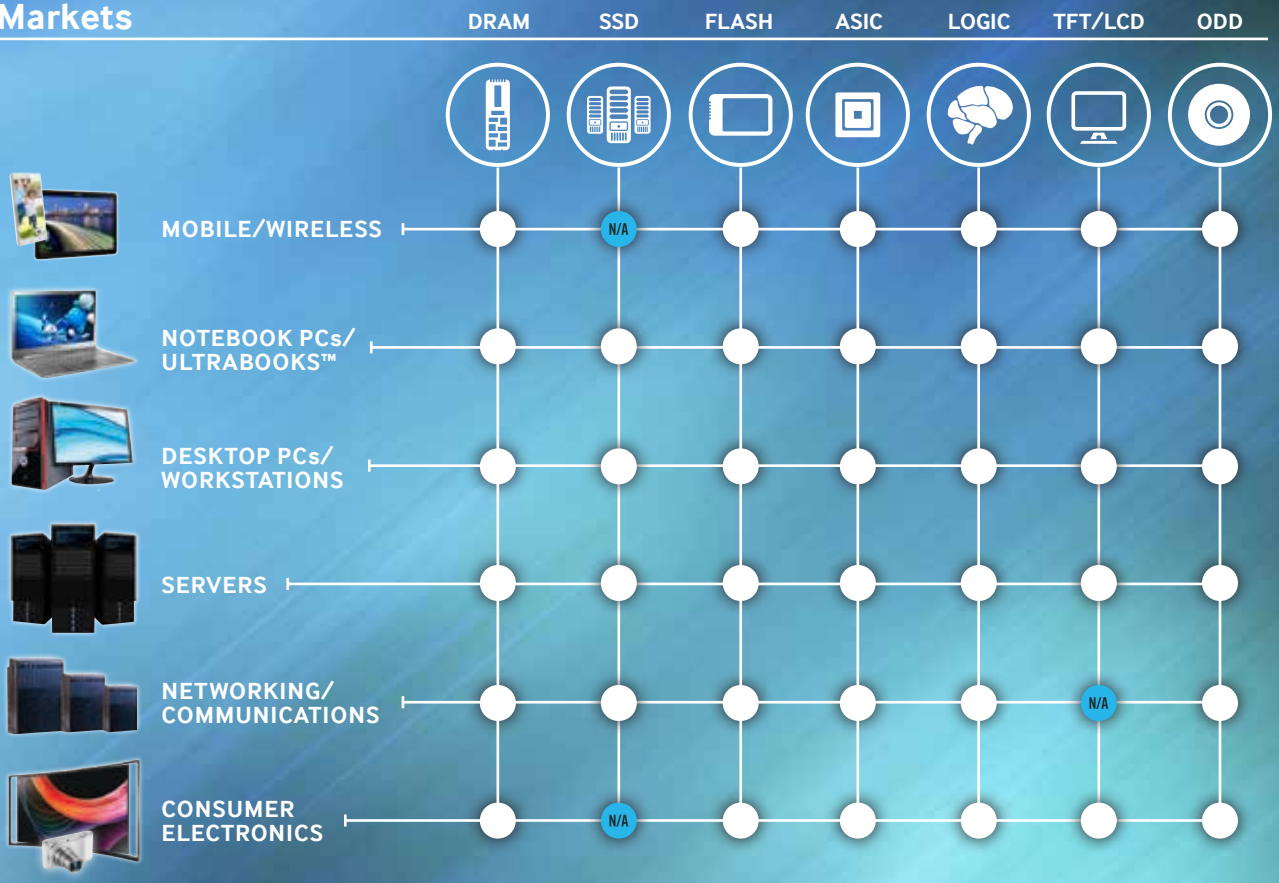
# Samsung Semiconductor, Inc.

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




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

www.samsung.com/us/oem-solutions

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 x8 | K4A4G085WD-BCRC/PB | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 2400/2133 | 7.5x11mm | Now |
| | | 256Mx16 | K4A4G165WD-BCRC/PB | 96 Ball -FBGA | Lead Free & Halogen Free | 2400/2133 | 7.5x13.3mm | Now |
| 8Gb | 1.2V | 2G x 4 | K4A8G045WB-BCRC/PB | 78 ball FBGA | Lead Free & Halogen Free | 2400/2133 | | 2Q'15 |
| | | 1G x 8 | K4A8G085WB-BCRC/PB | 78 ball FBGA | Lead Free & Halogen Free | 2400/2133 | | 2Q'15 |

## DDR4 SDRAM REGISTERED MODULES

| Density | Voltage | Organization | Part Number | Composition | Compliance | Speed (Mbps) | Ranks | Production |
|---|---|---|---|---|---|---|---|---|
| 8GB | 1.2V | 1Gx 72 | M393A1G40DB0-CPB/CRC | 4Gb (1G x4) * 18 | Lead Free & Halogen Free, Flip Chip | 2133/2400 | 1 | Now |
| | | | M393A1G43DB0-CPB/CRC | 4Gb (512M x8) * 18 | Lead Free & Halogen Free, Flip Chip | 2133/2400 | 2 | Now |
| 16GB | 1.2V | 2Gx 72 | M393A2G40DB0-CPB/CRC | 4Gb (1G x4) * 36 | Lead Free & Halogen Free, Flip Chip | 2133/2400 | 2 | Now |
| | | | M393A2K40BB0-CPB/CRC | 8Gb (2G x4) * 18 | Lead Free & Halogen Free | 2133/2400 | 1 | 1Q'15 |
| | | | M393A2K43BB0-CPB/CRC | 8Gb (1G x8) * 18 | Lead Free & Halogen Free | 2133/2400 | 1 | 1Q'15 |
| 32GB | 1.2V | 4Gx 72 | M393A4K40BB0-CPB/CRC | 8Gb (2G x4) * 36 | Lead Free & Halogen Free | 2133/2400 | 2 | 1Q'15 |
| 64GB TSV | 1.2V | 8Gx 72 | M393A8G40D40-CRB | 4Gb (4Gx4)*36 | Lead Free & Halogen Free | 2133 | 4 | Now |

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

## DDR4 SDRAM LOAD REDUCED MODULES

| Density | Voltage | Organization | Part Number | Composition | Compliance | Speed (Mbps) | Ranks | Production |
|---|---|---|---|---|---|---|---|---|
| 32GB | 1.2V | 4Gx 72 | M386A4G40DM0-CPB/CRC | 4Gb DDP (2Gx4) * 36 | Lead Free & Halogen Free | 2133/2400 | 4 | Now |
| 64GB | 1.2V | 8Gx 72 | M386A8K40BM0-CPB/CRC | 8Gb DDP (4Gx4) * 36 | Lead Free & Halogen Free | 2133/2400 | 4 | 1Q'15 |

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

## DDR4 SDRAM UNBUFFERED MODULES

| Density | Voltage | Organization | Part Number | Composition | Compliance | Speed (Mbps) | Ranks | Production |
|---|---|---|---|---|---|---|---|---|
| 4GB | 1.2V | 512Mx 64 | M378A5143DB0-CPB/CRC | 4Gb (512M x8) *8 | Lead Free & Halogen Free | 2133/2400 | 1 | Now |
| | | | M378A5144BB0-CPB/CRC | 8Gb (1G x16) * 4 | Lead Free & Halogen Free | 2133/2400 | 1 | 2Q'15 |
| 8GB | 1.2V | 1Gx 64 | M378A1G43DB0-CPB/CRC | 4Gb (512M x8) *16 | Lead Free & Halogen Free | 2133/2400 | 2 | Now |
| | | | M378A1K43BB0-CPB/CRC | 8Gb (1G x8) * 8 | Lead Free & Halogen Free | 2133/2400 | 1 | 2Q'15 |
| 16GB | 1.2V | 2Gx 64 | M378A2K43BB0-CPB/CRC | 8Gb (1G x8) * 16 | Lead Free & Halogen Free | 2133/2400 | 2 | 2Q'15 |

