DDR2 SDRAM Memory

Product Guide

SAMSUNG ELECTRONICS RESERVES THE RIGHT TO CHANGE PRODUCTS, INFORMATION AND SPECIFICATIONS WITHOUT NOTICE.

Products and specifications discussed herein are for reference purposes only. All information discussed herein is provided on an "AS IS" basis, without warranties of any kind.

This document and all information discussed herein remain the sole and exclusive property of Samsung Electronics. No license of any patent, copyright, mask work, trademark or any other intellectual property right is granted by one party to the other party under this document, by implication, estoppel or otherwise.

Samsung products are not intended for use in life support, critical care, medical, safety equipment, or similar applications where product failure could result in loss of life or personal or physical harm, or any military or defense application, or any governmental procurement to which special terms or provisions may apply.

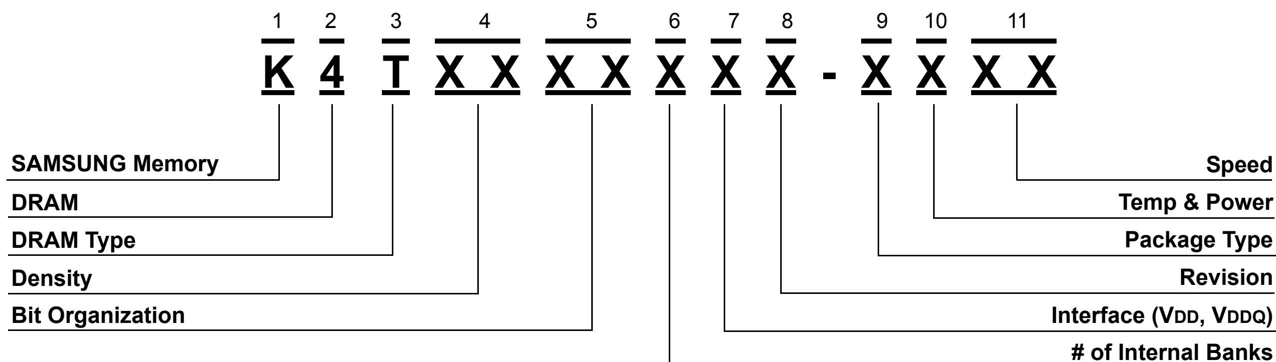
For updates or additional information about Samsung products, contact your nearest Samsung office.

All brand names, trademarks and registered trademarks belong to their respective owners.

ⓒ 2010 Samsung Electronics Co., Ltd. All rights reserved.

Downloaded from Elcodis.com electronic components distributor

1. DDR2 SDRAM MEMORY 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_18 (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.
I : 10th 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)
B : FBGA (Lead-free & Halogen-free, Flip Chip)

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)

Downloaded from Elcodis.com electronic components distributor

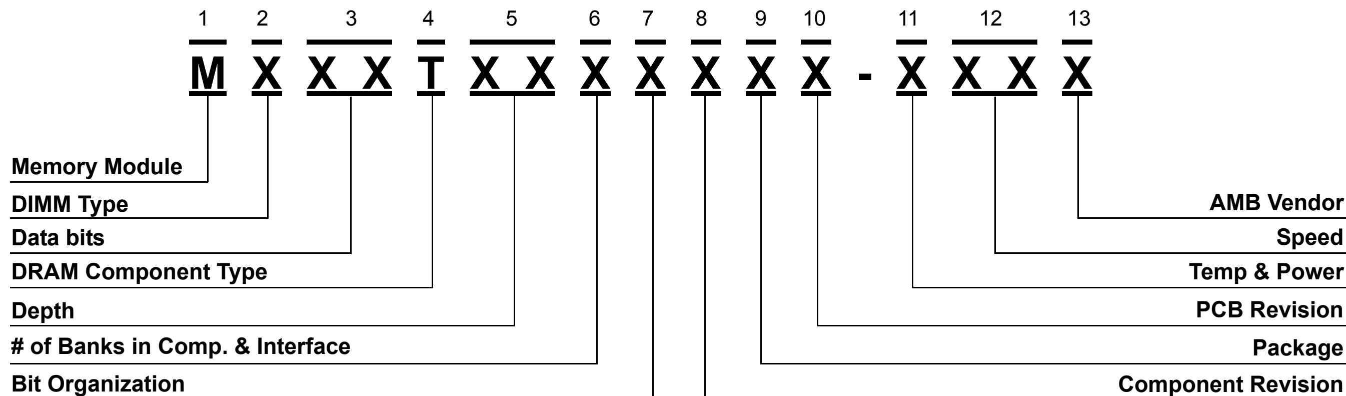
2. DDR2 SDRAM Component Product Guide

2.1 SDRAM

Density	Banks	Part Number	Package & Power, Temp. (-C/-L) & Speed	Org.	PKG	Avail.
512Mb I-die	4Banks	K4T51043QI	HCE7/F7/E6	128M x 4	60 ball FBGA	Now
		K4T51083QI	HCE7/F7/E6	64M x 8		
		K4T51163QI	HCF8/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
1Gb F-die	8Banks	K4T1G044QF	BCE7/F7/E6	256M x 4	60 ball FBGA	Jun. '10
		K4T1G084QF	BCE7/F7/E6	128M x 8		
		K4T1G164QF	BCE7/F7/E6	64M x 16	84 ball FBGA	May. '10
2Gb A-die	8Banks	K4T2G044QA	HC(L)F7/E6	512M x 4	68 ball FBGA	Now
		K4T2G084QA	HC(L)F7/E6	256M x 8		

