAM eMMC

Density	Flash	MMC*	Part Number	Seq R/W Perf (MB/s)	Random R/W IOPS	Package Size (mm)	Status
8GB	64Gb*1	5	KLM8G1WEPD-B0310**	140/8	5000/600	11.5 x 13.0 x 0.8	MP
16GB	64Gb*2	5	KLMAG2WEPD-B0310**	150/12	5000/1200	11.5 x 13.0 x 0.8	MP
32GB	64Gb*4	5	KLMBG4WEBD-B0310**	260/45	5500/6000	11.5 x 13.0 x 1.0	MP
64GB	64Gb*8	5	KLMCG8WEBD-B0310**	260/45	5500/6000	11.5 x 13.0 x 1.0	MP
128GB	64Gb*16	5	KLMDGAWEBD-B0310**	250/45	5300/5000	11.5 x 13.0 x 1.4	MP

\*MMC5.0 is backwards compatible with 4.51 & 4.4

## HIGH-PERFORMANCE eMMC

Density	Flash	MMC*	Part Number	Seq R/W Perf (MB/s)	Random R/W IOPS	Package Size (mm)	Status
4GB	32Gb*1	5	KLM4G1FEPD-B0310**	120/20	3000/700	11.0 x 10.0 x 0.8	MP
8GB	64Gb*1	5	KLM8G1GEND-B0310**	160/25	5000/2500	11.5 x 13.0 x 1.0	MP
16GB	64Gb*2	5	KLMAG2GEND-B0310**	230/50	6000/6000	11.5 x 13.0 x 1.0	MP
32GB	64Gb*4	5	KLMBG4GEND-B0310**	250/100	6000/12000	11.5 x 13.0 x 1.0	MP
64GB	64Gb*8	5	KLMCG8GEND-B0310**	250/100	6000/12000	11.5 x 13.0 x 1.0	MP

\*MMC5.0 is backwards compatible with 4.51 & 4.41

\*\*\*Denotes bucket code for latest firmware patch

## eMMC Key Features

- Industry's fastest eMMC
- Fully-managed NAND
- Low active and standby power
- High density in small form factor (11.5x13mm pkg)
- 4GB to 128GB capacities
- JEDEC standard MMC 5.0
- Leading edge 10nm-class NAND Flash

### Performance Specs

32GB, 64GB	eMMC 4.5	eMMC 5.0
Interface Speed	200MB/s	400MB/s
Random R/W	3500/2000 IOPS	6000/12000 IOPS
Sequential R/W	150/50 MB/s	250/100 MB/s

\* Device performance condition: x8 Bus, Cache-On mode, without host overhead.

### Applications

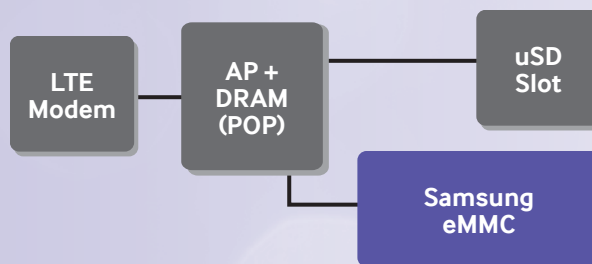
eMMC is the most optimized flash solution for tablets and smartphones, as well as applications from eReaders, HD cameras and smart TVs to PNDs, multi-media players and gaming devices.

## Industry-Leading Smartphone and Tablet Design

### Specifications

- Density: 4GB to 128GB
- Flash: 32Gb/64Gb
- Package Type: FBGA
- Package Size: 11x10mm, 11.5x13mm
- eMMC: 4.5/5.0