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/CRC | 4Gb (512M x8) * 18 | Lead Free & Halogen Free | 2133/2400 | 2 | Now |
| | | | M391A1K43BB0-CPB/CRC | 8Gb (1G x8) * 9 | Lead Free & Halogen Free | 2133/2400 | 1 | 2Q'15 |
| 16GB | 1.2V | 2G x72 | M391A2G43BB0-CPB/CRC | 8Gb (1G x8) * 18 | Lead Free & Halogen Free | 2133/2400 | 2 | 2Q'15 |

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 | 512Mx 64 | M471A5143DB0-CPB/CRC | 4Gb (512M x8) * 8 | Lead Free & Halogen Free | 2133/2400 | 1 | Now |
| | | | M471A5143BB0-CPB/CRC | 8Gb (1G x16) * 4 | Lead Free & Halogen Free | 2133/2400 | 1 | 2Q'15 |
| 8GB | 1.2V | 1Gx 64 | M471A1G43DB0-CPB/CRC | 4Gb (512M x8) * 16 | Lead Free & Halogen Free | 2133/2400 | 2 | Now |
| | | | M471A1K43BB0-CPB/CRC | 8Gb (1G x8) * 8 | Lead Free & Halogen Free | 2133/2400 | 1 | 2Q'15 |
| 16GB | 1.2V | 2Gx 64 | M471A2K43BB0-CPB/CRC | 8Gb (1G x8) * 16 | Lead Free & Halogen Free | 2133/2400 | 2 | 2Q'15 |

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 x72 | M474A1K43BB0-CPB/RC | 8Gb (1G x8) * 9 | Lead Free & Halogen Free | 2133/2400 | 1 | 2Q'15 |
| | | | M474A1G43DB0-CPB/CRC | 4Gb (512M x8) * 18 | Lead Free & Halogen Free | 2133/2400 | 2 | Now |
| 16GB | 1.2V | 2G x72 | M474A2K43BB0-CPB/RC | 8Gb (1G x8) * 18 | Lead Free & Halogen Free | 2133/2400 | 2 | 2Q'15 |

Notes: 0 =IDT 2 =Montage PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

## DDR3 SDRAM REGISTERED MODULES

| Density | Voltage | Organization | Part Number | Composition | Compliance | Speed (Mbps) | Ranks | Production |
|---|---|---|---|---|---|---|---|---|
| 8GB | 1.5V | 1Gx72 | 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 (1G x4) * 18 | Lead Free & Halogen Free | 1866 | 2 | Now |
| 16GB | 1.5V | 2Gx72 | M393B2G70QH0-CM (08/09) | 4Gb (512M x8) * 36 | Lead Free & Halogen Free | 1866 | 2 | Now |
| | | | M393B2G70DB0-CMA (02/03) | 4Gb (1G x4) * 36 | Lead Free & Halogen Free | 1866 | 2 | Now |
| 8GB | 1.35V | 1Gx72 | 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 | 2Gx72 | 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 |
| 32GB | 1.35V | 4Gx72 | M393B4G70DM0-YH9(02/03) | 8Gb DDP (2G x4) * 36 | Lead Free & Halogen Free | 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 | 4Gx72 | M386B4G70DM0-YK0(3/4) | 8Gb DDP (2G x4) * 36 | Lead Free & Halogen Free | 1600 | 4 | Now |
| | 1.5V | | M386B4G70DM0-CMA(3/4) | 8Gb DDP (2G x4) * 36 | Lead Free & Halogen Free | 1866 | 4 | Now |
| 64GB | 1.35V | 8Gx72 | M386B8G70DE0-YH9(4) | 16Gb QDP (4G x4) * 36 | Lead Free & Halogen Free | 1333 | 8 | Now |
| | 1.5V | | M386B8G70DE0-CK0(4) | 16Gb QDP (4G x4) * 36 | Lead Free & Halogen Free | 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 | 1Gx72 | 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 | 2Gx72 | M392B2G70DM0-CMA (03/04) | 4Gb DDP (2G DDP x4) * 18 | Lead Free & Halogen Free, Flip Chip | 1866 | 2 | Now |
| | 1.35V | | M392B2G70DM0-YK0 (03/04) | 4Gb DDP (2G DDP x4) * 18 | Lead Free & Halogen Free, Flip Chip | 1600 | 2 | Now |
| 32GB | 1.35V | 4Gx72 | M392B4G70DE0-YH9 (03/04) | 4Gb QDP (4G x4) * 18 | Lead Free & Halogen Free, Flip Chip | 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 (ECC)

| Density | Voltage | Organization | Part Number | Composition | Compliance | Speed (Mbps) | Ranks | Production |
|---|---|---|---|---|---|---|---|---|
| 8GB | 1.5V | 1024Mx72 | 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 UNBUFFERED MODULES

| Density | Voltage | Organization | Part Number | Composition | Compliance | Speed (Mbps) | Ranks | Production |
|---|---|---|---|---|---|---|---|---|
| 2GB | 1.5V | 256Mx64 | M378B5773QB0-CK0/MA | 2Gb (256M x8) * 8 | Lead Free & Halogen Free | 1600/1866 | 1 | Now |
| 4GB | 1.5V | 512Mx64 | 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 | 1024Mx64 | 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 COMPONENTS

