Oct. 2016

DDR3 SDRAM Memory

Product Guide

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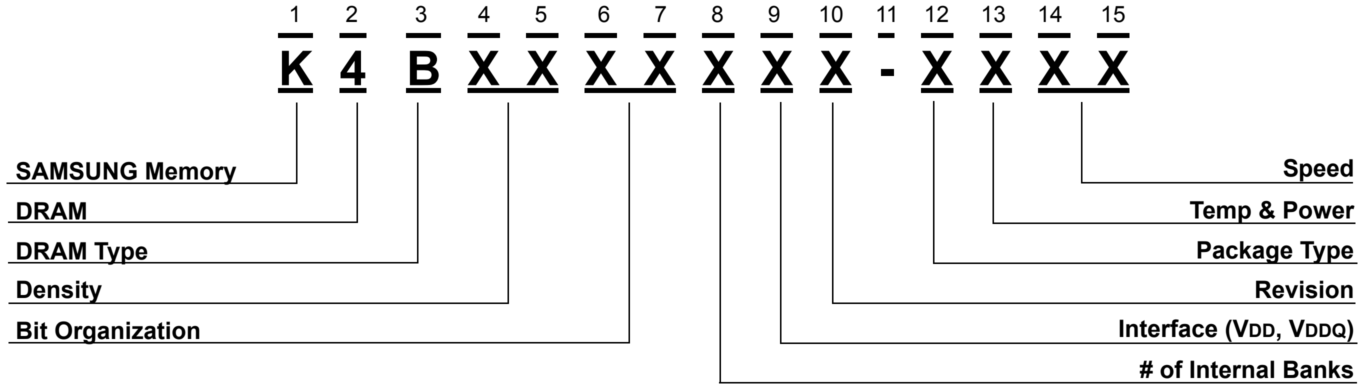
1. DDR3 SDRAM MEMORY ORDERING INFORMATION



1. SAMSUNG Memory : K

2. DRAM : 4

3. DRAM Type

B : DDR3 SDRAM

4~5. Density

51 : 512Mb
1G : 1Gb
2G : 2Gb
4G : 4Gb
8G : 8Gb

6~7. Bit Organization

04 : x 4
08 : x 8
16 : x16
33 : x32

8. # of Internal Banks

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

9. Interface (VDD, VDDQ)

6 : SSTL (1.5V, 1.5V)

10. Revision

M : 1st Gen.
A : 2nd Gen.
B/Q : 3rd Gen.
C : 4th Gen.
D : 5th Gen.
E : 6th Gen.
F : 7th Gen.
G : 8th Gen.
H : 9th Gen.
I : 10th Gen.

11. "-"

12. Package Type

H : FBGA (Halogen-free & Lead-free)
M : FBGA (Halogen-free & Lead-free, DDP)
B : FBGA (Halogen-free & Lead-free, Flip Chip)
E : FBGA(Lead-free & Halogen-free, QDP)
O : FBGA(Lead-free & Halogen-free, QDP for 64GB LRDIMM)

13. Temp & Power

C : Commercial Temp.(0°C ~ 85°C) & Normal Power(1.5V)
Y : Commercial Temp.(0°C ~ 85°C) & Low VDD(1.35V)
I : Industrial Temp.(-40°C ~ 95°C) & Normal Power(1.5V)
M : Industrial Temp.(-40°C ~ 95°C) & Low VDD(1.35V)

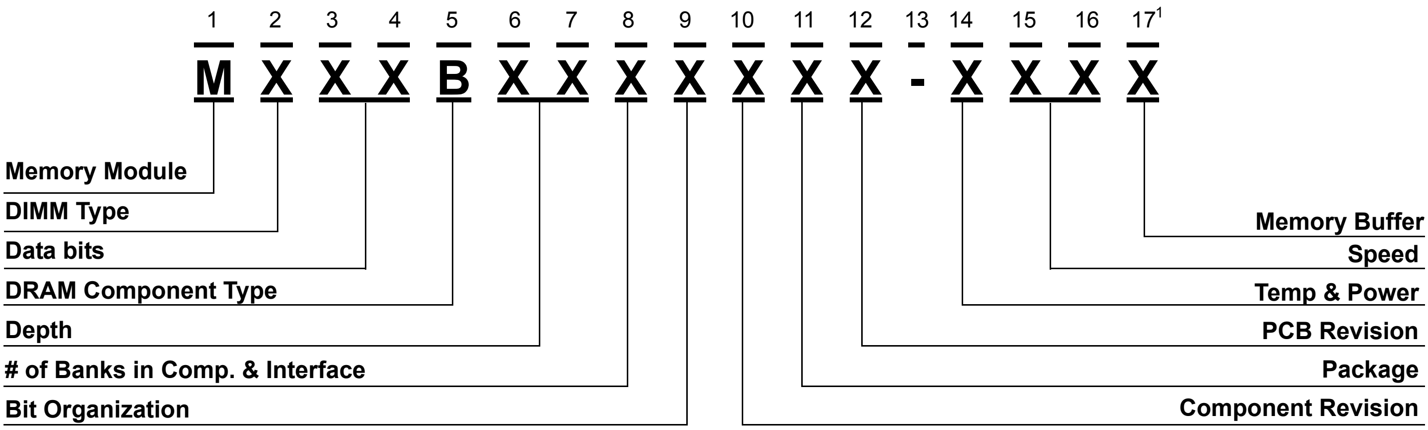
14~15. Speed

F7 : DDR3-800 (400MHz @ CL=6, tRCD=6, tRP=6)
F8 : DDR3-1066 (533MHz @ CL=7, tRCD=7, tRP=7)
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 (1066MHz @ CL=14, tRCD=14, tRP=14)

2. DDR3 SDRAM Component Product Guide

Density	Banks	Part Number	Package & Power, Temp. & Speed	Org.	VDD Voltage[1]	PKG	Avail.	NOTE
1Gb I-die	8Banks	K4B1G0846I	BCK0/MA/NB	128Mx8	1.5V	78 ball FBGA	MP	
		K4B1G1646I	BCK0/MA/NB	64Mx16		96 ball FBGA		
		K4B1G0846I	BYK0/MA BMK0/MA	128Mx8	1.35V	78 ball FBGA	MP	
		K4B1G1646I	BYK0/MA BMK0/MA	64Mx16		96 ball FBGA		
2Gb F-die	8Banks	K4B2G0846F	BCK0/MA/NB	256Mx8	1.5V	78 ball FBGA	MP	
		K4B2G1646F	BCK0/MA/NB	128Mx16		96 ball FBGA		
		K4B2G0846F	BYK0/MA BMK0/MA	256Mx8	1.35V	78 ball FBGA	MP	
		K4B2G1646F	BYK0/MA BMK0/MA	128Mx16		96 ball FBGA		
4Gb D-die	8Banks	K4B4G0446D	BCH9/K0/MA	1Gx4	1.5V	78 ball FBGA	MP	
		K4B4G0846D	BCH9/K0/MA/NB	512Mx8				
		K4B4G1646D	BCH9/K0/MA/NB	256Mx16		96ball FBGA		
		K4B4G0446D	BYH9/K0/MA	1Gx4	1.35V	78 ball FBGA	MP	
		K4B4G0846D	BYH9/K0/MA	512Mx8				
		K4B4G1646D	BYH9/K0/MA	256Mx16		96ball FBGA		
4Gb E-die	8Banks	K4A4G045WE	BCH9/K0/MA	1Gx4	1.5V	78 ball FBGA	MP	
		K4A4G085WE	BCH9/K0/MA/NB	512Mx8				
		K4A4G165WE	BCH9/K0/MA	256Mx16		96ball FBGA		
		K4A4G045WE	BYH9/K0/MA	1Gx4	1.35V	78 ball FBGA	MP	
		K4A4G085WE	BYH9/K0/MA	512Mx8				
		K4A4G165WE	BYH9/K0/MA	256Mx16		96ball FBGA		

