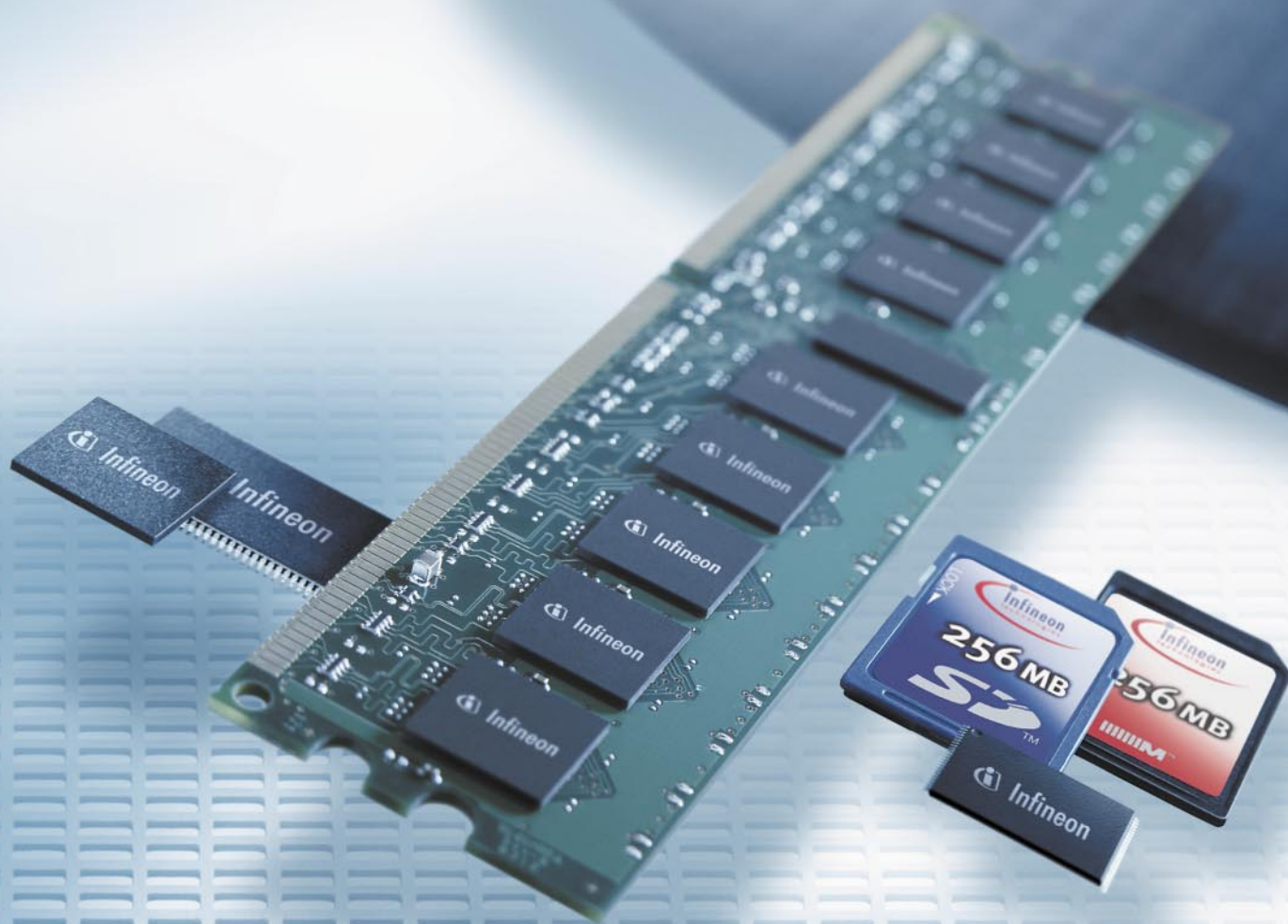


# MEMORY SPECTRUM



[www.infineon.com/memory](http://www.infineon.com/memory)  
[www.infineon.com/memory/flash](http://www.infineon.com/memory/flash)



Never stop thinking.

# Introduction

APRIL 2004. This edition of Memory Spectrum has been developed to enable you to easily view the entire range of Infineon's memory products. For more related product information and the latest datasheets, please visit our websites: [www.infineon.com/memory](http://www.infineon.com/memory) and [www.infineon.com/memory/flash](http://www.infineon.com/memory/flash).

## Technology and Trends

As a leading memory products supplier, Infineon continues to expand its portfolio with the recent introduction of:

- DDR400 Components and DIMMs (PC3200)
- 2 GB DDR2 Unbuffered DIMM
- 4 GB DDR2 Registered DIMM
- 16 Mb and 32 Mb CellularRAM
- 512 Mb Mobile-RAM
- "Green\*\*\*", DRAM Components and Modules
- 512 Mb and 1 Gb TwinNAND Components
- SD Cards/MultiMediaCards

\*\* Lead & Halogen-Free

## DRAM Components

Double Data Rate (DDR/DDR2) and Single Data Rate (SDR). Synchronous Dynamic Random Access Memory.

	16 Mb	32 Mb	128 Mb	256 Mb	512 Mb	1 Gb
DDR DRAMs			+	+	+	
DDR2 DRAMs				+	+	+
SDR DRAMs			+	+	+	
Reduced Latency (RLDRAM™)				+		
Graphics RAM			+	+		
Mobile-RAM			+	+	+	
CellularRAM™	+	+				

## DRAM Modules

Double Data Rate (DDR/DDR2), Dual Inline Memory Modules (DIMMs).

	64 MB	128 MB	256 MB	512 MB	1 GB	2 GB	4 GB
Unbuffered DDR		+	+	+	+		
Registered DDR		+	+	+	+		
Registered DDR Reduced Height		+	+	+	+	+	
SO-DIMM DDR		+	+	+	+		
Unbuffered DDR2			+	+	+	+	
Registered DDR2			+	+	+	+	+
SO-DIMM DDR2			+	+	+	+	

Single Data Rate (SDR), Dual Inline Memory Modules (DIMMs).

	64 MB	128 MB	256 MB	512 MB	1 GB	2 GB	4 GB
Unbuffered SDR		+	+	+			
Registered SDR		+	+	+	+		
SO-DIMM SDR		+	+	+			

## Flash Components

Thin Small Outline Package (TSOP).

	64 Mb	128 Mb	256 Mb	512 Mb	1 Gb	2 Gb	4 Gb
TwinFlash™				+	+		

## Flash Cards

MultiMediaCards and SD Cards.

	64 MB	128 MB	256 MB	512 MB	1 GB	2 GB	4 GB
MultiMediaCards	+	+	+				
SD Cards	+	+	+				

RLDRAM™ and CellularRAM™ are registered trademarks of Infineon Technologies AG. TwinFlash™ is a trademark of Infineon Technologies AG, based on Saifun NROM technology.

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# DRAM Components

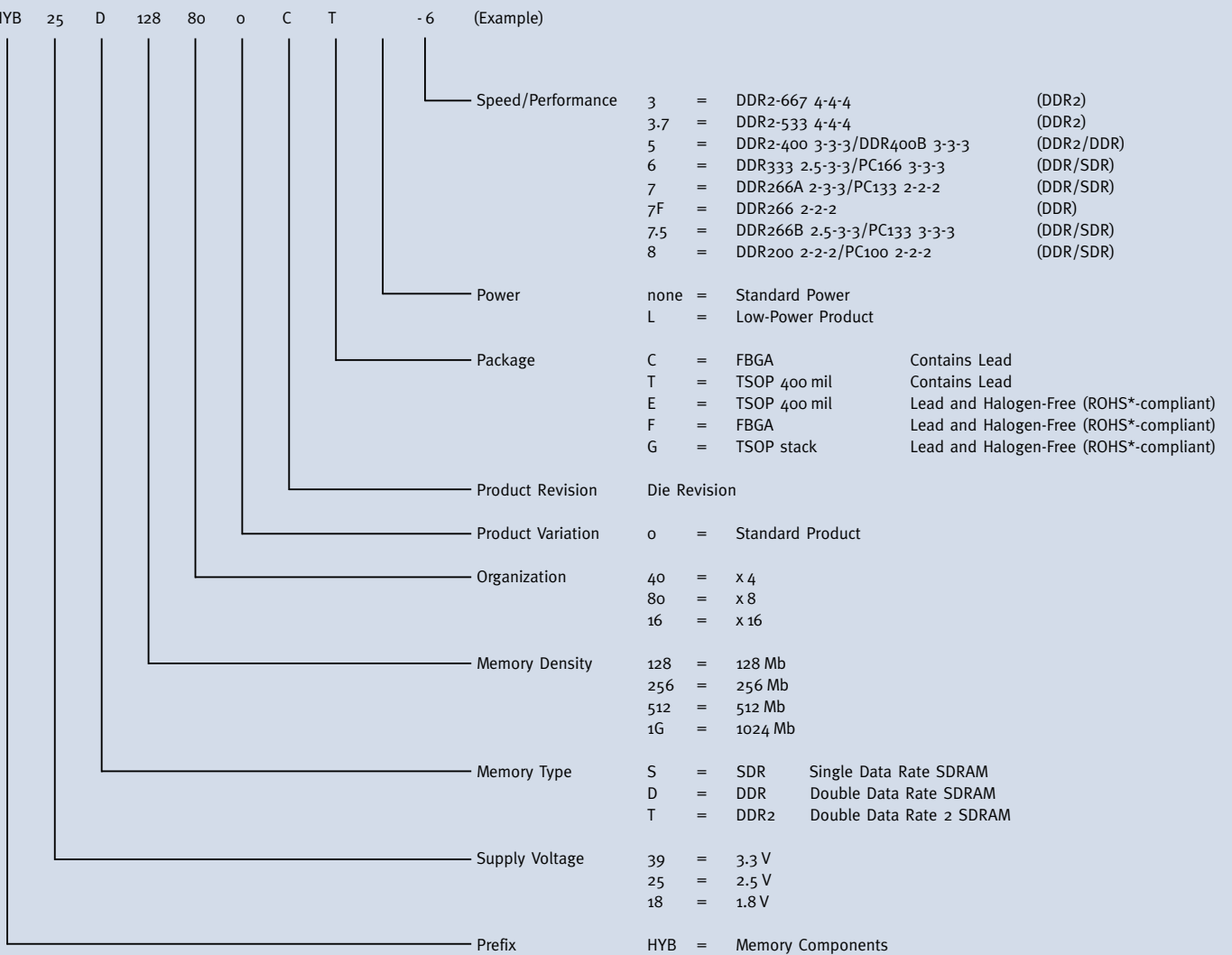
## Nomenclature DRAM Components

HYB 25 D 128 80 o C T -6 (Example)

