



# 512MB – 2x32Mx64 DDR2 SDRAM UNBUFFERED, w/PLL

## FEATURES

- 200-pin, dual in-line memory module (SO-DIMM)
- Fast data transfer rates: PC2-6400\*, PC2-5300\*, PC2-4200 and PC2-3200
- Utilizes 800, 667, 533 and 400 MT/s DDR2 SDRAM components
- Supports ECC error detection and correction
- V<sub>CC</sub> = V<sub>CCQ</sub> = 1.8V
- V<sub>CCSPD</sub> = 1.7V to 3.6V
- JEDEC standard 1.8V I/O (SSTL\_18-compatible)
- Differential data strobe (DQS, DQS#) option
- Four-bit prefetch architecture
- DLL to align DQ and DQS transitions with CK
- Multiple internal device banks for concurrent operation
- Supports duplicate output strobe (RDQS/RDQS#)
- Programmable CAS# latency (CL): 3, 4, 5 and 6
- Adjustable data-output drive strength
- On-die termination (ODT)
- Posted CAS# latency: 0, 1, 2, 3 and 4
- Serial Presence Detect (SPD) with EEPROM
- 64ms: 8,192 cycle refresh
- Gold edge contacts
- Product is lead-free
- JEDEC Package option
  - 200 Pin (SO-DIMM)
  - PCB – TBD

## DESCRIPTION

The W3HG232M64SEU is a 2x32Mx64 Double Data Rate 2 SDRAM memory module based on 512Mb DDR2 SDRAM components. The module consists of eight 32Mx16, in FBGA package mounted on a 200 pin SO-DIMM FR4 substrate.

\* This product is under development, is not qualified or characterized and is subject to change or cancellation without notice.

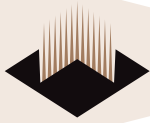
NOTE: Consult factory for availability of:

- RoHS compliant products
- Vendor source control options
- Industrial temperature options

## OPERATING FREQUENCIES

	PC2-6400*	PC2-5300*	PC2-4200	PC2-3200
Clock Speed	400MHz	333MHz	266MHz	200MHz
CL-trcd-trp	6-6-6	5-5-5	4-4-4	3-3-3