| Density | Voltage | Organization | Part Number | # Pins-Package | Compliance | Speed (Mbps) | Dimensions | Production |
|---|---|---|---|---|---|---|---|---|
| 1Gb | 1.5V | 256M x4 | K4B1G0446G-BC(H9/K0/MA) | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1333/1600/1866 | 7.5x11mm | Now |
| | | 128M x8 | K4B1G0846G-BC(H9/K0/MA) | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1333/1600/1866 | 7.5x11mm | Now |
| | | 128M x16 | K4B1G1646G-BC(H9/K0/MA/NB) | 96 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1333/1600/186/2133 | 7.5x13.3mm | Now |
| 2Gb | 1.5V | 512M x4 | K4B2G0446Q-BC(K0/MA) | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600/1866 | 7.5x11mm | Now |
| | | 256M x8 | K4B2G0846Q-BC(K0/MA) | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600/1866 | 7.5x11mm | Now |
| | | 128M x16 | K4B2G1646Q-BC(K0/MA/NB) | 96 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600/1866/2133 | 7.5x13.3mm | Now |
| 4Gb | 1.5V | 1G x4 | K4B4G0446Q-HC(K0/MA) | 78 Ball -FBGA | Lead Free & Halogen Free | 1600/1866 | 10x11mm | Now |
| | | 512M x8 | K4B4G0846Q-HC(K0/MA) | 78 Ball -FBGA | Lead Free & Halogen Free | 1600/1866 | 10x11mm | Now |
| | | 512M x8 | K4B4G0846D-BC(K0/MA/NB) | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600/1866/2133 | 7.5x11mm | Now |
| | | 256Mx16 | K4B4G1646Q-HC(K0/MA) | 96 Ball -FBGA | Lead Free & Halogen Free | 1600/1866 | 10x13.3mm | Now |
| 1Gb | 1.35V | 256Mx16 | K4B4G1646D-BC(K0/MA/NB) | 96 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600/1866/2133 | 7.5x13.3mm | Now |
| | | 256M x4 | K4B1G0446G-BY(F8/H9/K0) | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1333/1600 | 7.5x11mm | Now |
| | | 128M x8 | K4B1G0846G-BY(H9/K0) | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1333/1600 | 7.5x11mm | Now |
| 2Gb | 1.35V | 128M x16 | K4B1G1646G-BY(H9/K0) | 96 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1333/1600 | 7.5x13.3mm | Now |
| | | 512M x4 | K4B2G0446Q-BYK0 | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600 | 7.5x11mm | Now |
| | | 256M x8 | K4B2G0846Q-BYK0/MA | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600/1866 | 7.5x11mm | Now |
| | | 128M x16 | K4B2G1646Q-BYK0/MA | 96 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600/1866 | 7.5x13.3mm | Now |
| 4Gb | 1.35V | 1G x4 | K4B4G0446Q-HYK0 | 78 Ball -FBGA | Lead Free & Halogen Free | 1600 | 10x11mm | Now |
| | | 512M x8 | K4B4G0846Q-HYK0 | 78 Ball -FBGA | Lead Free & Halogen Free | 1600 | 10x11mm | Now |
| | | 512M x8 | K4B4G0846D-BYK0 | 78 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600 | 7.5x11mm | Now |
| | | 256Mx16 | K4B4G1646Q-HYK0 | 96 Ball -FBGA | Lead Free & Halogen Free | 1600 | 10x13.3mm | Now |
| | | 256Mx16 | K4B4G1646D-BYK0/MA | 96 Ball -FBGA | Lead Free & Halogen Free, Flip Chip | 1600/1866 | 7.5x13.3mm | Now |
| 8Gb | 1.35V | 512Mx16 | 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)

## DDR3 SDRAM ECC SODIMM MODULES

| Density | Voltage | Organization | Part Number | Composition | Compliance | Speed (Mbps) | Ranks | Production |
|---|---|---|---|---|---|---|---|---|
| 8GB | 1.5V | 1024Mx64 | M474B1G73QH0-CMA | 4Gb x8*18 | Lead Free & Halogen Free | 1866 | 2 | Now |
| | 1.35V | | M474B1G73QH0-YK0 | 4Gb x8*18 | Lead Free & Halogen Free | 1600 | 2 | Now |

## DDR3 SDRAM SODIMM MODULES

| Density | Voltage | Organization | Part Number | Composition | Compliance | Speed (Mbps) | Ranks | Production |
|---|---|---|---|---|---|---|---|---|
| 2GB | 1.35V | 256Mx64 | M471B5674QH0-YK0 | 4Gb (256M x16) * 4 | Lead Free & Halogen Free | 1600 | 1 | Now |
| 4GB | 1.35V | 512Mx64 | 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 | 1024Mx64 | 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)

## DDR2 SDRAM COMPONENTS

| Density | Organization | Part Number | # Pins-Package | Dimensions | Package | Speed (Mbps) | Production |
|---|---|---|---|---|---|---|---|
| 512Mb | 64M x8 | K4T51083QQ-BC(E6/F7/E7/F8) | 60-FBGA | 7.5x9.5mm | Lead free & Halogen free , Flip chip | 667/800/1066 | Now |
| | 32M x16 | K4T51163QQ-BC(E6/F7/E7/F8) | 84-FBGA | 7.5x12.5mm | Lead free & Halogen free , Flip chip | 667/800/1066 | Now |
| 1Gb | 128M x8 | K4T1G084QG-BC(E6/F7/E7/F8) | 60-FBGA | 7.5x9.5mm | Lead free & Halogen free , Flip chip | 667/800/1066 | Now |
| | 64M x16 | 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 | 256Mx32 | K4G80325FB-HC(04/03/28/25) | 170-FCFBGA | 1.5V/1.5V | 5000/6000/7000/8000 | CS: '15,1Q |
| | | | K4G80325FB-HC(04/03/28/25) | 170-FCFBGA | 1.35V/1.35V | 4000/5000/(6000)/(7000) | CS: '15,1Q |
| | 4Gb | 128Mx32 | K4G41325FC-HC(04/03/28) | 170-FCFBGA | 1.5V/1.5V | 5000/6000/7000 | Now |
| | | | K4G41325FC-HC(04/03) | 170-FCFBGA | 1.35V/1.35V | 4000/5000 | Now |
| | 2Gb | 64Mx32 | 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 | 5000/6000/7000 | Now |
| | | | K4G20325FD-FC(04/03) | 170-FBGA | 1.35V/1.35V | 4000/5000 | Now |
| gDDR3 | 4Gb | 256Mx16 | K4W4G1646E-BC(1A/1B) | 96-FCFBGA | 1.5V/1.5V | 2133/2400 | CS: '14,Oct |
| | | | K4W4G1646E-BC(1A/1B) | 96-FCFBGA | 1.35V/1.35V | 1866/2133 | CS: '14,Oct |
| | | | 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 | 128Mx16 | 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 |
|---|---|---|---|---|---|---|
| LPDDR2 | 4Gb | 1CH x32 | K4P4G324EQ-AGC2 | 168-FBGA, 12x12 PoP, SDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | | 1CH x32 | K4P4G324EQ-FGC2 | 134-FBGA, 11x11.5 , SDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | 8Gb | 1CH x32 | K4P8G304EQ-AGC2 | 168-FBGA, 12x12 PoP, DDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | | 1CH x32 | K4P8G304EQ-PGC2 | 216-FBGA, 12x12 PoP, DDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3PE7E70QM-BGC2 | 216-FBGA, 12x12 PoP, DDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3PE7E70QM-CGC2 | 220-FBGA, 14x14 PoP, DDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | 12Gb | 1CH x32 | K4P2E304EQ-AGC2 | 168-FBGA, 12x12 PoP, TDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | 16Gb | 1CH x32 | K4PAG304EQ-AGC2 | 168-FBGA, 12x12 PoP, QDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3PE0E00QM-BGC2 | 216-FBGA, 12x12 PoP, QDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3PE0E00QM-CGC2 | 220-FBGA, 14x14 PoP, QDP, 1066Mbps | 1.8V/1.2V/1.2V | Now |
| LPDDR3 | 4Gb | 1CH x32 | K4E4E324EE-EGCE | 178-FBGA, 11x11.5, SDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | 8Gb | 1CH x32 | K4E8E304EE-EGCE | 178-FBGA, 11x11.5, DDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 1CH x32 | K4E8E304EE-AGCE | 168-FBGA, 12x12, DDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3QF1F10EM-AGCE | 253-FBGA, 11x11.5, DDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | 12Gb | 1CH x32 | K4E2E304EE-AGCE | 168-FBGA, 12x12, TDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | 16Gb | 1CH x32 | K4E6E304EE-EGCE | 178-FBGA, 11x11.5, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 1CH x32 | K4E6E304EE-AGCE | 168-FBGA, 12x12, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3QF2F20EM-AGCE | 253-FBGA, 11x11.5, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3QF2F20EM-FGCE | 256-FBGA, 14x14 PoP, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3QF2F20EM-QGCE | 216-FBGA, 15x15 PoP, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3MF8F80DM-MGCE | 504-FBGA, 15x15 PoP, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | 24Gb | 2CH x32 | K3QF6F60MM-FGCE | 256-FBGA, 14x14 PoP, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3QF6F60MM-QGCE | 216-FBGA, 15x15 PoP, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |
| | | 2CH x32 | K3MF9F90MM-MGCE | 504-FBGA, 15x15 PoP, QDP, 1600Mbps | 1.8V/1.2V/1.2V | Now |