DRAM Modules

Specialty DRAMs

Flash



\*ROHS = Restriction Of Hazardous Substances



## DDR Components

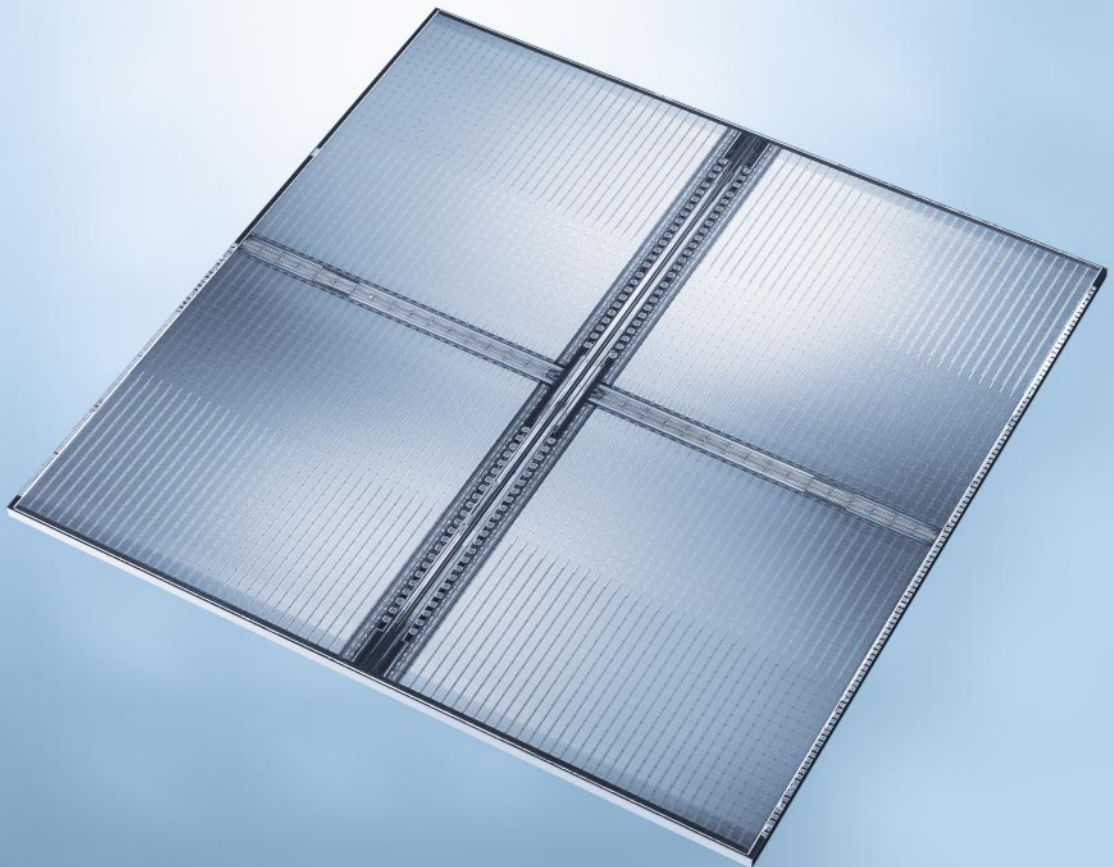
Generation	Organization	Package	Speed	Latency	Sales Description	Speed No.	Ordering Code	Prod.	Green
<b>128 Mb</b>	32 M x 4	TSOP-66 (400 mil)	DDR266A	2-3-3	HYB25D128400AT-	7	Q67100 Q4309	Now	
			DDR333	2.5-3-3	HYB25D128400CE-	6	Q67100 Q1455	2Q04	XX
	16 M x 8	TSOP-66 (400 mil)	DDR266A	2-3-3	HYB25D128800AT-	7	Q67100 Q4311	Now	
			DDR333	2.5-3-3	HYB25D128800CE-	6	Q67100 Q1459	2Q04	XX
	8 M x 16	TSOP-66 (400 mil)	DDR266A	2-3-3	HYB25D128160AT-	7	Q67100 Q4313	Now	
			DDR333	2.5-3-3		6	Q67100 Q5044		
DDR333			2.5-3-3	HYB25D128160CE-	6	Q67100 Q1458	2Q04	XX	
<b>256 Mb</b>	64 M x 4	TSOP-66 (400 mil)	DDR266A	2-3-3	HYB25D256400BT-	7	Q67100 Q4587	Now	
			DDR266	2-2-2		7F	Q67100 Q4880		
			DDR266A	2-3-3	HYB25D256400CE-	7	Q67100 Q5049	Now	XX
	32 M x 8	TSOP-66 (400 mil)	DDR333	2.5-3-3	HYB25D256800BT-	6	Q67100 Q4589	Now	
			DDR400	3-3-3		5	Q67100 Q4275		
			DDR333	2.5-3-3	HYB25D256800CE-	6	Q67100 Q5051	Now	XX
			DDR333	2.5-3-3	HYB25D256800CEL-	6	Q67100 Q1753	Now	XX
			DDR400	3-3-3	HYB25D256800CE-	5	Q67100 Q5180	Now	XX
	16 M x 16	TSOP-66 (400 mil)	DDR266A	2-3-3	HYB25D256160BT-	7	Q67100 Q4593	Now	
			DDR333	2.5-3-3		6	Q67100 Q4592		
			DDR400	3-3-3		5	Q67100 Q4277		
			DDR333	2.5-3-3	HYB25D256160CE-	6	Q67100 Q5045	Now	XX
DDR400			3-3-3	HYB25D256160CE-	5	Q67100 Q5182	Now	XX	
<b>256 Mb FBGA</b>	64 M x 4	FBGA 6o (8 x 12 mm)	DDR266A	2-3-3	HYB25D256400BC-	7	Q67100 Q4615	Now	
			DDR333	2.5-3-3		6	Q67100 Q4614		
			DDR400	3-3-3		5	Q67100 Q1071		
			DDR333	2.5-3-3	HYB25D256400CC-	6	Q67100 Q4764	2Q04	
			DDR400	3-3-3	5	Q67100 Q1418			
	32 M x 8	FBGA 6o (8 x 12 mm)	DDR266A	2-3-3	HYB25D256800BC-	7	Q67100 Q4596	Now	
			DDR333	2.5-3-3		6	Q67100 Q4595		
			DDR333	2.5-3-3	HYB25D256800CF-	6	Q67100 Q4443	2Q04	XX
			DDR333	2.5-3-3	HYB25D256800CC-	6	Q67100 Q4767	2Q04	
			DDR400	3-3-3	5	Q67100 Q1419			
	16 M x 16	FBGA 6o (8 x 12 mm)	DDR266A	2-3-3	HYB25D256160BC-	7	Q67100 Q4599	Now	
			DDR333	2.5-3-3		6	Q67100 Q4598		
			DDR333	2.5-3-3	HYB25D256160CC-	6	Q67100 Q4770	2Q04	

XX = Lead and Halogen-Free

## DDR Components

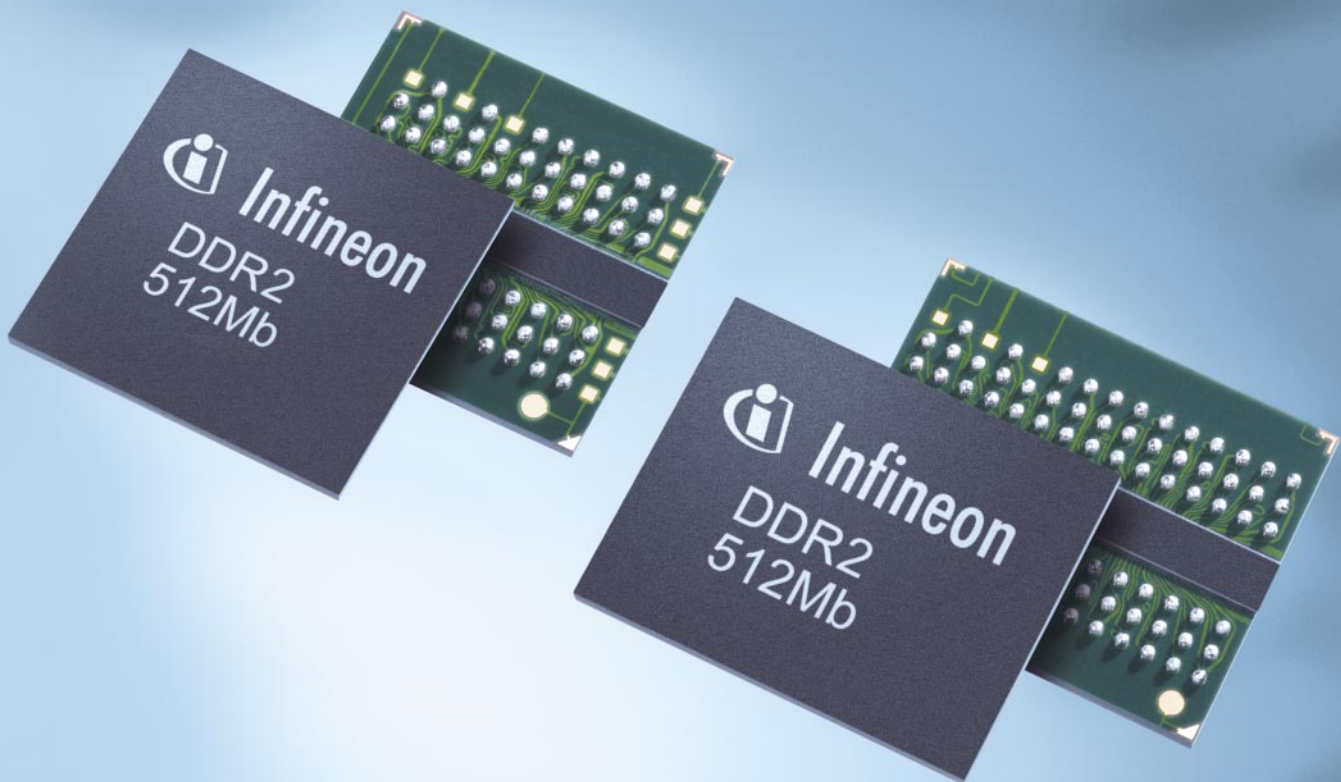
Generation	Organization	Package	Speed	Latency	Sales Description	Speed No.	Ordering Code		Prod.	Green	
512 Mb	128 M x 4	TSOP-66 (400 mil)	DDR266A	2-3-3	HYB25D512400AT-	7	Q67100	Q4413	Now		
					HYB25D512400BE-	7	Q67100	Q5202	Now	XX	
	256 M x 4	TSOP stack (400 mil)	DDR266A	2-3-3	HYB25D1G400BG-	7	On request				
	64 M x 8	TSOP-66 (400 mil)	DDR266A	2-3-3	HYB25D512800AT-	7	Q67100	Q4412	Now		
							Q67100	Q4415			
							Q67100	Q5205	Now	XX	
	32 M x 16	TSOP-66 (400 mil)	DDR400	3-3-3	HYB25D512800BE-	6	Q67100	Q5204	Now		
							Q67100	Q5208			
							Q67100	Q5209	Now	XX	
	512 Mb FBGA	128 M x 4	FBGA 60 (10 x 12 mm)	DDR333	2.5-3-3	HYB25D512400BC-	6	Q67100	Q1661	Now	
							5	Q67100	Q1693		
64 M x 8		FBGA 60 (10 x 12 mm)	DDR333	2.5-3-3	HYB25D512800BC-	6	Q67100	Q1663	Now		
							Q67100	Q5215	Now	XX	
							Q67100	Q1451	Now		
32 M x 16		FBGA 60 (10 x 12 mm)	DDR400	3-3-3	HYB25D512800BC-	5	Q67100	Q1452	Now	XX	
							Q67100	Q1453	Now		
							Q67100	Q1454	Now		

