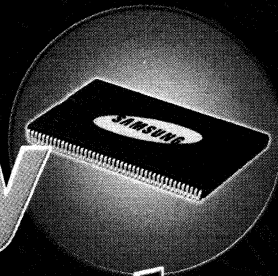


**SAMSUNG**

ELECTRONICS

1101-8101  
October 1998

# Memory Product Guide







### **PRINTED IN KOREA**

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# General Information 1

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4. SDRAM Module
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11. Mask ROM
12. NAND Flash Memory







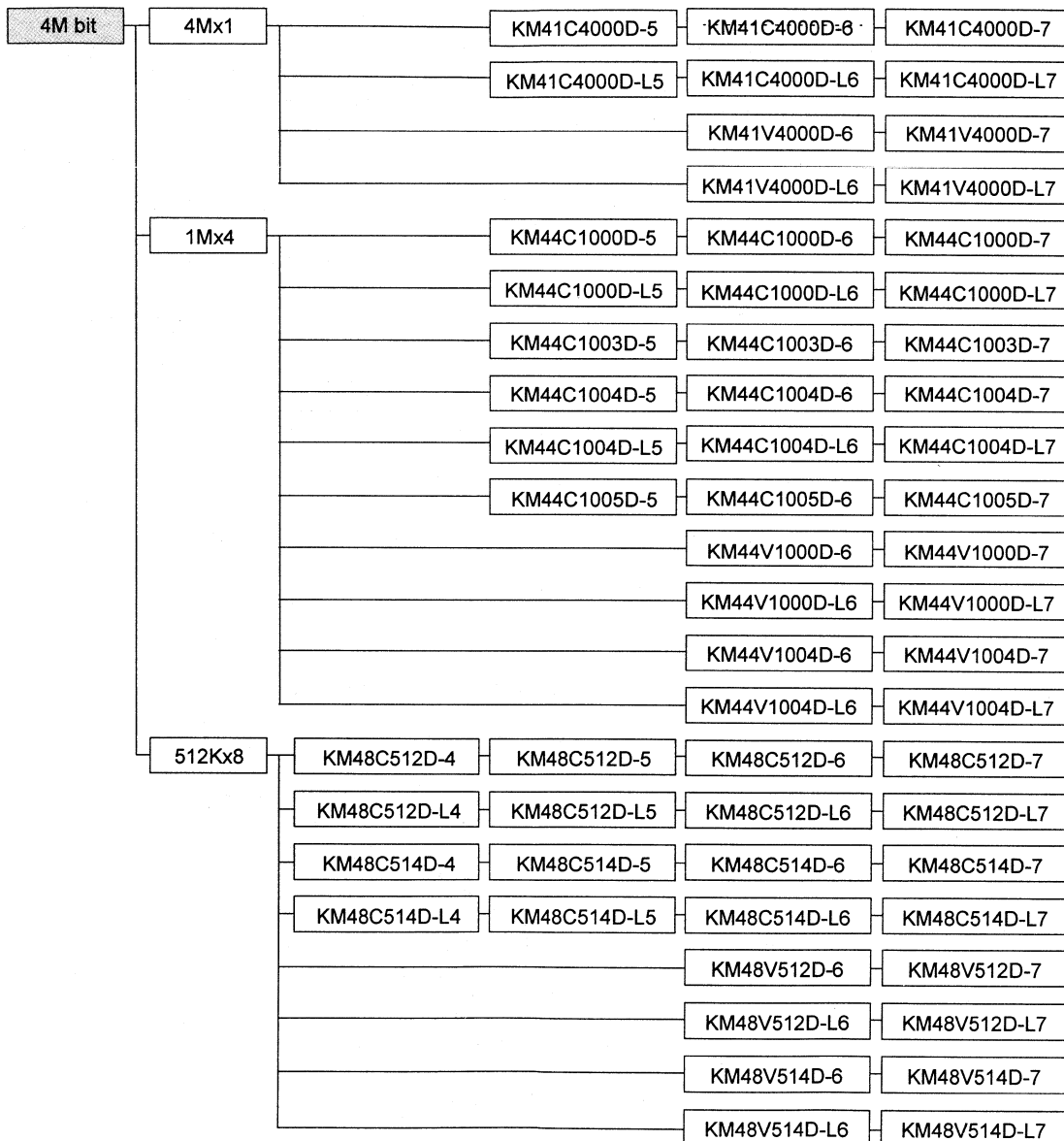
# **DRAM**



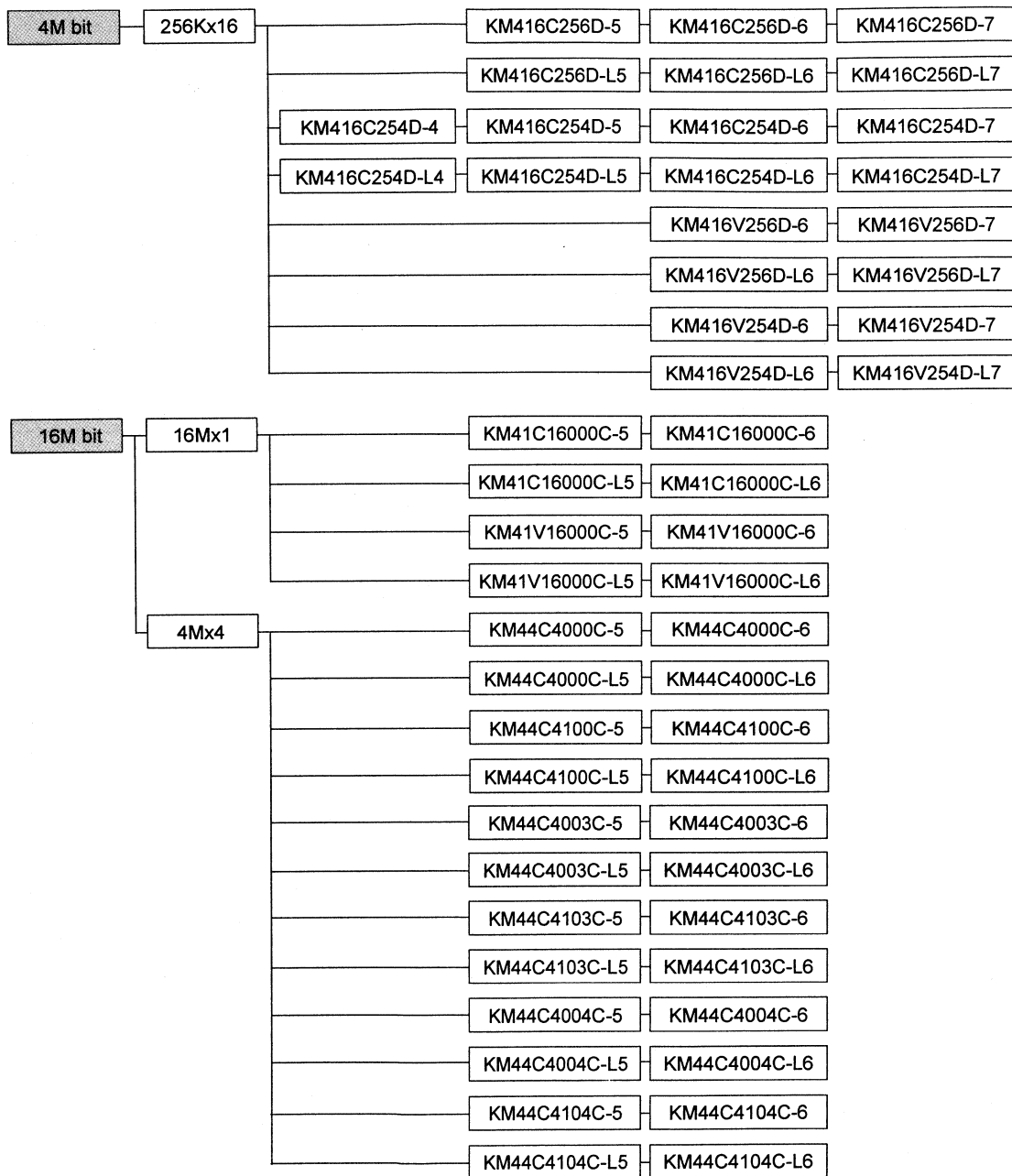


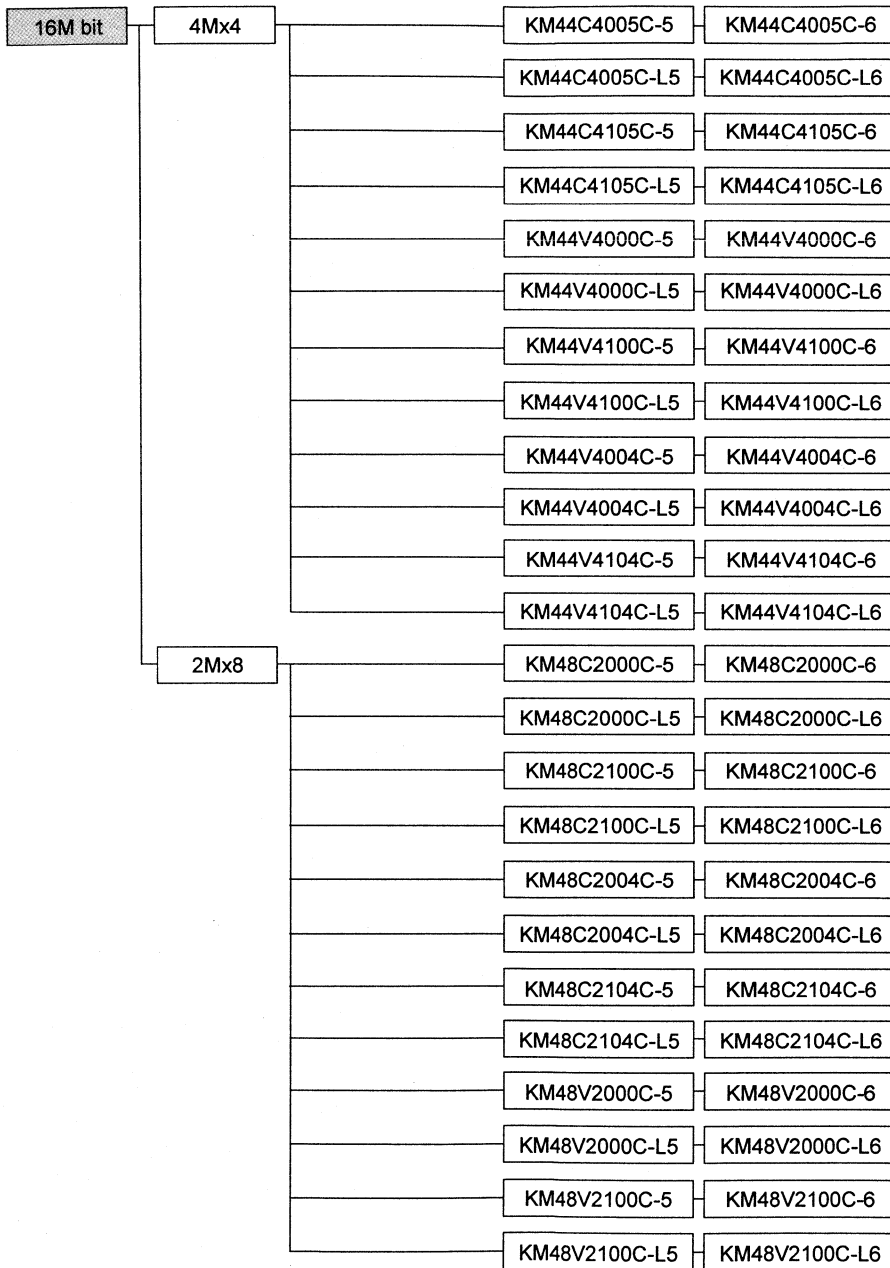
DRAM

1. Introduction

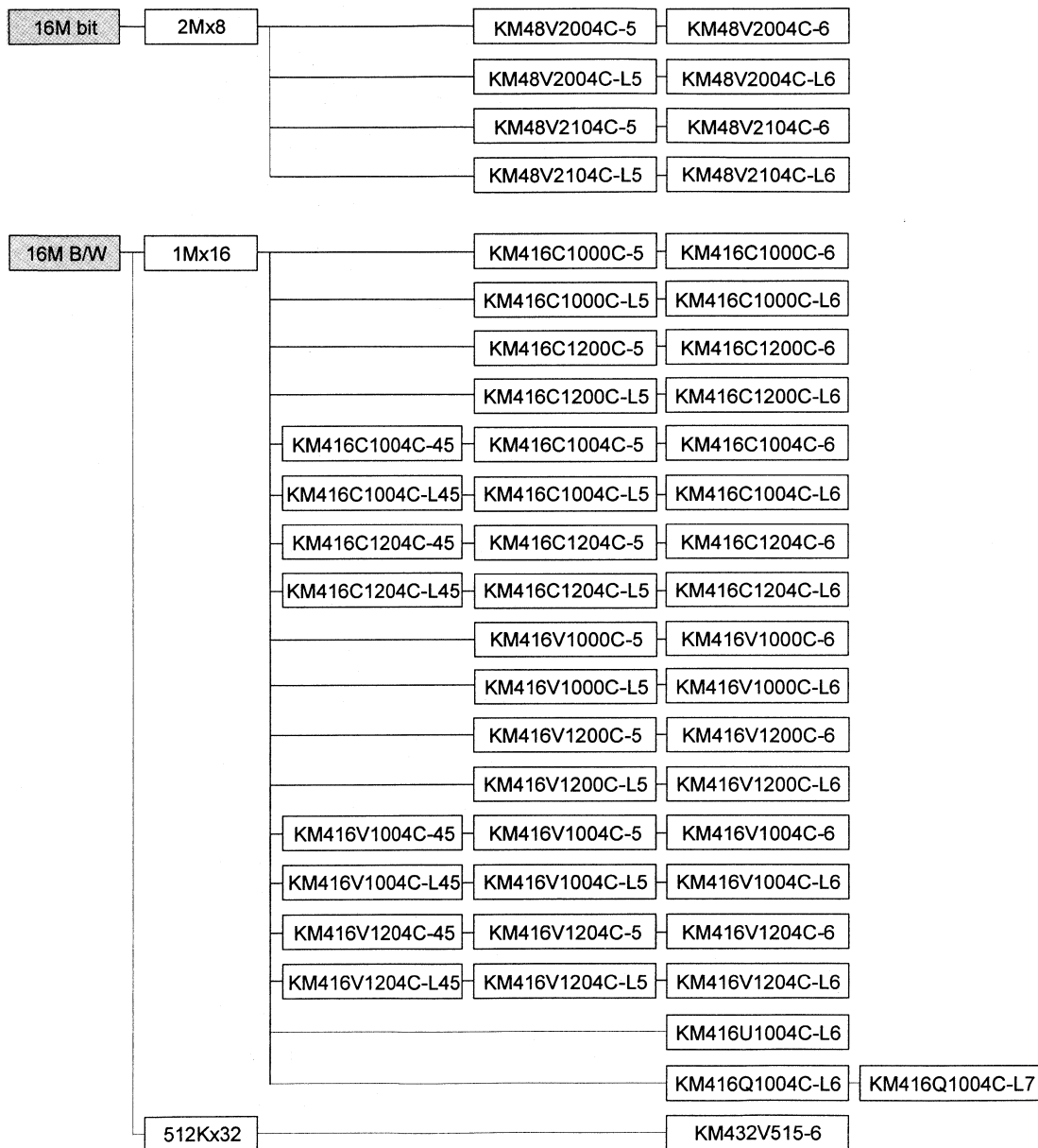


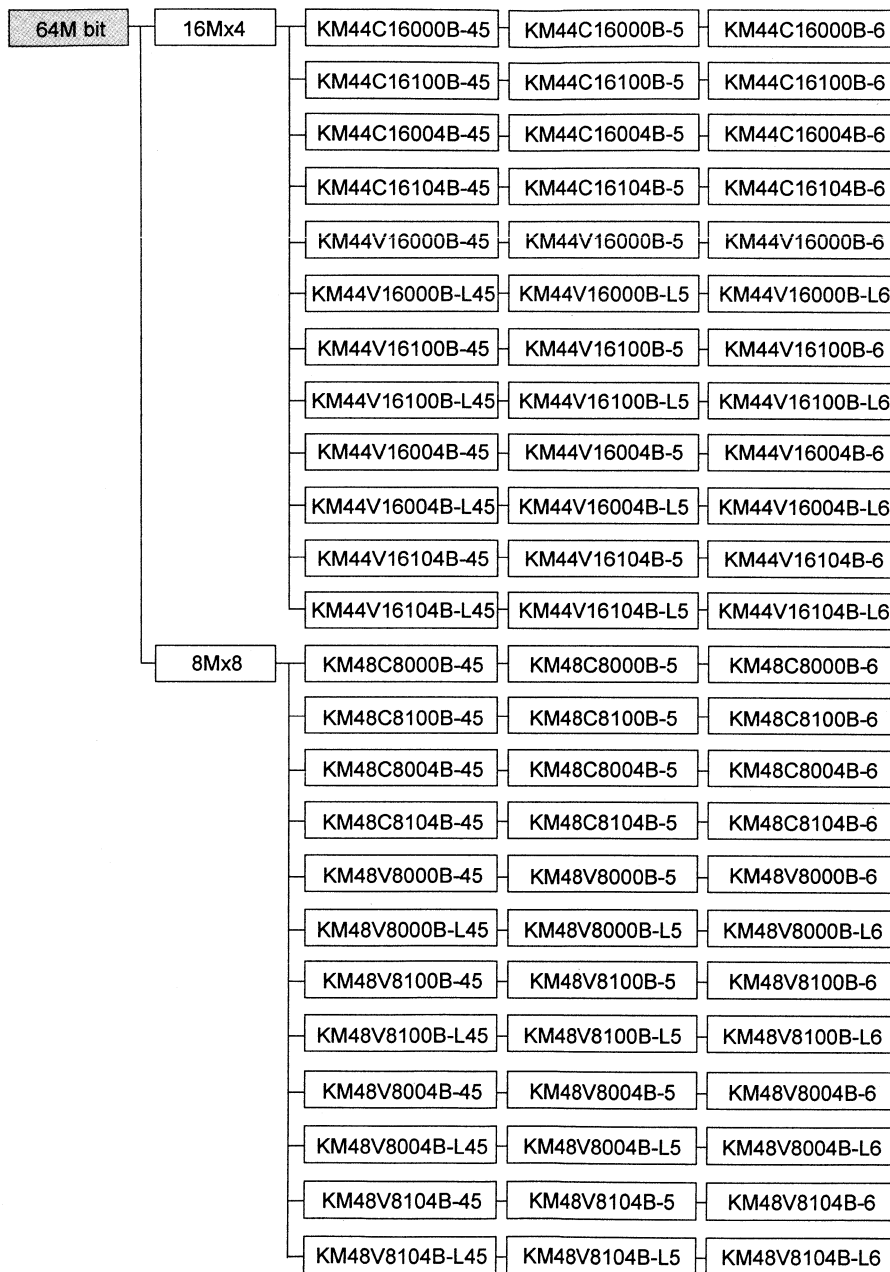
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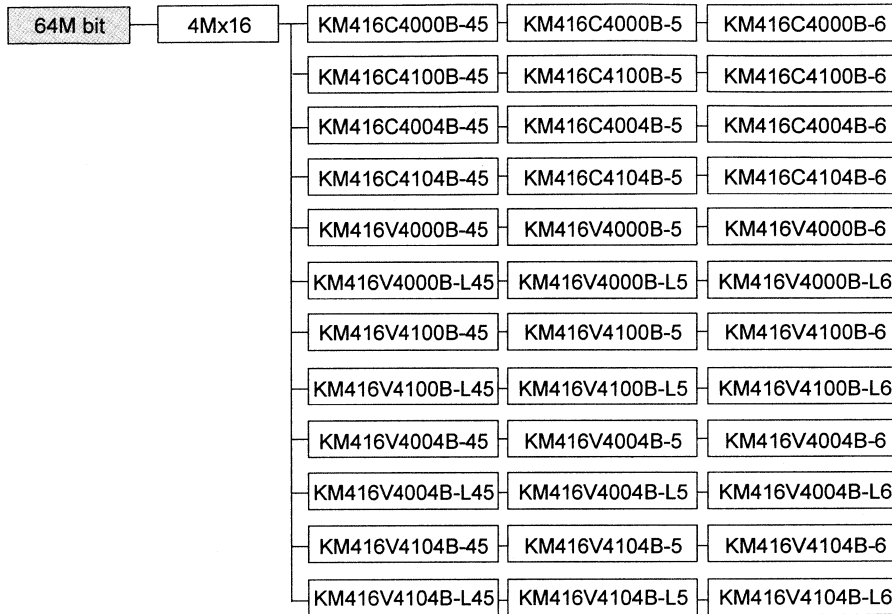


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2. Product Guide

1

Density	Org.	Power Supply	Part Number	Speed (ns)	Features	Packages (#)
4M bit	4Mx1	+5V±10%	KM41C4000D#	50/60/70	FP	J:20pin SOJ T:20pin TSOP-II  * Quad CAS J:24pin SOJ T:24pin TSOP-II
			KM41C4000D#-L		FP, LP	
		+3.3V±0.3V	KM41V4000D#	60/70	FP	
			KM41V4000D#-L		FP, LP	
	1Mx4	+5V±10%	KM44C1000D#	50/60/70	FP	
			KM44C1000D#-L		FP, LP	
			KM44C1003D#		Quad $\overline{\text{CAS}}$ FP	
			KM44C1004D#		EDO	
		+3.3V±0.3V	KM44C1004D#-L	60/70	EDO, LP	
			KM44C1005D#		Quad $\overline{\text{CAS}}$ EDO	
			KM44V1000D#		FP	
			KM44V1000D#-L		FP, LP	
	512Kx8	+5V±10%	KM48C512D#	40/50/60/70	FP	J:28pin SOJ T:28pin TSOP-II
			KM48C512D#-L		FP, LP	
			KM48C514D#		EDO	
			KM48C514D#-L		EDO, LP	
		+3.3V±0.3V	KM48V512D#	60/70	FP	
			KM48V512D#-L		FP, LP	
			KM48V514D#		EDO	
			KM48V514D#-L		EDO, LP	
256Kx16	+5V±10%	KM416C256D#	50/60/70	FP	J:40pin SOJ T:44(40)pin TSOP-II	
		KM416C256D#-L		FP, LP		
		+3.3V±0.3V	KM416C254D#	40/50/60/70		EDO
			KM416C254D#-L			EDO, LP
	+3.3V±0.3V		KM416V256D#	60/70		FP
			KM416V256D#-L			FP, LP
		KM416V254D#	EDO			
		KM416V254D#-L	EDO, LP			
16M bit	16Mx1	+5V±10%	KM41C16000C#	50/60	FP	K:26(24)pin SOJ (300mil) S:26(24)pin TSOP-II (300mil)
			KM41C16000C#-L		FP, LP	
		+3.3V±0.3V	KM41V16000C#		FP	
			KM41V16000C#-L		FP, LP	

Density	Org.	Power Supply	Part Number	Speed (ns)	Features	Packages (#)		
16M bit	4Mx4	+5V±10%	KM44C4000C#	50/60	FP	K:26(24)pin SOJ (300mil) S:26(24)pin TSOP-II (300mil)		
			KM44C4000C#-L		FP, LP			
			KM44C4100C#		FP			
			KM44C4100C#-L		FP, LP			
			KM44C4003C#		Quad $\overline{\text{CAS}}$ FP, 4K			
			KM44C4003C#-L		Quad $\overline{\text{CAS}}$ FP, 4K,LP			
			KM44C4103C#		Quad $\overline{\text{CAS}}$ FP, 2K			
			KM44C4103C#-L		Quad $\overline{\text{CAS}}$ FP, 2K,LP			
			KM44C4004C#		EDO			
			KM44C4004C#-L		EDO, LP			
			KM44C4104C#		EDO			
			KM44C4104C#-L		EDO, LP			
			KM44C4005C#		Quad $\overline{\text{CAS}}$ EDO, 4K			
			KM44C4005C#-L		Quad $\overline{\text{CAS}}$ EDO, 4K,LP			
			KM44C4105C#		Quad $\overline{\text{CAS}}$ EDO, 2K			
			KM44C4105C#-L		Quad $\overline{\text{CAS}}$ EDO, 2K,LP			
			+3.3V±0.3V		KM44V4000C#		50/60	FP
								FP, LP
								FP
								FP, LP
	EDO							
	EDO, LP							
	EDO							
	EDO, LP							
	2Mx8	+5V±10%	50/60	KM48C2000C#	FP	K:28pin SOJ (300mil) S:28pin TSOP-II (300mil)		
				KM48C2000C#-L	FP, LP			
				KM48C2100C#	FP			
				KM48C2100C#-L	FP, LP			
				KM48C2004C#	EDO			
				KM48C2004C#-L	EDO, LP			
				KM48C2104C#	EDO			
				KM48C2104C#-L	EDO, LP			
+3.3V±0.3V		KM48V2000C#	50/60	FP				
				FP, LP				
				FP				
				FP, LP				



Density	Org.	Power Supply	Part Number	Speed (ns)	Features	Packages (#)	
16M bit	2Mx8	+3.3V±0.3V	KM48V2004C#	50/60	EDO	(Continued)	
			KM48V2004C#-L		EDO, LP		
			KM48V2104C#		EDO		
			KM48V2104C#-L		EDO, LP		
16M B/W	1Mx16	+5V±10%	KM416C1000C#	50/60	FP	J:42pin SOJ (400mil) T:50(44)pin TSOP-II (400mil)	
			KM416C1000C#-L		FP, LP		
			KM416C1200C#		FP		
			KM416C1200C#-L		FP, LP		
			KM416C1004C#	45/50/60	EDO		
			KM416C1004C#-L		EDO, LP		
			KM416C1204C#		EDO		
			KM416C1204C#-L		EDO, LP		
		+3.3V±0.3V	KM416V1000C#	50/60	FP		
			KM416V1000C#-L		FP, LP		
			KM416V1200C#		FP		
			KM416V1200C#-L		FP, LP		
			KM416V1004C#	45/50/60	EDO		
			KM416V1004C#-L		EDO, LP		
			KM416V1204C#		EDO		
			KM416V1204C#-L		EDO, LP		
		3.0V+0.6/-0.3	KM416U1004C#-L	60	EDO, 4K, LP		T:50(44)pin TSOP-II (400mil)
		2.5V±0.2V	KM416Q1004C#-L	60/70	EDO, 4K, LP		
512Kx32	+3.3V±0.3V	KM432V515#	60	Quad $\overline{\text{CAS}}$ EDO, 4K	J:70pin SOJ (400mil)		
64M bit	16Mx4	+5V±10%	KM44C16000B#	45/50/60	FP, 8K	K:32pin SOJ (400mil) S:32pin TSOP-II (400mil)	
			KM44C16100B#		FP, 4K		
			KM44C16004B#		EDO, 8K		
			KM44C16104B#		EDO, 4K		
		+3.3V±0.3V	KM44V16000B#	45/50/60	FP, 8K		
			KM44V16000B#-L		FP, 8K, LP		
			KM44V16100B#		FP, 4K		
			KM44V16100B#-L		FP, 4K, LP		
			KM44V16004B#		EDO, 8K		
			KM44V16004B#-L		EDO, 8K, LP		
			KM44V16104B#		EDO, 4K		
			KM44V16104B#-L		EDO, 4K, LP		

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Density	Org.	Power Supply	Part Number	Speed (ns)	Features	Packages (#)	
64M bit	8Mx8	+5V±10%	KM48C8000B#	45/50/60	FP, 8K	K:32pin SOJ (400mil) S:32pin TSOP-II (400mil)	
			KM48C8100B#		FP, 4K		
			KM48C8004B#		EDO, 8K		
			KM48C8104B#		EDO, 4K		
		+3.3V±0.3V	KM48V8000B#	45/50/60	FP, 8K		
			KM48V8000B#-L		FP, 8K, LP		
			KM48V8100B#		FP, 4K		
			KM48V8100B#-L		FP, 4K, LP		
			KM48V8004B#		EDO, 8K		
			KM48V8004B#-L		EDO, 8K, LP		
	KM48V8104B#	EDO, 4K					
		KM48V8104B#-L	EDO, 4K, LP				
		4Mx16	+5V±10%	KM416C4000B#	45/50/60	FP, 8K	S:50pin TSOP-II (400mil)
				KM416C4100B#		FP, 4K	
	KM416C4004B#			EDO, 8K			
	KM416C4104B#			EDO, 4K			
	+3.3V±0.3V	KM416V4000B#	45/50/60	FP, 8K			
		KM416V4000B#-L		FP, 8K, LP			
		KM416V4100B#		FP, 4K			
		KM416V4100B#-L		FP, 4K, LP			
KM416V4004B#		EDO, 8K					
KM416V4004B#-L		EDO, 8K, LP					
KM416V4104B#		EDO, 4K					
KM416V4104B#-L		EDO, 4K, LP					

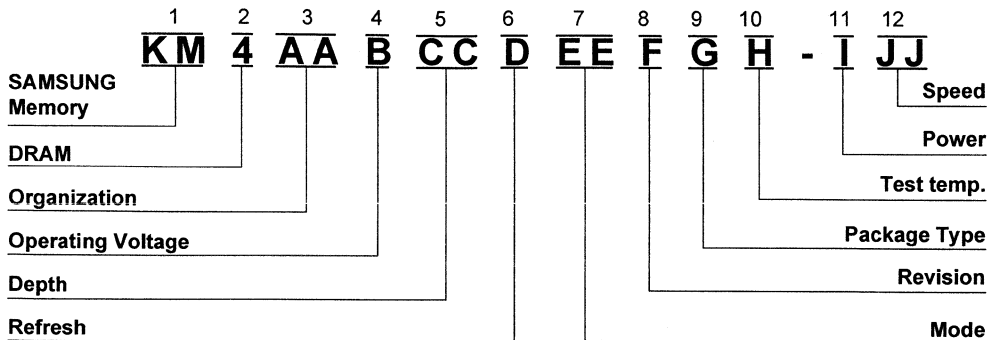
\* Note

FP : Fast Page Mode  
 LP : Low Power Product  
 1K : 1024cycles/16ms  
 4K : 4096cycles/64ms

EDO : Extended Data Out Mode  
 512 : 512cycles/8ms  
 2K : 2048cycles/32ms  
 8K : 4096cycles/64ms (CBR)    8192cycles/64ms (ROR)

**DRAM Ordering Information**

This DRAM ordering system is being used from 2H95.



**1. SAMSUNG Memory**

**2. DRAM(4)**

**3. Organization**

- 1 ..... x 1
- 4 ..... x 4
- 8 ..... x 8
- 16 ..... x 16
- 32 ..... x 32

**4. Operating Voltage**

- C ..... 5V
- V ..... 3.3V
- U ..... 3.0V
- Q ..... 2.5V

**5. Depth**

- 1 ..... 1M
- 2 ..... 2M
- 4 ..... 4M
- 8 ..... 8M
- 16 ..... 16M

\* 25 : 256Kx16(4MD)  
 \* 51 : 512Kx32(16MD)

**6. Refresh**

- 0 ..... 1K(4MD), 4K(16MD),8K(64MD)
- 1 ..... 512(4MD), 2K(16MD),4K(64MD)
- 2 ..... 1K(16MD)

**7. Mode**

- 0 ..... FP Mode
- 3 ..... FP (Quad CAS) Mode
- 4 ..... EDO Mode
- 5 ..... EDO (Quad CAS) Mode

**8. Revision**

- Blank ..... 1st Gen.
- A ..... 2nd Gen.
- B ..... 3rd Gen.
- C ..... 4th Gen.
- D ..... 5th Gen.

**9. Package Type**

- J ..... SOJ
- K ..... SOJ(Shrunked PKG)
- T ..... TSOP II
- S ..... TSOP II(Shrunked PKG)
- C ..... CSP

**10. Test Temperature**

- Blank : Normal (0°C~70°C)
- E : Extended temp. (-25°C~85°C)
- I : Industrial temp. (-40°C~85°C)

**11. Power(DC Current)**

- Blank ..... Normal
- L ..... Low Power  
with Self Refresh

**12. Speed**

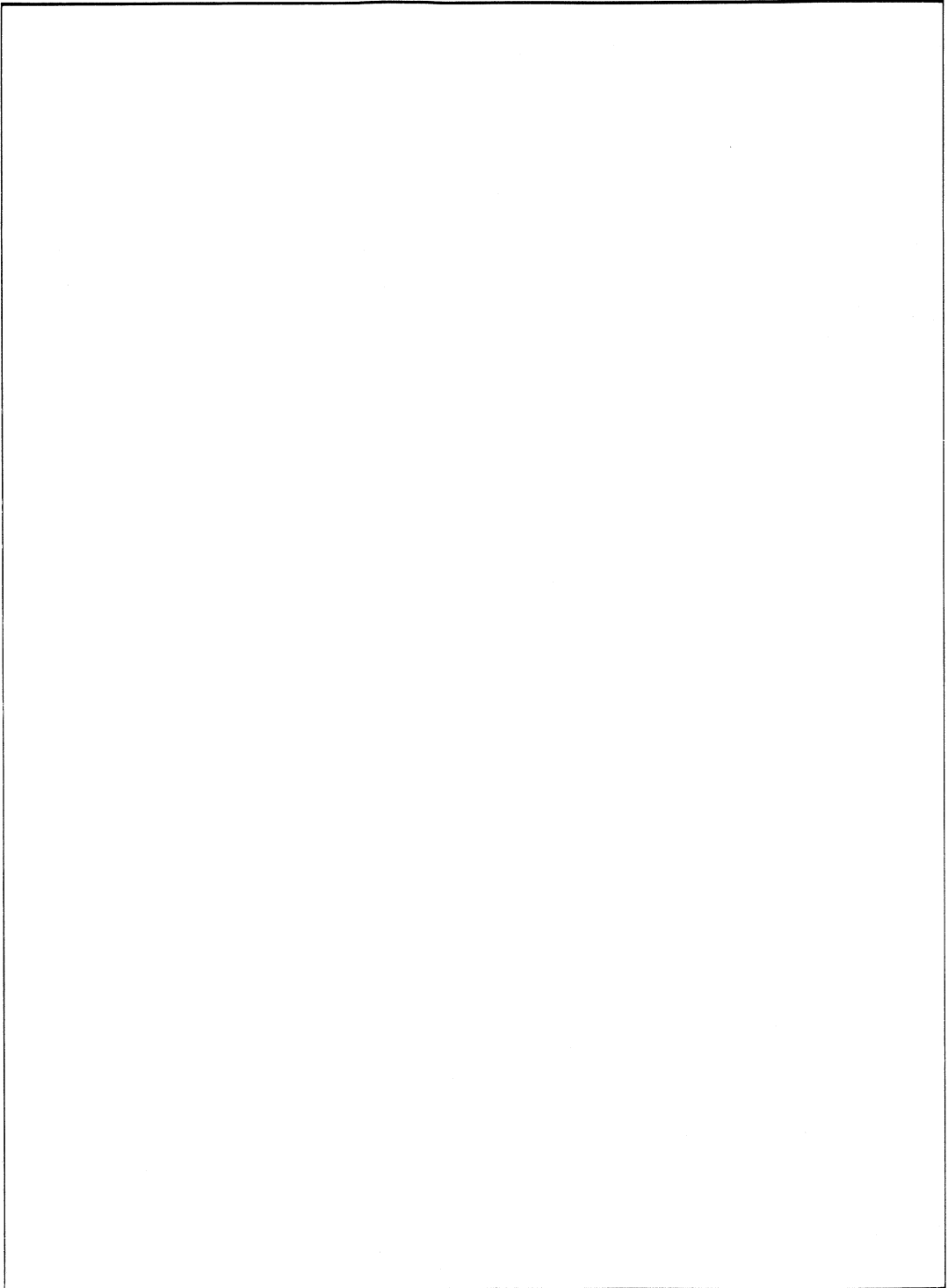
- 4 ..... 40ns
- 45 ..... 45ns
- 5 ..... 50ns
- 55 ..... 55ns
- 6 ..... 60ns
- 7 ..... 70ns



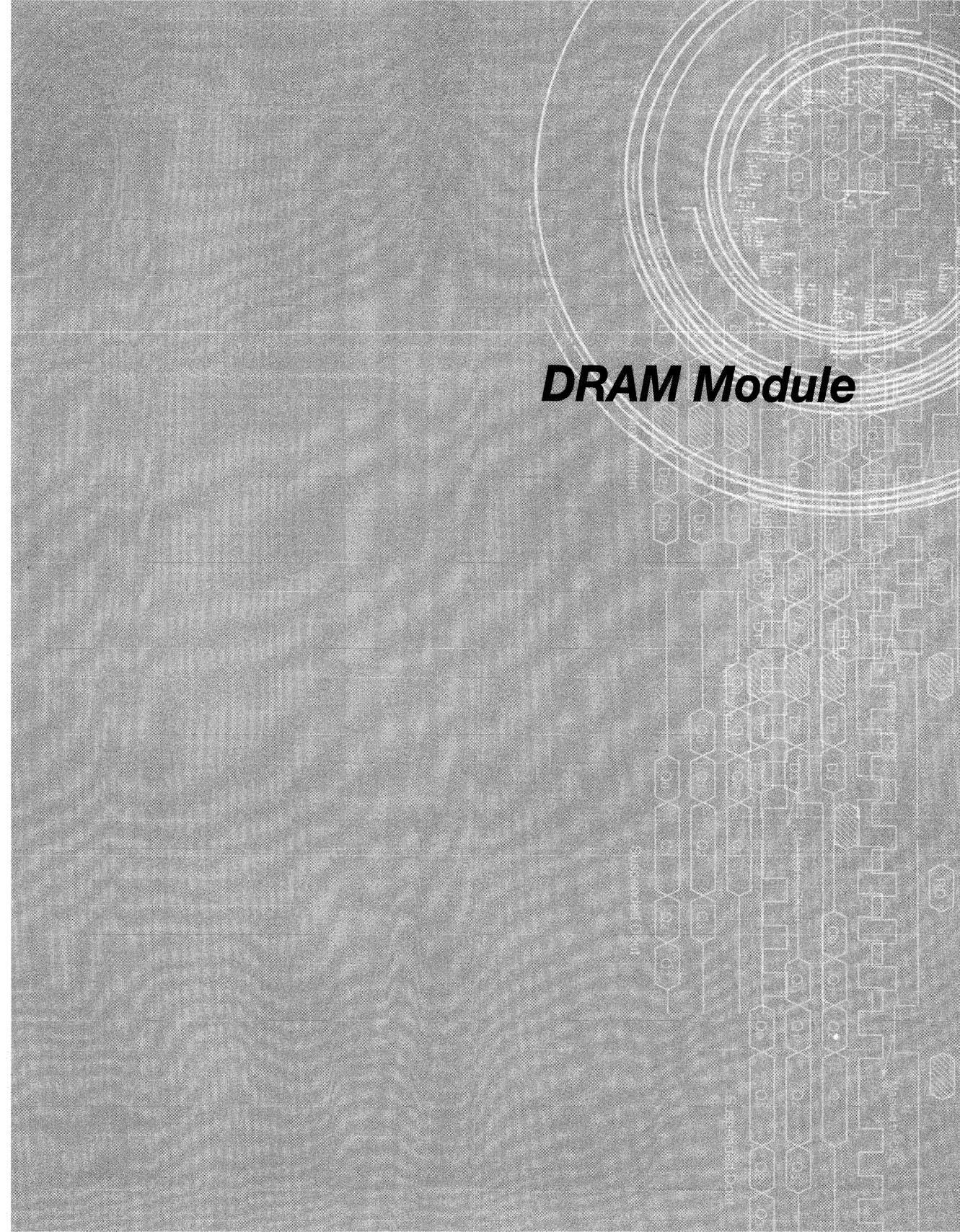
# NOTES

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# ***DRAM Module***





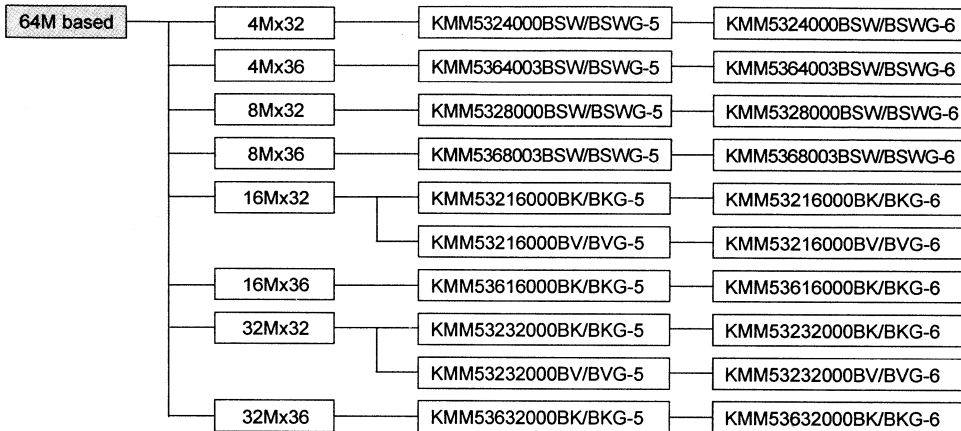
DRAM Module

1. Introduction

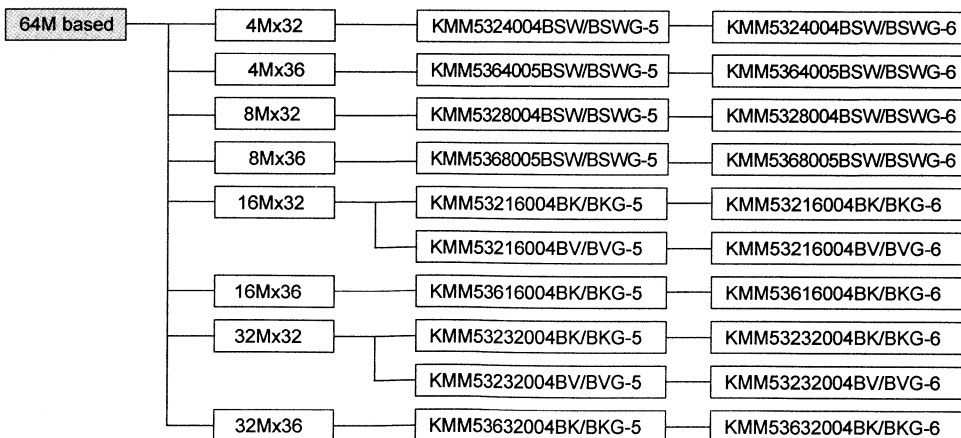
I. Single In-Line Memory Module (SIMM)

