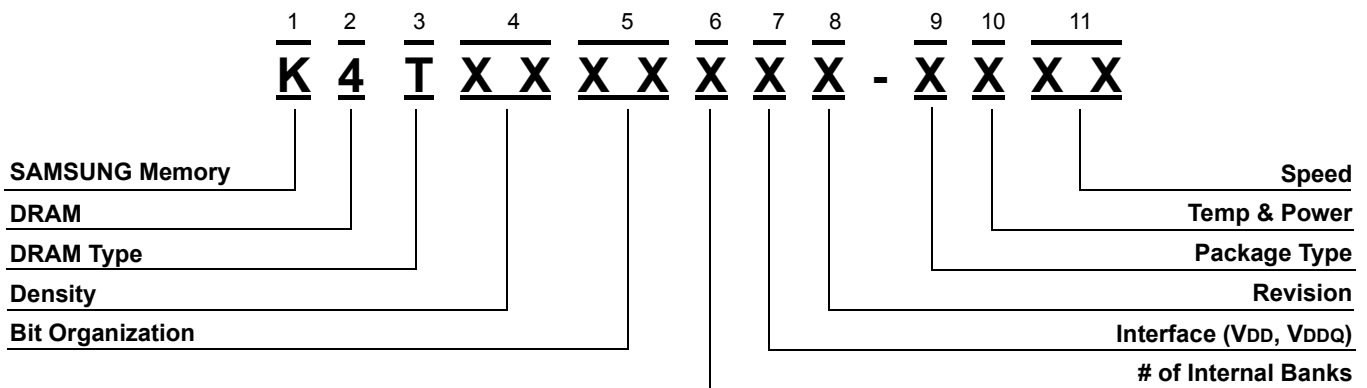


# DDR2 SDRAM Product Guide

January 2009

Memory Division

A. DDR2 SDRAM Component Ordering Information



1. SAMSUNG Memory : K

2. DRAM : 4

3. DRAM Type

T : DDR2 SDRAM

4. Density

56 : 256Mb  
 51 : 512Mb  
 1G : 1Gb  
 2G : 2Gb  
 4G : 4Gb

5. Bit Organization

04 : x 4  
 06 : x 4 Stack  
 07 : x 8 Stack  
 08 : x 8  
 16 : x16  
 26 : x 4 Stack (JEDEC Standard)  
 27 : x 8 Stack (JEDEC Standard)

6. # of Internal Banks

3 : 4 Banks  
 4 : 8 Banks

7. Interface ( VDD, VDDQ)

Q : SSTL-1.8V (1.8V, 1.8V)

8. Revision

M : 1st Gen.  
 A : 2nd Gen.  
 B : 3rd Gen.  
 C : 4th Gen.  
 D : 5th Gen.  
 E : 6th Gen.  
 F : 7th Gen.  
 G : 8th Gen.  
 H : 9th Gen.  
 Q : 17th Gen.  
 R : 18th Gen.

9. Package Type

Z : FBGA (Lead-free)  
 J : FBGA DDP (Lead-free)  
 H : FBGA (Lead-free & Halogen-free)  
 M : FBGA DDP (Lead-free & Halogen-free)  
 T : FBGA DSP (Lead-free & Halogen-free, Thin)

10. Temp & Power

C : Commercial Temp.( 0°C ~ 95°C) & Normal Power  
 L : Commercial Temp.( 0°C ~ 95°C) & Low Power  
 Y : Commercial Temp.( 0°C ~ 95°C) & Low Voltage

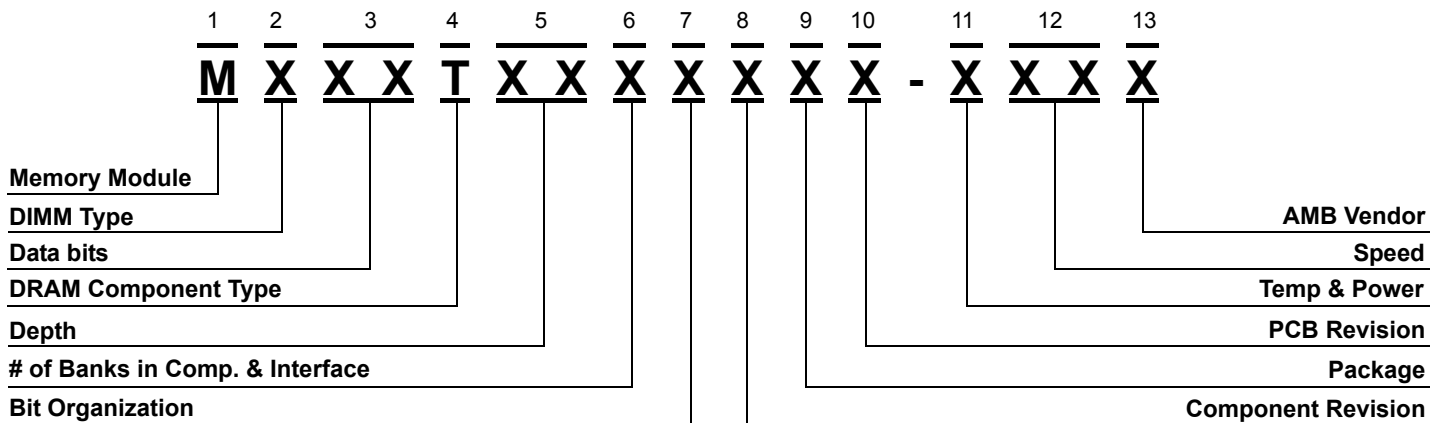
11. Speed

CC : DDR2-400 (200MHz @ CL=3, tRCD=3, tRP=3)  
 D5 : DDR2-533 (266MHz @ CL=4, tRCD=4, tRP=4)  
 E6 : DDR2-667 (333MHz @ CL=5, tRCD=5, tRP=5)  
 F7 : DDR2-800 (400MHz @ CL=6, tRCD=6, tRP=6)  
 E7 : DDR2-800 (400MHz @ CL=5, tRCD=5, tRP=5)  
 F8 : DDR2-1066(533MHz @ CL=7, tRCD=7, tRP=7)

## B. DDR2 SDRAM Component Product Guide

Density	Banks	Part Number	Package & Power, Temp. (-C/-L) & Speed	Org.	PKG	Avail.
512Mb G-die	4Banks	K4T51043QG	HC(L)E7/F7/E6	128M x 4	60 ball FBGA	Now
		K4T51083QG	HC(L)E7/F7/E6	64M x 8		
		K4T51163QG	HC(L)E7/F7/E6	32M x 16	84 ball FBGA	
1Gb Q-die	8Banks	K4T1G044QQ	HC(L)E7/F7/E6	256M x 4	60 ball FBGA	Now
		K4T1G084QQ	HC(L)E7/F7/E6	128M x 8		
		K4T1G164QQ	HC(L)E7/F7/E6	64M x 16	84 ball FBGA	
1Gb E-die	8Banks	K4T1G044QE	HC(L)E7/F7/E6	256M x 4	60 ball FBGA	Now
		K4T1G084QE	HC(L)E7/F7/E6	128M x 8		
		K4T1G164QE	HC(L)E7/F7/E6	64M x 16	84 ball FBGA	Now
		K4T1G164QE	HC(L)F8			Feb.'09
2Gb A-die	8Banks	K4T2G044QA	HC(L)F7/E6	512M x 4	68 ball FBGA	Now
		K4T2G084QA	HC(L)F7/E6	256M x 8		

C. DDR2 SDRAM Module Ordering Information



1. Memory Module : M

2. DIMM Type

- 3 : DIMM
- 4 : SODIMM

3. Data Bits

- 78 : x64 240pin Unbuffered DIMM
- 91 : x72 240pin ECC unbuffered DIMM
- 92 : x72 240pin VLP Registered DIMM
- 93 : x72 240pin Registered DIMM
- 95 : x72 240pin Fully Buffered DIMM
- 70 : x64 200pin Unbuffered SODIMM

4. DRAM Component Type

- T : DDR2 SDRAM (1.8V VDD)

5. Depth

- 32 : 32M
- 64 : 64M
- 28 : 128M
- 56 : 256M
- 51 : 512M
- 1G : 1G
- 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)

6. # of Banks in comp. & Interface

- 5 : 4Banks & SSTL-1.8V
- 6 : 8Banks & SSTL-1.8V

7. Bit Organization

- 0 : x 4
- 3 : x 8
- 4 : x16
- 6 : x 4 Stack (JEDEC Standard)
- 7 : x 8 Stack (JEDEC Standard)
- 8 : x 4 Stack
- 9 : x 8 Stack

8. Component Revision

- M : 1st Gen.
- B : 3rd Gen.
- D : 5th Gen.
- F : 7th Gen.
- Q : 17th Gen.
- A : 2nd Gen.
- C : 4th Gen.
- E : 6th Gen.
- G : 8th Gen.
- R : 18th Gen.

