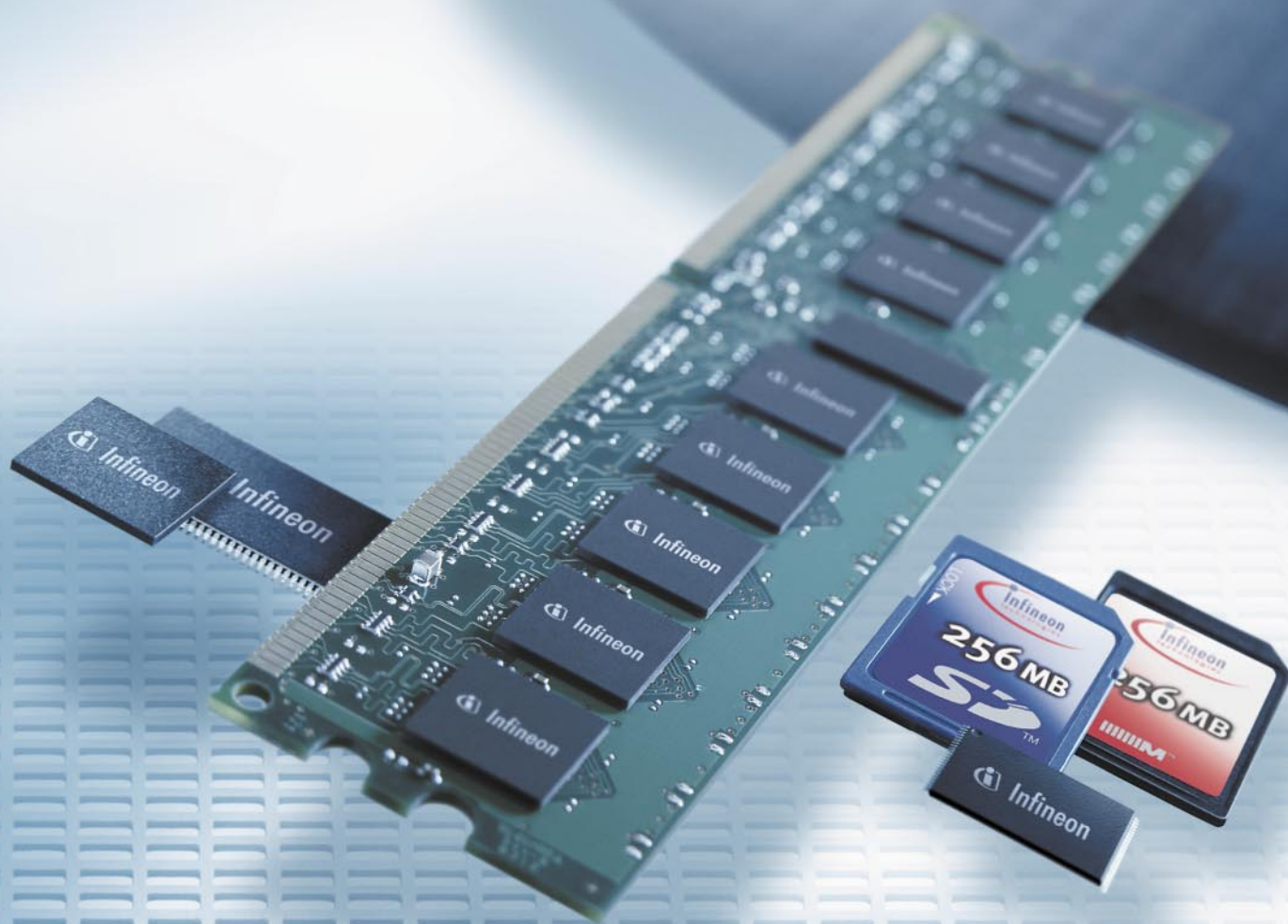


# MEMORY SPECTRUM



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

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# DRAM Components

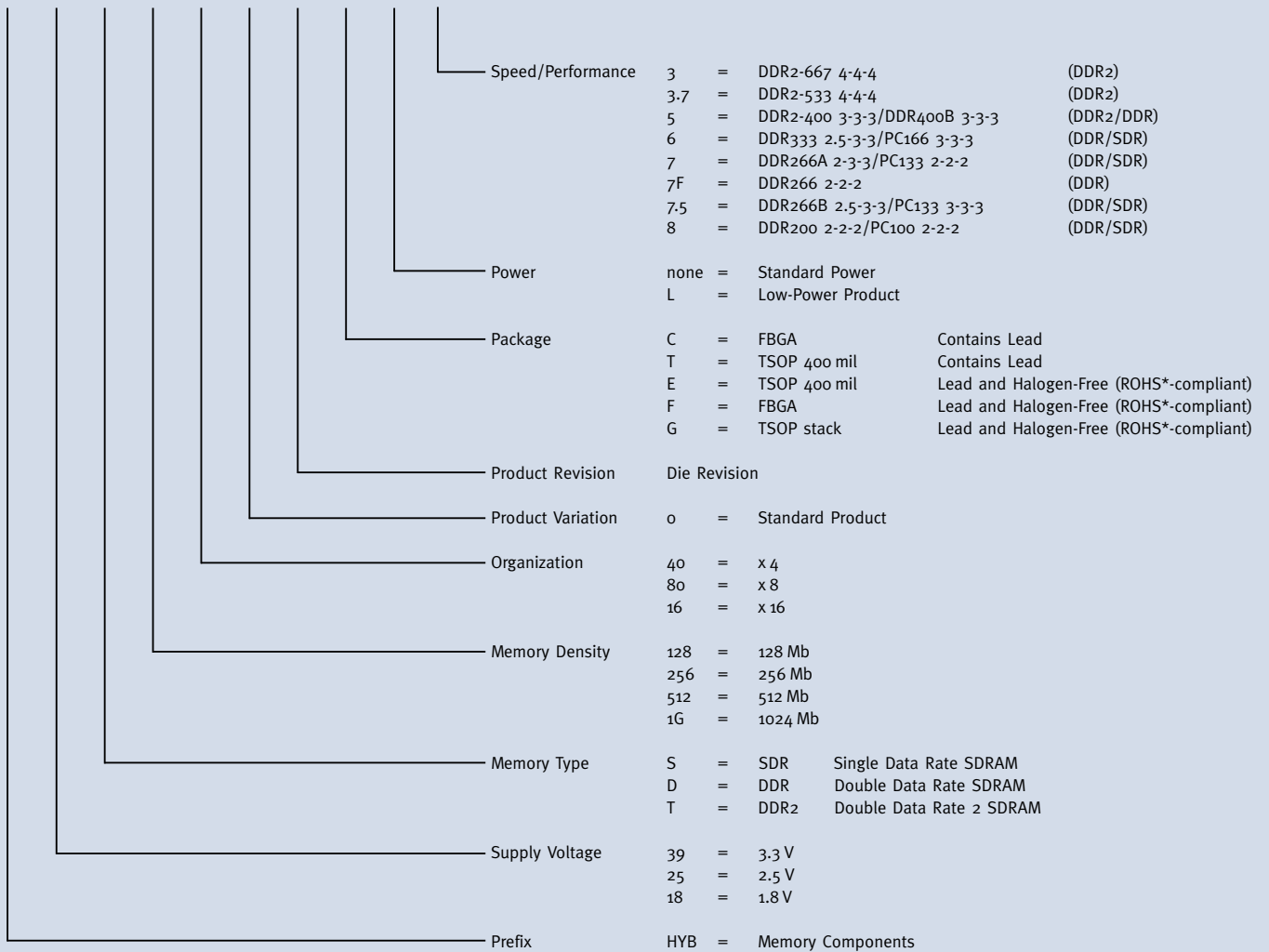
## Nomenclature DRAM Components

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

DRAM Modules

Specialty DRAMs

Flash



\*ROHS = Restriction Of Hazardous Substances



## DDR Components

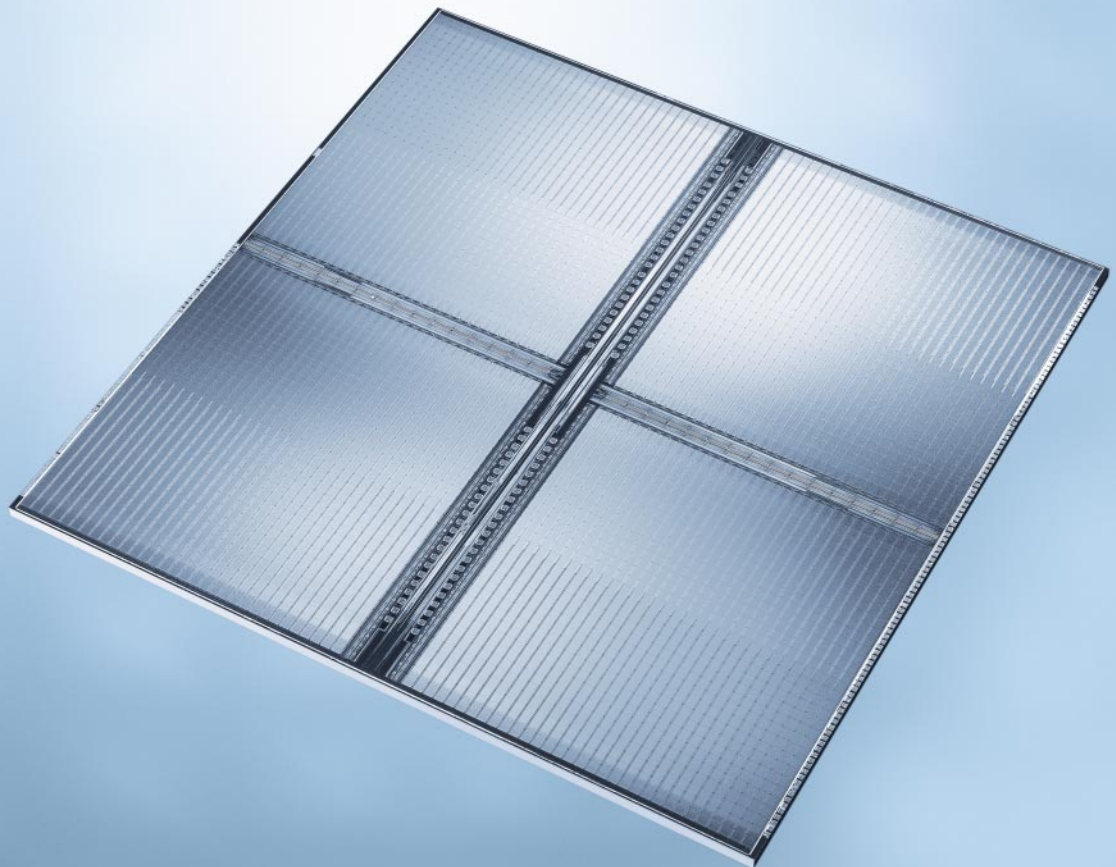
| Generation         | Organization | Package             | Speed        | Latency         | Sales Description | Speed No.    | Ordering Code | Prod. | Green |
|--------------------|--------------|---------------------|--------------|-----------------|-------------------|--------------|---------------|-------|-------|
| <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    |
|                    | 16 M x 16    | TSOP-66 (400 mil)   | DDR400       | 3-3-3           | HYB25D256800CE-   | 5            | Q67100 Q5180  | Now   | XX    |
|                    |              |                     | 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        | 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

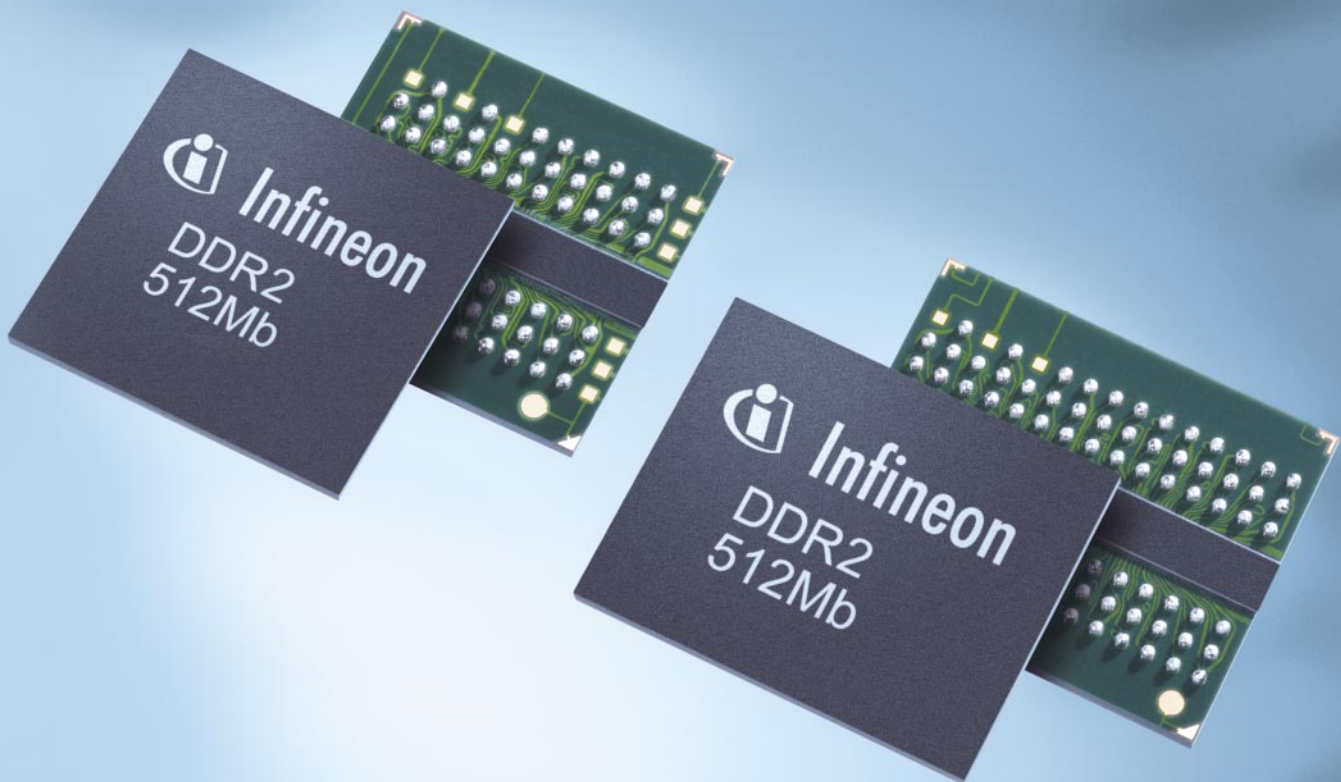
| Generation | Organization   | Package              | Speed                | Latency | Sales Description | Speed No.         | Ordering Code   |            | Prod.           | Green  |        |
|------------|----------------|----------------------|----------------------|---------|-------------------|-------------------|-----------------|------------|-----------------|--------|--------|
| 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 |
|            | DDR333         | 2.5-3-3              |                      | 6       |                   |                   |                 |            | Q67100          | Q4415  |        |
|            | DDR333         | 2.5-3-3              | HYB25D512800BE-      | 6       |                   |                   | Q67100          | Q5205      | Now             | XX     |        |
|            |                |                      |                      | DDR400  |                   |                   | 3-3-3           |            | 5               | Q67100 | Q5204  |