I-I. Fast Page(FP) Mode(5V)

1



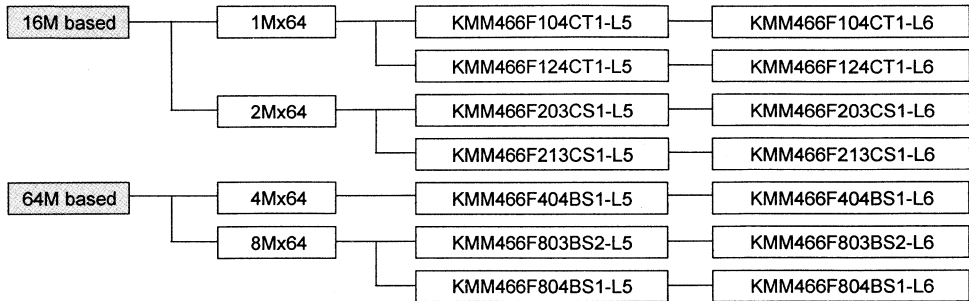
I-II. Extended Data-Out (EDO) Mode(5V)



II. Small Out-Line In Line Memory Module(SODIMM)

II-i. Extended Data-Out (EDO) Mode

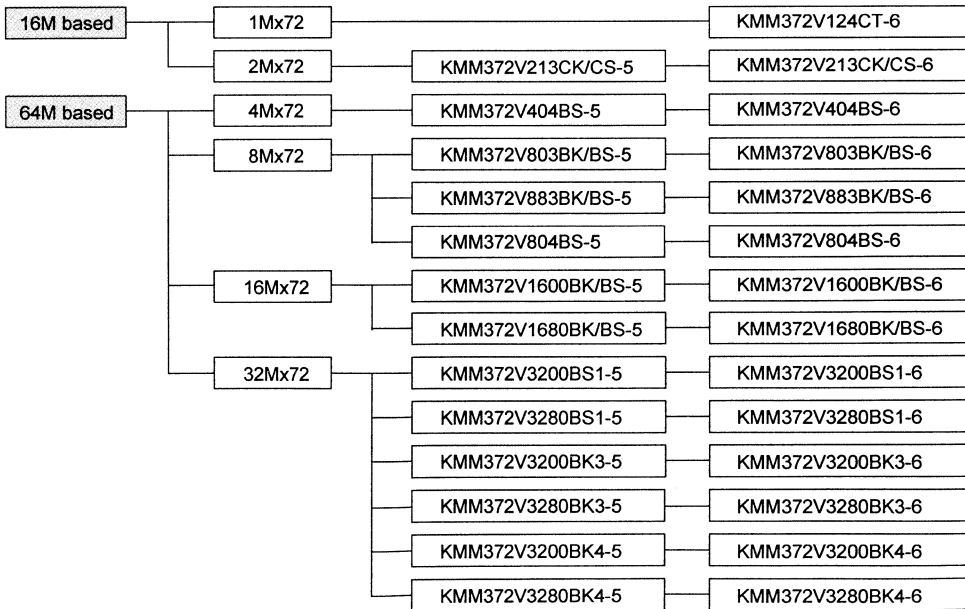
8 Byte SODIMM(3.3V)



III. Dual In-Line Memory Module (DIMM)

III-i. Fast Page (FP) Mode

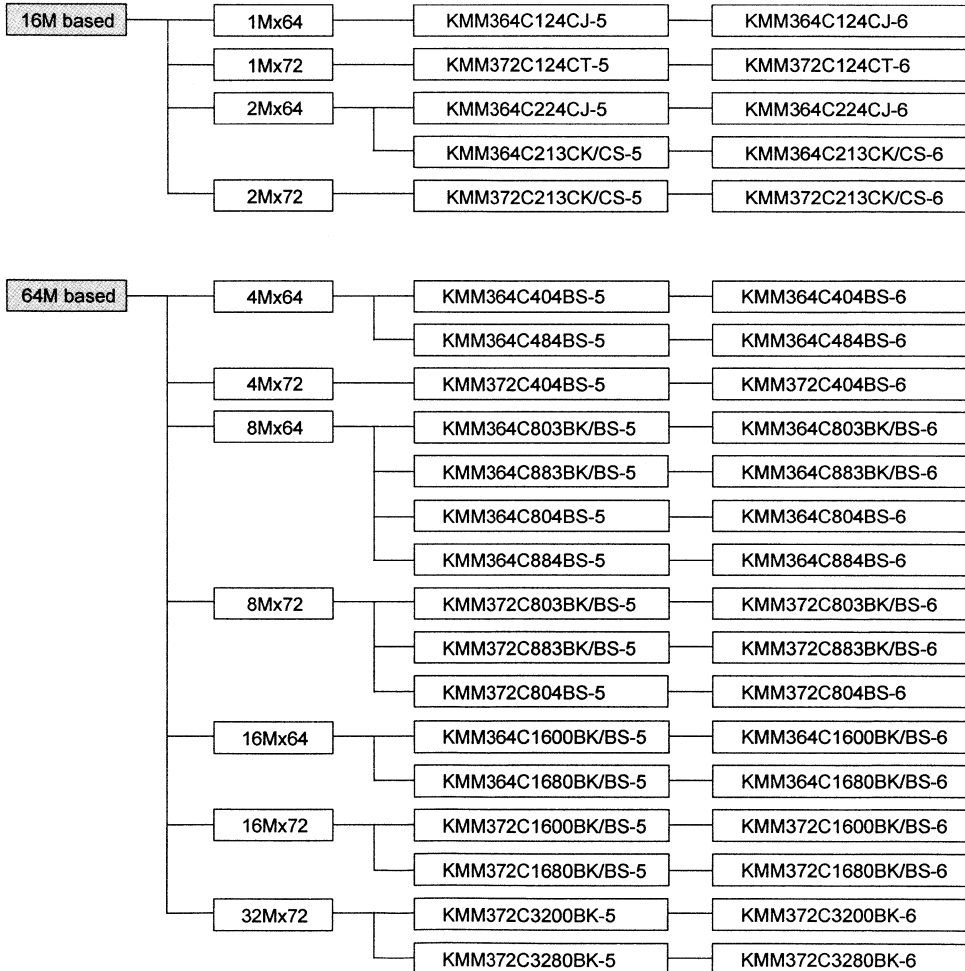
Buffered DIMM(3.3V)





III-I. Fast Page (FP) Mode -- Continued

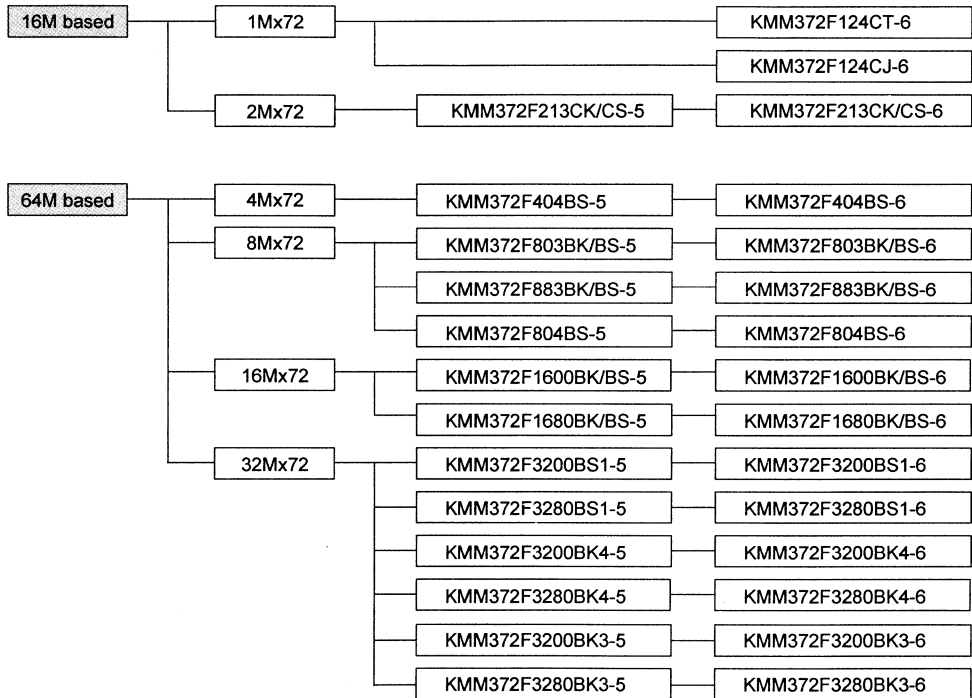
Buffered DIMM(5V)



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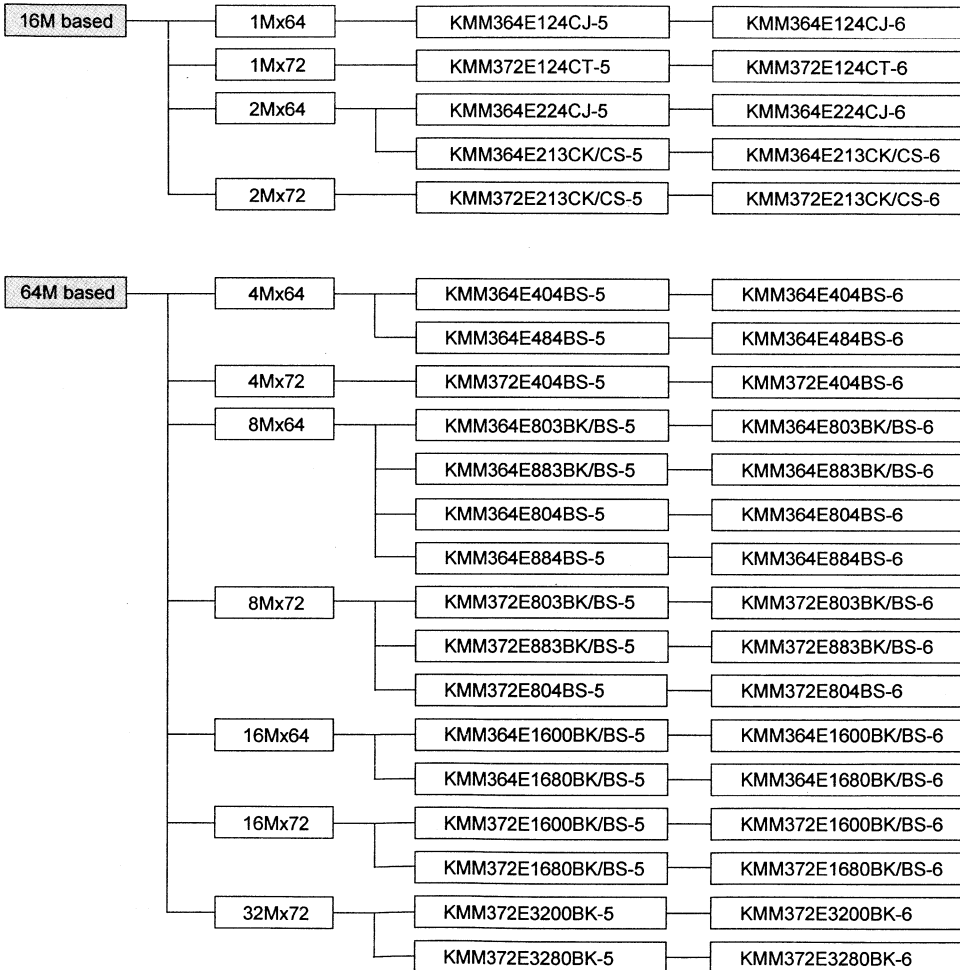
III-II. Extended Data-Out (EDO) Mode

***Buffered DIMM(3.3V)***



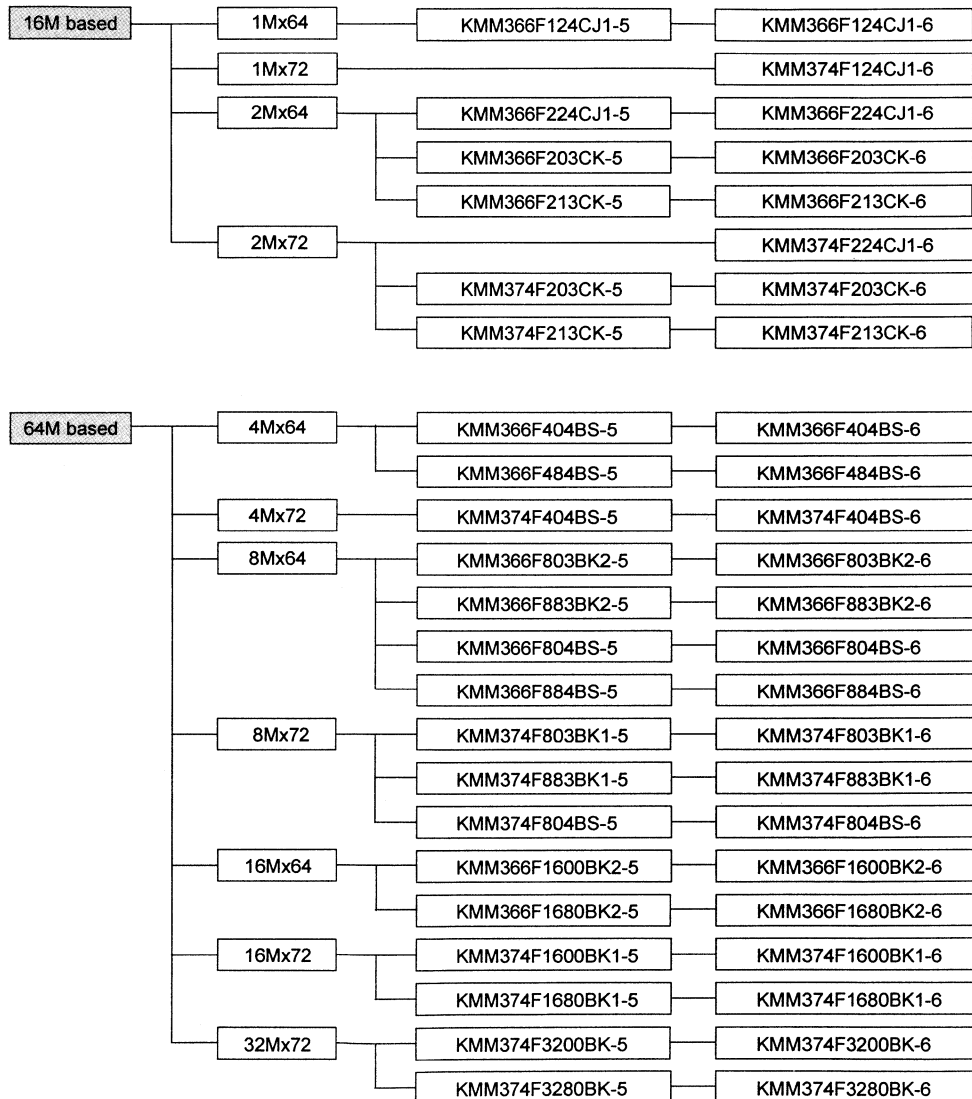
III-II. Extended Data-Out (EDO) Mode -- Continued

**Buffered DIMM(5V)**



III-II. Extended Data-Out (EDO) Mode -- Continued

Unbuffered DIMM(3.3V)



2. Product Guide

Org.	Part No.	Base	Vtg.	Mode <sup>6</sup>	Ref. <sup>7</sup>	Bank	PKG <sup>8</sup>	Height	Tab <sup>9</sup>	CS
<b>4Byte Single In-Line Memory Module(SIMM)</b>										
4Mx32	KMM5324000BSW/BSWG	4Mx16	5V	FP	4K	1	S	1.00"	G/S	Now
	KMM5324004BSW/BSWG	4Mx16	5V	EDO	4K	1	S	1.00"	G/S	Now
4Mx36 <sup>2</sup>	KMM5364003BSW/BSWG	4Mx16	5V	FP	4K	1	S	1.00"	G/S	Now
	KMM5364005BSW/BSWG	4Mx16	5V	EDO	4K	1	S	1.00"	G/S	Now
8Mx32	KMM5328000BSW/BSWG	4Mx16	5V	FP	4K	2	S	1.00"	G/S	Now
	KMM5328004BSW/BSWG	4Mx16	5V	EDO	4K	2	S	1.00"	G/S	Now
8Mx36 <sup>2</sup>	KMM5368003BSW/BSWG	4Mx16	5V	FP	4K	2	S	1.00"	G/S	Now
	KMM5368005BSW/BSWG	4Mx16	5V	EDO	4K	2	S	1.00"	G/S	Now
16Mx32	KMM53216000BK/BKG	16Mx4	5V	FP	4K	1	K	1.25"	G/S	Now
	KMM53216004BK/BKG	16Mx4	5V	EDO	4K	1	K	1.25"	G/S	Now
	KMM53216000BV/BVG	16Mx4	5V	FP	4K	1	K	1.00"	G/S	Now
	KMM53216004BV/BVG	16Mx4	5V	EDO	4K	1	K	1.00"	G/S	Now
16Mx36 <sup>2</sup>	KMM53616000BK/BKG	16Mx4	5V	FP	4K	1	K	1.25"	G/S	Now
	KMM53616004BK/BKG	16Mx4	5V	EDO	4K	1	K	1.25"	G/S	Now
32Mx32	KMM53232000BK/BKG	16Mx4	5V	FP	4K	2	K	1.42"	G/S	Now
	KMM53232004BK/BKG	16Mx4	5V	EDO	4K	2	K	1.42"	G/S	Now
	KMM53232000BV/BVG	16Mx4	5V	FP	4K	2	K	1.00"	G/S	Now
	KMM53232004BV/BVG	16Mx4	5V	EDO	4K	2	K	1.00"	G/S	Now
32Mx36 <sup>3</sup>	KMM53632000BK/BKG	16Mx4	5V	FP	1K	2	K	1.42"	G/S	Now
	KMM53632004BK/BKG	16Mx4	5V	EDO	1K	2	K	1.42"	G/S	Now
<b>8Byte Small Out-Line Dual In-Line Memory Module(SODIMM)</b>										
1Mx64	KMM466F124CT1-L	1Mx16	3.3V	EDO	1K	1	T	1.00"	G	Now
	KMM466F104CT1-L	1Mx16	3.3V	EDO	4K	1	T	1.00"	G	Now
2Mx64	KMM466F213CS2-L	2Mx8	3.3V	EDO	2K	1	S	1.00"	G	Now
	KMM466F203CS2-L	2Mx8	3.3V	EDO	4K	1	S	1.00"	G	Now
4Mx64	KMM466F404BS2-L	4Mx16	3.3V	EDO	4K	1	S	1.00"	G	Now
8Mx64	KMM466F803BS2-L	8Mx8	3.3V	EDO	4K	1	S	1.10"	G	Now
	KMM466F804BS1-L	4Mx16	3.3V	EDO	4K	2	S	1.00"	G	Now
<b>8Byte Buffered Dual In-Line Memory Module(DIMM-3.3V)</b>										
1Mx72 <sup>4</sup>	KMM372V124CT	1Mx16	3.3V	FP	1K	1	T	1.00"	G	Now
	KMM372F124CT	1Mx16	3.3V	EDO	1K	1	T	1.00"	G	Now
	KMM372F124CJ	1Mx16	3.3V	EDO	1K	1	J	1.00"	G	Now
2Mx72	KMM372V213CK/CS	2Mx8	3.3V	FP	2K	1	K/S	1.00"	G	Now
	KMM372F213CK/CS	2Mx8	3.3V	EDO	2K	1	K/S	1.00"	G	Now



Org.	Part No.	Base	Vtg.	Mode <sup>6</sup>	Ref. <sup>7</sup>	Bank	PKG <sup>8</sup>	Height	Tab <sup>9</sup>	CS
<b>8Byte Buffered Dual In-Line Memory Module(DIMM-3.3V) Continued</b>										
4Mx72 <sup>5</sup>	KMM372V404BS	4Mx16	3.3V	FP	4K	1	S	1.00"	G	Now
	KMM372F404BS	4Mx16	3.3V	EDO	4K	1	S	1.00"	G	Now
8Mx72	KMM372V803BK/BS	8Mx8	3.3V	FP	4K	1	S	1.25"	G	Now
	KMM372V883BK/BS	8Mx8	3.3V	FP	8K	1	S	1.25"	G	Now
	KMM372F803BK/BS	8Mx8	3.3V	EDO	4K	1	S	1.25"	G	Now
	KMM372F883BK/BS	8Mx8	3.3V	EDO	8K	1	S	1.25"	G	Now
8Mx72 <sup>5</sup>	KMM372V804BS	4Mx16	3.3V	FP	4K	2	S	1.00"	G	Now
	KMM372F804BS	4Mx16	3.3V	EDO	4K	2	S	1.00"	G	Now
16Mx72	KMM372V1600BK/BS	16Mx4	3.3V	FP	4K	1	K/S	1.25"	G	Now
	KMM372V1680BK/BS	16Mx4	3.3V	FP	8K	1	K/S	1.25"	G	Now
	KMM372F1600BK/BS	16Mx4	3.3V	EDO	4K	1	K/S	1.25"	G	Now
	KMM372F1680BK/BS	16Mx4	3.3V	EDO	8K	1	K/S	1.25"	G	Now
32Mx72	KMM372V3200BS1	16Mx4	3.3V	FP	4K	2	S	2.10"	G	Now
	KMM372V3280BS1	16Mx4	3.3V	FP	8K	2	S	2.10"	G	Now
	KMM372V3200BK4	16Mx4	3.3V	FP	4K	2	K	2.00"	G	Now
	KMM372V3280BK4	16Mx4	3.3V	FP	8K	2	K	2.00"	G	Now
	KMM372V3200BK3	16Mx4	3.3V	FP	4K	2	K	1.65"	G	Now
	KMM372V3280BK3	16Mx4	3.3V	FP	8K	2	K	1.65"	G	Now
	KMM372F3200BS1	16Mx4	3.3V	EDO	4K	2	S	2.10"	G	Now
	KMM372F3280BS1	16Mx4	3.3V	EDO	8K	2	S	2.10"	G	Now
	KMM372F3200BK4	16Mx4	3.3V	EDO	4K	2	K	2.00"	G	Now
	KMM372F3280BK4	16Mx4	3.3V	EDO	8K	2	K	2.00"	G	Now
	KMM372F3200BK3	16Mx4	3.3V	EDO	4K	2	K	1.65"	G	Now
	KMM372F3280BK3	16Mx4	3.3V	EDO	8K	2	K	1.65"	G	Now
<b>8Byte Buffered Dual In-Line Memory Module(DIMM-5V)</b>										
1Mx64	KMM364C124CJ	1Mx16	5V	FP	1K	1	J	1.00"	G	Now
	KMM364E124CJ	1Mx16	5V	EDO	1K	1	J	1.00"	G	Now
1Mx72 <sup>4</sup>	KMM372C124CT	1Mx16	5V	FP	1K	1	T	1.00"	G	Now
	KMM372E124CT	1Mx16	5V	EDO	1K	1	T	1.00"	G	Now
2Mx64	KMM364C224CJ	1Mx16	5V	FP	1K	2	J	1.00"	G	Now
	KMM364E224CJ	1Mx16	5V	EDO	1K	2	J	1.00"	G	Now
	KMM364C213CK/CS	2Mx8	5V	FP	2K	1	K/S	1.00"	G	Now
	KMM364E213CK/CS	2Mx8	5V	EDO	2K	1	K/S	1.00"	G	Now
2Mx72	KMM372C213CK/CS	2Mx8	5V	FP	2K	1	K/S	1.00"	G	Now
	KMM372E213CK/CS	2Mx8	5V	EDO	2K	1	K/S	1.00"	G	Now

Org.	Part No.	Base	Vtg.	Mode <sup>6</sup>	Ref. <sup>7</sup>	Bank	PKG <sup>8</sup>	Height	Tab <sup>9</sup>	CS
<b>8Byte Buffered Dual In-Line Memory Module(DIMM-5V) Continued</b>										
4Mx64	KMM364C404BS	4Mx16	5V	FP	4K	1	S	1.00"	G	Now
	KMM364C484BS	4Mx16	5V	FP	8K	1	S	1.00"	G	Now
	KMM364E404BS	4Mx16	5V	EDO	4K	1	S	1.00"	G	Now
	KMM364E484BS	4Mx16	5V	EDO	8K	1	S	1.00"	G	Now
4Mx72	KMM372C404BS	4Mx16	5V	FP	4K	1	S	1.00"	G	Now
	KMM372E404BS	4Mx16	5V	EDO	4K	1	S	1.00"	G	Now
8Mx64	KMM364C803BK/BS	8Mx8	5V	FP	4K	1	K/S	1.25"	G	Now
	KMM364C883BK/BS	8Mx8	5V	FP	8K	1	K/S	1.25"	G	Now
	KMM364E803BK/BS	8Mx8	5V	EDO	4K	1	K/S	1.25"	G	Now
	KMM364E883BK/BS	8Mx8	5V	EDO	8K	1	K/S	1.25"	G	Now
	KMM364C804BS	4Mx16	5V	FP	4K	2	S	1.00"	G	Now
	KMM364C884BS	4Mx16	5V	FP	8K	2	S	1.00"	G	Now
	KMM364E804BS	4Mx16	5V	EDO	4K	2	S	1.00"	G	Now
	KMM364E884BS	4Mx16	5V	EDO	8K	2	S	1.00"	G	Now
8Mx72	KMM372C803BK/BS	8Mx8	5V	FP	4K	1	K/S	1.25"	G	Now
	KMM372C883BK/BS	8Mx8	5V	FP	8K	1	K/S	1.25"	G	Now
	KMM372E803BK/BS	8Mx8	5V	EDO	4K	1	K/S	1.25"	G	Now
	KMM372E883BK/BS	8Mx8	5V	EDO	8K	1	K/S	1.25"	G	Now
	KMM372C804BS	4Mx16	5V	FP	4K	2	S	1.00"	G	Now
	KMM372E804BS	4Mx16	5V	EDO	4K	2	S	1.00"	G	Now
16Mx64	KMM364C1600BK/BS	16Mx4	5V	FP	4K	1	K/S	1.25"	G	Now
	KMM364C1680BK/BS	16Mx4	5V	FP	8K	1	K/S	1.25"	G	Now
	KMM364E1600BK/BS	16Mx4	5V	EDO	4K	1	K/S	1.25"	G	Now
	KMM364E1680BK/BS	16Mx4	5V	EDO	8K	1	K/S	1.25"	G	Now
16Mx72	KMM372C1600BK/BS	16Mx4	5V	FP	4K	1	K/S	1.25"	G	Now
	KMM372C1680BK/BS	16Mx4	5V	FP	8K	1	K/S	1.25"	G	Now
	KMM372E1600BK/BS	16Mx4	5V	EDO	4K	1	K/S	1.25"	G	Now
	KMM372E1680BK/BS	16Mx4	5V	EDO	8K	1	K/S	1.25"	G	Now
32Mx72	KMM372C3200BK	16Mx4	5V	FP	4K	2	K	2.00"	G	Now
	KMM372C3280BK	16Mx4	5V	FP	8K	2	K	2.00"	G	Now
	KMM372E3200BK	16Mx4	5V	EDO	4K	2	K	2.00"	G	Now
	KMM372E3280BK	16Mx4	5V	EDO	8K	2	K	2.00"	G	Now
<b>8Byte Unbuffered Dual In-Line Memory Module(DIMM-3.3V)</b>										
1Mx64	KMM366F124CJ1	1Mx16	3.3V	EDO	1K	1	J	1.00"	G	Now
1Mx72 <sup>4</sup>	KMM374F124CJ1	1Mx16	3.3V	EDO	1K	1	J	1.00"	G	Now



Org.	Part No.	Base	Vtg.	Mode <sup>6</sup>	Ref. <sup>7</sup>	Bank	PKG <sup>8</sup>	Height	Tab <sup>9</sup>	CS
<b>8Byte Unbuffered Dual In-Line Memory Module(DIMM-3.3V) Continued</b>										
2Mx64	KMM366F224CJ1	1Mx16	3.3V	EDO	1K	2	T	1.00"	G	Now
	KMM366F213CK	2Mx8	3.3V	EDO	2K	1	K	1.00"	G	Now
	KMM366F203CK	2Mx8	3.3V	EDO	4K	1	K	1.00"	G	Now
2MX72 <sup>4</sup>	KMM374F224CJ1	1Mx16	3.3V	EDO	1K	2	J	1.00"	G	Now
2Mx72	KMM374F213CK	2Mx8	3.3V	EDO	2K	1	K	1.00"	G	Now
	KMM374F203CK	2Mx8	3.3V	EDO	4K	1	K	1.00"	G	Now
4Mx64	KMM366F404BS1	4Mx16	3.3V	EDO	4K	1	S	1.00"	G	Now
	KMM366F484BS1	4Mx16	3.3V	EDO	8K	1	S	1.00"	G	Now
4MX72 <sup>5</sup>	KMM374F404BS	4Mx16	3.3V	EDO	4K	1	S	1.00"	G	Now
8Mx64	KMM366F803BK2	8Mx8	3.3V	EDO	4K	1	K	1.00"	G	Now
	KMM366F883BK2	8Mx8	3.3V	EDO	8K	1	K	1.00"	G	Now
	KMM366F804BS1	4Mx16	3.3V	EDO	4K	2	S	1.00"	G	Now
	KMM366F884BS1	4Mx16	3.3V	EDO	8K	2	S	1.00"	G	Now
8MX72	KMM374F803BK1	8Mx8	3.3V	EDO	4K	1	K	1.00"	G	Now
	KMM374F883BK1	8Mx8	3.3V	EDO	8K	1	K	1.00"	G	Now
8MX72 <sup>5</sup>	KMM374F804BS	4Mx16	3.3V	EDO	4K	2	S	1.00"	G	Now
16Mx64	KMM366F1600BK2	16Mx4	3.3V	EDO	4K	1	K	1.00"	G	Now
	KMM366F1680BK2	16Mx4	3.3V	EDO	8K	1	K	1.00"	G	Now
16MX72	KMM374F1600BK1	16Mx4	3.3V	EDO	4K	1	K	1.00"	G	Now
	KMM374F1680BK1	16Mx4	3.3V	EDO	8K	1	K	1.00"	G	Now
32Mx72	KMM374F3200BK1	16Mx4	3.3V	EDO	4K	2	K	1.625"	G	Now
	KMM374F3280BK1	16Mx4	3.3V	EDO	8K	2	K	1.625"	G	Now



## Note

\*1 ~\*5 : Error checking DRAM data width is as follows ;

\*1 : Quad CAS 1M X 4.

\*2 : Quad CAS 4M X 4.

\*3 : 16M X1.

\*4 : 1M X4.

\*5 : 4MX4.

\*6 : FP - Fast Page Mode, EDO - Extended Data Out Mode.

\*7 : 1K - 1024cycles/16ms,

2K - 2048cycles/32ms,

4K - 4096cycles/64ms,

8K - 4096cycles/64ms (CBR), 8192cycles/64ms (ROR).

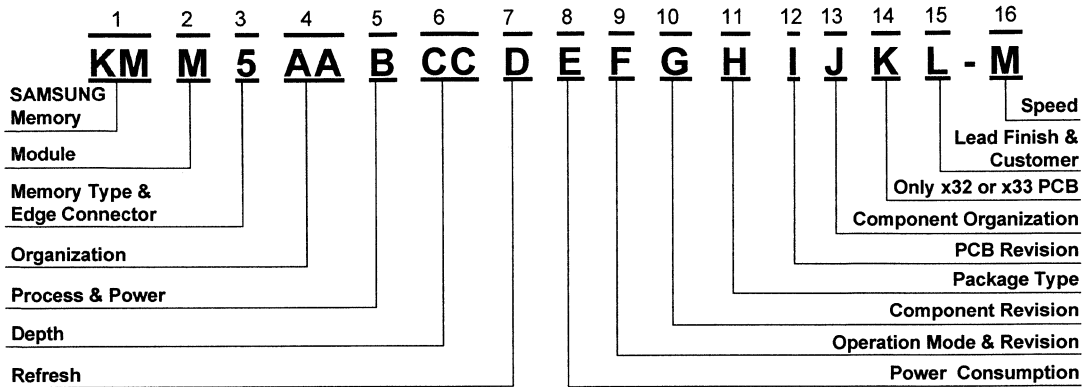
\*8 : Package

a. 16M base - J : 400mil SOJ, K : 300mil SOJ, T : 400mil TSOP II, S : 300mil TSOP II.

b. 64M base - K : 400mil SOJ, S : 400mil TSOP II.

\*9 : G - Gold, S - Solder.

**SIMM Module Ordering Information**



**1. SAMSUNG Memory**

**2. Module**

**3. Memory Type & Edge Connector**

- 3 ..... DRAM DIMM
- 4 ..... DRAM 8Byte SODIMM
- 5 ..... **DRAM SIMM**

**4. Organization**

- 32/36 ..... x32/x36 bit
- 64/72 ..... x64/x72 bit

**5. Process & Operating Voltage**

- Blank ..... CMOS 5V
- V ..... CMOS 3.3V

**6. Depth**

- 32 ..... 32M
- 16 ..... 16M
- 8 ..... 8M
- 4 ..... 4M

**7. Refresh**

- 0 ..... 4K Cycle
- 1 ..... 2K Cycle
- 2 ..... 1K Cycle
- 8 ..... 8K Cycle

**8. Power Consumption**

- 0 ..... Normal
- 2 ..... Low Power & Self Refresh

**9. Operation & Organization**

- 0 ..... F/P
- 3 ..... Using Quad CAS
- 4 ..... Using EDO
- 5 ..... Using EDO & Quad CAS

**10. Component Revision**

- Blank ..... None
- A ..... First Rev.
- B ..... Second Rev.
- C ..... Third Rev.

**11. Package Type**

- Blank ..... SOJ(1st)
- K ..... SOJ(2nd)
- T ..... TSOP(1st)
- S ..... TSOP(2nd)

**12. PCB Revision**

- Blank ..... None
- 1 ..... First Rev.
- 2 ..... Second Rev.
- 3 ..... Third Rev.

**13. Component Organization**

- Blank ..... x4
- U ..... x8
- W ..... x16

**14. Only x32 or x33 PCB**

- V ..... x32 or x33 PCB

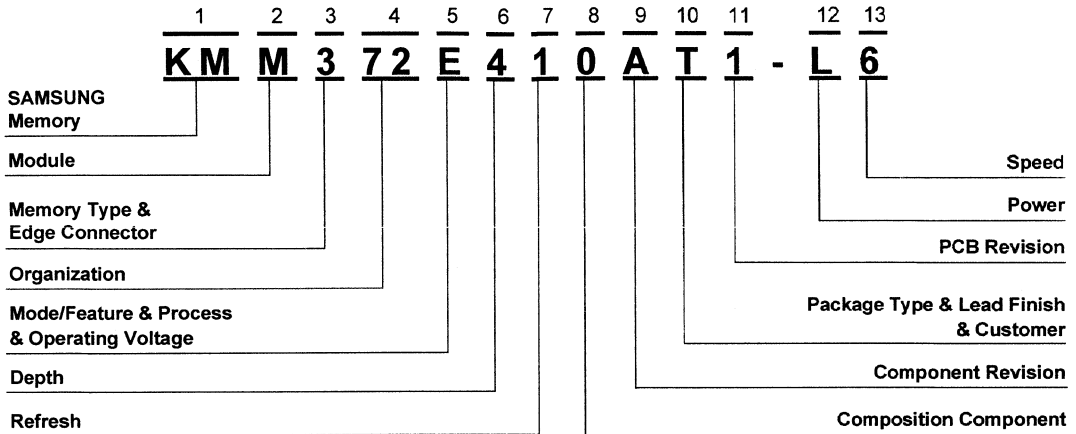
**15. Lead Finish & Customer**

- Blank ..... Solder
- G ..... Gold
- D ..... DEC                      - P ..... Nickel
- H ..... HP                        - Q ..... Compaq
- M ..... IBM                       - X ..... Cambex

**16. Speed**

- 5 ..... 50ns
- 6 ..... 60ns

**DIMM/SODIMM Module Ordering Information**



**1. SAMSUNG Memory**

**2. Module**

**3. Memory Type & Edge Connector**

- 3 ..... DRAM DIMM
- 4 ..... DRAM 8Byte SODIMM
- 5 ..... DRAM SIMM

**4. Organization**

- 32/36 ..... x32/x36 bit
- 64/72 ..... x64/x72 bit
- 66/74 ..... x64/x72 Unbuffered DIMM
- 144 ..... x144 bit

**5. Mode/Feature & Process & Operating Voltage**

- C ..... F/P,5V
- V ..... F/P,3.3V
- E ..... EDO,5V
- F ..... EDO,3.3V

**6. Depth**

- 4 ..... 4M
- 8 ..... 8M
- 16 ..... 16M
- 32 ..... 32M

**7. Refresh**

- 0 ..... 4K Cycle
- 1 ..... 2K Cycle
- 2 ..... 1K Cycle
- 8 ..... 8K Cycle

**8. Composition Component**

- 0 ..... x4
- 1 ..... x4 + x1
- 2 ..... x4 + x4(Quad CAS)
- 3 ..... x8
- 4 ..... x16
- 5 ..... x16 + x4(Quad CAS)

**9. Component Revision**

- Blank ..... None
- A ..... First Rev.
- B ..... Second Rev.
- C ..... Third Rev.

**10. Package Type & Lead Finish & Customer**

- J ..... SOJ(1st) & Gold
- K ..... SOJ(2nd) & Gold
- T ..... TSOP(1st) & Gold
- S ..... TSOP(2nd) & Gold
- C ..... CSP(u-BGA)

**11. PCB Revision**

- Blank ..... None
- 1 ..... First Rev.
- 2 ..... Second Rev.
- 3 ..... Third Rev.

