

SOSAM DDR4 RDIMM

32GB 3200MHz

Datasheet Ver1.0

I.Product Basic Information

- Memory Type: PC4-25600 DDR4 288pins R-DIMM CL22
- Memory Model: REG-2G*4-32G36P-3200MT/s
- Memory Capacity: 32GB
- IC Model: DDR4-2Gb*4

II.Technical Specifications

2.1 Memory Parameters

Item	Specification
Type	DDR4-3200
Operating Timing	CL=22, 22-22-22-52
Memory Capacity	32GB
IC Model	DDR4-2Gb*4
IC Structure	2Gb*4
IC Quantity	36
Operating Voltage	1.2V
RCD Model	M88DR4RCD02P
SPD	Yes
Chip Dimension	7.5mm*11mm
PCB Model	CAB4RRCB2

2.2 Environmental Requirements

Item	Specification
Operating Temperature	Commercial($0^{\circ}\text{C} \leq \text{TOPER} \leq 95^{\circ}\text{C}$)
Operating Humidity	Relative Humidity: 10% - 90%
Storage Temperature	-50°C - 100 °C
Storage Humidity	Relative Humidity: 5% - 95%
Operating & Storage Air Pressure	69 - 105 KPa

2.3 SPD Description

SPD must comply with the requirements of JEDEC DDR4 standard.

2.4 PCB Board Performance Parameters

Item	Specification
PCB Material	FR-4
Finished Board Thickness	55 ±4 mil
Ni/Au Plating Thickness	Au:30u/Ni:120-140u±15%
Board Warpage	<0.75%
Solder Mask	Green
Module Outline Dimension	5250 x 1230 mil
Impedance	Single-ended: 50/55 Ω±10%
	Differential: 85/93 Ω±15%
Number of Layers	12 Layers

2.5 Label Description

Label Type	Specification
PCB Board Label	PCB model printed on the board.
Memory Module Label	Includes memory capacity, frequency, and serial number

2.6 Absolute Maximum DC Ratings

Symbol	Parameter	Rating	Units	NOTE
VDD	Voltage on VDD pin relative to Vss	-0.3~1.5	V	1,3
VDDQ	Voltage on VDDQ pin relative to Vss	-0.3~1.5	V	1,3
VPP	Voltage on VPP pin relative to Vss	-0.3~3.0	V	4
V _{IN} , V _{OUT}	Voltage on any pin except VREFCA relative to Vss	-0.3~1.5	V	1,3,5
T _{STG}	Storage Temperature	-55 to+100	°C	1,2

NOTE:

1. Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability
2. Storage Temperature is the case surface temperature on the center/top side of the DRAM. For the measurement conditions, please refer to JESD51-2 standard.
3. VDD and VDDQ must be within 300 mV of each other at all times;and VREFCA must be not greater than $0.6 \times VDDQ$, When VDD and VDDQ are less than 500 mV ; VREFCA may be equal to or less than 300 mV
4. VPP must be equal or greater than VDD/VDDQ at all times
5. Overshoot area above 1.5V is specified in DDR4 Device Operation.

2.7 DRAM Component Operating Temperature Range

Symbol	Parameter	Rating	Units	Notes
TOPER	Normal Operating Temperature Range	0 to 85	°C	1,2
	Extended Temperature Range	85 to 95	°C	1,3

NOTE:

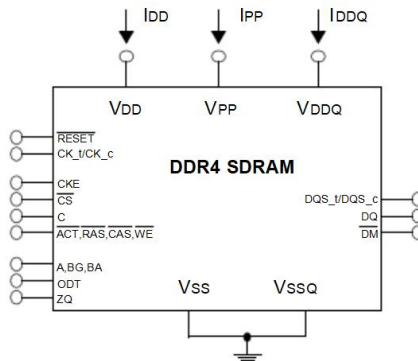
1. Operating Temperature TOPER is the case surface temperature on the center / top side of the DRAM. For measurement conditions, please refer to the JEDEC document JESD51-2.
2. The Normal Temperature Range specifies the temperatures where all DRAM specifications will be supported. During operation, the DRAM case temperature must be maintained between 0 - 85°C under all operating conditions.
3. Some applications require operation of the DRAM in the Extended Temperature Range between 85°C and 95°C case temperature. Full specifications are guaranteed in this range, but the following additional conditions apply:
 - a. Refresh commands must be doubled in frequency, therefore reducing the Refresh interval tREFI to 3.9 μ s. It is also possible to specify a component with 1X refresh (tREFI to 7.8 μ s) in the Extended Temperature Range. Please refer to the DIMM SPD for option availability
 - b. If Self-Refresh operation is required in the Extended Temperature Range, then it is mandatory to either use the Manual Self-Refresh mode with Extended Temperature Range capability (MR2 A6 = 0b and MR2 A7 = 1b) or enable the optional Auto Self-Refresh mode (MR2 A6 = 1b and MR2 A7 = 0b).