### Simple Block Diagram



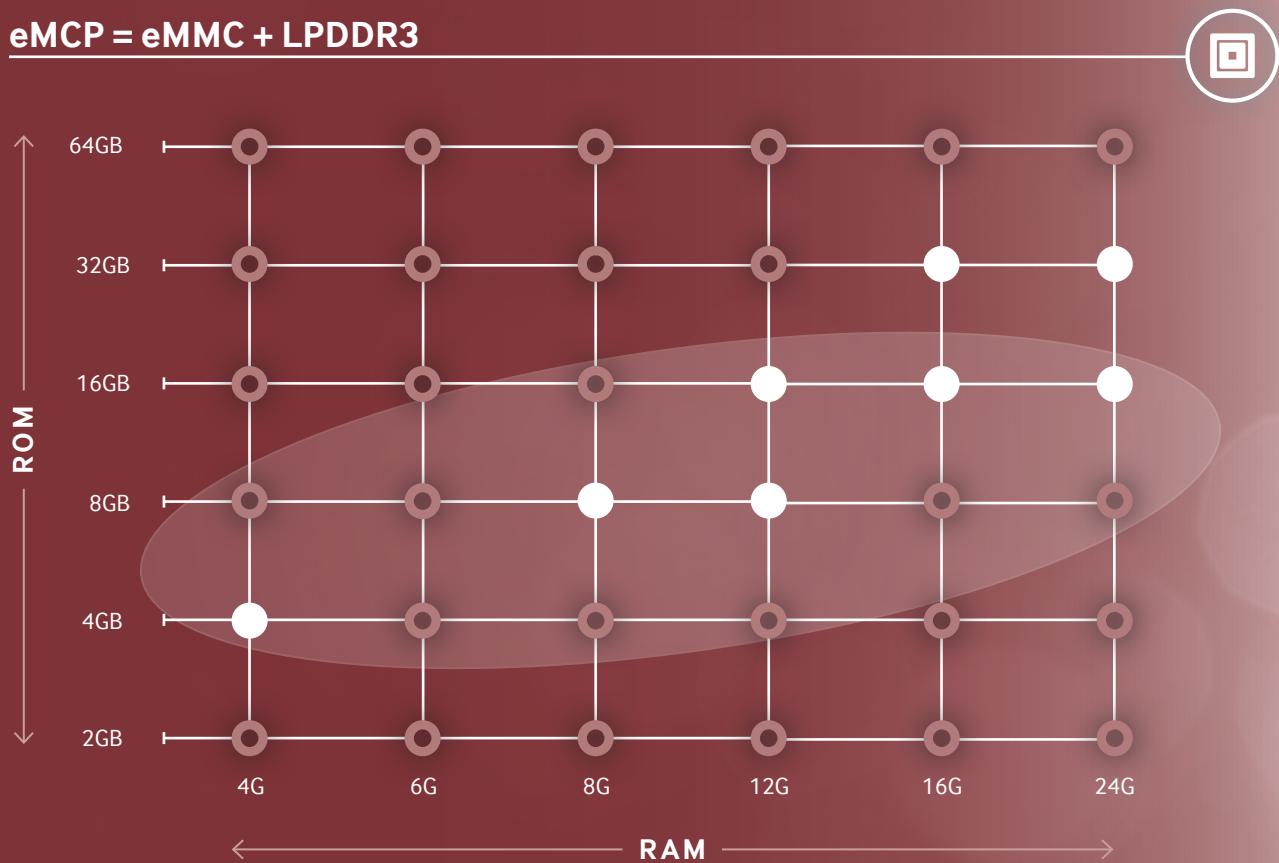
## SOLID STATE DRIVES (SSD)