9. Package

- Z : FBGA(Lead-free)
- J : FBGA DDP (Lead-free)
- Q : FBGA QDP (Lead-free)
- H : FBGA (Lead-free & Halogen-free)
- M : FBGA DDP (Lead-free & Halogen-free)
- E : FBGA QDP (Lead-free & Halogen-free)

10. PCB Revision

- 0 : Mother PCB
- 2 : 2nd Rev.
- 4 : 4th Rev.
- 1 : 1st Rev.
- 3 : 3rd Rev.
- A : Parity DIMM
- S : Reduced PCB

11. Temp & Power

- C : Commercial Temp.( 0°C ~ 95°C) & Normal Power
- L : Commercial Temp.( 0°C ~ 95°C) & Low Power
- Y : Commercial Temp.( 0°C ~ 95°C) & Low Voltage

12. Speed

- CC : DDR2-400 (200MHz @ CL=3, tRCD=3, tRP=3)
- D5 : DDR2-533 (266MHz @ CL=4, tRCD=4, tRP=4)
- E6 : DDR2-667 (333MHz @ CL=5, tRCD=5, tRP=5)
- F7 : DDR2-800 (400MHz @ CL=6, tRCD=6, tRP=6)
- E7 : DDR2-800 (400MHz @ CL=5, tRCD=5, tRP=5)
- F8 : DDR2-1066(533MHz @ CL=7, tRCD=7, tRP=7)

13. AMB Vendor For FBDIMM

- 5 : Intel
- 6, 8 : IDT
- 3, 4, 9 : Montage

Note : PC2-8500(DDR2-1066). PC2-6400(DDR2-800), PC2-5300(DDR2-667)  
PC2-4200(DDR2-533), PC2-3200(DDR2-400)

D. DDR2 SDRAM Module Product Guide

240Pin DDR2 Unbuffered DIMM													
Org.	Density	Part Number	Speed	Composition	Comp. Version	Internal Banks	Rank	PKG	Height	Avail.			
64Mx 64	512MB	M378T6553GZS	CE7/F7/E6	64M x 8 * 8pcs	512Mb G-die	4	1	60 ball FBGA	30mm	Now			
		M378T6464QZ(H)3	CE7/F7/E6	64M x 16 * 4pcs	1Gb Q-die	8	1	84 ball FBGA					
M378T6464EHS		CE7/F7/E6	64M x 16 * 4pcs	1Gb E-die	1		60 ball FBGA						
64Mx 72		M391T6553GZ3	CE7/F7/E6	64M x 8 * 9pcs	512Mb G-die	4	1	60 ball FBGA					
128Mx 64	1GB	M378T2953GZ3	CE7/F7/E6	64M x 8 * 16pcs	512Mb G-die	4	2	60 ball FBGA	30mm	Now			
		M378T2863QZ(H)S	CE7/F7/E6	128M x 8 * 8pcs	1Gb Q-die	8	1						
		M378T2863EHS	CE7/F7/E6		1Gb E-die								
M378T2863EHS		CF8											
128Mx 72			M391T2953GZ3	CE7/F7/E6	64M x 8 * 18pcs	512Mb G-die	4			2			
			M391T2863QZ(H)3	CE7/F7/E6	128M x 8 * 18pcs	1Gb Q-die	8			1	Now		
		M391T2863EH3	CE7/F7/E6	1Gb E-die									
256Mx 64	2GB	M378T5663QZ(H)3	CE7/F7/E6	128M x 8 * 16pcs	1Gb Q-die	8	2	60 ball FBGA	30mm	Now			
		M378T5663EH3	CE7/F7/E6		1Gb E-die								
		M378T5663EH3	CF8										
256Mx 72			M391T5663QZ(H)3	CE7/F7/E6	128M x 8 * 18pcs					1Gb Q-die	8	1	Now
			M391T5663EH3	CE7/F7/E6						1Gb E-die			
512Mx 64	4GB	M378T5263AZ(H)3	CF7/E6	256M x 8 * 16pcs	2Gb A-die	8	2	68 ball FBGA	30mm	Now			
512Mx 72		M391T5263AZ(H)3	CF7/E6	256M x 8 * 18pcs	2Gb A-die								

200Pin DDR2 SODIMM										
Org.	Density	Part Number	Speed	Composition	Comp. Version	Internal Banks	Rank	PKG	Height	Avail.
64Mx 64	512MB	M470T6554GZ3	C(L)E7/F7/E6	32M x 16 * 8pcs	512Mb G-die	4	2	84 ball FBGA	30mm	Now
		M470T6464QZ(H)3	C(L)E7/F7/E6	64M x 16 * 4pcs	1Gb Q-die	8	1			
		M470T6464EHS	C(L)E7/F7/E6		1Gb E-die					
128Mx 64	1GB	M470T2953GZ3	C(L)E7/F7/E6	64M x 8 * 16pcs	512Mb G-die	4	2	60 ball FBGA	30mm	Now
		M470T2864QZ(H)3	C(L)E7/F7/E6	64M x 16 * 8pcs	1Gb Q-die	8	2	84 ball FBGA		
		M470T2864EH3	C(L)E7/F7/E6		1Gb E-die			1		
		M470T2863EH3	C(L)E7/F7/E6	128M x 8 * 8pcs						
256Mx 64	2GB	M470T5663QZ(H)3	C(L)E7/F7/E6	128M x 8 * 16pcs	1Gb Q-die		8	2	60 ball FBGA	30mm
		M470T5663EH3	C(L)E7/F7/E6		1Gb E-die					
512Mx 64	4GB	M470T5267AZ(H)3	C(L)F7/E6	st.512M x 8 * 8pcs	2Gb A-die	8	2	83 ball FBGA	30mm	Now

240Pin DDR2 Registered DIMM										
Org.	Density	Part Number	Speed	Composition	Comp. Version	Internal Banks	Rank	PKG	Height	Avail.
64Mx 72	512MB	M393T6553GZ3	CD5/CC	64M x 8 * 9pcs	512Mb G-die	4	1	60 ball FBGA	30mm	Now
		M393T6553GZA	CF7/E6							
128Mx 72	1GB	M393T2953GZ3	CD5/CC	64M x 8 * 18pcs	512Mb G-die	4	2	60 ball FBGA	30mm	Now
		M393T2953GZA	CF7/E6							
		M393T2950GZ3	CD5/CC	128M x 4 * 18pcs	1Gb Q-die	8	1			
		M393T2950GZA	CF7/E6							
		M393T2863QZ3	CD5/CC	128M x 8 * 9pcs	1Gb Q-die	8	1			
		M393T2863QZA	CE7/F7/E6							
		M393T2863QHA	CE6/F7/E7							
256Mx 72	2GB	M393T5750GZ3	CD5/CC	128M x 4 * 36pcs	512Mb G-die	4	2	60 ball FBGA	30mm	Now
		M393T5750GZA	CF7/E6							
		M393T5663QZ3	CD5/CC	128M x 8 * 18pcs	1Gb Q-die	8	2			
		M393T5663QZA	CF7/E6							
		M393T5663QHA	CE6/F7/E7	256M x 4 * 18pcs	1Gb Q-die	8	1			
		M393T5660QZ3	CD5/CC							
		M393T5660QZA	CE7/F7/E6							
512Mx 72	4GB	M393T5160QZ3	CD5/CC	256M x 4 * 36pcs	1Gb Q-die	8	2	60 ball FBGA	30mm	Now
		M393T5160QZA	CE7/F7/E6							
		M393T5160QHA	CE6/F7/E7	512M x 4 * 18pcs	2Gb A-die	8	1			
		M393T5260AZA	CF7/E6							
1Gx 72	8GB	M393T1G60QJA	CE6/D5	DDP 512M x 4 * 36pcs	1Gb Q-die	8	4	63 ball FBGA	30mm	Now
		M393T1G60QMA	CE6/D5							
		M393T1K66AZA	CF7/E6	st.1G x 4 * 18pcs	2Gb A-die	8	2			

