

Graphic 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.

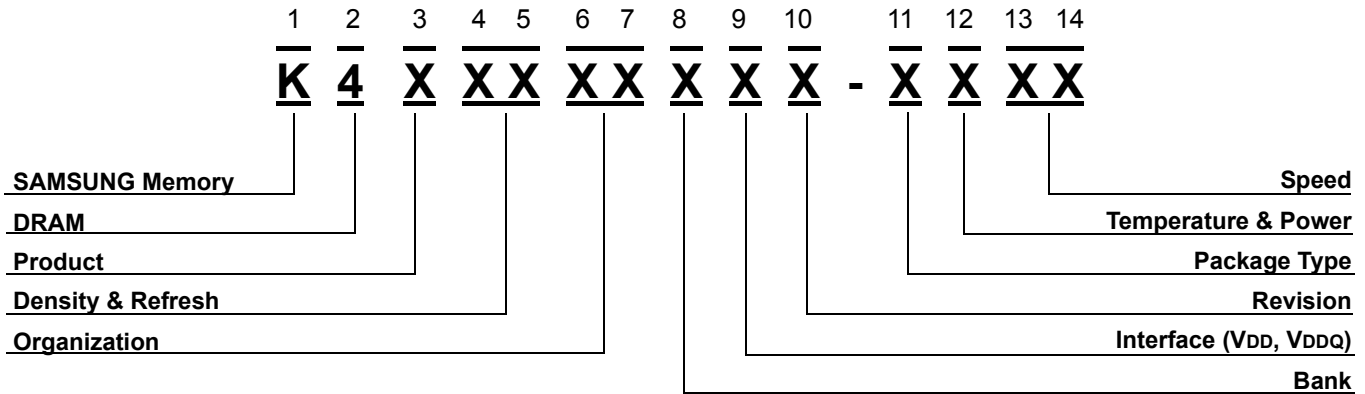
Samsung products are not intended for use in life support, critical care, medical, safety equipment, or similar applications where product failure could result in loss of life or personal or physical harm, or any military or defense application, or any governmental procurement to which special terms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

1. GRAPHIC MEMORY ORDERING INFORMATION



1. SAMSUNG Memory

2. DRAM

3. Product

N : gDDR2 SDRAM
 W : gDDR3 SDRAM
 J : GDDR3 SGRAM
 G : GDDR5 SGRAM

4~5. Density & Refresh

51 : 512M, 8K/64ms
 52 : 512M, 8K/32ms
 10 : 1G, 8K/32ms
 1G : 1G, 8K/64ms
 2G : 2G, 8K/64ms
 4G : 4G, 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. 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. Z : 26th Gen.

11. Package Type

gDDR2
 H : 84FBGA(Halogen Free & Lead Free)
 B : 84FBGA(Halogen Free & Lead Free & Flip Chip)

gDDR3
 E : 100FBGA(Halogen Free & Lead Free)
 H : 96FBGA(Halogen Free & Lead Free)

GDDR3
 B : 136FBGA(Lead Free)
 H : 136FBGA(Halogen Free & Lead Free)

GDDR5
 H : 170FBGA(Halogen Free & Lead Free)

12. Temperature & Power(VDD)

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

13~14. Speed

1A ¹⁾ : 0.935ns (2.1Gbps)	28 : 0.28ns (7.0Gbps)
11 ²⁾ : 1.07ns (1.8Gbps)	03 : 0.33ns (6.0Gbps)
12 : 1.25ns (1.6Gbps)	04 : 0.40ns (5.0Gbps)
14 : 1.4ns (1.4Gbps)	05 : 0.50ns (4.0Gbps)
15 : 1.5ns (1.3Gbps)	5C : 0.56ns (3.6Gbps)
16 : 1.6ns (1.2Gbps)	06 : 0.62ns (3.2Gbps)
18 : 1.8ns (1.1Gbps)	6A : 0.66ns (3.0Gbps)
19 : 1.875ns (1.06Gbps)	07 : 0.71ns (2.8Gbps)
20 : 2.0ns (1.0Gbps)	7A : 0.77ns (2.6Gbps)
22 : 2.2ns (0.9Gbps)	08 : 0.8ns (2.4Gbps)
25 : 2.5ns (0.8Gbps)	09 : 0.9ns (2.2Gbps)

NOTE :

1)Graphic high speed binning was unified to EDP binning(2000Mbps→2133Mbps)
 2)Graphic high speed binning was unified to EDP binning(1800Mbps→1866Mbps)

2. GRAPHIC MEMORY COMPONENT PRODUCT GUIDES

Product	Density	Banks	Part Num.	PKG & Speed	Org.	Interf.	Ref.	Voltage(V)	PKG.	PKG Type	Status
gDDR2 SDRAM	512Mb G-die	4Banks	K4N51163QG	HC20/25	32Mx16	SSTL_18	8K/64ms	1.8V ± 0.1V	84ball FBGA	Halogen-Free & Lead-Free	Mass Production
	512Mb Z-die		K4N51163QZ	HC20/25							
	1Gb E-die	8Banks	K4N1G164QE	HC20/25	64Mx16					Halogen-Free, Lead-Free & Flip-Chip	CS May. '10
	1Gb F-die		K4N1G164QF	BC20/25							
gDDR3 SDRAM	1Gb E-die	8Banks	K4W1G1646E	HC1A/11 12/15	64Mx16	SSTL_15	8K/64ms	1.5V ± 0.075V	96ball FBGA	Halogen-Free & Lead-Free	Mass Production
	2Gb B-die		K4W2G1646B	HC12/15	128Mx16						CS May. '10
	2Gb C-die		K4W2G1646C	HC1A/11 12/15	128Mx16						
GDDR3 SGRAM	512Mb I-die	8Banks	K4J52324KI	HC7A/08 1A/12/14	16Mx32	Pseudo Open_Drain	8K/32ms	1.8V ± 0.1V	136ball FBGA	Halogen-Free & Lead-Free	Mass Production
	1Gb E-die		K4J10324KE	HC7A/08 1A/12/14	32Mx32			1.8V ± 0.1V			Mass Production
GDDR5 SGRAM	1Gb E-die	8Banks	K4G10325FE	HC04/05 5C	32Mx32	POD_15	8K/32ms	1.5V ± 0.045V	170ball FBGA	Halogen-Free & Lead-Free	Mass Production
	2Gb C-die	16Banks	K4G20325FC	TBD	64Mx32	POD_15	16K/32ms	1.5V ± 0.045V	170ball FBGA	Halogen-Free & Lead-Free	CS May. '10