XX = Lead and Halogen-Free



## DDR2 Components

Generation	Organization	Package	Speed	Latency	Sales Description	Speed No.	Ordering Code	Production	Green
<b>256 Mb</b>	64 M x 4	PTFBGA-60	DDR2 400	3-3-3	HYB18T256400AC-	5	Q67100 Q1314	3Q04	
			DDR2 533	4-4-4		3-7	Q67100 Q1311		
	32 M x 8	PTFBGA-60	DDR2 400	3-3-3	HYB18T256800AC-	5	Q67100 Q1322		
			DDR2 533	4-4-4		3-7	Q67100 Q1320		
	16 M x 16	PTFBGA-84	DDR2 400	3-3-3	HYB18T256160AC-	5	Q67100 Q1301		
			DDR2 533	4-4-4		3-7	Q67100 Q1293		
<b>512 Mb</b>	128 M x 4	PTFBGA-60	DDR2 400	3-3-3	HYB18T512400AC-	5	Q67100 Q1350	2Q04	
			DDR2 533	4-4-4		3-7	Q67100 Q1349		
	64 M x 8	PTFBGA-60	DDR2 400	3-3-3	HYB18T512800AC-	5	Q67100 Q1354		
			DDR2 533	4-4-4		3-7	Q67100 Q1352		
	32 M x 16	PTFBGA-84	DDR2 400	3-3-3	HYB18T512160AC-	5	Q67100 Q1347		
			DDR2 533	4-4-4		3-7	Q67100 Q1346		
<b>1 Gb</b>	256 M x 4	PTFBGA-68	DDR2 400	3-3-3	HYB18T1G400AC-	5	Q67100 Q1619	3Q04	
			DDR2 533	4-4-4		3-7	Q67100 Q1618		
	128 M x 8	PTFBGA-68	DDR2 400	3-3-3	HYB18T1G800AC-	5	Q67100 Q1622		
			DDR2 533	4-4-4		3-7	Q67100 Q1621		
	64 M x 16	PTFBGA-92	DDR2 400	3-3-3	HYB18T1G160AC-	5	Q67100 Q1625		
			DDR2 533	4-4-4		3-7	Q67100 Q1624		





## SDR Components

Generation	Organization	Package	Speed	Latency	Sales Description	Speed No.	Ordering Code		Production	Green
<b>128 Mb</b>	32 M x 4	TSOP-54 (400 mil)	PC133	2-2-2	HYB39S128400CT-	7	Q67100	Q4101	Now	
	16 M x 8	TSOP-54 (400 mil)	PC133	2-2-2	HYB39S128800CT-	7	Q67100	Q4107		
	8 M x 16	TSOP-54 (400 mil)	PC133	2-2-2	HYB39S128160CT-	7	Q67100	Q4113		
<b>256 Mb</b>	64 M x 4	TSOP-54 (400 mil)	PC133	2-2-2	HYB39S256400DT-	7	Q67100	Q4330	Now	
	32 M x 8	TSOP-54 (400 mil)	PC133	2-2-2	HYB39S256800DT-	7	Q67100	Q4332		
	16 M x 16	TSOP-54 (400 mil)	PC133	2-2-2	HYB39S256160DT-	7	Q67100	Q4334		
<b>256 Mb FBGA</b>	64 M x 4	FBGA-54 (8 x 12 mm)	PC133	2-2-2	HYB39S256400DC-	7	Q67100	Q4772	Now	
	32 M x 8	FBGA-54 (8 x 12 mm)	PC133	2-2-2	HYB39S256800DC-	7	Q67100	Q4774		
	16 M x 16	FBGA-54 (8 x 12 mm)	PC133	2-2-2	HYB39S256160DC-	7	Q67100	Q4808		
<b>512 Mb</b>	128 M x 4	TSOP-54 (400 mil)	PC133	3-3-3	HYB39S512400AT-	7.5	Q67100	Q4404	Now	
	64 M x 8	TSOP-54 (400 mil)	PC133	3-3-3	HYB39S512800AT-	7.5	Q67100	Q4403		
	32 M x 16	TSOP-54 (400 mil)	PC133	3-3-3	HYB39S512160AT-	7.5	Q67100	Q4402		

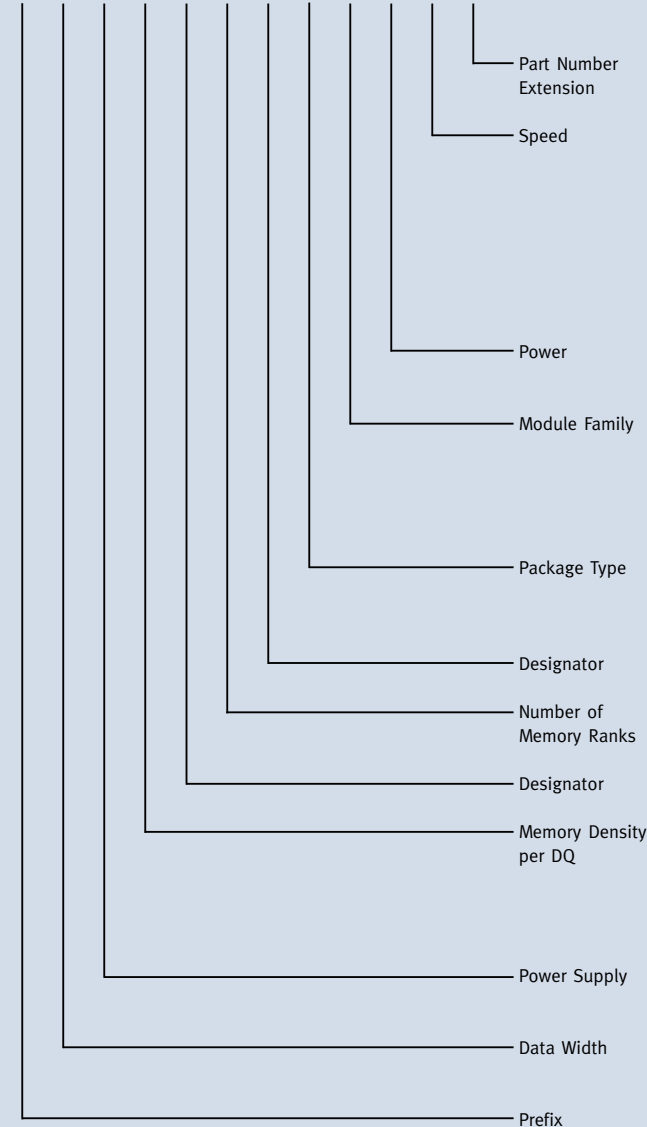


# DRAM Modules

## Nomenclature DDR/DDR2 Modules

### Unbuffered DIMM, Registered DIMM (184-pin) and SO-DIMM (200-pin)

HYS 64 D 32 2 2 0 G D L - 6 - A (Example)



#### Component Die Revision Indicator

8	=	PC1600 2-2-2	DDR200
7.5	=	PC2100 2.5-3-3	DDR266B
7	=	PC2100 2-3-3	DDR266A
7F	=	PC2100 2-2-2	DDR266
6	=	PC2700 2.5-3-3	DDR333
5	=	PC3200 3-3-3 / PC2-3200 3-3-3	DDR400 / DDR2-400
3.7	=	PC2-4300 4-4-4	DDR2-533
3	=	PC2-5300 4-4-4	DDR2-667

L	=	Low Power
none	=	Standard Power

U	=	Unbuffered DIMM	TSOP-based for DDR / FBGA-based for DDR2
R	=	Registered DIMM	TSOP-based for DDR / FBGA-based for DDR2
D	=	SO-DIMM	TSOP-based for DDR / FBGA-based for DDR2
BD	=	SO-DIMM	FBGA-based
BR	=	Registered DIMM	FBGA-based

G	=	Contains Lead
H	=	Lead-Free (ROHS*-compliant)
E	=	Lead and Halogen-Free available on request (ROHS*-compliant)

#### Product Variations

0	=	One Memory Module Rank
2	=	Two Memory Module Ranks

#### Data Sheet Defined

16	=	16 Mb
32	=	32 Mb
64	=	64 Mb
128	=	128 Mb
256	=	256 Mb

D	=	2.5 V (DDR Modules)
T	=	1.8 V (DDR2 Modules)

64	=	x 64 (Non-ECC)
72	=	x 72 (ECC)

HYS = Standard Prefix for SDRAM-based Memory Modules

\*ROHS = Restriction Of Hazardous Substances

# DDR Modules

## Unbuffered DDR DIMM – 184-pin

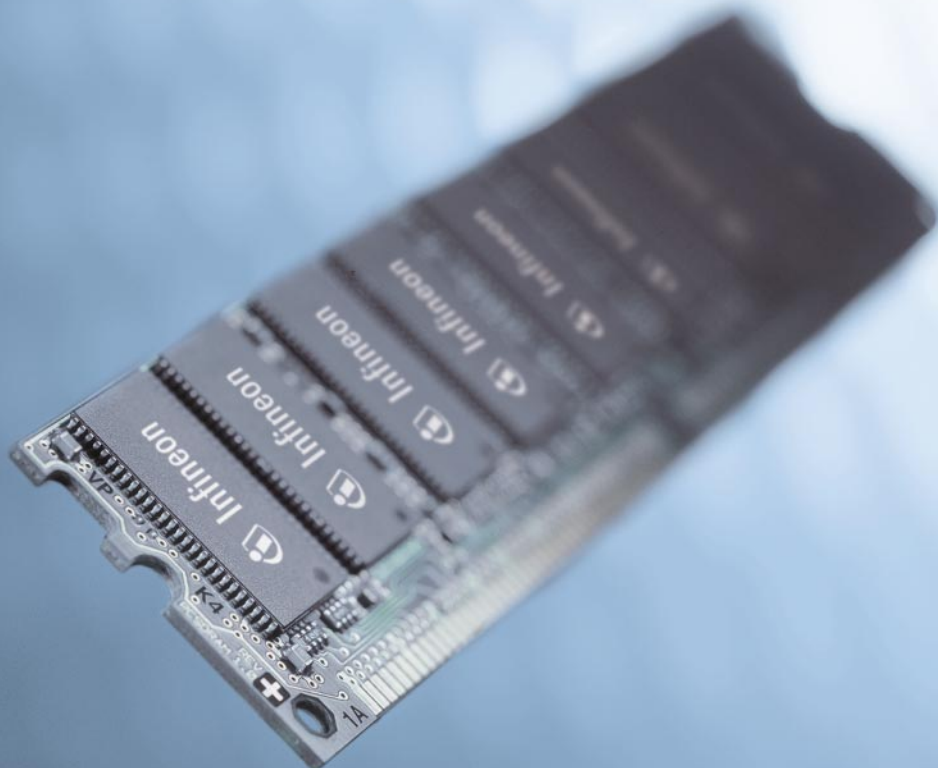
Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code		Prod.	Green
<b>128 MB</b>	16 M x 64	256 M	16 M x 16	TSOP	1	1.25"	PC2700	HYS64D16301GU-	6-B	Q67100	Q4940	Now	
							PC3200		5-B	Q67100	Q5136		
							PC2700		6-C	Q67100	Q1448		
							PC3200		5-C	Q67100	Q1754		
							PC2700	HYS64D16301HU-	6-C	Q67100	Q4995	Now	
							PC3200		5-C	Q67100	Q5188		
<b>128 MB ECC</b>	16 M x 72	128 M	16 M x 8	TSOP	1	1.25"	PC2100	HYS72D16000GU-	7-A	Q67100	Q4367	Now	
<b>256 MB</b>	32 M x 64	256 M	32 M x 8	TSOP	1	1.25"	PC2100	HYS64D32000GU-	7-B	Q67100	Q4517	Now	
							PC2700	HYS64D32300GU-	6-B	Q67100	Q4944	Now	
							PC3200		5-B	Q67100	Q5081		
							PC2700		6-C	Q67100	Q5184		
							PC3200		5-C	Q67100	Q1755		
							PC2700	HYS64D32300HU-	6-C	Q67100	Q4996	Now	
PC3200	5-C	Q67100	Q5189										
<b>256 MB ECC</b>	32 M x 72	256 M	32 M x 8	TSOP	1	1.25"	PC2100	HYS72D32000GU-	7-B	Q67100	Q4519	Now	
							PC2100-222		7F-B	Q67100	Q5029		
							PC2700	HYS72D32300GU-	6-B	Q67100	Q4946	Now	
							PC3200		5-B	Q67100	Q4957		
							PC2700		6-C	Q67100	Q1768		
							PC3200		5-C	Q67100	Q1756		
PC2700	HYS72D32300HU-	6-C	Q67100	Q4998	Now								
PC3200		5-C	Q67100	Q5191									
<b>512 MB</b>	64 M x 64	256 M	32 M x 8	TSOP	2	1.25"	PC2100	HYS64D64020GU-	7-B	Q67100	Q4521	Now	
							PC2700	HYS64D64320GU-	6-B	Q67100	Q4948	Now	
							PC3200		5-B	Q67100	Q5084		
							PC2700		6-C	Q67100	Q1449		
							PC3200		5-C	Q67100	Q1761		
							PC2700	HYS64D64320HU-	6-C	Q67100	Q5001	Now	
PC3200	5-C	Q67100	Q5190										
<b>512 MB ECC</b>	64 M x 72	256 M	32 M x 8	TSOP	2	1.25"	PC2100	HYS72D64020GU-	7-B	Q67100	Q4525	Now	
							PC2100-222		7F-B	Q67100	Q5030		
							PC2700	HYS72D64320GU-	6-B	Q67100	Q4950	Now	
							PC3200		5-B	Q67100	Q4958		
							PC2700		6-C	Q67100	Q1757		
							PC3200		5-C	Q67100	Q1762		
PC2700	HYS72D64320HU-	6-C	Q67100	Q4997	Now								
PC3200		5-C	Q67100	Q5192									