Downloaded from Elcodis.com electronic components distributor

3. 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

5. Depth

32 : 32M	33 : 32M (for 128Mb/512Mb)
64 : 64M	65 : 64M (for 128Mb/512Mb)
28 : 128M	29 : 128M (for 128Mb/512Mb)
56 : 256M	57 : 256M (for 512Mb/2Gb)
51 : 512M	52 : 512M (for 512Mb/2Gb)
1G : 1G	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.	A : 2nd Gen.
B : 3rd Gen.	C : 4th Gen.
D : 5th Gen.	E : 6th Gen.
F : 7th Gen.	G : 8th Gen.
I : 10th Gen.	Q : 17th 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)
B : FBGA (Lead-free & Halogen-free, Flip Chip)

10. PCB Revision

0 : Mother PCB	1 : 1st Rev.
2 : 2nd Rev.	3 : 3rd Rev.
4 : 4th 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)

13. AMB Vendor For FBDIMM

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

NOTE : PC2-6400(DDR2-800), PC2-5300(DDR2-667)
PC2-4200(DDR2-533), PC2-3200(DDR2-400)

Downloaded from Elcodis.com electronic components distributor

4. 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	M378T6464QZ(H)3	CE7/F7/E6	64M x 16 * 4pcs	1Gb Q-die	8	1	84 ball FBGA	30mm	Now
		M378T6464EHS	CE7/F7/E6	64M x 16 * 4pcs	1Gb E-die		1			
128Mx 64	1GB	M378T2863QZ(H)S	CE7/F7/E6	128M x 8 * 8pcs	1Gb Q-die	8	1	60 ball FBGA	30mm	Now
		M378T2863EHS	CE7/F7/E6		1Gb E-die					
		M378T2863FBS	CE7/F7/E6		1Gb F-die					Jun. '10
128Mx 72		M391T2863QZ(H)3	CE7/F7/E6	128M x 8 * 9pcs	1Gb Q-die	8	1			Now
		M391T2863EH3	CE7/F7/E6		1Gb E-die					
		M391T2863FB3	CE7/F7/E6		1Gb F-die					Jun. '10
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					
		M378T5663FB3	CE7/F7/E6		1Gb F-die					Jun. '10
256Mx 72		M391T5663QZ(H)3	CE7/F7/E6	128M x 8 * 18pcs	1Gb Q-die					Now
		M391T5663EH3	CE7/F7/E6		1Gb E-die					
		M391T5663FB3	CE7/F7/E6		1Gb F-die					Jun. '10
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					

Downloaded from Elcodis.com electronic components distributor

200Pin DDR2 SODIMM										
Org.	**Density**	**Part Number**	**Speed**	**Composition**	**Comp. Version**	**Internal Banks**	**Rank**	**PKG**	**Height**	**Avail.**
64Mx 64	512MB	M470T6464QZ(H)3	C(L)E7/F7/E6	64M x 16 * 4pcs	1Gb Q-die	8	1	84 ball FBGA	30mm	Now
		M470T6464EHS	C(L)E7/F7/E6		1Gb E-die					
		M470T6554IH3	CE6	32M x 16 * 8pcs	512Mb I-die	4	2			
128Mx 64	1GB	M470T2864QZ(H)3	C(L)E7/F7/E6	64M x 16 * 8pcs	1Gb Q-die	8	2	84 ball FBGA	30mm	Now
		M470T2864EH3	C(L)E7/F7/E6		1Gb E-die					
		M470T2863EH3	C(L)E7/F7/E6	128M x 8 * 8pcs			1	60 ball FBGA		
		M470T2863FB3	CE7/F7/E6		1Gb F-die					May. '10
256Mx 64	2GB	M470T5663QZ(H)3	C(L)E7/F7/E6	128M x 8 * 16pcs	1Gb Q-die	8	2	60 ball FBGA	30mm	Now
		M470T5663EH3	C(L)E7/F7/E6		1Gb E-die					
		M470T5663FB3	CE7/F7/E6		1Gb F-die					May. '10
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