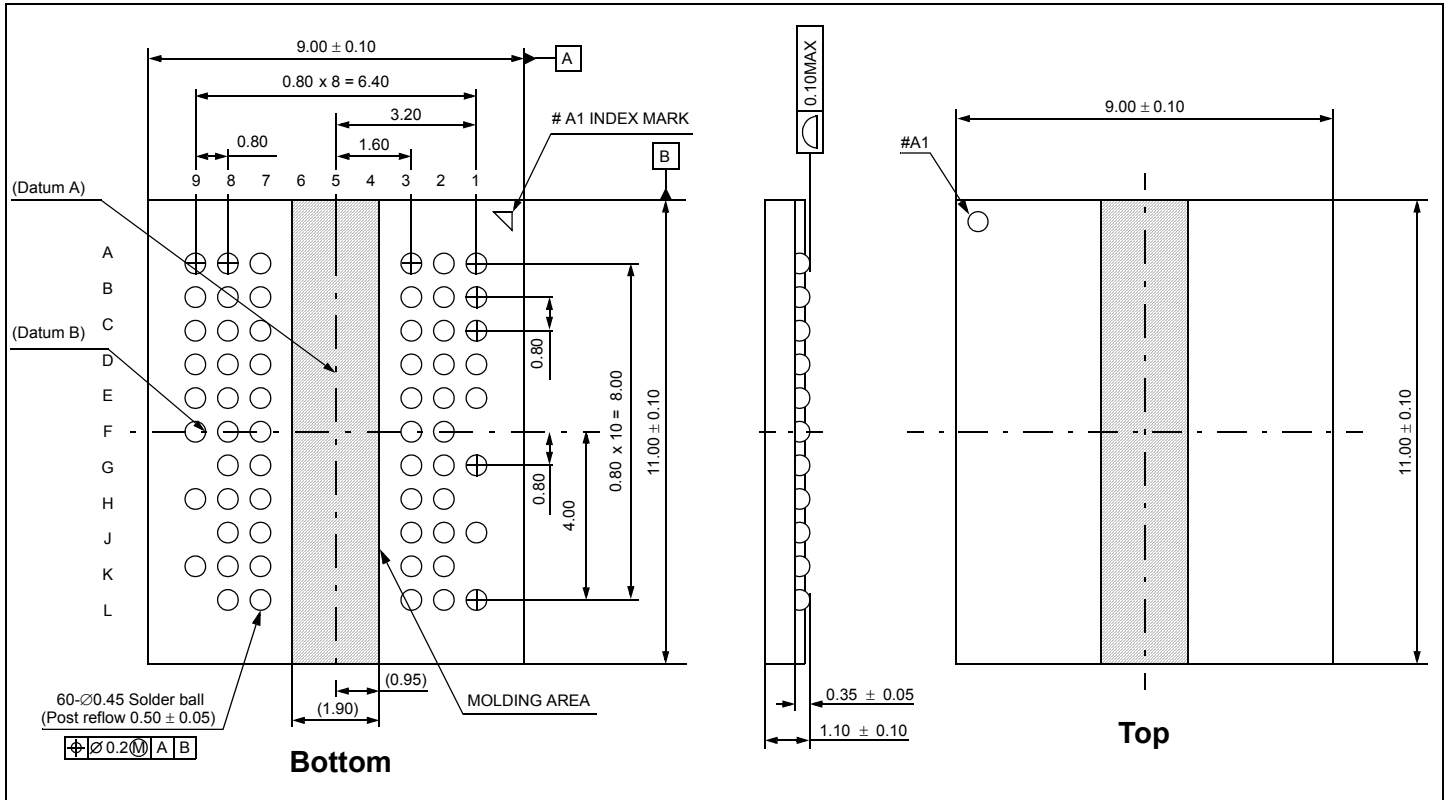
240Pin DDR2 VLP Registered DIMM											
Org.	Density	Part Number	Speed	Composition	Comp. Version	Internal Banks	Rank	PKG	Height	Avail.	
64Mx 72	512MB	M392T6553GZA	CF7/E6	64M x 8 * 9pcs	512Mb G-die	4	1	60 ball FBGA	18.3mm	Now	
128Mx 72	1GB	M392T2950GZA	CF7/E6	128M x 4 * 18pcs	512Mb G-die	4	1	60 ball FBGA	18.3mm	Now	
		M392T2863QZA	CF7/E6	128M x 8 * 9pcs	1Gb Q-die	8	1			2Q. '09	
		M392T2863QHA	CF7/E6								
256Mx 72	2GB	M392T5660QZA	CF7/E6	256M x 4 * 18pcs	1Gb Q-die	8	1	60 ball FBGA	18.3mm	Now	
		M392T5660QHA	CF7/E6				2			2Q. '09	
		M392T5663QZA	CF7/E6	128M x 8 * 18pcs						Now	
		M392T5663QHA	CF7/E6				2Q. '09				
512Mx 72	4GB	M392T5160QJA	CF7/E6	DDP 512M x 4 * 18pcs	1Gb Q-die	8	2	63 ball FBGA	18.3mm	Now	
		M392T5160QMA	CF7/E6							2Q. '09	
1Gx 72	8GB	M392T1G60QQA	CE6/D5	QDP 1G x 4 * 18pcs	1Gb Q-die	8	4	65 ball FBGA	18.3mm	Now	
		M392T1G60QEA	CE6/D5	QDP 1G x 4 * 18pcs						2Q. '09	