3. DDR3 SDRAM Module Ordering Information



1. Memory Module : M

2. DIMM Type

3 : DIMM
4 : SODIMM

3~4. Data Bits

71 : x64 204pin Unbuffered SODIMM
74 : x72 204pin ECC Unbuffered SODIMM
78 : x64 240pin Unbuffered DIMM
86 : x72 240pin LR DIMM
90 : x72 240pin VLP Unbuffered DIMM
91 : x72 240pin ECC Unbuffered DIMM
92 : x72 240pin VLP Registered DIMM
93 : x72 240pin Registered DIMM

5. DRAM Component Type

B : DDR3 SDRAM

6~7. Depth

32 : 32M
64 : 64M
28 : 128M
56 : 256M
51 : 512M
1G: 1G
2G: 2G
4G: 4G
8G: 8G

33 : 32M (for 128Mb/512Mb)
65 : 64M (for 128Mb/512Mb)
29 : 128M (for 128Mb/512Mb)
57 : 256M (for 512Mb/2Gb)
52 : 512M (for 512Mb/2Gb)
1K: 1G (for 2Gb)
2K: 2G (for 2Gb)

8. # of Banks in comp. & Interface

7 : 8Banks & SSTL-1.5V

9. Bit Organization

0 : x 4
3 : x 8
4 : x16

10. Component Revision

M : 1st Gen.
B/Q : 3rd Gen.
D : 5th Gen.
F : 7th Gen.

A : 2nd Gen.
C : 4th Gen.
E : 6th Gen.
G : 8th Gen.

11. Package

H : FBGA(Lead-free & Halogen-free)
M : FBGA(Lead-free & Halogen-free, DDP)
B : FBGA (Halogen-free & Lead-free, Flip Chip)
E : FBGA(Lead-free & Halogen-free, QDP)
O : FBGA(Lead-free & Halogen-free, QDP for 64GB LRDIMM)

12. PCB Revision

0 : None
2 : 2nd Rev.
4 : 4th Rev.

1 : 1st Rev.
3 : 3rd Rev.
S : Reduced Layer

13. "_"

14. Temp & Power

C : Commercial Temp.(0°C ~ 85°C) & Normal Power(1.5V)
Y : Commercial Temp.(0°C ~ 85°C) & Low VDD(1.35V)

15~16. Speed[2]

F7 : DDR3-800 (400MHz @ CL=6, tRCD=6, tRP=6)
F8 : DDR3-1066 (533MHz @ CL=7, tRCD=7, tRP=7)
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)

17. Memory Buffer

0 : Inphi iMB02-GS02A
1 : IDT A2 (Greendale)
2 : Montage MB C0
3 : Inphi iMB02-GS02B
4 : Montage MB CI

NOTE:
1. Only used for LRDIMM
2. PC3-6400(DDR3-800),PC3-8500(DDR3-1066), PC3-10600(DDR3-1333), PC3-12800(DDR3-1600) PC3-14900(DDR3-1866)

4. DDR3 SDRAM Module Product Guide

4.1 240Pin DDR3 Registered DIMM

240Pin DDR3 Registered DIMM

Org.	Density	Part Number	Speed	Raw Card	Composition	Comp. Version		Internal Banks	Rank	PKG	Height	Avail.	NOTE
1G x 72	8GB	M393B1G70EB0	YK0/CMA	C (1Rx4)	1G x 4 * 18 pcs	4Gb	E-die	8	1	78ball FBGA	30mm	MP	
2G x 72	16GB	M393B2G70DB0	YK0/CMA	E (2Rx4)	1G x 4 * 36 pcs	4Gb	D-die	8	2	78ball FBGA	30mm	EOL Q2'17	
2G x 72	16GB	M393B2G70EB0	YK0/CMA	E (2Rx4)	1G x 4 * 36 pcs	4Gb	E-die	8	2	78ball FBGA	30mm	MP	
4G x 72	32GB	M393B4G70DM0	YH9	AB (4Rx4)	2G DDP x 4 * 36 pcs	4Gb	D-die	8	4	78ball FBGA	30mm	EOL Q4'17	

4.2 240Pin DDR3 LRDIMM

240Pin DDR3 LRDIMM

Org.	Density	Part Number	Speed	Raw Card	Composition	Comp. Version		Internal Banks	Rank	PKG	Height	Avail.	NOTE
4G x 72	32GB	M386B4G70DM0	YK0/CMA	C (4Rx4)	2G DDP x 4 * 36 pcs	4Gb	D-die	8	4	78ball FBGA	30.35mm	EOL Q4'17	
8G x 72	64GB	M386B8G70DE0	YH9/CK0	E (8Rx4)	4G QDP x 4 * 36 pcs	4Gb	D-die	8	8	78ball FBGA	30.35mm	EOL Q4'17	

4.3 240Pin DDR3 VLP Registered DIMM

240Pin DDR3 VLP Registered DIMM													
Org.	**Density**	**Part Number**	**Speed**	**Raw Card**	**Composition**	**Comp. Version**		**Internal Banks**	**Rank**	**PKG**	**Height**	**Avail.**	**NOTE**
1G x 72	8GB	M392B1G73DB0	YK0/CMA	L (2Rx8)	1G x 8 * 18pcs	4Gb	D-die	8	1	78ball FBGA	18.75mm	EOL Q4'17	
1G x 72	8GB	M392B1G70DB0	YK0/CMA	M (1Rx4)	512M x 4 * 18pcs	4Gb	D-die	8	2	78ball FBGA	18.75mm	EOL Q4'17	
2G x 72	16GB	M392B2G70DM0	YK0/CMA	N (2Rx4)	2G DDP x 4 * 18pcs	4Gb	D-die	8	2	78ball FBGA	18.75mm	EOL Q4'17	
4G x 72	32GB	M392B4G70DE0	YH9	U (4Rx4)	4G QDP x 4 * 18pcs	4Gb	D-die	8	4	78ball FBGA	18.75mm	EOL Q4'17	

4.4 204Pin DDR3 ECC SODIMM

204Pin DDR3 ECC SODIMM													
Org.	**Density**	**Part Number**	**Speed**	**Raw Card**	**Composition**	**Comp. Version**		**Internal Banks**	**Rank**	**PKG**	**Height**	**Avail.**	**NOTE**
512M x 64	4GB	M474B5173EB0	YK0	C (1Rx8)	512M x 8 * 9pcs	4Gb	E-die	8	1	78 ball FBGA	30mm	MP	
1G x 64	8GB	M474B1G73EB0	YK0	D (2Rx8)	512M x 8 * 18pcs	4Gb	E-die	8	2	78 ball FBGA	30mm	MP	

4.5 204Pin DDR3 Non ECC SODIMM

204Pin DDR3 Non ECC SODIMM													
Org.	**Density**	**Part Number**	**Speed**	**Raw Card**	**Composition**	**Comp. Version**		**Internal Banks**	**Rank**	**PKG**	**Height**	**Avail.**	**NOTE**
256M x 64	2GB	M471B5674EB0	YK0/YMA	C (1Rx16)	256M x 16 * 8 pcs	4Gb	E-die	8	1	96 ball FBGA	30mm	MP	
512M x 64	4GB	M471B5173DB0	YK0	B (1Rx8)	512M x 8 * 8 pcs	4Gb	D-die	8	1	78 ball FBGA	30mm	EOL Q1'17	
512M x 64	4GB	M471B5173EB0	YK0/YMA	B (1Rx8)	512M x 8 * 8 pcs	4Gb	E-die	8	1	78 ball FBGA	30mm	MP	
1G x 64	8GB	M471B1G73DB0	YK0	F (2Rx8)	512M x 8 * 16 pcs	4Gb	D-die	8	2	78 ball FBGA	30mm	EOL Q1'17	
1G x 64	8GB	M471B1G73EB0	YK0/YMA	F (2Rx8)	512M x 8 * 16 pcs	4Gb	E-die	8	2	78 ball FBGA	30mm	MP	