Downloaded from Elcodis.com electronic components distributor

240Pin DDR2 Registered DIMM										
Org.	Density	Part Number	Speed	Composition	Comp. Version	Internal Banks	Rank	PKG	Height	Avail.
128Mx 72	1GB	M393T2863QZ(H)3	CD5/CC	128M x 8 * 9pcs	1Gb Q-die	8	1	60 ball FBGA	30mm	Now
		M393T2863QZ(H)A	CE7/F7/E6							
		M393T2863FB3	CE7/F7/E6		1Gb F-die	8	1			Jun. '10
256Mx 72	2GB	M393T5663QZ3	CD5/CC	128M x 8 * 18pcs	1Gb Q-die	8	2	60 ball FBGA	30mm	Now
		M393T5663QZ(H)A	CE7/F7/E6							
		M393T5660QZ3	CD5/CC	256M x 4 * 18pcs			1			
		M393T5660QZ(H)A	CE7/F7/E6							
		M393T5660FB3	CE7/F7/E6		1Gb F-die					Jun. '10
512Mx 72	4GB	M393T5160QZ3	CD5/CC	256M x 4 * 36pcs	1Gb Q-die	8	2	60 ball FBGA	30mm	Now
		M393T5160QZ(H)A	CE7/F7/E6							
		M393T5160FB3	CE7/F7/E6		1Gb F-die					Jun. '10
		M393T5260AZ(H)A	CF7/E6	512M x 4 * 18pcs	2Gb A-die		1	68 ball FBGA		Now
1Gx 72	8GB	M393T1G60QJ(M)A	CE6/D5	DDP 512M x 4 * 36pcs	1Gb Q-die	8	4	63 ball FBGA	30mm	Now
		M393T1K66AZ(H)A	CF7/E6	st.1G x 4 * 18pcs	2Gb A-die		2	83 ball FBGA		

Downloaded from Elcodis.com electronic components distributor

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	M392T2863QZ(H)A	CF7/E6	128M x 8 * 9pcs	1Gb Q-die	8	1	60 ball FBGA	18.3mm	Now
		M392T2863FBA	CE7/F7/E6		1Gb F-die					Jun. '10
256Mx 72	2GB	M392T5660QZ(H)A	CF7/E6	256M x 4 * 18pcs	1Gb Q-die	8	1	60 ball FBGA	18.3mm	Now
		M392T5660FBA	CE7/F7/E6		1Gb F-die					Jun. '10
		M392T5663QZ(H)A	CF7/E6	128M x 8 * 18pcs	1Gb Q-die		2			Now
		M392T5663FBA	CE7/F7/E6		1Gb F-die					Jun. '10
512Mx 72	4GB	M392T5160QJ(M)A	CF7/E6	DDP 512M x 4 * 18pcs	1Gb Q-die	8	2	63 ball FBGA	18.3mm	Now
1Gx 72	8GB	M392T1G60QQ(E)A	CE6/D5	QDP 1G x 4 * 18pcs	1Gb Q-die	8	4	65 ball FBGA	18.3mm	Now

Downloaded from Elcodis.com electronic components distributor

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	M395T2863QZ(H)4	CE7/F7/E6	6 : IDT C1	128M x 8 * 9pcs	1Gb Q-die	8	1	60 ball FBGA	30.35mm	Now
			CE7/F7/E6	8: IDT L4							
			CE6	5 : Intel D1							
		M395T2863FB4	CE7/F7/E6	6 : IDT C1		1Gb F-die					Jun. '10
				8: IDT L4							
256Mx 72	2GB	M395T5663QZ(H)4	CE7/F7/E6	6 : IDT C1	128M x 8 * 18pcs	1Gb Q-die	8	2	60 ball FBGA	30.35mm	Now
			CE7/F7/E6	8: IDT L4							
			CE6	5 : Intel D1							
				3: Montage D3							
		M395T5663FB4	CE7/F7/E6	6 : IDT C1		1Gb F-die					Jun. '10
				8: IDT L4							
512Mx 72	4GB	M395T5160QZ(H)4	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							
				3: Montage D3							
		M395T5160FB4	CE7/F7/E6	6 : IDT C1		1Gb F-die					Jun. '10
				8: IDT L4							
		M395T5163QZ(H)4	CE7/F7/E6	8: IDT L4	128M x 8 * 36pcs	1Gb Q-die		4			Now
		M395T5163FB4	CE7/F7/E6	6 : IDT C1		1Gb F-die					Jun. '10
				8: IDT L4							
		M395T5263AZ(H)4	CF7/E6	6 : IDT C1	256M x 8 * 18pcs	2Gb A-die		2	68 ball FBGA		Now
			CF7/E6	8: IDT L4							
1Gx 72	8GB	M395T1G60QJ(M)4	CE6/F7	8: IDT L4	DDP 512M x 4 * 36pcs	1Gb Q-die	8	4	63 ball FBGA	30.35mm	Now
		M395T1K66AZ(H)4	CF7/E6/D5	6 : IDT C1	st.1G x 4 * 18pcs	2Gb A-die		2	83 ball FBGA		
			CF7/E6	8: IDT L4							