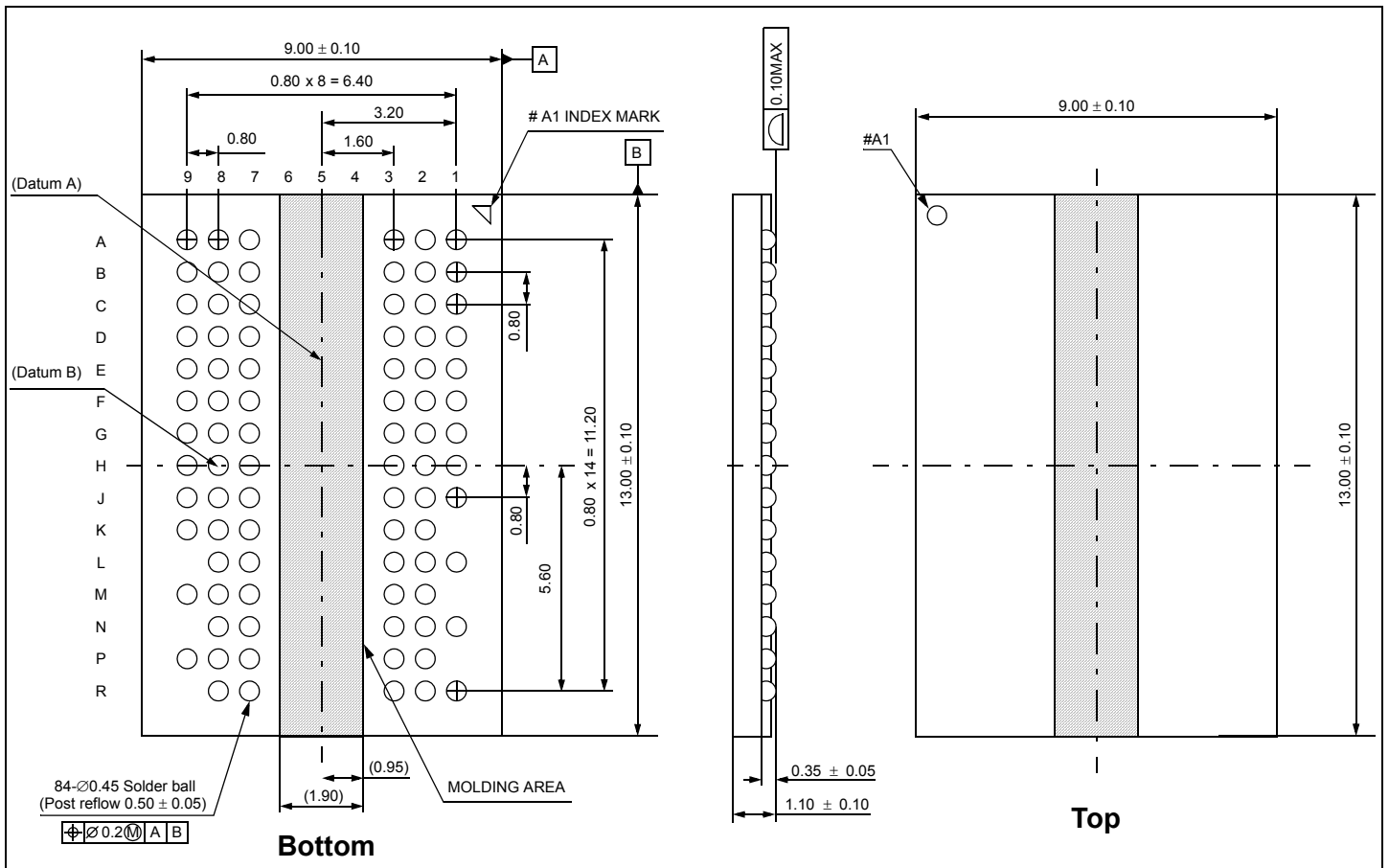
240Pin DDR2 Fully Buffered DIMM(1.8V)																
Org.	Density	Part Number	Speed	AMB	Composition	Comp. Version	Internal Banks	Rank	PKG	Height	Avail.					
64Mx 72	512MB	M395T6553GZ4	CE7/F7/E6	6 : IDT C1	64M x 8 * 9pcs	512Mb G-die	4	1	60 ball FBGA	30.35mm	Now					
			CE6	5 : Intel D1												
128Mx 72	1GB	M395T2953GZ4	CE7/F7/E6	6 : IDT C1	64M x 8 * 18pcs	512Mb G-die	4	2	60 ball FBGA	30.35mm	Now					
			CE6	5 : Intel D1												
		M395T2863QZ4	CE7/F7/E6	6 : IDT C1	128M x 8 * 9pcs	1Gb Q-die	8	1				1	1	1	1	2Q. '09
			CE7/F7/E6	8 : IDT L4												
			CE6	5 : Intel D1												
			CE6	9: Montage D1												
		M395T2863QH4	CE7/F7/E6	6 : IDT C1	128M x 8 * 9pcs	1Gb Q-die	8	1			1	1	1	1	2Q. '09	
			CE7/F7/E6	8 : IDT L4												
			CE6	5 : Intel D1												
			CE6	9: Montage D1												
256Mx 72	2GB	M395T5750GZ4	CE7/F7/E6	6 : IDT C1	128M x 4 * 36pcs	512Mb G-die	4	2	60 ball FBGA	30.35mm	Now					
			CE6	5 : Intel D1												
		M395T5663QZ4	CE7/F7/E6	6 : IDT C1	128M x 8 * 18pcs	1Gb Q-die	8	2				2	2	2	2	2Q. '09
			CE7/F7/E6	8 : IDT L4												
			CE6	5 : Intel D1												
			CE6	9: Montage D1												
		M395T5663QH4	CE7/F7/E6	6 : IDT C1	128M x 8 * 18pcs	1Gb Q-die	8	2			2	2	2	2	2Q. '09	
			CE7/F7/E6	8 : IDT L4												
			CE6	5 : Intel D1												
			CE6	9: Montage D1												
512Mx 72	4GB	M395T5160QZ4	CE7/F7/E6	6 : IDT C1	256M x 4 * 36pcs	1Gb Q-die	8	2	60 ball FBGA	30.35mm	Now					
			CE6	8 : IDT L4												
			CE6	5 : Intel D1												
		M395T5160QH4	CE7/F7/E6	6 : IDT C1	128M x 8 * 36pcs	1Gb Q-die	8	4			4	4	4	4	2Q. '09	
			CE6	8 : IDT L4												
			CE6	5 : Intel D1												
		M395T5163QZ4	CE7/F7/E6	6 : IDT C1	128M x 8 * 36pcs	1Gb Q-die	8	4			4	4	4	4	Now	
			CE6	8 : IDT L4												
		M395T5163QH4	CE7/F7/E6	6 : IDT C1	128M x 8 * 36pcs	1Gb Q-die	8	4			4	4	4	4	2Q. '09	
			CE6	8 : IDT L4												
M395T5263AZ4	CF7/E6	6 : IDT C1	256M x 8 * 18pcs	2Gb A-die	8	2	2	2	68 ball FBGA	30.35mm	Now					
	CF7/E6	8 : IDT L4														
1Gx 72	8GB	M395T1G60QJ4	CE6/F7	8 : IDT L4	DDP 512M x 4 * 36pcs	1Gb Q-die	8	4	63 ball FBGA	30.35mm	Now					
		M395T1G60QM4	CF7/E6	8 : IDT L4												
		M395T1K66AZ4	CF7/E6/D5	6 : IDT C1	st.1G x 4 * 18pcs	2Gb A-die					8	2	2	83 ball FBGA	30.35mm	Now
			CF7/E6	8 : IDT L4												

240Pin DDR2 Fully Buffered DIMM(1.55V)											
Org.	Density	Part Number	Speed	AMB	Composition	Comp. Version	Internal Banks	Rank	PKG	Height	Avail.
128Mx 72	1GB	M395T2863QZ4	YE6	8: IDT L4	64M x 8 * 18pcs	1Gb Q-die	8	1	60 ball FBGA	30.35mm	Now
		M395T2863QH4	YE6	8: IDT L4							2Q. '09
256Mx 72	2GB	M395T5663QZ4	YE6	8: IDT L4	128M x 8 * 18pcs	1Gb Q-die	8	2	60 ball FBGA	30.35mm	Now
		M395T5663QH4	YE6	8: IDT L4							2Q. '09
512Mx 72	4GB	M395T5160QZ4	YE6	8: IDT L4	256M x 4 * 36pcs	1Gb Q-die	8	2	60 ball FBGA	30.35mm	Now
		M395T5160QH4	YE6	8: IDT L4							2Q. '09
		M395T5163QZ4	YE6	8: IDT L4	128M x 8 * 36pcs			4			Now
		M395T5163QH4	YE6	8: IDT L4							2Q. '09
		M395T5263AZ4	YE6	8: IDT L4	256M x 8 * 18pcs			2			68 ball FBGA
1Gx 72	8GB	M395T1K66AZ4	YE6	8: IDT L4	st.1G x 4 * 18pcs	2Gb A-die	8	2	83 ball FBGA	30.35mm	Now