4.6 240Pin DDR3 ECC UDIMM

240Pin DDR3 ECC UDIMM													
Org.	**Density**	**Part Number**	**Speed**	**Raw Card**	**Composition**	**Comp. Version**		**Internal Banks**	**Rank**	**PKG**	**Height**	**Avail.**	**NOTE**
512M x 64	4GB	M391B5173EB0	YK0/CMA	D (1Rx8)	512M x 8 * 9 pcs	4Gb	E-die	8	1	78 ball FBGA	30mm	MP	
1G x 64	8GB	M391B1G73EB0	YK0/CMA	E (2Rx8)	512M x 8 * 18 pcs	4Gb	E-die	8	2	78 ball FBGA	30mm	MP	

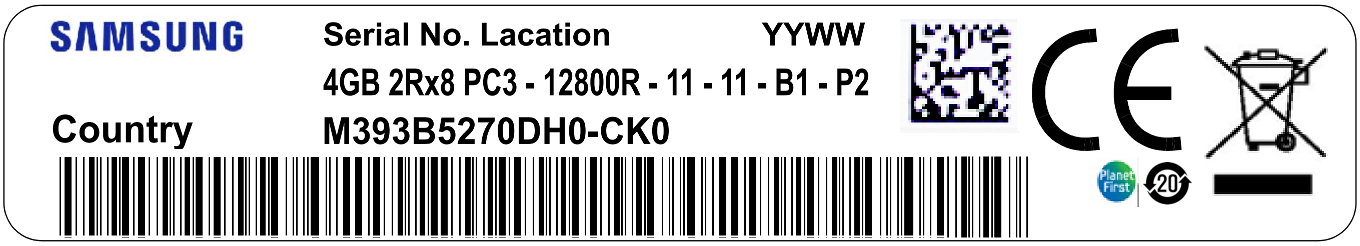
4.7 240Pin DDR3 Non ECC UDIMM

240Pin DDR3 Non ECC UDIMM													
Org.	**Density**	**Part Number**	**Speed**	**Raw Card**	**Composition**	**Comp. Version**		**Internal Banks**	**Rank**	**PKG**	**Height**	**Avail.**	**NOTE**
256M x 64	2GB	M378B5674EB0	YK0/YMA	C (1Rx16)	256M x 16 * 8 pcs	4Gb	E-die	8	1	96ball FBGA	30mm	MP	
512M x 64	4GB	M378B5173DB0	CK0/CMA	A (1Rx8)	512M x 8 * 8 pcs	4Gb	D-die	8	1	78ball FBGA	30mm	EOL Q1'17	
512M x 64	4GB	M378B5173EB0	CK0/CMA	A (1Rx8)	512M x 8 * 8 pcs	4Gb	E-die	8	1	78ball FBGA	30mm	MP	
512M x 64	4GB	M378B5173EB0	YK0/YMA	A (1Rx8)	512M x 8 * 8 pcs	4Gb	E-die	8	1	78ball FBGA	30mm	MP	
1G x 64	8GB	M378B1G73DB0	CK0/CMA	B (2Rx8)	512M x 8 * 16 pcs	4Gb	D-die	8	2	78ball FBGA	30mm	EOL Q1'17	
1G x 64	8GB	M378B1G73EB0	CK0/CMA	B (2Rx8)	512M x 8 * 16 pcs	4Gb	E-die	8	2	78ball FBGA	30mm	MP	
1G x 64	8GB	M378B1G73EB0	YK0/YMA	B (2Rx8)	512M x 8 * 16 pcs	4Gb	E-die	8	2	78ball FBGA	30mm	MP	

5. RDIMM RCD Information

5.1 RCD Identification in JEDEC Description in Module Label

5.2 Label Example



SAMSUNG

Serial No. Lacation YYWW

4GB 2Rx8 PC3 - 12800R - 11 - 11 - B1 - P2

Country M393B5270DH0-CK0

5.3 RCD Information

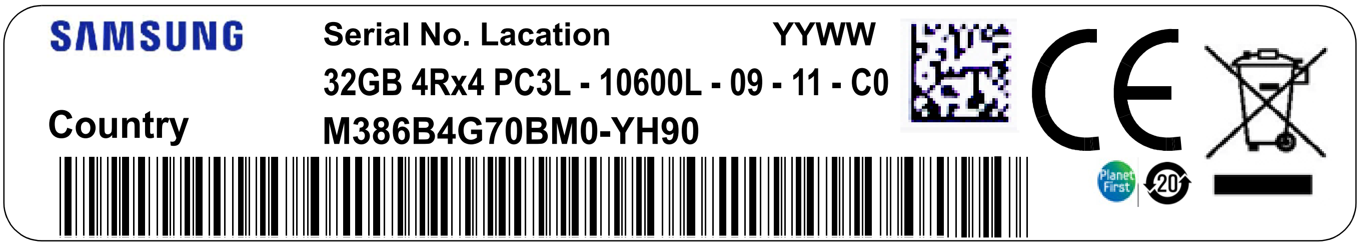
- Example

PKG	RCD Vendor	RCD Version(Rev.)	JEDEC Description (Example - 4GB 2Rx8 PC3(L)[1] - 12800R - 11 - 11 - B1 - XX)
4Gb D-die 4Gb E-die	IDT	B1	D3
	Inphi	XV-GS02	P2
	IDT	A1	D4
	Inphi	UV-GS02	P3

* **NOTE**
1) PC3L is used for 1.35V
2) RCD information is subject to change.

6. LRDIMM Memory Buffer Information

6.1 Label Example



Serial No. Lacation YYWW
32GB 4Rx4 PC3L - 10600L - 09 - 11 - C0
Country
M386B4G70BM0-YH90