\* Consult factory for availability



## PIN CONFIGURATION

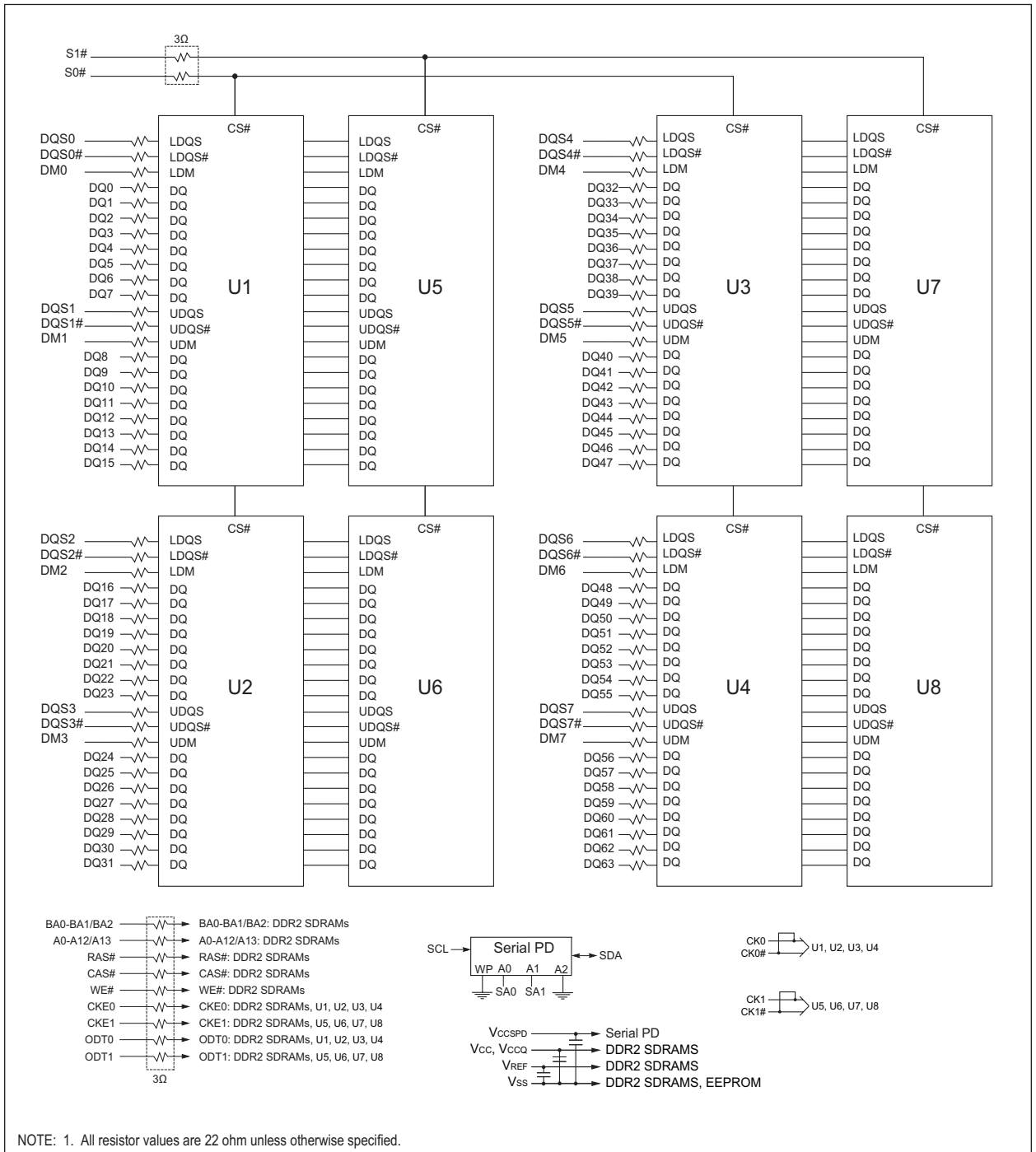
PIN#	SYMBOL	PIN#	SYMBOL	PIN#	SYMBOL	PIN#	SYMBOL
1	VREF	51	DQS2	101	A1	151	DQ42
2	Vss	52	DM2	102	A0	152	DQ46
3	Vss	53	Vss	103	Vcc	153	DQ43
4	DQ4	54	Vss	104	Vcc	154	DQ47
5	DQ0	55	DQ18	105	A10/AP	155	Vss
6	DQ5	56	DQ22	106	BA1	156	Vss
7	DQ1	57	DQ19	107	BA0	157	DQ48
8	Vss	58	DQ23	108	RAS#	158	DQ52
9	Vss	59	Vss	109	WE#	159	DQ49
10	DM0	60	Vss	110	S0#	160	DQ53
11	DQS0#	61	DQ24	111	Vcc	161	Vss
12	Vss	62	DQ28	112	Vcc	162	Vss
13	DQS0	63	DQ25	113	CAS#	163	NC
14	DQ6	64	DQ29	114	ODT0	164	CK1
15	Vss	65	Vss	115	S1#	165	Vss
16	DQ7	66	Vss	116	NC	166	CK1#
17	DQ2	67	DM3	117	Vcc	167	DQS6#
18	Vss	68	DQS3#	118	Vcc	168	Vss
19	DQ3	69	NC	119	ODT1	169	DQS6
20	DQ12	70	DQS3	120	NC	170	DM6
21	Vss	71	Vss	121	Vss	171	Vss
22	DQ13	72	Vss	122	Vss	172	Vss
23	DQ8	73	DQ26	123	DQ32	173	DQ50