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

## 6. # of Internal Banks

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

## 7. Interface ( VDD, VDDQ)

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

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

### 4. DRAM Component Type

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

### 5. Depth

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

### 6. # of Banks in Comp. & Interface

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

### 7. Bit Organization

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

### 8. 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

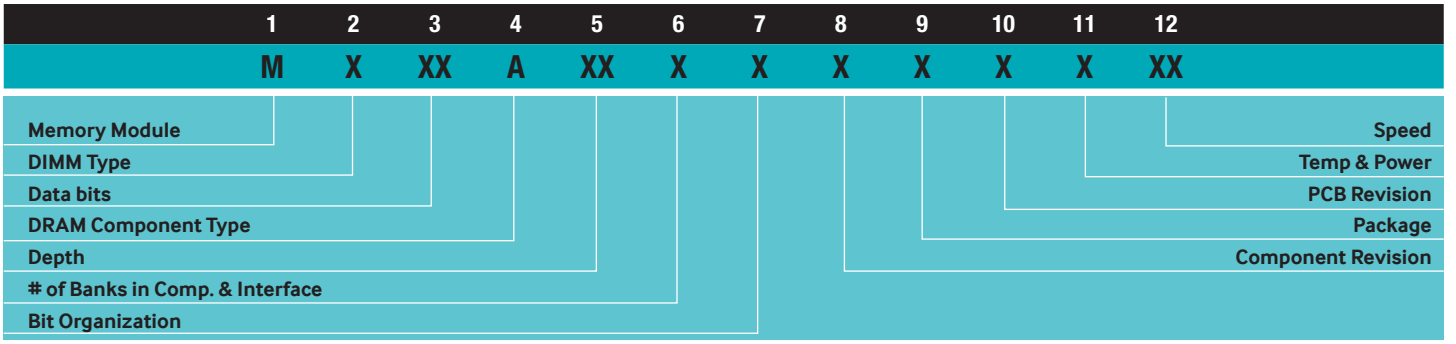
CC: (200MHz @ CL=3, tRCD=3, tRP=3)
D5: (266MHz @ CL=4, tRCD=4, tRP=4)
E6: (333MHz @ CL=5, tRCD=5, tRP=5)
F7: (400MHz @ CL=6, tRCD=6, tRP=6)
E7: (400MHz @ CL=5, tRCD=5, tRP=5)
F8: (533MHz @ CL=7, tRCD=7, tRP=7)
G8: (533MHz @ CL=8, tRCD=8, tRP=8)
H9: (667MHz @ CL=9, tRCD=9, tRP=9)
K0: (800MHz @ CL=10, 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: x72 260pin SODIMM
86: x72 288pin Load Reduced DIMM
93: x72 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.

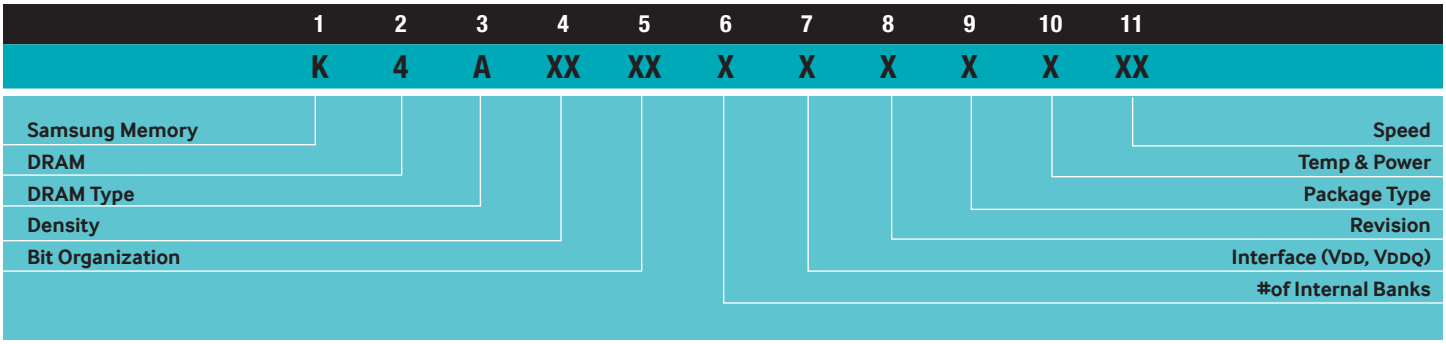
### 11. Temp & Power

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: x4
08: x8

### 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)

# New 10nm-class eMMC

## MAINSTREAM eMMC

| Density | Flash | MMC* | Class | Part Number | Seq R/W Perf (MB/s) | Random R/W IOPS | Package Size (mm) | Status |
|---|---|---|---|---|---|---|---|---|
| 8GB | 64Gb*1 | 5 | 200 | KLM8G1WEPD-B0310** | 130/7 | 5000/600 | 11.5 x 13.0 x 0.8 | MP |
| 16GB | 64Gb*2 | 5 | 700 | KLMAG2WEPD-B0310** | 150/12 | 5000/1200 | 11.5 x 13.0 x 0.8 | MP |
| 32GB | 64Gb*4 | 5 | 1500 | KLMBG4WEBD-B0310** | 250/45 | TBD | 11.5 x 13.0 x 1.0 | Sampling Q1'15 |
| 64GB | 64Gb*8 | 5 | 1500 | KLMCG8WEBD-B0310** | 250/45 | TBD | 11.5 x 13.0 x 1.0 | Sampling Q1'15 |
| 128GB | 64Gb*16 | 5 | TBD | TBD | TBD | TBD | 11.5 x 13.0 x 1.4 | Sampling Q1'15 |

*MMC5.0 is backwards compatible with 4.51 & 4.4 eMMC EVO > 1000 RW IOPS, eMMC PRO > 1000 RW IOPS

## HIGH-PERFORMANCE eMMC

| Density | Flash | MMC* | Class | Part Number | Seq R/W Perf (MB/s) | Random R/W IOPS | Package Size (mm) | Status |
|---|---|---|---|---|---|---|---|---|
| 4GB | 32Gb*1 | 5 | 700 | KLM4G1FEPD-B0310** | TBD | TBD | 11.0 x 10.0 x 0.8 | Sampling Q1'15 |
| 8GB | 64Gb*1 | 5 | 700 | KLM8G1GEND-B0310** | 160/25 | 5000/2500 | 11.5 x 13.0 x 1.0 | MP |
| 16GB | 64Gb*2 | 5 | 2000 | KLMAG2GEND-B0310** | 230/50 | 6000/6000 | 11.5 x 13.0 x 1.0 | MP |
| 32GB | 64Gb*4 | 5 | 2000 | KLMBG4GEND-B0310** | 250/100 | 6000/12000 | 11.5 x 13.0 x 1.0 | MP |
| 64GB | 64Gb*8 | 5 | 2000 | 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 & standby power
- High density in small form factor (11.5x13mm pkg)
- 4GB to 128GB capacities
- JEDEC standard MMC 4.51/5.0
- 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

Samsung offers a compact eMMC solution to fit the needs of any mobile application category, ranging from high-end tablets and smartphones to 4K gaming devices , set-top boxes, and Internet of Things (iOT) devices.