6.2 Memory Buffer Information

- Example

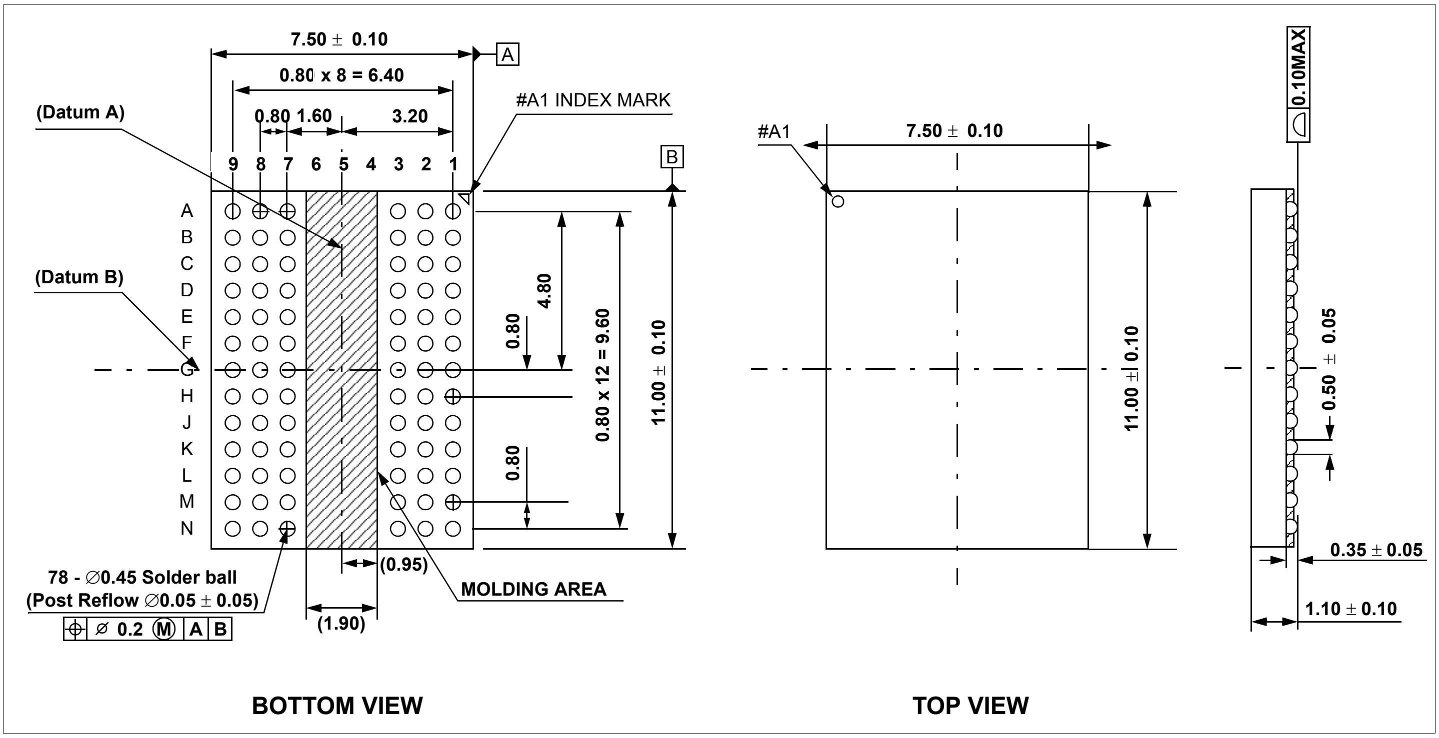
Voltage	Vendor	Revision	Module P/N	JEDEC Description On Label
1.35V	Inphi	iMB02-GS02A	M386B4G70BM0-YH90[1]	32GB 4Rx4 PC3L-10600L-09-11-C0
	Montage	MB C0	M386B4G70BM0-YH92[1]	32GB 4Rx4 PC3L-10600L-09-11-C0
1.5V	Inphi	iMB02-GS02A	M386B4G70BM0-CMA3[1]	32GB 4Rx4 PC3-14900L-13-11-C0
	IDT	A2	M386B4G70BM0-CMA1[1]	32GB 4Rx4 PC3-14900L-13-11-C0
	Montage	MB C1	M386B4G70BM0-CMA4[1]	32GB 4Rx4 PC3-14900L-13-11-C0

* **NOTE**

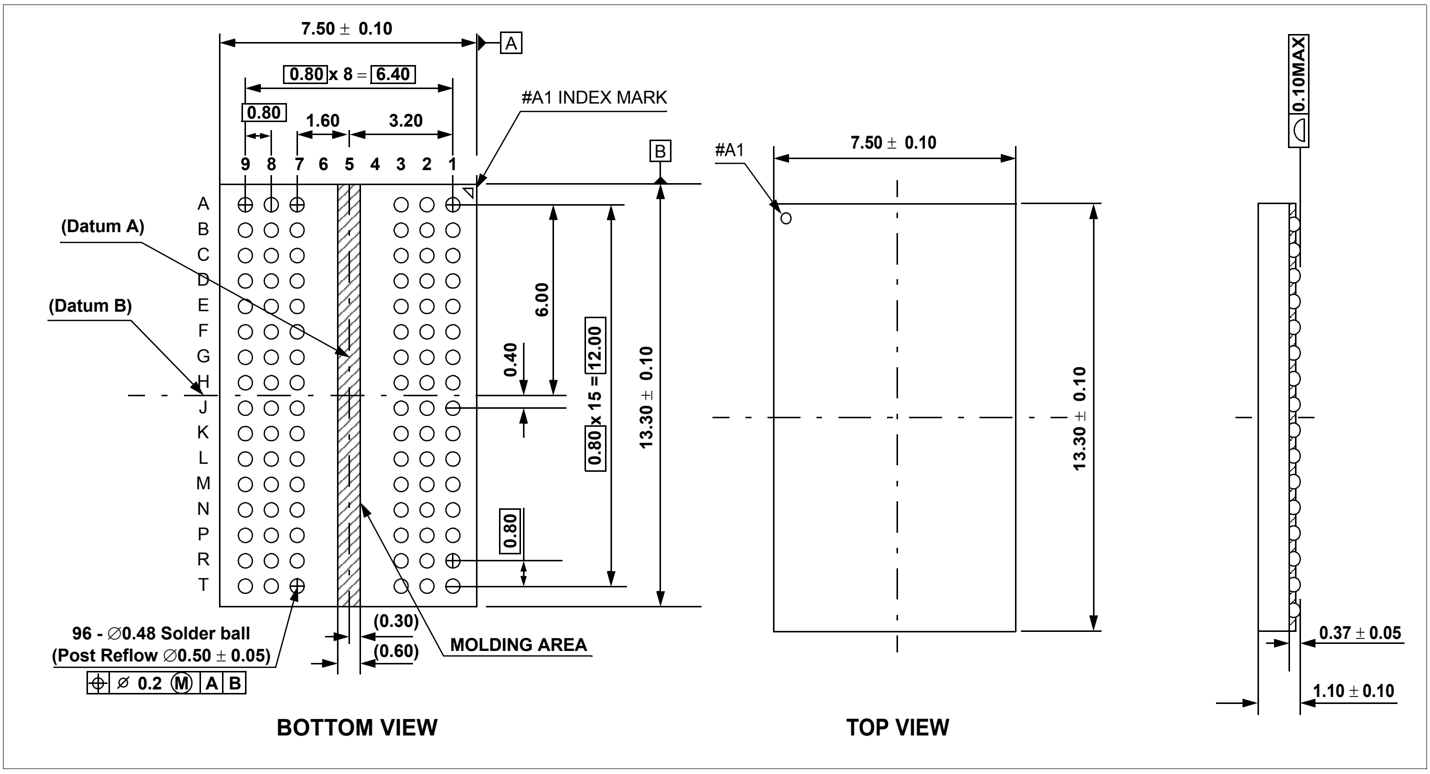
1) The 16th digit refers memory buffer vendor and revision.
    0: Inphi iMB02-GS02A
    1: IDT A2
    2: Montage MB C0
    3: Inphi iMB02-GS02B
    4: Montage MB C1
2) Memory buffer information is subject to change.

7. Package Dimension

78Ball FBGA for 4Gb D-die (x4/x8) / 4Gb E-die (x4/8)



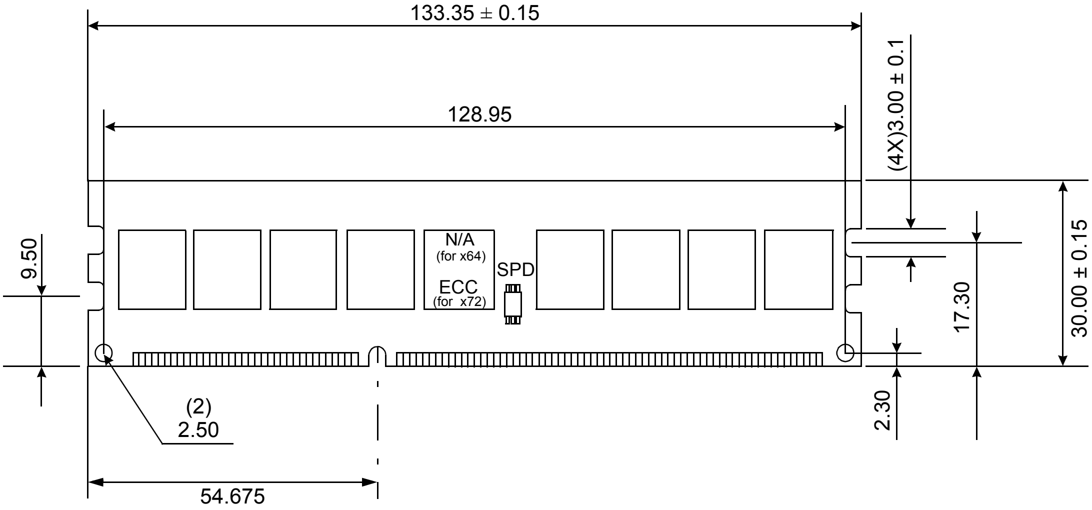
96Ball FBGA for 4Gb D-die (x16) / 4Gb E-die (x16)