X = Lead-Free

## Unbuffered DDR DIMM – 184-pin

Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green
1 GB	128 M x 64	512 M	64 M x 8	TSOP	2	1.25"	PC2100	HYS64D128020GU-	7-A	Q67100 Q4656	Now	
							PC2700		6-A	Q67100 Q4823		
							PC2700	HYS64D128320GU-	6-B	Q67100 Q1779	Now	
							PC3200		5-B	Q67100 Q1780		
							PC2700	HYS64D128320HU-	6-B	Q67100 Q1426	Now	X
							PC3200		5-B	Q67100 Q1427		
1 GB ECC	128 M x 72	512 M	64 M x 8	TSOP	2	1.25"	PC2100	HYS72D128020GU-	7-A	Q67100 Q4658	Now	
							PC2700		6-A	Q67100 Q4935		
							PC2700	HYS72D128320GU-	6-B	Q67100 Q1781	Now	
							PC3200		5-B	Q67100 Q1782		
							PC2700	HYS72D128320HU-	6-B	Q67100 Q1065	Now	X
							PC3200		5-B	Q67100 Q1064		

X = Lead-Free



## Registered DDR DIMM (Reduced Height) – 184-pin

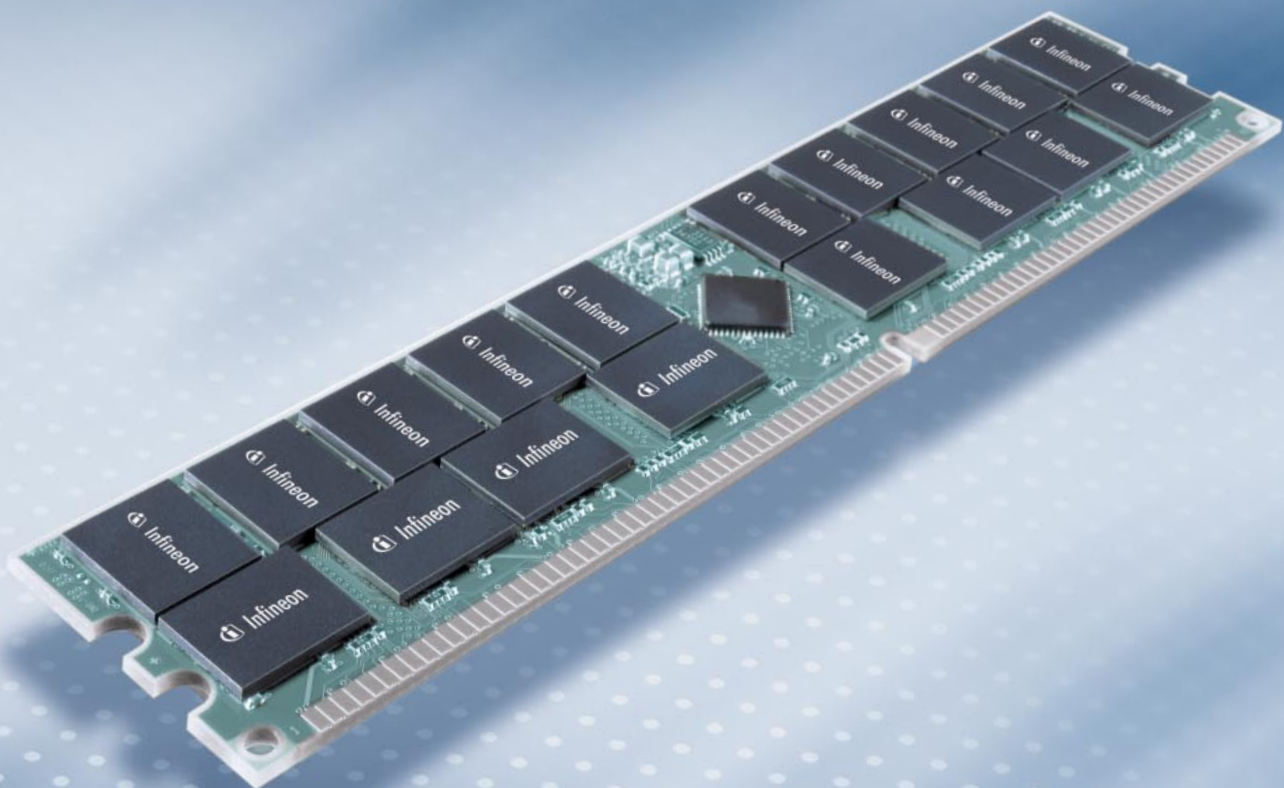
Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green		
<b>128 MB</b>	16 M x 72	128 M	16 M x 8	TSOP	1	1.2"	PC2100	HYS72D16500GR-	7-A	Q67100 Q4446	Now			
<b>256 MB</b>	32 M x 72	128M	32 M x 4	TSOP	1	1.2"	PC2100	HYS72D32501GR-	7-A	Q67100 Q4377				
				HYS72D32501HR-	7-C	Q67100 Q1471	3Q04	X						
			256 M	32 M x 8	TSOP	1	1.2"	PC2100	HYS72D32500GR-	7-B	Q67100 Q4457	Now		
										7-B	Q67100 Q4533			
								PC2700		6-B	Q67100 Q4671			
		256 M	32 M x 8	FBGA	1	1.125"	PC3200	HYS72D32300GBR-	5-B	Q67100 Q1461				
								PC2700		6-C	Q67100 Q1413	2Q04		
								PC3200		5-C	Q67100 Q1673	3Q04		
<b>512 MB</b>	64 M x 72	256 M	64 M x 4	TSOP	1	1.2"	PC2100	HYS72D64500GR-	7-B	Q67100 Q4463	Now			
				PC2100-222	7F-B	Q67100 Q5007								
				FBGA	1	1.125"	PC2100	HYS72D64300GBR-	7-B	Q67100 Q4673				
						PC2700		6-B	Q67100 Q4686					
						PC3200		5-B	Q67100 Q1462					
						PC2700		6-C	Q67100 Q1415	2Q04				
					PC3200		5-C	Q67100 Q1685	3Q04					
				32 M x 8	FBGA		2	1.125"	PC2100	HYS72D64320GBR-	7-B	Q67100 Q4687	Now	
									PC2700		6-B	Q67100 Q4693		
									PC3200		5-B	Q67100 Q1463		
							PC2700		6-C	Q67100 Q1414	2Q04			
						PC3200		5-C	Q67100 Q1684	3Q04				
<b>1 GB</b>	128 M x 72	256 M	128 M x 4	TSOP stack	2	1.2"	PC2100	HYS72D128521GR-	7-B	Q67100 Q4752	Now			
				PC2100-222	7F-B	Q67100 Q5008								
			64 M x 4	FBGA	2	1.2"	PC2100	HYS72D128320GBR-	7-B	Q67100 Q4674				
							PC2700		6-B	Q67100 Q4668				
					PC2700		6-C	Q67100 Q1412	2Q04					
		512 M	128 M x 4	TSOP	1	1.2"	PC2100	HYS72D128500GR-	7-A	Q67100 Q4990	Now			
				FBGA	1	1.125"	PC2100	HYS72D128300GBR-	7-B	Q67100 Q1429	Now			
									PC2700		6-B	Q67100 Q1032		
									PC3200		5-B	Q67100 Q1687		
	64 M x 8		FBGA		2	1.125"	PC2100	HYS72D128321GBR-	7-B	Q67100 Q1422	Now			
								PC2700		6-B	Q67100 Q1043			
						PC3200		5-B	Q67100 Q1686					
<b>2 GB</b>	256 M x 72	512 M	256 M x 4	TSOP stack	2	1.2"	PC2100	HYS72D256520GR-	7-A	Q67100 Q4661	Now			
		128 M x 4	FBGA		2	1.2"	PC2100	HYS72D256320GBR-	7-B	Q67100 Q1031	Now			
						PC2700		6-B	Q67100 Q1030					
						PC3200		5-B	Q67100 Q1689					

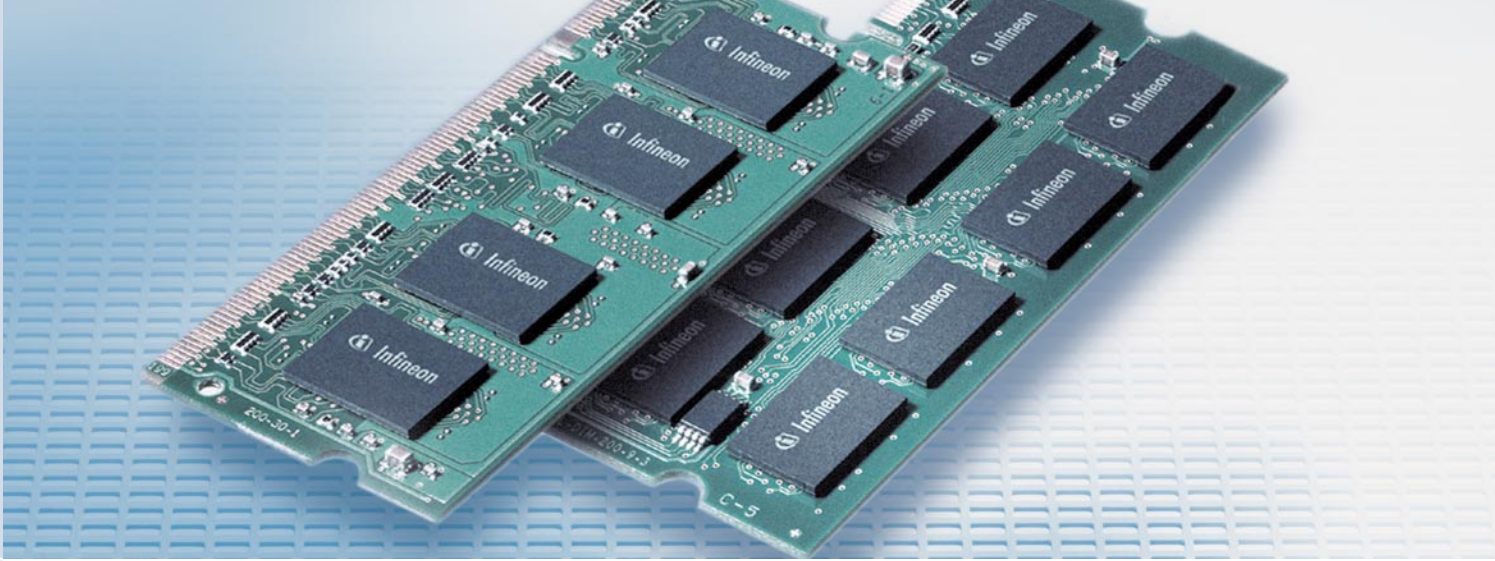
X = Lead-Free

## Registered DDR DIMM – 184-pin

Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green
128 MB	16 Mx72	128 M	16 Mx8	TSOP	1	1.7"	PC1600	HYS72D16000GR-	8-A	Q67100	Q4372	EOL
							PC2100		7-A	Q67100	Q4373	
256 MB	32 Mx72	128 M	32 Mx4	TSOP	1	1.7"	PC1600	HYS72D32001GR-	8-A	Q67100	Q4375	EOL
							PC2100		7-A	Q67100	Q4378	
	256 M	32 Mx8	TSOP	1	1.7"	PC1600	HYS72D32000GR-	8-B	Q67100	Q4508		
						PC2100		7-B	Q67100	Q4509		
512 MB	64 Mx72	256 M	64 Mx4	TSOP	1	1.7"	PC1600	HYS72D64000GR-	8-B	Q67100	Q4510	EOL
							PC2100		7-B	Q67100	Q4511	
1 GB	128 Mx72	256 M	128 Mx4	TSOP stack	2	1.7"	PC1600	HYS72D128021GR-	8-B	Q67100	Q4743	EOL
							PC2100		7-B	Q67100	Q4694	