|            | 32 M x 16      | TSOP-66 (400 mil)    | DDR266A              | 2-3-3   | HYB25D512160AT-   | 7                 | Q67100          | Q4411      | Now             |        |        |
|            |                |                      |                      |         | DDR333            | 2.5-3-3           | HYB25D512160AT- | 6          | Q67100          | Q4416  | Now    |
|            |                |                      | DDR333               | 2.5-3-3 | HYB25D512160BE-   | 6                 | Q67100          | Q5209      | Now             | XX     |        |
|            |                |                      |                      |         |                   | DDR400            | 3-3-3           |            | 5               | Q67100 | Q5208  |
|            | 512 Mb<br>FBGA | 128 M x 4            | FBGA 60 (10 x 12 mm) | DDR333  | 2.5-3-3           | HYB25D512400BC-   | 6               | Q67100     | Q1661           | Now    |        |
|            |                |                      |                      | DDR400  | 3-3-3             |                   | 5               | Q67100     | Q1693           |        |        |
|            |                | 64 M x 8             | FBGA 60 (10 x 12 mm) | DDR333  | 2.5-3-3           | HYB25D512800BC-   | 6               | Q67100     | Q1663           | Now    |        |
| DDR333     |                |                      |                      | 2.5-3-3 | HYB25D512800BF-   | 6                 | Q67100          | Q5215      | Now             | XX     |        |
| DDR400     |                |                      |                      | 3-3-3   | HYB25D512800BC-   | 5                 | Q67100          | Q1451      | Now             |        |        |
| DDR400     |                |                      |                      | 3-3-3   | HYB25D512800BF-   | 5                 | Q67100          | Q1452      | Now             | XX     |        |
| 32 M x 16  |                | FBGA 60 (10 x 12 mm) | DDR333               | 2.5-3-3 | HYB25D512160BC-   | 6                 | Q67100          | Q1453      | Now             |        |        |
|            |                |                      | DDR400               | 3-3-3   |                   | 5                 | Q67100          | Q1454      |                 |        |        |