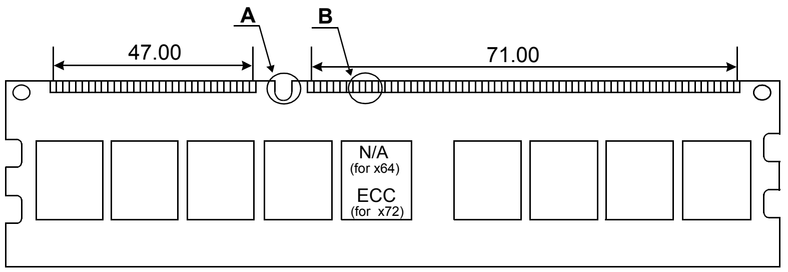


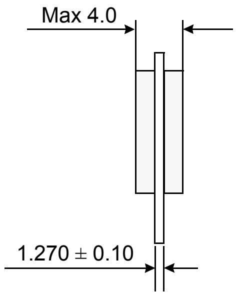
8. Module Dimension

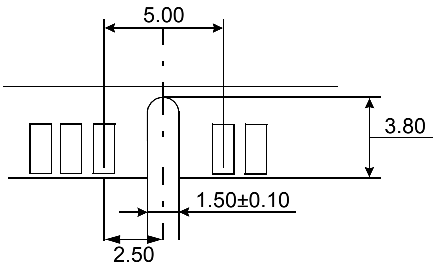
x72 240pin DDR3 SDRAM SDRAM ECC UDIMM
x64 240pin DDR3 SDRAM SDRAM Non ECC UDIMM