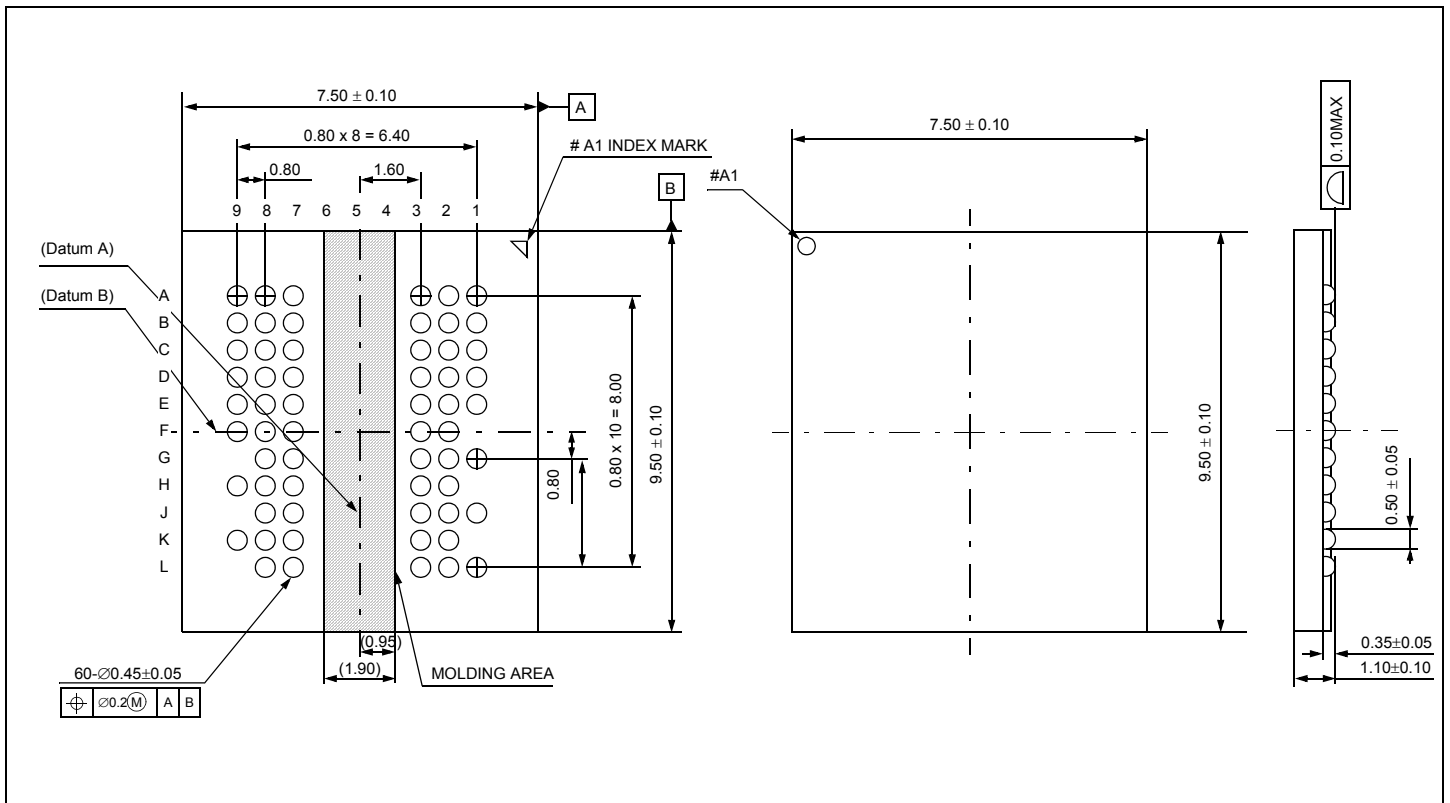
60Ball FBGA for 512Mb E-die (x4/x8)



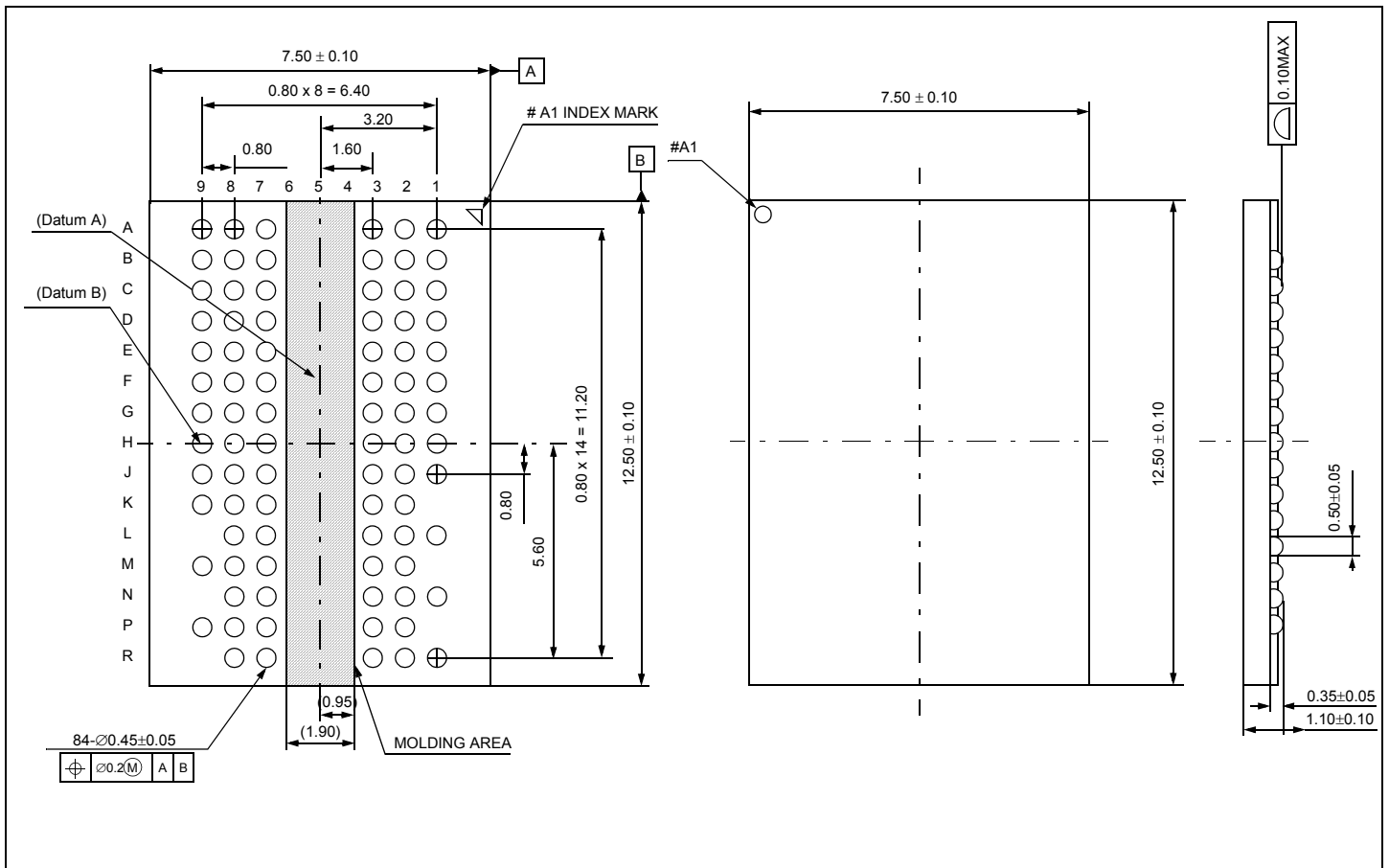
84Ball FBGA for 512Mb E-die (x16)



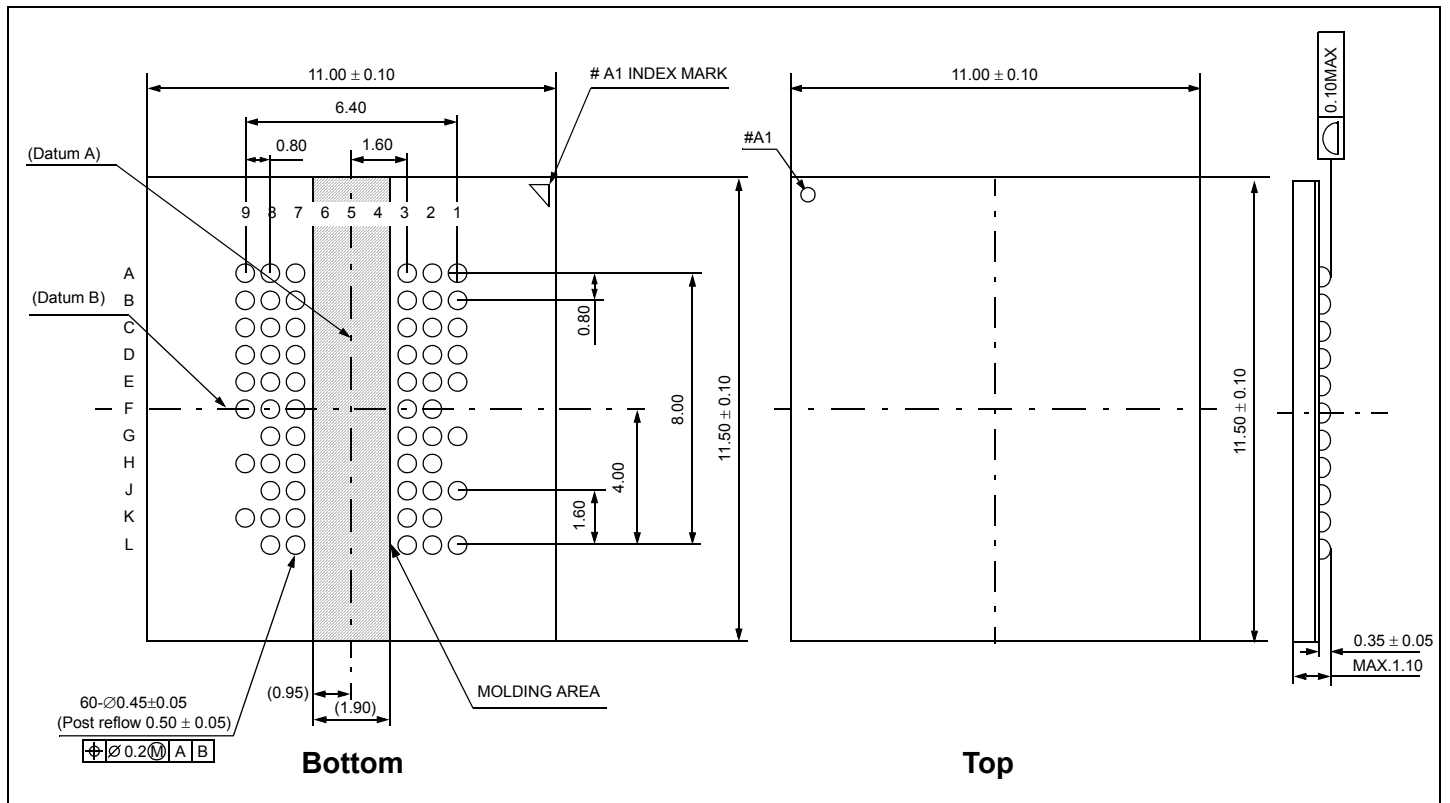
60Ball FBGA for 512Mb G-die (x4/x8)