**12. Power**

- Blank ..... Normal
- L ..... Low Power & Self Refresh

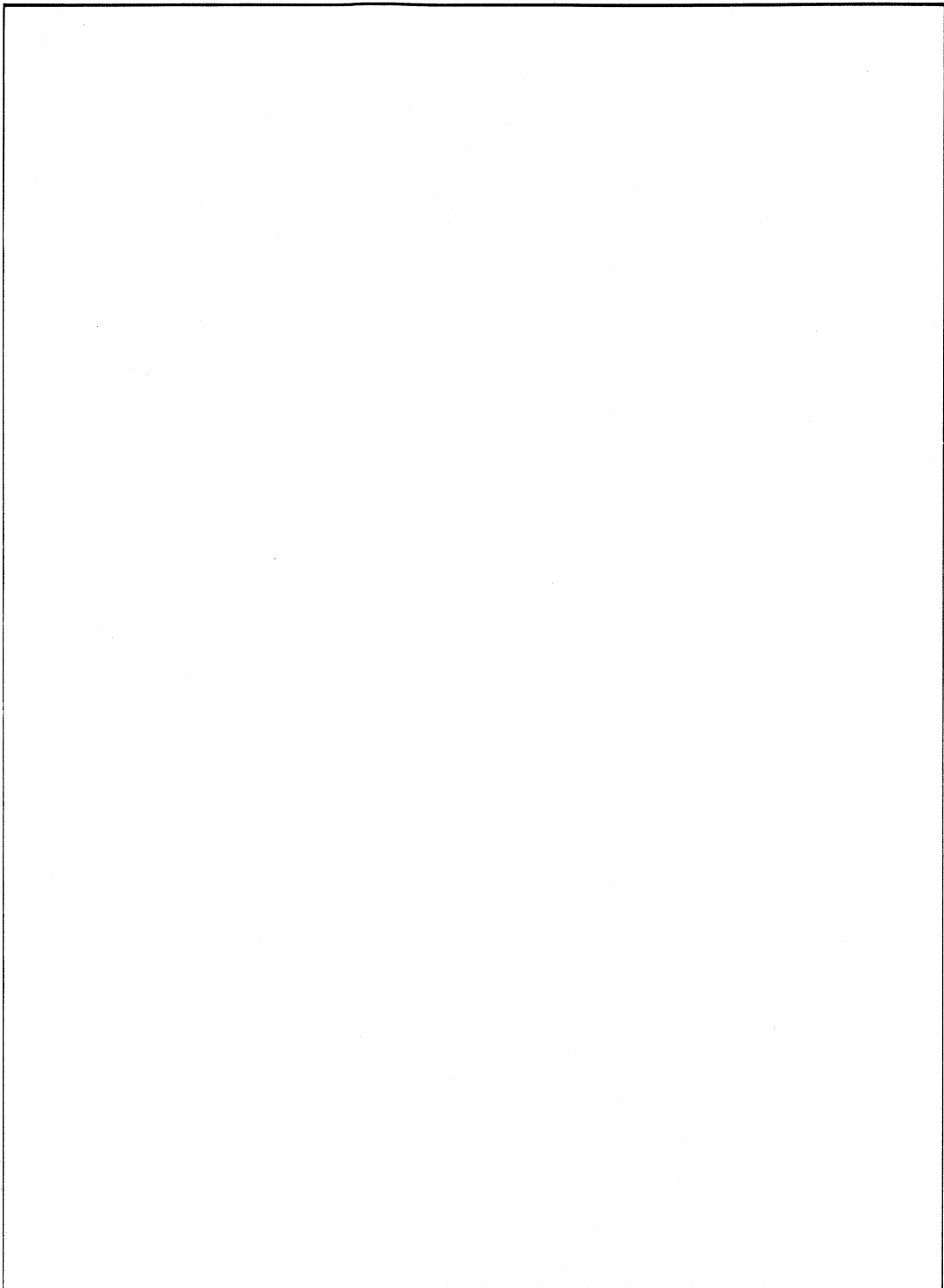
**13. Speed**

- 5 ..... 50ns
- 6 ..... 60ns

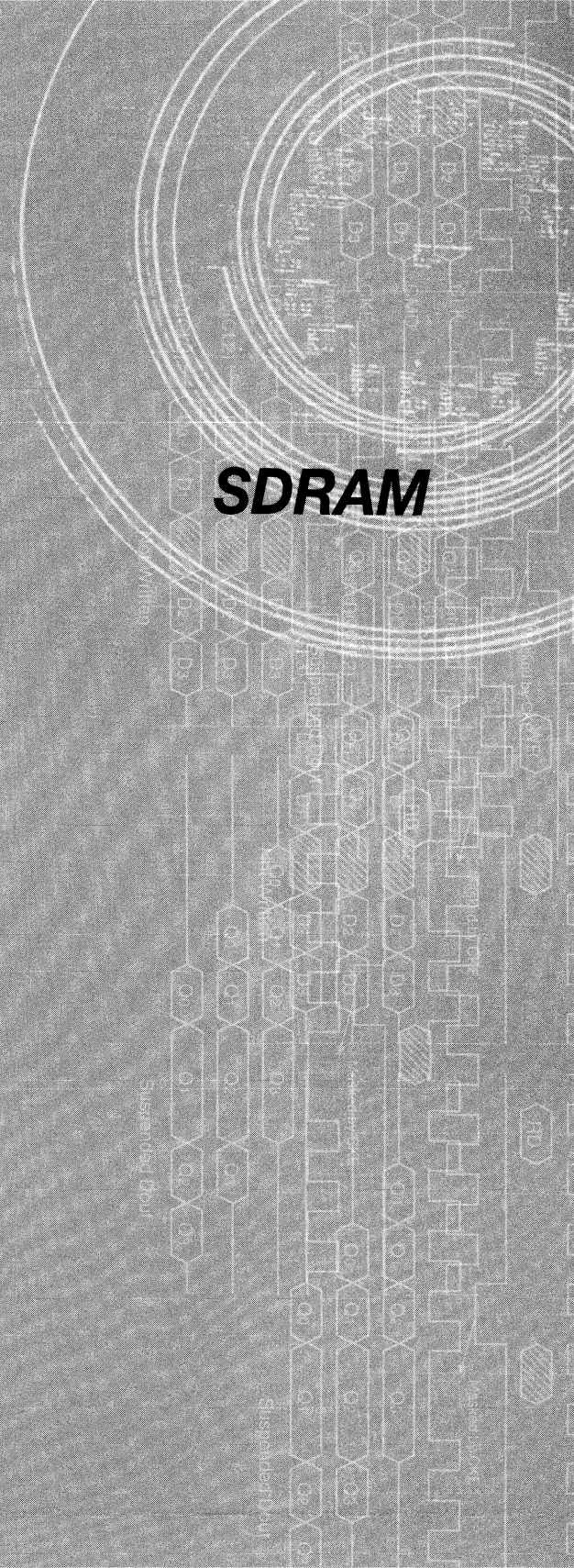


**NOTES**

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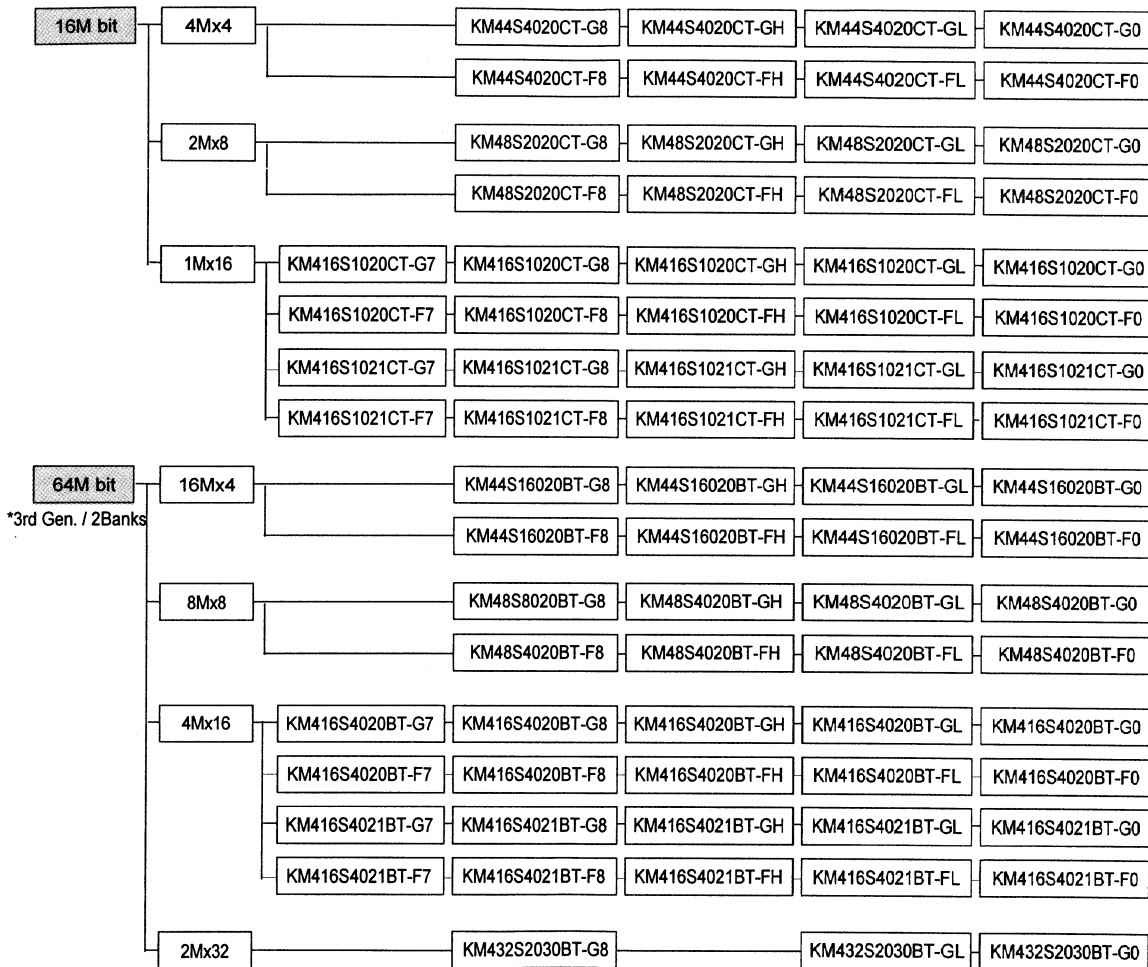
# SDRAM

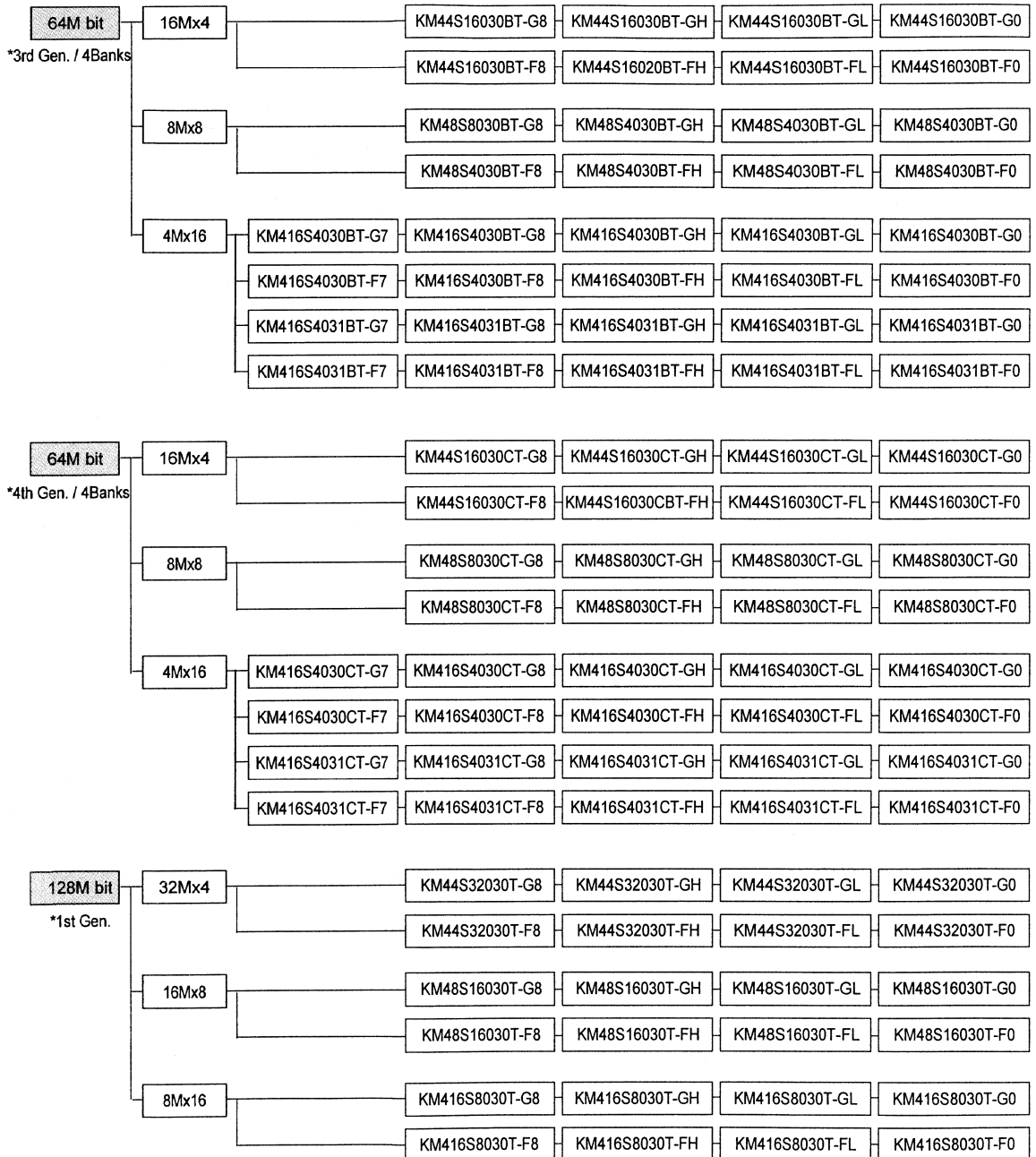




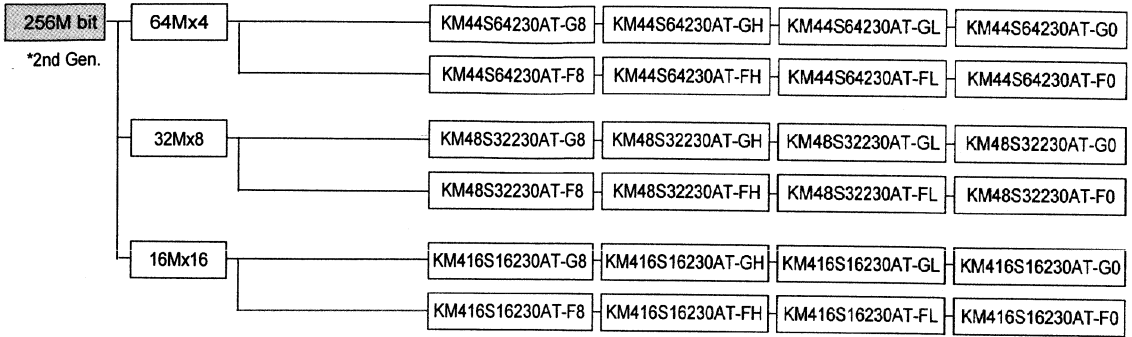
SDRAM

1. Introduction









1

## 2. Product Guide (Component)

Density	Banks.	Part Number	Org.	Inter- face	Ref.	Power (V)	Speed		Pkg. TSOPII	Avl.
							G*1	F*2		
16M 4th	2Banks	KM44S4020CT	4Mx4	LVTTL	4K	3.3±0.3	8/H*3/L*4/10*5	8/H/L/10	44pin	C/S
		KM48S2020CT	2Mx8	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	44pin	C/S
		KM416S1020CT	1Mx16	LVTTL	4K	3.3±0.3	7/8/H/L/10	7/8/H/L/10	50pin	C/S
		KM416S1021CT	1Mx16	SSTL	4K	3.3±0.3	7/S*6/8	7/S/8	50pin	C/S
64M 3rd	2Banks	KM44S16020BT	16Mx4	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
		KM48S8020BT	8Mx8	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
		KM416S4020BT	4Mx16	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
		KM416S4021BT	4Mx16	SSTL	4K	3.3±0.3	7/S/8	7/S/8	54pin	C/S
	4Banks	KM44S16030BT	16Mx4	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
		KM48S8030BT	8Mx8	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
		KM416S4030BT	4Mx16	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
		KM416S4031BT	4Mx16	SSTL	4K	3.3±0.3	7/S/8	7/S/8	54pin	C/S
64M 4th	4Banks	KM44S16030CT	16Mx4	LVTTL	4K	3.3±0.3	7/8/H/L/10	7/8/H/L/10	54pin	C/S
		KM48S8030CT	8Mx8	LVTTL	4K	3.3±0.3	7/8/H/L/10	7/8/H/L/10	54pin	C/S
		KM416S4030CT	4Mx16	LVTTL	4K	3.3±0.3	7/8/H/L/10	7/8/H/L/10	54pin	C/S
		KM416S4031CT	4Mx16	SSTL	4K	3.3±0.3	7/S/8	7/S/8	54pin	C/S
2Mx32	4Banks	KM432S2030BT	2Mx32	LVTTL	4K	3.3±0.3	8/L/10	8/L/10	86pin	C/S
128M	4Banks	KM44S32030T	32Mx4	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
		KM48S16030T	16Mx8	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
		KM416S8030T	8Mx16	LVTTL	4K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	C/S
256M	4Banks	KM44S64230AT	64Mx4	LVTTL	8K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	E/S
		KM48S32230AT	32Mx8	LVTTL	8K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	E/S
		KM416S16230AT	16Mx16	LVTTL	8K	3.3±0.3	8/H/L/10	8/H/L/10	54pin	E/S

\*1 : Auto & Self refresh with Normal Power

\*2 : Auto & Self refresh with Low Power

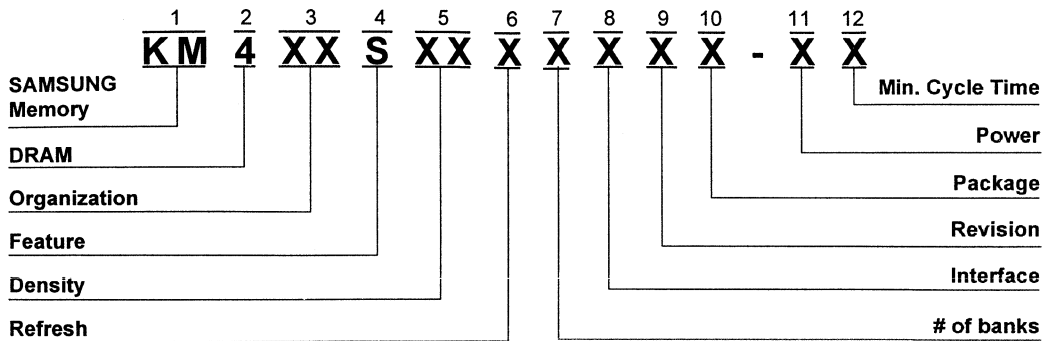
\*3 : Binning H(CL=2 @ 100MHz)

\*4 : Binning H(CL=3 @ 100MHz)

\*5 : Binning 10(CL=3 @ 100MHz)

\*6 : Binning S(CL=2 @ 100MHz) for SSTL Interface Only

SDRAM Ordering Information



**1. SAMSUNG Memory**

**2. DRAM**

**3. Organization**

- 4 : x4
- 8 : x8
- 16 : x16
- 32 : x32

**4. Feature**

- S : SDRAM

**5. Density**

- 1 : 1M
- 2 : 2M
- 4 : 4M
- 8 : 8M
- 16 : 16M
- 32 : 32M
- 64 : 64M
- 28 : 128M

**6. Refresh**

- 0 : 4K
- 1 : 2K
- 2 : 8K
- 3 : 16K

**7. # of banks**

- 2 : 2Banks
- 3 : 4Banks

**8. Interface**

- 0 : LVTTTL (3.3V)
- 1 : SSTL-3 (3.3V)
- 2 : SSTL-2 (2.5V)
- 3 : LVTTTL (2.5V)
- 4 : LVTTTL (3.0V)
- 5 : SSTL (2.5V)

**9. Revision**

- Blank : 1st
- A : 2nd Gen.
- B : 3rd Gen.
- C : 4th Gen.

**10. Package**

- T : TSOP II (400mil)
- B : BGA
- C : u - BGA (CSP)

**11. Temperature**

- Blank : Normal ( 0°C ~ 70°C)
- E : Extended ( -25°C ~ 85°C)
- I : Industrial ( -40°C ~ 85°C)

**12. Power(G/F for 3.3V VDD, D/E for 2.5V VDD & C/D for 3.0V)**

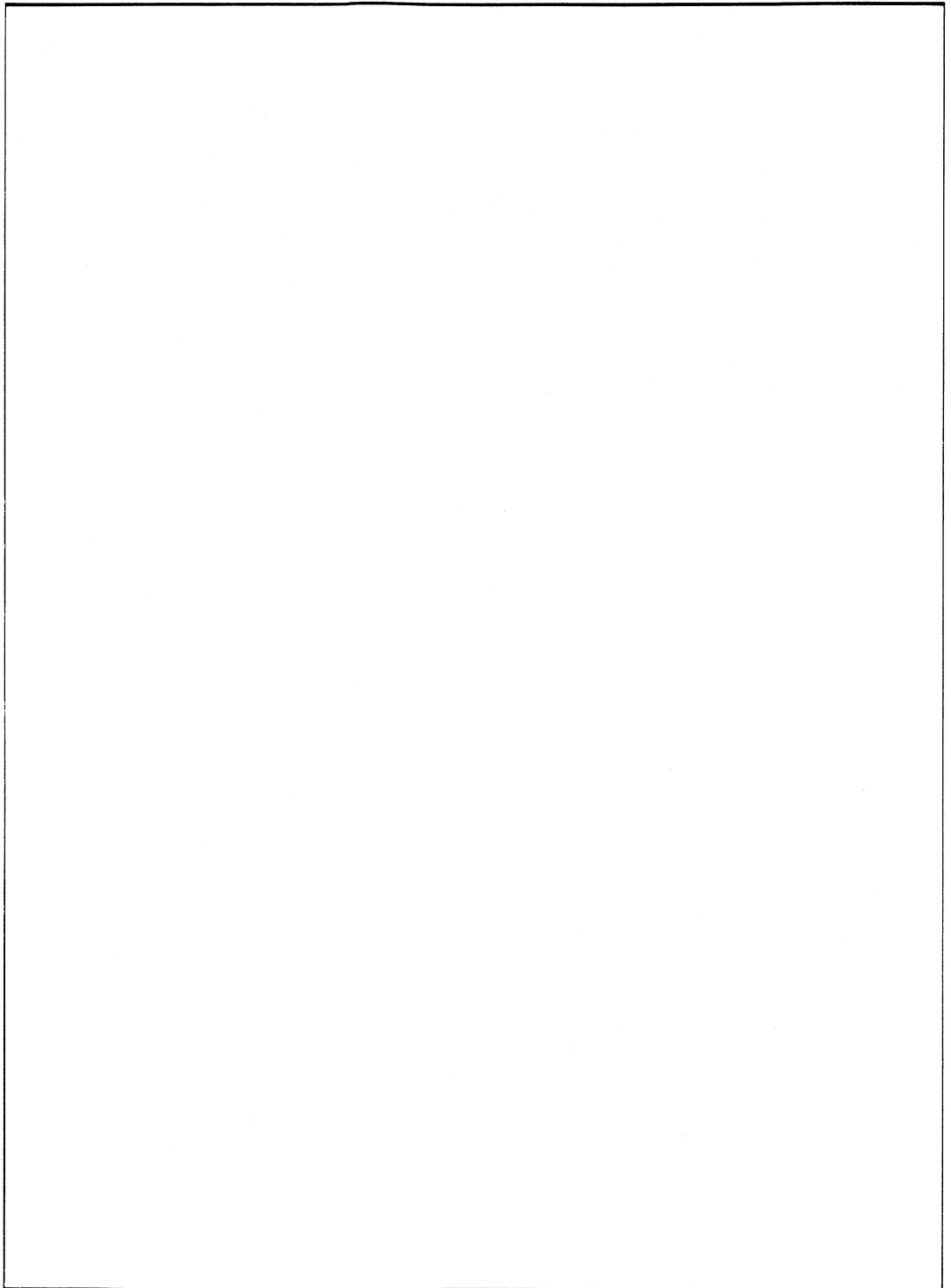
- G : Auto & Self refresh (3.3V)
- F : Auto & Self refresh with Low - power
- D : Auto & Self refresh (2.5V)
- E : Auto & Self refresh with Low - power
- B : Auto & Self refresh (3.0V)
- C : Auto & Self refresh with Low - power

**13. Min. Cycle Time (Max. frequency)**

- 7 : 7ns (143MHz)
- 8 : 8ns (125MHz)
- 0 : 10ns (100MHz)
- L : CL3 100MHz**
- H : CL2 & CL3 100MHz**

# NOTES

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# ***SDRAM Module***



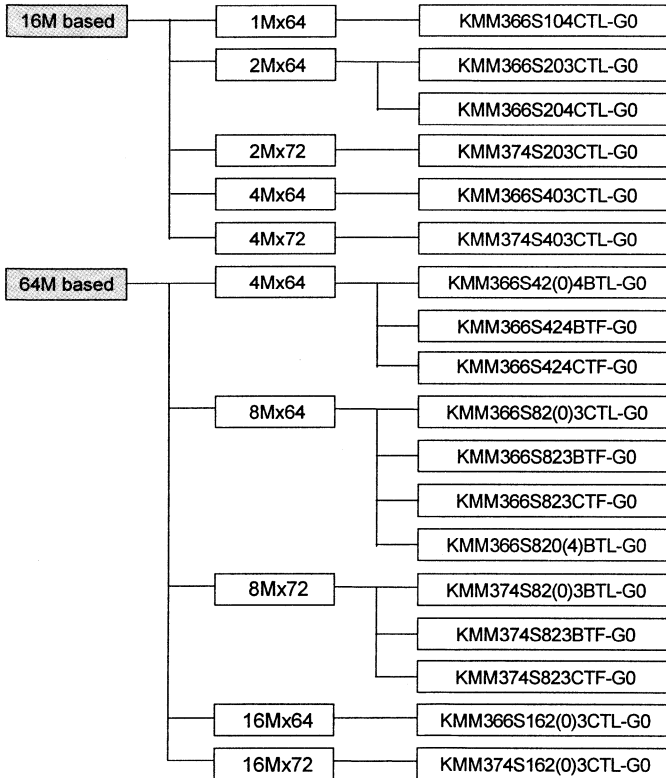
SDRAM Module

1. Introduction

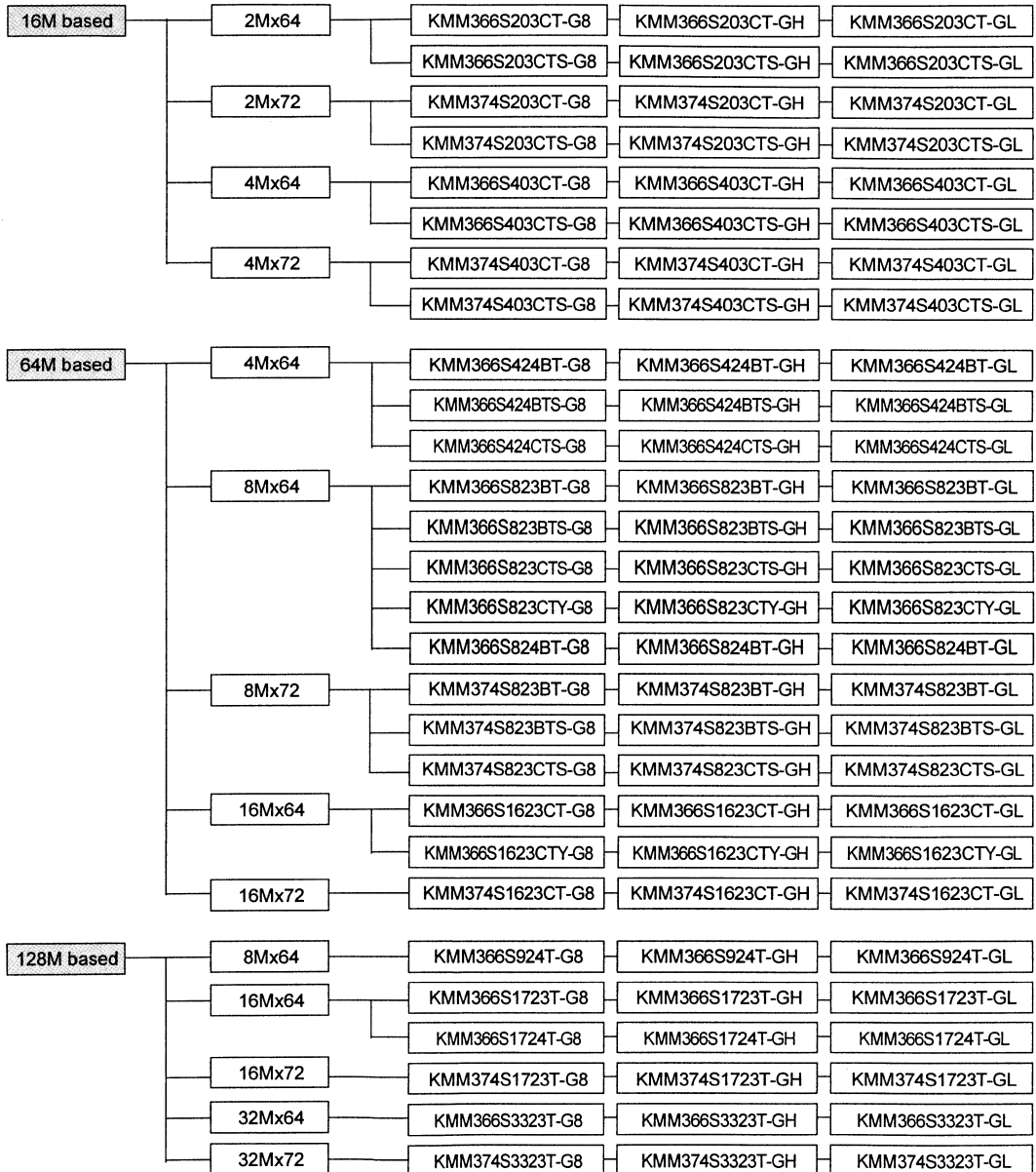
I. Dual In-Line Memory Module (DIMM)

I-I. PC66 168pin Unbuffered DIMM

1

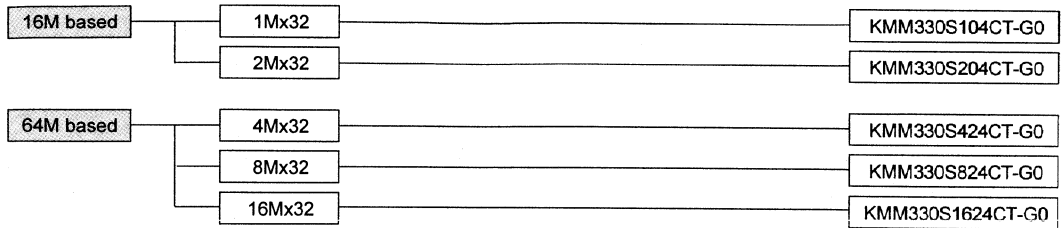


I-II. PC100 168pin Unbuffered DIMM





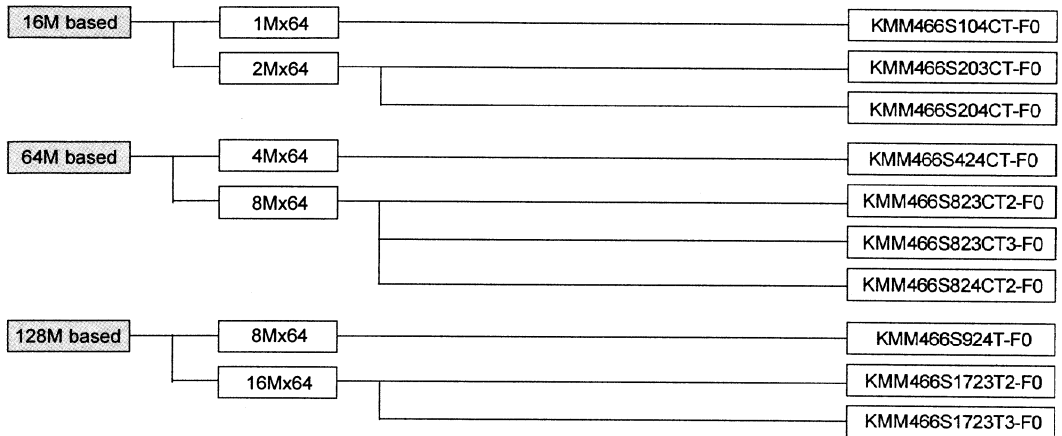
I-III. 100pin Unbuffered DIMM



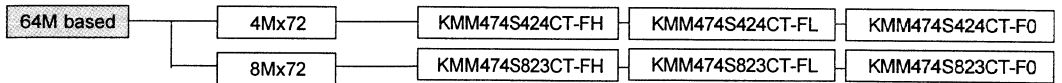
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II. Small Out-Line In Line Memory Module(SODIMM)

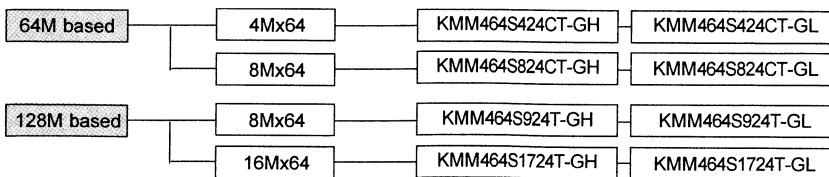
II-i. PC66 144pin Unbuffered SoDIMM



II-i. PC66 ECC SoDIMM

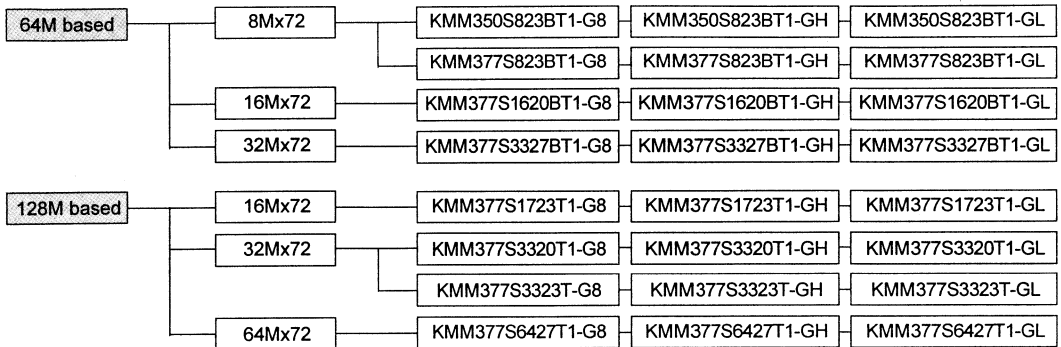


II-ii. PC100 144pin Unbuffered SoDIMM

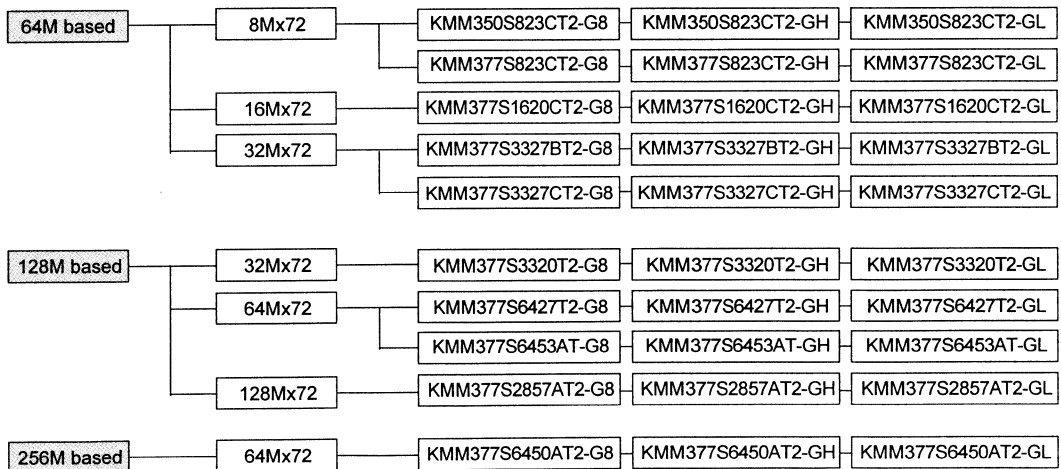


III. Registered Dual In-Line Memory Module(Registered DIMM)

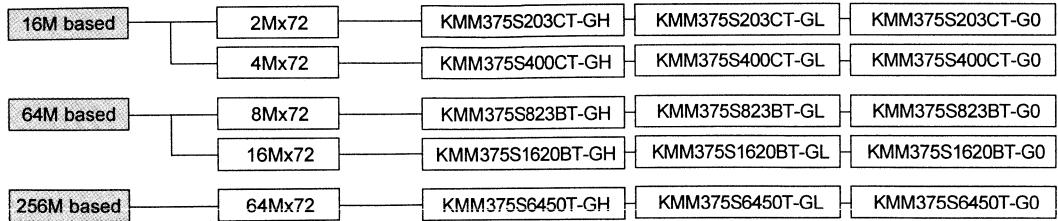
III-I. Intel type 1.0 Ver. Registered DIMM



III-II. Intel type 1.1 Ver. Registered DIMM

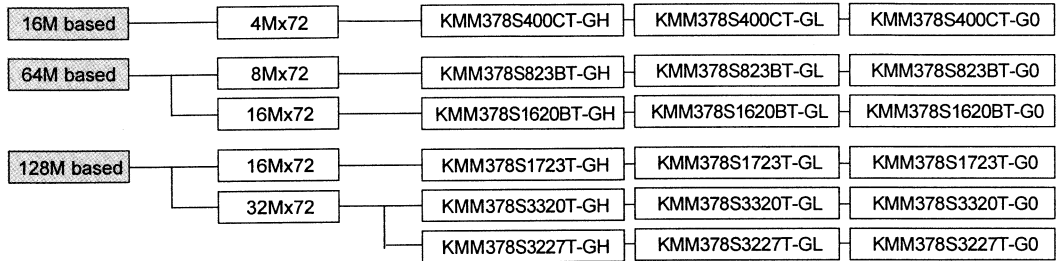


III-III. JEDEC type 168pin Registered DIMM

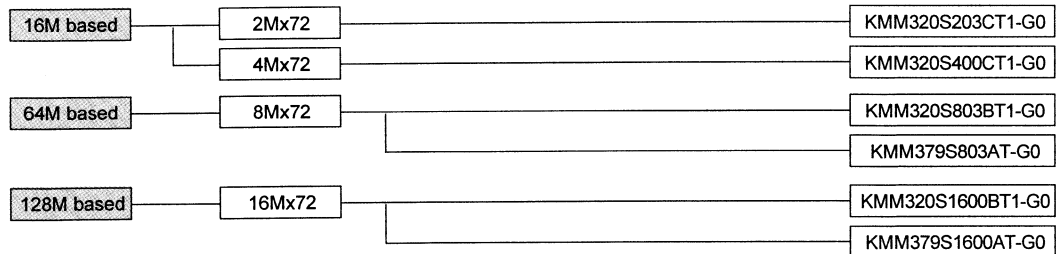


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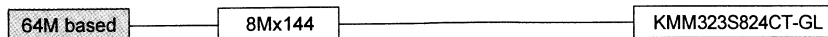
III-IV. 200pin (SPD) Registered DIMM



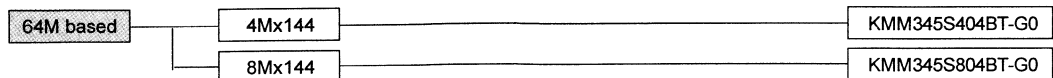
III-V. 200pin (PPD) Registered DIMM



III-VI. 232pin Registered DIMM



III-VII. 278pin Registered DIMM



## 2. Product Guide (Module)

Org.	Part No.	Compostion	Comp. Version	Vtg.	Speed	Internal-Bank	External Bank	Feature	Avail.
<b>PC66 168pin Unbuffered DIMM</b>									
1Mx64	KMM366S104CTL	1Mx16*4pcs	16M 4th	3.3V	G0	2	1	SS,1000mil	C/S
2Mx64	KMM366S203CTL	2Mx8*8pcs	16M 4th	3.3V	G0	2	1	DS,1000mil	C/S
	KMM366S204CTL	1Mx16*8pcs	16M 4th	3.3V	G0	2	2	DS,1000mil	C/S
2Mx72	KMM374S203CTL	2Mx8*9pcs	16M 4th	3.3V	G0	2	1	DS,1000mil	C/S
4Mx64	KMM366S403CTL	2Mx8*16pcs	16M 4th	3.3V	G0	2	2	DS,1100mil	C/S
	KMM366S42(0)4BTL	4Mx16*4pcs	64M 3rd	3.3V	G0	4(2)	1	SS,1000mil	C/S
	KMM366S424BTF**	4Mx16*4pcs	64M 3rd	3.3V	G0	4	1	SS,1000mil	C/S
	KMM366S424CTF**	4Mx16*4pcs	64M 4th	3.3V	G0	4	1	SS,1000mil	C/S
4Mx72	KMM374S403CTL	2Mx8*18pcs	64M 4th	3.3V	G0	2	2	DS,1100mil	C/S
8Mx64	KMM366S82(0)3BTL	8Mx8*8pcs	64M 3rd	3.3V	G0	4(2)	1	DS,1000mil	C/S
	KMM366S823BTF**	8Mx8*8pcs	64M 3rd	3.3V	G0	4	1	SS,1250mil	C/S
	KMM366S823CTF**	8Mx8*8pcs	64M 4th	3.3V	G0	4	1	SS,1250mil	C/S
	KMM366S82(0)4BTL	4Mx16*8pcs	64M 3rd	3.3V	G0	4(2)	2	DS,1000mil	C/S
8Mx72	KMM374S82(0)3BTL	8Mx8*9pcs	64M 3rd	3.3V	G0	4(2)	1	DS,1000mil	C/S
	KMM374S823BTF**	8Mx8*9pcs	64M 3rd	3.3V	G0	4	1	SS,1250mil	C/S
	KMM374S823CTF**	8Mx8*9pcs	64M 4th	3.3V	G0	4	1	SS,1250mil	C/S
16Mx64	KMM366S162(0)3CTL	8Mx8*16pcs	64M 4th	3.3V	G0	4(2)	2	DS,1250mil	C/S
16Mx72	KMM374S162(0)3CTL	8Mx8*18pcs	64M 4th	3.3V	G0	4(2)	2	DS,1250mil	C/S
<b>PC100 168pin Unbuffered DIMM</b>									
2Mx64	KMM366S203CT	2Mx8*8pcs	16M 4th	3.3V	G8/GH/GL	2	1	SS,1250mil	C/S
	KMM366S203CTS**	2Mx8*8pcs	16M 4th	3.3V	G8/GH/GL	2	1	SS,1250mil	C/S
2Mx72	KMM374S203CT	2Mx8*9pcs	16M 4th	3.3V	G8/GH/GL	2	1	SS,1250mil	C/S
	KMM374S203CTS**	2Mx8*9pcs	16M 4th	3.3V	G8/GH/GL	2	1	SS,1250mil	C/S
4Mx64	KMM366S403CT	2Mx8*16pcs	16M 4th	3.3V	G8/GH/GL	2	2	DS,1250mil	C/S
	KMM366S403CTS**	2Mx8*16pcs	16M 4th	3.3V	G8/GH/GL	2	2	DS,1250mil	C/S
	KMM366S424BT	4Mx16*4pcs	64M 3rd	3.3V	G8/GH/GL	4	1	SS,1375mil	C/S
	KMM366S424BTS**	4Mx16*4pcs	64M 3rd	3.3V	G8/GH/GL	4	1	SS,1000mil	C/S
	KMM366S424CTS**	4Mx16*4pcs	64M 4th	3.3V	G8/GH/GL	4	1	SS,1000mil	C/S
4Mx72	KMM374S403CT	2Mx8*18pcs	16M 4th	3.3V	G8/GH/GL	2	2	DS,1250mil	C/S
	KMM374S403CTS**	2Mx8*18pcs	16M 4th	3.3V	G8/GH/GL	2	2	DS,1250mil	C/S
8Mx64	KMM366S823BT	8Mx8*8pcs	64M 3rd	3.3V	G8/GH/GL	4	1	DS,1375mil	C/S
	KMM366S823BTS**	8Mx8*8pcs	64M 3rd	3.3V	G8/GH/GL	4	1	DS,1375mil	C/S
	KMM366S823CTS**	8Mx8*8pcs	64M 4th	3.3V	G8/GH/GL	4	1	DS,1375mil	C/S

