



# DDR2 SDRAM

## DDR's Next Step to Higher Performance

In yet another improvement of its double data rate (DDR) memory, Micron boosts the clock frequency of its DDR266 SDRAM memory by two times with its DDR2 technology. Micron's new DDR2-533 SDRAM also broadens the available bandwidth without increasing power consumption. In fact, its 1.8V VDD and SSTL\_18 I/O can actually reduce device power requirements.

Micron's DDR2 SDRAM, with its fast 533-megabits-per-second transfer rate, gives designers all the tools they need to create the next generation of high-performance, low-power desktops, laptops, and servers. Using this new high-speed technology, a 64-bit memory system can whisk through 4,300 megabytes of data per second, more than 1.5 times faster than standard DDR333.

For additional DDR2 SDRAM resources or to request a data sheet, call us at 208-368-3900.

### Features

- VDD = 1.8V, VDDQ = 1.8V
- I/O = SSTL\_18
- 200 MHz and 266 MHz clock frequencies
- 400 Mb/s/pin and 533 Mb/s/pin data rates
- 3,200 MB/s and 4,300 MB/s for 64-bit systems
- 4n data prefetch
- 4 banks for 256Mb and 512Mb devices
- 8 banks for 1Gb and 2Gb devices
- Burst length of 4 or 8
- WRITE latency = READ latency - 1 clock
- Differential data strobe option
- Duplicate RDQS data strobe option
- READ latency: 3, 4, and 5 clocks
- Posted CAS# additive latency: 0, 1, 2, 3, and 4 clocks
- On-die termination (ODT)
- Off-chip driver (OCD) output impedance calibration option
- FBGA packaging

### DDR2 SDRAM Components

Density	Memory Configuration	Features	Part Number	Package	Speed Mark	MT/s	Samples	Production
				FBGA Balls				
256Mb	64 Meg x 4	4-bank, 1.8V, SSTL_18	MT47H64M4FP	60	5E, 37E	400/533	4Q03	1Q04
	32 Meg x 8	4-bank, 1.8V, SSTL_18	MT47H32M8FP	60	5E, 37E	400/533	4Q03	1Q04
	16 Meg x 16	4-bank, 1.8V, SSTL_18	MT47H16M16FG	84	5E, 37E	400/533	4Q03	1Q04
512Mb	128 Meg x 4	4-bank, 1.8V, SSTL_18	MT47H128M4FT	92	5E, 37E	400/533	2Q04	3Q04
	64 Meg x 8	4-bank, 1.8V, SSTL_18	MT47H64M8FT	92	5E, 37E	400/533	2Q04	3Q04
	32 Meg x 16	4-bank, 1.8V, SSTL_18	MT47H32M16FT	92	5E, 37E	400/533	2Q04	3Q04
1Gb	256 Meg x 4	8-bank, 1.8V, SSTL_18	MT47H256M4FT	92	5E, 37E	400/533	2Q04	3Q04
	128 Meg x 8	8-bank, 1.8V, SSTL_18	MT47H128M8FT	92	5E, 37E	400/533	2Q04	3Q04
	64 Meg x 16	8-bank, 1.8V, SSTL_18	MT47H64M16FT	92	5E, 37E	400/533	2Q04	3Q04





DDR2 SDRAM Modules

Density	Description <sup>1</sup>	CS/ Rank <sup>2</sup>	DRAM Components	Base Module Part Number	Speed Mark <sup>3</sup>	CAS Latency	PCB (Height)	Data Rate <sup>4</sup>	Sample	Prod.
■ 200-pin SODIMM										
256MB	DS/DR 32 Meg x 64 1.8V Gold	1	(8) 16 Meg x 16 FBGA	MT8HTF3264HDG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
256MB	SS/SR 32 Meg x 64 1.8V Gold	1	(4) 32 Meg x 16 FBGA	MT4HTF3264HG <sup>5</sup>	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
512MB	DS/DR 64 Meg x 64 1.8V Gold	1	(8) 32 Meg x 16 FBGA	MT8HTF6464HDG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
512MB	SS/SR 64 Meg x 64 1.8V Gold	1	(4) 64 Meg x 16 FBGA	MT4HTF6464HG <sup>5</sup>	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
1GB	DS/DR 128 Meg x 64 1.8V Gold	1	(8) 64 Meg x 16 FBGA	MT8HTF12864HDG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04