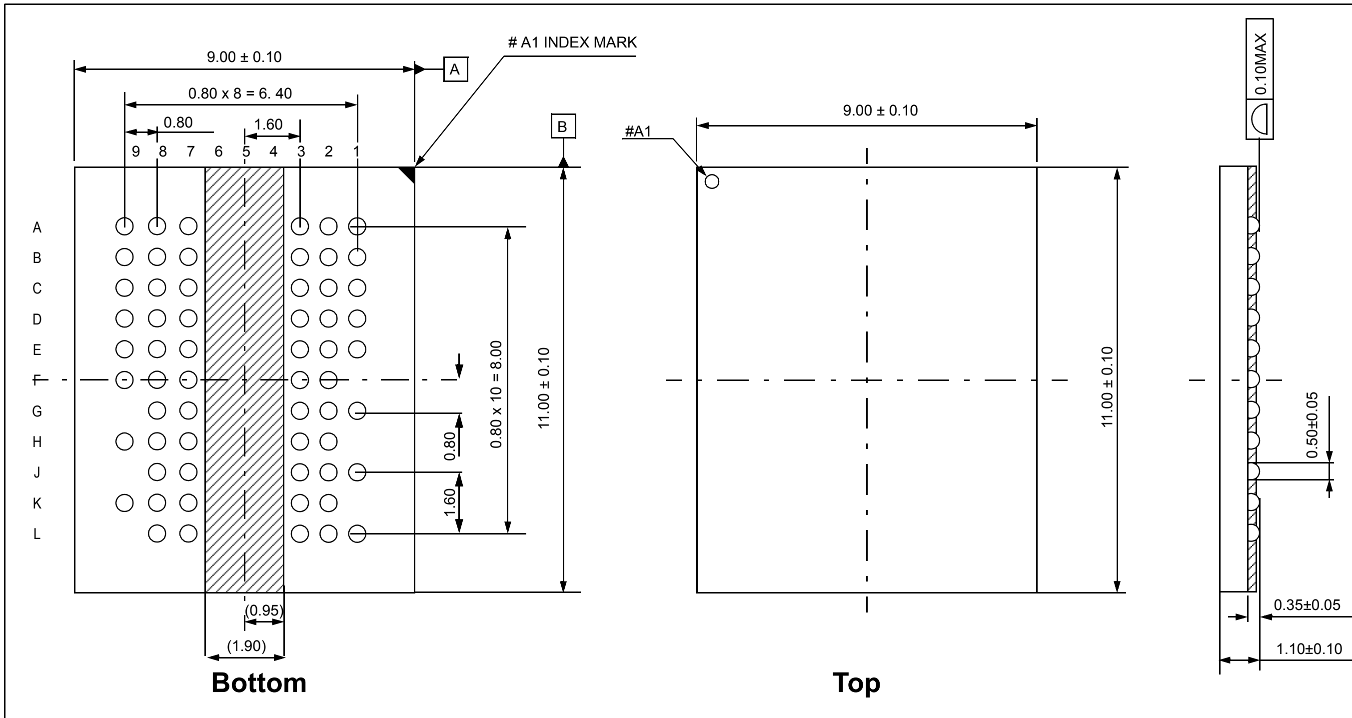
Downloaded from Elcodis.com electronic components distributor

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	M395T2863QZ(H)4	YE6	8: IDT L4	64M x 8 * 18pcs	1Gb Q-die	8	1	60 ball FBGA	30.35mm	Now
256Mx 72	2GB	M395T5663QZ(H)4	YE6	8: IDT L4	128M x 8 * 18pcs	1Gb Q-die	8	2	60 ball FBGA	30.35mm	Now
512Mx 72	4GB	M395T5160QZ(H)4	YE6	8: IDT L4	256M x 4 * 36pcs	1Gb Q-die	8	2	60 ball FBGA	30.35mm	Now
		M395T5163QZ(H)4	YE6	8: IDT L4	128M x 8 * 36pcs			4			
		M395T5263AZ(H)4	YE6	8: IDT L4	256M x 8 * 18pcs	2Gb A-die		2	68 ball FBGA		
1Gx 72	8GB	M395T1K66AZ(H)4	YE6	8: IDT L4	st.1G x 4 * 18pcs	2Gb A-die	8	2	83 ball FBGA	30.35mm	Now