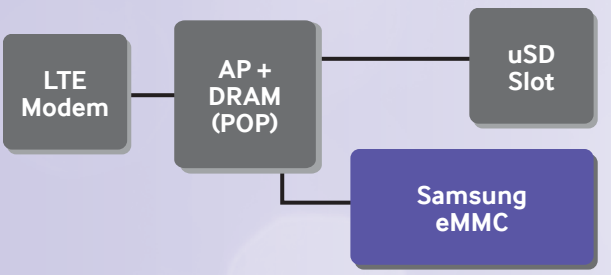
# Industry-Leading Smartphone and Tablet Design

### Specifications

- Density: 4GB to 128GB
- Class: 200/700/1500/2000*
- Flash: 32Gb/64Gb
- Package Type: FBGA
- Package Size: 11x10mm, 11.5x13mm
- eMMC: 4.5/5.0

* Class = Random Write IOPS

### Simple Block Diagram



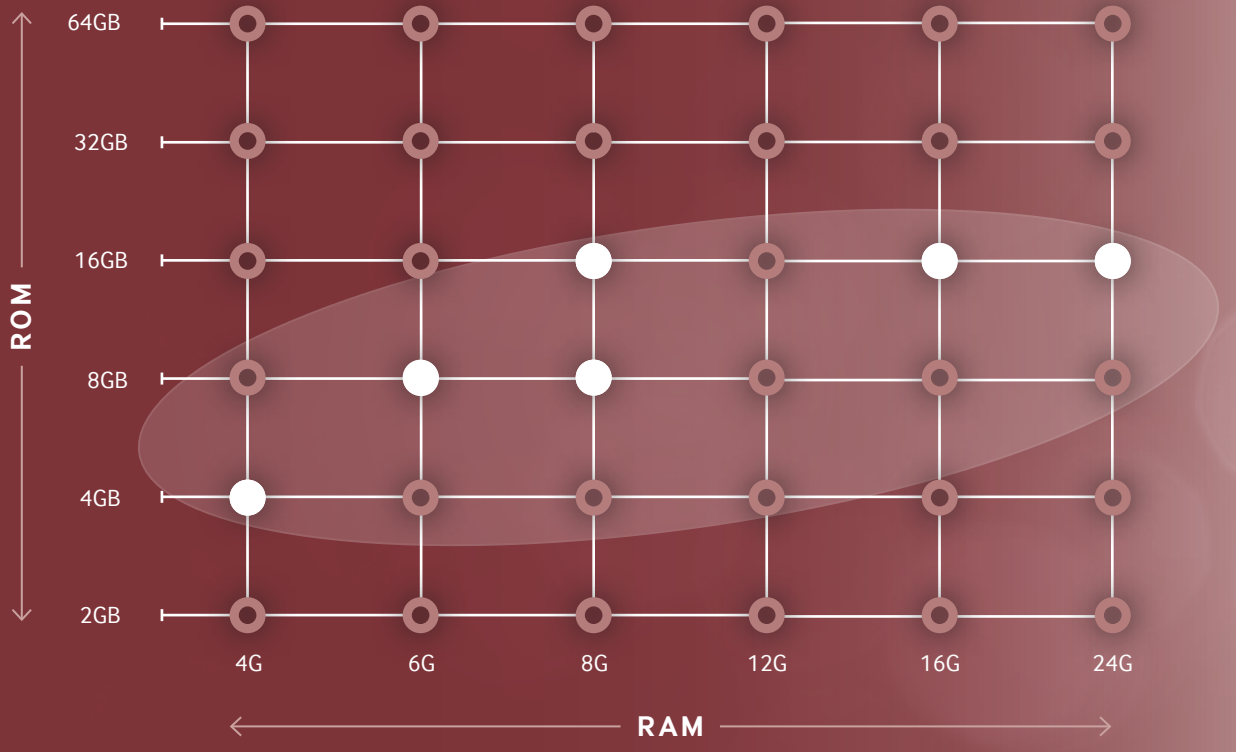
## SOLID STATE DRIVES (SSD)

| Drive Type | Drive Name | Interface | Form Factor | Connector | Power-loss Protection | Write Endurance | Density | Part Number |
|---|---|---|---|---|---|---|---|---|
| Client PC/ Embedded | CM851 | SATA III - 6Gb/s | mSATA (MZM)<br>M.2 (MZA) | Mini PCIe<br>M.2 | No | PC Workload | 16GB | MZAPF016HCDD-00000 |
| | | | | | | | 32GB | MZMPF032HCFV-00000 |
| | | | | | | | | MZAPF032HCFV-00000 |
| | | | | | | | 64GB | MZMPF032HCFV-00000 |
| | PM851 | SATA III - 6Gb/s | mSATA (MZM)<br>M.2 (MZN)<br>2.5" (MZ7) | Mini PCIe<br>M.2<br>SFF-8223 | No | PC Workload | 128GB | MZMTE128HMGR-00000 |
| | | | | | | | | MZNTE128HMGR-00000 |
| | | | | | | | | MZ7TE128HMGR-00000 |
| | | | | | | | 256GB | MZMTE256HMHP-00000 |
| | | | | | | | | MZNTE256HMHP-00000 |
| | | | | | | | | MZ7TE256HMHP-00000 |
| | | | | | | | 512GB | MZMTE512HMHP-00000 |
| | | | | | | | | MZNTE512HMJH-00000 |
| | | | | | | | | MZ7TE512HMHP-00000 |
| | | | | | | | 1024GB | MZMTE1T0HMJH-00000 |
| | XP941 | PCIe - SATAe | M.2 | M.2 | No | PC Workload | 128GB | MZHPU128HCGM-00004 |
| | | | | | | | 256GB | MZHPU256HCGL-00004 |
| | | | | | | | 512GB | MZHPU512HCGL-00004 |
| Data Center | PM853T | SATA III - 6Gb/s | 2.5" 7mmT | SFF-8223 | Yes | 0.3 DWPD | 240GB | MZ7GE240HMGR-00003 |
| | | | | | | | 480GB | MZ7GE480HMHP-00003 |
| | | | | | | | 960GB | MZ7GE960HMHP-00003 |
| | SM843Tn | SATA III - 6Gb/s | 2.5" 7mmT | SFF-8223 | Yes | 1.8 DWPD | 120GB | MZ7WD120HCFV-00003 |
| | | | | | | | 240GB | MZ7WD240HCFV-00003 |
| | | | | | | | 480GB | MZ7WD480HCGM-00003 |
| | SV843 | SATA III - 6Gb/s | 2.5" 7mmT | SFF-8223 | Yes | 3.6 DWPD | 480GB | MZ7WD480HMHP-00003 |
| | | | | | | | 960GB | MZ7WD960HMHP-00003 |
| Enterprise | SM1635 | SAS - 12Gb/s | 2.5" 15mmT | SFF-8680 | Yes | 10 DWPD | 400GB | MZIES400HMGR-00003 |
| | | | | | | | 800GB | MZIES800HMHP-00003 |
| | | | | | | | 1600GB | MZIES1T6HMJH-00003 |
| | XS1715 | PCIe - NVMe | 2.5" 15mmT | SFF-8639 | Yes | 7.0 DWPD | 400GB | MZWEI400HAGM-00003 |
| | | | | | | 5.4 DWPD | 800GB | MZWEI800HAGM-00003 |
| | | | | | | | 1600GB | MZWEI1T6HAGP-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 + LPDDR2 or LPDDR3**