Units : Millimeters

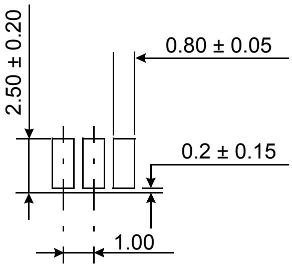




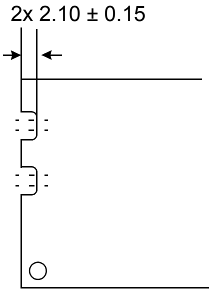




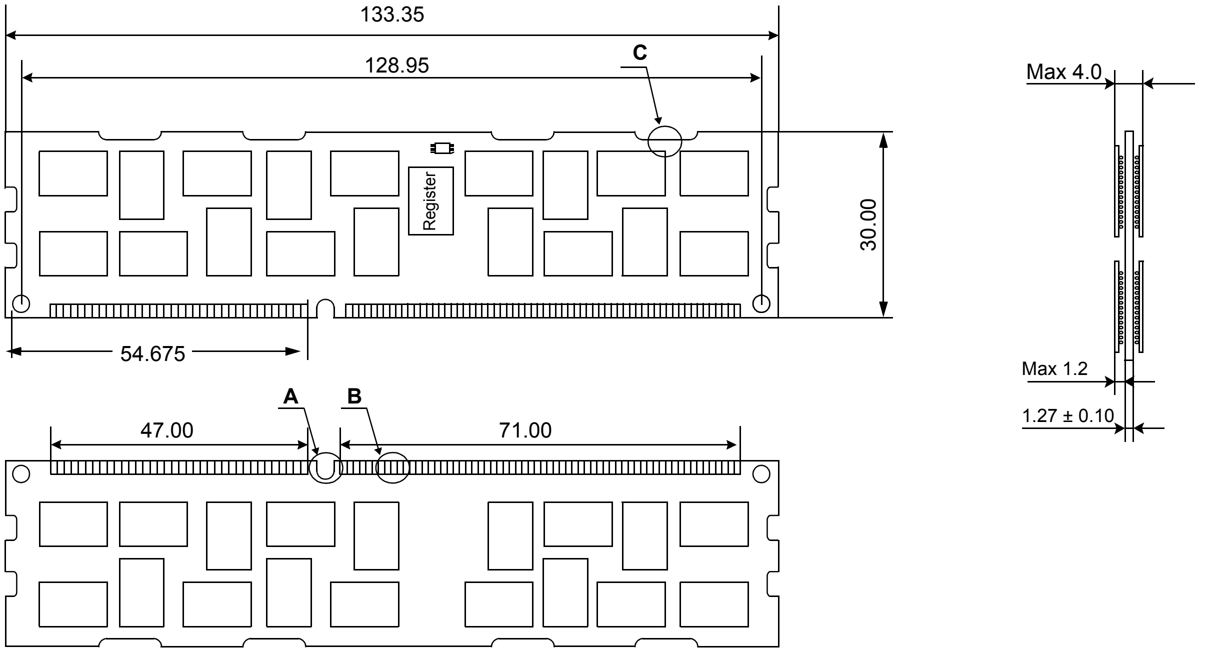
Detail A

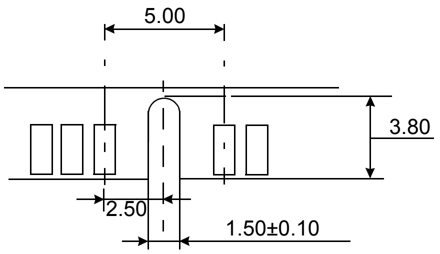


Detail B

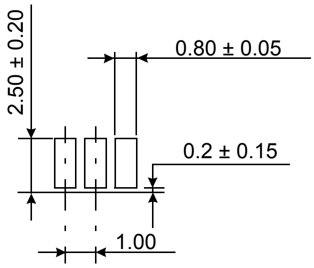


x72 240pin DDR3 SDRAM RDIMM

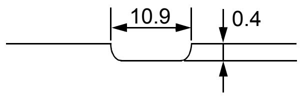




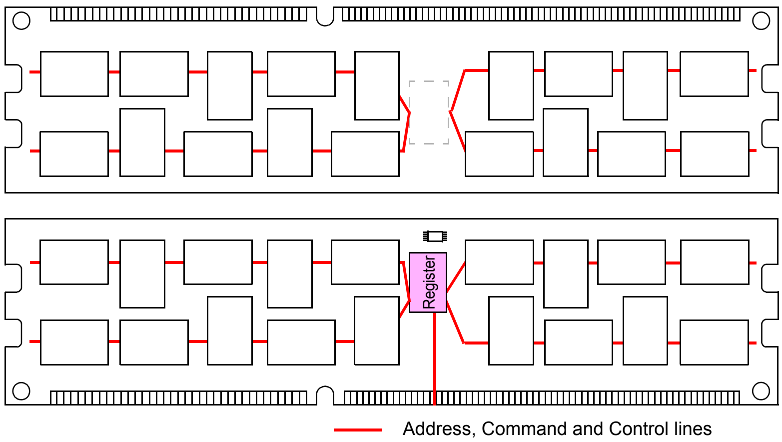
Detail A

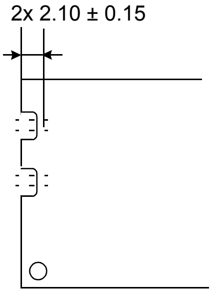


Detail B



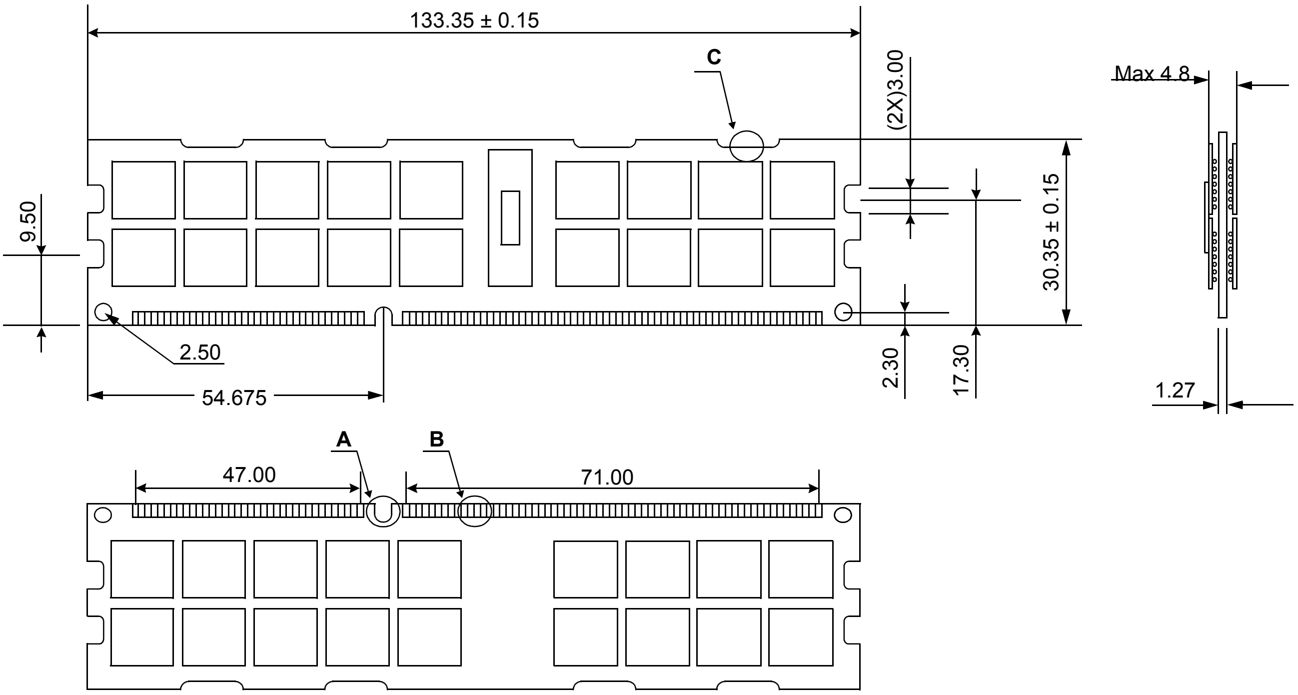
Detail C

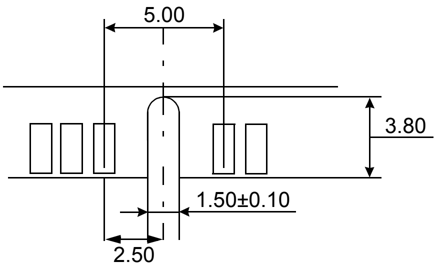




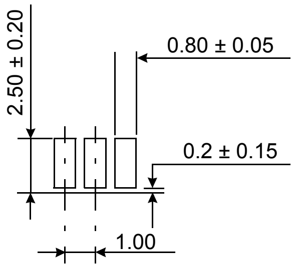
x72 240pin DDR3 SDRAM LRDIMM

Units : Millimeters

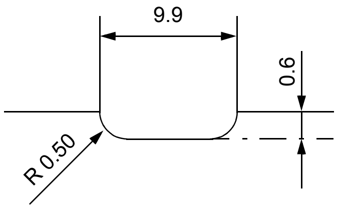




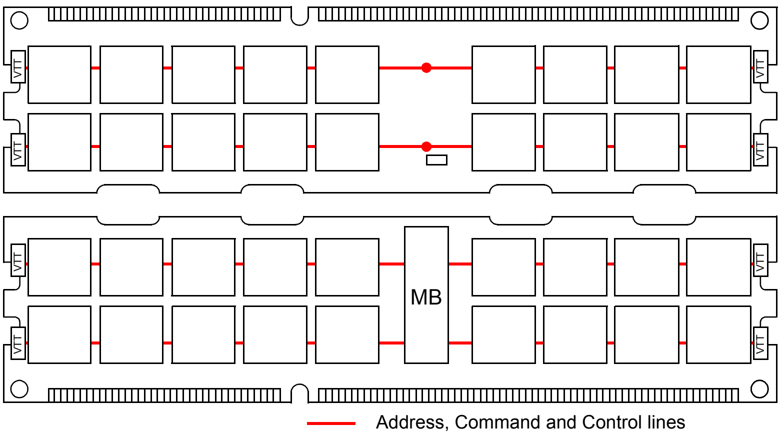
Detail A



Detail B



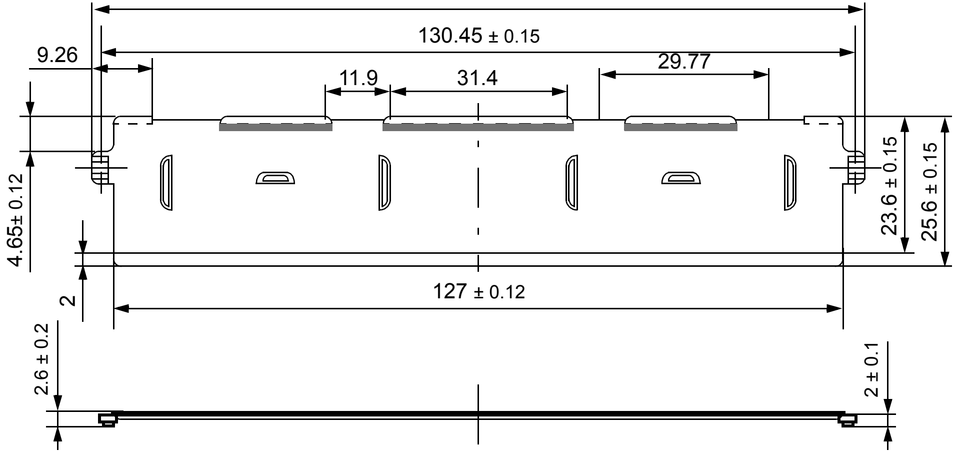
Detail C

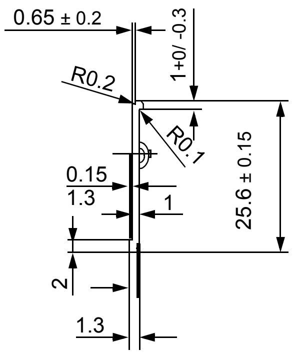


x72 240pin DDR3 SDRAM RDIMM Heat Spreader Design (DDP)
x72 240pin DDR3 SDRAM LRDIMM Heat Spreader Design (DDP)