Org.	Part No.	Composition	Comp. Version	Vtg.	Speed	Internal-Bank	External Bank	Feature	Avail.
<b>PC100 168pin Unbuffered DIMM (Continued)</b>									
8Mx64	KMM366S823CTY	8Mx8*8pcs	64M 4th	3.3V	G8/GH/GL	4	1	SS,1150mil	C/S
	KMM366S824BT	4Mx16*8pcs	64M 3rd	3.3V	G8/GH/GL	4	2	DS,1375mil	C/S
8Mx72	KMM374S823BT	8Mx8*9pcs	64M 3rd	3.3V	G8/GH/GL	4	1	SS,1375mil	C/S
	KMM374S823BTS**	8Mx8*9pcs	64M 3rd	3.3V	G8/GH/GL	4	1	SS,1375mil	C/S
	KMM374S823CTS**	8Mx8*9pcs	64M 4th	3.3V	G8/GH/GL	4	1	SS,1375mil	C/S
16Mx64	KMM366S1623CT	8Mx8*16pcs	64M 4th	3.3V	G8/GH/GL	4	2	DS,1375mil	C/S
	KMM366S1623CTY	4Mx16*16pcs	64M4th	3.3V	G8/GH/GL	4	2	DS,1150mil	C/S
16Mx72	KMM374S1623CT	8Mx8*18pcs	64M 4th	3.3V	G8/GH/GL	4	2	DS,1375mil	C/S
8Mx64	KMM366S924T	8Mx16*4pcs	128M 1st	3.3V	G8/GH/GL	4	1	SS,1375mil	C/S
16Mx64	KMM366S1723T	16Mx8*8pcs	128M 1st	3.3V	G8/GH/GL	4	1	SS,1375mil	C/S
	KMM366S1724T	8Mx16*8pcs	128M 1st	3.3V	G8/GH/GL	4	2	SS,1375mil	C/S
16Mx72	KMM374S1723T	16Mx8*9pcs	128M 1st	3.3V	G8/GH/GL	4	1	SS,1375mil	C/S
32Mx64	KMM366S3323T	16Mx8*16pcs	128M 1s	3.3V	G8/GH/GL	4	2	DS,1375mil	C/S
32Mx72	KMM374S3323T	16Mx8*18pcs	128M 1s	3.3V	G8/GH/GL	4	2	DS,1375mil	C/S
<b>100pin Unbuffered DIMM</b>									
1Mx32	KMM330S104CT	1Mx16*2pcs	16M 4th	3.3V	G0	2	1	SS,1000mil	E/S
2Mx32	KMM330S204CT	1Mx16*4pcs	16M 4th	3.3V	G0	2	2	DS,1000mil	E/S
4Mx32	KMM330S424CT	4Mx16*2pcs	64M 4th	3.3V	G0	4	1	SS,1000mil	E/S
8Mx32	KMM330S824CT	4Mx16*4pcs	64M 4th	3.3V	G0	4	2	DS,1000mil	E/S
16Mx32	KMM330S1623CT	8Mx8*8pcs	64M 4th	3.3V	G0	4	2	DS,1250mil	TBD
<b>PC66 144pin Unbuffered SoDIMM</b>									
1Mx64	KMM466S104CT	1Mx16*4pcs	16M 4th	3.3V	F0	2	1	DS,1000mil	C/S
2Mx64	KMM466S203CT	2Mx8*8pcs	16M 4th	3.3V	F0	2	1	DS,1000mil	C/S
	KMM466S204CT	1Mx16*8pcs	16M 4th	3.3V	F0	2	2	DS,1050mil	C/S
4Mx64	KMM466S424CT	4Mx16*4pcs	64M 4th	3.3V	F0	4	1	DS,1000mil	C/S
8Mx64	KMM466S823CT2	8Mx8*8pcs	64M 4th	3.3V	F0	4	1	DS,1150mil	C/S
	KMM466S823CT3	8Mx8*8pcs	64M 4th	3.3V	F0	4	1	DS,1050mil	C/S
	KMM466S824CT2	4Mx16*8pcs	64M 4th	3.3V	F0	4	2	DS,1150mil	C/S
	KMM466S924T	8Mx16*4pcs	128M 1st	3.3V	F0	4	1	DS,1000mil	C/S
16Mx64	KMM466S1723T2	16Mx8*8pcs	128M 1st	3.3V	F0	4	1	DS,1150mil	C/S
	KMM466S1723T3	16Mx8*8pcs	128M 1st	3.3V	F0	4	2	DS,1050mil	C/S

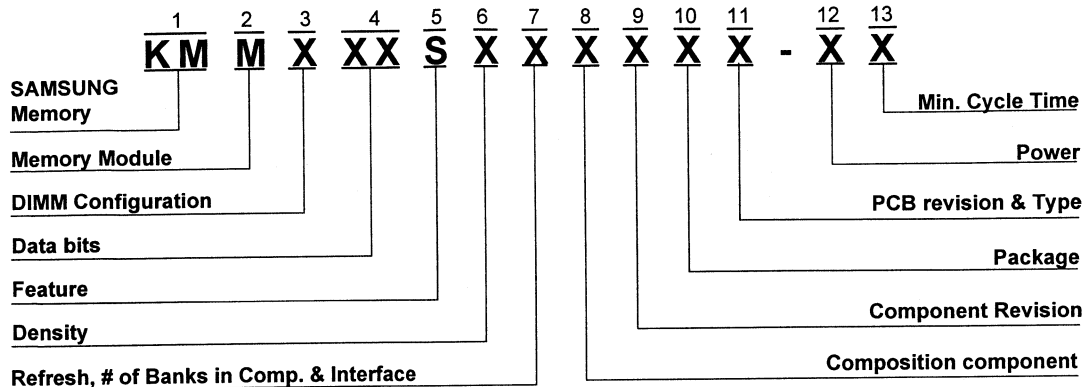
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Org.	Part No.	Compostion	Comp. Version	Vtg.	Speed	Internal Bank	External Bank	Feature	Avail.
<b>PC66 ECC SoDIMM</b>									
4Mx72	KMM474S424CT	4Mx16*5pcs	64M 4th	3.3V	FH/L/0	4	1	DS,1250mil	E/S
8Mx72	KMM474S823CT	(8Mx8*7)+8Mx16	64/128M	3.3V	FH/L/0	4	1	DS,1250mil	E/S
<b>PC100 144pin Unbuffered SoDIMM</b>									
4Mx64	KMM464S424CT	4Mx16*4pcs	64M 4th	3.3V	GH/L	4	1	DS,1000mil	TBD
8Mx64	KMM464S824CT	4Mx16*8pcs	64M 4th	3.3V	GH/L	4	2	DS,1250mil	TBD
	KMM464S924T	8Mx16*4pcs	128M 1st	3.3V	GH/L	4	1	DS,1000mil	TBD
16Mx64	KMM464S1724T	8Mx16*8pcs	128M 1st	3.3V	GH/L	4	2	DS,1250mil	TBD
<b>INTEL TYPE 1.0Ver. 168pin Registered DIMM</b>									
8Mx72	KMM350S823BT1	8Mx8*9pcs	64M 3rd	3.3V	G8/GH/GL	4	1	DS,1500mil	E/S
	KMM377S823BT1	8Mx8*9pcs	64M 3rd	3.3V	G8/GH/GL	4	1	DS,1500mil	E/S
16Mx72	KMM377S1620BT1	16Mx4*18pcs	64M 3rd	3.3V	G8/GH/GL	4	1	DS,1700mil	E/S
32Mx72	KMM377S3227BT1	32Mx4*18pcs	64M 3rd	3.3V	G8/GH/GL	4	2	DS,1700mil	E/S
16Mx72	KMM377S1723T1	16Mx8*9pcs	128M 1st	3.3V	G8/GH/GL	4	1	DS,1500mil	E/S
32Mx72	KMM377S3320T1	32Mx4*18pcs	128M 1st	3.3V	G8/GH/GL	4	1	DS,1700mil	E/S
	KMM377S3323T	16Mx8*18pcs	128M 1st	3.3V	G8/GH/GL	4	2	DS,1700mil	E/S
64Mx72	KMM377S6427T1	64Mx4*18pcs	128M 1st	3.3V	G8/GH/GL	4	2	DS,1700mil	E/S
<b>INTEL TYPE 1.1Ver. 168pin Registered DIMM</b>									
8Mx72	KMM350S823CT2	8Mx8*9pcs	64M 3rd	3.3V	G8/GH/GL	4	1	DS,1500mil	TBD
	KMM377S823CT2	8Mx8*9pcs	64M 3rd	3.3V	G8/GH/GL	4	1	DS,1500mil	TBD
16Mx72	KMM377S1620CT2	16Mx4*18pcs	64M 3rd	3.3V	G8/GH/GL	4	1	DS,1700mil	TBD
32Mx72	KMM377S3227BT2	32Mx4*18pcs	64M 3rd	3.3V	G8/GH/GL	4	2	DS,1700mil	TBD
	KMM377S3227CT2	32Mx4*18pcs	64M 4rd	3.3V	G8/GH/GL	4	2	DS,1700mil	TBD
	KMM377S3320T2	32Mx4*18pcs	128M 1st	3.3V	G8/GH/GL	4	1	DS,1700mil	TBD
64Mx72	KMM377S6427T2	64Mx4*18pcs	128M 1st	3.3V	G8/GH/GL	4	2	DS,1700mil	TBD
	KMM377S6453AT	32Mx8*18pcs	128M 1st	3.3V	G8/GH/GL	4	2	DS,1700mil	TBD
	KMM377S6450AT2	64Mx4*18pcs	256M 2nd	3.3V	G8/GH/GL	4	1	DS,1700mil	TBD
128Mx72	KMM377S2857AT2	128Mx4*18pcs	128M 1st	3.3V	G8/GH/GL	4	2	DS,1700mil	TBD
<b>JEDEC TYPE 168pin Registered DIMM</b>									
2Mx72	KMM375S2033CT	2Mx8*9pcs	16M 4th	3.3V	GH/GL/G0	2	1	DS,1300mil	E/S
4Mx72	KMM375S400CT	4Mx4*18pcs	16M 4th	3.3V	GH/GL/G0	2	1	DS,1500mil	E/S
8Mx72	KMM375S823BT	8Mx8*9pcs	64M 3rd	3.3V	GH/GL/G0	4	1	DS,1450mil	E/S
16Mx72	KMM375S1620BT	16Mx4*18pcs	64M 3rd	3.3V	GH/GL/G0	4	1	DS,1650mil	E/S
64Mx72	KMM375S6450T	64Mx4*18pcs	64M 3rd	3.3V	GH/GL/G0	4	2	DS,1700mil	E/S

Org.	Part No.	Compostion	Comp. Version	Vtg.	Speed	Internal-Bank	External Bank	Feature	Avail.
<b>200pin Registered DIMM (SPD)</b>									
4Mx72	KMM378S400CT	4Mx4*18pcs	16M 4th	3.3V	GH/GL/G0	2	1	DS,1150mil	C/S
8Mx72	KMM378S823BT	8Mx8*9pcs	64M 3rd	3.3V	GH/GL/G0	4	1	DS,1250mil	E/S
16Mx72	KMM378S1620BT	16Mx4*18pcs	64M 4th	3.3V	GH/GL/G0	4	1	DS,1250mil	C/S
	KMM378S1723T	16Mx8*9pcs	128M 1st	3.3V	GH/GL/G0	4	1	DS,1250mil	E/S
32Mx72	KMM378S3320T	32Mx4*18pcs	128M 1st	3.3V	GH/GL/G0	4	1	DS,1250mil	E/S
	KMM378S3327BT	32Mx4*18pcs	128M 1st	3.3V	GH/GL/G0	4	2	DS,1820mil	E/S
<b>200pin Registered DIMM (PPD)</b>									
2Mx72	KMM320S203CT1	2Mx8*9pcs	16M 4th	3.3V	G0	2	1	SS,1500mil	E/S
4Mx72	KMM320S400CT1	4Mx4*18pcs	16M 4th	3.3V	G0	2	1	DS,1500mil	E/S
8Mx72	KMM320S803BT1	8Mx8*9pcs	64M 3rd	3.3V	G0	2	1	SS,1500mil	E/S
	KMM379S803AT	8Mx8*9pcs	64M 2nd	3.3V	G0	2	1	SS,1500mil	E/S
16Mx72	KMM320S1600BT1	16Mx4*18pcs	64M 3rd	3.3V	G0	2	1	DS,1500mil	E/S
	KMM379S1600AT	16Mx4*18pcs	64M 2nd	3.3V	G0	2	1	DS,1500mil	E/S
<b>232pin Registered DIMM</b>									
8Mx144	KMM323S824CT	4Mx16*18pcs	64M 4th	3.3V	GL	4	2	DS,2000mil	E/S
<b>278pin Registered DIMM</b>									
4Mx144	KMM345S404BT	4Mx16*9pcs	64M 3rd	3.3V	G0	2	1	SS,1300mil	E/S
8Mx144	KMM345S804BT	4Mx16*18pcs	64M 3rd	3.3V	G0	2	2	DS,1300mil	E/S

\*\* 4Layer PCB (PC66-"F",PC100-"S")

## SDRAM Module Ordering Information



### 1. SAMSUNG Memory

### 2. Memory Module

### 3. DIMM Configuration

- 3 : 8 Byte DIMM (168 & 200 pin)
- 4 : 8 Byte SODIMM (144 pin)

### 4. Data bits

- 23 : x144/ECC PLL+Register DIMM
- 30 : x32/non ECC Unbuffered DIMM
- 50 : x72/ECC w/o PLL+Register DIMM with SPD for 168pin(Intel)
- 64 : x64 PC100 SoDIMM with SPD
- 66 : x64 Unbuffered DIMM with SPD
- 74 : X72/ECC Unbuffered DIMM with SPD
- 75 : x72/ECC PLL+Register DIMM with SPD for 168pin (JEDEC)
- 77 : x72/ECC PLL+Register DIMM with SPD for 168pin (Intel)
- 78 : x72/ECC PLL+Register DIMM with SPD for 200pin (JEDEC)

### 5. Feature

S : SDRAM

### 6. Density

- 1 : 1M, 2 : 2M, 4 : 4M, 8 : 8M
- 9 : 8M (for 128Mb/512Mb)
- 16 : 16M 17 : 16M (for 128Mb/512Mb)
- 32 : 32M 33 : 32M (for 128Mb/512Mb)
- 64 : 64M 65 : 64M (for 128Mb/512Mb)
- 28 : 128M 29 : 128M (for 128Mb/512Mb)

### 7. Refresh, # of Banks in comp. & Interface

- 0 : 4K/64ms Ref., 2Banks & LVTTL
- 1 : 2K/32ms Ref., 2Banks & LVTTL
- 2 : 4K/64ms Ref., 4Banks & LVTTL
- 3 : 4K/64ms Ref., 2Banks & SSTL
- 4 : 4K/64ms Ref., 4Banks & SSTL
- 5 : 8K/64ms Ref., 4Banks & LVTTL
- 6 : 16K/128ms Ref., 4Banks & LVTTL

### 8. Composition component

- 0 : x4
- 3 : x8
- 4 : x16
- 5 : x32
- 7 : x4 Stack

### 9. Component Revision

- Blank : 1st
- A : 2nd Gen.
- B : 3rd Gen.
- C : 4th Gen.

### 10. Package

- T : TSOP II (400mil)
- B : BGA
- C : u - BGA (CSP)

### 11. PCB revision & Type

- Blank : 1st
- 1 : 2nd
- 2 : 3rd
- 3 : 4th
- L : PC66

### 12. Power

- G : Auto & Self refresh
- F : Auto & Self refresh with Low - Power

### 13. Min. Cycle Time (Max. Frequency)

- 7 : 7ns (143MHz)
- 8 : 8ns (125MHz)
- 0 : 10ns (100MHz)
- L : CL3 100MHz**
- H : CL2 & CL3 100MHz**



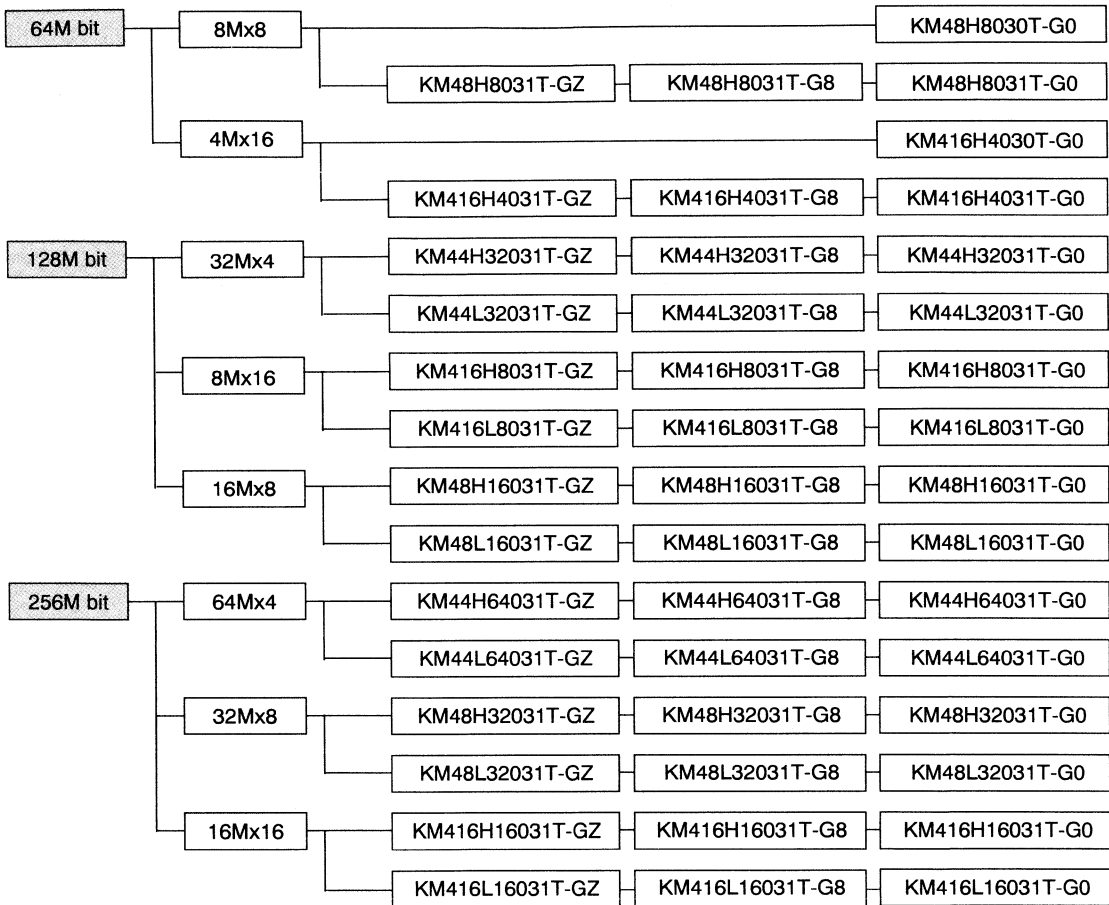
# DDR SDRAM





DDR SDRAM

1. Introduction

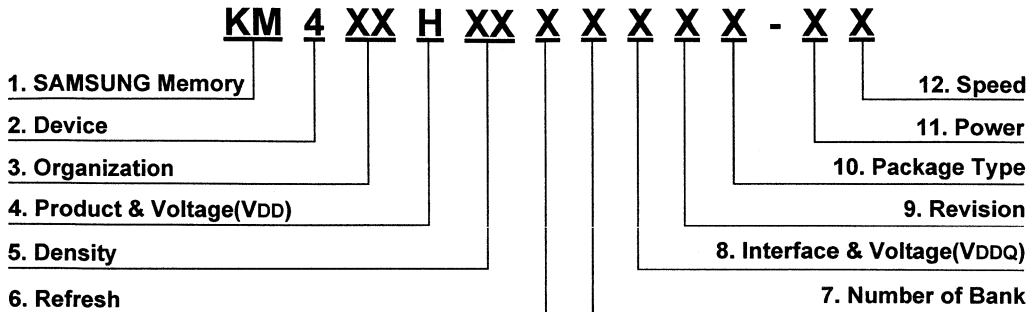


2. Product Guide

Density	Org.	Power Supply	Part Number	Speed (ns)	Interface	Packages	C/S	M/P	
64M bit	4Mx16	+3.3V±10%	KM416H4030T	10	LVTTTL&SSTL_3	66pin TSOPII	3Q/98	4Q/98	
			KM416H4031T	7.5/8/10	SSTL_2				
	8Mx8	+3.3V±10%	KM48H8030T	10	LVTTTL&SSTL_3				
			KM48H4031T	7.5/8/10	SSTL_2				
128Mb	32Mx4	+2.5V±10%	KM44L32031T	7.5/8/10	SSTL_2		66pin TSOPII	2Q/99	3Q/99
		+3.3V±10%	KM44H32031T						
	16Mx8	+2.5V±10%	KM48L16031T						
		+3.3V±10%	KM48H16031T						
	8Mx16	+2.5V±10%	KM416L8031T						
		+3.3V±10%	KM416H8031T						
256Mb	64Mx4	+2.5V±10%	KM44L64031T	7.5/8/10	SSTL_2	66pin TSOPII	3Q/99	4Q/99	
		+3.3V±10%	KM44H64031T						
	32Mx8	+2.5V±10%	KM48L32031T						
		+3.3V±10%	KM48H32031T						
	16Mx16	+2.5V±10%	KM416L16031						
		+3.3V±10%	KM416H16031						

DDR SDRAM Ordering Information

1



**1. SAMSUNG Memory**

- 2. Device**
- 4 ..... DRAM

- 3. Organization**
- 4 ..... x4
  - 8 ..... x8
  - 16 ..... x16
  - 32 ..... x32

- 4. Product & Voltage(VDD)**
- H ..... DDR SDRAM(3.3V VDD)
  - L ..... DDR SDRAM(2.5V VDD)

- 5. Density**
- 4 ..... 4M
  - 8 ..... 8M
  - 16 ..... 16M
  - 32 ..... 32M
  - 64 ..... 64M
  - 12 ..... 128M
  - 25 ..... 256M
  - 51 ..... 512M
  - 1G ..... 1G
  - 2G ..... 2G
  - 4G ..... 4G

- 6. Refresh**
- 0 ..... 64m/4K(15.6us)
  - 1 ..... 32m/2K(15.6us)
  - 2 ..... 128m/8K(15.6us)
  - 3 ..... 64m/8K(7.8us)
  - 4 ..... 128m/16K(7.8us)

- 7. Number of Bank**
- 3 ..... 4 Banks
  - 4 ..... 8 Banks

- 8. Interface & Voltage(VDDQ)**
- 0 ..... Mixed Interface(LVTTL & SSTL\_3 & 3.3V VDDQ)
  - 1 ..... SSTL\_2(2.5V VDDQ)

- 9. Revision**
- Blank ..... 1st Gen.
  - A ..... 2nd Gen.
  - B ..... 3rd Gen.
  - C ..... 4th Gen.

- 10. Package Type**
- T ..... 66pin TSOP-II
  - B ..... BGA
  - C ..... u - BGA(CSP)

- 11. Power**
- G ..... Auto & Self Refresh
  - F ..... Auto & Self Refresh with Low Power

- 12. Speed**
- 5 ..... 5ns, 200MHz (400Mbps/pin)
  - 6 ..... 6ns, 166MHz (333Mbps/pin)
  - Y ..... 6.7ns, 150MHz (300Mbps/pin)
  - Z ..... 7.5ns, 133MHz (266Mbps/pin)
  - 8 ..... 8ns, 125MHz (250Mbps/pin)
  - 0 ..... 10ns, 100MHz (200Mbps/pin)

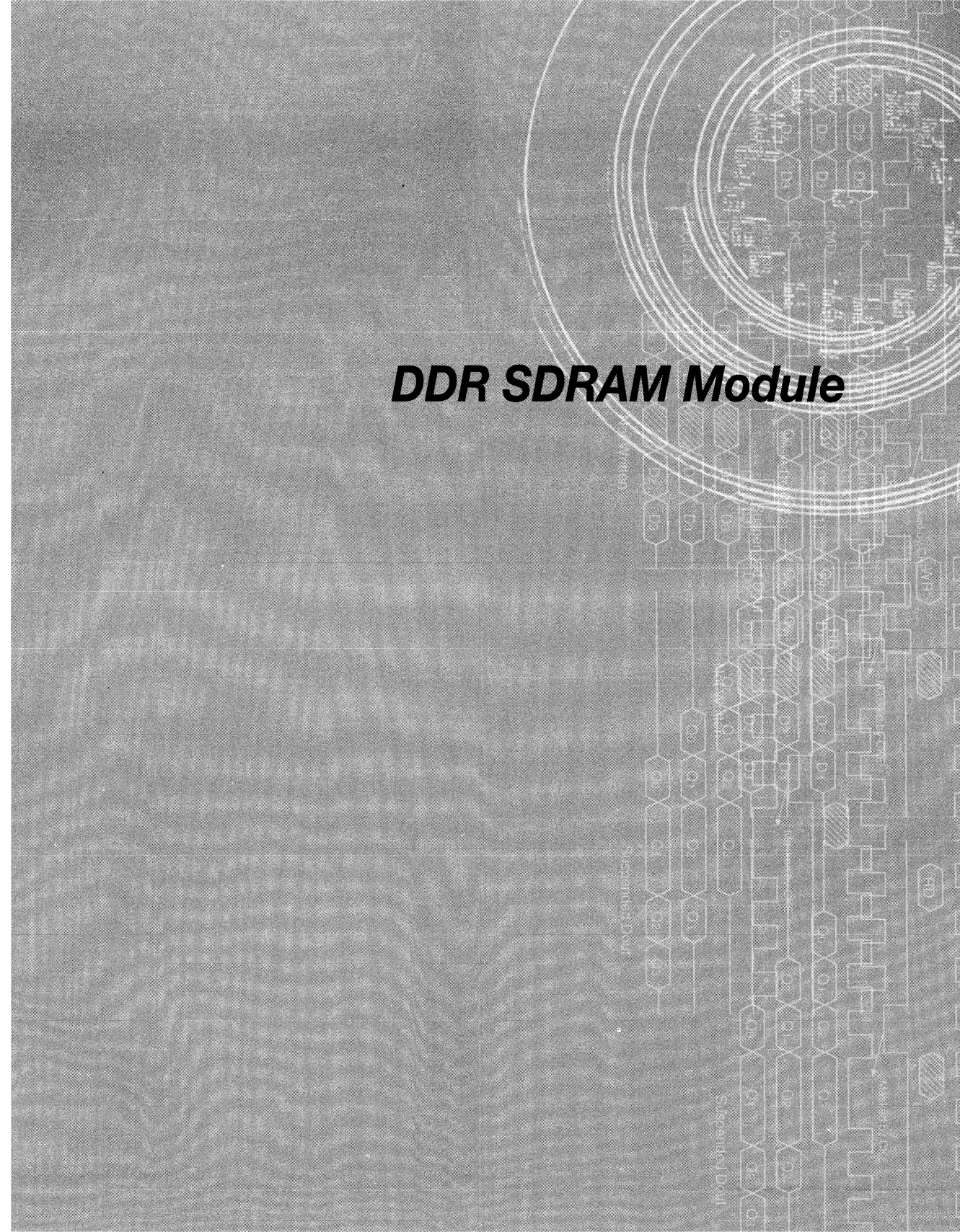
# NOTES

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# **DDR SDRAM Module**

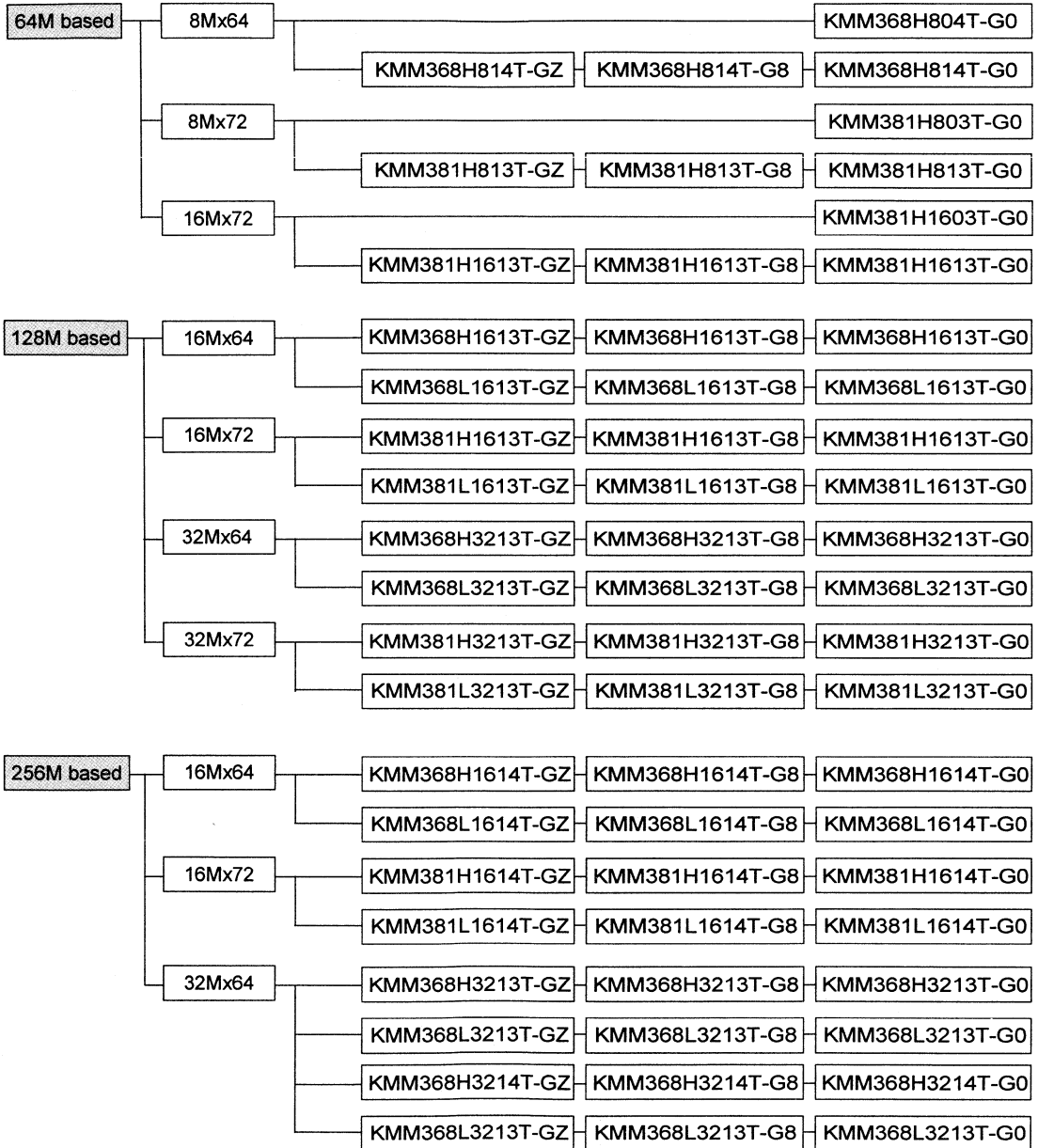




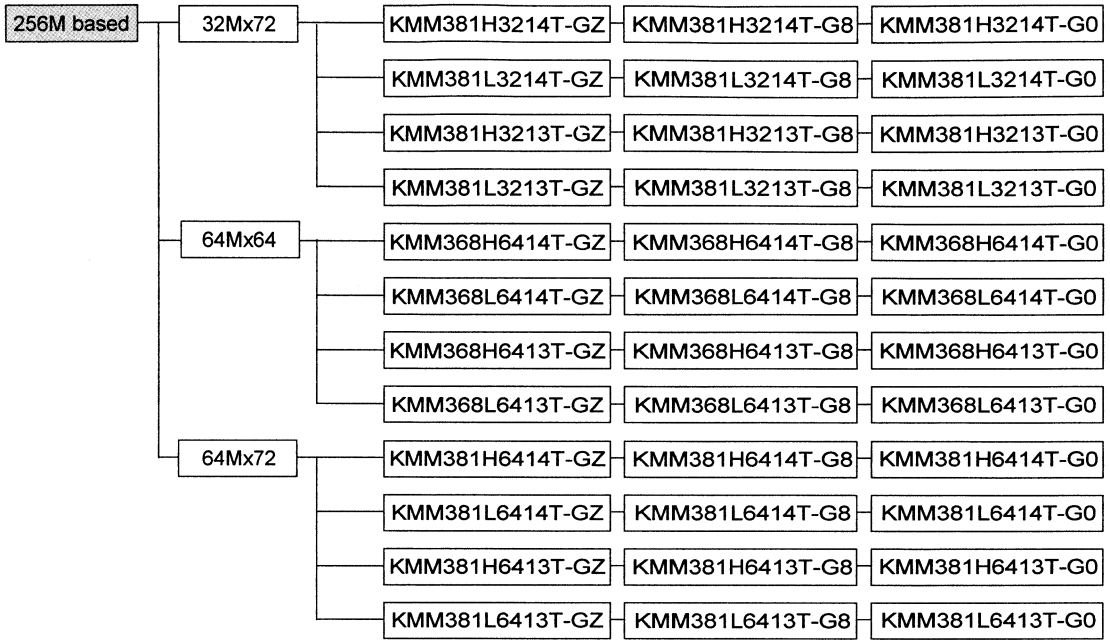


DDR SDRAM Module

1. Introduction



1



NOTE : Above picture shows only typical 184 pin unbuffered DIMM.

2. Product Guide

Org.	Part No.	Base	Vtg.	Interface	Ref.	Bank	PKG	Tab	CS
<b>64MByte 184pin DIMM</b>									
8Mx64	KMM368H804T	4Mx16	3.3V	LVTTL&SSTL_3	4K	1	TSOP II	Gold	3Q/98
	KMM368H814T	4Mx16	3.3V	SSTL_2	4K	1	TSOP II	Gold	3Q/98
8Mx72	KMM381H803T	8Mx8	3.3V	LVTTL&SSTL_3	4K	1	TSOP II	Gold	3Q/98
	KMM381H813T	8Mx8	3.3V	SSTL_2	4K	1	TSOP II	Gold	3Q/98
16Mx72	KMM381H1603T	8Mx8	3.3V	LVTTL&SSTL_3	4K	2	TSOP II	Gold	3Q/98
	KMM381H1613T	8Mx8	3.3V	SSTL_2	4K	2	TSOP II	Gold	3Q/98
<b>128MByte 184pin DIMM</b>									
16Mx64	KMM368H1613T	16Mx8	3.3V	SSTL_2	4K	1	TSOP II	Gold	2Q/99
	KMM368L1613T	16Mx8	2.5V	SSTL_2	4K	1	TSOP II	Gold	2Q/99
	KMM368H1614T	16Mx16	3.3V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
	KMM368L1614T	16Mx16	2.5V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
16Mx72	KMM381H1613T	16Mx8	3.3V	SSTL_2	4K	1	TSOP II	Gold	2Q/99
	KMM381L1613T	16Mx8	2.5V	SSTL_2	4K	1	TSOP II	Gold	2Q/99
	KMM381H1614T	16Mx16	3.3V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
	KMM381L1614T	16Mx16	2.5V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
<b>256MByte 184pin DIMM</b>									
32Mx64	KMM368H3213T	16Mx8	3.3V	SSTL_2	4K	2	TSOP II	Gold	2Q/99
	KMM368L3213T	16Mx8	2.5V	SSTL_2	4K	2	TSOP II	Gold	2Q/99
	KMM368H3213T	32Mx8	3.3V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
	KMM368L3213T	32Mx8	2.5V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
	KMM368H3214T	16Mx16H	3.3V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
	KMM368L3214T	16Mx16	2.5V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
32Mx72	KMM381H3213T	16Mx8	3.3V	SSTL_2	4K	2	TSOP II	Gold	2Q/99
	KMM381L3213T	16Mx8	2.5V	SSTL_2	4K	2	TSOP II	Gold	2Q/99
	KMM381H3214T	16Mx16	3.3V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
	KMM381L3214T	16Mx16	2.5V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
	KMM381H3213T	32Mx8	3.3V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
	KMM381L3213T	32Mx8	2.5V	SSTL_2	4K	1	TSOP II	Gold	3Q/99
<b>512MByte 184pin DIMM</b>									
64Mx64	KMM368H6414T	16Mx16	3.3V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
	KMM368L6414T	16Mx16	2.5V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
	KMM368H6413T	32Mx8	3.3V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
	KMM368L6413T	32Mx8	2.5V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
64Mx72	KMM381H6414T	16Mx16	3.3V	SSTL_2	4K	2	TSOP II	Gold	3Q/99



Org.	Part No.	Base	Vtg.	Interface	Ref.	Bank	PKG	Tab	CS
64Mx72	KMM381L6414T	16Mx16	2.5V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
	KMM381H6413T	32Mx8	3.3V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
	KMM381L6413T	32Mx8	2.5V	SSTL_2	4K	2	TSOP II	Gold	3Q/99
<b>200pin DIMM</b>									
T.B.D	T.B.D	T.B.D							T.B.D
<b>200pin SODIMM</b>									
T.B.D	T.B.D	T.B.D							T.B.D

**NOTE :** There should be a different module types. For example, with FET switch, without FET switch, unbuffered and registered and so on. These modules will be developed depending on custom requirement. Above table shows only unbuffered DIMM type modules.