## eMCP: 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 | 221FBGA 11.5x13mm |
| | | 6Gb (x32) | 3.3V/1.8V - 1.8V/1.2V | 221FBGA 11.5x13mm |
| | 8GB | 4Gb*2 (x32, 1CH, 2CS) | 3.3V/1.8V - 1.8V/1.2V | 221FBGA 11.5x13mm |
| | | 6Gb*2 (x32, 1CH, 2CS) | 3.3V/1.8V - 1.8V/1.2V | 221FBGA 11.5x13mm |
| | 16GB | 4Gb*2 (x32, 1CH, 2CS) | 3.3V/1.8V - 1.8V/1.2V | 221FBGA 11.5x13mm |
| | | 4Gb*4 (x32, 1CH, 2CS) | 3.3V/1.8V - 1.8V/1.2V | 221FBGA 11.5x13mm |
| | | 6Gb*4 (x32, 1CH, 2CS) | 3.3V/1.8V - 1.8V/1.2V | 221FBGA 11.5x13mm |

## eMCP: eMMC + LPDDR2

| Memory | eMMC Density | DRAM Density/Organization | Voltage (eMMC-DRAM) | Package |
|---|---|---|---|---|
| eMMC & MDRAM | 4GB | 4Gb (x32) | 3.3V/1.8V - 1.8V/1.2V | 162FBGA 11.5x13mm |

# Samsung Solid State Drives

| | SATA | | SAS | PCIe |
|---|---|---|---|---|
| | **STANDARD DATA CENTER SERIES**<br>Read-Intensive Environments | **DELUXE ENTERPRISE SERIES**<br>High-Write Environments | **ENTERPRISE STORAGE SERIES**<br>High Redundancy Environments | **EXTREME PERFORMANCE SERIES**<br>Data Cache Environments |
| | **Samsung PM853T** | **Samsung SV843** | **Samsung SM1635** | **Samsung XS1715** |
| **Form Factor** | 2.5 inches | 2.5 inches | 2.5 inches | 2.5 inches |
| **Capacity (GB)** | 240/480/960 | 480/960 | 400/800/1600 | 400/800/1600 |
| **Host Interface** | Serial ATA 3 (6 Gb/s) | Serial ATA 3 (6 Gb/s) | SAS 3 (12 Gb/s) | PCIe Gen3 x4 |
| **MTBF** | 1.5 Million Hours | 2.0 Million Hours | 2.0 Million Hours | 2.0 Million Hours |
| **Uncorrectable Bit Error Rate (UBER)** | $1x10^{16}$ | $1x10^{17}$ | $1x10^{17}$ | $1x10^{17}$ |
| **Power Consumption (Active)** | 3.4W | 2.9W | 11.0W | 25.0W |
| **Power Consumption (Idle)** | 1.1W | 1.0W | 4.0W | 8.0W |
| **Random Read** | Up to 87,000 IOPS | Up to 88,000 IOPS | Up to 215,000 IOPS | Up to 750,000 IOPS |
| **Random Write** | Up to 15,000 IOPS (28% O/P: up to 35,000 IOPS) | Up to 14,000 IOPS (28% O/P: up to 35,000 IOPS) | Up to 47,000 IOPS | Up to 115,000 IOPS |
| **Sequential Read** | Up to 530 MB/s | Up to 530 MB/s | Up to 1380 MB/s | Up to 3000 MB/s |
| **Sequential Write** | Up to 410 MB/s | Up to 430 MB/s | Up to 1300 MB/s | Up to 1400 MB/s |
| **Terabytes Written (TBW)** | **Up to 665 TBW**<br>**Up to 0.3 DWPD** | **Up to 6,728 TBW**<br>**Up to 3.6 DWPD** | **Up to 29,200 TBW**<br>**Up to 10 DWPD** | **Up to 16,700 TBW**<br>**Up to 7 DWPD** |
| **Physical Dimensions** | 100 x 70 x 7mm | 100 x 70 x 7mm | 100 x 70 x 15mm | 100 x 70 x 15mm |
| **Weight** | 63g | 62g | 140g | 210g |

→ Which SSD is right for you?

For more information, email: **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 | mSATA (MZM)<br>M.2 (MZA) | Mini PCIe - M.2 | No | PC Workload | 16GB | MZAPF016HCDD-00000 |
| | | | | | | | 32GB | MZMPF032HCFV-00000 |
| | | | | | | | | MZAPF032HCFV-00000 |
| | | | | | | | 64GB | MZMPF032HCFV-00000 |
| | PM851 | SATA III - 6Gb/s | mSATA (MZM)<br>M.2 (MZN)<br>2.5" (MZ7) | Mini PCIe<br>M.2<br>SFF-8223 | No | PC Workload | 128GB | MZMTE128HMGR-00000 |
| | | | | | | | | MZNTE128HMGR-00000 |
| | | | | | | | | MZ7TE128HMGR-00000 |
| | | | | | | | 256GB | MZMTE256HMHP-00000 |
| | | | | | | | | MZNTE256HMHP-00000 |
| | | | | | | | | MZ7TE256HMHP-00000 |
| | | | | | | | 512GB | MZMTE512HMHP-00000 |
| | | | | | | | | MZNTE512HMJH-00000 |
| | | | | | | | | MZ7TE512HMHP-00000 |
| | | | | | | | 1024GB | MZMTE1T0HMJH-00000 |
| | XP941 | PCIe - SATAe | M.2 | M.2 | No | PC Workload | 128GB | MZHPU128HCGM-00004 |
| | | | | | | | 256GB | MZHPU256HCGL-00004 |
| | | | | | | | 512GB | MZHPU512HCGL-00004 |
| Data Center | PM853T | SATA III - 6Gb/s | 2.5" 7mmT | SFF-8223 | Yes | 0.3 DWPD | 240GB | MZ7GE240HMGR-00003 |
| | | | | | | | 480GB | MZ7GE480HMHP-00003 |
| | | | | | | | 960GB | MZ7GE960HMHP-00003 |
| | SM843Tn | SATA III - 6Gb/s | 2.5" 7mmT | SFF-8223 | Yes | 1.8 DWPD | 120GB | MZ7WD120HCFV-00003 |
| | | | | | | | 240GB | MZ7WD240HCFV-00003 |
| | | | | | | | 480GB | MZ7WD480HCGM-00003 |
| | SV843 | SATA III - 6Gb/s | 2.5" 7mmT | SFF-8223 | Yes | 3.6 DWPD | 480GB | MZ7WD480HMHP-00003 |
| | | | | | | | 960GB | MZ7WD960HMHP-00003 |
| Enterprise | SM1635 | SAS - 12Gb/s | 2.5" 15mmT | SFF-8680 | Yes | 10 DWPD | 400GB | MZIES400HMGR-00003 |
| | | | | | | | 800GB | MZIES800HMHP-00003 |
| | | | | | | | 1600GB | MZIES1T6HMJH-00003 |
| | XS1715 | PCIe - NVMe | 2.5" 15mmT | SFF-8639 | Yes | 7.0 DWPD | 400GB | MZWEI400HAGM-00003 |
| | | | | | | 5.4 DWPD | 800GB | MZWEI800HAGM-00003 |
| | | | | | | | 1600GB | MZWEI1T6HAGP-00003 |

