

Graphic Memory

Product Guide

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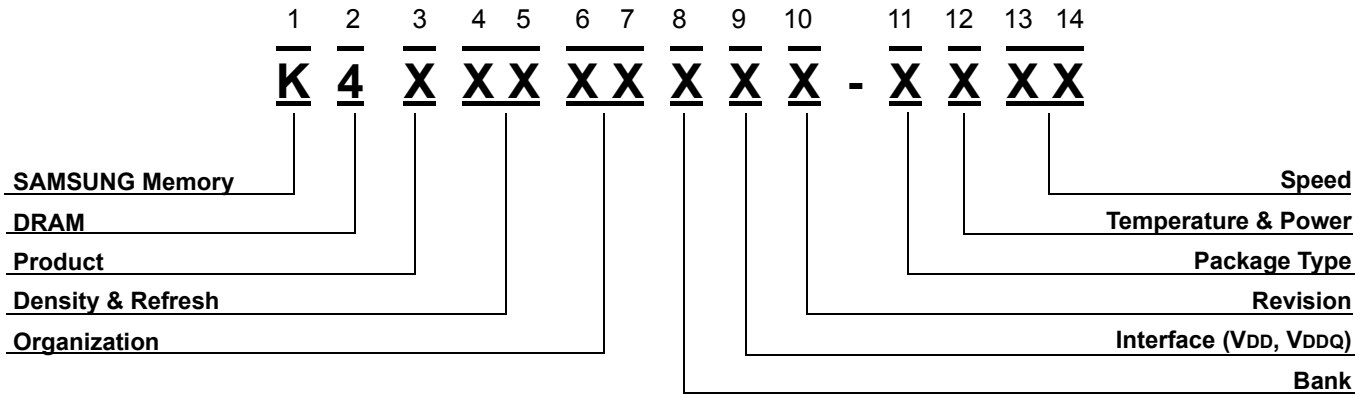
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1. GRAPHIC MEMORY ORDERING INFORMATION



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.
- 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

- 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)
 - B : 96FBGA(Flip-Chip)
- 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 : 0.935ns (2133Mbps) | 28 : 0.28ns (7000Mbps) |
| 11 : 1.07ns (1866Mbps) | 03 : 0.33ns (6000Mbps) |
| 12 : 1.25ns (1600Mbps) | 04 : 0.40ns (5000Mbps) |
| 14 : 1.4ns (1400Mbps) | 05 : 0.50ns (4000Mbps) |
| 15 : 1.5ns (1333Mbps) | 5C : 0.56ns (3600Mbps) |
| 16 : 1.6ns (1200Mbps) | 06 : 0.62ns (3200Mbps) |
| 18 : 1.8ns (1100Mbps) | 6A : 0.66ns (3000Mbps) |
| 19 : 1.875ns (1066Mbps) | 07 : 0.71ns (2800Mbps) |
| 20 : 2.0ns (1000Mbps) | 7A : 0.77ns (2600Mbps) |
| 22 : 2.2ns (900Mbps) | 08 : 0.8ns (2400Mbps) |
| 25 : 2.5ns (800Mbps) | 09 : 0.9ns (2200Mbps) |



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 Jul. '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						
	2Gb C-die		K4W2G1646C	HC1A/11 12/15	128Mx16					CS Jul. '10	
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 Jun. '10