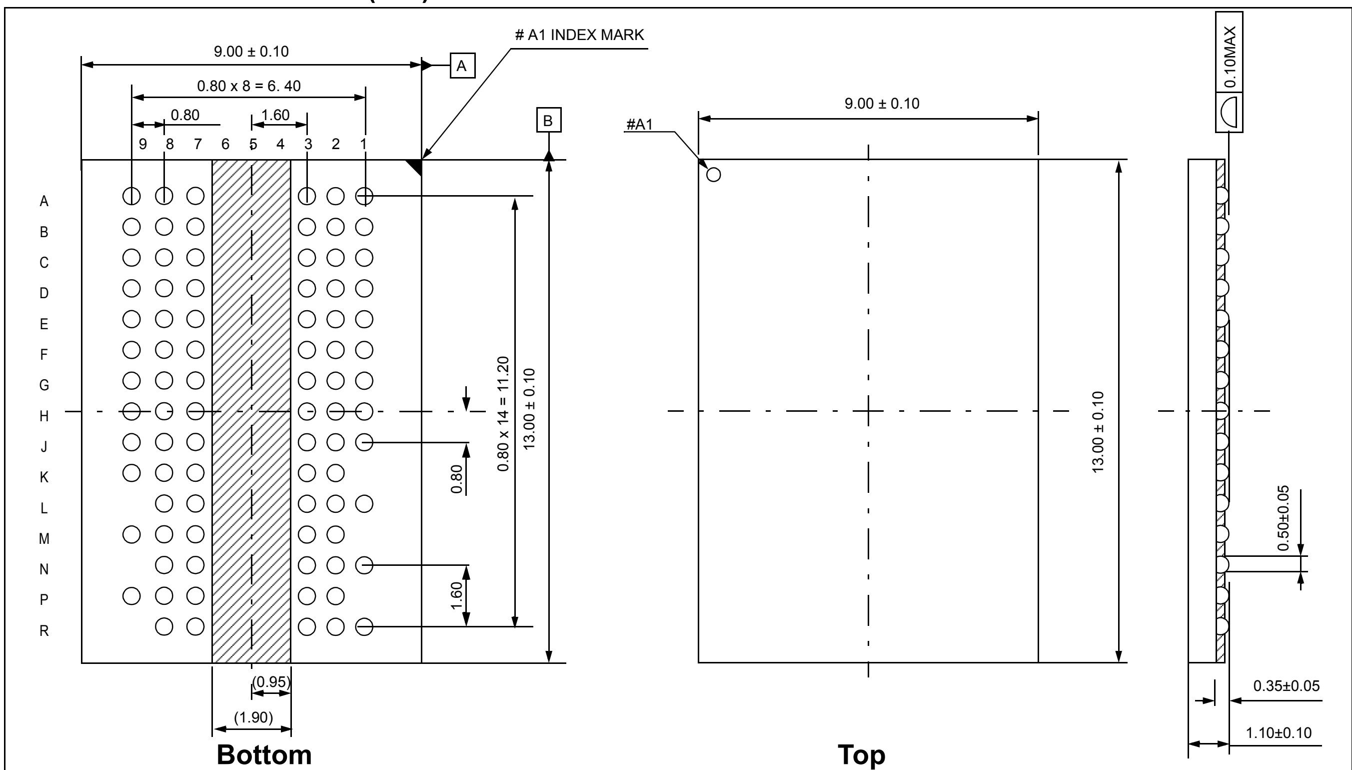
Downloaded from Elcodis.com electronic components distributor

5. Package Dimension

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

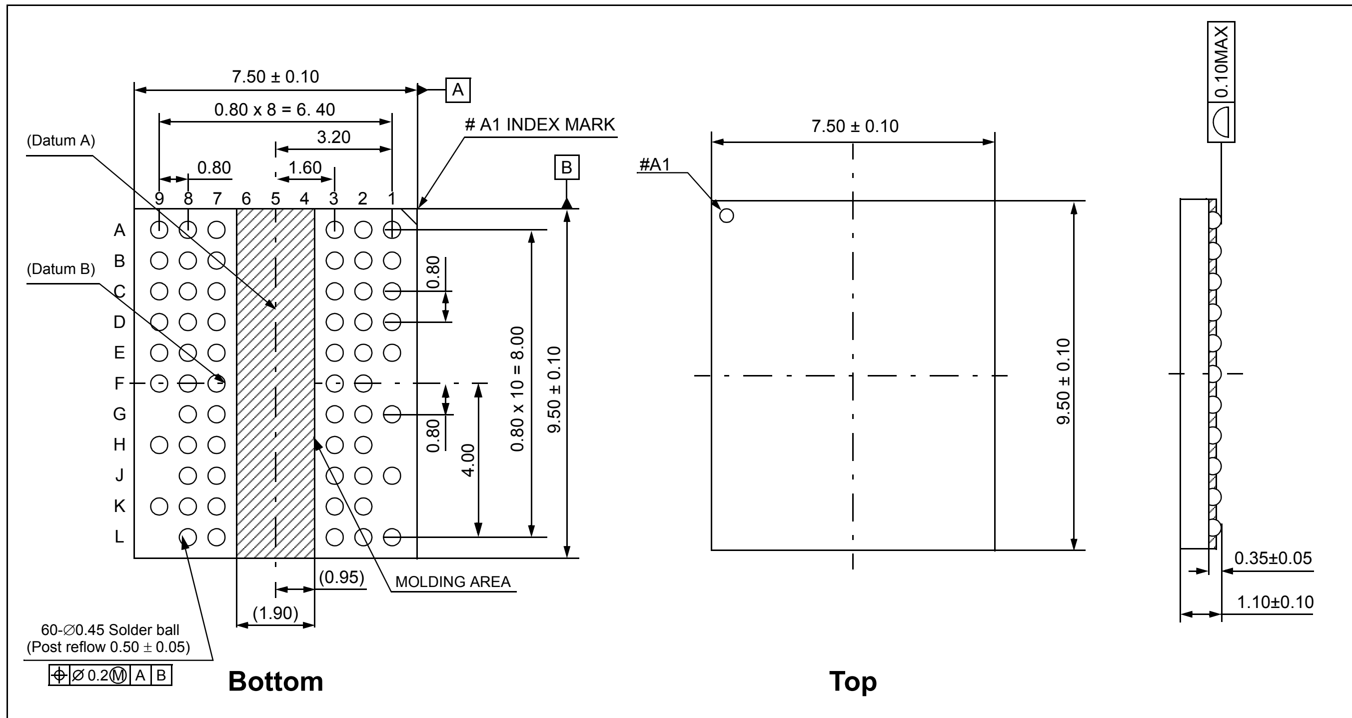


84Ball FBGA for 1Gb Q-die (x16)