## Blu-ray SLIM

| Interface | Speed | Type | Loading | Model |
|---|---|---|---|---|
| SATA | BD Writer 6X | Slim | Tray | SN-506BB |

## 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-ROM H/H

| Interface | Speed | Type | Loading | Model |
|---|---|---|---|---|
| SATA | DVD Read 18X | H/H | Tray | SH-118CB |

## DVD-W SLIM

| Interface | Speed | Type | Loading | Model |
|---|---|---|---|---|
| SATA | DVD Write 8X | Slim (12.7mm) | Tray | SN-208FB |
| | DVD Write 8X | Slim (9.5mm) | Tray | SU-208GB |
| | DVD Write 8X | Slim (9.0mm) | Tray | SU-228GB |

## DVD-W SLIM EXTERNAL

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

# Public Information Display (PID) Product Classification

| | | | |
|---|---|---|---|
| **Outdoor PID** | » High Brightness | » Full High Definition | » 110°C Clearing Point |
| **Super Narrow Bezel (SNB)/ Ultra Narrow Bezel (UNB)** | » Video Wall | » UNB: 3.9mm A-to-A<br>» SNB: 5.9mm A-to-A | » 500 - 700 nits Brightness<br>» AGAR Surface Treatment |
| **Indoor PID** | » Narrow Bezel | » 40"/46"/55"/75" | » 700 nits Brightness |
| **E-Board PID** | » Landscape Orientation | » 55"/70"/82" Edge LED | » AGAR Surface Treatment |

## Why PID instead of TV?

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

# Product Segmentation

HEAVY USE

LIGHT USE

**Outdoor PID**

| Restaurant | Retail | Digital Signage |
|---|---|---|
| • QSR Menu Boards<br>• Outdoor TV | • Wayfinding<br>• Outdoor Mall | • Street Furniture<br>• Mobile Signage |

**SNB / UNB**

| Professional | Indoor Events | Billboard |
|---|---|---|
| • Control Room<br>• Simulation | • Scoreboard<br>• Sports Broadcasting | • Dynamic Signage<br>• Flagship Retail |

**Indoor PID**

| Entertainment | Transportation | Communication | Rental |
|---|---|---|---|
| • Casino<br>• Theatre | • Airport<br>• Train/Bus Station | • Conference Room | • Rental<br>• Staging |

**E-Board PID**

| Commercial | Education | Hospitality |
|---|---|---|
| • Kiosk<br>• Conference Systems | • Interactive FPD | • Hotel Signage |

## Product Segmentation

| Type | Class | Warranty | Bezel | Suggested Run Time | Brightness | Usage | Applications | Value Tier |
|---|---|---|---|---|---|---|---|---|
| Outdoor PID | High Bright, Wide Temp | 2 years | Normal | 20+ hours | 2500-5000 nits | Heavy | Outdoor | Premium commercial range |
| SNB / UNB | Super / Ultra 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 |

## SAMSUNG PUBLIC INFORMATION DISPLAY (PID) PANEL LINEUP

| Type | Model | Size | Model Resolution | Bezel | Backlight | Brightness (typical) | Contrast Ratio | Response Time | Frequency | MP* | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Outdoor PID | LTI460HZ01 | 46" | FHD | Narrow | D-LED | 5,000 nits | 4,000:1 | 8ms | 60Hz | Now | High Bright, Hi Temp LC, 1/4λ Pol. |
| | LTI460HF01 | 46" | FHD | Narrow | D-LED | 2,500 nits | 5,000:1 | 8ms | 60Hz | Q4, '14 | High Bright, Hi Temp LC, 1/4λ Pol. |
| | LTI550HF04 | 55" | FHD | Narrow | D-LED | 2,500 nits | 5,000:1 | 8ms | 60Hz | Q4, '14 | High Bright, Hi Temp LC, 1/4λ Pol. |
| | LTI750HF01 | 75" | FHD | Narrow | D-LED | 2,500 nits | 5,000:1 | 8ms | 60Hz | Q4, '14 | High Bright, Hi Temp LC, 1/4λ Pol. |
| 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 |
| | LTI460HN12 | 46" | FHD | Ultra narrow | D-LED | 500 nits | 3,000:1 | 8ms | 60Hz | Q4, '14 | 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 |
| | LTI550HN10 | 55" | FHD | Ultra narrow | D-LED | 500 nits | 3,000:1 | 8ms | 60Hz | Q4, '14 | 3.9mm Active to Active, LED |
| Indoor PID | LTI400HA10 | 40" | FHD | Narrow | eLED | 700 nits | 3,000:1 | 8ms | 60Hz | Now | eLED, Landscape / Portrait |
| | LTI460HN08 | 46" | FHD | Narrow | eLED | 700 nits | 4,000:1 | 8ms | 60Hz | Now | eLED, Landscape / Portrait |
| | LTI550HN06 | 55" | FHD | Narrow | eLED | 700 nits | 4,000:1 | 8ms | 60Hz | Now | eLED, Landscape / Portrait |
| | LTI550HN07 | 55" | FHD | Narrow | eLED | 450 nits | 4,000:1 | 8ms | 60Hz | Now | E-Board; Landscape/Portrait |
| | NEW | 75" | FHD | Normal | D-LED | 500 nits | 3,500:1 | 8 ms | 120Hz | Q4, '14 | 120Hz, Landscape / Portrait |
| | NEW | 75" | UHD | Normal | D-LED | 500 nits | 3,500:1 | 8 ms | 240Hz | Q4, '14 | 240Hz, 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 |

## TABLETS

| Size | PN | Mode | Resolution | H(RGB) | V | Aspect Ratio | PPI | Brightness (nits) | MP |
|---|---|---|---|---|---|---|---|---|---|
| 7" | LTN070AL01 | PLS | WXGA | 1280 | 800 | 16:10 | 216 | 400 | EOL |
| | LTL070NL01 | PLS | WSVGA | 1024 | 600 | 16:9 | 170 | 400 | Now |
| 8.0" Open Cell | LTL080AL01 | PLS | WXGA | 1280 | 800 | 16:9 | 189 | Open Cell | Now |
| 10.1" | LTL101AL06 | PLS | WXGA | 1280 | 800 | 16:10 | 149 | 400 | Now |
| | 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 | 16:9 | 96 | 300 | Now |
| 27" | LTM270HT03 | TN | FHD | 1920 | 1080 | 16:9 | 82 | 300 | Now |
| | LTM270DL02 | PLS | QHD | 2560 | 1440 | 16:9 | 109 | 300 | Now |
| | LTM270HL02 | PLS | FHD | 1920 | 1080 | 16:9 | 82 | 350 | Now |
| 31.5" | LTM315FL01 | PLS | UHD | 3840 | 2160 | 16:9 | 140 | 350 | Now |

# Contacts

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

## Adelsa | www.adetronics.com.mx

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Mexico<br>Guadalajara<br>Monterrey<br>Cd. Juarez<br>Reynosa | **MEXICO**<br>Hacienda Corralejo #80<br>Bosque de Echegaray<br>Naucalpan, Mexico 53310 | 52-555-560-5002 | 52-555-363-1010 |
| | | **GUADALAJARA**<br>El Rosario #643<br>Jardines de Los Arcos<br>Guadalajara, Jal, CP 44500 | 52-333-122-3054 | 52-333-647-9611 |
| | | **MONTERREY**<br>Lince #113<br>Cumbre Elite 8vo. Sector<br>Monterrey, NL. CP 64349 | 52-818-214-0011 | 52-818-214-0012 |
| | | **CD. JUAREZ**<br>Rio Magdalena #4425<br>Fovissste Chamizal<br>Cd. Juarez, CH, CP 32310 | 52-656-613-3517 | |
| | | **REYNOSA**<br>Bravo #1040<br>Centro<br>Reynosa, Tam, CP 88500 | 52-899-922-5540 | |