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<br/>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 |            |       |

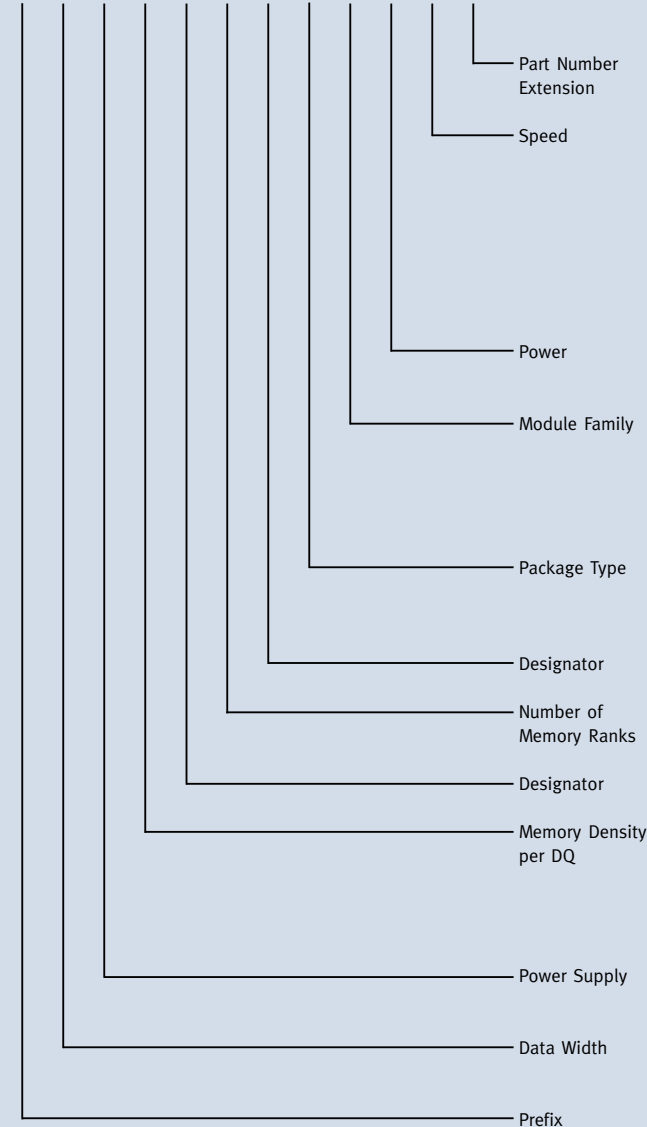


# DRAM Modules

## 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

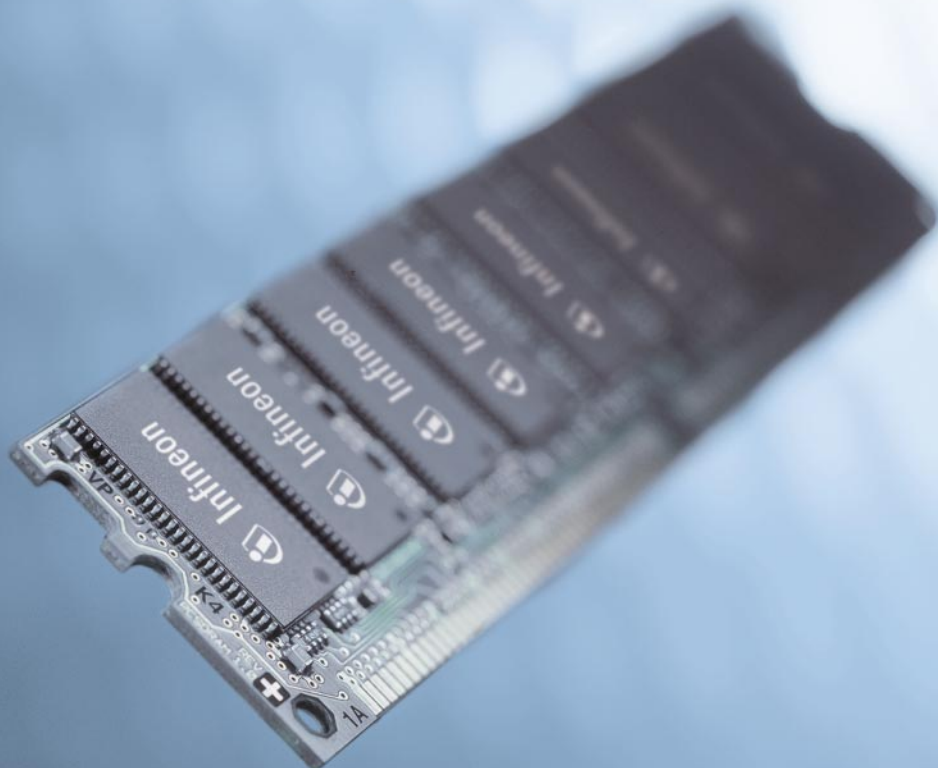
| Module Density    | Organization | Generation | Compo. Organization | Compo. Package | # of Ranks on Module | Module Height | Module Speed | Sales Description | Speed No. | Ordering Code |       | Prod. | Green |   |
|-------------------|--------------|------------|---------------------|----------------|----------------------|---------------|--------------|-------------------|-----------|---------------|-------|-------|-------|---|
| <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   |       | X |
|                   |              |            |                     |                |                      |               | 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   |       | X |
| 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       | HYS72D32300HU-    | 5-C       | Q67100        | Q1756 | Now   |       | X |
| PC2700            | 6-C          | Q67100     | Q4998               |                |                      |               |              |                   |           |               |       |       |       |   |
| 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       | HYS64D64320HU-    | 5-C       | Q67100        | Q1761 | Now   |       | X |
|                   |              |            |                     |                |                      |               | PC2700       |                   | 6-C       | Q67100        | Q5001 |       |       |   |
| 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       | HYS72D64320HU-    | 5-C       | Q67100        | Q1762 | Now   |       | X |
| PC2700            | 6-C          | Q67100     | Q4997               |                |                      |               |              |                   |           |               |       |       |       |   |
| 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