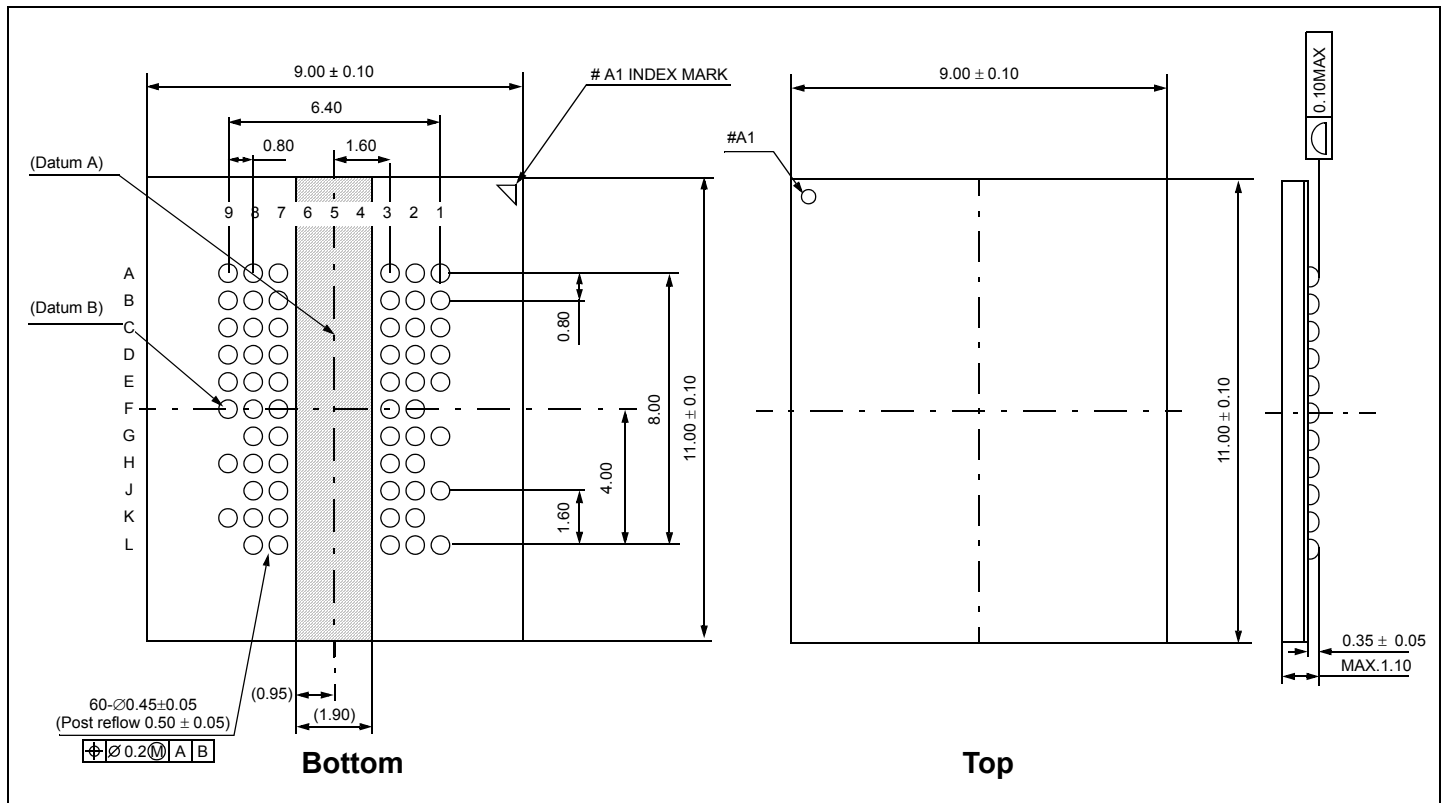
84Ball FBGA for 512Mb G-die (x16)



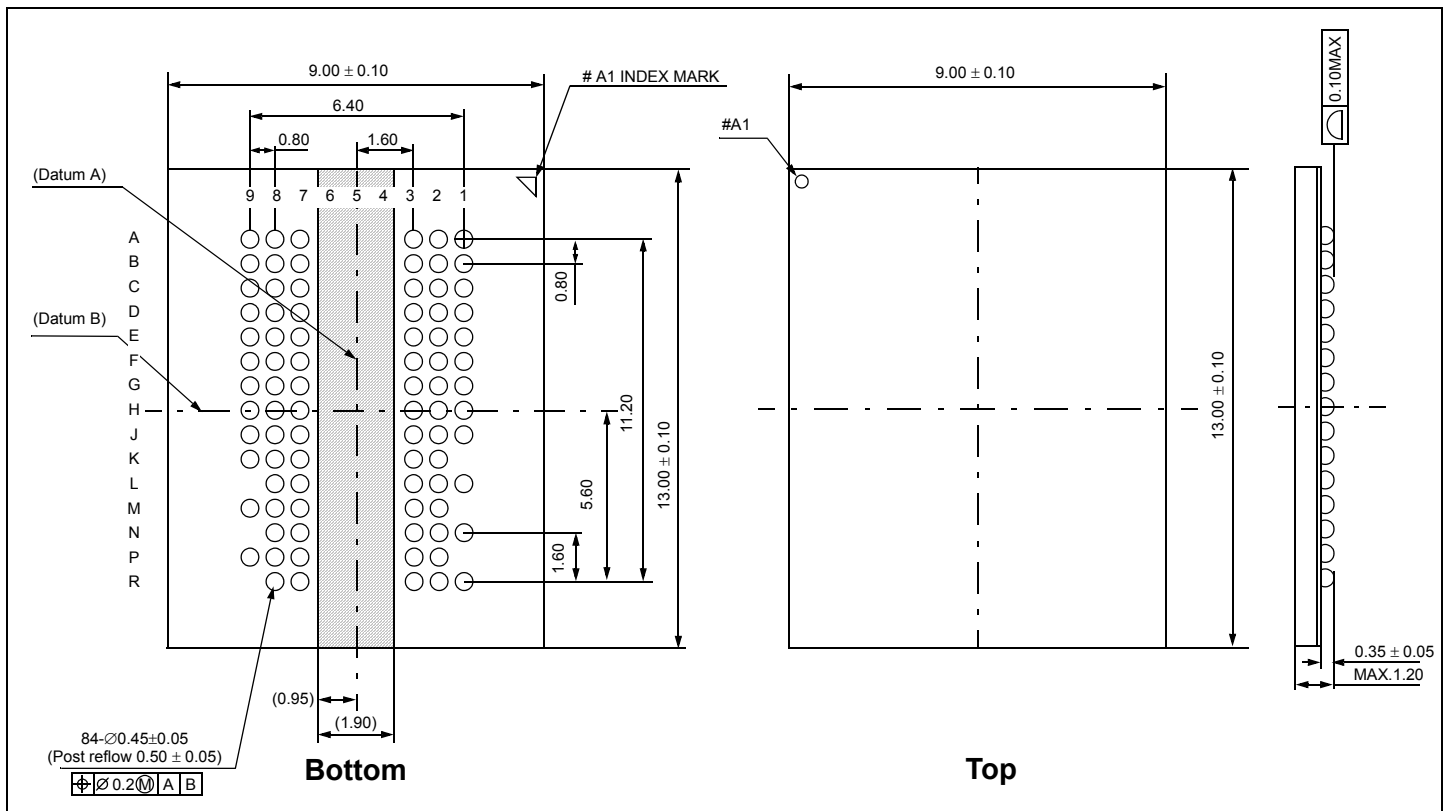
60Ball FBGA for 1Gb C-die (x4/x8)