EOL = End of Life





### SO-DIMM DDR – 200-pin

Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green	
128 MB	16 M x 64	256 M	16 M x 16	TSOP	1	1,25"	PC2100	HYS64D16001GDL-	7-B	Q67100	Q5179	Now	X
							PC2700		6-B	Q67100	Q5187		
							PC2100	HYS64D16000GDL-	7-B	Q67100	Q4531	2Q04	
							PC2700		6-B	Q67100	Q4670		
							PC2700		6-C	Q67100	Q1763		
							PC2700		6-C	Q67100	Q5078		

256 MB	32 M x 64	256 M	16 M x 16	TSOP	2	1,25"	PC2100	HYS64D32020GDL-	7-B	Q67100	Q4454	Now	X
							PC2700		6-B	Q67100	Q4667		
							PC3200		5-B	Q67100	Q5227		
							PC2700	HYS64D32020HDL-	6-C	Q67100	Q1767	2Q04	
							PC3200		5-C	Q67100	Q1769		
							PC2700		6-C	Q67100	Q4831		
							PC3200		5-C	Q67100	Q1699		

512 MB	64 M x 64	256M	32 M x 8	FBGA	2	1,25"	PC2100	HYS64D64020GBDL-	7-B	Q67100	Q4680	Now	X
							PC2700		6-B	Q67100	Q4681		
							PC3200		5-B	Q67100	Q1193		
							PC2700		6-C	Q67100	Q1450		
							PC3200		5-C	Q67100	Q1702		
	PC2700	HYS64D64020HBDL-	6-C	Q67100	Q4835	3Q04							
	PC2100	HYS64D64020GDL-	7-A	Q67100	Q4663	Now							
	PC2700		6-A	Q67100	Q4744								
	PC2700		6-B	Q67100	Q1774								
	PC3200		5-B	Q67100	Q1783								
PC2700	HYS64D64020HDL-		6-B	Q67100	Q1423		Now						
PC3200		5-B	Q67100	Q1698									

1 GB	128 M x 64	512 M	64 M x 8	FBGA	2	1,25"	PC2700	HYS64D128021GBDL-	6-B	Q67100	Q1416	Now	X
							PC3200		5-B	Q67100	Q1694		
							PC2700	HYS64D128021HBDL-	6-B	Q67100	Q1028	Now	
							PC3200		5-B	Q67100	Q1695		

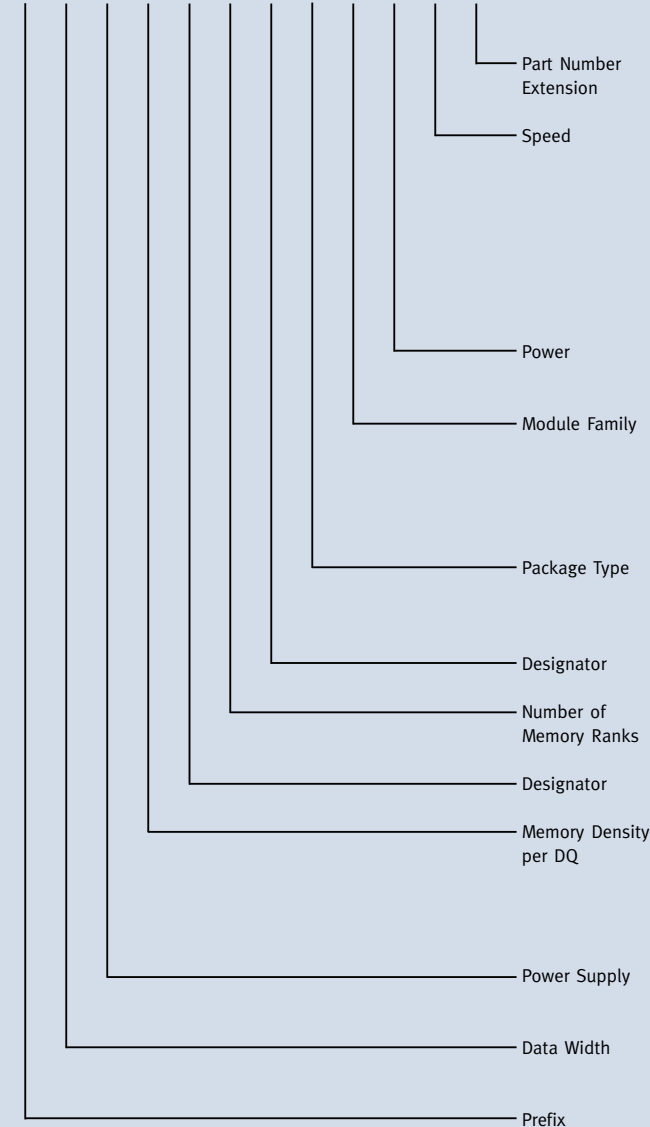
X = Lead-Free

# DDR2 Modules

## Nomenclature DDR/DDR2 Modules

### Unbuffered DIMM, Registered DIMM (240-pin) and SO-DIMM (200-pin)

HYS 64 D 32 2 2 0 G D L - 6 - A (Example)



#### Component Die Revision Indicator

8	=	PC1600 2-2-2	DDR200
7.5	=	PC2100 2.5-3-3	DDR266B
7	=	PC2100 2-3-3	DDR266A
7F	=	PC2100 2-2-2	DDR266
6	=	PC2700 2.5-3-3	DDR333
5	=	PC3200 3-3-3 / PC2-3200 3-3-3	DDR400 / DDR2-400
3.7	=	PC2-4300 4-4-4	DDR2-533
3	=	PC2-5300 4-4-4	DDR2-667

L	=	Low Power
none	=	Standard Power

U	=	Unbuffered DIMM	TSOP-based for DDR / FBGA-based for DDR2
R	=	Registered DIMM	TSOP-based for DDR / FBGA-based for DDR2
D	=	SO-DIMM	TSOP-based for DDR / FBGA-based for DDR2
BD	=	SO-DIMM	FBGA-based
BR	=	Registered DIMM	FBGA-based

G	=	Contains Lead
H	=	Lead-Free (ROHS* -compliant)
E	=	Lead and Halogen-Free available on request (ROHS* -compliant)

#### Product Variations

0	=	One Memory Module Rank
2	=	Two Memory Module Ranks

#### Data Sheet Defined

16	=	16 Mb
32	=	32 Mb
64	=	64 Mb
128	=	128 Mb
256	=	256 Mb

D	=	2.5 V (DDR Modules)
T	=	1.8 V (DDR2 Modules)

64	=	x 64 (Non-ECC)
72	=	x 72 (ECC)

HYS	=	Standard Prefix for SDRAM-based Memory Modules
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\*ROHS = Restriction Of Hazardous Substances

## Unbuffered DDR2 DIMM – 240-pin

Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green
256 MB	32Mx64	512M	32Mx16	PTFBGA84	1	30 mm	PC2-3200 3-3-3	HYS64T32000GU	5-A	Q67100	Q1386	2Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1387	
256 MB ECC	32 M x 72	256 M	32 M x 8	PTFBGA60	1	30 mm	PC2-3200 3-3-3	HYS72T32000GU	5-A	Q67100	Q1371	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1370	
512 MB	64 M x 64	512 M	64 M x 8	PTFBGA60	1	30 mm	PC2-3200 3-3-3	HYS64T64000GU	5-A	Q67100	Q1389	2Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1390	
512 MB ECC	64 M x 72	512 M	64 M x 8	PTFBGA60	1	30 mm	PC2-3200 3-3-3	HYS72T64000GU	5-A	Q67100	Q1392	2Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1393	
1 GB	128 M x 64	512 M	64 M x 8	PTFBGA60	2	30 mm	PC2-3200 3-3-3	HYS64T128020GU	5-A	Q67100	Q1395	2Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1396	
1 GB ECC	128 M x 72	512 M	64 M x 8	PTFBGA60	2	30 mm	PC2-3200 3-3-3	HYS72T128020GU	5-A	Q67100	Q1398	2Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1399	
2 GB	256 M x 64	1 G	128 M x 8	PTFBGA68	2	30 mm	PC2-3200 3-3-3	HYS64T256020GU	5-A	Q67100	Q1739	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1740	
2 GB ECC	256 M x 72	1 G	128 M x 8	PTFBGA68	2	30 mm	PC2-3200 3-3-3	HYS72T256020GU	5-A	Q67100	Q1741	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1742	