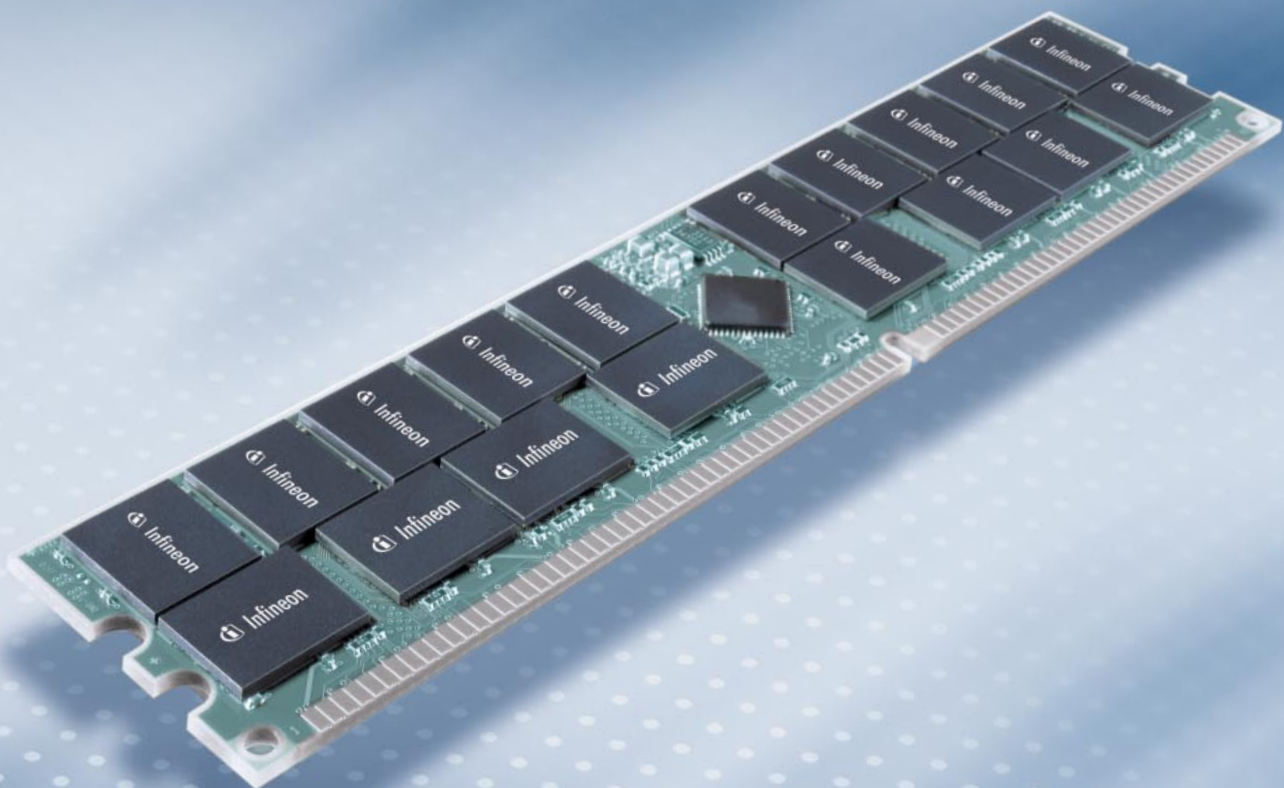
| Module Density | Organization | Generation  | Compo. Organization | Compo. Package | # of Ranks on Module | Module Height | Module Speed | Sales Description | Speed No.      | Ordering Code    | Prod.            | Green        |              |                 |     |              |     |  |
|----------------|--------------|-------------|---------------------|----------------|----------------------|---------------|--------------|-------------------|----------------|------------------|------------------|--------------|--------------|-----------------|-----|--------------|-----|--|
| <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     | 2Q04             |              |              |                 |     |              |     |  |
|                |              |             |                     |                |                      |               | PC2700       | 6-C               | Q67100 Q1413   |                  |                  |              |              |                 |     |              |     |  |
|                |              |             |                     |                |                      |               | 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     | 2Q04             |              |              |                 |     |              |     |  |
|                |              |             |                     |                |                      |               | PC2700       | 6-B               | Q67100 Q4686   |                  |                  |              |              |                 |     |              |     |  |
|                |              |             | PC3200              |                |                      |               | 5-B          | Q67100 Q1462      | 3Q04           |                  |                  |              |              |                 |     |              |     |  |
|                |              |             | PC2700              |                |                      |               | 6-C          | Q67100 Q1415      |                |                  |                  |              |              |                 |     |              |     |  |
|                |              |             | 32 M x 8            | FBGA           | 2                    | 1.125"        | PC3200       | HYS72D64320GBR-   | 5-C            | Q67100 Q1685     | Now              |              |              |                 |     |              |     |  |
|                |              |             |                     |                |                      |               | PC2100       | 7-B               | Q67100 Q4687   |                  |                  |              |              |                 |     |              |     |  |
|                |              | PC2700      |                     |                |                      |               | 6-B          | Q67100 Q4693      | 2Q04           |                  |                  |              |              |                 |     |              |     |  |
|                |              | PC3200      |                     |                |                      |               | 5-B          | Q67100 Q1463      |                |                  |                  |              |              |                 |     |              |     |  |
|                |              | PC2700      |                     |                |                      |               | 6-C          | Q67100 Q1414      | 3Q04           |                  |                  |              |              |                 |     |              |     |  |
|                |              | PC3200      |                     |                |                      |               | 5-C          | Q67100 Q1684      |                |                  |                  |              |              |                 |     |              |     |  |
|                |              | <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 | 2Q04         |                 |     |              |     |  |
|                |              |             |                     |                |                      |               |              |                   | PC2700         | 6-B              | Q67100 Q4668     |              |              |                 |     |              |     |  |
| 512 M          | 128 M x 4    |             | TSOP                | 1              | 1.2"                 | PC2100        |              | HYS72D128500GR-   | 7-A            | Q67100 Q4990     | Now              |              |              |                 |     |              |     |  |
|                |              |             |                     |                |                      | PC2100        |              | 7-B               | Q67100 Q1429   |                  |                  |              |              |                 |     |              |     |  |
|                |              |             |                     |                |                      | FBGA          |              | 1                 | 1.125"         | PC2700           | HYS72D128300GBR- | 6-B          | Q67100 Q1032 | Now             |     |              |     |  |
|                |              |             |                     |                |                      |               |              |                   |                | 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              |              |              |                 |     |              |     |  |
|                |              |             |                     | PC2100         | 7-B                  | Q67100 Q1031  |              |                   |                |                  |                  |              |              |                 |     |              |     |  |
|                |              |             | 128 M x 4           | FBGA           | 2                    | 1.2"          | PC2700       | HYS72D256320GBR-  | 6-B            | Q67100 Q1030     | Now              |              |              |                 |     |              |     |  |
|                |              |             |                     |                |                      |               | PC3200       | 5-B               | Q67100 Q1689   |                  |                  |              |              |                 |     |              |     |  |