Drive Type	Drive Name	Interface	Form Factor	Connector	Power-loss Protection	Write Endurance	Density	Part Number		
Client PC/ Embedded	CM851	SATA III - 6Gb/s	M.2 22x42 mm	M.2	No	PC Workload	16GB	MZAPF016HCDD-00000		
			mSATA	Mini PCIe			32GB	MZAPF032HCFV-00000		
							64GB	MZMPF064HCGM-00000		
	PM871	SATA III - 6Gb/s	M.2 22x80 mm	M.2	No	PC Workload	128GB	MZNLN128HCGR-00000		
							256GB	MZNLN256HCHP-00000		
							512GB	MZNLN512HCJH-00000		
			2.5" 7mmT	SFF-8223			128GB	MZ7LN128HCHP-00000		
							256GB	MZ7LN256HCHP-00000		
	512GB	MZ7LN512HCHP-00000								
	SM951	PCIe Gen 3 - SATAe	M.2 22x80 mm	M.2	No	PC Workload	128GB	MZHPV128HDGM-00000		
							256GB	MZHPV256HDGL-00000		
							512GB	MZHPV512HDGL-00000		
		PCIe Gen 3 - NVMe					128GB	MZVPV128HDGM-00000		
							256GB	MZVPV256HDGL-00000		
	512GB	MZVPV512HDGL-00000								
Data Center	PM863	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	0.8 DDPD	120GB	MZ7LM120HCFD-00003		
							240GB	MZ7LM240HCGR-00003		
							480GB	MZ7LM480HCHP-00003		
							960GB	MZ7LM960HCHP-00003		
							1920GB	MZ7LM1T9HCJM-00003		
							3840GB	MZ7LM3T8HCJM-00003		
	SM843Tn	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	1.8 DDPD	120GB	MZ7WD120HCFV-00003		
							240GB	MZ7WD240HCFV-00003		
							480GB	MZ7WD480HCGM-00003		
	SV843	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	3.6 DDPD	480GB	MZ7WD480HMHP-00003		
							960GB	MZ7WD960HMHP-00003		
Enterprise	PM1633	SAS 3.0 - 12 Gb/s	2.5" 15mmT	SFF-8680	Yes	1.0 DDPD	480GB	MZILS480HCGR-00003		
							960GB	MZILS960HCHP-00003		
							1920GB	MZILS1T9HCHP-00003		
	SM1635	SAS 3.0 - 12 Gb/s	2.5" 15mmT	SFF-8680	Yes	10 DDPD	3840GB	MZILS3T8HCJM-00003		
							400GB	MZIES400HMGR-00003		
							800GB	MZIES800HMHP-00003		
							1600GB	MZIES1T6HMJH-00003		
	SM1715	PCIe Gen 3 - NVMe	2.5" 15mmT	SFF-8639	Yes	10 DDPD	800GB	MZWKI800HMHP-00003		
							1600GB	MZWKI1T6HMHP-00003		
			Half-Height Half-Length Add-In Card (HHHL AIC)	PCIe Edge-Connector			Yes	10 DDPD	3200GB	MZWKI3T2HMJM-00003
									1600GB	MZPKI1T6HMHP-00003
3200GB	MZPKI3T2HMJM-00003									

Samsung has a portfolio of eMCP products for a variety of devices, such as mobile phones and tablets. The following illustration shows Samsung's lineup of eMCP memory solutions, which can be deployed in almost any application.

→ Samsung eMCP product suite with different densities and types of Mobile DRAM and eMMC

eMCP = eMMC + LPDDR3





## eMCP: eMMC + LPDDR3

Memory	eMMC Density	DRAM Density/Organization	Voltage (eMMC-DRAM)	Package
eMMC & MDRAM	4GB	4Gb (x 32)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
	8GB	4Gb*2 (x 32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
		6Gb*2 (x 32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
	16GB	6Gb*2 (x 32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
		4Gb*4 (x 32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
		6Gb*4 (x 32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
	32GB	4Gb*4 (x 32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm
		6Gb*4 (x 32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5 x 13mm