## ATMI Sales | www.atmisales.com

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

## Bear VAI Technology | www.bearvai.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Michigan<br>Ohio<br>Western Pennsylvania<br>Kentucky | **MAIN OFFICE - BRECKSVILLE, OHIO**<br>6910 Treeline Drive<br>Unit H<br>Brecksville, OH 44141 | 440-526-1991 | 440-526-5426 |
| | | **MAIN OFFICE - INDIANA**<br>11451 Overlook Drive<br>Fishers, IN 46037 | 440-832-7637 | 317-845-8650 |
| | | **SOUTHERN OHIO OFFICES**<br>2676 Longwood Dr.<br>Beavercreek, OH 45431 | 440-526-1991 | 440-526-5426 |
| | | 58 E California Ave<br>Columbus, OH 43202 | 440-526-1991 | 440-526-5426 |
| | | **PITTSBURGH OFFICE**<br>1975 Menold Dr.<br>Allison Park, PA 15101 | 440-526-1991 | 412-364-8776 |
| | | **MICHIGAN OFFICES**<br>5506 Alpine Ridge<br>Stevensville, MI 49127 | 440-526-1991 | 440-526-5426 |
| | | 17426 Willow Ridge<br>Northville, MI 48168 | | |
| | | 312 Woodward Ave<br>Rochester, MI 48307 | | |
| | | 600 Broadway Ave NW #617<br>Grand Rapids, MI 49504 | | |
| | | 3120 Edgewood Park Dr.<br>Commerce Twp, MI 48382 | | |

## Core Sales, Inc. | www.coresales.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Chicago<br>Milwaukee | 901 Warrenville Road<br>Suite 211<br>Lisle, IL 60532 | 847-843-8888 | |

## Crestone Technology Group | www.crestonegroup.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Idaho<br>Montana<br>Wyoming<br>Utah<br>Colorado | **COLORADO**<br>7108 S. Alton Way<br>Building L<br>Centennial, CO 80112 | 303-280-7202 | 720-482-2220 |
| | | **UTAH**<br>(home office based) | | |

## Customer 1st | www.customer1st.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | North Dakota<br>South Dakota<br>Nebraska<br>Kansas<br>Minnesota<br>Iowa<br>Missouri<br>Wisconsin (exclude Milwaukee)<br>Illinois (exclude Chicago) | **MINNESOTA**<br>2950 Metro Drive<br>Suite 101<br>Bloomington, MN 55425 | 952-851-7909 | 952-851-7907 |
| | | **KANSAS**<br>2111 E. Crossroad Lane<br>#202<br>Olathe, KS 66062 | | |

## InTELaTECH | www.intelatech.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI | Canada (exclude BC) | **ONTARIO - CANADA**<br>5225 Orbitor Drive<br>Suite 2 | 905-629-0082 | 905-624-6909<br>905-629-1795<br>905-629-8910 |
| | | 21 Concourse Gate<br>Suite 12<br>Ottawa, ONT K2E 7S4 | 905-629-0082 | 613-221-9160 |
| | | **ALBERTA - CANADA**<br>1925-18th Ave NE<br>Suite #115<br>Calgary, Alberta T2E 7T8 | 905-629-0082 | 403-686-6926 |
| | | **QUEBEC - CANADA**<br>620 St-Jean Blvd<br>Suite 202<br>Pointe Claire Quebec H9R 3K2 | 905-629-0082 | 905-629-0082 |
| | | **BRITISH COLUMBIA - CANADA**<br>5811 Cooney Road<br>Suite 305, South Tower<br>Vancouver, BC V5X 3M1 | 905-629-0082 | 905-629-1795 |

## I-Squared Incorporated | www.isquared.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Northern California<br>Nevada | 2635 N. 1st Street<br>Suite 128<br>San Jose, CA 95134 | 408-988-3400 | 408-988-2079 |
| | | 1250 B Street<br>Petaluma, CA 94952 | | |

## Neptune Electronics (necco) | www.neccoelect.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Southern New York<br>Eastern Pennsylvania<br>West Virginia<br>Virginia<br>Maryland<br>Delaware<br>New Jersey<br>Washington D.C. | 11 Oval Drive<br>Suite 169<br>Islandia, NY 11749 | 631-234-2525 | 631-234-2707 |

## New Elpis, Inc. | www.newelpis.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| LCD | Canada (exclude BC) | 2550 Matheson Blvd.<br>E. Unit 129<br>Mississauga, ONT<br>Canada L4W 4Z1 | | 905-275-4109 |

## New Tech Solutions

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Maine<br>New Hampshire<br>Vermont<br>Massachusetts<br>Rhode Island<br>Connecticut | 26 Ray Avenue<br>Burlington, MA 01803 | 781-229-8888<br>585-204-2183 | 781-229-1614 |

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

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | North Carolina<br>South Carolina<br>Georgia<br>Alabama<br>MIssissippi<br>Florida | **ALABAMA**<br>303 Williams Ave<br>Suite 1011<br>Huntsville, AL 35801 | | |
| | | **GEORGIA**<br>3000 Langford Rd<br>Bldg 300<br>Norcross, GA 30071 | 770-209-9242<br>678-591-6753 | 770-209-9245 |
| | | **NORTH CAROLINA**<br>5540 Centerview Dr<br>Suite 200<br>Raleigh, NC 27606 | | 919-424-3866 |
| | | 10800 Sikes Place<br>Suite 300<br>Charlotte, NC 28277 | 704-846-5744 | |
| | | **FLORIDA**<br>(home office based) | | |

## Tech Coast Sales | www.tc-sales.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Arizona/New Mexico<br>Los Angeles, CA<br>Orange County Area, CA<br>San Diego, CA<br>Southern Nevada | **MAIN OFFICE**<br>23121 Verdugo Drive<br>Suite 101<br>Laguna Hills, CA 92653 | 949-305-6869 | 949-305-4073<br>818-715-1012<br>818-597-1770 |

## West Associates | www.westassociates.com

| PRODUCTS | TERRITORY | ADDRESS | MAIN PHONE | FAX |
|---|---|---|---|---|
| Memory<br>SLSI<br>LCD | Oklahoma<br>Texas<br>Louisiana<br>Arkansas | **AUSTIN / SAN ANTONIO**<br>4100 Duval Rd<br>Bld 1, Ste 102<br>Austin, TX 78759 | 512-343-1199 | 512-343-1922 |
| | | **DALLAS / OKLAHOMA / ARKANSAS**<br>2745 Dallas Pkwy<br>Ste 460<br>Plano, TX 75093 | 972-680-2800 | 972-699-0330 |
| | | **HOUSTON / VALLEY / LOUISIANA**<br>24624 Interstate 45 North<br>Ste 200<br>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**

## Notes

# PRODUCT SELECTION GUIDE

Displays, Memory and Storage

2H 2014


FLASH - SSD

MCP

STORAGE

DISPLAYS

CONTACTS

SAMSUNG

**Samsung Semiconductor, Inc.**
**601 McCarthy Boulevard**
**Milpitas, CA 95035**

**samsung.com/us/oem-solutions**



BR-14-ALL-001 | Printed 10/14