

## Features

- 240-pin, DDR2 Fully Buffered Dual In-line Memory Module (FBDIMM)
- High-speed, 1.5V differential, point-to-point link between the host controller and advanced memory buffer (AMB)
- SMBus interface to AMB for configuration register access
- VDD = VDDQ = +1.8V,
- VDDSPD = +1.7V to +3.6V,
- VCC = 1.5V for AMB
- Channel fail over mode support
- Programmable CAS Latency: 3, 4, 5
- In-band and out-of-band command access
- MBIST and IBIST Test functions
- Automatic DDR2 SDRAM bus and channel calibration
- Serial presence-detect (SPD) with EEPROM
- Gold edge contacts

## Module Specification

Part Number	Module Density & Configuration	Bandwidth	Data Rate	Timing (tCL-tRCD-tRP)
SP001GBFRI667O01	1GB (128Mx72) 64Mx8 2Rank With Intel Heat Sink	PC2-5300	DDR2-667	5-5-5
SP001GBFRI800O01		PC2-6400	DDR2-800	5-5-5
SP001GBFRI533S01	1GB (128Mx72) 128Mx8 1Rank With Intel Heat Sink	PC2-4200	DDR2-533	4-4-4
SP001GBFRI667S01		PC2-5300	DDR2-667	5-5-5
SP001GBFRI800S01		PC2-6400	DDR2-800	5-5-5
SP002GBFRI533S01	2GB (256Mx72) 128Mx8 2Ranks With Intel Heat Sink	PC2-4200	DDR2-533	4-4-4
SP002GBFRI667S01		PC2-5300	DDR2-667	5-5-5
SP002GBFRI800S01		PC2-6400	DDR2-800	5-5-5
SP004GBFRI667S01	4GB (512Mx72) 128Mx8 4Ranks With Intel Heat Sink	PC2-5300	DDR2-667	5-5-5
SP004GBFRI800S01		PC2-6400	DDR2-800	5-5-5
SP004GBFRI667U01	4GB (512Mx72) 256Mx4 2Rank With Intel Heat Sink	PC2-5300	DDR2-667	5-5-5
SP004GBFRI800U01		PC2-6400	DDR2-800	5-5-5
SP001GBFRE533O01	1GB (128Mx72) 64Mx8 2Rank With Apple Heat Sink	PC2-4200	DDR2-533	4-4-4
SP001GBFRE667O01		PC2-5300	DDR2-667	5-5-5
SP001GBFRE800O01		PC2-6400	DDR2-800	5-5-5
SP001GBFRE533S01	1GB (128Mx72) 128Mx8 1Rank With Apple I Heat Sink	PC2-4200	DDR2-533	4-4-4
SP001GBFRE667S01		PC2-5300	DDR2-667	5-5-5
SP001GBFRE800S01		PC2-6400	DDR2-800	5-5-5
SP002GBFRE533S01	2GB (256Mx72) 128Mx8 2Ranks With Apple Heat Sink	PC2-4200	DDR2-533	4-4-4
SP002GBFRE667S01		PC2-5300	DDR2-667	5-5-5
SP002GBFRE800S01		PC2-6400	DDR2-800	5-5-5
SP004GBFRE667S01	4GB (512Mx72) 128Mx8 4Ranks With Apple Heat Sink	PC2-5300	DDR2-667	5-5-5
SP004GBFRE800S01		PC2-6400	DDR2-800	5-5-5
SP004GBFRE667U01	4GB (512Mx72) 256Mx4 2Rank With Apple Heat Sink	PC2-5300	DDR2-667	5-5-5
SP004GBFRE800U01		PC2-6400	DDR2-800	5-5-5

**Note:**

This document supports all DDR2 240Pin RDIMM products.

Some item was be EOL in this list, Please contact with our sales Dep.