# Samsung Solid State Drives

	Client		Data Center		Enterprise	
	SATA	PCIe	SATA		SAS	PCIe
	Mainstream	Extreme Performance	STANDARD DATA CENTER SERIES Read-Intensive Environments	DELUXE ENTERPRISE SERIES High-Write Environments	ENTERPRISE STORAGE SERIES High Redundancy Environments	EXTREME PERFORMANCE SERIES Data Cache Environments
	Samsung PM871	Samsung SM951	Samsung PM863	Samsung SV843	Samsung PM1633	Samsung SM1715
<b>Form Factor</b>	2.5", M.2	M.2	2.5"	2.5"	2.5"	2.5" and HHHL
<b>Capacity (GB)</b>	128/256/512	128/256/512	120/240/480/ 960/1920/ 3840	480/960	480/960/ 1920/3840	800/1600/ 3200
<b>Host Interface</b>	Serial ATA 3 (6 Gb/s)	PCIe Gen3 x4	Serial ATA 3 (6 Gb/s)	Serial ATA 3 (6 Gb/s)	SAS 3 (12 Gb/s)	PCIe Gen3 x4
<b>MTBF</b>	1.5 Million Hours	1.5 Million Hours	2.0 Million Hours	2.0 Million Hours	2.0 Million Hours	2.0 Million Hours
<b>Uncorrectable Bit Error Rate (UBER)</b>	1 in 10 <sup>15</sup>	1 in 10 <sup>15</sup>	1 in 10 <sup>17</sup>	1 in 10 <sup>17</sup>	1 in 10 <sup>17</sup>	1 in 10 <sup>17</sup>
<b>Power Consumption (Active)</b>	250mW	6.5W	4.0W	2.9W	11.0W	25.0W
<b>Power Consumption (Idle)</b>	50mW	50mW	1.3W	1.0W	4.0W	10.0W
<b>Random Reads (up to)</b>	97,000 IOPS	90,000 IOPS	99,000 IOPS	88,000 IOPS	180,000 IOPS	750,000 IOPS
<b>Random Writes (up to)</b>	90,000 IOPS	70,000 IOPS	18,000 IOPS	14,000 IOPS	15,000 IOPS	185,000 IOPS
<b>Sequential Reads (up to)</b>	540 MB/s	2,150MB/s	540 MB/s	530 MB/s	1,100 MB/s	3,000 MB/s
<b>Sequential Writes (up to)</b>	510 MB/s	1,500 MB/s	480 MB/s	480 MB/s	1,000 MB/s	2,200 MB/s
<b>Endurance (up to)</b>	Client workload	Client workload	0.8 DWPD	3.6 DWPD	1 DWPD	10 DWPD
<b>Physical Dimensions</b>	100 x 70 x 7mm (2.5") 80 x 22 x 3.7mm (M.2)	80 x 22 x 3.7mm	100 x 70 x 7mm	100 x 70 x 7mm	100 x 70 x 15mm	100 x 70 x 15mm (2.5") 168 x 70 x 19mm (HHHL)
<b>Weight</b>	54g (2.5"), 8.5g (M.2)	10g	60g	62g	140g	210g

→ Which SSD is right for you?

For more information, email: [SSD@ssi.samsung.com](mailto:SSD@ssi.samsung.com)

## SOLID STATE DRIVES (SSD)

Drive Type	Drive Name	Interface	Form Factor	Connector	Power-loss Protection	Write Endurance	Density	Part Number	
Client PC/ Embedded	CM851	SATA III - 6Gb/s	M.2 22 x 42 mm	M.2	No	PC Workload	16GB	MZAPF016HCDD-00000	
			mSATA	Mini PCIe			32GB	MZAPF032HCFV-00000	
							64GB	MZMPF064HCGM-00000	
	PM871	SATA III - 6Gb/s	M.2 22 x 80 mm	M.2	No	PC Workload	128GB	MZNLN128HCGR-00000	
							256GB	MZNLN256HCHP-00000	
							512GB	MZNLN512HCJH-00000	
			2.5" 7mmT	SFF-8223			128GB	MZ7LN128HCHP-00000	
							256GB	MZ7LN256HCHP-00000	
	512GB	MZ7LN512HCHP-00000							
	SM951	PCIe Gen 3 - SATAe	M.2 22 x 80 mm	M.2	No	PC Workload	128GB	MZHPV128HDGM-00000	
							256GB	MZHPV256HDGL-00000	
							512GB	MZHPV512HDGL-00000	
			PCIe Gen 3 - NVMe	M.2 22 x 80 mm			M.2	128GB	MZVPV128HDGM-00000
								256GB	MZVPV256HDGL-00000
	512GB	MZVPV512HDGL-00000							
Data Center	PM863	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	0.8 DDPD	120GB	MZ7LM120HCFD-00003	
							240GB	MZ7LM240HCGR-00003	
							480GB	MZ7LM480HCHP-00003	
							960GB	MZ7LM960HCHP-00003	
							1920GB	MZ7LM1T9HCJM-00003	
							3840GB	MZ7LM3T8HCJM-00003	
	SM843Tn	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	1.8 DDPD	120GB	MZ7WD120HCFV-00003	
							240GB	MZ7WD240HCFV-00003	
							480GB	MZ7WD480HCGM-00003	
	SV843	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	3.6 DDPD	480GB	MZ7WD480HMHP-00003	
							960GB	MZ7WD960HMHP-00003	
Enterprise	PM1633	SAS 3.0 - 12 Gb/s	2.5" 15mmT	SFF-8680	Yes	1.0 DDPD	480GB	MZILS480HCGR-00003	
							960GB	MZILS960HCHP-00003	
							1920GB	MZILS1T9HCHP-00003	
							3840GB	MZILS3T8HCJM-00003	
	SM1635	SAS 3.0 - 12 Gb/s	2.5" 15mmT	SFF-8680	Yes	10 DDPD	400GB	MZIES400HMGR-00003	
							800GB	MZIES800HMHP-00003	
							1600GB	MZIES1T6HMJH-00003	
	SM1715	PCIe Gen 3 - NVMe	2.5" 15mmT	SFF-8639	Yes	10 DDPD	800GB	MZWKI800HMHP-00003	
							1600GB	MZWKI1T6HMHP-00003	
			3200GB	MZWKI3T2HMJM-00003					
		Half-Height Half-Length Add-In Card (HHHL AIC)	PCIe Edge-Connector	Yes	10 DDPD	1600GB	MZPKI1T6HMHP-00003		
						3200GB	MZPKI3T2HMJM-00003		