## DDR SDRAM Module Ordering Information

**KM M X XX H XX X X X X X - X X**  
**1 2 3 4 5 6 7 8 9 10 11 12 13**

### 1. SAMSUNG Memory

### 2. Memory Module

### 3. DIMM Configuration

- 3 : 8Byte DIMM
- 4 : 8Byte SODIMM

### 4. Data Bit & Module Type

- 66/74 : x64/x72 168pin Unbuffered DIMM
- 68/81 : x64/x72 184pin Unbuffered DIMM
- 69/82 : x64/x72 184pin Unbuffered DIMM w/ FET Switch
- 83 : x72 184pin Registered DIMM
- 84 : x72 184pin Registered DIMM w/ FET Switch
- 70/85 : x64/x72 200pin Unbuffered DIMM
- 71/86 : x64/x72 200pin Unbuffered DIMM w/ FET Switch
- 87 : x72 200pin Registered DIMM
- 88 : x72 200pin Registered DIMM w/ FET Switch

### 5. Product & Voltage(VDD)

- H : DDR SDRAM(3.3V VDD)
- L : DDR SDRAM(2.5V VDD)

### 6. Density

- 4 : 4M
- 8 : 8M
- 16 : 16M
- 32 : 32M
- 64 : 64M
- 12 : 128M
- 25 : 256M
- 9 : 8M (for 128Mb/512Mb)
- 17 : 16M (for 128Mb/512Mb)
- 33 : 32M (for 128Mb/512Mb)
- 65 : 64M (for 128Mb/512Mb)
- 13 : 128M (for 128Mb/512Mb)

### 7. Number of Bank in Comp. & Interface & Refresh

- 0 : 4 Banks & Mixed Interface(LVTTL & SSTL\_3)  
& 64m/4K Refresh(15.6us)
- 1 : 4 Banks & SSTL\_2  
& 64m/4K Refresh(15.6us)
- 2 : 4 Banks & SSTL\_2  
& 64m/8K Refresh(7.8us)
- 3 : 8 Banks & SSTL\_2  
& 128m/16K Refresh(7.8us)

### 8. Composition Component

- 2 : x4
- 3 : x8
- 4 : x16
- 5 : x32

### 9. Component Revision

- Blank : 1st
- A : 2nd
- B : 3rd
- C : 4th

### 10. Package Type

- T : 66pin TSOP-II
- B : BGA
- C : u - BGA(CSP)

### 11. PCB Revision

- Blank : 1st
- A : 2nd
- B : 3rd
- C : 4th

### 12. Power

- G : Auto & Self Refresh
- F : Auto & Self Refresh with Low Power

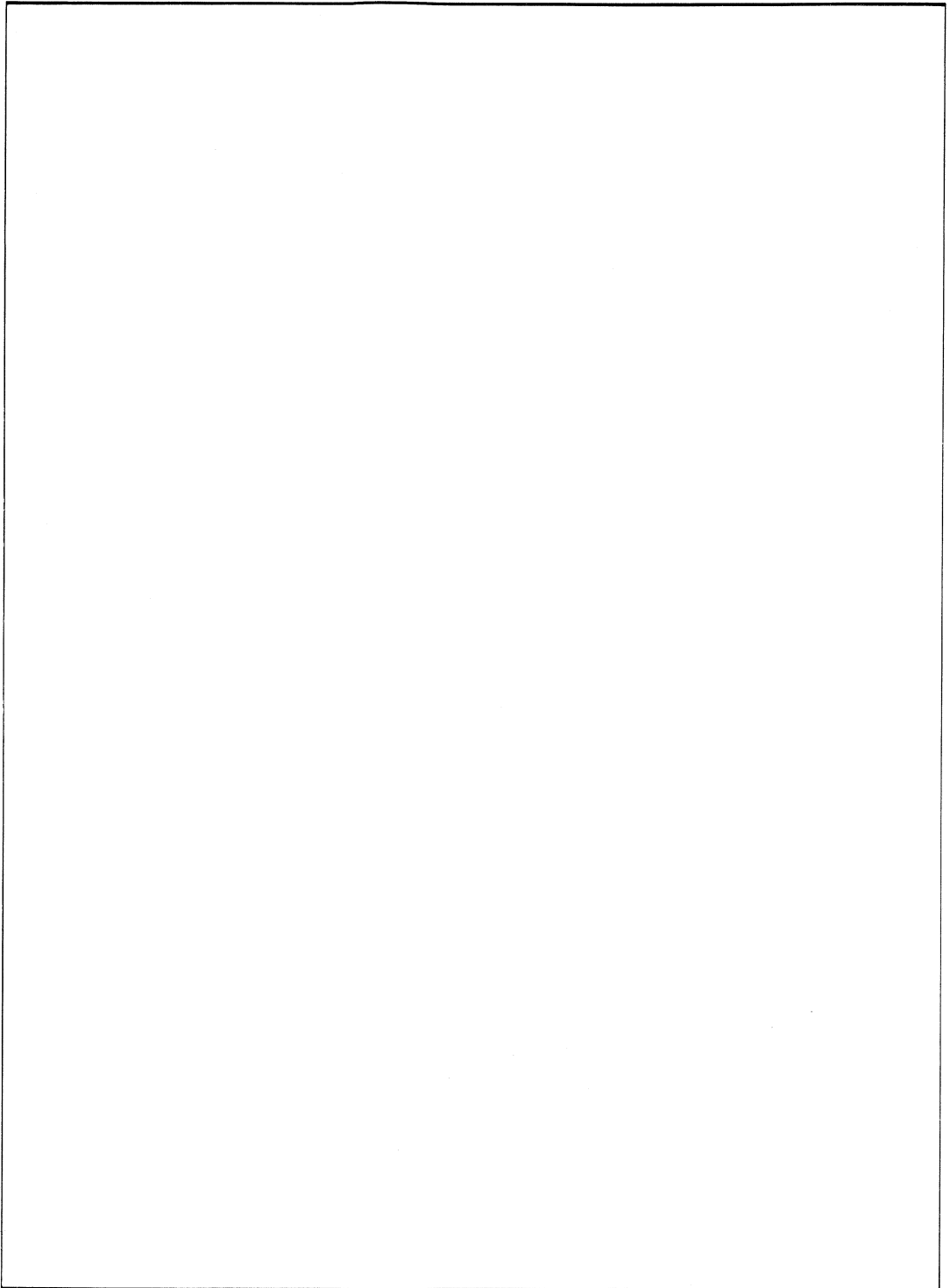
### 13. Speed

- 5 : 5ns, 200MHz (400Mbps/pin)
- 6 : 6ns, 166MHz (333Mbps/pin)
- Y : 6.7ns, 150MHz (300Mbps/pin)
- Z : 7.5ns, 133MHz (266Mbps/pin)
- 8 : 8ns, 125MHz (250Mbps/pin)
- 0 : 10ns, 100MHz (200Mbps/pin)

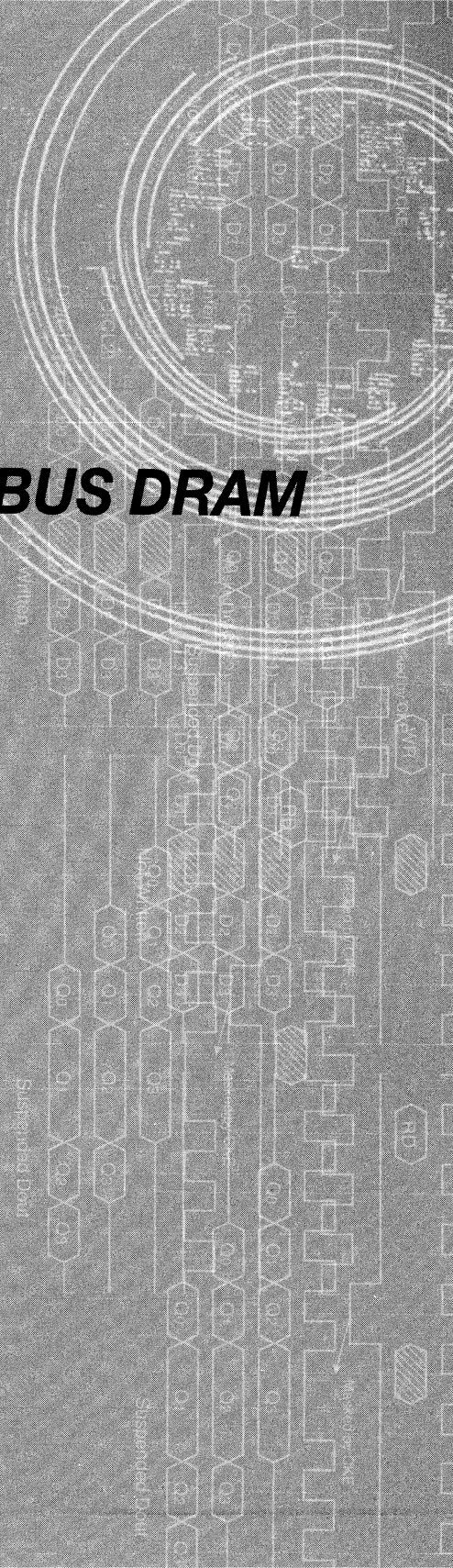


# NOTES

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# ***RAMBUS DRAM***

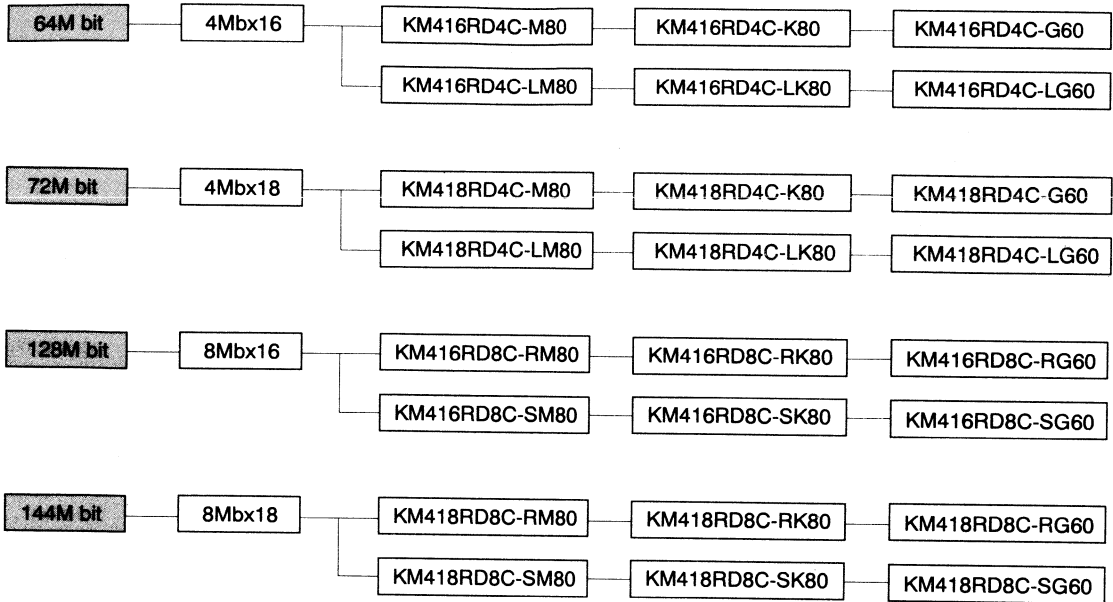






**DIRECT RAMBUS DRAM**

1. Introduction



1

## 2. Product Guide

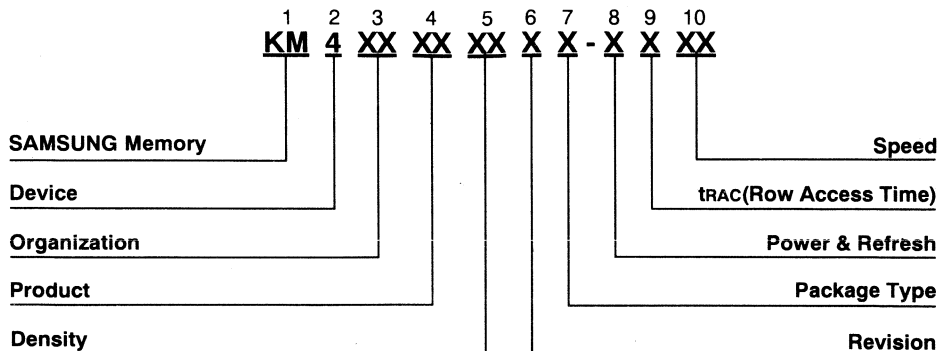
Density	Org.	Power Supply	Part Number	I/O Freq. (MHz)	Access Time (ns)	Refresh
64M bit	256Kx16*16c <sup>*1</sup>	2.5V±0.13V	KM416RD4C-M80	800	40	8K/32ms
64M bit	256Kx16*16c	2.5V±0.13V	KM416RD4C-K80	800	45	8K/32ms
64M bit	256Kx16*16c	2.5V±0.13V	KM416RD4C-G60	600	53.3	8K/32ms
64M bit	256Kx16*16c	2.5V±0.13V	KM416RD4C-LM80	800	40	8K/32ms with LPS <sup>*3</sup>
64M bit	256Kx16*16c	2.5V±0.13V	KM416RD4C-LK80	800	45	8K/32ms with LPS
64M bit	256Kx16*16c	2.5V±0.13V	KM416RD4C-LG60	600	53.3	8K/32ms with LPS
72M bit	256Kx18*16c	2.5V±0.13V	KM418RD4C-M80	800	40	8K/32ms
72M bit	256Kx18*16c	2.5V±0.13V	KM418RD4C-K80	800	45	8K/32ms
72M bit	256Kx18*16c	2.5V±0.13V	KM418RD4C-G60	600	53.3	8K/32ms
72M bit	256Kx18*16c	2.5V±0.13V	KM418RD4C-LM80	800	40	8K/32ms with LPS
72M bit	256Kx18*16c	2.5V±0.13V	KM418RD4C-LK80	800	45	8K/32ms with LPS
72M bit	256Kx18*16c	2.5V±0.13V	KM418RD4C-LG60	600	53.3	8K/32ms with LPS
128M bit	256Kx16*32s <sup>*2</sup>	2.5V±0.13V	KM416RD8C-RM80	800	40	16K/32ms
128M bit	256Kx16*32s	2.5V±0.13V	KM416RD8C-RK80	800	45	16K/32ms
128M bit	256Kx16*32s	2.5V±0.13V	KM416RD8C-RG60	600	53.3	16K/32ms
128M bit	256Kx16*32s	2.5V±0.13V	KM416RD8C-SM80	800	40	16K/32ms with LPS
128M bit	256Kx16*32s	2.5V±0.13V	KM416RD8C-SK80	800	45	16K/32ms with LPS
128M bit	256Kx16*32s	2.5V±0.13V	KM416RD8C-SG60	600	53.3	16K/32ms with LPS
144M bit	256Kx18*32s	2.5V±0.13V	KM418RD8C-RM80	800	40	16K/32ms
144M bit	256Kx18*32s	2.5V±0.13V	KM418RD8C-RK80	800	45	16K/32ms
144M bit	256Kx18*32s	2.5V±0.13V	KM418RD8C-RG60	600	53.3	16K/32ms
144M bit	256Kx18*32s	2.5V±0.13V	KM418RD8C-SM80	800	40	16K/32ms with LPS
144M bit	256Kx18*32s	2.5V±0.13V	KM418RD8C-SK80	800	45	16K/32ms with LPS
144M bit	256Kx18*32s	2.5V±0.13V	KM418RD8C-SG60	600	53.3	16K/32ms with LPS

\*1 \*16c means Dependent 16 Banks with Conventional architecture.

\*2 \*32s means Dependent 32 Banks with Split architecture.

\*3 LPS means Low Power Self refresh.

**DIRECT RAMBUS DRAM Ordering Information**



1

**1. SAMSUNG Memory**

**7. Package Type**

**2. Device**

- 4 : DRAM

- H : SHP(Surface Horizontal PKG)
- C : u - BGA(CSP)
- W : WL - CSP

**3. Organization**

- 8 : x8 bit
- 9 : x9 bit
- 16 : x16 bit
- 18 : x18 bit

**8. Power & Refresh**

- Blank : Normal Power Self Refresh(32m/8K, 3.9us)
- L : Low Power Self Refresh(32m/8K, 3.9us)
- R : Normal Power Self Refresh(32m/16K, 1.95us)
- S : Low Power Self Refresh(32m/16K, 1.95us)

**4. Product**

- RC : Concurrent RAMBUS DRAM
- RD : Direct RAMBUS DRAM

**9. trAC(Row Access Time)**

- Blank : for Daisy Chain Sample
- A : for Concurrent RDRAM
- E : 60ns
- G : 53.3ns
- H : 50ns
- K : 45ns
- M : 40ns
- B~D, F, J, L, N~ : Reserved

**5. Density**

- 2 : 2M
- 4 : 4M
- 8 : 8M
- 16 : 16M

**10. Speed**

- DS : for Daisy Chain Sample
- 53 : 533Mbps (266MHz)
- 60 : 600Mbps (300MHz)
- 66 : 667Mbps (333MHz)
- 70 : 700Mbps (350MHz)
- 80 : 800Mbps (400MHz)

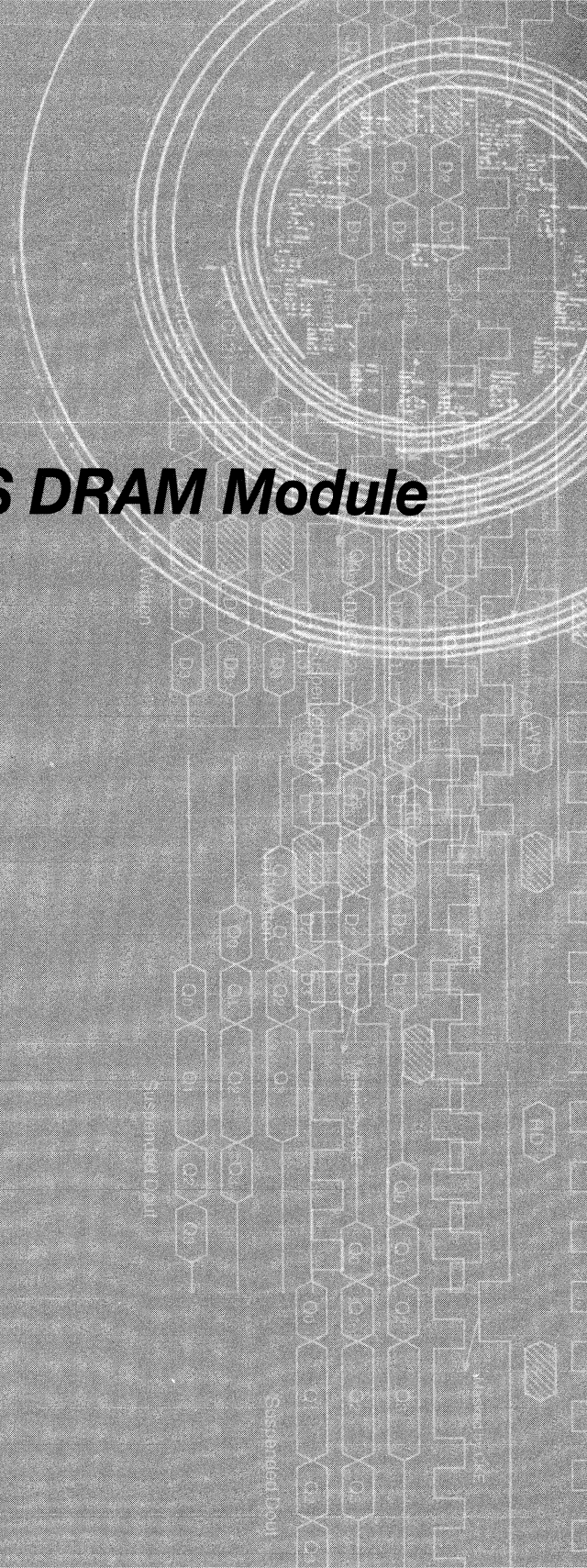
**6. Revision**

- Blank : 1st Gen.
- A : 2nd Gen.

# NOTES

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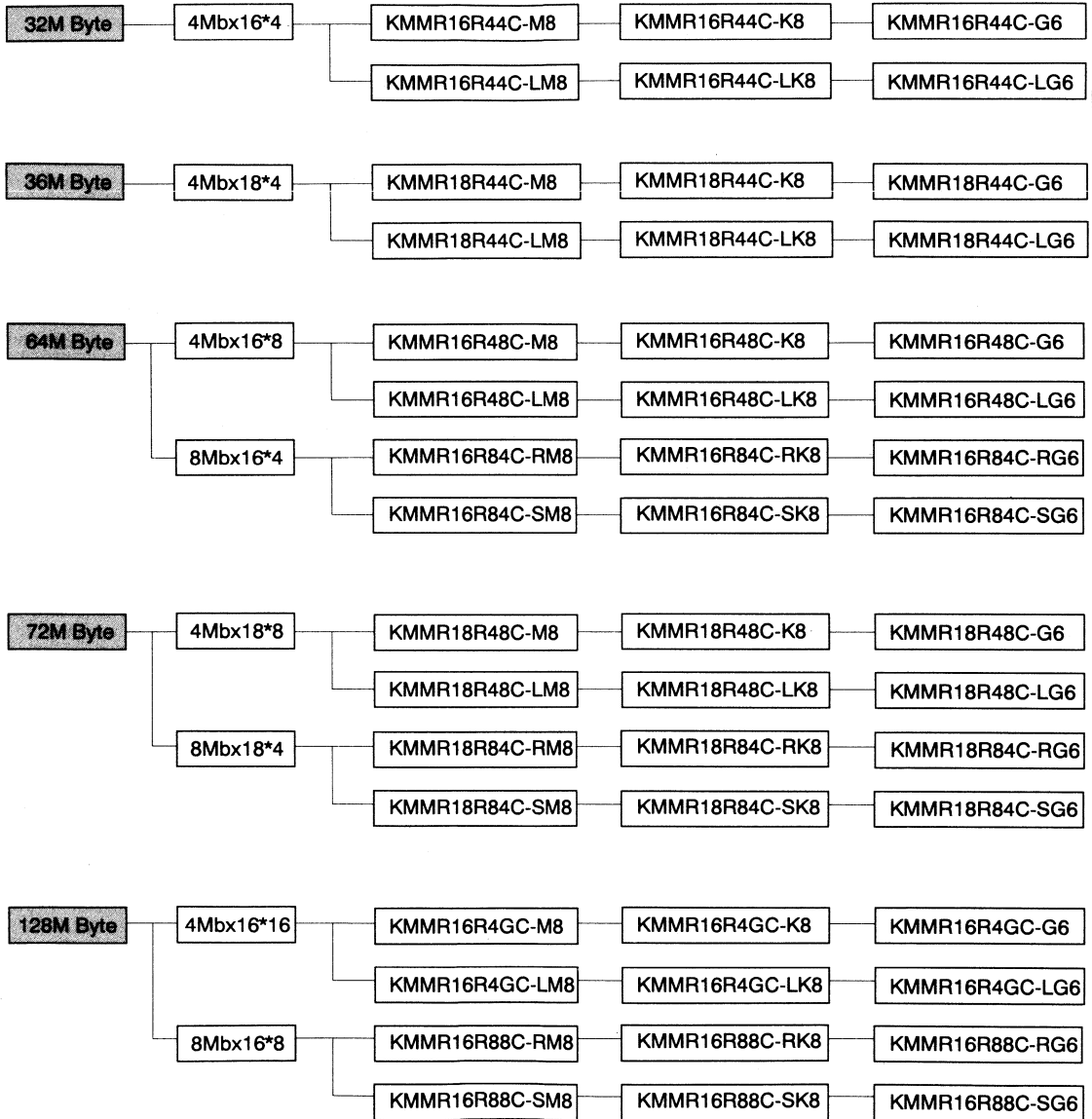
# ***RAMBUS DRAM Module***



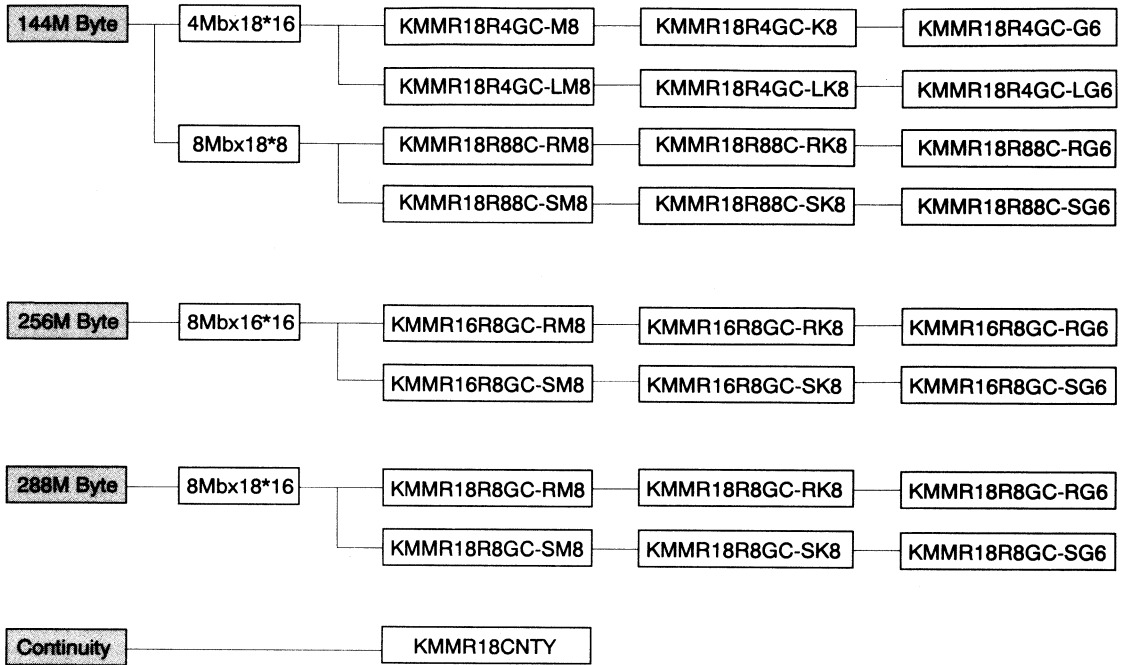


***RAMBUS INTERFACE MEMORY MODULE***

**1. Introduction**



1





## 2. Product Guide

Module Density	Power Supply	Part No.	# of Pin	Base Component	I/O Freq. (MHz)	Access Time (ns)	Refresh	CS
32MB	2.5V±0.13V	KMMR16R44C-M8	184	256Kx16*16c* <sup>1</sup>	800	40	8K/32ms	1Q '99
32MB	2.5V±0.13V	KMMR16R44C-K8	184	256Kx16*16c	800	45	8K/32ms	1Q '99
32MB	2.5V±0.13V	KMMR16R44C-G6	184	256Kx16*16c	600	53.3	8K/32ms	1Q '99
32MB	2.5V±0.13V	KMMR16R44C-LM8	184	256Kx16*16c	800	40	8K/32ms with LPS* <sup>3</sup>	1Q '99
32MB	2.5V±0.13V	KMMR16R44C-LK8	184	256Kx16*16c	800	45	8K/32ms with LPS	1Q '99
32MB	2.5V±0.13V	KMMR16R44C-LG6	184	256Kx16*16c	600	53.3	8K/32ms with LPS	1Q '99
36MB	2.5V±0.13V	KMMR18R48C-M8	184	256Kx18*16c	800	40	8K/32ms	1Q '99
36MB	2.5V±0.13V	KMMR18R48C-K8	184	256Kx18*16c	800	45	8K/32ms	1Q '99
36MB	2.5V±0.13V	KMMR18R48C-G6	184	256Kx18*16c	600	53.3	8K/32ms	1Q '99
36MB	2.5V±0.13V	KMMR18R48C-LM8	184	256Kx18*16c	800	40	8K/32ms with LPS	1Q '99
36MB	2.5V±0.13V	KMMR18R48C-LK8	184	256Kx18*16c	800	45	8K/32ms with LPS	1Q '99
36MB	2.5V±0.13V	KMMR18R48C-LG6	184	256Kx18*16c	600	53.3	8K/32ms with LPS	1Q '99
64MB	2.5V±0.13V	KMMR16R48C-M8	184	256Kx16*16c	800	40	8K/32ms	1Q '99
64MB	2.5V±0.13V	KMMR16R48C-K8	184	256Kx16*16c	800	45	8K/32ms	1Q '99
64MB	2.5V±0.13V	KMMR16R48C-G6	184	256Kx16*16c	600	53.3	8K/32ms	1Q '99
64MB	2.5V±0.13V	KMMR16R48C-LM8	184	256Kx16*16c	800	40	8K/32ms with LPS	1Q '99
64MB	2.5V±0.13V	KMMR16R48C-LK8	184	256Kx16*16c	800	45	8K/32ms with LPS	1Q '99
64MB	2.5V±0.13V	KMMR16R48C-LG6	184	256Kx16*16c	600	53.3	8K/32ms with LPS	1Q '99
64MB	2.5V±0.13V	KMMR16R84C-RM8	184	256Kx16*32s* <sup>2</sup>	800	40	16K/32ms	1Q '99
64MB	2.5V±0.13V	KMMR16R84C-RK8	184	256Kx16*32s	800	45	16K/32ms	1Q '99
64MB	2.5V±0.13V	KMMR16R84C-RG6	184	256Kx16*32s	600	53.3	16K/32ms	1Q '99
64MB	2.5V±0.13V	KMMR16R84C-SM8	184	256Kx16*32s	800	40	16K/32ms with LPS	1Q '99
64MB	2.5V±0.13V	KMMR16R84C-SK8	184	256Kx16*32s	800	45	16K/32ms with LPS	1Q '99
64MB	2.5V±0.13V	KMMR16R84C-SG6	184	256Kx16*32s	600	53.3	16K/32ms with LPS	1Q '99
72MB	2.5V±0.13V	KMMR18R48C-M8	184	256Kx18*16c	800	40	8K/32ms	1Q '99
72MB	2.5V±0.13V	KMMR18R48C-K8	184	256Kx18*16c	800	45	8K/32ms	1Q '99
72MB	2.5V±0.13V	KMMR18R48C-G6	184	256Kx18*16c	600	53.3	8K/32ms	1Q '99
72MB	2.5V±0.13V	KMMR18R48C-LM8	184	256Kx18*16c	800	40	8K/32ms with LPS	1Q '99
72MB	2.5V±0.13V	KMMR18R48C-LK8	184	256Kx18*16c	800	45	8K/32ms with LPS	1Q '99
72MB	2.5V±0.13V	KMMR18R48C-LG6	184	256Kx18*16c	600	53.3	8K/32ms with LPS	1Q '99

Module Density	Power Supply	Part No.	# of Pin	Base Component	I/O Freq. (MHz)	Access Time (ns)	Refresh	CS
72MB	2.5V±0.13V	KMMR18R84C-M8	184	256Kx18*32s	800	40	16K/32ms	1Q '99
72MB	2.5V±0.13V	KMMR18R84C-K8	184	256Kx18*32s	800	45	16K/32ms	1Q '99
72MB	2.5V±0.13V	KMMR18R84C-G6	184	256Kx18*32s	600	53.3	16K/32ms	1Q '99
72MB	2.5V±0.13V	KMMR18R84C-LM8	184	256Kx18*32s	800	40	16K/32ms with LPS	1Q '99
72MB	2.5V±0.13V	KMMR18R84C-LK8	184	256Kx18*32s	800	45	16K/32ms with LPS	1Q '99
72MB	2.5V±0.13V	KMMR18R84C-LG6	184	256Kx18*32s	600	53.3	16K/32ms with LPS	1Q '99
128MB	2.5V±0.13V	KMMR16R4GC-M8	184	256Kx16*16c	800	40	8K/32ms	1Q '99
128MB	2.5V±0.13V	KMMR16R4GC-K8	184	256Kx16*16c	800	45	8K/32ms	1Q '99
128MB	2.5V±0.13V	KMMR16R4GC-G6	184	256Kx16*16c	600	53.3	8K/32ms	1Q '99
128MB	2.5V±0.13V	KMMR16R4GC-LM8	184	256Kx16*16c	800	40	8K/32ms with LPS	1Q '99
128MB	2.5V±0.13V	KMMR16R4GC-LK8	184	256Kx16*16c	800	45	8K/32ms with LPS	1Q '99
128MB	2.5V±0.13V	KMMR16R4GC-LG6	184	256Kx16*16c	600	53.3	8K/32ms with LPS	1Q '99
128MB	2.5V±0.13V	KMMR16R88C-RM8	184	256Kx16*32s	800	40	16K/32ms	1Q '99
128MB	2.5V±0.13V	KMMR16R88C-RK8	184	256Kx16*32s	800	45	16K/32ms	1Q '99
128MB	2.5V±0.13V	KMMR16R88C-RG6	184	256Kx16*32s	600	53.3	16K/32ms	1Q '99
128MB	2.5V±0.13V	KMMR16R88C-SM8	184	256Kx16*32s	800	40	16K/32ms with LPS	1Q '99
128MB	2.5V±0.13V	KMMR16R88C-SK8	184	256Kx16*32s	800	45	16K/32ms with LPS	1Q '99
128MB	2.5V±0.13V	KMMR16R88C-SG6	184	256Kx16*32s	600	53.3	16K/32ms with LPS	1Q '99
144MB	2.5V±0.13V	KMMR18R4GC-M8	184	256Kx18*16C	800	40	8K/32ms	1Q '99
144MB	2.5V±0.13V	KMMR18R4GC-K8	184	256Kx18*16C	800	45	8K/32ms	1Q '99
144MB	2.5V±0.13V	KMMR18R4GC-G6	184	256Kx18*16C	600	53.3	8K/32ms	1Q '99
144MB	2.5V±0.13V	KMMR18R4GC-LM8	184	256Kx18*16C	800	40	8K/32ms with LPS	1Q '99
144MB	2.5V±0.13V	KMMR18R4GC-LK8	184	256Kx18*16C	800	45	8K/32ms with LPS	1Q '99
144MB	2.5V±0.13V	KMMR18R4GC-LG6	184	256Kx18*16C	600	53.3	8K/32ms with LPS	1Q '99
144MB	2.5V±0.13V	KMMR18R88C-RM8	184	256Kx18*32s	800	40	16K/32ms	1Q '99
144MB	2.5V±0.13V	KMMR18R88C-RK8	184	256Kx18*32s	800	45	16K/32ms	1Q '99
144MB	2.5V±0.13V	KMMR18R88C-RG6	184	256Kx18*32s	600	53.3	16K/32ms	1Q '99
144MB	2.5V±0.13V	KMMR18R88C-SM8	184	256Kx18*32s	800	40	16K/32ms with LPS	1Q '99
144MB	2.5V±0.13V	KMMR18R88C-SK8	184	256Kx18*32s	800	45	16K/32ms with LPS	1Q '99
144MB	2.5V±0.13V	KMMR18R88C-SG6	184	256Kx18*32s	600	53.3	16K/32ms with LPS	1Q '99

Module Density	Power Supply	Part No.	# of Pin	Base Component	I/O Freq. (MHz)	Access Time (ns)	Refresh	CS
256MB	2.5V±0.13V	KMMR16R8GC-RM8	184	256Kx16*32s	800	40	16K/32ms	1Q '99
256MB	2.5V±0.13V	KMMR16R8GC-RK8	184	256Kx16*32s	800	45	16K/32ms	1Q '99
256MB	2.5V±0.13V	KMMR16R8GC-RG6	184	256Kx16*32s	600	53.3	16K/32ms	1Q '99
256MB	2.5V±0.13V	KMMR16R8GC-SM8	184	256Kx16*32s	800	40	16K/32ms with LPS	1Q '99
256MB	2.5V±0.13V	KMMR16R8GC-SK8	184	256Kx16*32s	800	45	16K/32ms with LPS	1Q '99
256MB	2.5V±0.13V	KMMR16R8GC-SG6	184	256Kx16*32s	600	53.3	16K/32ms with LPS	1Q '99
288MB	2.5V±0.13V	KMMR18R8GC-RM8	184	256Kx18*32s	800	40	16K/32ms	1Q '99
288MB	2.5V±0.13V	KMMR18R8GC-RK8	184	256Kx18*32s	800	45	16K/32ms	1Q '99
288MB	2.5V±0.13V	KMMR18R8GC-RG6	184	256Kx18*32s	600	53.3	16K/32ms	1Q '99
288MB	2.5V±0.13V	KMMR18R8GC-SM8	184	256Kx18*32s	800	40	16K/32ms with LPS	1Q '99
288MB	2.5V±0.13V	KMMR18R8GC-SK8	184	256Kx18*32s	800	45	16K/32ms with LPS	1Q '99
288MB	2.5V±0.13V	KMMR18R8GC-SG6	184	256Kx18*32s	600	53.3	16K/32ms with LPS	1Q '99
Continuity	2.5V±0.13V	KMMR18CNTY	-	-	-	-	-	1Q '99

\*1 \*16c means Dependent 16 Banks with Conventional architecture.

\*2 \*32s means Dependent 32 Banks with Split architecture.

\*3 LPS means Low Power Self refresh.

1

***RAMBUS INTERFACE MEMORY MODULE Oding Information***

**KM M R XX R XX X X X X - X XX**  
**1 2 3 4 5 6 7 8 9 10 11 12**

**1. SAMSUNG Memory**

**2. Memory Module**

**3. Module Configuration**

- R : RIMM

**4. Data Bit & Module Type\***

- 16/18 : x16/x18 184pin

**5. Product**

- CNTY : for Continuity Module
- R : Direct RAMBUS DRAM

**6. Density**

- Blank : for Continuity Module
- 4 : 4M
- 8 : 8M
- 16 : 16M
- 32 : 32M
- 64 : 64M

**7. Number of Component**

- Blank : for Continuity Module
- 1 : 1ea                    - 9 : 9ea
- 2 : 2ea                    - A : 10ea
- 3 : 3ea                    - B : 11ea
- 4 : 4ea                    - C : 12ea
- 5 : 5ea                    - D : 13ea
- 6 : 6ea                    - E : 14ea
- 7 : 7ea                    - F : 15ea
- 8 : 8ea                    - G : 16ea

**8. Component Revision**

- Blank : 1st or for Continuity Module
- A : 2nd
- B : 3rd

**9. Package Type**

- Blank : for Continuity Module
- C : u - BGA(CSP)
- W : WL - CSP

**10. PCB Revision**

- Blank : 1st
- A : 2nd
- B : 3rd

**11. Power & Refresh \*\***

- Blank : Normal Power Self Refresh(32m/8K, 3.9us)
- L : Low Power Self Refresh(32m/8K, 3.9us)
- R : Normal Power Self Refresh(32m/16K, 1.95us)
- S : Low Power Self Refresh(32m/16K, 1.95us)

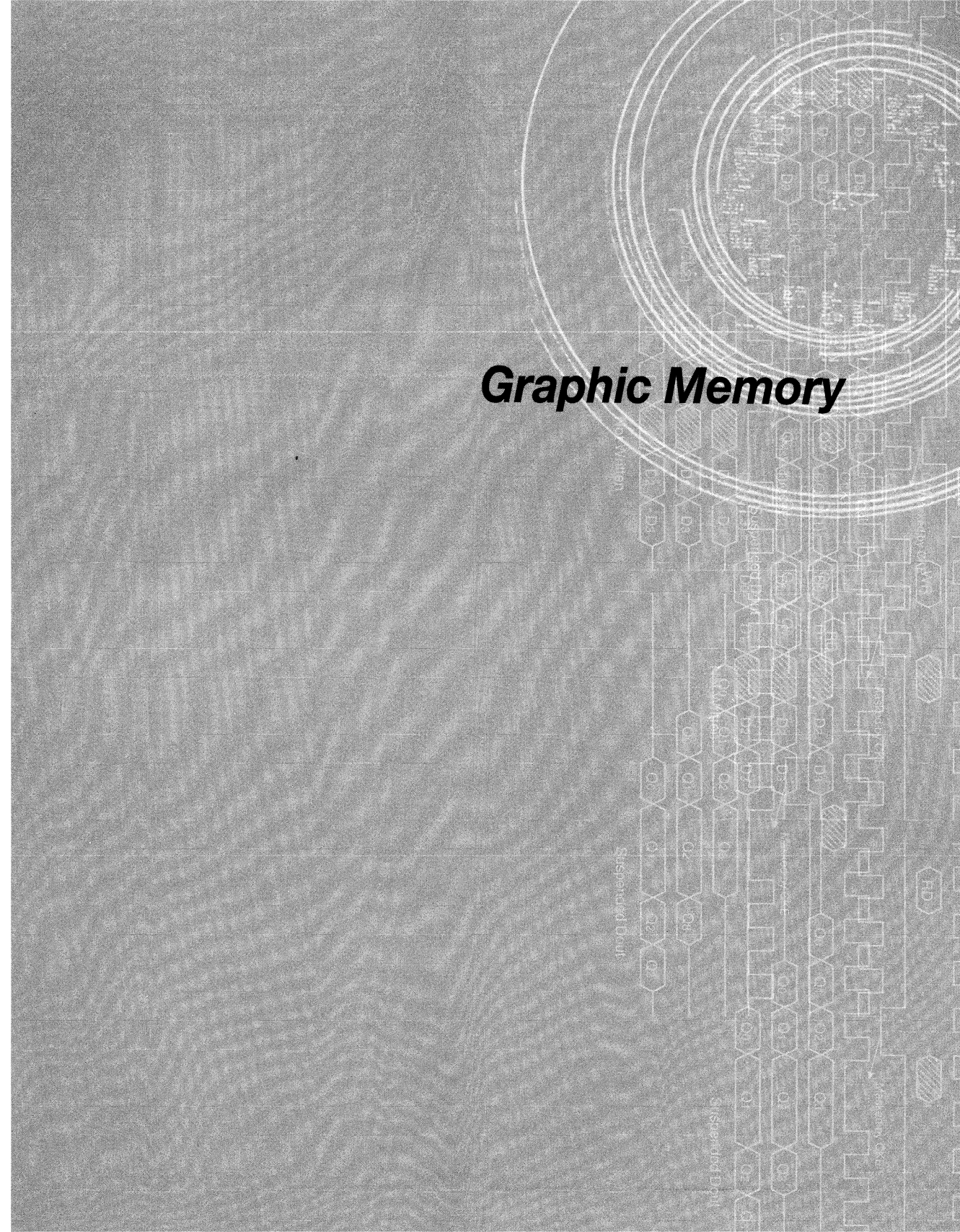
**12. tRAC(Row Access Time) & Speed \*\***

- M8 : 40ns & 800Mbps (400MHz)
- K8 : 45ns & 800Mbps (400MHz)
- G6 : 53.3ns & 600Mbps (300MHz)

\* x16/x18 are same PCB, so x18 is used for Continuity Module.

\*\* The Codes after " - " are not used for Continuity Module.