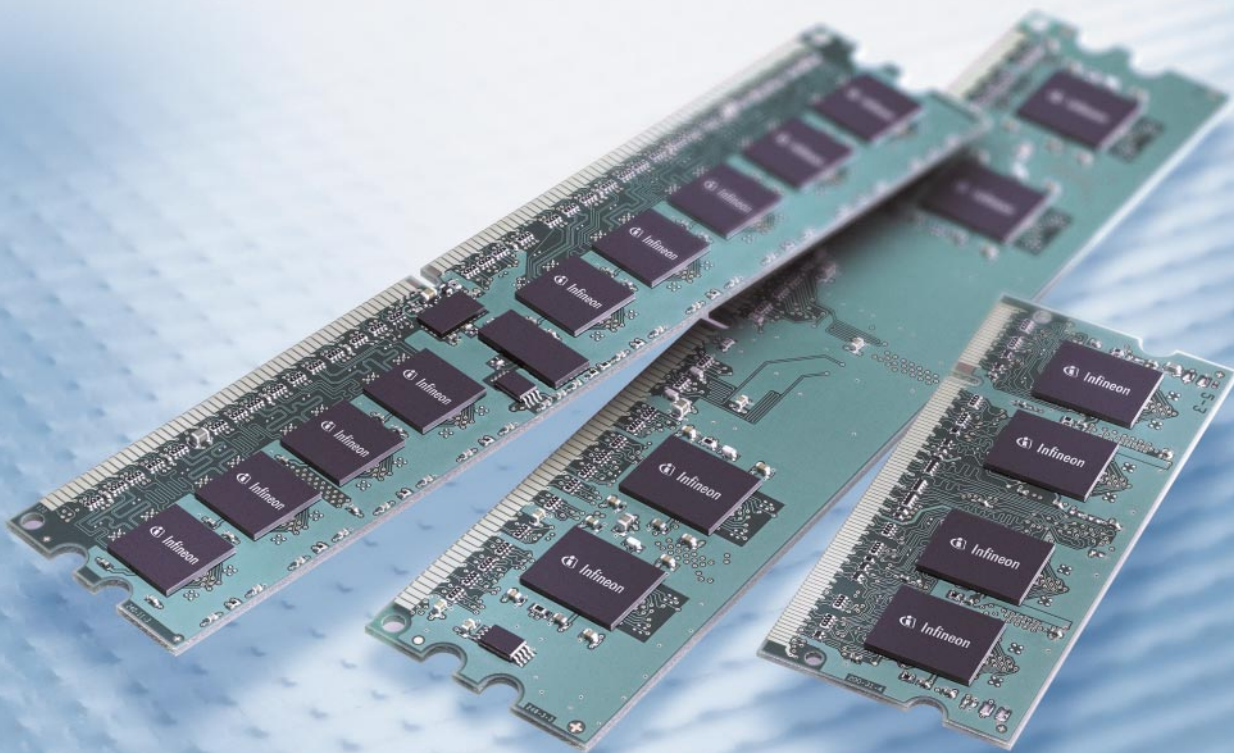
## Registered DDR2 DIMM – 240-pin

Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green
256 MB	32 M x 72	256 M	32 M x 8	PTFBGA60	1	30 mm	PC2-3200 3-3-3	HYS72T32000GR	5-A	Q67100	Q1326	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1330	
512 MB	64 M x 72	256 M	64 M x 4	PTFBGA60	1	30 mm	PC2-3200 3-3-3	HYS72T64001GR	5-A	Q67100	Q1715	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1716	
			32 M x 8	PTFBGA60	2	30 mm	PC2-3200 3-3-3	HYS72T64020GR	5-A	Q67100	Q1367	
							PC2-4300 4-4-4		3.7-A	Q67100	Q1366	
		512 M	64 M x 8	PTFBGA60	1	30 mm	PC2-3200 3-3-3	HYS72T64000GR	5-A	Q67100	Q1378	2Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1379	
1 GB	128 M x 72	512 M	128 M x 4	PTFBGA60	1	30 mm	PC2-3200 3-3-3	HYS72T128000GR	5-A	Q67100	Q1380	2Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1381	
			64 M x 8	PTFBGA60	2	30 mm	PC2-3200 3-3-3	HYS72T128020GR	5-A	Q67100	Q1382	
							PC2-4300 4-4-4		3.7-A	Q67100	Q1383	
2 GB	256 M x 72	512 M	128 M x 4	PTFBGA60	2	30 mm	PC2-3200 3-3-3	HYS72T256220GR	5-A	Q67100	Q1891	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1918	
		1 G	256 M x 4	PTFBGA68	1	30 mm	PC2-3200 3-3-3	HYS72T256000GR	5-A	Q67100	Q1735	
							PC2-4300 4-4-4		3.7-A	Q67100	Q1736	
4 GB	512 M x 72	1 G	512 M x 4	SDFBGA	2	30 mm	PC2-3200 3-3-3	HYS72T512022GR	5-A	Q67100	Q1737	1Q05
							PC2-4300 4-4-4		3.7-A	Q67100	Q1738	



## SO-DIMM DDR2 – 200-pin

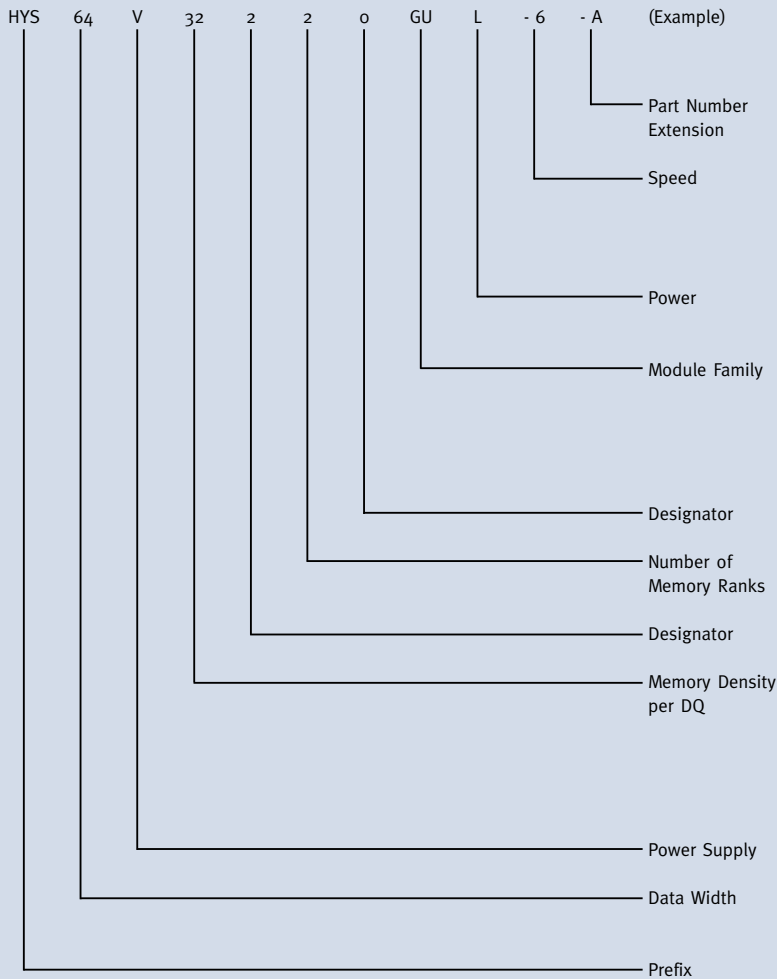
Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green
256 MB	32 M x 64	512 M	32 M x 16	PTFBGA84	1	30 mm	PC2-3200 3-3-3	HYS64T32000GDL	5-A	Q67100	Q1401	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1402	
512 MB	64 M x 64	512 M	32 M x 16	PTFBGA84	2	30 mm	PC2-3200 3-3-3	HYS64T64020GDL	5-A	Q67100	Q1404	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1405	
1 GB	128 M x 64	512 M	128 M x 8	SDFBGA	2	30 mm	PC2-3200 3-3-3	HYS64T128022GDL	5-A	Q67100	Q1692	3Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1691	
	1 G	64 M x 16	PTFBGA92	2	30 mm	PC2-3200 3-3-3	HYS64T128020GDL	5-A	Q67100	Q1743		
						PC2-4300 4-4-4		3.7-A	Q67100	Q1744		
2 GB	256 M x 64	1 G	256 M x 8	SDFBGA	2	30 mm	PC2-3200 3-3-3	HYS64T256022GDL	5-A	Q67100	Q1745	4Q04
							PC2-4300 4-4-4		3.7-A	Q67100	Q1746	



# SDR Modules

## Nomenclature SDR Modules

Unbuffered DIMM, Registered DIMM (168-pin) and SO-DIMM (144-pin)



Component Die Revision Indicator

- 6 = 166 MHz (PC166 3-3-3)
- 7 = 133 MHz (PC133 2-2-2)
- 7.5 = 133 MHz (PC133 3-3-3)
- 8 = 100 MHz (PC100 2-2-2)

- L = Low-Power Product
- none = Standard-Power Product

- GU = Unbuffered 168-pin DIMM
- GR = Registered 168-pin DIMM
- GBR = Registered 168-pin DIMM (FBGA-based)
- GD = 144-pin Small Outline DIMM (SO-DIMM)
- GBD = 144-pin SO-DIMM (FBGA-based)

Product Variations

- 0 = One Memory Module Rank
- 2 = Two Memory Module Ranks

Data Sheet Defined

- 8 = 8 Mb
- 16 = 16 Mb
- 32 = 32 Mb
- 64 = 64 Mb
- 128 = 128 Mb
- 256 = 256 Mb

- V = 3.3 V (SDR Modules)

- 64 = x 64 (Non-ECC)
- 72 = x 72 (ECC)

HYS = Standard Prefix for SDRAM-based Memory Modules



## Unbuffered SDR DIMM – 168-pin

Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green	
<b>128 MB</b>	16 M x 64	128 M	16 M x 8	TSOP	1	1.25"	PC133 3-3-3	HYS64V16300GU-	7.5-C2	Q67100	Q4079	EOL	
							PC133 2-2-2		7-C2	Q67100	Q4080		
	256 M	16 M x 16	TSOP	1	1.15"	PC133 3-3-3	HYS64V16302GU-	7.5-D	Q67100	Q4466			
						PC133 2-2-2		7-D	Q67100	Q4442			
<b>128 MB ECC</b>	16 M x 72	128 M	16 M x 8	TSOP	1	1.25"	PC133 3-3-3	HYS72V16300GU-	7.5-C2	Q67100	Q4085	EOL	
							PC133 2-2-2		7-C2	Q67100	Q4086		
<b>256 MB</b>	32 M x 64	128 M	16 M x 8	TSOP	2	1.25"	PC133 3-3-3	HYS64V32220GU-	7.5-C2	Q67100	Q4082	EOL	
							PC133 2-2-2		7-C2	Q67100	Q4083		
	256 M	32 M x 8	TSOP	1	1.25"	PC133 3-3-3	HYS64V32300GU-	7.5-D	Q67100	Q4359			
						PC133 2-2-2		7-D	Q67100	Q4361			
<b>256 MB ECC</b>	32 M x 72	128 M	16 M x 8	TSOP	2	1.25"	PC133 3-3-3	HYS72V32220GU-	7.5-C2	Q67100	Q4088	EOL	
							PC133 2-2-2		7-C2	Q67100	Q4089		
	256 M	32 M x 8	TSOP	1	1.25"	PC133 3-3-3	HYS72V32300GU-	7.5-D	Q67100	Q4362			
						PC133 2-2-2		7-D	Q67100	Q4360			
<b>512 MB</b>	64 M x 64	256 M	32 M x 8	TSOP	2	1.25"	PC133 3-3-3	HYS64V64220GU-	7.5-D	Q67100	Q4390	EOL	
							PC133 2-2-2		7-D	Q67100	Q4389		
<b>512 MB ECC</b>	64 M x 72	256 M	32 M x 8	TSOP	2	1.25"	PC133 3-3-3	HYS72V64220GU-	7.5-D	Q67100	Q4387	EOL	
							PC133 2-2-2		7-D	Q67100	Q4388		

EOL = End of Life



### Registered SDR DIMM – 168-pin

Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green	
<b>128 MB</b>	16 M x 72	128 M	16 M x 8	TSOP	1	1.5"	PC133 3-3-3	HYS72V16301GR-	7.5-C2	Q67100	Q4091	EOL	
							PC133 2-2-2		7-C2	Q67100	Q4092		
<b>256 MB</b>	32 M x 72	128 M	32 M x 4	TSOP	1	1.5"	PC133 3-3-3	HYS72V32301GR-	7.5-C2	Q67100	Q4094	EOL	
		256 M	32 M x 8	TSOP	1	1.5"	PC133 3-3-3	HYS72V32300GR-	7.5-D	Q67100	Q4479		
							PC133 2-2-2		7-D	Q67100	Q4440		
<b>512 MB</b>	64 M x 72	256 M	64 M x 4	TSOP	1	1.5"	PC133 3-3-3	HYS72V64300GR-	7.5-D	Q67100	Q4474	EOL	
							PC133 2-2-2		7-D	Q67100	Q4441		
<b>1 GB</b>	128 M x 72	256 M	128 M x 4	TSOP stack	2	1.5"	PC133 3-3-3	HYS72V128321GR-	7.5-D	Q67100	Q4725	EOL	
							PC133 2-2-2		7-D	Q67100	Q4726		
							PC133 3-3-3	HYS72V128320GR-	7.5-D	Q67100	Q4475		
							PC133 2-2-2		7-D	Q67100	Q4439		