2.8 Recommended DC Operating Conditions

Symbol	Parameter	Rating			Unit	NOTE
		Min.	Typ.	Max.		
VDD	Supply Voltage	1.14	1.2	1.26	V	1,2,3
VDDQ	Supply Voltage for Output	1.14	1.2	1.26	V	1,2,3
VPP	Supply Voltage for DRAM Activating	2.375	2.5	2.75	V	3

NOTE:

1. Under all conditions VDDQ must be less than or equal to VDD.
2. VDDQ tracks with VDD. AC parameters are measured with VDD and VDDQ tied together.
3. DC bandwidth is limited to 20MHz.



NOTE:

1. DIMM level Output test load condition may be different from above

Figure 1 - Measurement Setup and Test Load for IDD, IPP and IDDQ Measurements

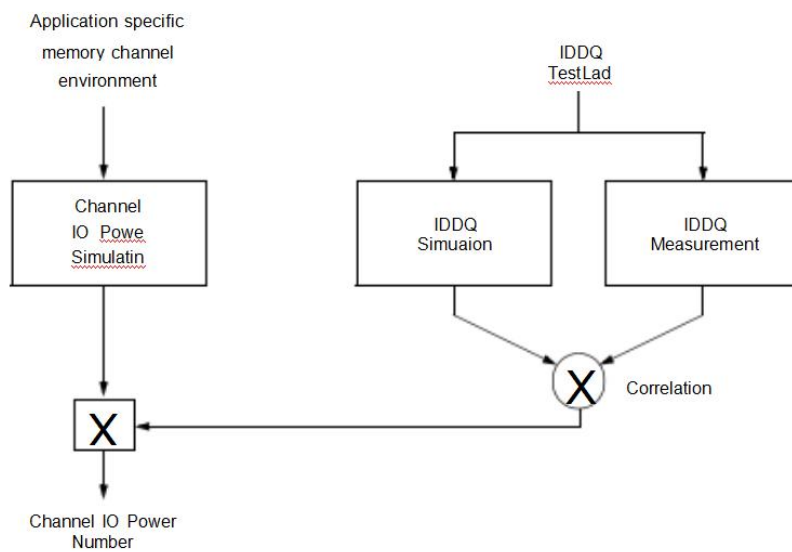


Figure 2 - Correlation from simulated Channel IO Power to actual Channel IO Power supported by IDDQ Measurement

III.Ordering Information

Part Number	Density	Organization	Component Composition	#of ranks
KMD4R32GCAH432DC	32GB	4Gx72	2Gx4(HynixIC)*36	2R

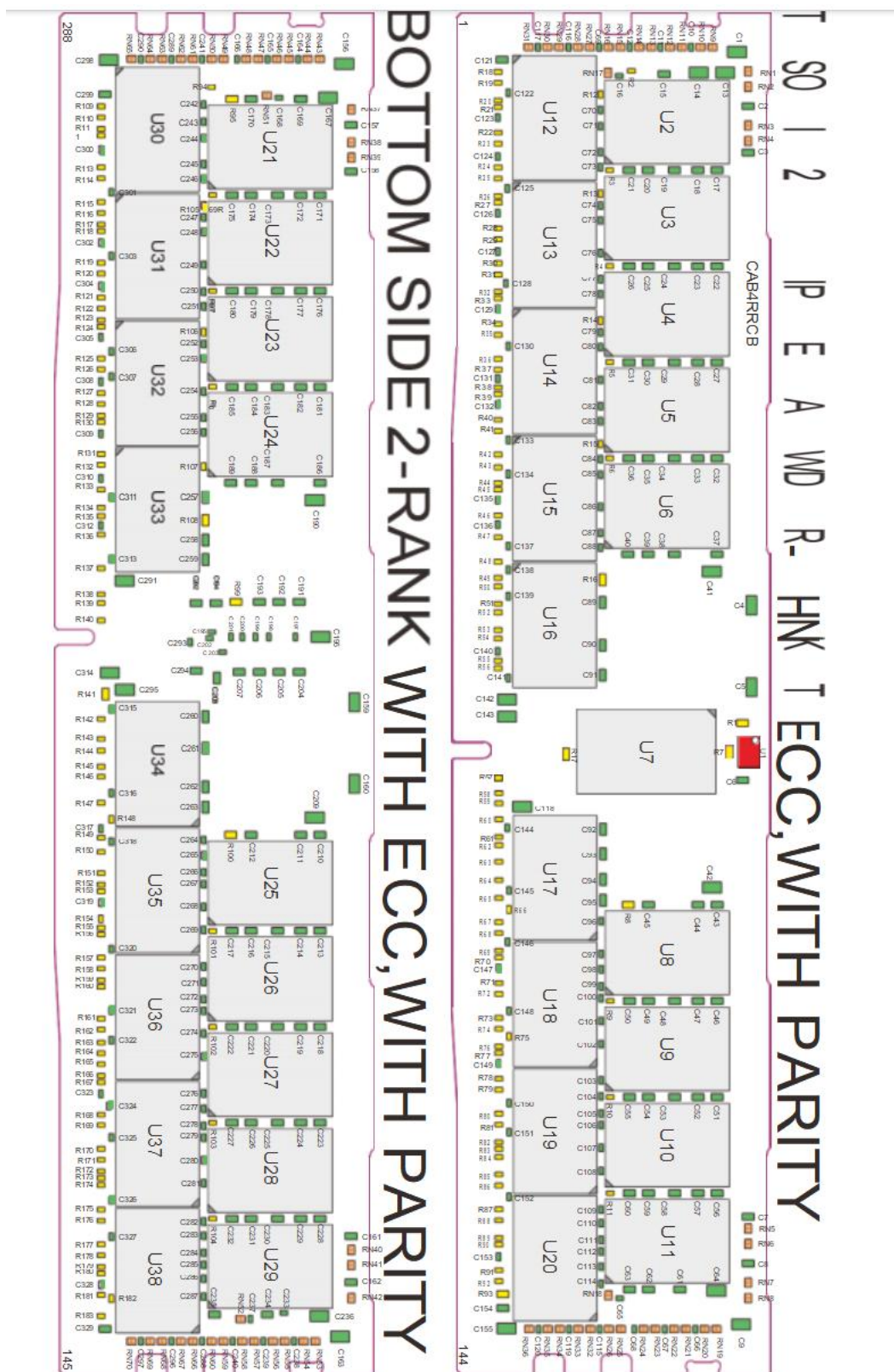
Product Specification:

- Density -- 32GB (x72-bit)
- PC4-25600 3200MT/s
- CL= 22-22-22-52
- IC Marking: Hynix
- Mounting 36 pieces of 2G*4 DDR4, Double Rank - 288pin, Registered, ECC, DDR4 SDRAM DIMM
- 12 Layers Ultra Low Noises Shielded PCB
- Electroplated gold finger: 30u
- Supports ECC error correction and detection
- Temperature sensor with integrated SPD
- VDD= 1.2V $\pm$ 0.06V
- Operation Temperature : 0°C ~ 85°C
- Lead-free (RoHS compliant)

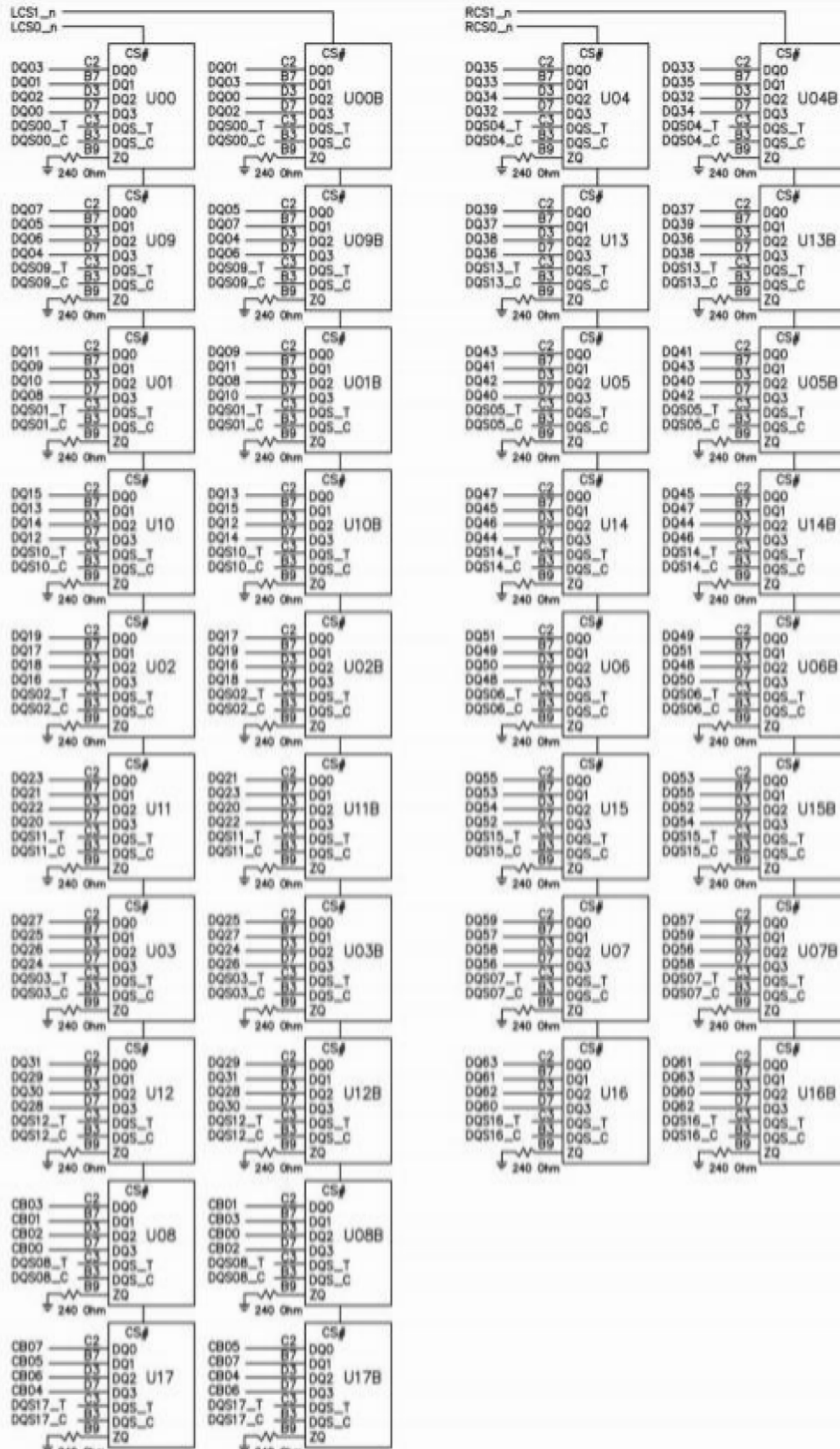
Address Table

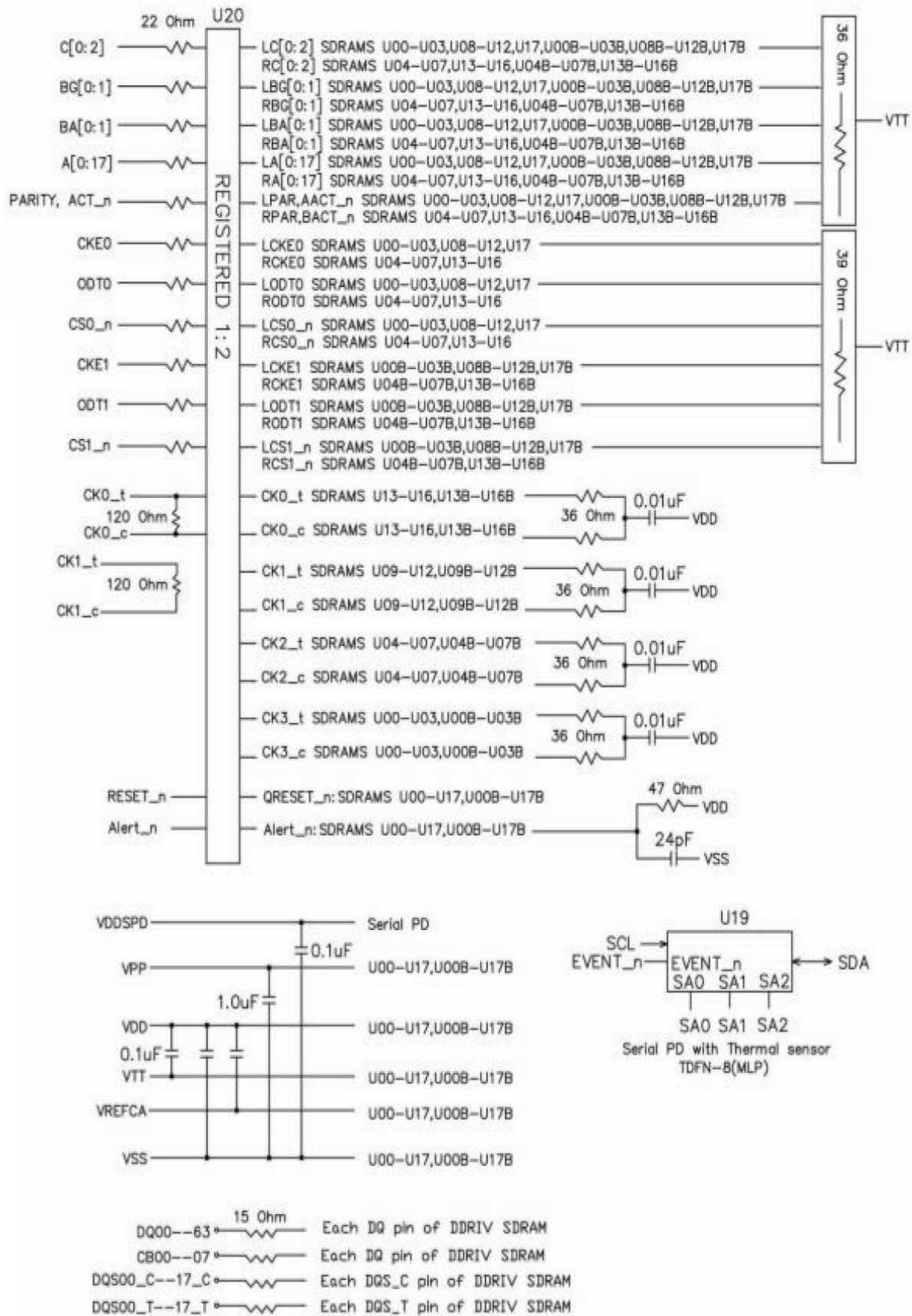
		16GB(1Rx4)	32GB(2Rx4)
Bank Address	# of Bank Groups	4	4
	BG Address	BG0~BG1	BG0~BG1
	Bank Address in a BG	BA0~BA1	BA0~BA1
Row Address		A0~A16	A0~A16
Column Address		A0~A9	A0~A9
Page size		512MB	512MB