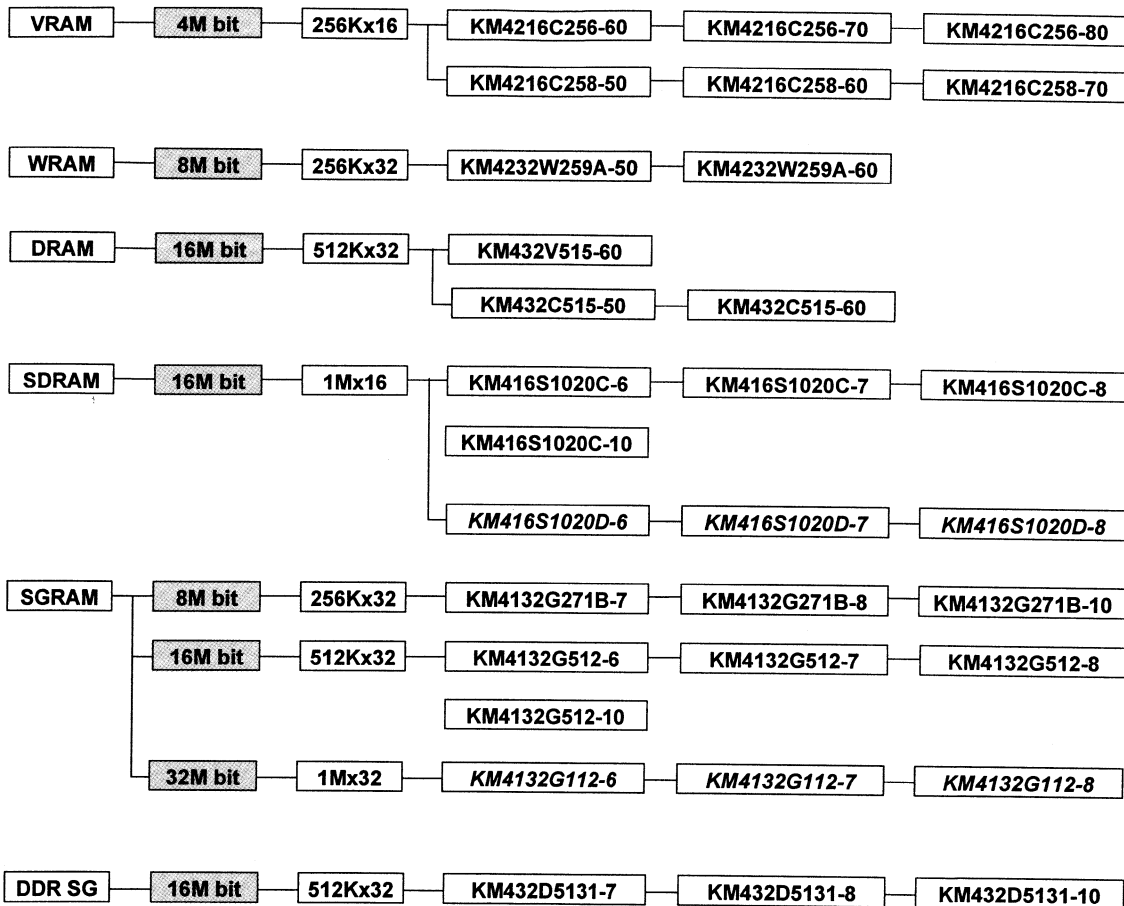
# ***Graphic Memory***





*Graphic*

1. Introduction



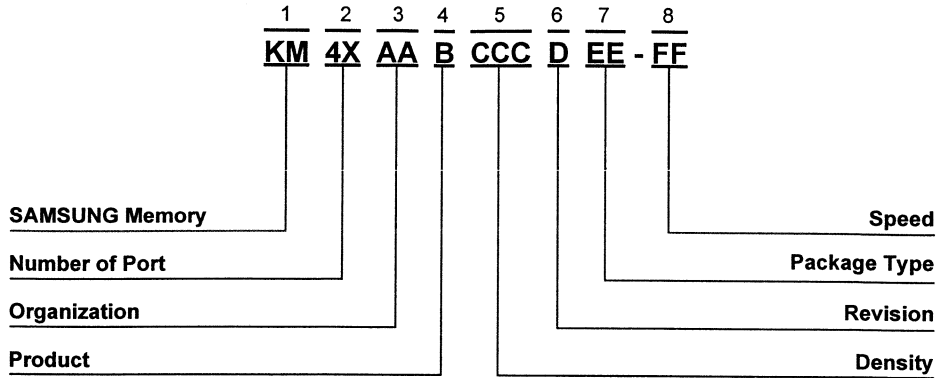
1

2. PRODUCT GUIDE

Product	Density	Org.	Power Supply	Part Number	Speed	Features	Package	Remark
Dual port	4Mbit	256K x 16	5V ± 10%	KM4216C256# KM4216C258#	60/70/80 50/60/70	F/F(EDO, 2WE) F/F(EDO, 2CAS)	64 SSOP	Now Now
	8Mbit	256K x 32	5V ± 10%	KM4232W259A#	50/60	(EDO, 4BE)	120 PQFP	Now
RDRAM	16Mbit	2M x 8	3.3V ± 0.30V	KM48RC2#	A60/A66	Concurrent, 2Bank	32 SHP	Now
	18Mbit	2M x 9	3.3V ± 0.30V	KM49RC2#		Concurrent, 2Bank	32 SHP	Now
DRAM	16Mbit	512K x 32	3.3V ± 0.30V	KM432V515#	60	EDO	70 SOJ	Now
				KM432V515#-L		EDO, LP		
	5V ± 10%	KM432C515#	50/60	EDO				
		KM432C515#-L		EDO, LP				
SDRAM	16Mbit C-die	1M x 16	3.3V ± 0.30V	KM416S1020C#-G	6/7/8/10	LVTTTL, 2Bank	50 TSOP II	Now
				KM416S1020C#-F		LVTTTL, 2Bank, LP		
	16Mbit D-die	1M x 16	3.3V ± 0.30V	KM416S1020D#-G	6/7/8	LVTTTL, 2Bank	50 TSOP II	E/S:4Q98 C/S:1Q99
				KM416S1020D#-F		LVTTTL, 2Bank, LP		
SGRAM	8Mbit	256K x 32	3.3V ± 0.30V	KM4132G271B#	7/8/10	LVTTTL, 2Bank	100 P(T)QFP	Now
	16Mbit	512K x 32	3.3V ± 0.30V	KM4132G512#	6/7/8/10	LVTTTL, 2Bank	100 P(T)QFP	Now
	32Mbit	1M x 32	3.3V ± 0.30V	KM4132G112#	6/7/8	LVTTTL, 2Bank	100 P(T)QFP	E/S:4Q98 C/S:1Q99
DDR SGRAM	16Mbit	512K x 32	3.3V ± 0.30V	KM432D5131#-G	7/8/10	SSTL2, 4Bank	100 TQFP	E/S:2Q98 C/S:3Q98
	32Mbit	1M x 32	3.3V ± 0.30V	?	6/7/8	SSTL2, 4Bank	100 TQFP	E/S:2Q99 C/S:3Q99
	64Mbit	2M x 32	3.3V ± 0.30V	?	6/7/8	SSTL2, 4Bank	100 TQFP	E/S:1Q99 C/S:2Q99
SGRAM SODIMM	2MB	256K x 64	3.3V ± 0.30V	KMM965(6)G256B#	7/8/10	256Kx32x1BANK	100 P(T)QFP	Now
	4MB	512K x 64		KMM965(6)G512B#	7/8/10	256Kx32x2BANKs		
	4MB	512K x 64		KMM965(6)G511#	6/7/8/10	512Kx32x1BANK		
	8MB	1M x 64		KMM965(6)G112#	6/7/8/10	512Kx32x2BANKs		
	8MB	1M x 64		?	6/7/8	1Mx32x1BANK		
	16MB	2M x 64		?	6/7/8	1Mx32x2BANKs		
DDR SG SODIMM	4MB	512K x 64	3.3V ± 0.30V	?	7/8/10	512Kx32x1BANK	100 TQFP	E/S:3Q98 C/S:4Q98
	8MB	1M x 64		?	7/8/10	512Kx32x2BANKs		



Graphic Ordering Information



**1. SAMSUNG Memory**

**2. Number of Port**

- 1 ..... Single Port(SGRAM)
- 2 ..... Dual Port(VRAM, WRAM)

**3. Organization**

- 16 ..... x16 bit
- 32 ..... x32 bit(SGRAM & WRAM)

**4. Product**

- C ..... VRAM(5V)
- W ..... Window RAM(5V)
- G ..... Sync Graphic RAM(3.3V only)

**5. Density**

- Refer to previous "2. PRODUCT GUIDE."

**6. Revision**

- BLANK ..... 1st Version
- A ..... 2nd Version
- B ..... 3rd Version

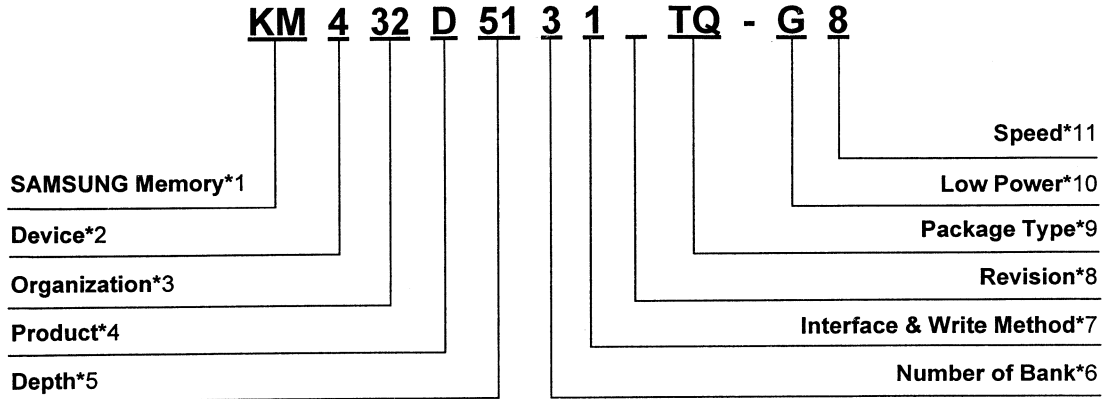
**7. Package Type**

- G ..... SSOP
- Q ..... PQFP(SGRAM & WRAM)
- QR ..... PQFP - Reverse Typ
- TQ ..... TQFP(SGRAM)

**8. Speed**

- 6 ..... 6 ns
  - 7 ..... 7 ns
  - 8 ..... 8 ns
  - 10 ..... 10 ns
  - 50 ..... 50 ns
  - 60 ..... 60 ns
  - 70 ..... 70 ns
  - 80 ..... 80 ns
- } SGRAM
- } VRAM  
} WRAM

DDR SGRAM Ordering Information



**1. SAMSUNG Memory**

**2. Device**

- 4 ..... DRAM

**3. Organization**

- 32 ..... x32

**4. Product**

- D ..... DDR SGRAM

**5. Depth**

- 51 ..... 512K

**6. Number of Bank**

- 3 ..... 4 Banks

**7. Interface**

- 1 ..... SSTL-2

**8. Revision**

- Blank ..... 1st Gen.
- A ..... 2nd Gen.

**9. Package Type**

- TQ ..... TQFP

**10. Refresh & Power**

- G ..... Auto & Self Refresh
- F ..... Auto & Self Refresh with Low Power

**11. Frequency**

- 0 ..... 100MHz
- 8 ..... 125MHz
- 7 ..... 143MHz



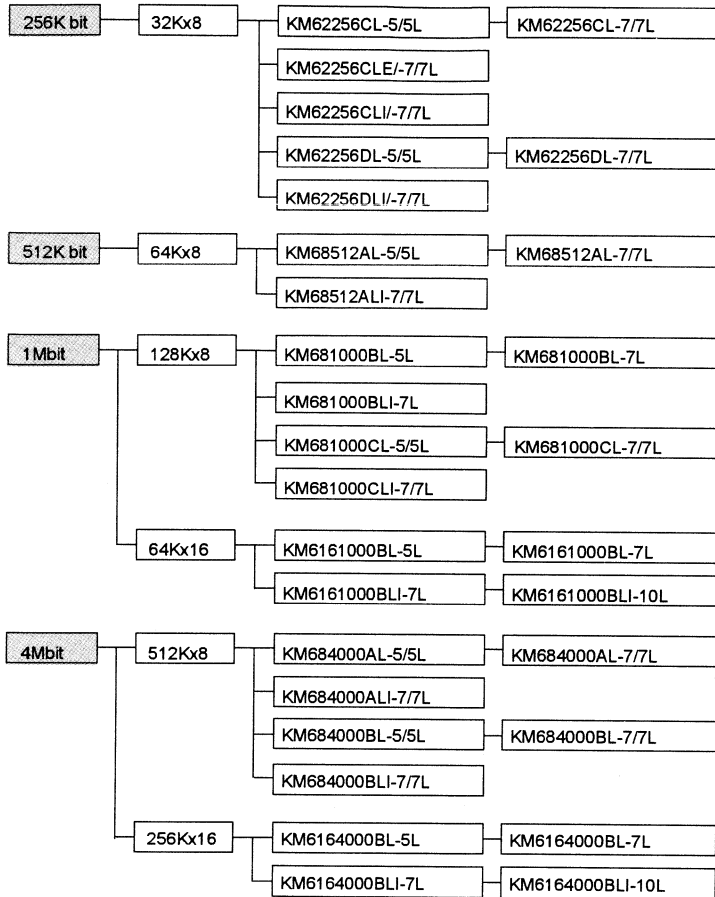
The image shows a microscopic view of a circuit board with a grid of components. A large circular highlight is drawn around the 'SRAM' label. The label 'SRAM' is in a bold, italicized font. Other labels like 'D1', 'D2', 'D3', 'D4', 'D5', 'D6', 'D7', 'D8', 'D9', 'D10', 'D11', 'D12', 'D13', 'D14', 'D15', 'D16', 'D17', 'D18', 'D19', 'D20', 'D21', 'D22', 'D23', 'D24', 'D25', 'D26', 'D27', 'D28', 'D29', 'D30', 'D31', 'D32', 'D33', 'D34', 'D35', 'D36', 'D37', 'D38', 'D39', 'D40', 'D41', 'D42', 'D43', 'D44', 'D45', 'D46', 'D47', 'D48', 'D49', 'D50', 'D51', 'D52', 'D53', 'D54', 'D55', 'D56', 'D57', 'D58', 'D59', 'D60', 'D61', 'D62', 'D63', 'D64', 'D65', 'D66', 'D67', 'D68', 'D69', 'D70', 'D71', 'D72', 'D73', 'D74', 'D75', 'D76', 'D77', 'D78', 'D79', 'D80', 'D81', 'D82', 'D83', 'D84', 'D85', 'D86', 'D87', 'D88', 'D89', 'D90', 'D91', 'D92', 'D93', 'D94', 'D95', 'D96', 'D97', 'D98', 'D99', 'D100' are visible. The text 'SRAM' is located at approximately [295, 775, 338, 941].

# ***SRAM***



## 1. SRAM PRODUCT TREE

### 1.1.1. Low Power(5.0V Operation) SRAM



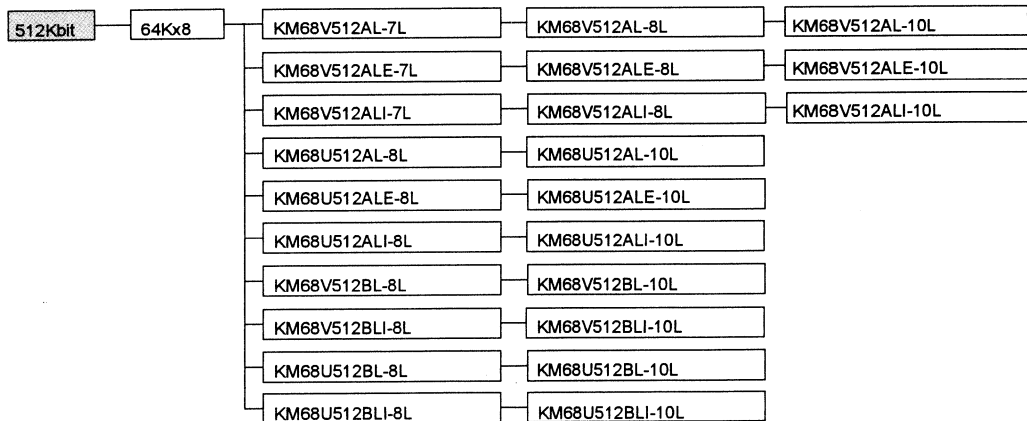
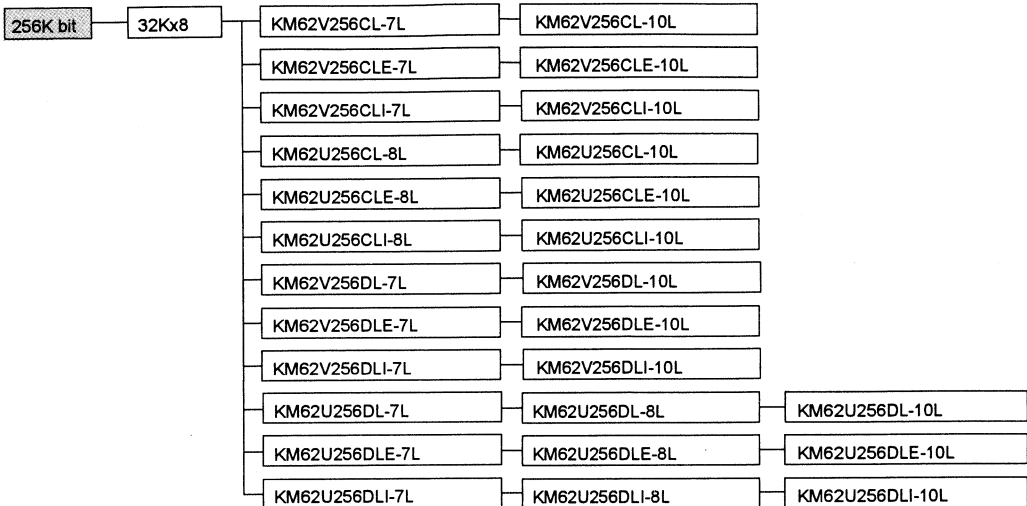
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\* : New Product