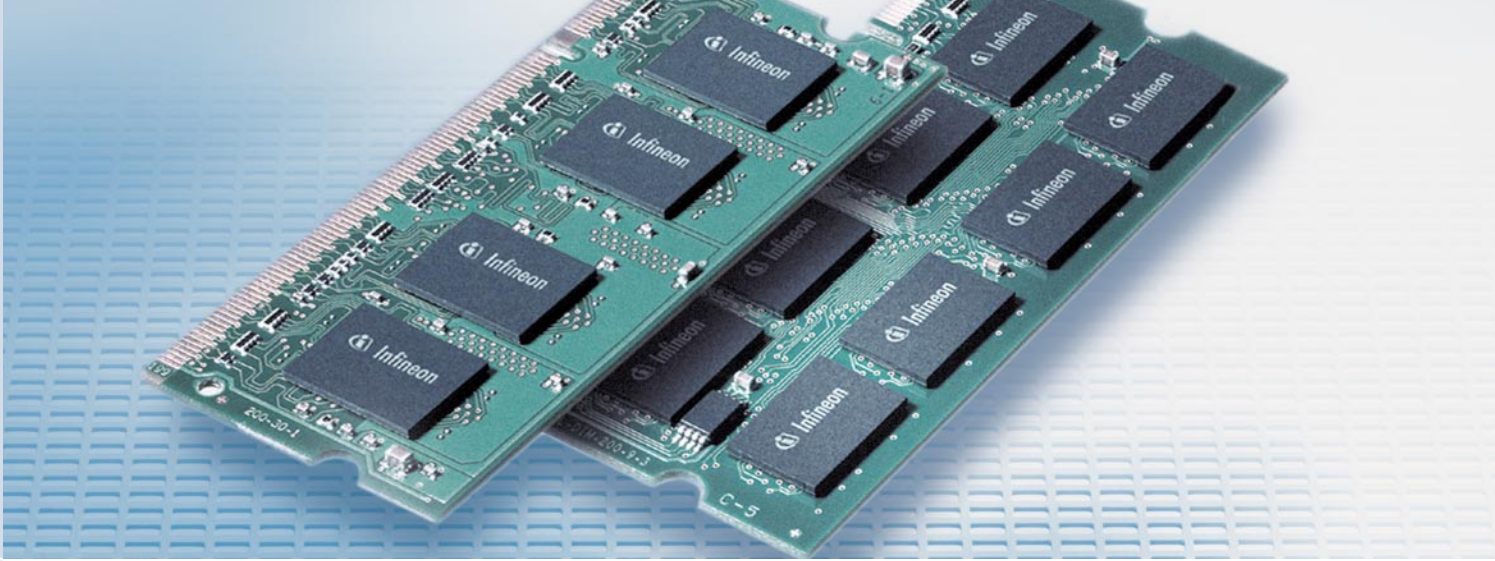
X = Lead-Free

## 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       | HYS64D64020HBDL-  | 6-C       | Q67100        | Q1450 | 2Q04  |   |
|                |              |            |                     |                |                      |               | PC3200       |                   | 5-C       | Q67100        | Q1702 |       |   |
|                |              |            |                     |                |                      |               | PC2700       |                   | 6-C       | Q67100        | Q4835 |       |   |
|                | 64 M x 64    | 512 M      | 32 M x 16           | TSOP           | 2                    | 1,25"         | PC2100       | HYS64D64020GDL-   | 7-A       | Q67100        | Q4663 | Now   | X |
|                |              |            |                     |                |                      |               | PC2700       |                   | 6-A       | Q67100        | Q4744 |       |   |
|                |              |            |                     |                |                      |               | PC2700       |                   | 6-B       | Q67100        | Q1774 |       |   |
|                |              |            |                     |                |                      |               | PC3200       | HYS64D64020HDL-   | 5-B       | Q67100        | Q1783 | Now   |   |
|                |              |            |                     |                |                      |               | PC2700       |                   | 6-B       | Q67100        | Q1423 |       |   |
|                |              |            |                     |                |                      |               | 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 |       |   |