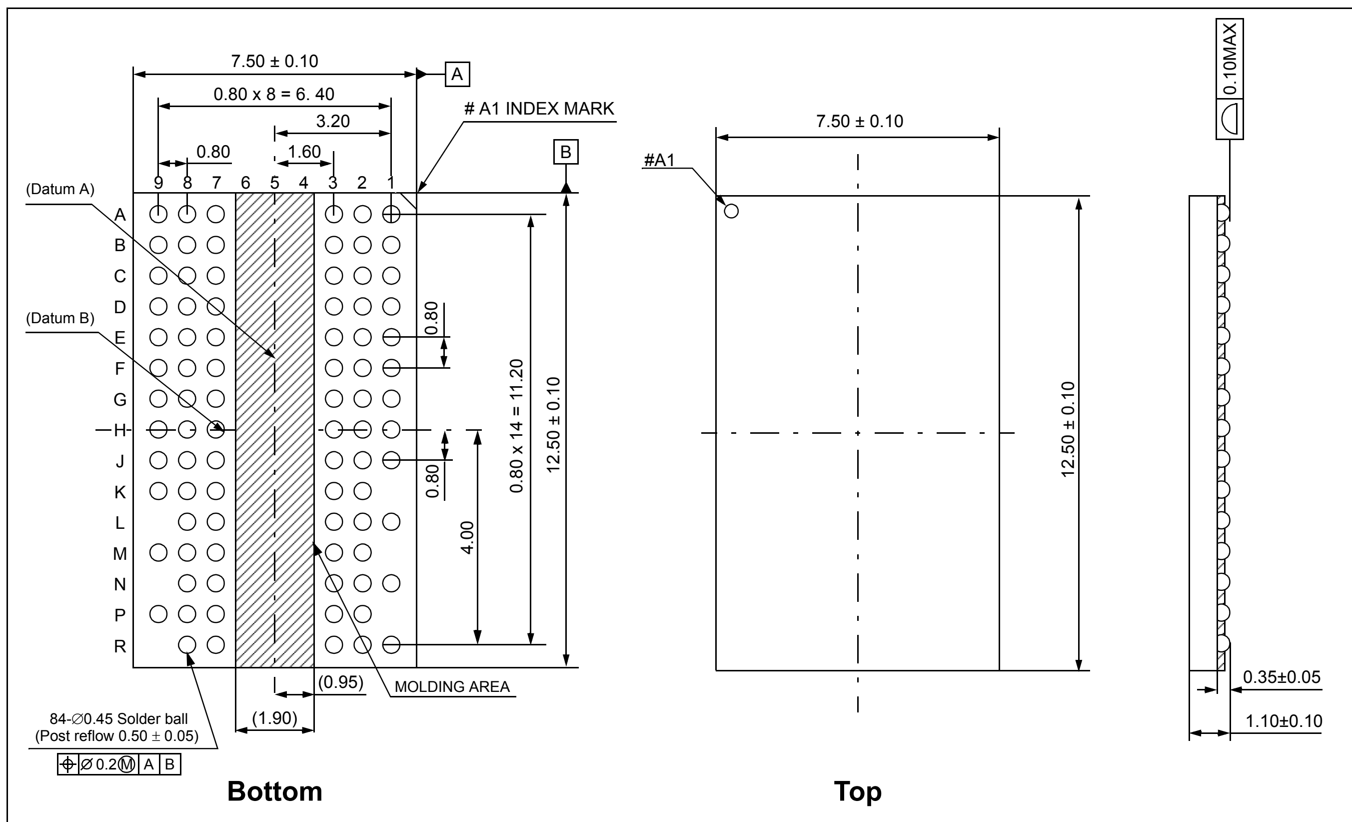


Downloaded from Elcodis.com electronic components distributor

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

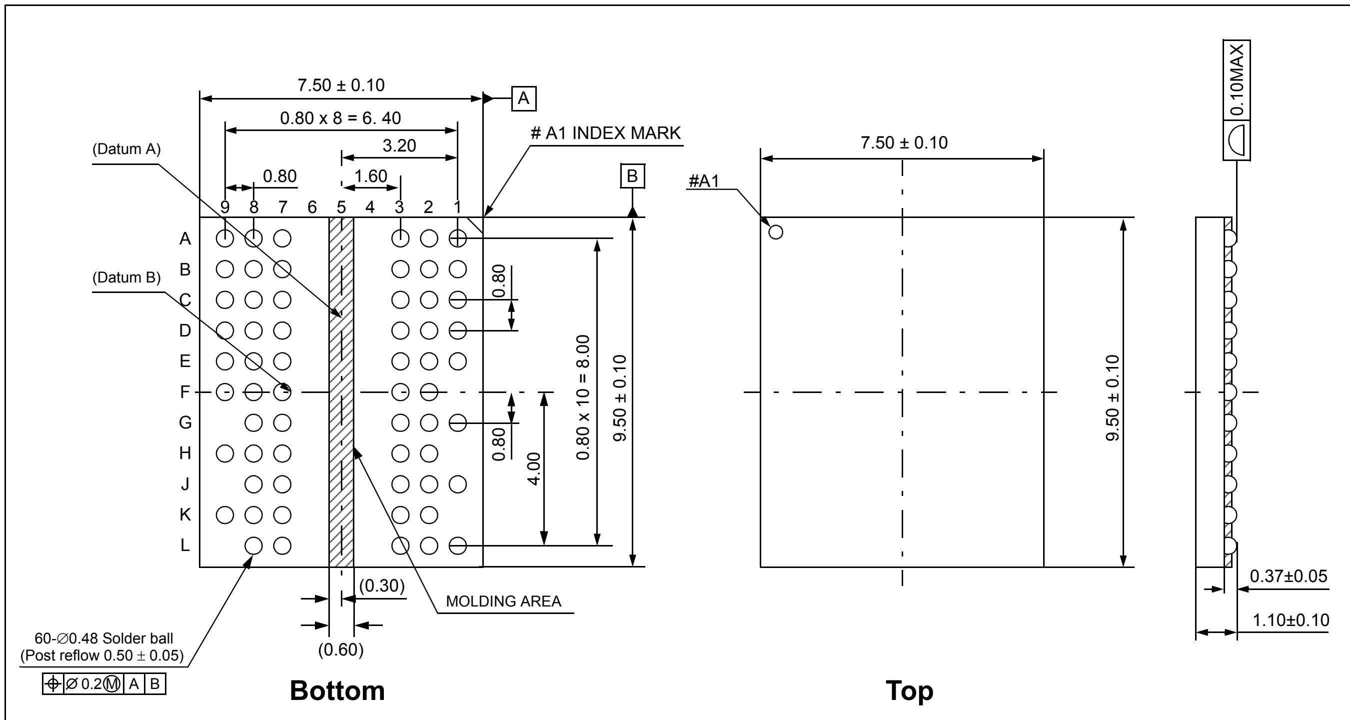


84Ball FBGA for 1Gb E-die (x16)