## Blu-ray Writer SLIM EXTERNAL

Interface	Speed	Type	Loading	Model
USB 2.0	BD Writer 6X	Slim	Tray	SE-506CB

## DVD-W H/H

Interface	Speed	Type	Loading	Model
SATA	DVD Write 24X	H/H	Tray	SH-224FB

## DVD-W SLIM

Interface	Speed	Type	Loading	Model
SATA	DVD Write 8X	Slim	Tray	SN-208FB

## DVD-W SLIM EXTERNAL

Interface	Speed	Type	Loading	Model
USB 2.0	DVD Write 8X	Ultra Slim	Tray	SE-218GN
		Slim		SE-208GB

## Public Information Display (PID) Product Classification

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

### Why PID instead of TV?

	COMMERCIAL (PID)	CONSUMER (TV)
<b>WARRANTY</b>	18 months to 2 years	90 days to 1 year
<b>RELIABILITY</b>	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
<b>PRODUCTION LIFECYCLE</b>	24-36 months	12-15 months
<b>PICTURE QUALITY</b>	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
<b>LOCATION</b>	Most models portrait capable	Can only be oriented in landscape mode

## Product Segmentation

<b>HEAVY USE</b>   <b>LIGHT USE</b>	<b>SNB / UNB</b>	<b>Professional</b> <ul style="list-style-type: none"> <li>Control Room</li> <li>Simulation</li> </ul>	<b>Indoor Events</b> <ul style="list-style-type: none"> <li>Scoreboard</li> <li>Sports Broadcasting</li> </ul>	<b>Billboard</b> <ul style="list-style-type: none"> <li>Dynamic Signage</li> </ul>
	<b>Indoor PID</b>	<b>Entertainment</b> <ul style="list-style-type: none"> <li>Casino</li> <li>Theatre</li> <li>Menu</li> </ul>	<b>Transportation</b> <ul style="list-style-type: none"> <li>Airport</li> <li>Train/Bus Station</li> </ul>	<b>Communication</b> <ul style="list-style-type: none"> <li>Conference Room</li> </ul>
	<b>E-Board PID</b>	<b>Commercial</b> <ul style="list-style-type: none"> <li>Kiosk</li> <li>Conference Systems</li> </ul>	<b>Education</b> <ul style="list-style-type: none"> <li>Interactive FPD</li> </ul>	<b>Hospitality</b> <ul style="list-style-type: none"> <li>Hotel Signage</li> </ul>
	<b>Outdoor PID</b>	<b>Commercial</b> <ul style="list-style-type: none"> <li>Kiosk</li> <li>Conference Systems</li> </ul>	<b>Education</b> <ul style="list-style-type: none"> <li>Interactive FPD</li> </ul>	<b>Hospitality</b> <ul style="list-style-type: none"> <li>Hotel Signage</li> </ul>

### Product Segmentation

Type	Class	Warranty	Bezel	Suggested Run Time	Brightness	Usage	Applications	Value Tier
UNB / SNB	Ultra / Super Narrow Bezel	2 years	3.9mm - 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