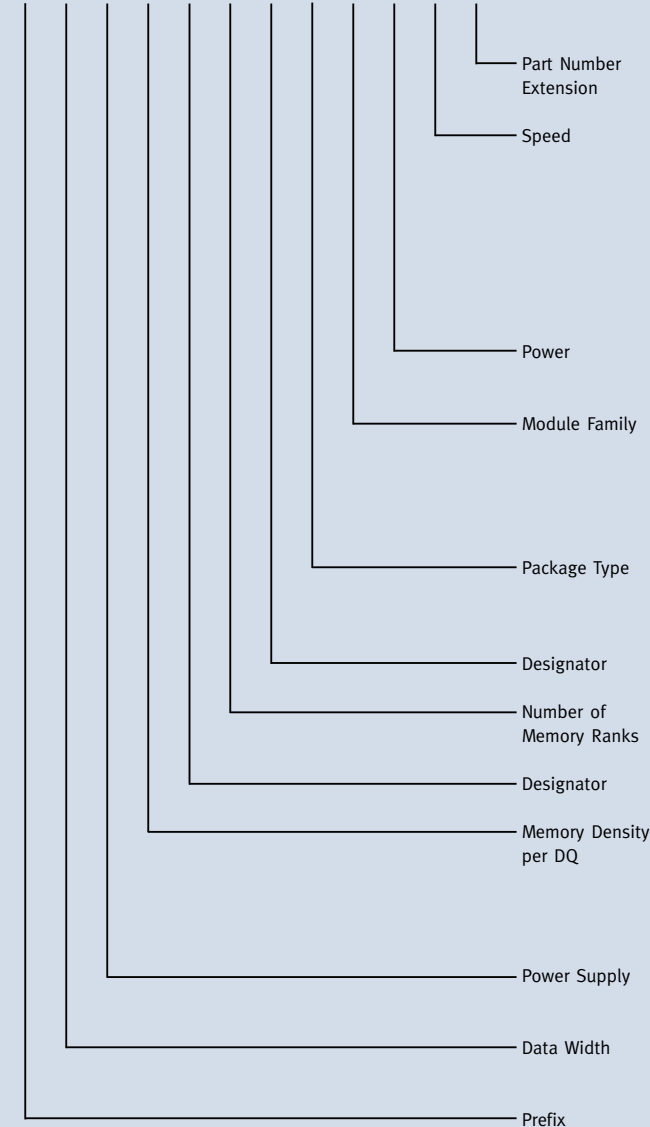
X = Lead-Free

# 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

\*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 |       |  |

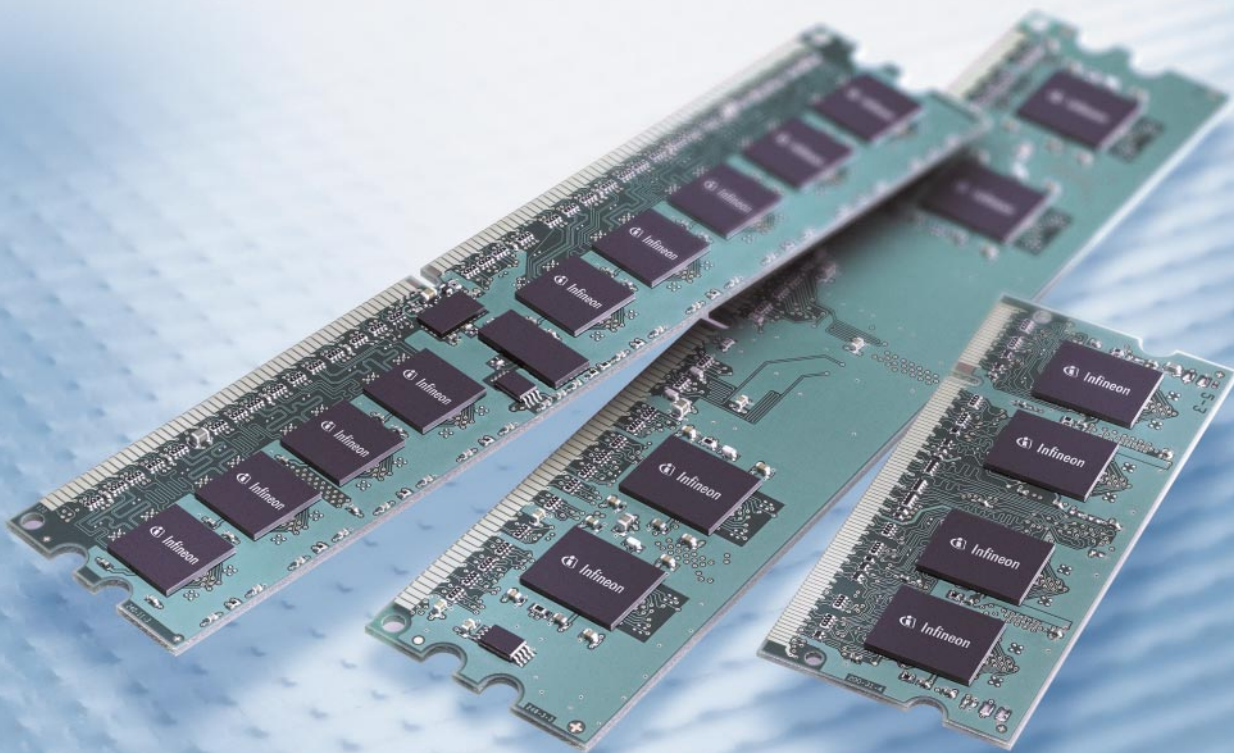
## Registered DDR2 DIMM – 240-pin

| 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

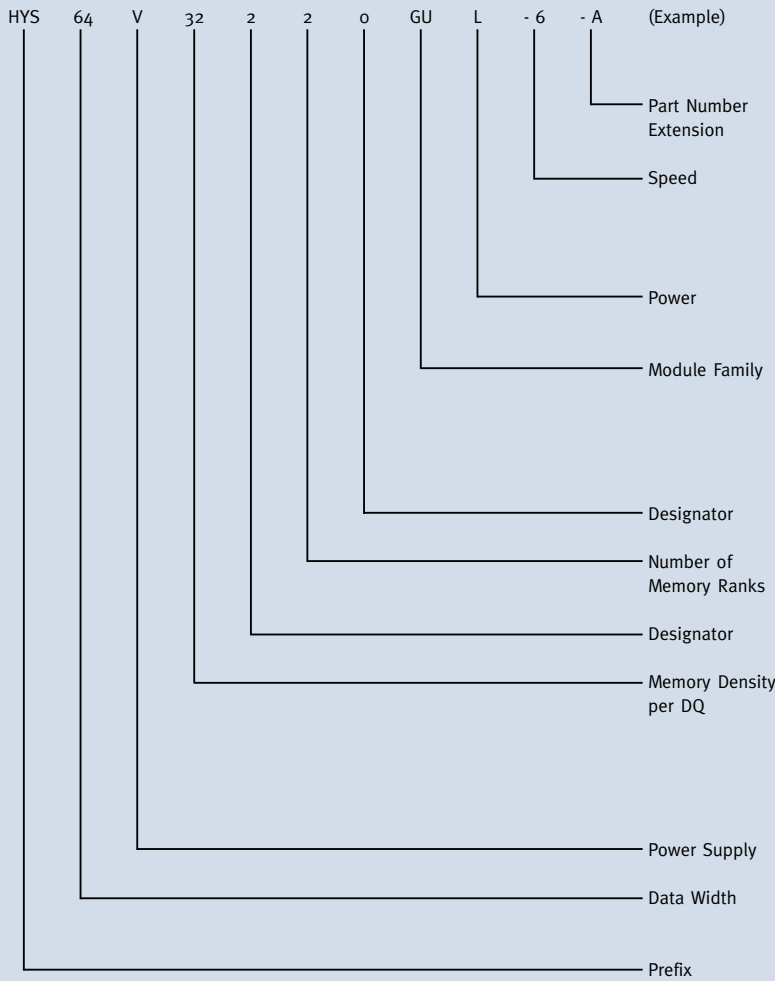
| Module Density | Organization | Generation | Compo. Organization | Compo. Package | # of Ranks on Module | Module Height  | Module Speed     | Sales Description | Speed No. | Ordering Code | Prod. | Green |
|----------------|--------------|------------|---------------------|----------------|----------------------|----------------|------------------|-------------------|-----------|---------------|-------|-------|
| 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