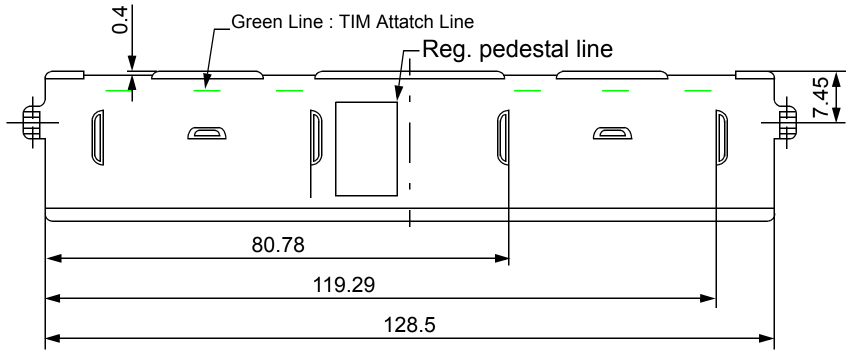
1. FRONT PART

Outside



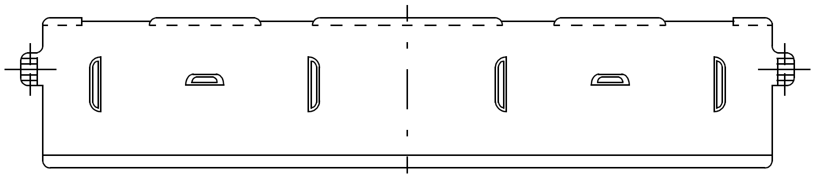


Inside

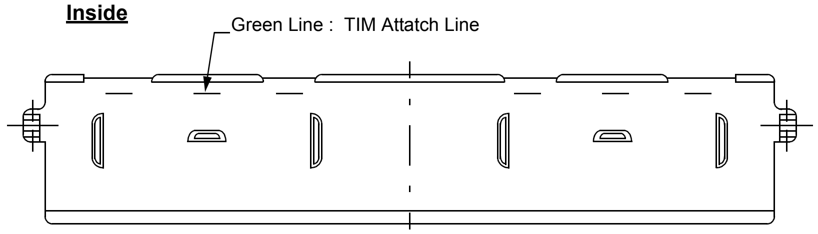


2. BACK PART

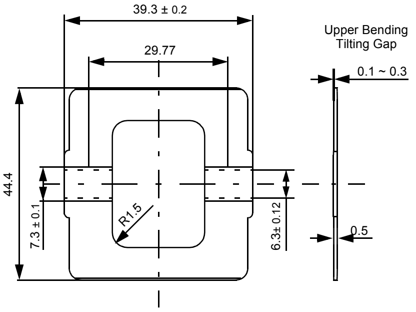
Outside



Inside

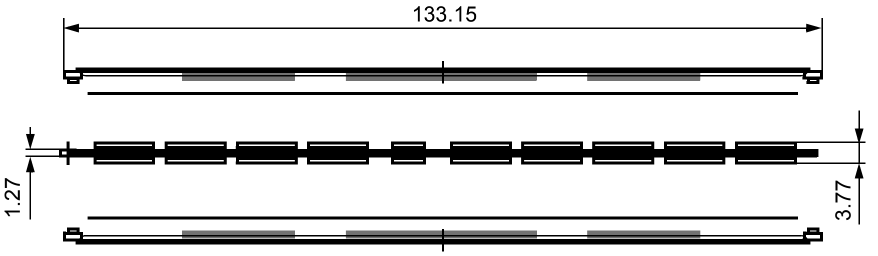


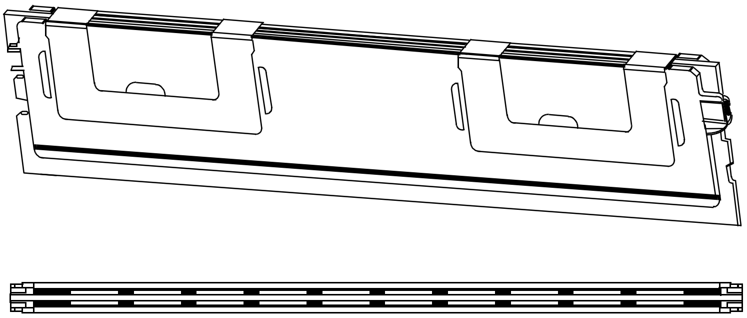
3. CLIP PART

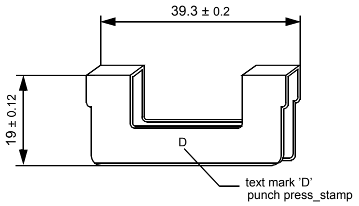


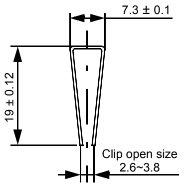
4. DDR3 RDIMM ASS'Y View

Reference thickness total (Maximum) : 7.55mm (With Clip thickness)



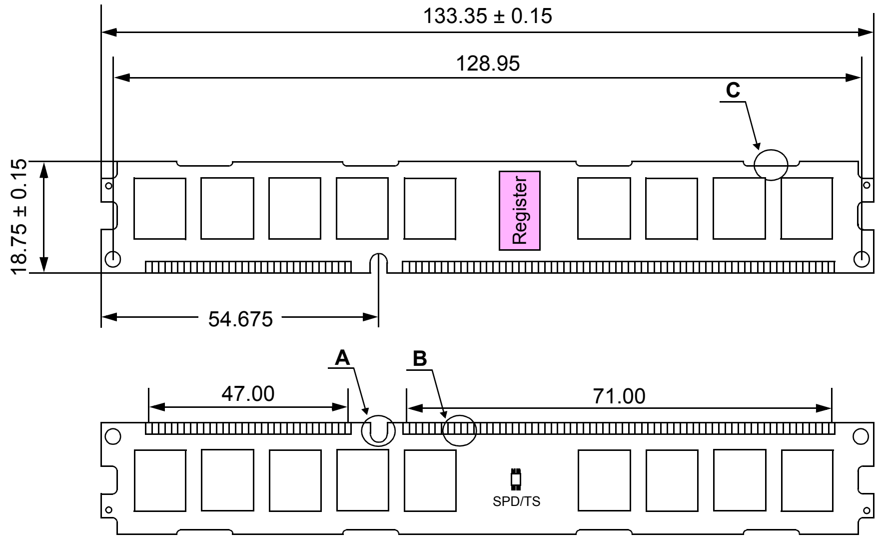


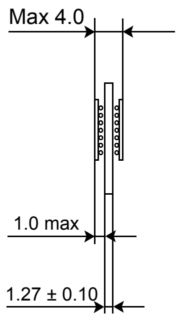


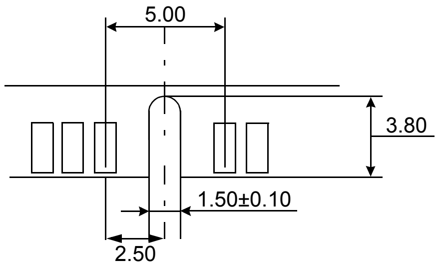


x72 240pin DDR3 SDRAM VLP RDIMM

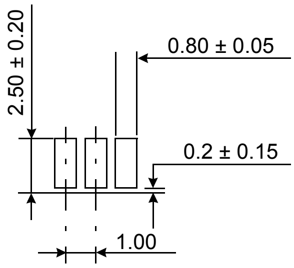
Units : Millimeters



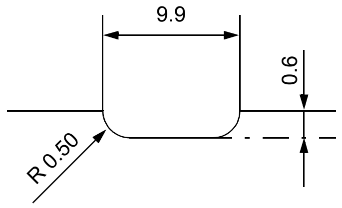




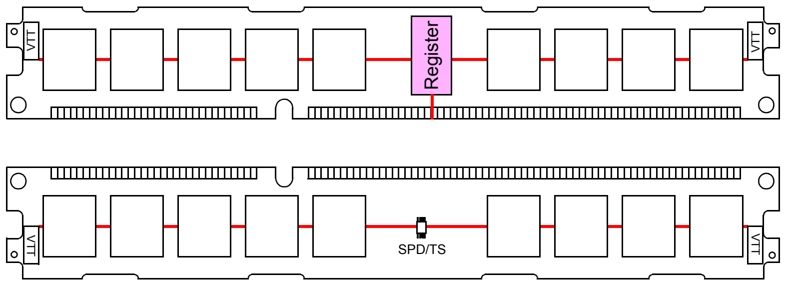
Detail A



Detail B



Detail C

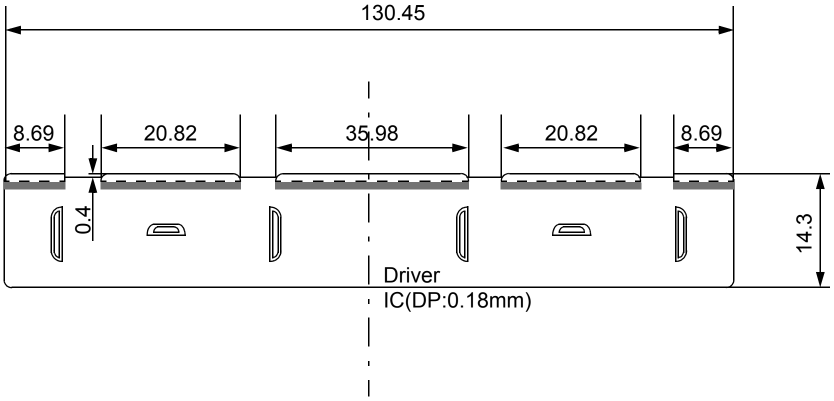


— Address, Command and Control lines

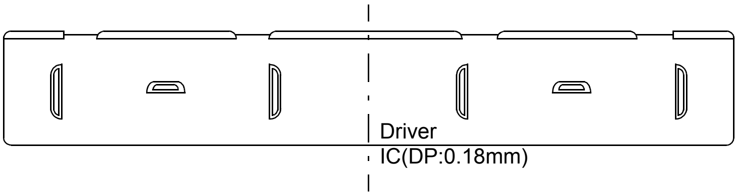
x72 240pin DDR3 SDRAM VLP RDIMM Heat Spreader Design (DDP, QDP)