## Pin Assignments

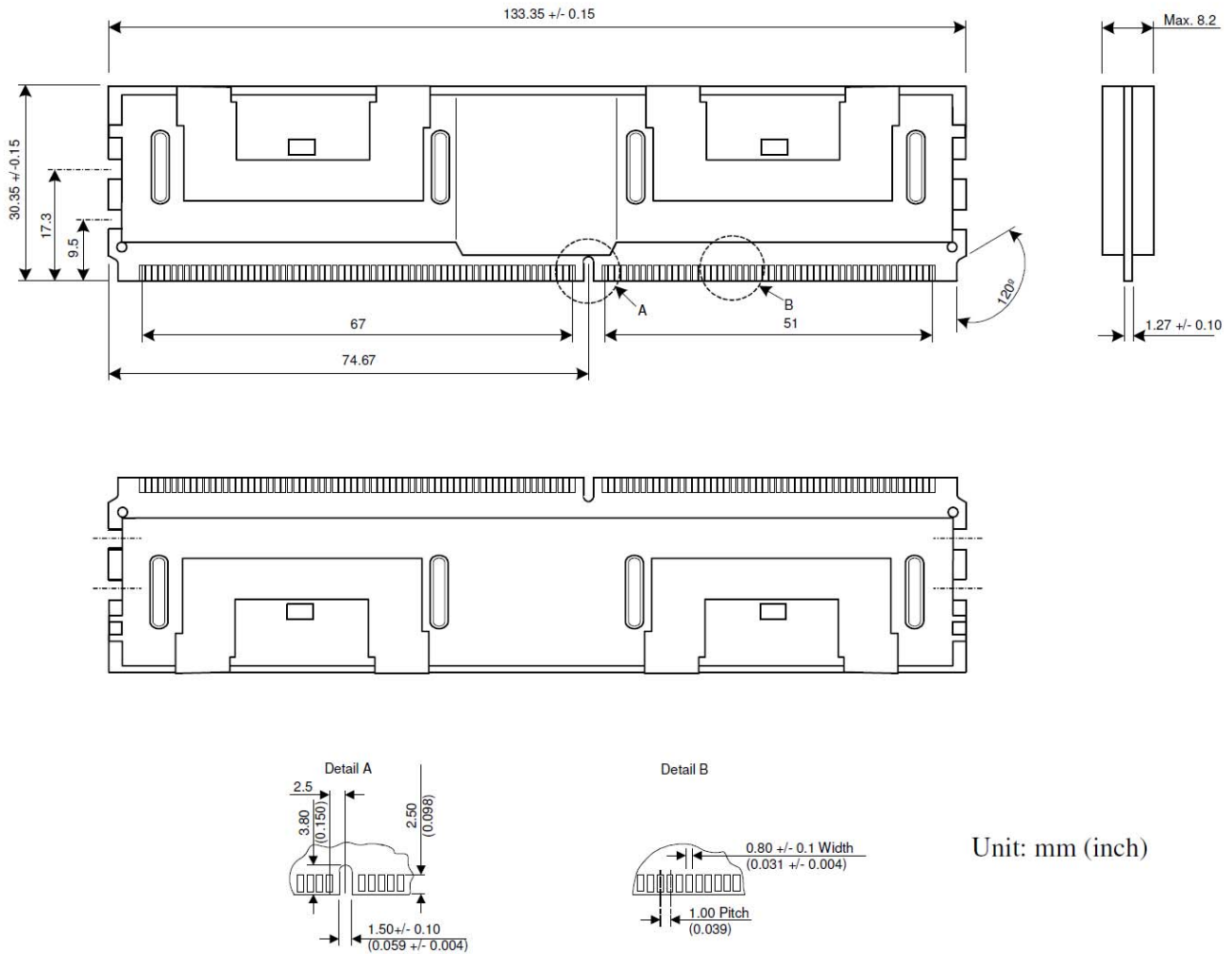
240-Pin FBDIMM Front								240-Pin FBDIMM Back							
Pin	Symbol	Pin	Symbol	Pin	Symbol	Pin	Symbol	Pin	Symbol	Pin	Symbol	Pin	Symbol	Pin	Symbol
1	VDD	31	PN3	61	PN9#	91	PS9#	121	VDD	151	SN3	181	SN9#	211	SS9#
2	VDD	32	PN3#	62	VSS	92	VSS	122	VDD	152	SN3#	182	VSS	212	VSS
3	VDD	33	VSS	63	PN10	93	PS5	123	VDD	153	VSS	183	SN10	213	SS5
4	VSS	34	PN4	64	PN10#	94	PS5#	124	VSS	154	SN4	184	SN10#	214	SS5#
5	VDD	35	PN4#	65	VSS	95	VSS	125	VDD	155	SN4#	185	VSS	215	VSS
6	VDD	36	VSS	66	PN11	96	PS6	126	VDD	156	VSS	186	SN11	216	SS6
7	VDD	37	PN5	67	PN11#	97	PS6#	127	VDD	157	SN5	187	SN11#	217	SS6#
8	VSS	38	PN5#	68	VSS	98	VSS	128	VSS	158	SN5#	188	VSS	218	VSS
9	VCC	39	VSS	69	VSS	99	PS7	129	VCC	159	VSS	189	VSS	219	SS7
10	VCC	40	PN131	70	PS0	100	PS7#	130	VCC	160	SN131	190	SS0	220	SS7#
11	VSS	41	PN13#	71	PS0#	101	VSS	131	VSS	161	SN13#	191	SS0#	221	VSS
12	VCC	42	VSS	72	VSS	102	PS8	132	VCC	162	VSS	192	VSS	222	SS8
13	VCC	43	VSS	73	PS1	103	PS8#	133	VCC	163	VSS	193	SS1	223	SS8#
14	VSS	44	DNU	74	PS1#	104	VSS	134	VSS	164	DNU	194	SS1#	224	VSS
15	VTT	45	DNU	75	VSS	105	DNU	135	VTT	165	DNU	195	VSS	225	DNU
16	DNU	46	VSS	76	PS2	106	DNU	136	DNU	166	VSS	196	SS2	226	DNU
17	RESET#	47	VSS	77	PS2#	107	VSS	137	M_Test (DNU)	167	VSS	197	SS2#	227	VSS
18	VSS	48	PN121	78	VSS	108	VDD	138	VSS	168	SN121	198	VSS	228	SCK
19	DNU	49	PN12#	79	PS3	109	VDD	139	DNU	169	SN12#	199	SS3	229	SCK#
20	DNU	50	VSS	80	PS3#	110	VSS	140	DNU	170	VSS	200	SS3#	230	VSS
21	VSS	51	PN6	81	VSS	111	VDD	141	VSS	171	SN6	201	VSS	231	VDD
22	PN0	52	PN6#	82	PS4	112	VDD	142	SN0	172	SN6#	202	SS4	232	VDD
23	PN0#	53	VSS	83	PS4#	113	VDD	143	SN0#	173	VSS	203	SS4#	233	VDD
24	VSS	54	PN7	84	VSS	114	VSS	144	VSS	174	SN7	204	VSS	234	VSS
25	PN1	55	PN7#	85	VSS	115	VDD	145	SN1	175	SN7#	205	VSS	235	VDD
26	PN1#	56	VSS	86	DNU	116	VDD	146	SN1#	176	VSS	206	DNU	236	VDD
27	VSS	57	PN8	87	DNU	117	VTT	147	VSS	177	SN8	207	DNU	237	VTT
28	PN2	58	PN8#	88	VSS	118	SA2	148	SN2	178	SN8#	208	VSS	238	VDDSPD
29	PN2#	59	VSS	89	VSS	119	SDA	149	SN2#	179	VSS	209	VSS	239	SA0
30	VSS	60	PN9	90	PS91	120	SCL	150	VSS	180	SN9	210	SS91	240	SA1