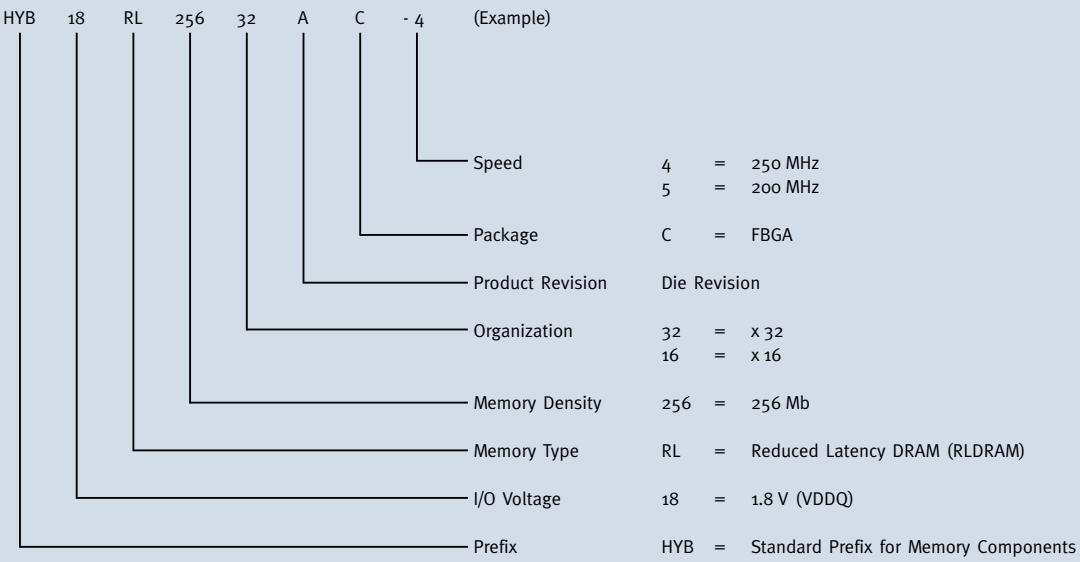
### SO-DIMM SDR – 144-pin

| 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

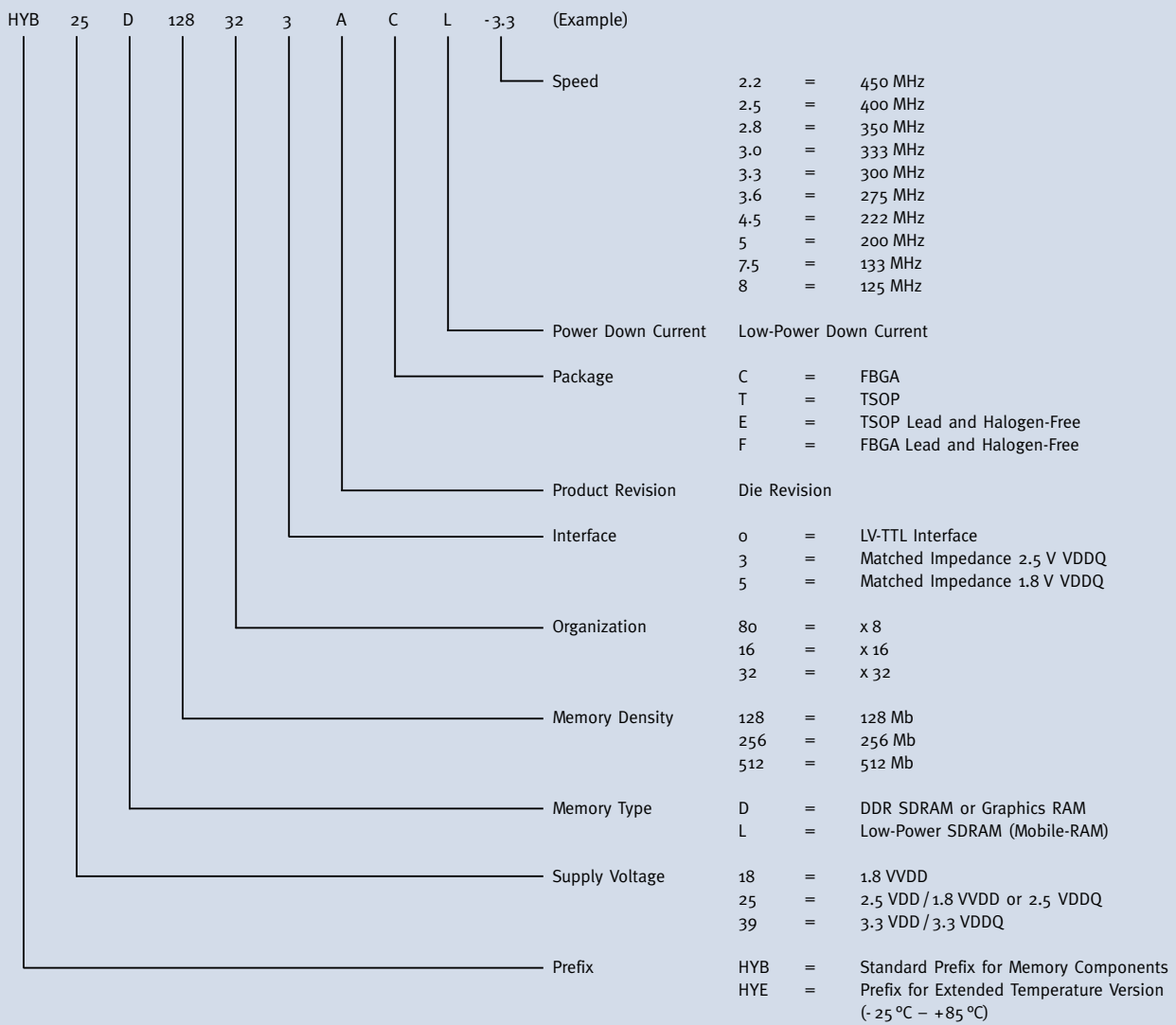
## Nomenclature Reduced Latency DRAM (RLDRAM™)

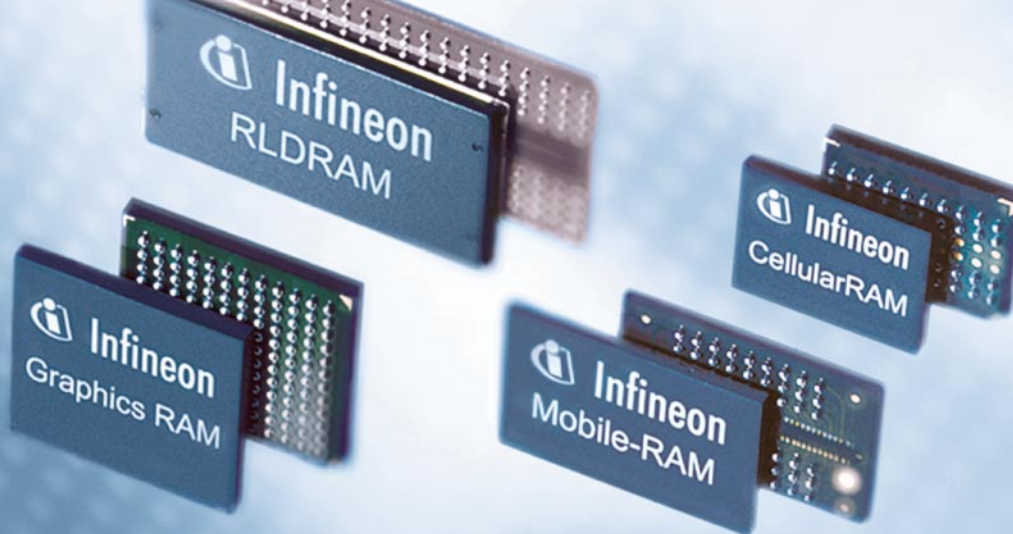


## Reduced Latency DRAM (RLDRAM™)

| 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 | HYB25D128323CL-   | 3.6       | Q67100 Q4930  |          |       |       |
|         |              |              |         | HYB25D128323C-    | 4.5       | Q67100 Q4123  |          |       |       |
|         |              |              |         | HYB25D128323CL-   | 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  |          |       |       |

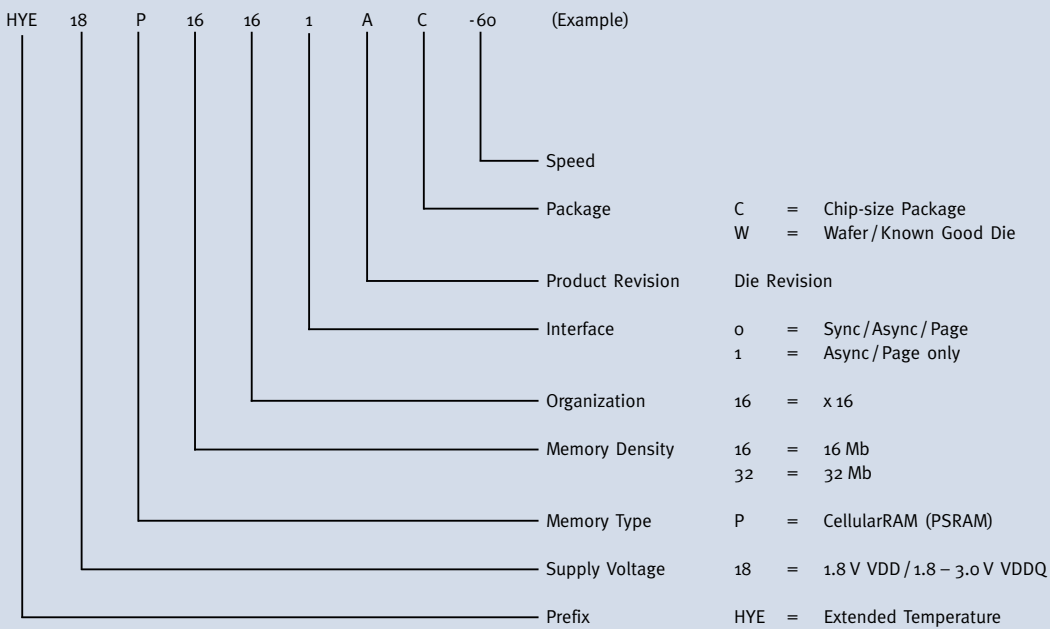
XX = Lead and Halogen-Free    X = Lead-Free    EOL = End of Life