EOL = End of Life

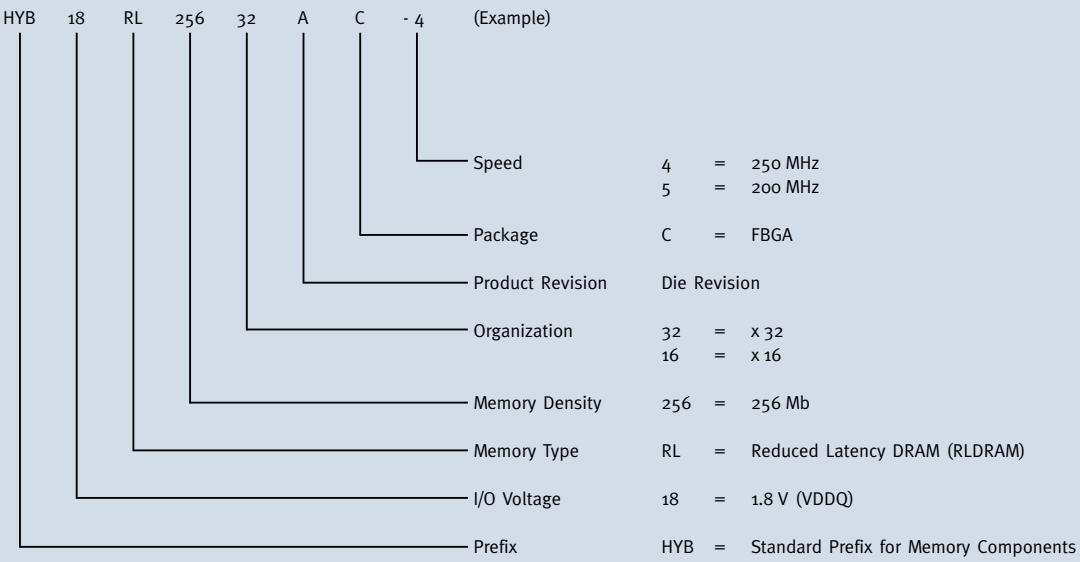
### SO-DIMM SDR – 144-pin

Module Density	Organization	Generation	Compo. Organization	Compo. Package	# of Ranks on Module	Module Height	Module Speed	Sales Description	Speed No.	Ordering Code	Prod.	Green	
<b>128 MB</b>	16 M x 64	128 M	8 M x 16	TSOP	2	1.00"	PC133 3-3-3	HYS64V16220GDL-	7.5-C2	Q67100	Q4342	EOL	
		256 M	16 M x 16	TSOP	1	1.00"	PC133 3-3-3	HYS64V16200GDL-	7.5-D	Q67100	Q4478		
							PC133 2-2-2		7-D	Q67100	Q4363		
<b>256 MB</b>	32 M x 64	256 M	16 M x 16	TSOP	2	1.00"	PC133 3-3-3	HYS64V32220GDL-	7.5-D	Q67100	Q4472	EOL	
							PC133 2-2-2		7-D	Q67100	Q4444		
<b>512 MB</b>	64 M x 64	256 M	32 M x 8	FBGA	2	1.15"	PC133 3-3-3	HYS64V64220GBDL-	7.5-D	Q67100	Q4499	EOL	
							PC133 2-2-2		7-D	Q67100	Q4501		

EOL = End of Life

# Specialty DRAMs

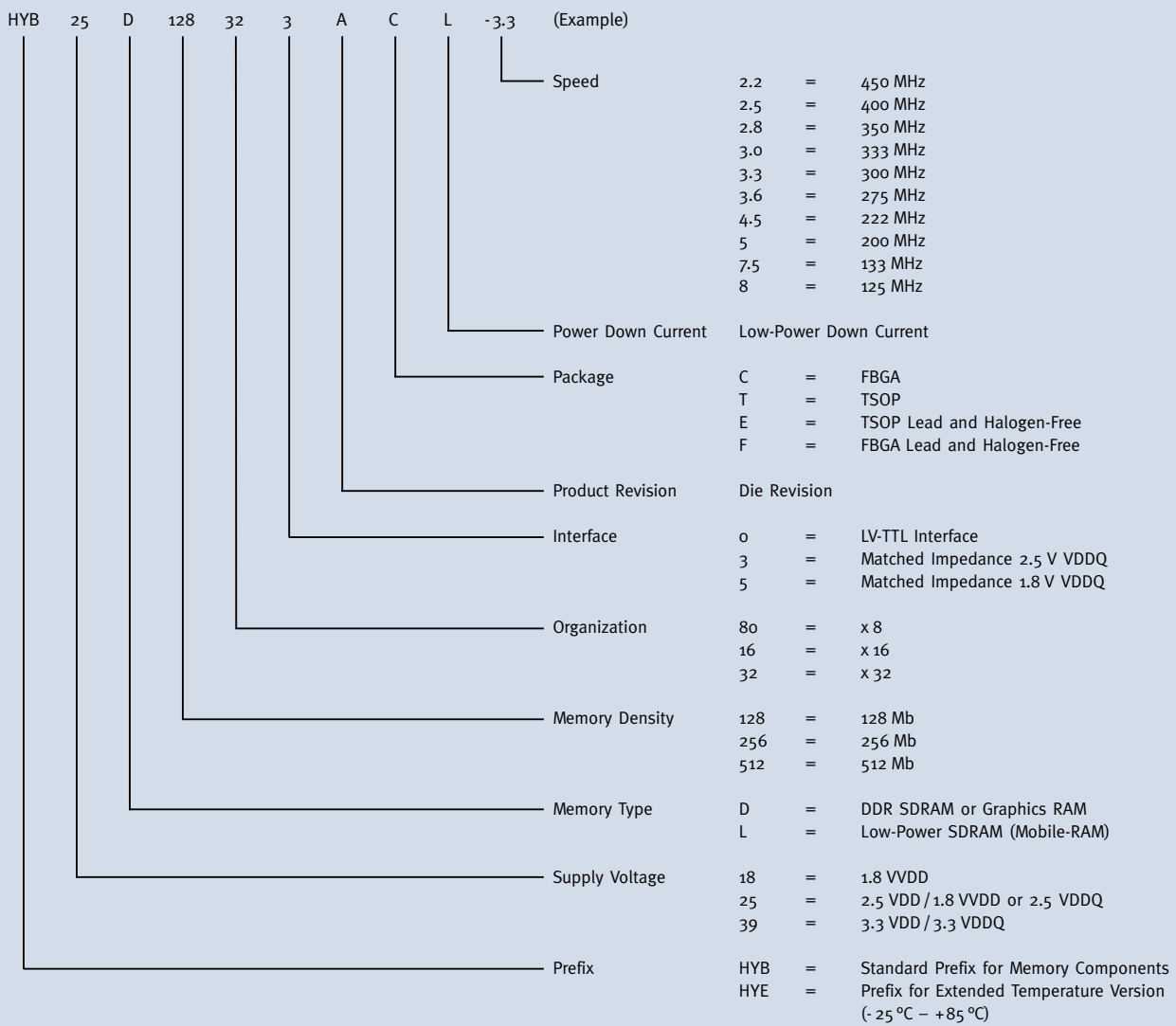
## Nomenclature Reduced Latency DRAM (RLDRAM™)

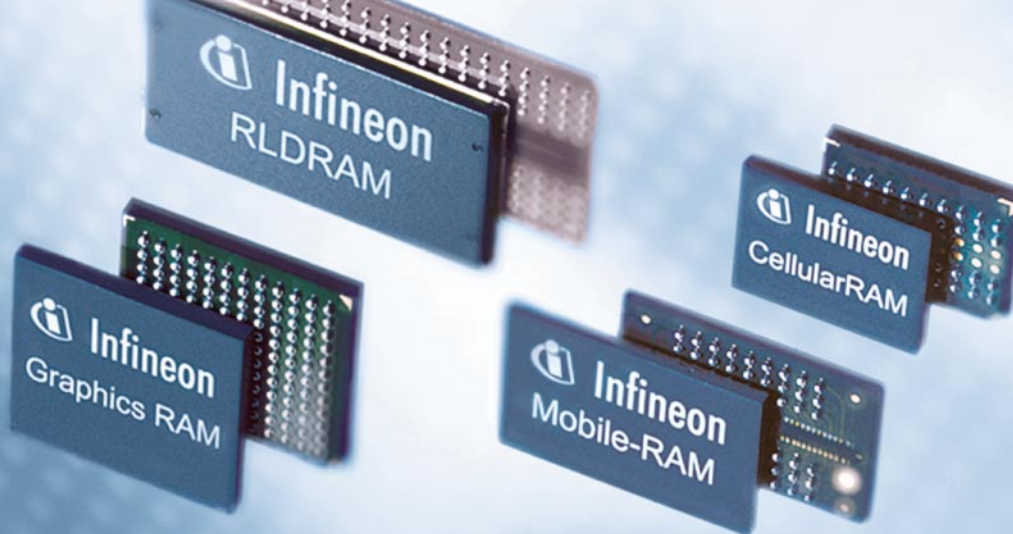


## Reduced Latency DRAM (RLDRAM™)

Density	Organization	Power Supply	Speed	Sales Description	Speed No.	Ordering Code	Package	Prod.	Green
256 Mb	8 M x 32	2.5 V / 1.8 V VDDQ	250 MHz	HYB18RL25632AC-	4	Q67100 Q4355	T-FBGA-144	Now	
			200 MHz		5	Q67100 Q4357			
	16 M x 16		250 MHz	HYB18RL25616AC-	4	Q67100 Q4356			
			200 MHz		5	Q67100 Q4358			

## Nomenclature Graphics RAM and Mobile-RAM





## Graphics RAM

Density	Organization	Power Supply	Speed	Sales Description	Speed No.	Ordering Code	Package	Prod.	Green
128 Mb	4 M x 32	2.5 V	333 MHz	HYB25D128323C-	3.0	Q67100 Q4866	FBGA-144	EOL	
			300 MHz		3.3	Q67100 Q4121			
			275 MHz		3.6	Q67100 Q4348			
			222 MHz	3.6	Q67100 Q4930				
				4.5	Q67100 Q4123				
				4.5	Q67100 Q4786				
256 Mb	16 M x 16	2.5 V	166 MHz	HYB25D256160BT-	6.0	Q67100 Q4592	TSOP-66	Now	
			200 MHz		5.0	Q67100 Q4277			
			200 MHz	HYB25D256161CE-	5.0	Q67100 Q1408		Now	XX
			250 MHz		4.0	Q67100 Q1409			
	8 M x 32	1.8 V	500 MHz	HYB18T256321F-	20	Q67100 Q4868	FBGA-144	3Q04	X
			450 MHz		22	Q67100 Q4869			
			400 MHz		25	Q67100 Q4870			

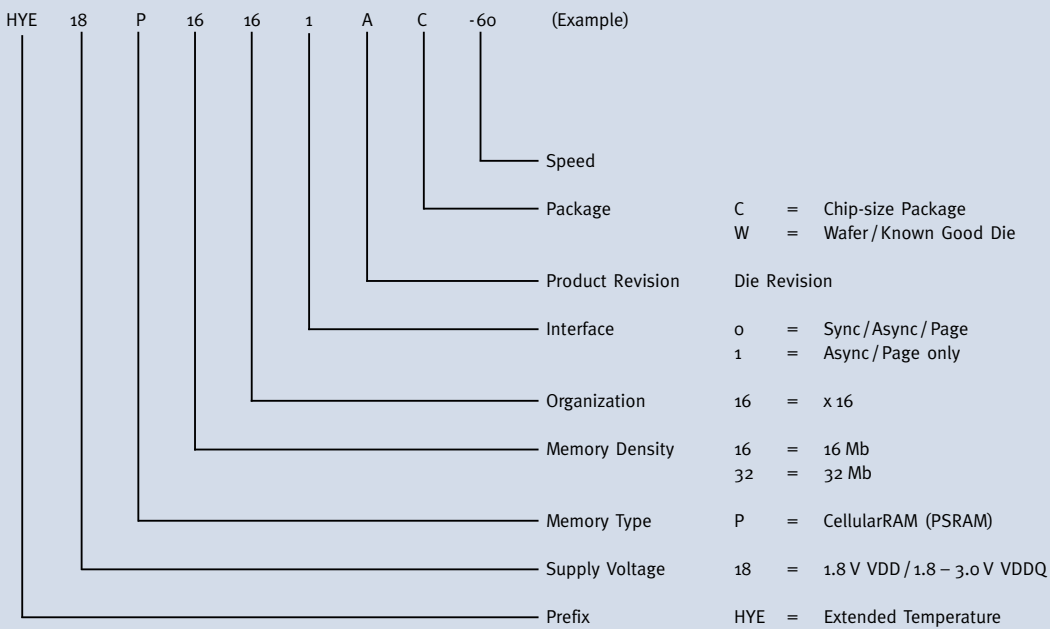
XX = Lead and Halogen-Free    X = Lead-Free    EOL = End of Life