■ 240-pin Unbuffered DIMM										
128MB	SS/SR 16 Meg x 64 1.8V Gold	1	(4) 16 Meg x 16 FBGA	MT4HTF1664AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
256MB	SS/SR 32 Meg x 64 1.8V Gold	1	(8) 32 Meg x 8 FBGA	MT8HTF3264AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
256MB	SS/SR 32 Meg x 72 1.8V ECC Gold	1	(9) 32 Meg x 8 FBGA	MT9HTF3272AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
512MB	DS/DR 64 Meg x 64 1.8V Gold	1	(16) 32 Meg x 8 FBGA	MT16HTF6464AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
512MB	DS/DR 64 Meg x 72 1.8V ECC Gold	1	(18) 32 Meg x 8 FBGA	MT18HTF6472AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
512MB	SS/SR 64 Meg x 64 1.8V Gold	1	(8) 64 Meg x 8 FBGA	MT8HTF6464AG <sup>5</sup>	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
512MB	SS/SR 64 Meg x 72 1.8V ECC Gold	1	(9) 64 Meg x 8 FBGA	MT9HTF6472AG <sup>5</sup>	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
1GB	DS/DR 128 Meg x 64 1.8V Gold	1	(16) 64 Meg x 8 FBGA	MT16HTF12864AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
1GB	DS/DR 128 Meg x 72 1.8V ECC Gold	1	(18) 64 Meg x 8 FBGA	MT18HTF12872AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
1GB	SS/SR 128 Meg x 64 1.8V Gold	1	(8) 128 Meg x 8 FBGA	MT8HTF12864AG <sup>5</sup>	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
1GB	SS/SR 128 Meg x 72 1.8V ECC Gold	1	(9) 128 Meg x 8 FBGA	MT9HTF12872AG <sup>5</sup>	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
2GB	DS/DR 256 Meg x 64 1.8V Gold	1	(16) 128 Meg x 8 FBGA	MT16HTF25664AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
2GB	DS/DR 256 Meg x 72 1.8V ECC Gold	1	(18) 128 Meg x 8 FBGA	MT18HTF25672AG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04

■ 240-pin Registered DIMM										
256MB	SS/SR 32 Meg x 72 1.8V ECC Gold	1	(9) 32 Meg x 8 FBGA	MT9HTF3272G	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
512MB	DS/DR 64 Meg x 72 1.8V ECC Gold	1	(18) 32 Meg x 8 FBGA	MT18HTF6472DG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
512MB	DS/DR 64 Meg x 72 1.8V ECC Gold	1	(18) 64 Meg x 4 FBGA	MT18HTF6472G	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	4Q03 4Q03	1Q04 1Q04
512MB	SS/SR 64 Meg x 72 1.8V ECC Gold	1	(9) 64 Meg x 8 FBGA	MT9HTF6472DG <sup>5</sup>	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
1GB	DS/DR 128 Meg x 72 1.8V ECC Gold	1	(18) 64 Meg x 8 FBGA	MT18HTF12872DG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
1GB	DS/SR 128 Meg x 72 1.8V ECC Gold	1	(18) 128 Meg x 4 FBGA	MT18HTF12872G	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
1GB	SS/SR 128 Meg x 72 1.8V ECC Gold	1	(9) 128 Meg x 4 FBGA	MT9HTF12872G <sup>5</sup>	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
2GB	DS/DR 256 Meg x 72 1.8V ECC Gold	1	(18) 128 Meg x 8 FBGA	MT18HTF25672DG	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04
2GB	DS/DR 256 Meg x 72 1.8V ECC Gold	1	(18) 128 Meg x 4 FBGA	MT18HTF25672G	-40EXX -53EXX	3 4	1.18" 1.18"	3,200 4,200	2Q04 2Q04	3Q04 3Q04

Note: <sup>1</sup>DS = Double-sided; SS = Single-sided; DR = Dual rank; SR = Single rank. <sup>2</sup>CS/Rank = Number of chip selects per rank. <sup>3</sup>XX = Die/PCB rev. <sup>4</sup>Data Rate = MB/s on 64-bit data bus. <sup>5</sup>Production schedule considerations may affect availability. Please contact Micron Product Marketing for details.