IV.Memory Component Location Diagram



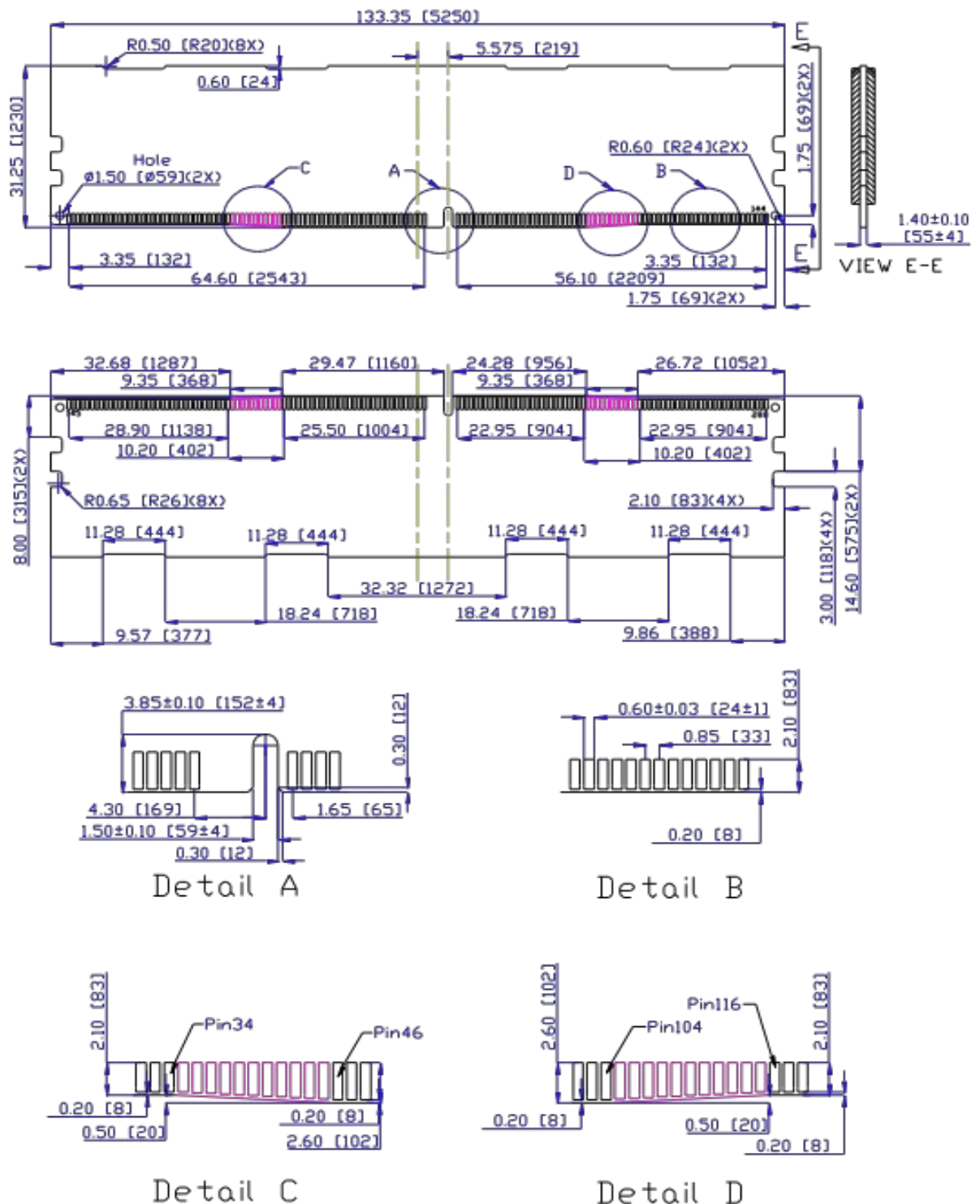
V.Memory Functional Block Diagram





VI.PCB Outline Dimension Drawing

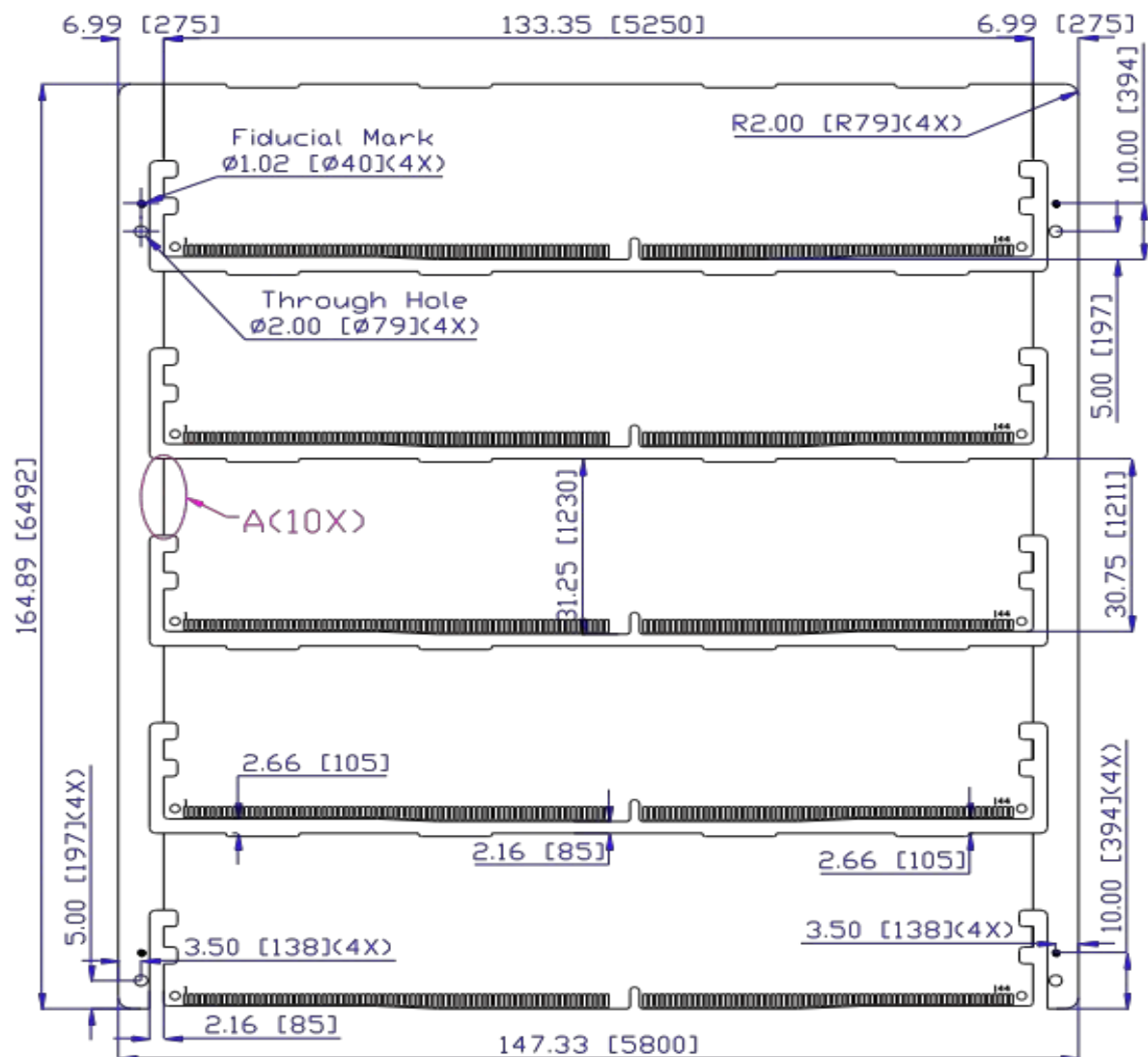
Single PCB Structural Drawing



BC4RRCA2 0.70 HF
 DIMM Module Package Dimensions
 1 PCS Size:133.35[5250]x31.25[1230]

Note:
 All dimensions are in millimeters[mils] and should be kept within a tolerance of ± 0.15 [6], unless otherwise specified.

Panel PCB Structural Drawing



Detail A:
V-CUT

There are some holes on Breakaway of panel which do not indicate size for fabrication purpose.

BC4RRCA2 0.70 HF
DIMM Module Package Dimensions
1 PCS Size:133.35[5250]x31.25[1230]

Note:
All dimensions are in millimeters[mils] and should be kept within a tolerance of ± 0.15 [6], unless otherwise specified.

VII.Registered DIMM pin configurations

Pin#	Front Side	Pin#	Back Side	Pin#	Front Side	Pin#	Back Side
1	12V	145	12V	37	VSS	181	DQ29
2	VSS	146	VREFCA	38	DQ24	182	VSS
3	DQ4	147	VSS	39	VSS	183	DQ25
4	VSS	148	DQ5	40	DQS12_t, DM3_n, DBI3_n, TDQS12_t	184	VSS
5	DQ0	149	VSS	41	DQS12_c, TDQS12_c	185	DQS3_c
6	VSS	150	DQ1	42	VSS	186	DQS3_t