## Mobile-RAM

Density	Organization	Power Supply Core	Power Supply I/O	Speed	Latency	Sales Description	Speed No.	Ordering Code	Package	Prod.	Green		
128 Mb	8 M x 16	2.5 V	2.5 V / 1.8 V	133 MHz	3-3-3	HYB25L128160AC-	7.5	Q67100 Q4542	FBGA-54	Now			
						HYE25L128160AC-	7.5 ETR	Q67100 Q4544					
		3.3 V	3.3 V			HYB39L128160AT-	7.5	Q67100 Q4624	TSOP-54				
						HYB39L128160AC-	7.5	Q67100 Q4546	FBGA-54				
		1.8 V	1.8 V			HYB18L128160BF-	7.5	Q67100 Q1581	FBGA-54			2Q04	XX
						HYB18L128160BC-	7.5	Q67100 Q1588	FBGA-54			2Q04	○
256 Mb	16 M x 16	2.5 V	2.5 V / 1.8 V	133 MHz	3-3-3	HYB25L256160AC-	7.5	Q67100 Q5145	FBGA-54	Now			
						HYE25L256160AC-	7.5 ETR	Q67100 Q5148					
		3.3 V	3.3 V			HYB39L256160AC-	7.5	Q67100 Q5144	FBGA-54				
						HYB39L256160AT-	7.5	Q67100 Q4627	TSOP-54				
		1.8 V	1.8 V			HYB18L256160BF-	7.5	Q67100 Q1295	FBGA-54			2Q04	XX
						HYB18L256160BC-	7.5	Q67100 Q1577	FBGA-54			2Q04	○
512 Mb	Dual 16 M x 16	3.3 V or 2.5 V	3.3 V or 2.5 V / 1.8 V	133 MHz	3-3-3	HYB25L512160AC-	7.5	Q67100 Q4921	FBGA-54	Now			
						HYE25L512160AC-	7.5 ETR	Q67100 Q4923					

○ = Halogen-Free    XX = Lead and Halogen-Free    ETR = Extended Temperature

## Nomenclature CellularRAM™



## CellularRAM™

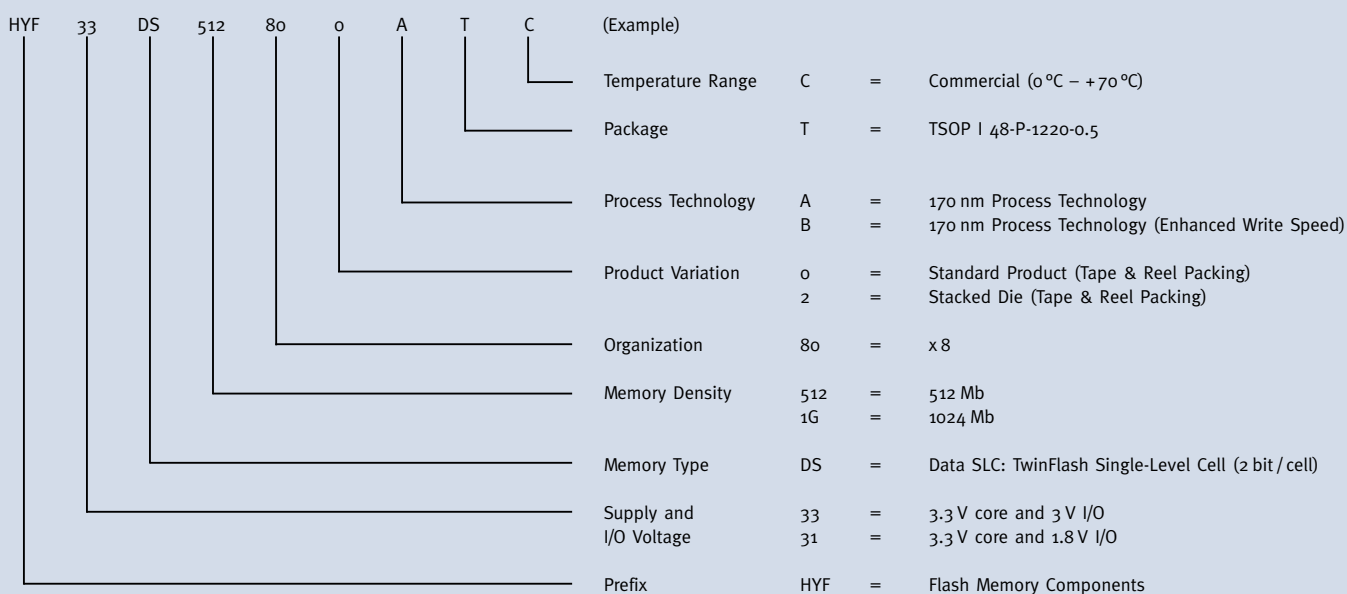
Density	Organization	Interface	Speed	Sales Description	Speed No.	Ordering Code	Package	Prod.	Green
<b>16 Mb Async</b>	1 M x 16	SRAM	85 ns	HYE18P16161AC-	85	Q67100 Q5098	VFBGA-48	2Q04	X
			70 ns		70	Q67100 Q5099	VFBGA-48		
			70 ns	HYE18P16161AW-	70	Q67100 Q5101	Wafer/KGD		
<b>32 Mb Async</b>	2 M x 16	SRAM	85 ns	HYE18P32161AC-	85	Q67100 Q5103	VFBGA-48	2Q04	X
			70 ns		70	Q67100 Q5104	VFBGA-48		
			70 ns	HYE18P32161AW-	70	Q67100 Q5106	Wafer/KGD		
<b>32 Mb Sync</b>	2 M x 16	SRAM / Flash	80 MHz / 70 ns	HYE18P32160AC-	12.5	Q67100 Q1802	VFBGA-54	2Q04	X
			66 MHz / 85 ns		15	Q67100 Q5108	VFBGA-54		
			66 MHz / 85 ns	HYE18P32160AW-	15	Q67100 Q5110	Wafer/KGD		

X = Lead-Free



# Flash

## Nomenclature TwinFlash™ Components



## TwinFlash™ Components

Density	Organization	Page Size	Block Size	Core Voltage	I/O Voltage	Write Speed	Sales Description	Ordering Code	Package
512 Mb	64 M x 8	512 + 16 Bytes	16 K + 512 Bytes	3 V	3 V	Normal	HYF33DS51280oATC	On request	P-TSOP1-48
					3 V	Enhanced	HYF33DS51280oBTC		
					1.8 V	Enhanced	HYF31DS51280oBTC		
1 Gb	128 M x 8	512 + 16 Bytes	16 K + 512 Bytes	3 V	3 V	Normal	HYF33DS1G802ATC	On request	P-TSOP1-48
					3 V	Enhanced	HYF33DS1G802BTC		
					1.8 V	Enhanced	HYF31DS1G802BTC		



## Nomenclature TwinFlash™ Cards

Character	Value	Parameter	Meaning
HYC	3	Type	C = Flash Card
N	256	Technology	N = TWIN-NAND
0	NO	Label Shortcut	NO = No label IF = IFX label
5	0	Speed	0 = Standard 1 = Future use
AA	1	Firmware	AA = 1st firmware AB = 2nd firmware
1	A	Controller Generation	1 = 1st generation 2 = 2nd generation
A	A	Memory Revision	A = 170 nm Process Technology B = 110 nm Process Technology
A	A	Package	A = SD (commercial) B = MMC (commercial) C = miniSD (commercial) D = mini MMC (commercial)
0	0	Content	0 = No content 1 = Content 1 rev. label
5	0	Label Size	0 = No label 1 = 16 MB 2 = 32 MB 3 = 64 MB 4 = 128 MB 5 = 256 MB 6 = 512 MB 7 = 1 GB
0	0	Memory Capacity	64 = 64 MB 128 = 128 MB 256 = 256 MB 512 = 512 MB 01G = 1024 MB
3	3	Supply Voltage	3 = 3.3 V Core 1 = 1.8 V Core (Dual-Voltage)

## TwinFlash™ Cards

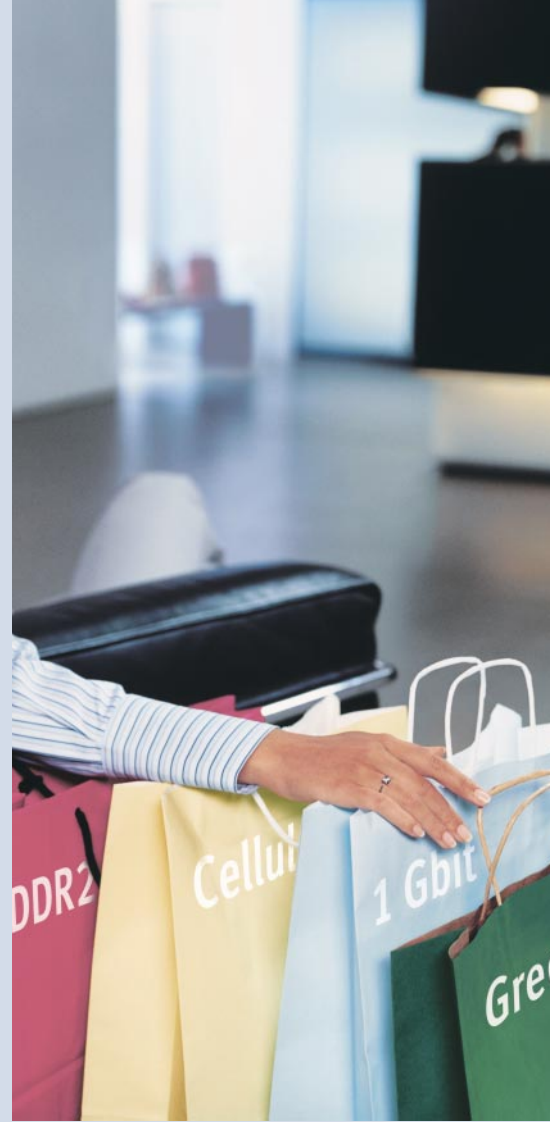
Card	Density	Operating Voltage	Sales Description	Ordering Code
Multi Media Cards	64 MB	2.7 V – 3.6 V	HYC3N0640NO00AA1AB	On request
	128 MB		HYC3N1280NO00AA1AB	
	256 MB		HYC3N2560NO00AA1AB	
SD Cards	64 MB	2.7 V – 3.6 V	HYC3N0640NO00AA1AA	On request
	128 MB		HYC3N1280NO00AA1AA	
	256 MB		HYC3N2560NO00AA1AA	

## More detailed Information on Memory Products is available:

On our Internet websites:

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- Datasheets
- Simulation models
- Memory Spectrum (PDF version)
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