24	Vss	74	DQ30	124	DQ36	174	DQ54
25	DQ9	75	DQ27	125	DQ33	175	DQ51
26	DM1	76	DQ31	126	DQ37	176	DQ55
27	Vss	77	Vss	127	Vss	177	Vss
28	Vss	78	Vss	128	Vss	178	Vss
29	DQS1#	79	CKE0	129	DQS4#	179	DQ56
30	CK0	80	CKE1	130	DM4	180	DQ60
31	DQS1	81	Vcc	131	DQS4	181	DQ57
32	CK0#	82	Vcc	132	Vss	182	DQ61
33	Vss	83	NC	133	Vss	183	Vss
34	Vss	84	NC	134	DQ38	184	Vss
35	DQ10	85	NC	135	DQ34	185	DM7
36	DQ14	86	NC	136	DQ39	186	DQS7#
37	DQ11	87	Vcc	137	DQ35	187	Vss
38	DQ15	88	Vcc	138	Vss	188	DQS7
39	Vss	89	A12	139	Vss	189	DQ58
40	Vss	90	A11	140	DQ44	190	Vss
41	Vss	91	A9	141	DQ40	191	DQ59
42	Vss	92	A7	142	DQ45	192	DQ62
43	DQ16	93	A8	143	DQ41	193	Vss
44	DQ20	94	A6	144	Vss	194	DQ63
45	DQ17	95	Vcc	145	Vss	195	SDA
46	DQ21	96	Vcc	146	DQS5#	196	Vss
47	Vss	97	A5	147	DM5	197	SCL
48	Vss	98	A4	148	DQS5	198	SA0
49	DQS2#	99	A3	149	Vss	199	VCCSPD
50	NC	100	A2	150	Vss	200	SA1