7	DQS9_t, DM0_n, DBI0_n, TDQS9_t	151	VSS	43	DQ30	187	VSS
8	DQS9_c, TDQS9_c	152	DQS0_c	44	VSS	188	DQ31
9	VSS	153	DQS0_t	45	DQ26	189	VSS
10	DQ6	154	VSS	46	VSS	190	DQ27
11	VSS	155	DQ7	47	CB4, NC	191	VSS
12	DQ2	156	VSS	48	VSS	192	CB5, NC
13	VSS	157	DQ3	49	CB0, NC	193	VSS
14	DQ12	158	VSS	50	VSS	194	CB1, NC
15	VSS	159	DQ13	51	DQS17_t, DM8_n, DBI8_n, TDQS17_t	195	VSS
16	DQ8	160	VSS	52	DQS17_c, TDQS17_c	196	DQS8_c
17	VSS	161	DQ9	53	VSS	197	DQS8_t
18	DQS10_t, DM1_n, DBI1_n, TDQS10_t	162	VSS	54	CB6, NC	198	VSS
19	DQS10_c, TDQS10_c	163	DQS1_c	55	VSS	199	CB7, NC
20	VSS	164	DQS1_t	56	CB2, NC	200	VSS
21	DQ14	165	VSS	57	VSS	201	CB3, NC
22	VSS	166	DQ15	58	RESET_n	202	VSS
23	DQ10	167	VSS	59	VDD	203	CKE1
24	VSS	168	DQ11	60	CKE0	204	VDD
25	DQ20	169	VSS	61	VDD	205	RFU
26	VSS	170	DQ21	62	ACT_n	206	VDD
27	DQ16	171	VSS	63	BG0	207	BG1
28	VSS	172	DQ17	64	VDD	208	ALERT_n
29	DQS11_t, DM2_n, DBI2_n, TDQS11_t	173	VSS	65	A12	209	VDD
30	DQS11_c, TDQS11_c	174	DQS2_c	66	A9	210	A11
31	VSS	175	DQS2_t	67	VDD	211	A7
32	DQ22	176	VSS	68	A8	212	VDD
33	VSS	177	DQ23	69	A6	213	A5
34	DQ18	178	VSS	70	VDD	214	A4
35	VSS	179	DQ19	71	A3	215	VDD
36	DQ28	180	VSS	72	A1	216	A2