## 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	LTI460HN01	46"	FHD	Super narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	5.9mm Active to Active, LED
	LTI460HN09	46"	FHD	Super narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Now	5.9mm Active to Active, LED
	LTI460HN10	46"	FHD	Ultra narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	3.9mm Active to Active, LED
	LTI460HN11	46"	FHD	Ultra narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Now	3.9mm Active to Active, LED
	LTI550HN01	55"	FHD	Super narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	5.9mm Active to Active, LED
	LTI550HN08	55"	FHD	Super narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Now	5.7mm Active to Active, LED
	LTI550HN09	55"	FHD	Ultra narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	3.9mm Active to Active, LED
	LTI550HN11-V	55"	FHD	Ultra narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Now	3.9mm Active to Active, LED
Indoor PID	LTI400HA10	40"	FHD	Narrow	eLED	700 nits	3,000:1	8ms	60Hz	Now	eLED
	LTI460HN08	46"	FHD	Narrow	eLED	700 nits	4,000:1	8ms	60Hz	Now	eLED
	LTI550HN06	55"	FHD	Narrow	eLED	700 nits	4,000:1	8ms	60Hz	Now	eLED
	LTI550HN07	55"	FHD	Narrow	eLED	450 nits	4,000:1	8ms	60Hz	Now	E-Board; Landscape/Portrait
	LTI750HF02-0	75"	FHD	Normal	D-LED	400 nits	3,500:1	8ms	120Hz	Now	Landscape / Portrait
	LTI750FJ01	75"	UHD	Normal	D-LED	500 nits	5,000:1	8ms	120Hz	Now	Landscape / Portrait
E-Board	LTI700HA02	70"	FHD	Normal	eLED	400 nits	4,000:1	8ms	60Hz	Now	E-Board; Landscape/Portrait
	LTI820HA01	82"	FHD	Normal	eLED	450 nits	3,000:1	8ms	60Hz	Now	E-Board; Landscape mode only
Outdoor	LTI460HZ01	46"	FHD	Narrow	D-LED	5,000 nits	4,000:1	8ms	60Hz	Now	High Bright, Hi Temp LC, 1/4λ Pol.
	LTI460HF01-V	46"	FHD	Narrow	D-LED	2,500 nits	3,000:1	8ms	120Hz	Now	High Bright, Hi Temp LC, 1/4λ Pol.
	LTH550HF04-V	55"	FHD	Narrow	D-LED	2,500 nits	3,000:1	8ms	120Hz	Now	High Bright, Hi Temp LC, 1/4λ Pol.
	LTI750HF01-V	75"	FHD	Narrow	D-LED	3,500 nits	3,000:1	8ms	120Hz	Now	High Bright, Hi Temp LC, 1/4λ Pol.

## TABLETS

Size	PN	Mode	Resolution	H(RGB)	V	Aspect Ratio	PPI	Brightness (nits)	MP
7"	LTL070NL01	PLS	WSVGA	1024	600	16:09	170	400	Now
8.0" Open Cell	LTL080AL01	PLS	WXGA	1280	800	16:09	189	Open Cell	Now
10.1"	LTL101AL06	PLS	WXGA	1280	800	16:10	149	400	Now
10.1"	LTL101DL03	PLS	WQXGA	2560	1600	16:10	300	370	Now

## MONITORS

Size	PN	Mode	Resolution	H(RGB)	V	Aspect Ratio	PPI	Brightness (nits)	MP
23"	LTM230HL07	PLS	FHD	1920	1080	16:09	96	300	Now
23.6"	LTM236FL01	PLS	UHD	3840	2160	16:09	193	300	Now
27"	LTM270HT10	TN	FHD	1920	1080	16:09	82	300	Now
	LTM270DL02	PLS	QHD	2560	1440	16:09	109	300	Now
	LTM270HL02	PLS	FHD	1920	1080	16:09	82	350	Now
	LTM270FL01	PLS	UHD	3840	2160	16:09	164	350	Now
31.5"	LTM315FL01	PLS	UHD	3840	2160	16:09	140	350	Now
	LTM315FL02	PLS	UHD	3840	2160	16:09	140	350	Now