1. FRONT PART

Outside

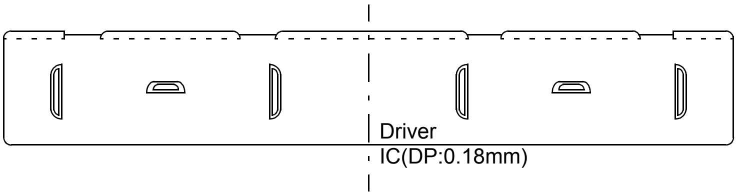


Inside

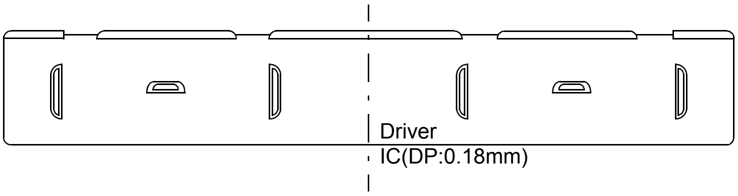


2. BACK PART

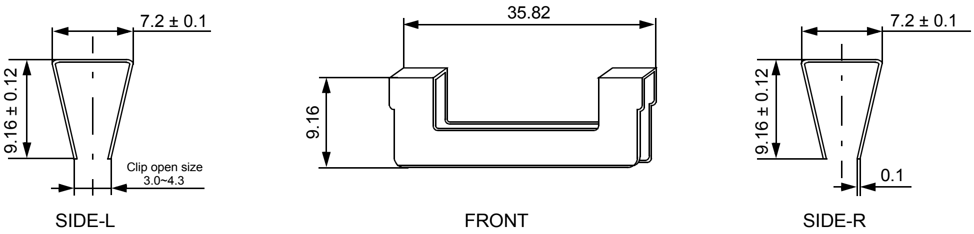
Outside



Inside

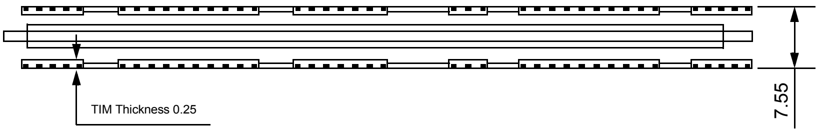


3. CLIP PART



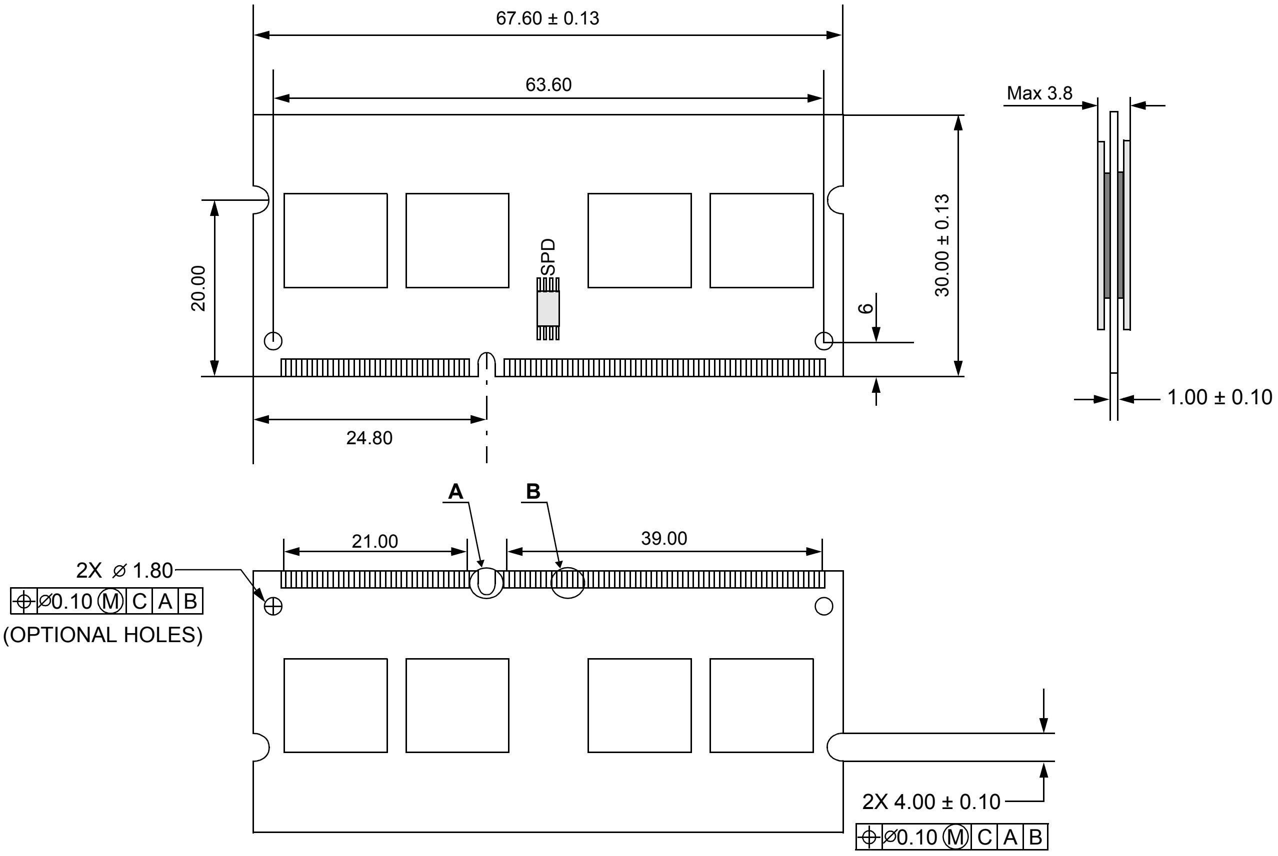
4. ASS’Y VIEW

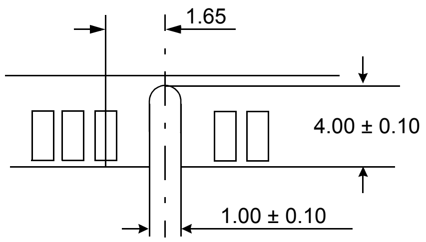
Reference thickness total (Maximum) : 7.55 (With Clip thickness)



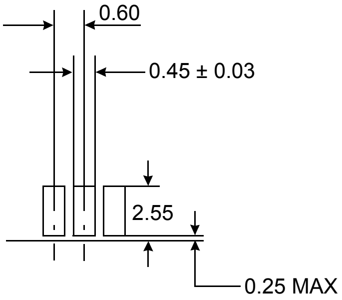
x72 204 pin DDR3 SDRAM ECC SODIMM
x64 204pin DDR3 SDRAM Non ECC SODIMM

Units : Millimeters





Detail A



Detail B