\*\* : Preliminary

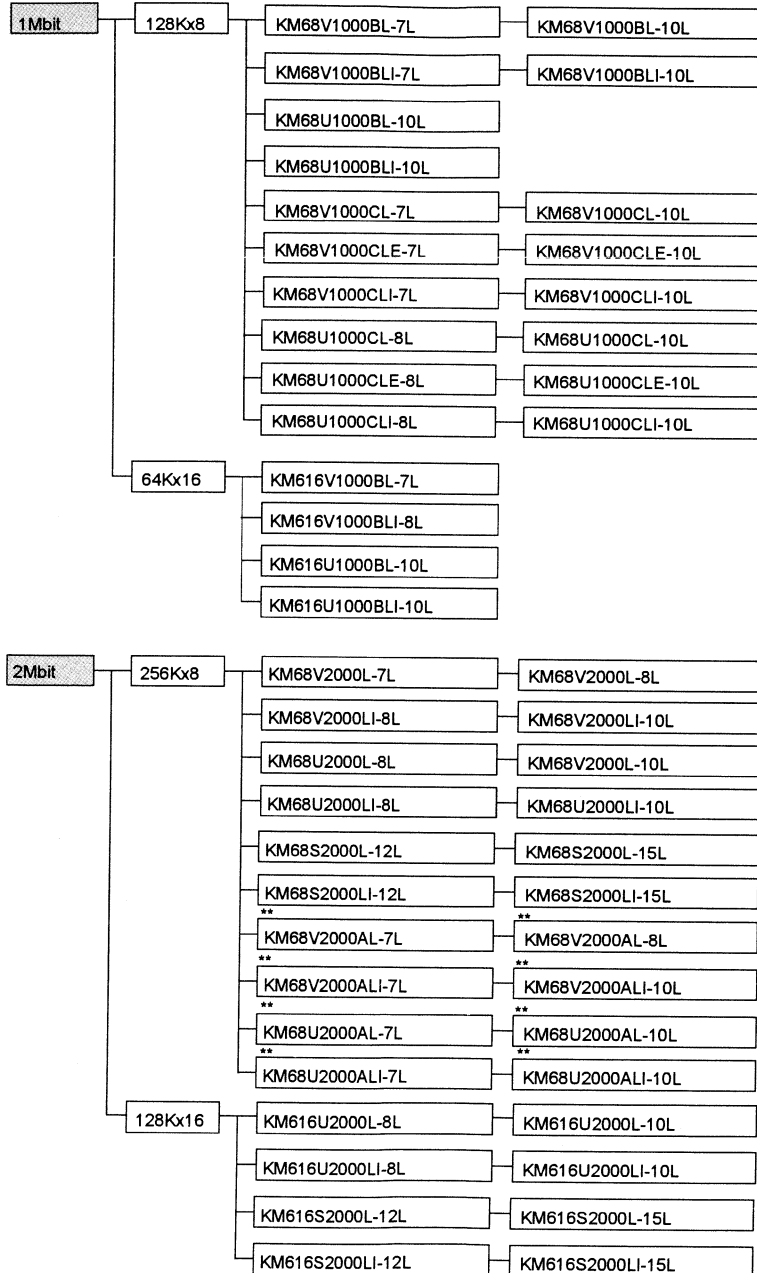
\*\*\* : Under Development

1.1.2. Low Power and Low Voltage(2.5V 3.0V, 3.3V Operation) SRAM



\* : New Product      \*\* : Preliminary      \*\*\* : Under Development

## 1.1.2. Low Power and Low Voltage(2.5V,3.0V, 3.3V Operation) SRAM(Continued)

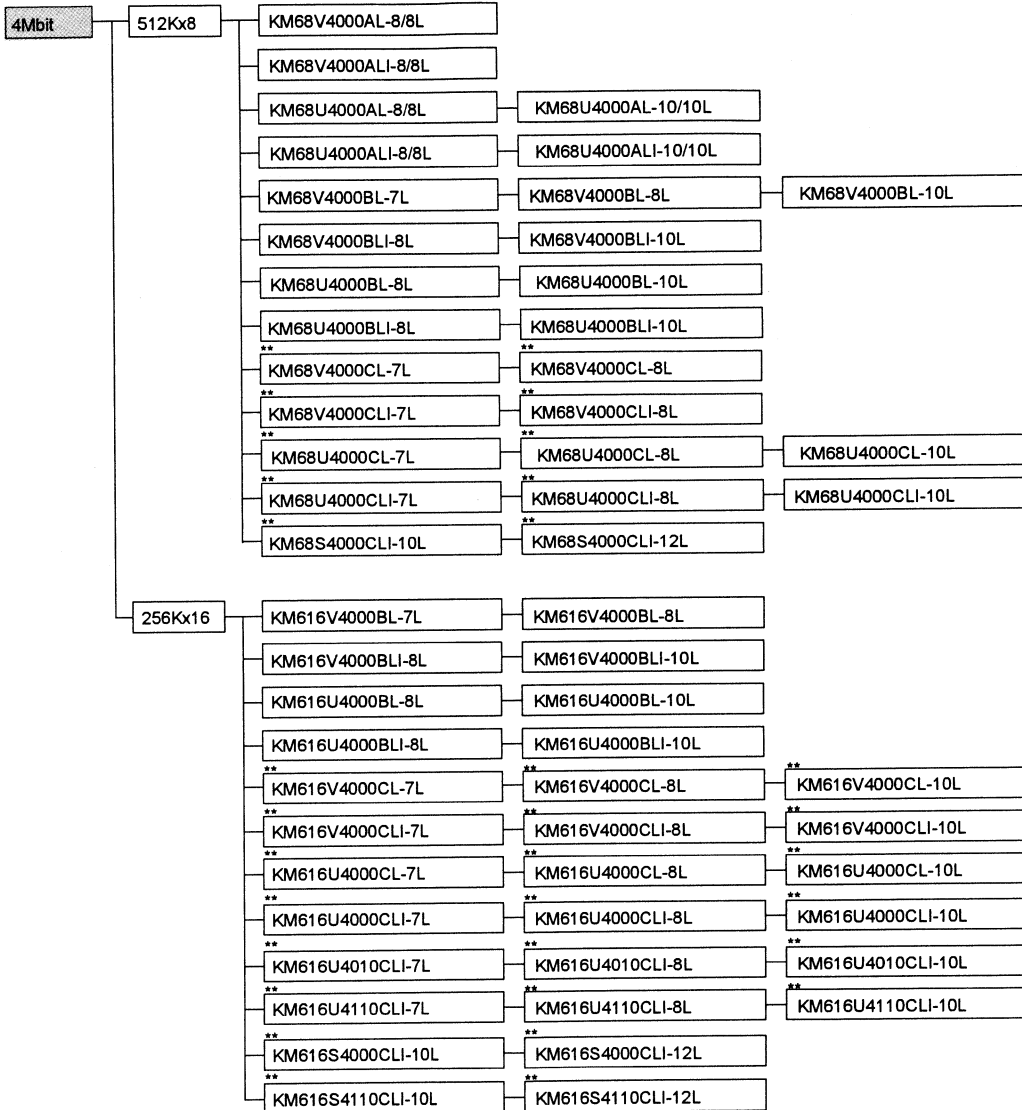


\* : New Product

\*\* : Preliminary

\*\*\* : Under Development

## 1.1.2. Low Power and Low Voltage(2.5V,3.0V, 3.3V Operation) SRAM(Continued)



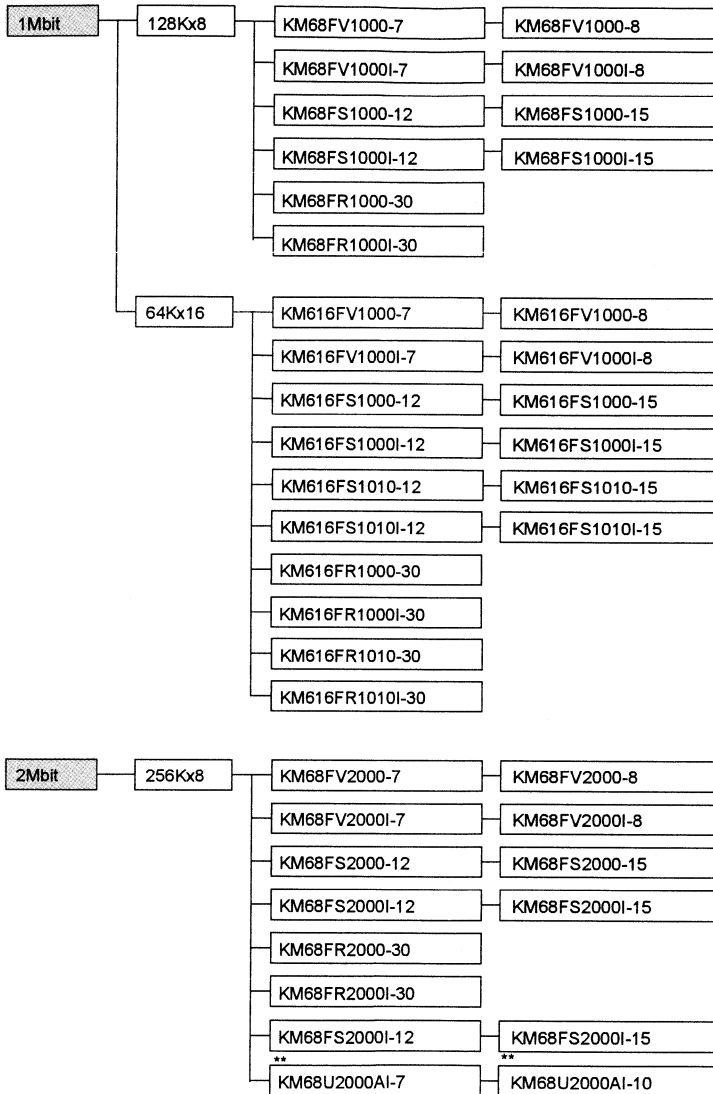
\* : New Product

\*\* : Preliminary

\*\*\* : Under Development



## 1.1.3. Super Low Power and Low Voltage(Full CMOS) SRAM

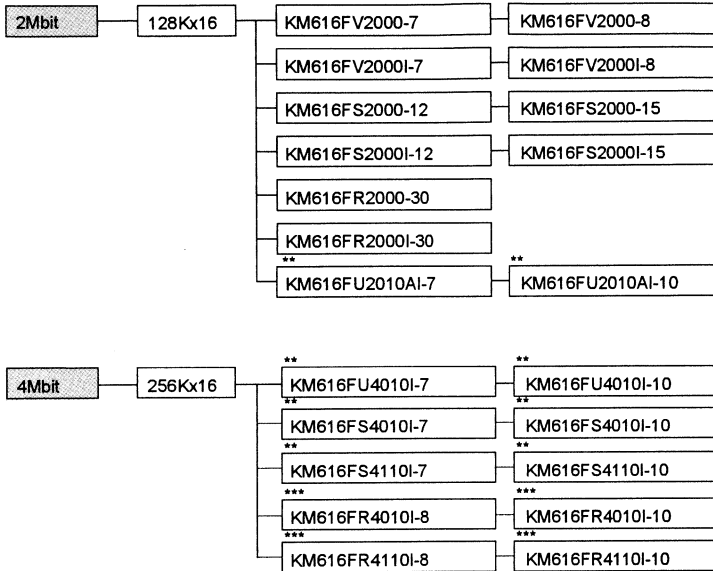


\* : New Product

\*\* : Preliminary

\*\*\* : Under Development

## 1.1.3. Super Low Power and Low Voltage(Full CMOS) SRAM(Continued)

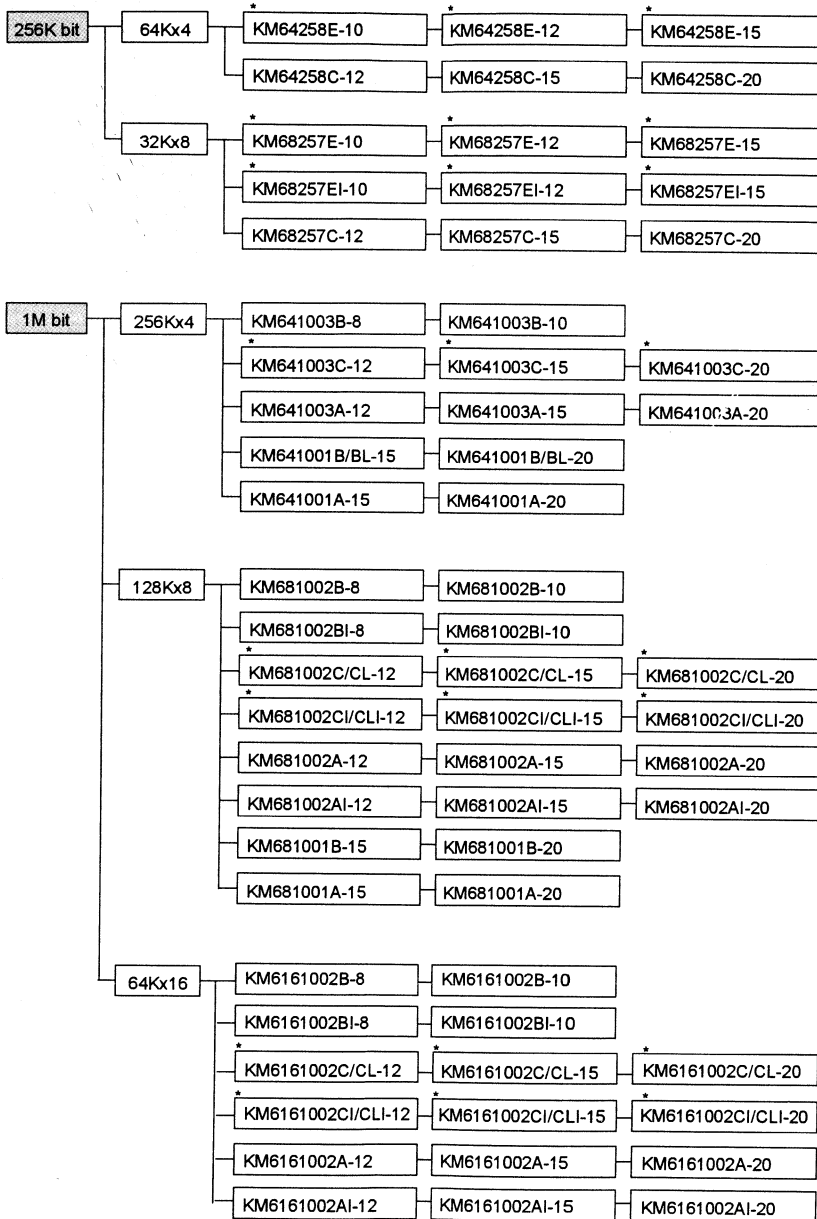


\* : New Product

\*\* : Preliminary

\*\*\* : Under Development

## 1.2.1. High Speed(5.0V Operation) SRAM



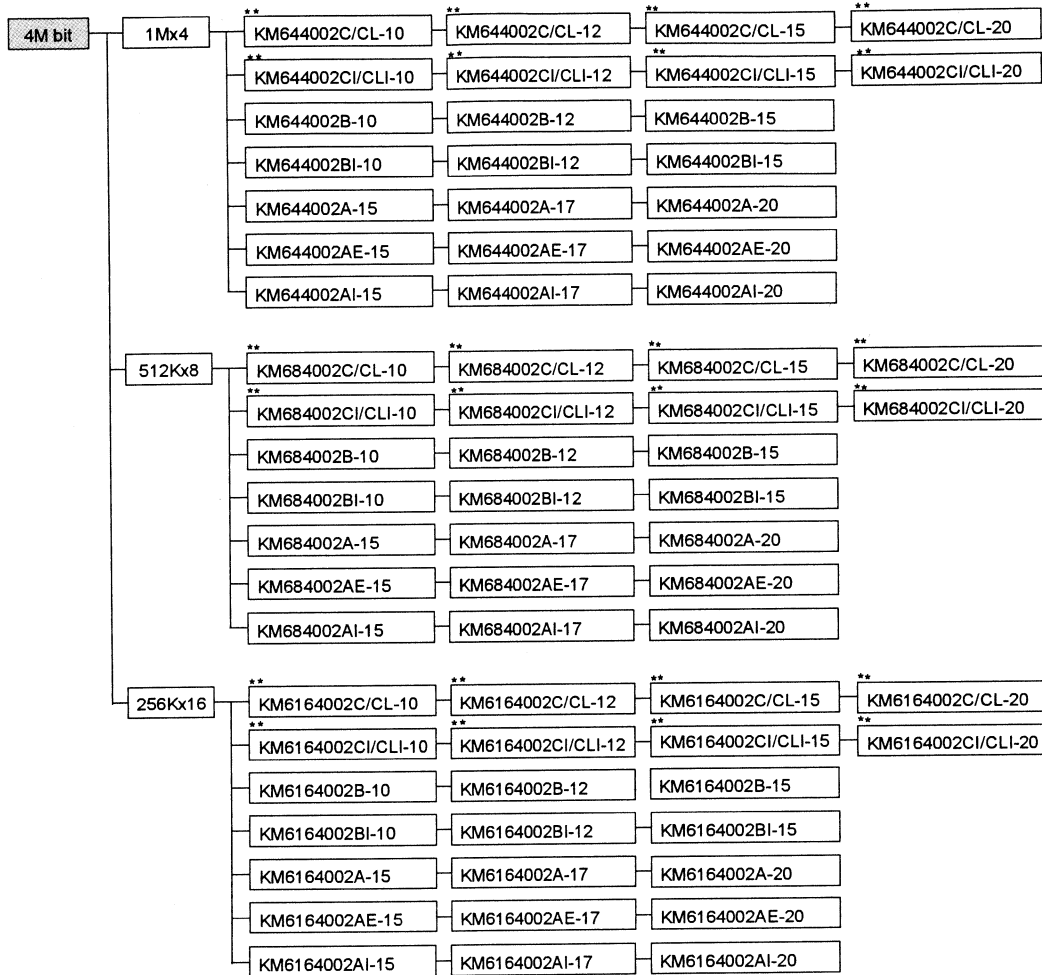
1

\* : New Product

\*\* : Preliminary

\*\*\* : Under Development

## 1.2.1. High Speed(5.0V Operation) SRAM(Continue)

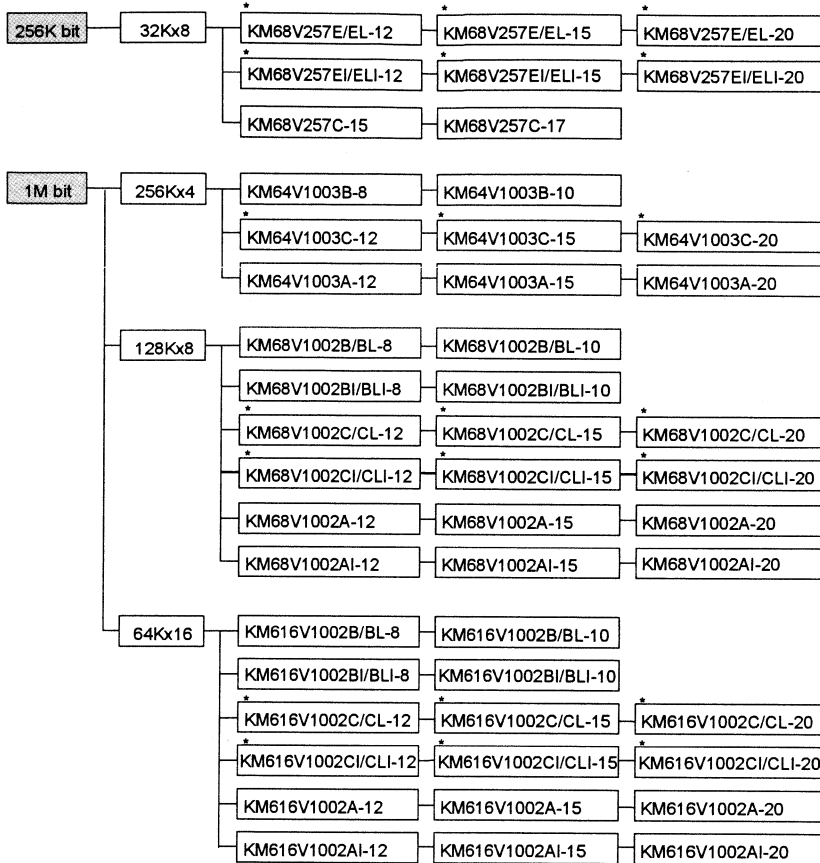


\* : New Product

\*\* : Preliminary

\*\*\* : Under Development

## 1.2.2. High Speed(3.3V Operation) SRAM

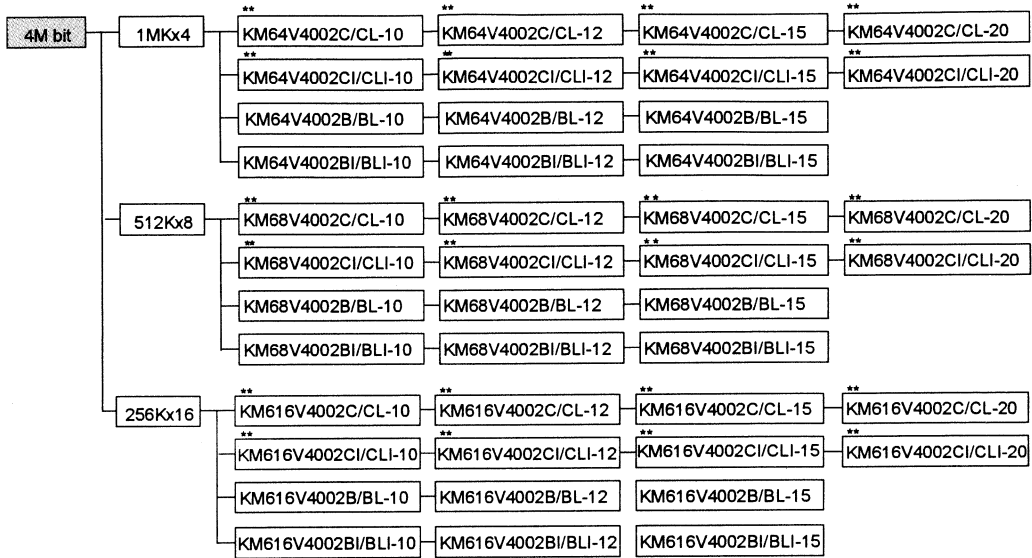


\* : New Product

\*\* : Preliminary

\*\*\* : Under Development

## 1.2.2. High Speed(3.3V Operation) SRAM

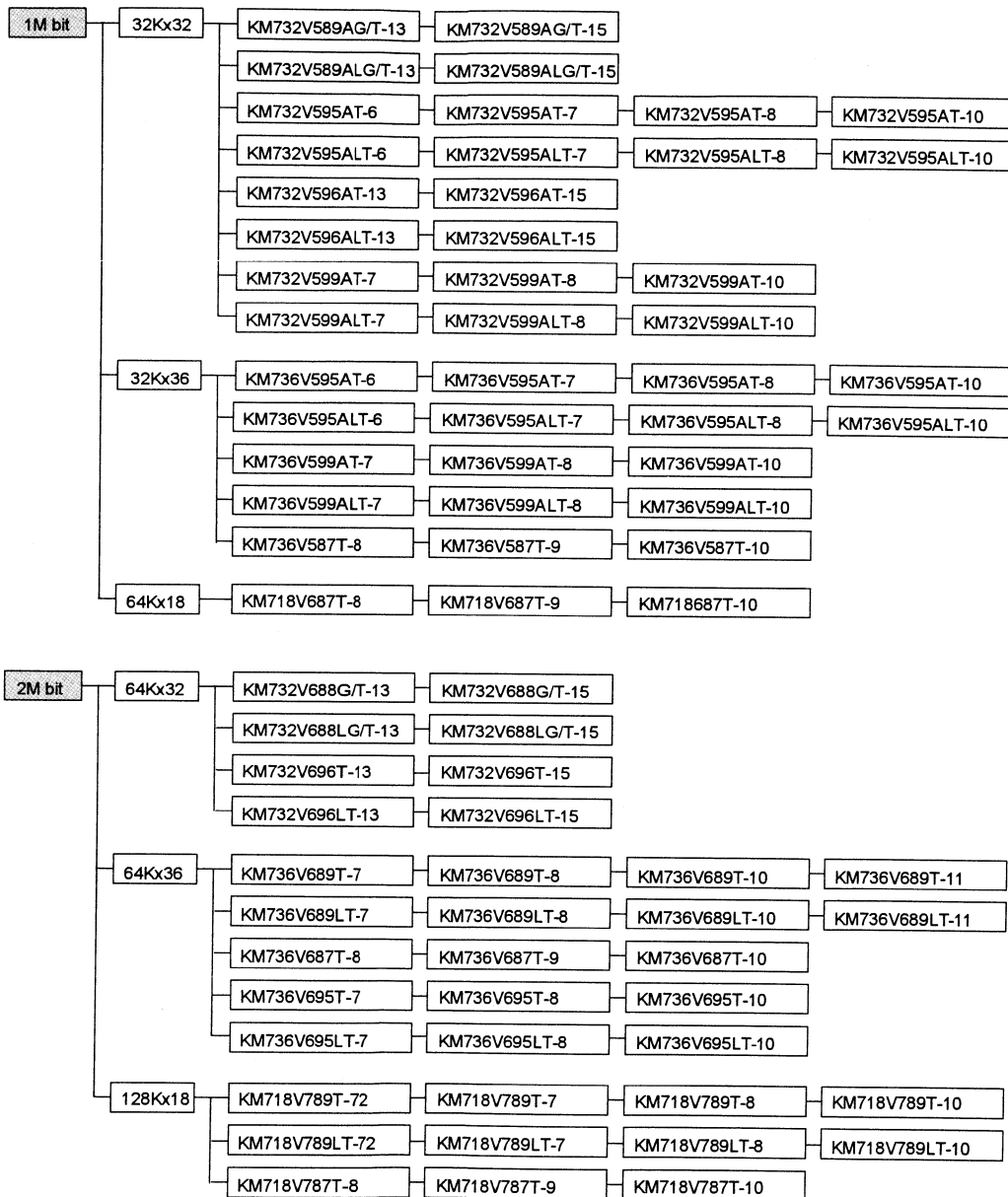


\* : New Product

\*\* : Preliminary

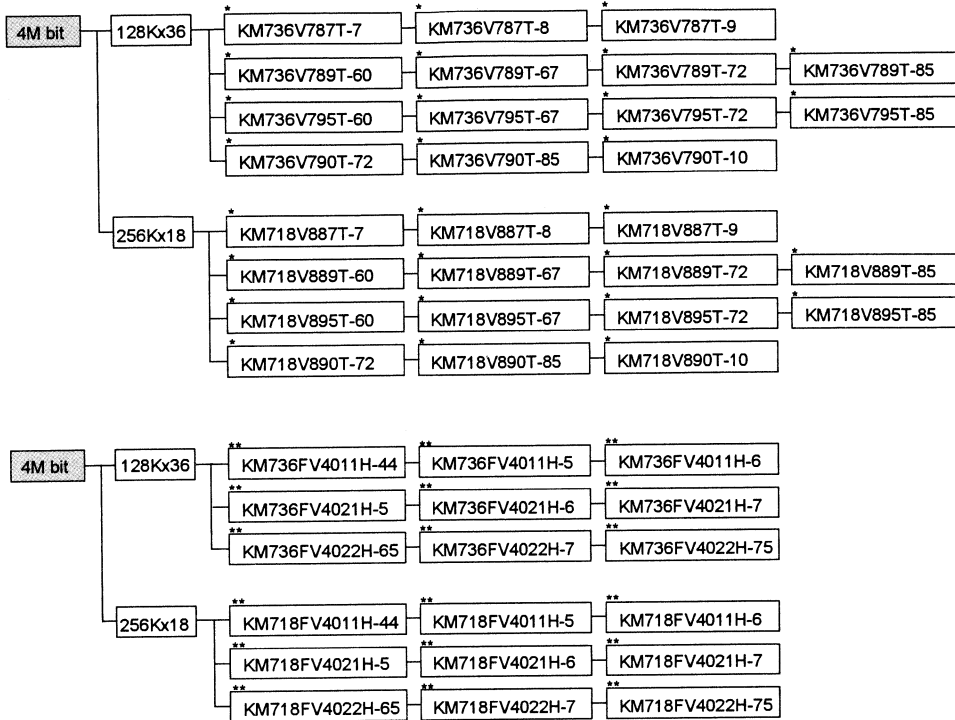
\*\*\* : Under Development

## 1.3.1. Synchronous SRAM



\* : New Product      \*\* : Preliminary      \*\*\* : Under Development

## 1.3.2. High Performance Synchronous SRAM



\* : New Product

\*\* : Preliminary

\*\*\* : Under Development



## 2. SRAM FUNCTION GUIDE

### 2.1.1. Low Power(5.0V Operation) SRAM

Den.	Org.	Product No	Op.Temp	Speed	Icc2/Isb1 (mA/μA)	Package
256K	32K x 8	KM62256CL KM62256CL-L	0~70°C	55/70	70/100 70/20	28-DIP-600 28-SOP-450 28-TSOP1-0813.4F/R
		KM62256CLE KM62256CLE-L	-25~85°C	70	70/100 70/50	
		KM62256CLI KM62256CLI-L	-40~85°C	70	70/100 70/50	
		KM62256DL KM62256DL-L	0~70°C	55/70	60/30 60/5	
		KM62256DLI KM62256DLI-L	-40~85°C	70	60/50 60/15	
512K	64K x 8	KM68512AL KM68512AL-L	0~70°C	55/70	70/100 70/20	32-SOP-525 32-TSOP1-0820F
		KM68512ALI KM68512ALI-L	-40~85°C	70	70/100 70/50	
1M	128K x 8	KM681000BL-L	0~70°C	55/70	70/20	32-DIP-600 32-SOP-525 32-TSOP1-0820F
		KM681000BLI-L	-40~85°C	70	70/50	
		KM681000CL KM681000CL-L	0~70°C	55/70	60/50 60/10	
		KM681000CLI KM681000CLI-L	-40~85°C	70	60/50 60/15	
	64K x 16	KM6161000BL-L	0~70°C	55/70	120/20	44-TSOP2-400F/R
		KM6161000BLI-L	-40~85°C	70/100	120/50	
4M	512K x 8	KM684000AL KM684000AL-L	0~70°C	55/70	90/100 90/20	32-DIP-600 32-SOP-525 32-TSOP2-400F/R
		KM684000ALI KM684000ALI-L	-40~85°C	70	90/100 90/50	
		KM684000BL KM684000BL-L	0~70°C	55/70	80/100 20/20	
		KM684000BLI KM684000BLI-L	-40~85°C	70	80/100 80/50	
	256Kx16	KM6164000BL-L	0~70°C	55/70	130/20	44TSOP2-400F/R
		KM6164000BLI-L	-40~85°C	70/100	130/50	

Note1. Refer to the ordering information for more detail description of each product.

\* : New Product

\*\* : Preliminary

\*\*\* : Under development

## 2.1.2. Low Power and Low Voltage(2.5V,3.0V, 3.3V Operation) SRAM

Den.	Org. & Vcc	Product No <sup>note1</sup>	Op.Temp	Speed	Icc2/Iss1 (mA/μA)	Package
256K	32K x 8 (Vcc=3.0~3.6V)	KM62V256CL-L	0~70°C	70/100	35/10	28-SOP-450 28-TSOP1-0813.4F/R
		KM62V256CLE-L	-25~85°C	70/100	35/20	
		KM62V256CLI-L	-40~85°C	70/100	35/20	
	32K x 8 (Vcc=2.7~3.3V)	KM62U256DL-L**	0~70°C	70/100	35/10	
		KM62V256DLE-L**	-25~85°C	85/100	35/20	
		KM62U256DIL-L**	-40~85°C	85/100	35/20	
512K	64K x 8 (Vcc=3.0~3.6V)	KM68V512AL-L	0~70°C	70/85/100	40/10	32-SOP-525 32-TSOP1-0820F
		KM68V512ALE-L	-25~85°C	70/85/100	40/20	
		KM68V512ALI-L	-40~85°C	70/85/100	40/20	
	64K x 8 (Vcc=2.7~3.3V)	KM68V512BL-L	0~70°C	85/100	40/10	
		KM68V512BLI-L	-40~85°C	85/100	40/20	
		64K x 8 (Vcc=2.7~3.3V)	KM68U512AL-L	0~70°C	85/100	
KM68U512ALE-L	-25~85°C		85/100	45/15		
KM68U512ALI-L	-40~85°C		85/100	45/15		
1M	128K x 8 (Vcc=3.0~3.6V)	KM68V1000BL-L	0~70°C	70/100	40/15	32-SOP-525 32-TSOP1-0820F/R
		KM68V1000BLE-L	-25~85°C	70/100	40/20	
		KM68V1000BLI-L	-40~85°C	70/100	40/20	
	128K x 8 (Vcc=2.7~3.3V)	KM68V1000CL-L	0~70°C	70/100	40/10	
		KM68V1000CLE-L	-25~85°C	70/100	40/20	
		KM68V1000CLI-L	-40~85°C	70/100	40/20	
	128K x 8 (Vcc=2.7~3.3V)	KM68U1000BL-L	0~70°C	100	40/15	32-SOP-525 32-TSOP1-0820F 32-TSOP-0813.4F
		KM68U1000BLE-L	-25~85°C	100	40/15	
		KM68U1000BLI-L	-40~85°C	100	40/15	
	64K x 16 (Vcc=3.0~3.6V)	64K x 16 (Vcc=2.7~3.3V)	KM68U1000CL-L	0~70°C	85/100	40/10
			KM68U1000CLE-L	-25~85°C	85/100	40/20
			KM68U1000CLI-L	-40~85°C	85/100	40/20
64K x 16 (Vcc=3.0~3.6V)	64K x 16 (Vcc=2.7~3.3V)	KM616V1000BL-L	0~70°C	70	65/15	44-TSOP2-400F/R
		KM616V1000BLI-L	-40~85°C	85	65/20	
64K x 16 (Vcc=2.7~3.3V)	64K x 16 (Vcc=2.7~3.3V)	KM616U1000BL-L	0~70°C	100	65/15	
		KM616U1000BLI-L	-40~85°C	100	65/20	

Note1. Refer to the ordering information for more detail description of each product.

\* : New Product

\*\* : Preliminary

\*\*\* : Under development

## 2.1.2. Low Power and Low Voltage(3.0V, 3.3V Operation) SRAM(Continued)

Den.	Org. & Vcc	Product No <sup>note1</sup>	Op.Temp	Speed	Icc2/I <sub>sa</sub> 1 (mA/μA)	Package	
2M	256K x 8 (Vcc=3.0~3.6V)	KM68V2000L-L KM68V2000LI-L	0~70°C -40~85°C	70/85 85/100	40/15 40/30	32-TSOP1-0820F 32-TSOP1-0813.4F	
		KM68V2000AL-L KM68V2000ALI-L	0~70°C -40~85°C	70/85 70/100	35/10 35/15		
	256K x 8 (Vcc=2.7~3.3V)	KM68U2000L-L KM68U2000LI-L	0~70°C -40~85°C	85/100 85/100	40/15 40/30		
		KM68U2000AL-L KM68U2000ALI-L	0~70°C -40~85°C	70/100 70/100	30/10 30/15		
	256K x 8 (Vcc=2.3~3.3V)	KM68S2000L-L** KM68S2000LI-L**	0~70°C -40~85°C	120/150 120/150	40/15 40/30		
	128Kx16 (Vcc=2.7~3.3V)	KM616U2000L-L** KM616U2000LI-L**	0~70°C -40~85°C	85/100 85/100	25/10 25/15		
128Kx16 (Vcc=2.3~3.3V)	KM616S2000L-L KM616S2000LI-L	0~70°C -40~85°C	120/150 120/150	40/10 40/15			
4M	512K x 8 (Vcc=3.0~3.6V)	KM68V4000AL KM68V4000AL-L KM68V4000ALI KM68V4000ALI-L	0~70°C -40~85°C	85 85 85 85	50/50 50/15 50/50 50/20	32-SOP-525 32-TSOP2-400	
		KM68V4000BL-L KM68V4000BLI-L	0~70°C -40~85°C	70/85/100 85/100	45/15 45/20		
		KM68V4000CL-L** KM68V4000CLI-L**	0~70°C -40~85°C	70/85/100 70/85/100	30/15 30/20		
	512K x 8 (Vcc=2.7~3.3V)	KM68U4000AL KM68U4000AL-L KM68U4000ALI KM68U4000ALI-L	0~70°C -40~85°C	85/100 85/100 85/100 85/100	50/30 50/10 50/30 50/15		
		KM68U4000BL-L KM68U4000BLI-L	0~70°C -40~85°C	70/85/100 85/100	45/15 45/20		
		KM68U4000CL-L** KM68U4000CLI-L**	0~70°C -40~85°C	70/85/100 70/85/100	30/15 30/20		
	512K x 8 (Vcc=2.3~2.7V)	KM68S4000CLI-L**	-40~85°C	100/120	16/15		
	256K x 16 (Vcc=3.0~3.6V)	KM616V4000BL-L KM616V4000BLI-L	0~70°C -40~85°C	70/85 85/100	60/15 60/20		44-TSOP2-400F/R 48-CSP
		KM616V4000CL-L** KM616V4000CLI-L**	0~70°C -40~85°C	70/85/100 70/85/100	50/15 50/20		44-TSOP2-400F/R
	512K x 8 (Vcc=2.7~3.3V)	KM616U4000BL-L KM616U4000BLI-L	0~70°C -40~85°C	85/100 85/100	60/15 60/20		44-TSOP2-400F/R 48-CSP
		KM616U4000CL-L** KM616U4000CLI-L**	0~70°C -40~85°C	70/85/100 70/85/100	45/15 45/20		44-TSOP2-400F/R
		KM616U4010CLI-L**	-40~85°C	70/85/100	45/20		48-CSP
		KM616U4110CLI-L**	-40~85°C	70/85/100	45/20		
	512K x 8 (Vcc=2.3~2.7V)	KM616S4000CLI-L**	-40~85°C	100/120	25/15		44-TSOP2-400F/R
KM616S4110CLI-L**		-40~85°C	100/120	25/15	48-CSP		

Note1. Refer to the ordering information for more detail description of each product.

\* : New Product, \*\* : Preliminary, \*\*\* : Under development

## 2.1.3. Super Low Power and Low Voltage(Full CMOS) SRAM

Den.	Org.	Product No <sup>Note1</sup>	Op.Temp	Speed	Icc2/Isb1 (mA/μA)	Package
1M	128K x 8 (Vcc=3.0~3.6V)	KM68FV1000	0~70°C	70/85	55/5	32-SOP-525 32-TSOP1-0820F/R 32-TSOP1-0813.4F/R 48-CSP
		KM68FV1000I	-40~85°C	70/85	55/5	
	128K x 8 (Vcc=2.3~3.3V)	KM68FS1000	0~70°C	120/150 70/85	30/5 50/5	
		KM616FS1010	0~70°C	120/150 70/85	30/5 50/5	
	128K x 8 (Vcc=1.8~2.7V)	KM68FR1000	0~70°C	300	15/5	
		KM68FR1000I	-40~85°C	300	15/5	
	64Kx16 (Vcc=3.0~3.6V)	KM616FV1000	0~70°C	70/85	80/5	44-TSOP2-400F/R
		KM616FV1000I	-40~85°C	70/85	80/5	
	64Kx16 (Vcc=2.3~3.3V)	KM616FS1000	0~70°C	120/150 70/85	50/5 80/5	
		KM616FS1000I	-40~85°C	120/150 70/85	50/5 80/5	
		KM616FS1010	0~70°C	120/150 70/85	50/5 80/5	44-TSOP2-400F/R 48-CSP
		KM616FS1010I	-40~85°C	120/150 70/85	50/5 80/5	
	64Kx16 (Vcc=1.8~2.7V)	KM616FR1000	0~70°C	300	20/5	44-TSOP2-400F/R
		KM616FR1000I	-40~85°C	300	20/5	
KM616FR1010		0~70°C	300	20/5	44-TSOP2-400F/R 48-CSP	
KM616FR1010I		-40~85°C	300	20/5		
2M	256K x 8 (Vcc=3.0~3.6V)	KM68FV2000	0~70°C	70/85	60/10	32-SOP-525 32-TSOP1-0820F/R 32-TSOP1-0813.4F/R
		KM68FV2000I	-40~85°C	70/85	60/10	
	256K x 8 (Vcc=2.7~3.3V)	KM68FU2000AI	-40~85°C	70/100	35/10	
	256K x 8 (Vcc=2.3~3.3V)	KM68FS2000	0~70°C	120/150 70/85	30/10 55/10	
		KM68FS2000I	-40~85°C	120/150 70/85	30/10 55/10	
	256K x 8 (Vcc=1.8~2.7V)	KM68FR2000	0~70°C	300	15/10	
		KM68FR2000I	-40~85°C	300	15/10	
	128K x 16 (Vcc=3.0~3.6V)	KM616FV2000	0~70°C	70/85	80/10	44-TSOP2-400F/R
		KM616FV2000I	-40~85°C	70/85	80/10	
	128K x 16 (Vcc=2.7~3.3V)	KM616FU2010AI	-40~85°C	70/100	45/10	48-CSP
	128K x 16 (Vcc=2.7~3.3V)	KM616FS2000	0~70°C	120/150 70/85	50/10 80/10	44-TSOP2-400F/R 48-CSP
		KM616FS2000I	-40~85°C	120/150 70/85	50/10 80/10	
	128K x 16 (Vcc=1.8~2.7V)	KM616FR2000	0~70°C	300	20/10	44-TSOP2-400F/R 48-CSP
		KM616FR2000I	-40~85°C	300	20/10	

Note1. Refer to the ordering information for more detail description of each product.

\* : New Product

\*\* : Preliminary

\*\*\* : Under development

## 2.1.3. Super Low Power and Low Voltage(Full CMOS) SRAM

Den.	Org.	Product No <sup>Note1</sup>	Op.Temp	Speed	Icc2/Isb1 (mA/μA)	Package
4M	256Kx16 (Vcc=2.7~3.3V)	KM616FU4010I	-40~85°C	70/100	45/10	48-CSP
	256Kx16 (Vcc=2.4~2.6V)	KM616FS4010I KM616FS4110I	-40~85°C	70/100	35/10	
	256Kx16 (Vcc=1.7~2.2V)	KM616FR4010I KM616FR4110I	-40~85°C	85/100	25/5	

Note1. Refer to the ordering information for more detail description of each product.

\* : New Product

\*\* : Preliminary

\*\*\* : Under development

## 2.2.1. High Speed SRAM(5V Operation)

Den.	Org.	Product No	Speed(ns)	Tech.	Power Dissipation		Package
					Active Max(mA)	Standby Max(μA)	
256K	64K x 4	KM64258E*	10/12/15	CMOS	70	2	28SOJ
		KM64258C	12/15/20	CMOS	150	2	28SOJ
	32K x 8	KM68257E, EI*	10/12/15	CMOS	80	2	28SOJ/TSOP1F
		KM68257C	12/15/20	CMOS	165	2	28SOJ/TSOP1F
1M	256K x 4	KM641003B	8/10	CMOS	150	10	32SOJ
		KM641003C*	12/15/20	CMOS	70	5	32SOJ
		KM641003A	12/15/20	CMOS	150	8	32SOJ
		KM641001B/BL	15/20	CMOS	120	5/1	28SOJ
		KM641001A	15/20	CMOS	125	8	28SOJ
	128K x 8	KM681002B, BI KM681002C/CL, CI/CLI* KM681002A, AI KM681001B KM681001A	8/10	CMOS	160	10	32SOJ/TSOP2F
			12/15/20	CMOS	75	5/0.5	32SOJ/TSOP2F
			12/15/20	CMOS	170	8	32SOJ/TSOP2F
			15/20	CMOS	125	5	32SOJ-300/400mil
			15/20	CMOS	125	8	32SOJ-400mil
	64K x 16	KM6161002B, BI KM6161002C/CL, CI/CLI* KM6161002A, AI	8/10	CMOS	200	10	44SOJ/TSOP2F
12/15/20			CMOS	95	5/0.5	44SOJ/TSOP2F	
12/15/20			CMOS	190	8	44SOJ/TSOP2F	
4M	1M x 4	KM644002C/CL, CI/CLI** KM644002B, BI KM644002A, AE, AI	10/12/15/20	CMOS	TBD	TBD	32SOJ
			10/12/15	CMOS	195	10	32SOJ/TSOP2F
			15/17/20	CMOS	150	10	32SOJ
	512K x 8	KM684002C/CL, CI/CLI** KM684002B, BI KM684002A, AE, AI	10/12/15/20	CMOS	TBD	TBD	36SOJ
			10/12/15	CMOS	210	10	36SOJ/TSOP2F
			15/17/20	CMOS	170	10	36SOJ
	256K x 16	KM6164002C/CL, CI/CLI** KM6164002B, BI KM6164002A, AE, AI	10/12/15/20	CMOS	TBD	TBD	44SOJ/TSOP2F
			10/12/15	CMOS	260	10	44SOJ/TSOP2F
			15/17/20	CMOS	210	10	44SOJ

\* : New product

\*\* : Preliminary

\*\*\* : Under development

## 2.2.2. High Speed SRAM(3.3V Operation)

Den.	Org.	Product No	Speed(ns)	Tech.	Power Dissipation		Package
					Active Max(mA)	Standby Max(mA)	
256K	32K x 8	KM68V257E/EL, EI/ELI*	12/15/20	CMOS	70	2/0.5	28SOJ/TSOP1F
		KM68V257C	15/17	CMOS	90	0.1	28SOJ/TSOP1F
1M	256K x 4	KM64V1003B	8/10	CMOS	150	5	32SOJ
		KM64V1003C*	12/15/20	CMOS	70	5	32SOJ
		KM64V1003A	12/15/20	CMOS	130	5	32SOJ
	128K x 8	KM68V1002B/BL, BI/BLI	8/10	CMOS	160	5/0.7	32SOJ/TSOP2F
		KM68V1002C/CL, CI/CIL*	12/15/20	CMOS	75	5/0.3	32SOJ/TSOP2F
		KM68V1002A, AI	12/15/20	CMOS	140	5	32SOJ/TSOP2F
64K x 16	KM616V1002B/BL, BI/BLI	8/10	CMOS	200	5/0.7	44SOJ/TSOP2F	
	KM616V1002C/CL, CI/CLI*	12/15/20	CMOS	95	5/0.3	44SOJ/TSOP2F	
	KM616V1002A, AI	12/15/20	CMOS	170	5	44SOJ/TSOP2F	
4M	1M x 4	KM64V4002C/CL, CI/CLI**	10/12/15/20	CMOS	TBD	TBD	32SOJ
		KM64V4002B/BL, BI/BLI	10/12/15	CMOS	185	10/1.2	32SOJ/TSOP2F
	512K x 8	KM68V4002C/CL, CI/CLI**	10/12/15/20	CMOS	TBD	TBD	36SOJ
		KM68V4002B/BL, BI/BLI	10/12/15	CMOS	205	10/1.2	36SOJ/TSOP2F
	256K x 16	KM616V4002C/CL, CI/CLI**	10/12/15/20	CMOS	TBD	TBD	44SOJ/TSOP2F
		KM616V4002B/BL, BI/BLI	10/12/15	CMOS	250	10/1.2	44SOJ/TSOP2F

\* : New product  
 \*\* : Preliminary  
 \*\*\* : Under development

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## 2.3.1. Specialty SRAM

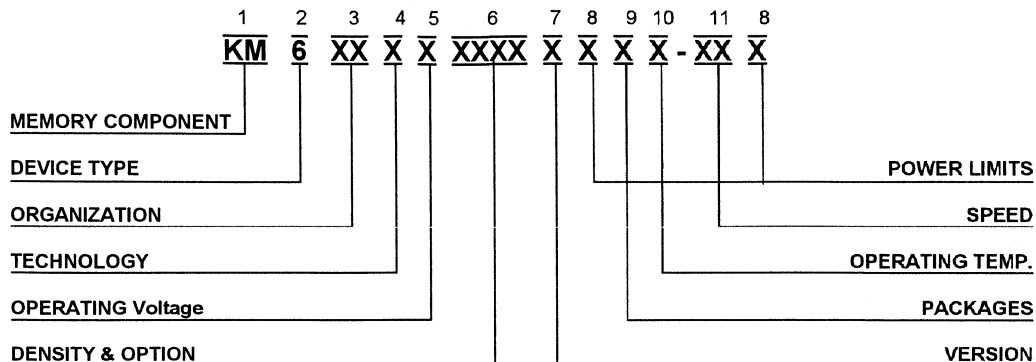
Den.	Org. & Vcc	Product No	Mode	Op.Tech	I/O	tcyc	tCD	Package
1M	32Kx32, 3.3V	KM732V589A	SPB	CMOS	3.3V	13/15	7/8	(T)QFP
		KM732V595A	SPB	CMOS	2.5V	6.6/7.5/8.6/10	4.4/5/5.5	TQFP
		KM732V596A KM732V599A	SPB SPB	CMOS CMOS	2.5V/3.3V 3.3V	13/15 7.5/8.6/10	7/8 4.5/5/5	TQFP TQFP
1M	32Kx36, 3.3V	KM736V595A	SPB	CMOS	2.5V	6.6/7.5/8.6/10	4.4/5/5.5	TQFP
		KM736V599A KM736V587	SPB SB	CMOS CMOS	3.3V 3.3V	7.5/8.6/10 12/15/17	4.5/5/5 8.5/9/10	TQFP TQFP
1M	64Kx18, 3.3V	KM718V687	SB	CMOS	3.3V	12/15/17	8.5/9/10	TQFP
2M	64Kx32, 3.3V	KM732V688	SPB	CMOS	3.3V	13/15	7/7	(T)QFP
		KM732V696	SPB	CMOS	2.5V/3.3V	13/15	7/8	TQFP
	64Kx36, 3.3V	KM736V689	SPB	CMOS	3.3V	7.5/8.6/10/11	4.5/5/5/6	TQFP
		KM736V687 KM736V695	SB SPB	CMOS CMOS	3.3V 2.5V	12/15/17 7.5/8.6/10	8.5/9/10 5/5/5.5	TQFP TQFP
128Kx18, 3.3V	KM718V789 KM718V787	SPB	CMOS	3.3V	7.2/7.5/8.6/10	4.5/4.5/5/5	TQFP	
		SB	CMOS	3.3V	12/15/17	8.5/9/10	TQFP	
4M	128Kx36, 3.3V	KM736V787*	SB	CMOS	3.3V	8.5/10/12	7.5/8/9	TQFP
		KM736V789*	SPB	CMOS	3.3V	6.0/6.7/7.2/8.5	3.5/3.8/4.0/4.0	TQFP
		KM736V795*	SPB	CMOS	2.5V	6.0/6.7/7.2/8.5	3.5/3.8/4.0/4.0	TQFP
		KM736V790*	SPB	CMOS	3.3V	7.2/8.5/10	4.5/5.0/5.0	TQFP
256Kx18, 3.3V	KM718V887* KM718V889* KM718V895* KM718V890*	SB	CMOS	3.3V	8.5/10/12	7.5/8/9	TQFP	
		SPB	CMOS	3.3V	6.0/6.7/7.2/8.5	3.5/3.8/4.0/4.0	TQFP	
		SPB	CMOS	2.5V	6.0/6.7/7.2/8.5	3.5/3.8/4.0/4.0	TQFP	
		SPB	CMOS	3.3V	7.2/8.5/10	4.5/5.0/5.0	TQFP	
4M	128Kx36, 3.3V	KM736FV4011**	RR	CMOS	1.5V	4.4/5/6	2.2/2.5/3.0	119BGA
		KM736FV4021**	RR	CMOS	3.3V	5/6/7	2.5/3.0/3.5	119BGA
		KM736FV4022**	RL	CMOS	2.5V/3.3V	6/6.5/7	6.5/7/7.5	119BGA
256Kx18, 3.3V	KM718FV4011** KM718FV4021** KM718FV4022**	RR	CMOS	1.5V	4.4/5/6	2.2/2.5/3.0	119BGA	
		RR	CMOS	3.3V	5/6/7	2.5/3.0/3.5	119BGA	
		RL	CMOS	2.5V/3.3V	6/6.5/7	6.5/7/7.5	119BGA	

- \* : New product
- \*\* : Preliminary
- \*\*\* : Under development

- SPB : Synchronous pipelined burst
- SB : Synchronous burst
- RR : Register to Register
- RL : Register to Latch



## Asynchronous SRAM



### 1. MEMORY COMPONENT

### 2. DEVICE TYPE

- . 6 ..... Async. SRAM
- . 7 ..... Sync. SRAM

### 3. ORGANIZATION

- . 1 ..... x1 bit
- . 4 ..... x4 bit
- . 2 or 8 ..... x8 bit
- . 9 ..... x9 bit
- . 16 ..... x16 bit
- . 32 ..... x32 bit

### 4. TECHNOLOGY

- . BLANK ..... CMOS
- . B ..... BiCMOS
- . F ..... Full CMOS

### 5. OPERATING Voltage

- . BLANK ..... 5.0V
- . V ..... 3.3V
- . U ..... 3.0V
- . S ..... 2.5V
- . R ..... 2.0V

### 6. DENSITY & OPTION

- . 64 ..... 64K Slow
- . 256 ..... 256K Slow
- . 257 ..... 256K Fast
- . 258 ..... 256K Fast(with  $\overline{OE}$ )
- . 512 ..... 512K Slow
- . 1000 ..... 1M Slow
- . 1001 ..... 1M Fast(Evolutionary)
- . 1002 ..... 1M Fast(Revolutionary)
- . 1003 ..... 1M Fast(Revolutionary, with  $\overline{OE}$ )
- . 1010 ..... 1M Slow,  $\overline{UB}/\overline{LB}$  Power control
- . 2000 ..... 2M Slow
- . 4000 ..... 4M Slow
- . 4002 ..... 4M Fast
- . 4010 ..... 4M Slow,  $\overline{UB}/\overline{LB}$  Power control

### 7. VERSION

- . BLANK ..... Mother Die
- . A ..... First revision
- . B ..... Second revision
- . C ..... Third revision

### 8. POWER LIMITS

- . BLANK ..... Normal Power
  - . L ..... Low Power
  - . L-L ..... Low Low Power
- \* For fCMOS product, Blank means Low Low Power,  
L means Super Low Power.

### 9. PACKAGES

- . P ..... DIP
- . G ..... SOP
- . TG ..... sTSP(Forward)
- . RG ..... sTSP(Reverse)
- . Z ..... CSP
- . J ..... SOJ or PLCC
- . T ..... TSOP(Forward)
- . R ..... TSOP(Reverse)
- . SJ ..... SOJ(300)

### 10. OPERATING TEMP.

- . BLANK ..... Commercial
- . E ..... Extended
- . I ..... Industrial

### 11. SPEED

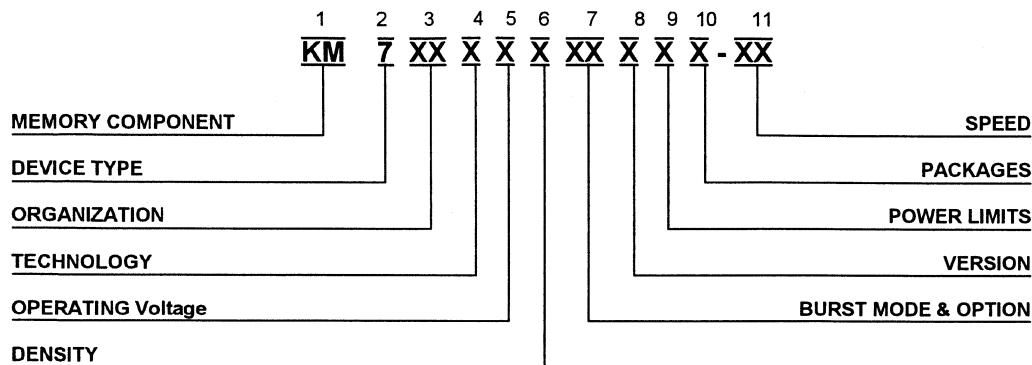
#### SLOW SRAM

- . 4 ..... 45ns
- . 5 ..... 55ns
- . 7 ..... 70ns
- . 8 ..... 85ns
- . 10 ..... 100ns
- . 12 ..... 120ns
- . 15 ..... 150ns
- . 30 ..... 300ns

#### FAST SRAM

- . 6 ..... 6ns
- . 7 ..... 7ns
- . 8 ..... 8ns
- . 10 ..... 10ns
- . 12 ..... 12ns
- . 15 ..... 15ns
- . 20 ..... 20ns
- . 25 ..... 25ns
- . 30 ..... 30ns

## Synchronous Burst SRAM



### 1. MEMORY COMPONENT

### 2. DEVICE TYPE

- . 6 ..... Async. SRAM
- . 7 ..... Sync. SRAM

### 3. ORGANIZATION

- . 16 ..... x16 bit
- . 18 ..... x18 bit
- . 32 ..... x32 bit
- . 36 ..... x36 bit

### 4. TECHNOLOGY

- . BLANK ..... CMOS
- . B ..... BiCMOS

### 5. OPERATING Voltage

- . BLANK ..... 5.0V
- . V ..... 3.3V
- . S ..... 2.5V

### 6. DENSITY

- . 5 ..... 32K Depth
- . 6 ..... 64K Depth
- . 7 ..... 128K Depth
- . 8 ..... 256K Depth

### 7. BURST MODE & OPTION

- . 47 ..... Sync. Burst NtRAM 3.3V I/O
- . 49 ..... Sync. Pipelined Burst NtRAM 3.3V I/O
- . 87 ..... SB 3.3V I/O
- . 88 ..... SB 3.3V I/O Low Speed 2E1D
- . 89 ..... SPB 3.3V I/O 2E1D
- . 90 ..... SPB 3.3V I/O 2E2D
- . 95 ..... SPB 2.5V I/O 2E1D
- . 96 ..... SPB 2.5V I/O Low Speed 2E1D

### 8. VERSION

- . BLANK ..... Mother Die
- . A ..... First revision.
- . B ..... Second revision.
- . C ..... Third revision.

### 9. POWER LIMITS

- . BLANK ..... Normal Power
- . L ..... Low Power

### 10. PACKAGES

- . H ..... BGA
- . T ..... TSOP/TQFP
- . G ..... QFP

### 11. SPEED

#### Sync Bust(CLOCK ACCESS TIME)

- . 7 ..... 7.5ns
- . 8 ..... 1M:8.5ns  
2M:8.0ns
- . 9 ..... 9.0ns
- . 10 ..... 10ns

#### Sync Pipe & Burst(CLOCK CYCLE TIME)

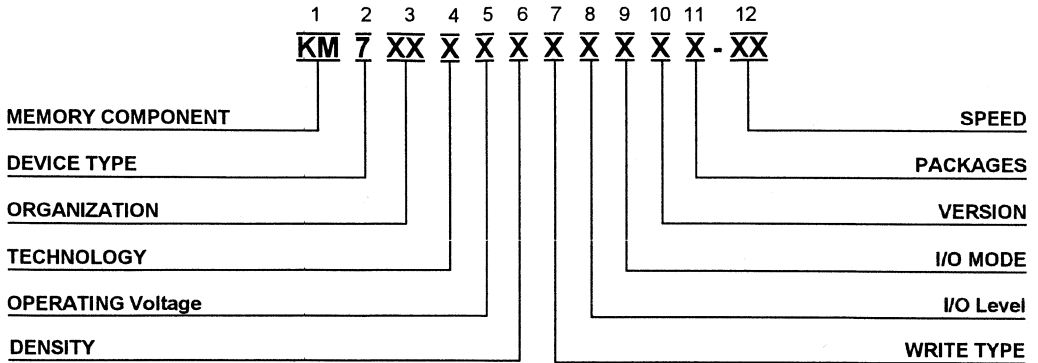
#### 1M/2M

- . 6 ..... 150MHz
- . 72 ..... 138MHz
- . 7 ..... 133MHz
- . 8 ..... 116MHz
- . 10 ..... 100MHz
- . 13 ..... 75MHz
- . 15 ..... 66MHz

#### 4M

- . 60 ..... 166MHz
- . 67 ..... 150MHz
- . 72 ..... 138MHz
- . 85 ..... 117MHz

## Synchronous Pipelined SRAM



### 1. MEMORY COMPONENT

### 2. DEVICE TYPE

- . 7 ..... Synch. SRAM

### 3. ORGANIZATION

- . 18 ..... x18 bit
- . 36 ..... x36 bit

### 4. TECHNOLOGY

- . BLANK ..... CMOS or AMOS
- . B ..... BiCMOS
- . F ..... Full CMOS

### 5. OPERATING Voltage

- . BLANK ..... 5.0V
- . V ..... 3.3V
- . S ..... 2.5V

### 6. DENSITY

- . 1 ..... 1M
- . 4 ..... 4M
- . 8 ..... 8M
- . 16 ..... 16M

### 7. WRITE TYPE

- . 0 ..... Standard Write
- . 1 ..... Late Write

### 8. I/O Level

- . 1 ..... HSTL
- . 2 ..... LVTTL/LVCMOS

### 9. I/O MODE

- . 1 ..... Registered Input and Registered Output
- . 2 ..... Registered Input and Latched Output

### 10. VERSION

- . BLANK ..... Mother Die
- . A ..... First revision.
- . B ..... Second revision.
- . C ..... Third revision.