## Contacts

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

### Adelsa | [www.adelectronics.com.mx](http://www.adelectronics.com.mx)

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

### ATMI Sales | [www.atmisales.com](http://www.atmisales.com)

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

### Bear VAI Technology | [www.bearvai.com](http://www.bearvai.com)

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	<b>MAIN OFFICE - BRECKSVILLE, OHIO</b> 6910 Treeline Drive Unit H Brecksville, OH 44141	440-526-1991	440-526-5426
	<b>MAIN OFFICE - INDIANA</b> 11451 Overlook Drive Fishers, IN 46037	440-832-7637	317-845-8650
	<b>SOUTHERN OHIO/PITTSBURGH/KENTUCKY/MICHIGAN OFFICES</b>	440-526-1991	440-526-5426

### Core Sales, Inc. | [www.coresales.com](http://www.coresales.com)

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	901 Warrenville Road Suite 211 Lisle, IL 60532	847-843-8888	

### Crestone Technology Group | [www.crestonegroup.com](http://www.crestonegroup.com)

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	<b>COLORADO</b> 7108 S. Alton Way Building L Centennial, CO 80112	303-280-7202	720-482-2220
	<b>UTAH OFFICE</b>		

**Customer 1st** | [www.customer1st.com](http://www.customer1st.com)

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

**InTELaTECH** | [www.intelatech.com](http://www.intelatech.com)

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory SLSI	<b>ONTARIO - CANADA</b> 5225 Orbitor Drive Suite 2	905-629-0082	905-624-6909 905-629-1795 905-629-8910
	21 Concourse Gate Suite 12 Ottawa, ONT K2E 7S4	905-629-0082	613-221-9160
	<b>ALBERTA - CANADA</b> 14939 Mt. McKenzie Drive SE Calgary, Alberta T2Z 2M6	905-629-0082	403-686-6926
	<b>QUEBEC - CANADA</b> 620 St-Jean Boulevard Suite 202 Pointe Claire Quebec H9R 3K2	905-629-0082	905-629-0082
	<b>BRITISH COLUMBIA - CANADA</b> 5811 Cooney Road Suite 305, South Tower Vancouver, BC V5X 3M1	905-629-0082	905-629-1795

**I-Squared Incorporated** | [www.isquared.com](http://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		

**Neptune Electronics (necco)** | [www.neccoelect.com](http://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 Elpis, Inc.** | [www.newelpis.com](http://www.newelpis.com)

PRODUCTS	ADDRESS	MAIN PHONE	FAX
LCD	165 Dundas Street, W Suite 702 Mississauga, ON Canada L5B 2N6	905-275-3516	905-275-4109



## 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](http://www.repone.com)

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	<b>ALABAMA</b> 303 Williams Avenue Suite 1011 Huntsville, AL 35801	256-539-7371	256-533-4509
	<b>GEORGIA</b> 3000 Langford Road Bldg 300 Norcross, GA 30071	770-209-9242 678-591-6753	770-209-9245
	<b>NORTH CAROLINA</b> 5540 Centerview Drive Suite 200 Raleigh, NC 27606	704-846-5744	919-424-3866
	10800 Sikes Place Suite 300 Charlotte, NC 28277	704-846-5744	704-846-25
	<b>FLORIDA</b> 128 Ledbury Drive Longwood, FL 32779		

## Tech Coast Sales | [www.tc-sales.com](http://www.tc-sales.com)

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

## West Associates | [www.westassociates.com](http://www.westassociates.com)

PRODUCTS	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	<b>AUSTIN / SAN ANTONIO</b> 4100 Duval Road Building 1, Suite 102 Austin, TX 78759	512-343-1199	512-343-1922
	<b>DALLAS / OKLAHOMA / ARKANSAS</b> 2745 Dallas Parkway Suite 460 Plano, TX 75093	972-680-2800	972-699-0330
	<b>HOUSTON / VALLEY / LOUISIANA</b> 24624 Interstate 45 North Suite 200 Spring, TX 77386	512-343-1199	512-343-1922

To access our online sales portal, visit: <https://smarttools.ssi.samsung.com>

→ For all product information please visit:  
[samsung.com/us/oem-solutions](http://samsung.com/us/oem-solutions)







**Samsung Semiconductor, Inc.**

**601 McCarthy Boulevard**

**Milpitas, CA 95035**

**[samsung.com/us/oem-solutions](http://samsung.com/us/oem-solutions)**

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