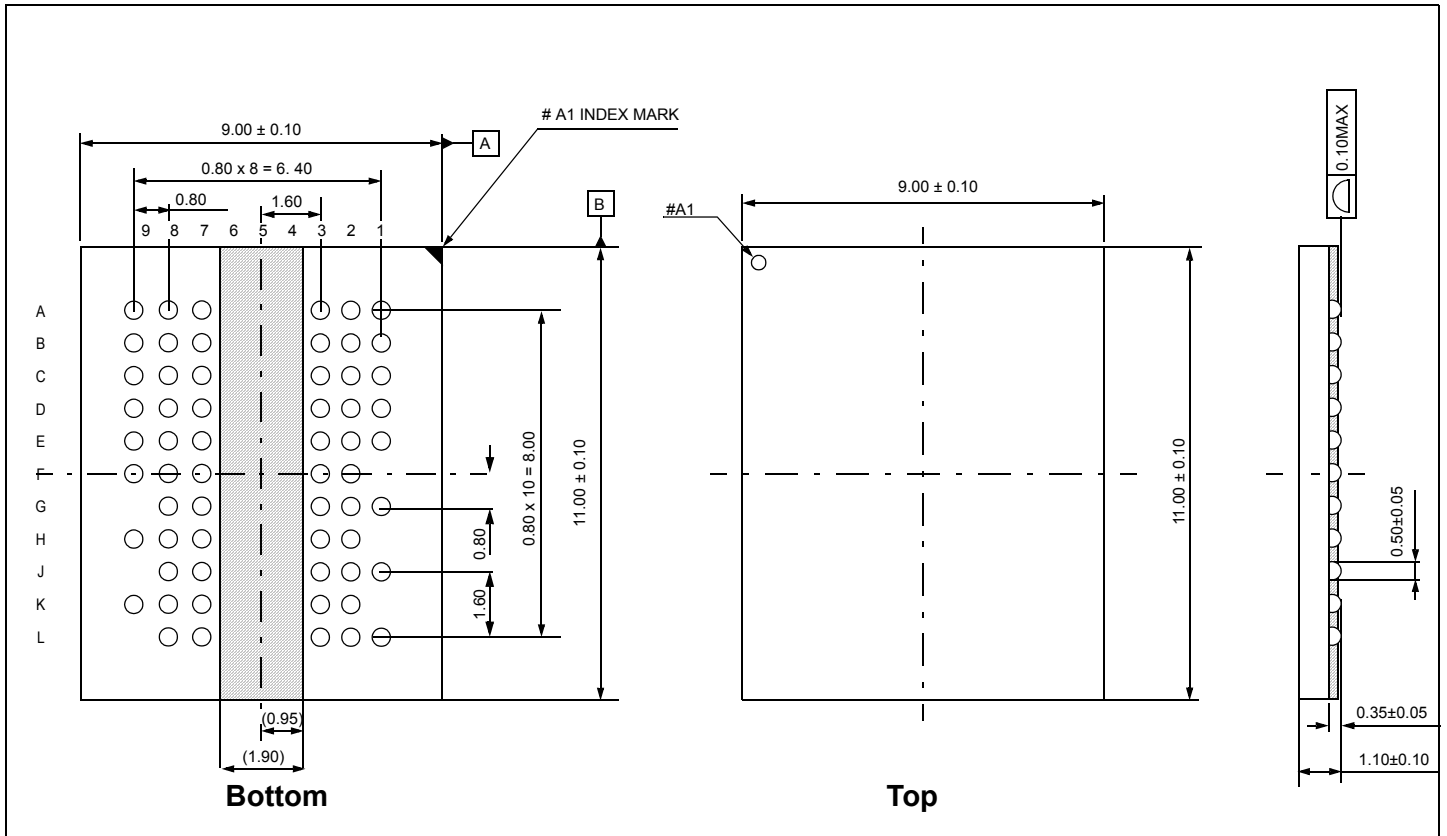
60Ball FBGA for 1Gb D-die (x8)



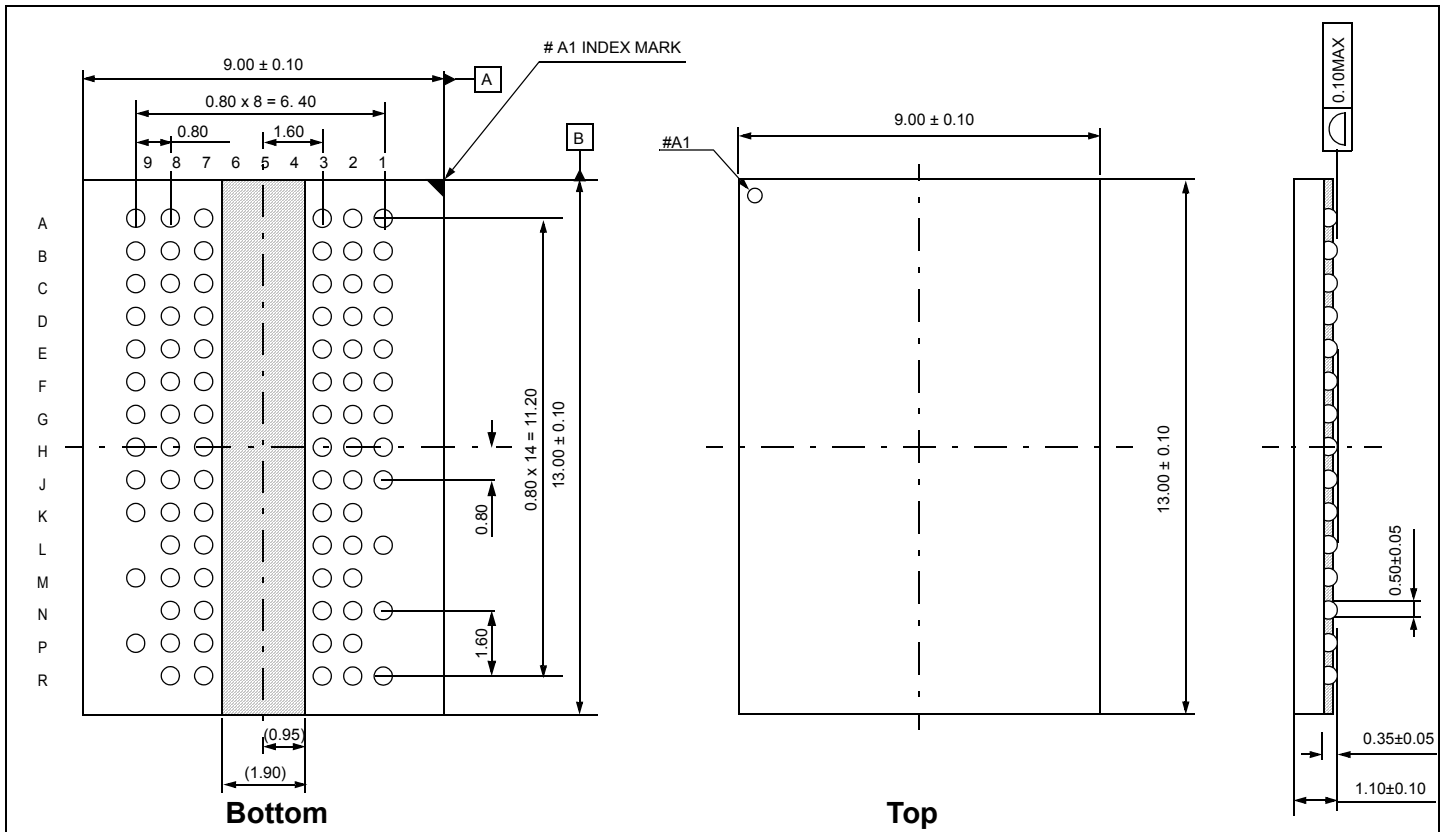
84Ball FBGA for 1Gb D-die (x16)