### 11. PACKAGES

- . H ..... BGA

### 12. SPEED

#### Registered Input and Registered Output (Clock Cycle Time)

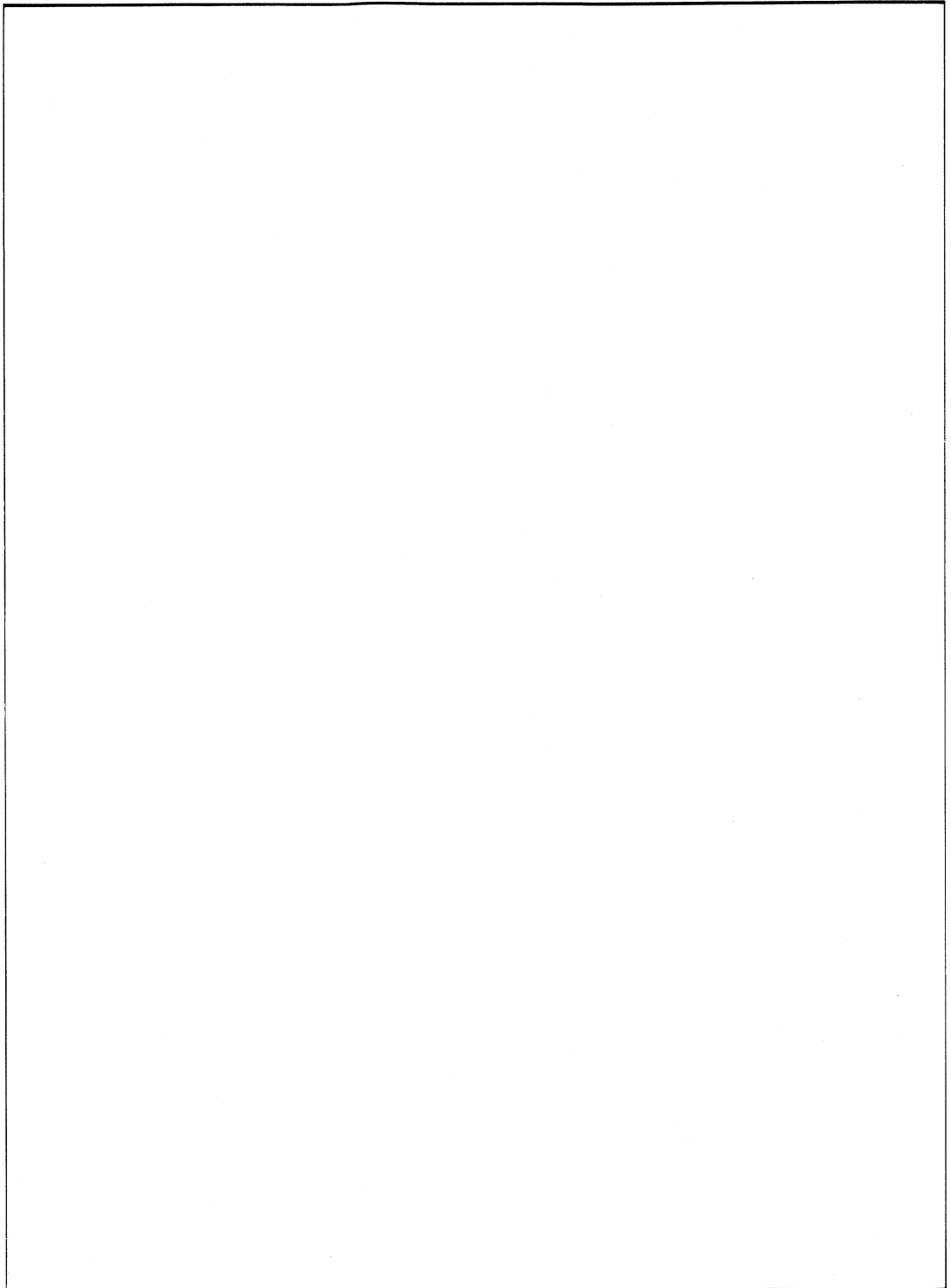
- . 4 ..... 4.0ns(250MHz)
- . 44 ..... 4.4ns(225MHz)
- . 5 ..... 5.0ns(200MHz)
- . 6 ..... 6.0ns(167MHz)
- . 7 ..... 7.0ns(143MHz)

#### Registered Input and Latched Output (Clock Access Time)

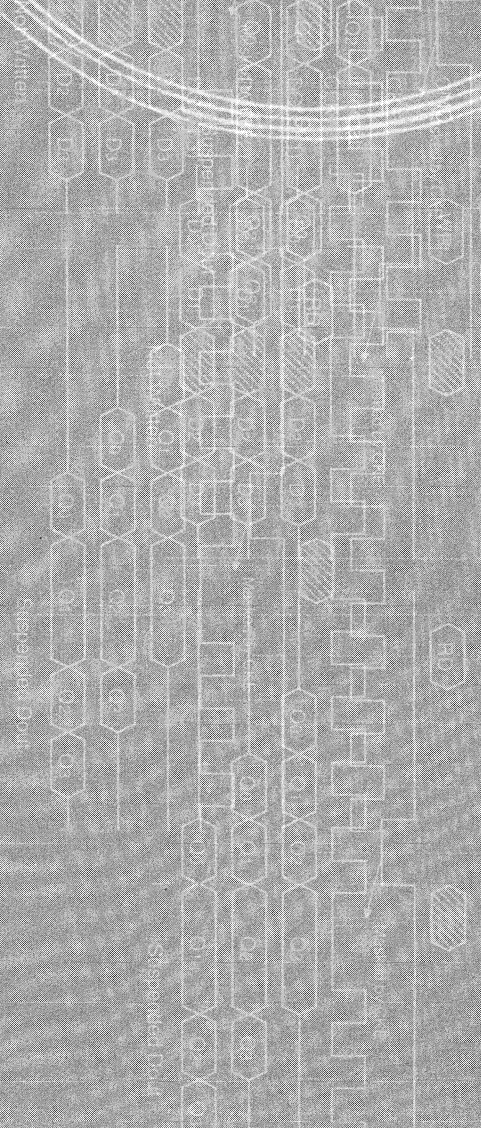
- . 5 ..... 5.0ns
- . 55 ..... 5.5ns
- . 6 ..... 6.0ns
- . 65 ..... 6.5ns
- . 7 ..... 7.0ns
- . 75 ..... 7.5ns

# NOTES

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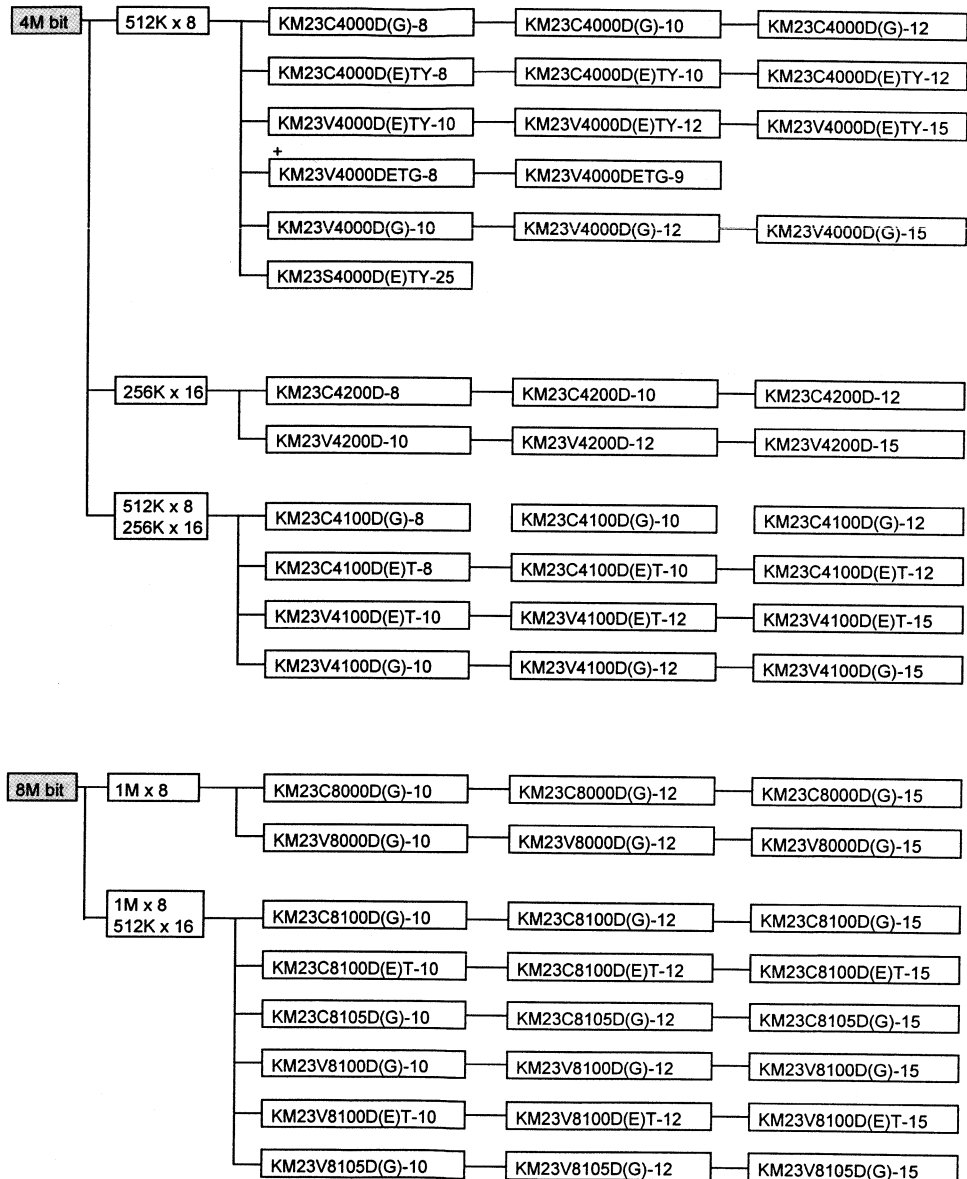


# ***Mask ROM***



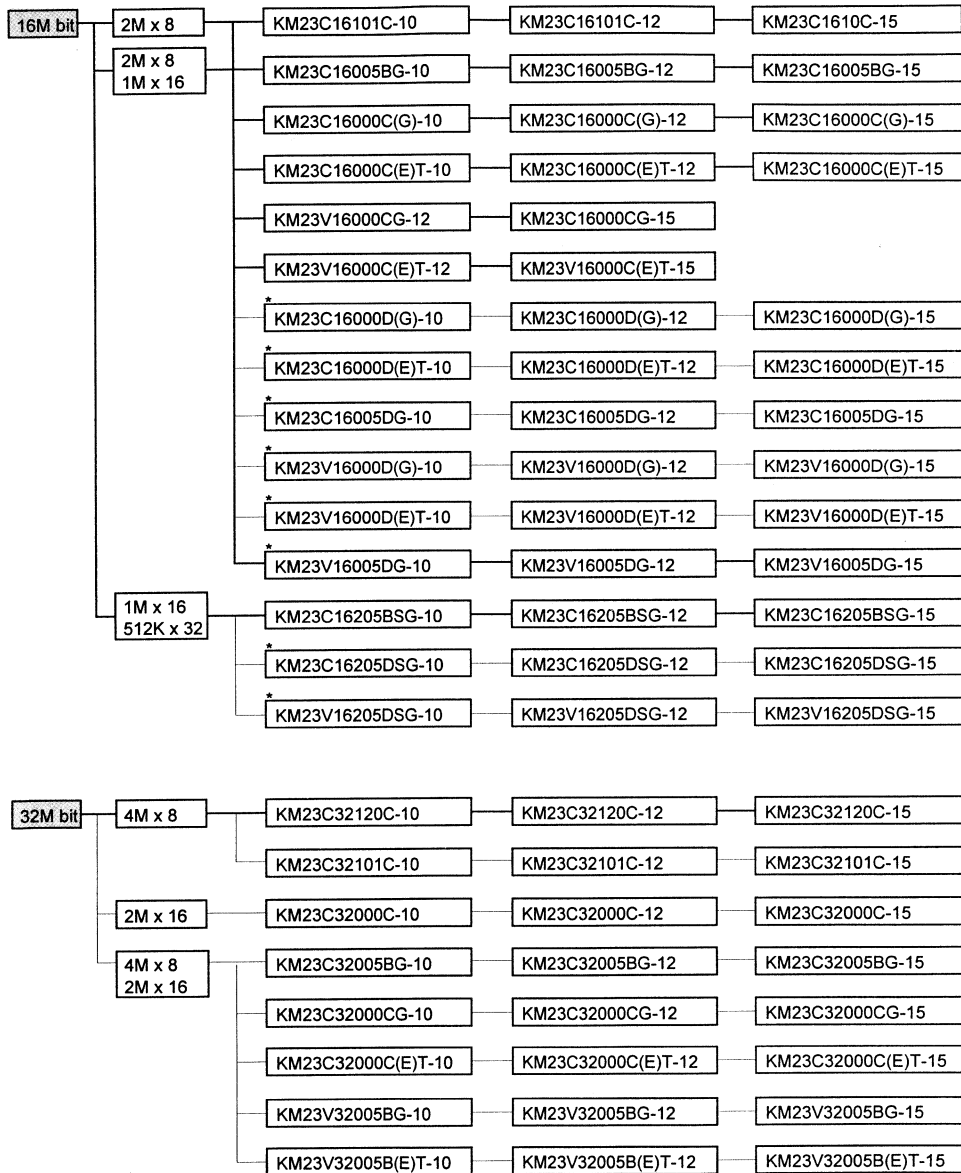


## 1. INTRODUCTION



\* : New Product

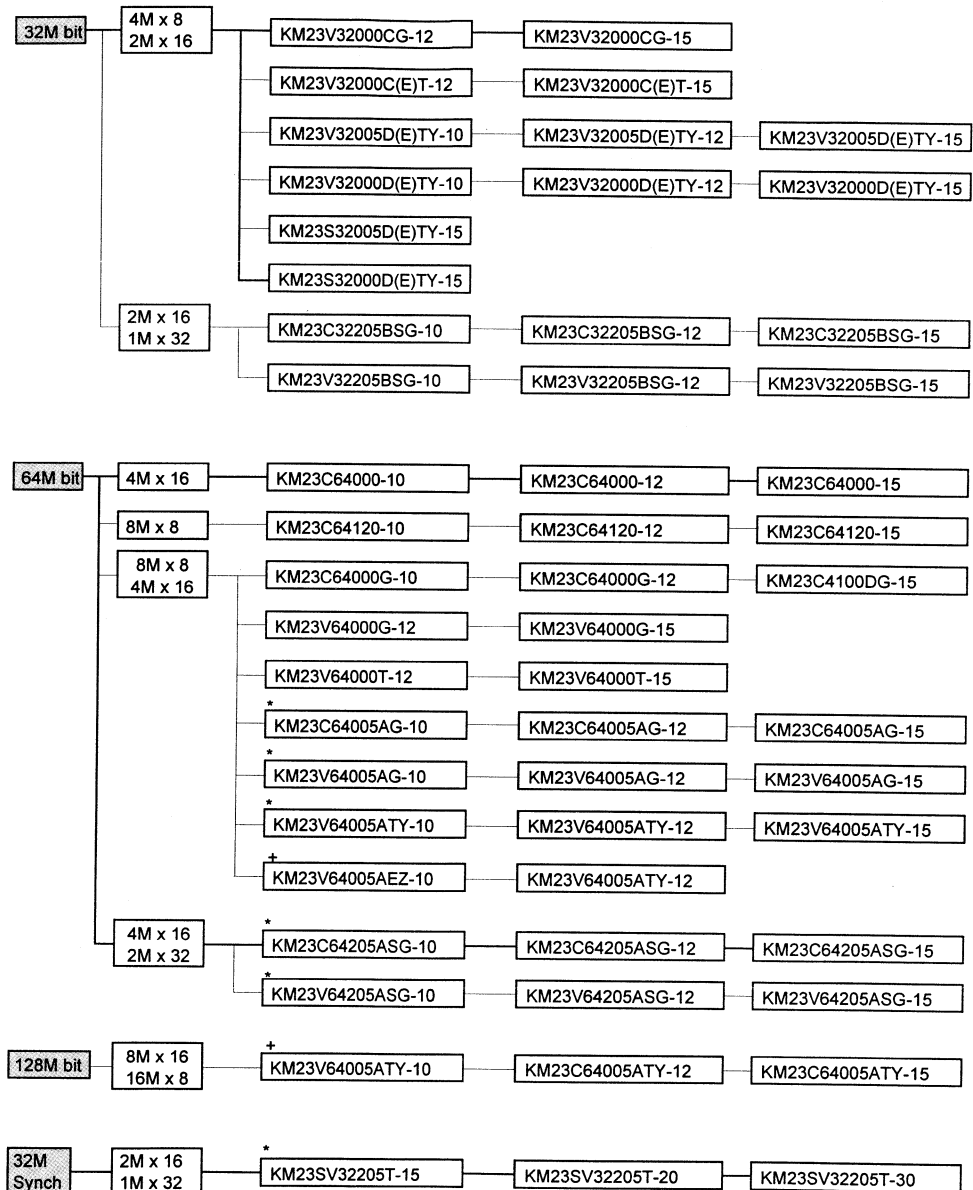
+ : Under Development



\* : New Product

+ : Under Development





\* : New Product  
 + : Under Development

## 2. PRODUCT GUIDE

Density	Power Supply	Part Number	Organization	Speed tAA[TPA]	Features	Package
4M bit	5.0V±10%	KM23C4000D(G)	512Kx8	80	-	32DIP/SOP
		KM23C4000D(E)TY	512Kx8	80	Extended	32TSOP1
		KM23C4100D(E)T	512Kx8/256Kx16	80	Extended	44TSOP2
		KM23C4100D(G)	512Kx8/256Kx16	80	-	40DIP/SOP
		KM23C42000D	256Kx16	80	EPROM TYPE	40DIP
	3.3V±0.3V 3.0V±0.3V	KM23V4000D(G)	512Kx8	100/120	-	32DIP/SOP
		KM23V4000D(E)TY	512Kx8	100/120	Extended	32TSOP1
		KM23V4100D(E)T	512Kx8/256Kx16	100/120	Extended	44TSOP2
		KM23V4100D(G)	512Kx8/256Kx16	100/120	-	40DIP/SOP
2.5V±0.2V	KM23V4200D	256Kx16	100/120	EPROM TYPE	40DIP	
	KM23V4000DETG	512Kx8	85/95	Extended	32sTSOP1	
8M bit	5.0V±10%	KM23C8000D(G)	1Mx8	100	-	32DIP/SOP
		KM23C8100D(G)	1Mx8/512Kx16	100	-	42DIP/44SOP
		KM23C8100D(E)T	1Mx8/512Kx16	100	Extended	44TSOP2
		KM23C8105D(G)	1Mx8/512Kx16	100[30]	-	42DIP/44SOP
	3.3V±0.3V 3.0V±0.3V	KM23V8000D(G)	1Mx8	100/120	-	32DIP/SOP
		KM23V8100D(G)	1Mx8/512Kx16	100/120	-	42DIP/44SOP
		KM23V8100D(E)T	1Mx8/512Kx16	100/120	Extended	44TSOP2
		KM23V8105D(G)	1Mx8/512Kx16	100[30]/120[50]	-	42DIP/44SOP
		KM23C16205BSG	1Mx16/512Kx32	100[30]	-	70SSOP
16M bit	5.0V±10%	KM23C16005BG	2Mx8/1Mx16	100[50]	-	44SOP
		KM23C16000C(G)	2Mx8/1Mx16	100	-	42DIP/44SOP
		KM23C16101C	2Mx8	100	-	36DIP
		KM23C16000C(E)T	2Mx8/1Mx16	100	Extended	44TSOP2
		KM23C16000D(G)	2Mx8/1Mx16	100	-	42DIP/44SOP
		KM23C16000D(E)T	2Mx8/1Mx16	100	Extended	44TSOP2
		KM23C15005DG	2Mx8/1Mx16	100/30	-	44SOP
		KM23C16205DSG	1Mx16/512Kx32	100/30	-	70SSOP
	3.3V±0.3V 3.0V±0.3V	KM23V16000CG	2Mx8/1Mx16	120/150	-	44SOP
		KM23V16000C(E)T	2Mx8/1Mx16	120/150	Extended	44TSOP2
		KM23V16000D(G)	2Mx8/1Mx16	100	-	42DIP/44SOP
		KM23V16000D(E)T	2Mx8/1Mx16	100	Extended	44TSOP2
		KM23V16005DG	2Mx8/1Mx16	100/30	-	44SOP
		KM23V16205DSG	1Mx16/512Kx32	100/30	-	70SSOP

\* : New Product

+ : Under Development

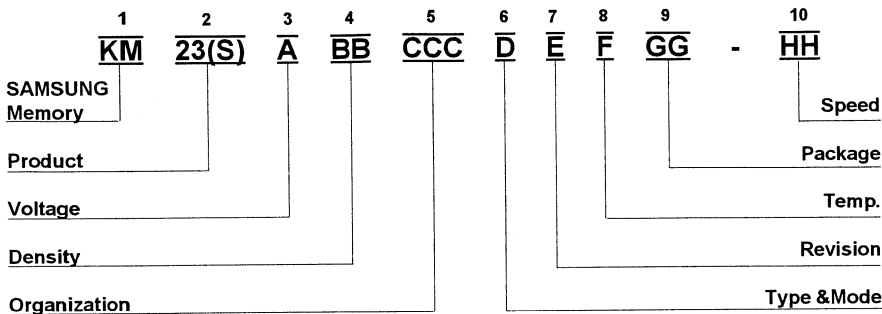
1

Density	Power Supply	Part Number	Organization	Speed tAA[tpA]	Features	Package
32M bit	5.0V±10%	KM23C32205BSG	2Mx16/1Mx32	100[30]	-	70SSOP
		KM23C32005BG	4Mx8/2Mx16	100[30]	-	44SOP
		KM23C32000CG	4Mx8/2Mx16	100	-	44SOP
		KM23C32000C(E)T	4Mx8/2Mx16	100	Extended	44TSOP2
		KM23C32000C	2Mx16	100	-	42DIP
		KM23C32101C	4Mx8	100	-	36DIP
	KM23C32120C	4Mx8	100	-	42DIP	
	3.3V±0.3V 3.0V±0.3V	KM23V32205BSG	2Mx16/1Mx32	100[30]	-	70SSOP
		KM23V32005BG	4Mx8/2Mx16	100[30]	-	44SOP
		KM23V32005B(E)T	4Mx8/2Mx16	100[30]	-	44TSOP2
		KM23V32000CG	4Mx8/2Mx16	120/150	-	44SOP
		KM23V32000C(E)T	4Mx8/2Mx16	120/150	Extended	44TSOP2
		KM23V32005D(E)TY	4Mx8/2Mx16	100[30]	Extended	48TSOP1
	2.5V±0.2V	KM23S32005D(E)TY	4Mx8/2Mx16	150[50]	Extended	48TSOP1
		KM23S32000D(E)TY	4Mx8/2Mx16	150	Extended	48TSOP1
64M bit	5.0V±10%	KM23C64000G	8Mx8/4Mx16	100	-	44SOP
		KM23C64000	4Mx16	100	-	42DIP
		KM23C64120	8Mx8	100	-	42DIP
		KM23C64000T	8Mx8/4Mx16	100	-	44TSOP2
		KM23C64005AG	8Mx8/4Mx16	100[30]	-	44SOP
		KM23C64205ASG	4Mx16/2Mx32	100[30]	-	70SSOP
	3.3V±0.3V 3.0V±0.3V	KM23V64000G	8Mx8/4Mx16	120/150	-	44SOP
		KM23V64000T	8Mx8/4Mx16	120/150	-	44TSOP2
		KM23V64005AG	8Mx8/4Mx16	100[30]/120[40]	-	44SOP
		KM23V64005ATY	8Mx8/4Mx16	100[30]/120[40]	-	48TSOP1
		KM23V64205ASG	4Mx16/2Mx32	100[30]/120[40]	-	70SSOP
		KM23V64005AEZ	8Mx8/4Mx16	100[30]/110[40]	Extended	48uBGA
128M bit	3.3V±0.3V 3.0V±0.3V	KM23V128005TY (+)	16Mx8/8Mx16	100[30]	-	48TSOP1
		KM23V128205SG(+)	8Mx16/4Mx32			70SSOP

Density	Power Supply	Part Number	Organization	Frequency	Features	Package
32M bit Synch.	3.3V±0.3V	KM23SV32205T	2Mx16/1Mx32	66/50/33MHz	-	86TSOP2

\*: New Product  
+: Under Development

**ORDERING INFORMATION**



**1. SAMSUNG Memory(KM)**

**2. Product**

23 ----- Asynch. MaskROM  
23S ----- Synch. MaskROM

**3. Voltage**

C ----- 5.0V  
V ----- 3.3/3.0V  
S ----- 2.5V

**4. Density**

4 ----- 4M bit  
8 ----- 8M bit  
16 ----- 16M bit  
32 ----- 32M bit  
64 ----- 64M bit  
128 ----- 128M bit

**5. Organization**

4M/8M bit ----- 00 : 8bit data out  
10/20 : 16bit  
16M/32M bit ----- 00 : 16bit  
10/12 : 8bit  
20 : 32bit  
64M bit ----- 00 : 16bit  
12 : 8bit  
20 : 32bit  
128Mbit ----- 00 : 16bit

**\* Internal KF-code Information**

: The KF-code is used to manage MROM internally.

**6. Type & Mode**

0 ----- Commercial  
1 ----- Multi OE  
5 ----- Page Mode

**7. Revision**

Blank ----- 1st Gen.  
A ----- 2nd Gen.  
B ----- 3rd Gen.  
C ----- 4th Gen.  
D ----- 5th Gen.

**8. Temp.**

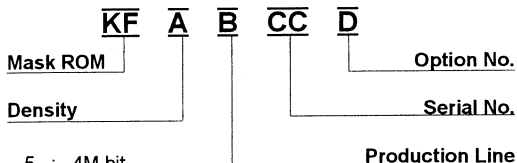
Blank ----- Commercial(0 ~ 70°C)  
E ----- Extended(-20°C ~ 85°C)

**9. Package Type**

Blank : DIP / G : SOP / SG : SSOP  
T : TSOP2 / TY : TSOP1 / TG : sTSOP1 / Z : uBGA

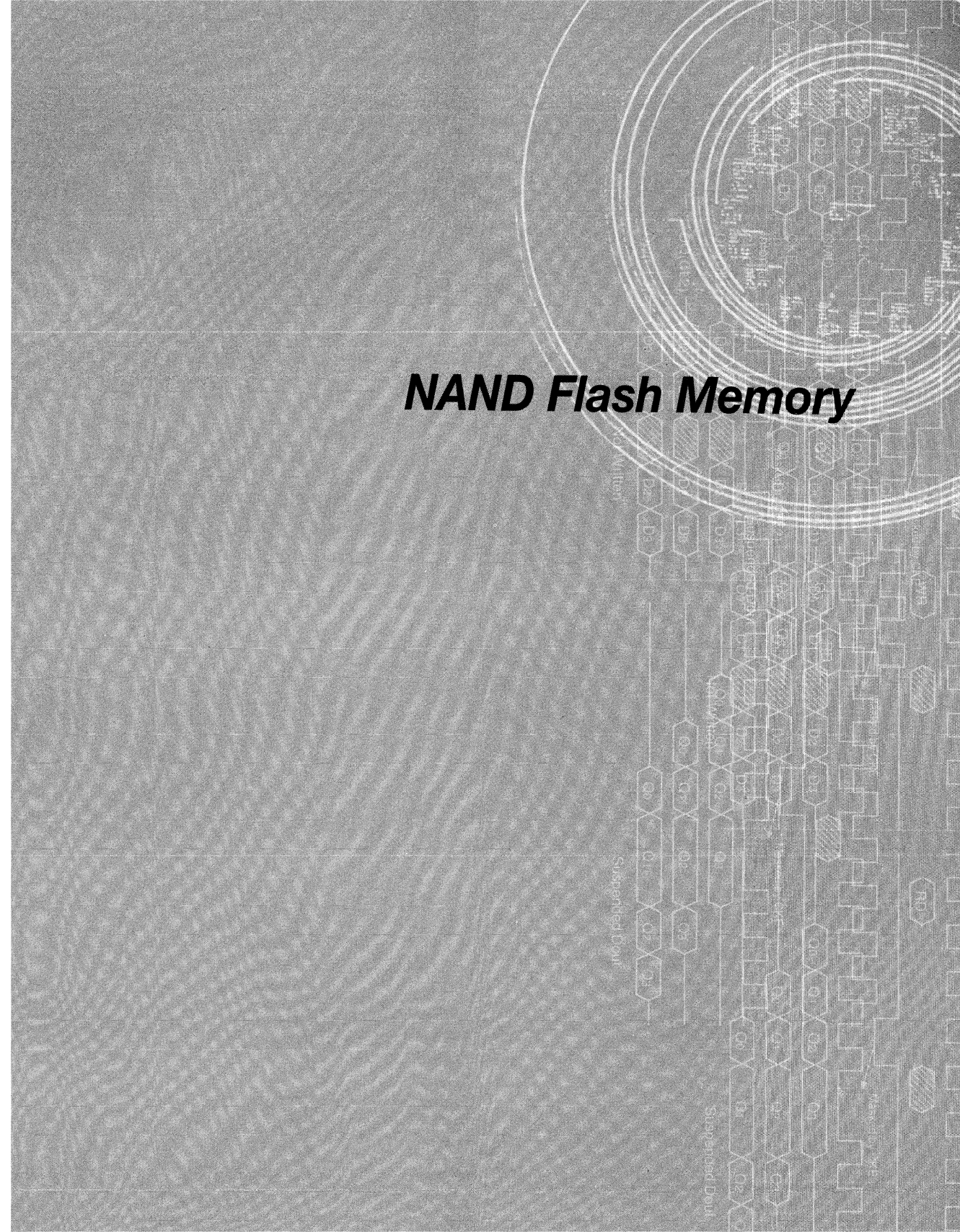
**10. Speed**

8 : 80ns / 10 : 100ns / 12 : 120ns / 15 : 150ns  
20 : 200ns / 25 : 250ns



5 : 4M bit  
X : 8M bit  
6 : 16M bit  
W : 32M bit  
7 : 64M bit  
 : 128M bit

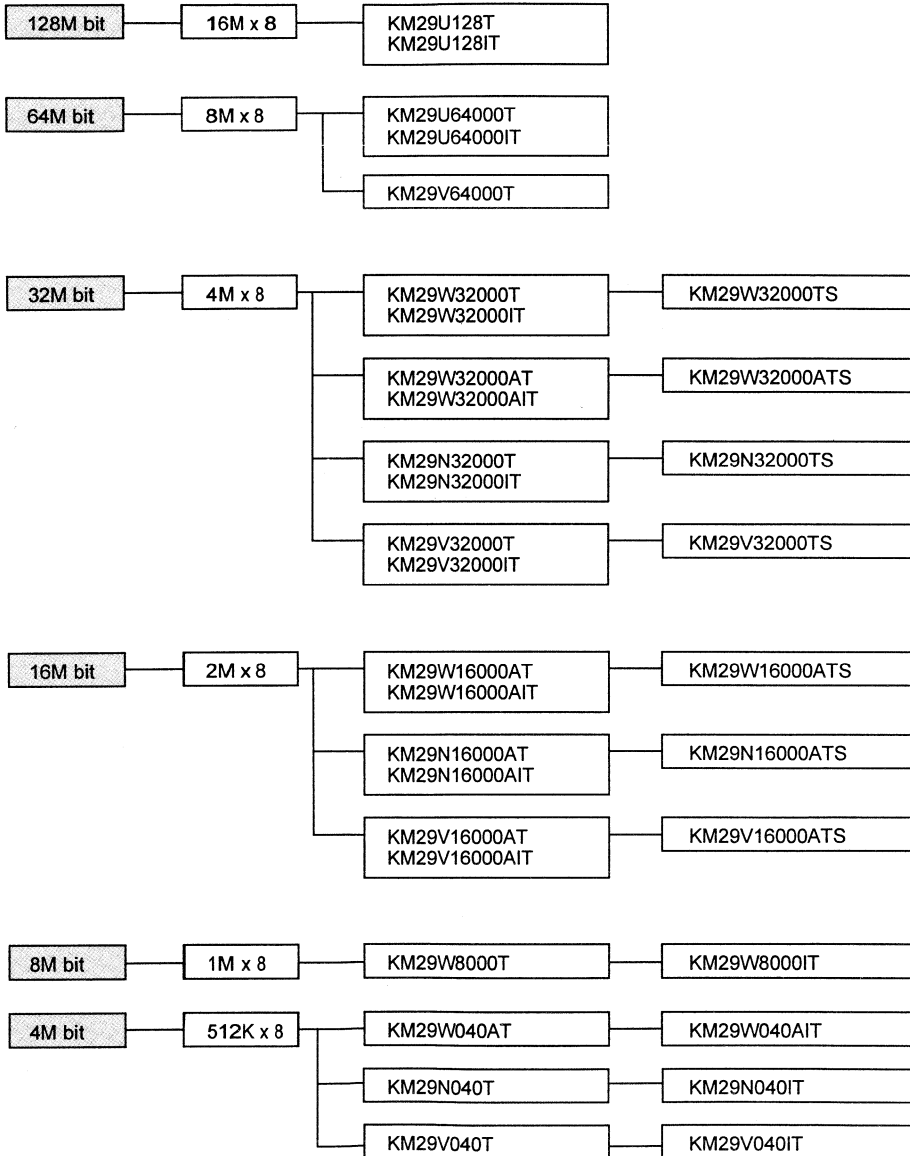
# ***NAND Flash Memory***





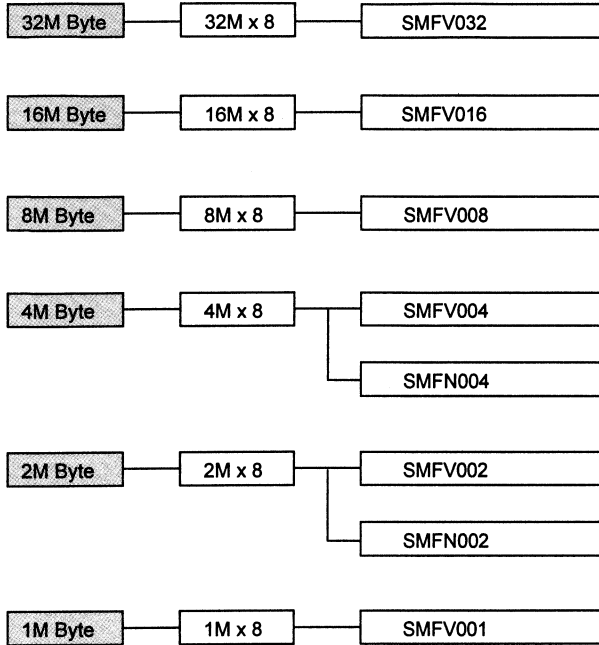
1. INTRODUCTION

< FLASH MEMORY >



1

< SmartMedia™ >





2. PRODUCT GUIDE

< FLASH MEMORY >

Density	Org.	Power Supply	Part Number	Speed	Features	Package
128M bit	16M x 8	2.7V~3.6V	KM29U128T	tr=7μs trc=50ns	512B Page Mode 16KB Block Size	48 TSOP I
			KM29U128IT			
64M bit	8M x 8	2.7V~3.6V	KM29U64000T	tr=7μs trc=50ns	512B Page Mode 16KB Block Size	48 TSOP I
			KM29U64000IT			
		3.3V±10%	KM29V64000T			
32M bit	4M x 8	2.7V~5.5V	KM29W32000T	tr=10μs trc=50ns	512B Page Mode 8KB Block Size	44(40)TSOP II
			KM29W32000IT			
			KM29W32000TS			
			KM29W32000AT			
			KM29W32000AIT			
			KM29W32000ATS			
		5.0V±10%	KM29N32000T			
			KM29N32000IT			
			KM29N32000TS			
		3.3V±10%	KM29V32000T			
			KM29V32000IT			
			KM29V32000TS			
16M bit	2M x 8	2.7V~5.5V	KM29W16000AT	tr=10μs trc=80ns	256B Page Mode 4KB Block Size	44(40)TSOP II
			KM29W16000AIT			
			KM29W16000ATS			
		5.0V±10%	KM29N16000AT			
			KM29N16000AIT			
			KM29N16000ATS			
		3.3V±10%	KM29V16000AT			
			KM29V16000AIT			
			KM29V16000ATS			
8M bit	1M x 8	2.7V~5.5V	KM29W8000T	tr=15μs trc=120ns	32B Frame Mode 4KB Block Size	44(40)TSOP II
			KM29W8000IT			
4M bit	512K x 8	3.0V~5.5V	KM29W040AT	tr=15μs trc=120ns	32B Frame Mode 4KB Block Size	44(40)TSOP II
			KM29W040AIT			
		5.0V±10%	KM29N040T			
			KM29N040IT			
		3.3V±10%	KM29V040T			
			KM29V040IT			

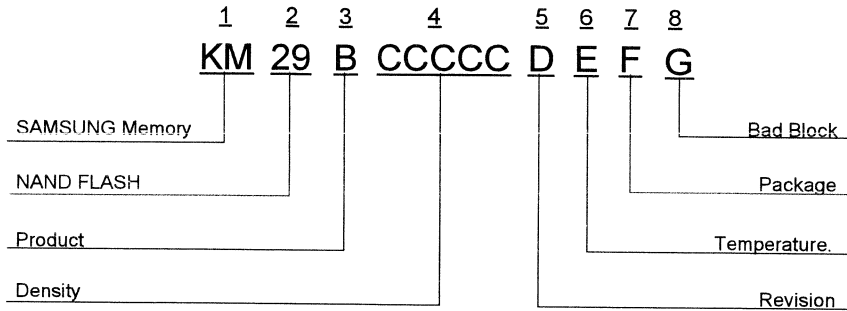
1

< SmartMedia™ >

Density	Org.	Power Supply	Part Number	Speed	Features	Package
32M Byte	32M x 8	2.7V~3.6V	SMFV032	tR=7μs trc=50ns	512B Page Mode 16KB Block Size	SmartMrdia™ (22PAD)
16M Byte	16M x 8	2.7V~3.6V	SMFV016			
8M Byte	8M x 8	2.7V~3.6V	SMFV008	tR=10μs trc=50ns	512B Page Mode 8KB Block Size	
4M Byte	4M x 8	3.3V±10%	SMFV004			
		5V±10%	SMFN004			
2M Byte	2M x 8	3.3V±10%	SMFV002	tR=10μs trc=80ns	512B Page Mode 4KB Block Size	
		5V±10%	SMFN002			
1M Byte	1M x 8	2.7V~3.6V	SMFV001			

3. ORDERING INFORMATION

NAND FLASH MEMORY



1. SAMSUNG Memory

2. NAND Flash

3. Product

- N -----5V
- V -----3.3V
- W -----2.7V~5.5V
- U -----2.7V~3.6V

4. Density

- 040 ----- 4M bit
- 8000 ----- 8M bit
- 16000 ----- 16M bit
- 32000 ----- 32M bit
- 64000 ----- 64M bit
- 128 -----128M bit

5. Revision

- Blank -----1st Generation
- A -----2nd Generation
- B -----3rd Generation

6. Temperature

- Blank ----- Commercial(0~70 °C)
- I ----- Industrial (-40~85 °C)

7. Package Type

- T ----- 44(40)TSOP II(Forward)  
48 TSOP I(128M bit Only)

8. Bad Block

- Blank ----- Include Bad Block(s)
- S ----- All Good Blocks



# NOTES

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**SALES OFFICES and MANUFACTURER'S  
REPRESENTATIVES**

**2**



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## SAMSUNG SEMICONDUCTOR SALES OFFICE-U.S.A.

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### **Northwest**

3655 North First Street  
San Jose, CA 95134  
TEL : 408-544-4000  
FAX : 408-544-4934

### **Southwest**

7700 Irvine Center Drive  
Suite 150, Irvine, CA 92618  
TEL : 714-753-7530  
FAX : 714-753-7544

### **North Central**

1111 Plaza Drive, Suite 100  
Schaumburg, IL 60173  
TEL : 847-969-9515  
FAX : 847-969-9509

### **South Central**

8303 Mopac Blvd. Suite A100  
Austin, TX 78759  
TEL : 512-342-1904  
FAX : 512-342-1915

### **Northeast**

238 Littleton Road, Suite 201  
Westford, MA 01886  
TEL : 978-392-2220  
FAX : 978-392-2240

### **Southeast**

8000 Regency Pkwy, Suite 585  
Cary, NC 27511  
TEL : 919-380-8483  
FAX : 919-380-8492

2

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## SAMSUNG SEMICONDUCTOR REPRESENTATIVES

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### **ALABAMA**

#### **REP ONE**

2707 Artie Street, Bldg 200  
Suite 12, Huntsville, AL 35805  
TEL : 205-539-7371  
FAX : 205-533-4509

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#### **SUMMIT SALES**

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Scottsdale, AZ 85260  
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FAX : 602-998-5274

### **CALIFORNIA**

#### **BESTRONICS**

9988 Hibert Street  
Suite 210, San Diego, CA 92131  
TEL : 619-693-1111  
FAX : 619-693-1963

#### **I-SQUARED**

3255-1 Scott Blvd, Suite 102  
Santa Clara, CA 95054  
TEL : 408-988-3400  
FAX : 408-988-2079

#### **I-SQUARED**

9198 Greenback Lane, #101  
Orangevale, CA 95662  
TEL : 916-989-0843  
FAX : 916-989-2841

#### **WESTAR**

15265 Alton Parkway,  
Suite #400, Irvine, CA 92718  
TEL : 714-453-7900  
FAX : 714-453-7930

#### **WESTAR**

26500 Agoura Rd., Suite #204  
Calabasas, CA 91302  
TEL : 818-880-0594  
FAX : 818-880-5013

### **CANADA**

#### **InTELaTECH, INC.**

5225 Orbitor Drive, Suite 2  
Mississauga, Ontario  
Canada L4W 4Y8  
TEL : 905-629-0082  
FAX : 905-629-1795

#### **InTELaTECH, INC.**

# 300 3665 Kings Way  
Vancouver, B.C. V5R 5W2  
TEL : 604-434-5699  
FAX : 604-434-5655

#### **InTELaTECH, INC.**

6765 Cote De Liesse, Suite #366  
St. Laurent, Quebec  
Canada H4T 1E5  
TEL : 514-343-4877  
FAX : 514-343-4355

#### **InTELaTECH, INC.**

140, 6815 8th Street N.E  
Calgary, AB T2E7H7 Canada  
TEL : 403-686-2268  
FAX : 403-686-6926

#### **InTELaTECH, INC.**

260 Hearst Way, Ste 248  
Kanata, ON K2L3H1 Canada  
TEL : 613-599-8330  
FAX : 613-599-7329

### **COLORADO**

#### **FRONT RANGE MARKETING, INC.**

3100 Arapahoe Road, #404  
Boulder, CO 80303  
TEL : 303-443-4780  
FAX : 303-447-0371

### **FLORIDA**

#### **DYNE-A-MARK CORPORATION**

500 Winderley Place  
Suite #100, Maitland, FL 32751  
TEL : 407-660-1661  
FAX : 407-660-9407

#### **DYNE-A-MARK CORPORATION**

742 Penguin Avenue NE  
Palm Bay, FL 32905  
TEL : 407-725-7470  
FAX : 407-984-2718

#### **DYNE-A-MARK CORPORATION**

Two Prospect Park Business Ctr,  
3351 N.W. 55th Street  
Fort Lauderdale, FL 33309  
TEL : 954-485-3500  
FAX : 954-485-6555

#### **DYNE-A-MARK CORPORATION**

508 Palm Drive  
Largo, FL 34640  
TEL : 813-586-3778  
FAX : 813-586-3863

### **GEORGIA**

#### **SOUTH ATLANTIC COMPONENT SALES**

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Norcross, GA 30071  
TEL : 770-447-6154  
FAX : 770-447-6714



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**ILLINOIS****DAVIX INTERNATIONAL**

1655 N. Arlington Heights RD. TEL : 847-259-5300  
 Suite #204 East, Arlington Heights, IL 60004 FAX : 847-259-5428

**IDAHO****INTERMOUNTAIN TECH**

1310 East First Street TEL : 208-888-6071  
 Meridian, Idaho 83642 FAX : 208-888-6074

**INDIANA****GEN II MARKETING, INC.**

1415 Magnavox Way, #130 TEL : 219-436-4485  
 Ft. Wayne, IN 46804 FAX : 219-436-1977

**GEN II MARKETING, INC.**

31 E. Main Street TEL : 317-848-3083  
 Carmel, IN 46032 FAX : 317-848-1264

**KANSAS****CUSTOMER 1ST**

10540 Marty #200N TEL : 913-385-0390  
 Overland Park, KS 66212 FAX : 612-851-7907

**KENTUCKY****GEN II MARKETING, INC.**

861 Corporate Drive, Suite 210 TEL : 606-223-9181  
 Lexington, KY 40503 FAX : 606-223-2864

**MARYLAND****BEACON NORTH**

8965 Guilford Road TEL : 410-381-4309  
 Columbia, MD 21046 FAX : 410-381-4752

**BESCON NORTH**

2821 Sommersby Road TEL : 301-831-5492  
 Mt. Airy, MD 21771 FAX : 301-829-2167

**MASSACHUSETTS****NEW TECH SOLUTIONS**

1 Van de Graaff Drive 4th Floor TEL : 617-229-8888  
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