Pin#	Front Side	Pin#	Back Side	Pin#	Front Side	Pin#	Back Side
73	VDD	217	VDD	108	DQ40	252	VSS
74	CK0 t	218	CK1 t	109	VSS	253	DQ41
75	CK0 c	219	CK1 c	110	DQS14_t, DM5_n, DBI5_n, TDQS14_t	254	VSS
76	VDD	220	VDD	111	DQS14_c, TDQS14_c	255	DQS5_c
77	VTT	221	VTT	112	VSS	256	DQS5_t
KEY				113	DQ46	257	VSS
78	EVENT n	222	PARITY	114	VSS	258	DQ47
79	A0	223	VDD	115	DQ42	259	VSS
80	VDD	224	BA1	116	VSS	260	DQ43
81	BA0	225	A10 AP	117	DQ52	261	VSS
82	RAS_n/A16	226	VDD	118	VSS	262	DQ53
83	VDD	227	RFU	119	DQ48	263	VSS
84	S0 n	228	WE_n/A14	120	VSS	264	DQ49
85	VDD	229	VDD	121	DQS15_t, DM6_n, DBI6_n, TDQS15_t	265	VSS
86	CAS_n/A15	230	Save_n,NC	122	DQS15_c, TDQS15_c	266	DQS6_c
87	ODT0	231	VDD	123	VSS	267	DQS6_t
88	VDD	232	A13	124	DQ54	268	VSS
89	S1 n	233	VDD	125	VSS	269	DQ55
90	VDD	234	A17, NC	126	DO50	270	VSS
91	ODT1	235	C[2], NC	127	VSS	271	DQ51
92	VDD	236	VDD	128	DQ60	272	VSS
93	S2_n, C[0]	237	S3_n, C[1]	129	VSS	273	DO61
94	VSS	238	SA2,	130	DQ56	274	VSS
95	DQ36	239	VSS	131	VSS	275	DQ57
96	VSS	240	DQ37	132	DQS16_t, DM7_n, DBI7_n, TDQS16_t	276	VSS
97	DQ32	241	VSS	133	DQS16_c, TDQS16_c	277	DQS7_c
98	VSS	242	DQ33	134	VSS	278	DQS7_t
99	DQS13_t, DM4_n, DBI4_n, TDQS13_t	243	VSS	135	DQ62	279	VSS
100	DQS13_c, TDQS13_c	244	DQS4_c	136	VSS	280	DQ63
101	VSS	245	DQS4_t	137	DQ58	281	VSS
102	DQ38	246	VSS	138	VSS	282	DQ59
103	VSS	247	DQ39	139	SA0	283	VSS
104	DQ34	248	VSS	140	SA1	284	VDDSPD
105	VSS	249	DQ35	141	SCL	285	SDA
106	DQ44	250	VSS	142	VPP	286	VPP
107	VSS	251	DQ45	143	VPP	287	VPP
				144	RFU	288	VPP