Note: The following signals are cyclical redundancy code (CRC) bits and thus appear out of the normal sequence: PN12/PN12#, SN12/SN12#, PN13/PN13#, SN13/SN13#, PS9/PS9#, SS9/SS9#.

## Pin Description

Symbol	Type	Description
PS[9:0]	Input	Primary southbound data, positive lines.
PS#[9:0]	Input	Primary southbound data, negative lines.
SCK	Input	System clock input, positive line.
SCK#	Input	System clock Input, negative line.
SCL	Input	Serial presence-detect (SPD) clock input.
SS[9:0]	Input	Secondary southbound data, positive lines.
SS#[9:0]	Input	Secondary southbound data, negative lines.
PN[13:0]	Output	Primary northbound data, positive lines.
PN#[13:0]	Output	Primary northbound data, negative lines.
SN[13:0]	Output	Secondary northbound data, positive lines.
SN#[13:0]	Output	Secondary northbound data, negative lines.
SA[2:0]	I/O	SPD address inputs, also used to select the FBDIMM number in the AMB.
SDA	I/O	SPD data input/output.
RESET#	Supply	AMB reset signal.
VCC	Supply	AMB core power and AMB channel interface power (1.5V).
VDD	Supply	DRAM power and AMB DRAM I/O power (1.8V).
VDDSPD	Supply	SPD/AMB SMBUS power (3.3V).
VSS	Supply	Ground.
VTT	Supply	DRAM address/command/clock termination power (VDD/2).
M_Test	–	The M_Test pin provides an external connection for testing the margin of VREF, which is produced by a voltage divider on the module. It is not intended to be used in normal system operation and must not be connected (DNU) in a system. This test pin may have other features on future card designs and will be included in this specification at that time.
DNU	–	Do not use.