## PIN NAMES

SYMBOL	DESCRIPTION
A0-A12	Address input
ODT0, ODT1	On-Die Termination
CK0, CK0#	Clock Input
CK1, CK1#	Clock input
CKE0-CKE1	Clock Enable input
S0#-S1#	Chip select
RAS#, CAS#, WE#	Command Inputs
BA0, BA1	Command Inputs
DM0-DM7	Input Data Mask
DQ0-DQ63	Data Input/Output
DQS0-DQS7	Data Strobe
DQS0#-DQS7#	Data Strobe
SCL	Serial Clock for Presence Detect
SA0-SA1	Presence Detect Address Input
SDA	Serial Presence Detect Data
Vcc	Power Supply: +1.8V ±0.1V
VREF	SSTL_18 reference voltage
Vss	Ground
VCCSPD	Serial EEPROM Positive Power Supply
NC	No Connect



FUNCTIONAL BLOCK DIAGRAM



NOTE: 1. All resistor values are 22 ohm unless otherwise specified.

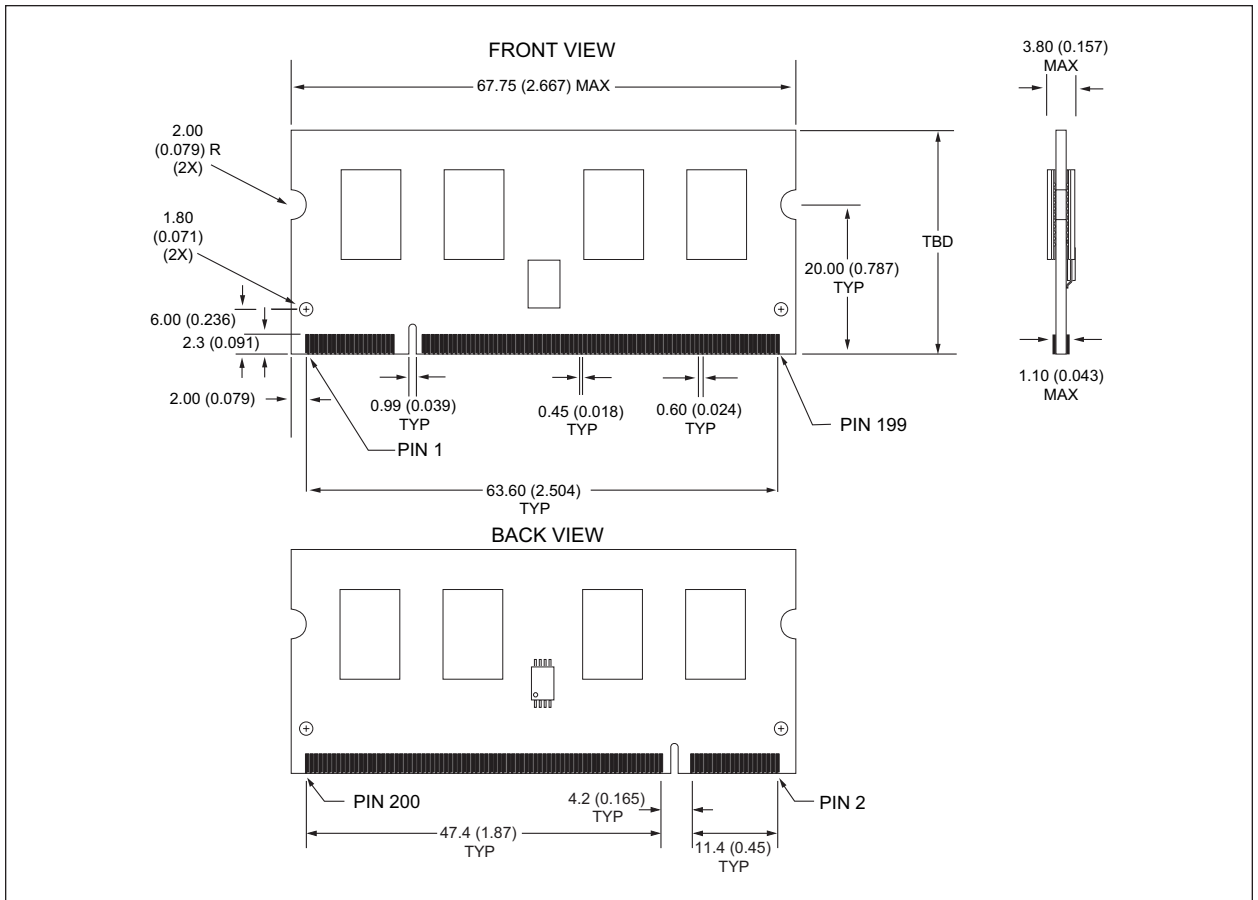


**ORDERING INFORMATION FOR D6**

Part Number	Speed	CAS Latency	t <sub>RC</sub> D	t <sub>RP</sub>	Height*
W3HG232M64SEU806D4xF	400MHz/800Mb/s	6	6	6	TBD
W3HG232M64SEU665D4xF	333MHz/667Mb/s	5	5	5	TBD
W3HG232M64SEU534D4xF	266MHz/533Mb/s	4	4	4	TBD
W3HG232M64SEU403D4xF	200MHz/400Mb/s	3	3	3	TBD

- NOTES:
- Consult Factory for availability of RoHS products. ("F" = Lead-Free will be replaced with "G" = RoHS Compliant)
  - Vendor specific part numbers are used to provide memory component source control. The place holder for this is shown as a lower case "x" in the part numbers above and is to be replaced with respective vendors code. Consult factory for qualified sourcing options.  
(M = Micron, S = Samsung & consult factory for others)
  - Consult factory for availability of industrial temperature (-40°C to 85°C) option