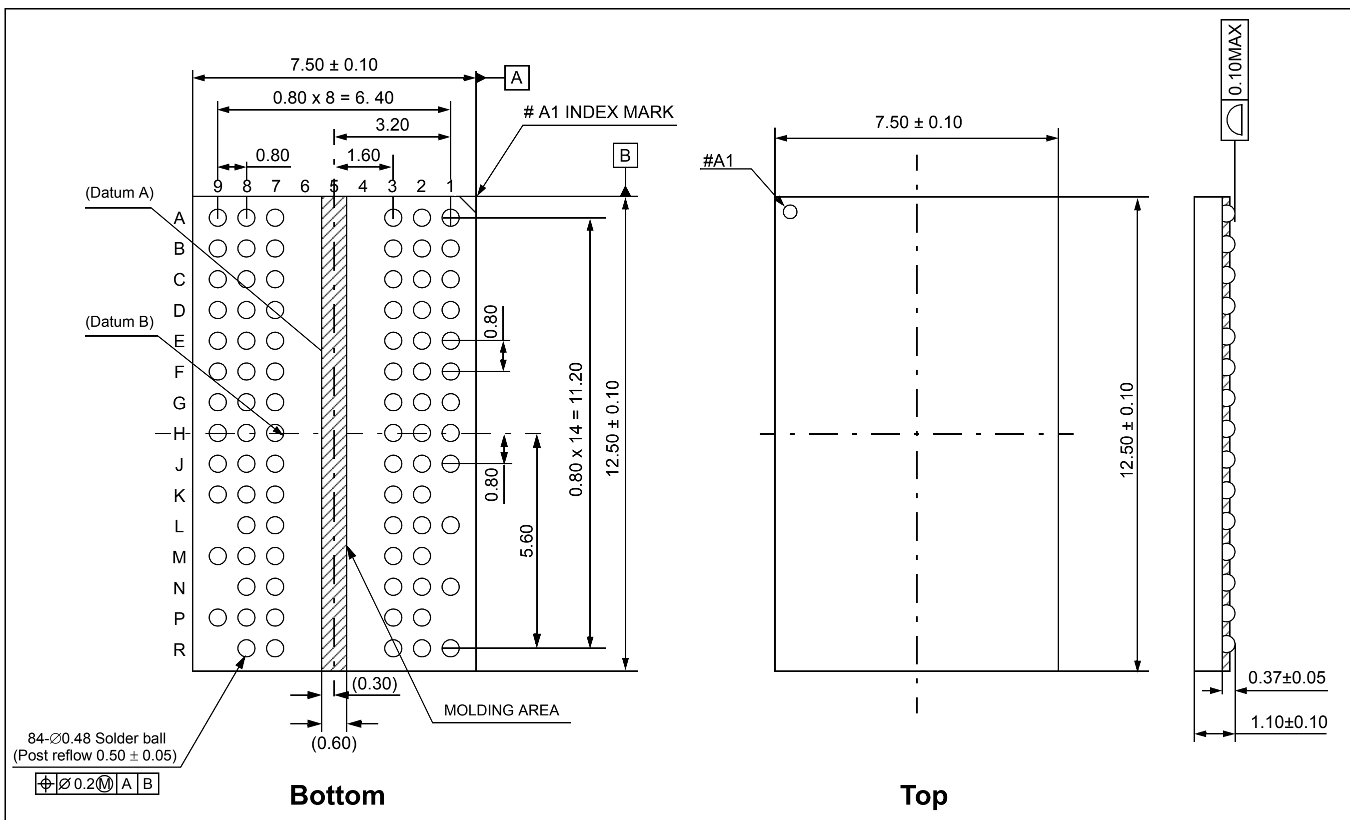


Downloaded from Elcodis.com electronic components distributor

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

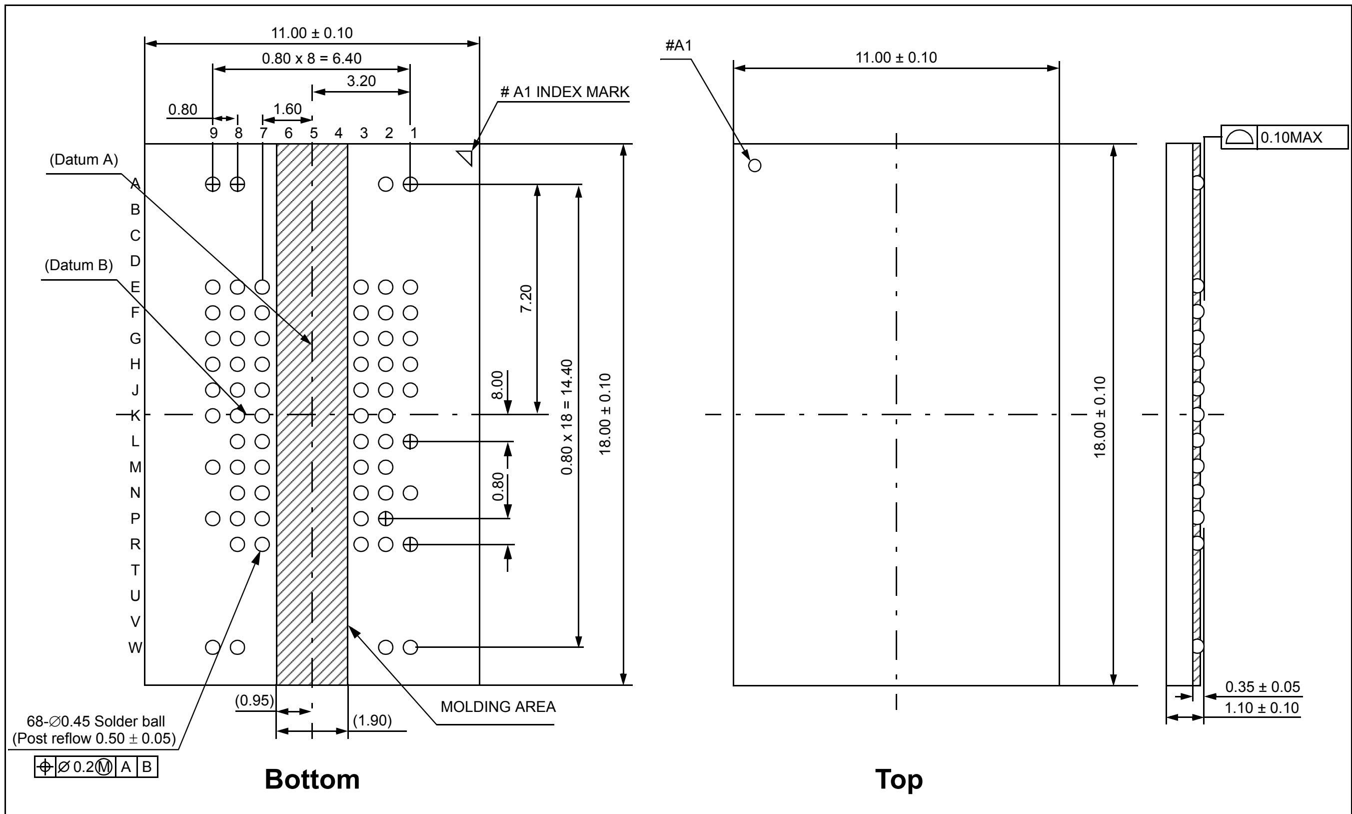


84Ball FBGA for 1Gb F-die (x16)



Downloaded from Elcodis.com electronic components distributor

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



SAMSUNG

Downloaded from Elcodis.com electronic components distributor