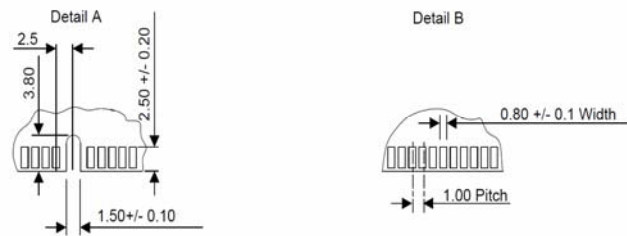
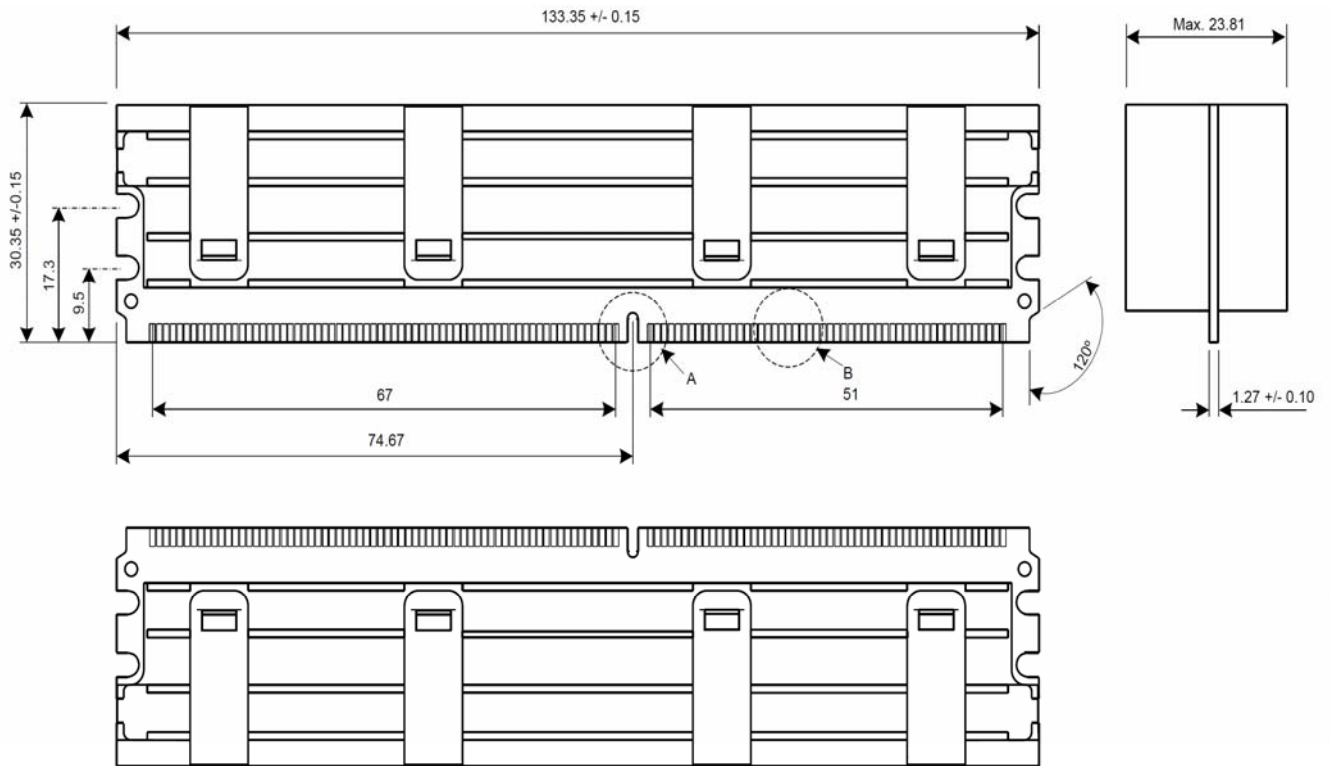
**DDR2 FBDIMM Module Dimensions (Intel Heat Sink)**



**Note 1:** All dimensions are typical unless otherwise stated. (Millimeters)

**Note 2:** The dimensional diagram is for reference only

**DDR2 FBDIMM Module Dimensions (Apple Heat Sink)**



Unit: mm

**Note 1:** All dimensions are typical unless otherwise stated. (Millimeters)

**Note 2:** The dimensional diagram is for reference only