VIII. Standard Speed Bins

DDR4-3200 Speed Bins and Operations

Speed Bin			DDR4-3200		Unit	NOTE	
CL-nRCD-nRP			22-22-22				
Parameter	Symbol		min	max			
Internal read command to first data	tAA		13.75	18.00	ns	12	
Internal read command to first data with read DBI enabled	tAA_DBI		tAA(min) + 4nCK	tAA(max) + 4nCK	ns	12	
ACT to internal read or write delay time	tRCD		13.75	-	ns	12	
PRE command period	tRP		13.75	-	ns	12	
ACT to PRE command period	tRAS		32	9 x tREFI	ns	12	
ACT to ACT or REF command period	tRC		45.75	-	ns	12	
	Normal	Read DBI					
CWL = 9	CL = 9	CL = 11	tCK(AVG)	Reserved	ns	1,2,3,4,11	
	CL = 10	CL = 12	tCK(AVG)	Reserved	ns	1,2,3,4,11	
CWL = 9,11	CL = 10	CL = 12	tCK(AVG)	Reserved	ns	1,2,3,4	
	CL = 11	CL = 13	tCK(AVG)	1.25	<1.5	ns	1,2,3,4,10
	CL = 12	CL = 14	tCK(AVG)	1.25	<1.5	ns	1,2,3,10
CWL = 10,12	CL = 12	CL = 14	tCK(AVG)	Reserved	ns	1,2,3,4	
	CL = 13	CL = 15	tCK(AVG)	1.071	<1.25	ns	1,2,3,4,10
	CL = 14	CL = 16	tCK(AVG)	1.071	<1.25	ns	1,2,3,10
CWL = 11,14	CL = 14	CL = 17	tCK(AVG)	Reserved	ns	1,2,3,4	
	CL = 15	CL = 18	tCK(AVG)	0.937	<1.071	ns	1,2,3,4,10
	CL = 16	CL = 19	tCK(AVG)	0.937	<1.071	ns	1,2,3,10
CWL = 12,16	CL = 15	CL = 18	tCK(AVG)	Reserved	ns	1,2,3,4	
	CL = 16	CL = 19	tCK(AVG)	Reserved	ns	1,2,3,4,10	
	CL = 17	CL = 20	tCK(AVG)	0.833	<0.937	ns	1,2,3,4,10
	CL = 18	CL = 21	tCK(AVG)	0.833	<0.937	ns	1,2,3,10
CWL = 14,18	CL = 17	CL = 20	tCK(AVG)	Reserved	ns	1,2,3,4	
	CL = 18	CL = 21	tCK(AVG)	Reserved	ns	1,2,3,4,10	
	CL = 19	CL = 22	tCK(AVG)	0.75	<0.833	ns	1,2,3,4,10
	CL = 20	CL = 23	tCK(AVG)	0.75	<0.833	ns	1,2,3,10
CWL = 16,20	CL = 20	CL = 24	tCK(AVG)	Reserved	ns	1,2,3,4	
	CL = 22	CL = 26	tCK(AVG)	0.625	<0.75	ns	1,2,3,4
	CL = 24	CL = 28	tCK(AVG)	0.625	<0.75	ns	1,2,3
Supported CL Settings			10,11,12,13,14,15, 16,17,18,19,20,22, 24		nCK	13	
Supported CL Settings with read DBI			12,13,14,15,16,18, 19,20,21,22,23,24, 26, 28		nCK		
Supported CWL Settings			9,10,11,12,14,16, 18,20		nCK		

IX.IDD Specifications

Module IDD values in the datasheet are only a calculation based on the component IDD specified power. The actual measurements may vary according to DQ loading cap.

32GB,4Gx72R-DIMM

IDD					unit	note
Symbol	2400	2667	2933	3200		
IDD0	1627	1669	1642	1686	mA	
IDD0A	1627	1687	1660	1740	mA	
IDD1	1794	1857	1850	1913	mA	
IDD1A	1848	1875	1832	1877	mA	
IDD2N	1465	1507	1462	1524	mA	
IDD2NA	1465	1507	1462	1524	mA	
IDD2NT	1645	1687	1642	1704	mA	
IDD2NL	1213	1255	1210	1272	mA	
IDD2NG	1465	1507	1462	1524	mA	
IDD2ND	1429	1471	1426	1488	mA	
IDD2NP	1465	1507	1462	1524	mA	
IDD2P	990	1033	1030	1091	mA	
IDD2Q	1393	1399	1318	1344	mA	
IDD3N	1825	1867	1858	1920	mA	
IDD3NA	1825	1867	1858	1920	mA	
IDD3P	1386	1429	1426	1487	mA	
IDD4R	2640	2739	2894	3065	mA	
IDD4RA	2694	2829	2948	3137	mA	
IDD4RB	2658	2793	2912	3083	mA	
IDD4W	2568	2703	2804	2957	mA	
IDD4WA	2622	2775	2894	3065	mA	
IDD4WB	2388	2505	2588	2741	mA	
IDD4WC	2550	2703	2822	2975	mA	
IDD4WP	2838	3009	3146	3353	mA	
IDD5B	4507	4549	4504	4566	mA	
IDD5F2	3535	3595	3568	3648	mA	
IDD5F4	3265	3325	3298	3378	mA	
IDD6N	778	778	771	771	mA	
IDD6E	1030	1030	1023	1023	mA	
IDD6R	526	526	519	519	mA	
IDD6A	1030	1030	1023	1023	mA	
IDD7	4170	4485	4766	5099	mA	
IDD8	454	454	447	447	mA	

IPP					unit	note
Symbol	2400	2667	2933	3200		
IPP0	157	157	157	157	mA	
IPP1	175	175	175	175	mA	
IPP2N	115	115	115	115	mA	
IPP2P	115	115	115	115	mA	
IPP3N	576	576	576	576	mA	
IPP3P	576	576	576	576	mA	
IPP4R	400	400	400	400	mA	
IPP4W	400	400	400	400	mA	
IPP5B	1192	1192	1192	1192	mA	
IPP5F2	778	796	814	832	mA	
IPP5F4	688	688	688	688	mA	
IPP6N	180	180	180	180	mA	
IPP6E	252	252	252	252	mA	
IPP6R	148	148	148	148	mA	
IPP6A	252	252	252	252	mA	
IPP7	490	526	562	616	mA	
IPP8	115	115	115	115	mA	

For More Information

For Technical Support:

If additional support is needed, please visit the SOSAM website at <https://kumi-sosam.com/>

for the following topics:

- **Warranty Services:** Includes the warranty service policy and the RMA requestforms.
- **Technical Information:** Includes product data sheets and various storage product white papers.
- **Tools Section:** Includes frequently asked questions (FAQs).