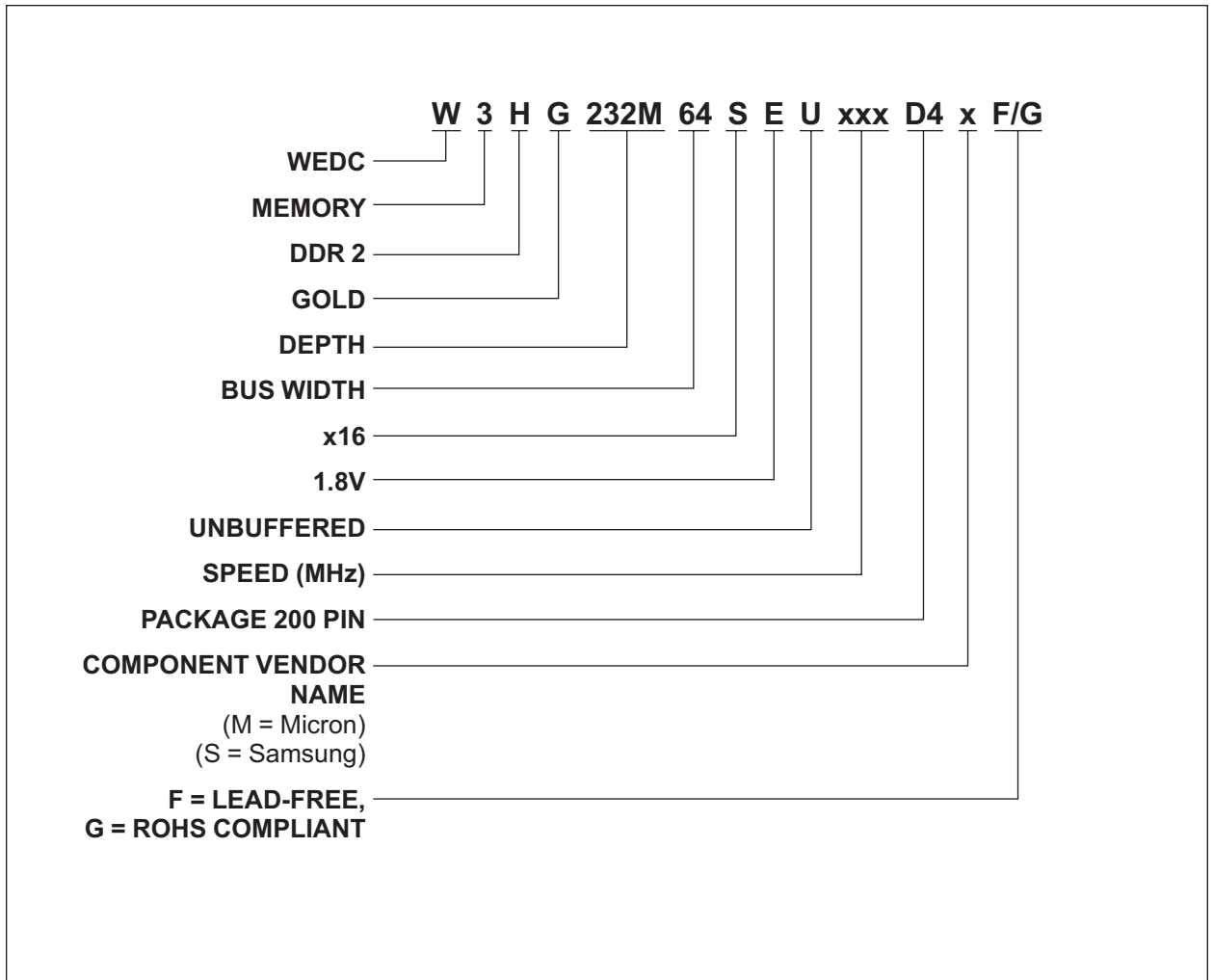
**PACKAGE DIMENSIONS FOR D4**



\* ALL DIMENSIONS ARE IN MILLIMETERS AND (INCHES)



**PART NUMBERING GUIDE**





**Document Title**

1GB – 128Mx72 DDR2 SDRAM UNBUFFERED, w/PLL

**Revision History**

<b>Rev #</b>	<b>History</b>	<b>Release Date</b>	<b>Status</b>
Rev 0	Created	February 2005	Advanced