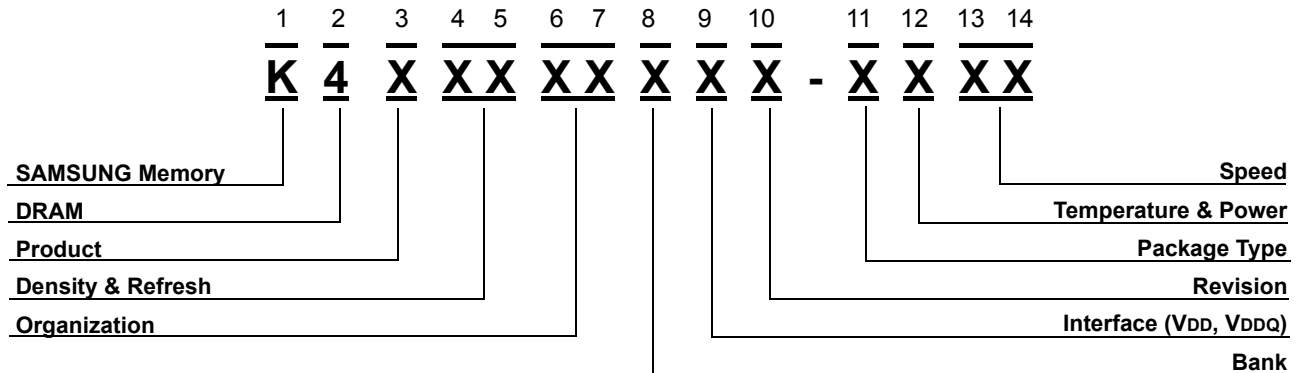


# Graphic Memory Product Guide

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Memory Division

1. GRAPHIC MEMORY ORDERING INFORMATION



1. SAMSUNG Memory

2. DRAM

3. Product

- N : gDDR2 SDRAM
- W : gDDR3 SDRAM
- J : GDDR3 SDRAM
- U : GDDR4 SDRAM
- G : GDDR5 SDRAM

4~5. Density & Refresh

- 55 : 256M, 4K/32ms
- 56 : 256M, 8K/64ms
- 51 : 512M, 8K/64ms
- 52 : 512M, 8K/32ms
- 10 : 1G, 8K/32ms
- 1G : 1G, 8K/64ms

6~7. Organization

- 16 : x16
- 32 : x32

8. Bank

- 3 : 4Banks
- 4 : 8Banks

9. Interface ( VDD, VDDQ)

- Q : SSTL\_2 (1.8V, 1.8V)
- 5 : SSTL\_2 (1.8V,1.8V,LP)
- 6 : SSTL\_15 (1.5V,1.5V)
- F : POD\_15 (1.5V,1.5V)
- K : POD\_18 (1.8V,1.8V)

10. Revision

- M : 1st Gen.
- B : 3rd Gen.
- D : 5th Gen.
- F : 7th Gen.
- H : 9th Gen.
- Q : 17th Gen.
- A : 2nd Gen.
- C : 4th Gen.
- E : 6th Gen.
- G : 8th Gen.
- I : 10th Gen.
- Z : 26th Gen.

11. Package Type

- Z : 84 FBGA(Lead Free)
- A : 136 FBGA(Leaded)
- B : 136 FBGA(Lead Free)
- H : FBGA(Halogen Free & Lead Free)
- E : 100 FBGA(Halogen Free & Lead Free)

12. Temperature & Power(VDD)

- C : Commercial Normal
- J : Commercial High
- L : Commercial Low

13~14. Speed

- 1A : 1.0ns (2.0Gbps)
- 11 : 1.1ns (1.8Gbps)
- 12 : 1.25ns (1.6Gbps)
- 14 : 1.4ns (1.4Gbps)
- 15 : 1.5ns (1.3Gbps)
- 16 : 1.6ns (1.2Gbps)
- 18 : 1.8ns (1.1Gbps)
- 20 : 2.0ns (1.0Gbps)
- 22 : 2.2ns (0.9Gbps)
- 25 : 2.5ns (0.8Gbps)
- 04 : 0.40ns (5.0Gbps)
- 05 : 0.50ns (4.0Gbps)
- 5C : 0.56ns (3.6Gbps)
- 06 : 0.62ns (3.2Gbps)
- 6A : 0.66ns (3.0Gbps)
- 07 : 0.71ns (2.8Gbps)
- 7A : 0.77ns (2.6Gbps)
- 08 : 0.8ns (2.4Gbps)
- 09 : 0.9ns (2.2Gbps)

2. GRAPHIC MEMORY COMPONENT PRODUCT GUIDES

Product	Density	Banks	Part Num.	PKG & Speed	Org.	Interf.	Ref.	Voltage(V)	PKG.	PKG Type	Status
gDDR2 SDRAM	256Mb I-die	4Banks	K4N56163QI	ZC20/25	16Mx16	SSTL18	8K/64ms	1.8V ± 0.1V	84ball FBGA	Lead Free	Mass Production
	512Mb G-die		K4N51163QG	HC20/25	32Mx16			1.8V ± 0.1V		Mass Production	
	512Mb Z-die		K4N51163QZ	HC20/25				1.8V ± 0.1V		Mass Production	
	1Gb Q-die	8Banks	K4N1G164QQ	HC20/25	64Mx16			1.8V ± 0.1V		Halogen Free & Lead Free	Mass Production
	1Gb E-die		K4N1G164QE	HC20/25				1.8V ± 0.1V		CS Dec.'08	
gDDR3 SDRAM	1Gb D-die	K4W1G1646D	EC15	SSTL_15	100ball FBGA	1.5V ± 0.075V	Mass Production				
			EJ11/12			1.8V± 0.1V					
GDDR3 SDRAM	256Mb I-die	4Banks	K4J55323QI	BC12/14	8Mx32	Pseudo Open_Drain	8K/32ms	1.8V ± 0.1V	136ball FBGA	Lead Free	EOL Announced
				BJ1A/11				1.9V ± 0.1V			EOL Announced
	512Mb E-die	K4J52324QE	BC12/14	16Mx32	1.8V ± 0.1V			Halogen Free & Lead Free		ES Now	
			BJ1A		1.9V ± 0.1V						
			BJ08		2.1V ± 0.05V						
	512Mb H-die	K4J52324QH	HL14	32Mx32	1.55V± 0.05V			Mass Production			
			HC12/14		1.8V ± 0.1V						
			HJ1A		1.9V ± 0.1V						
			HJ7A/08		2.05V ± 0.05V						
	1Gb D-die	K4J10324QD	HL14	16Mx32	1.55V± 0.075V			ES Now			
HC12/14			1.8V ± 0.1V								
		HJ1A		1.85V ± 0.05V	Mass Production						
GDDR4 SDRAM	512Mb E-die	K4U52324QE	BC07/08/09	16Mx32	1.8V ± 0.09V	Lead Free	Mass Production				
	BC06							1.95V ± 0.05V			
GDDR5 SDRAM	512Mb G-die	K4G52324FG	HC04/05 5C/06		1.5V ± 0.045V	170ball FBGA	Halogen Free & Lead Free	CS Now			