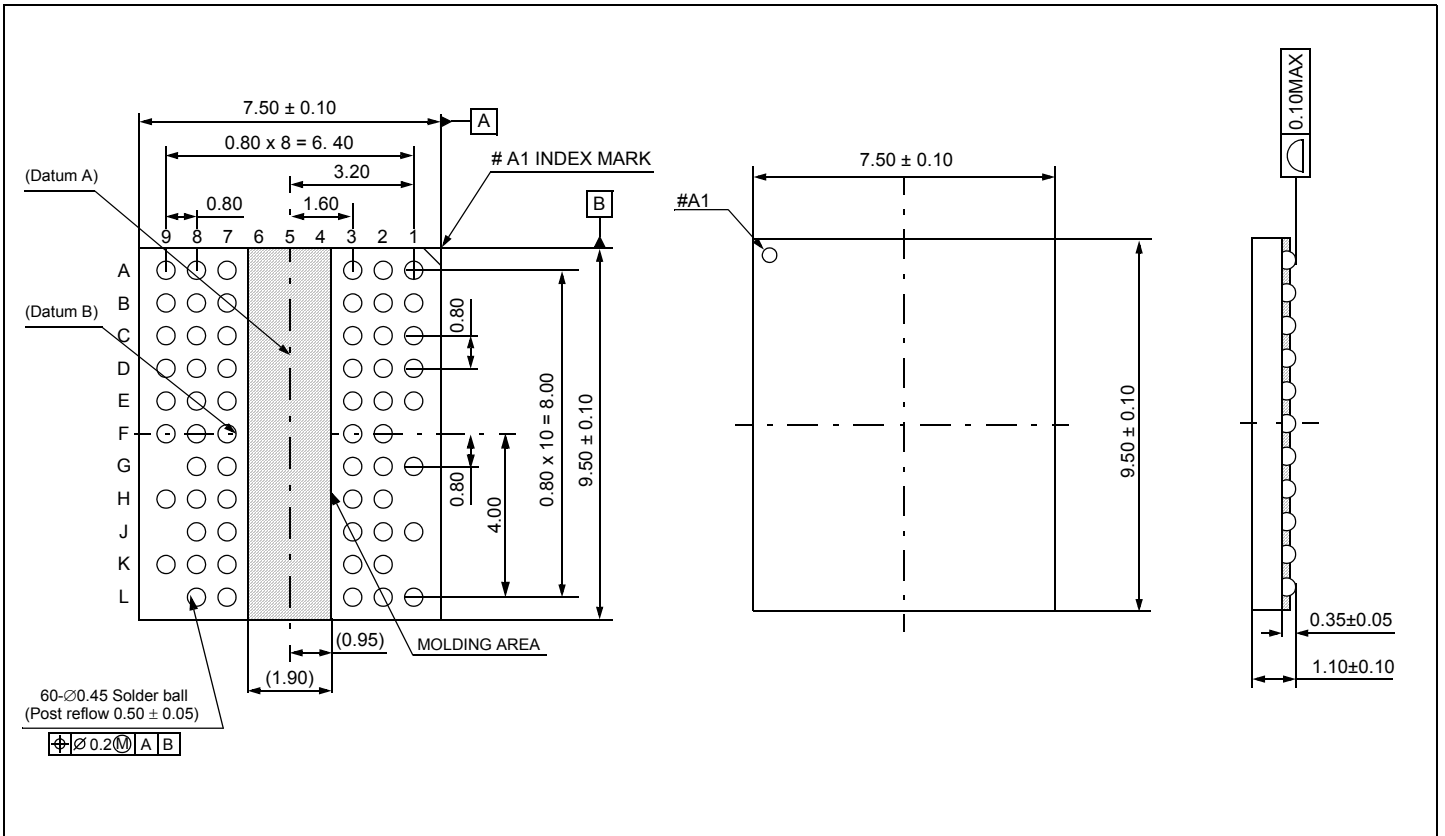
60Ball FBGA for 1Gb Q-die (x4/x8)



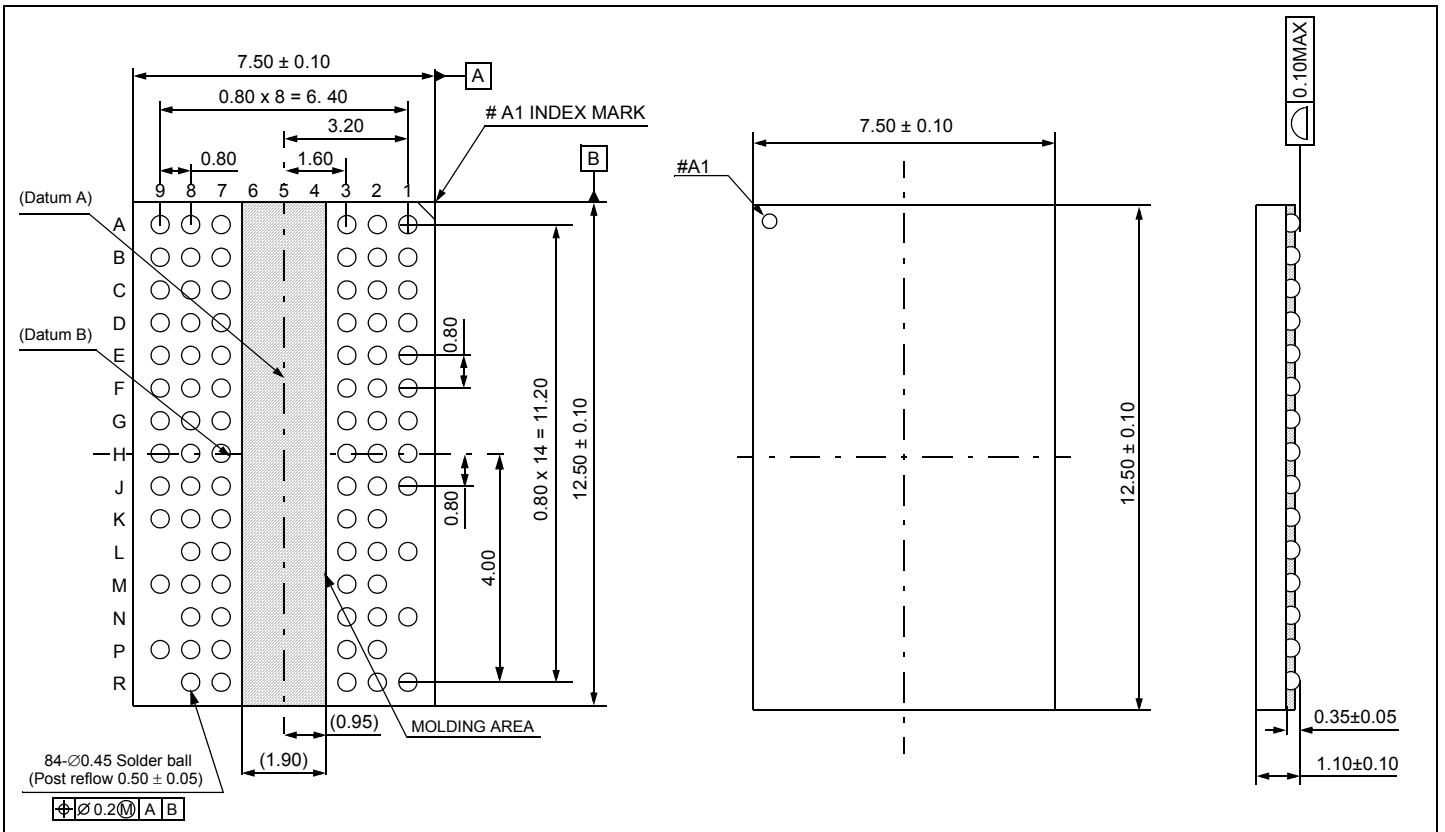
84Ball FBGA for 1Gb Q-die (x16)



60Ball FBGA for 1Gb E-die (x4/x8)



84Ball FBGA for 1Gb E-die (x16)





68Ball FBGA for 2Gb A-die (x4/x8)