## 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™

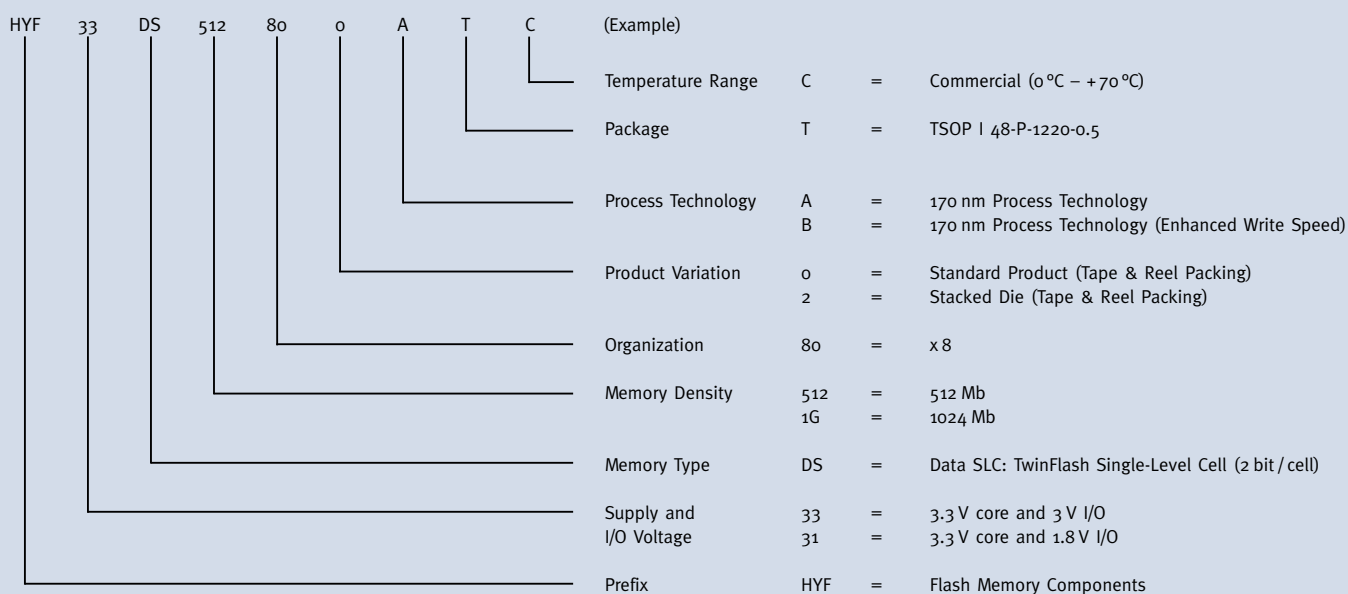
| Density            | Organization | Interface    | Speed          | Sales Description | Speed No. | Ordering Code | Package   | Prod. | Green |
|--------------------|--------------|--------------|----------------|-------------------|-----------|---------------|-----------|-------|-------|
| <b>16 Mb 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   |
| o         | NO    | Label Shortcut        | NO = No label, IF = IFX label   |
| o         | 0     | Speed                 | 0 = Standard, 1 = Future use  |
| o         | 5     | Memory Capacity       | 64 = 64 MB, 128 = 128 MB, 256 = 256 MB, 512 = 512 MB, 01G = 1024 MB                           |
| o         | AA    | Firmware              | AA = 1st firmware, AB = 2nd firmware  |
| o         | 1     | Controller Generation | 1 = 1st generation, 2 = 2nd generation  |
| o         | A     | Memory Revision       | A = 170 nm Process Technology, B = 110 nm Process Technology                                  |
| o         | A     | Package               | A = SD (commercial), B = MMC (commercial), C = miniSD (commercial), D = mini MMC (commercial) |
| o         | 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   |

## TwinFlash™ Cards

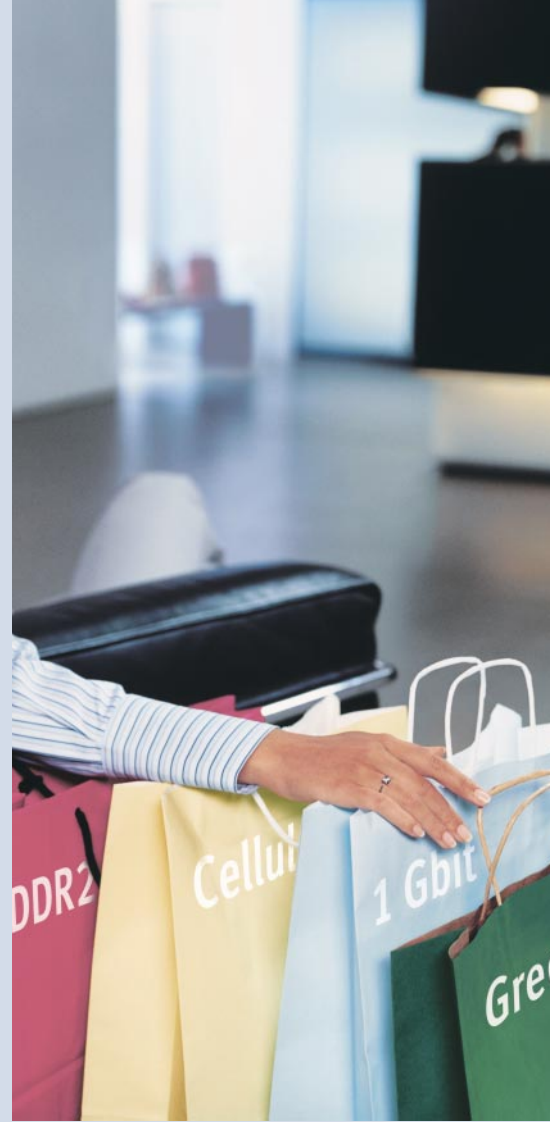
| Card              | Density | Operating Voltage | Sales Description  | Ordering Code |
|-------------------|---------|-------------------|--------------------|---------------|
| Multi Media Cards | 64 MB   | 2.7 V – 3.6 V     | HYC3N0640NO0oAA1AB | On request    |
|                   | 128 MB  |                   | HYC3N1280NO0oAA1AB |               |
|                   | 256 MB  |                   | HYC3N2560NO0oAA1AB |               |
| SD Cards          | 64 MB   | 2.7 V – 3.6 V     | HYC3N0640NO0oAA1AA | On request    |
|                   | 128 MB  |                   | HYC3N1280NO0oAA1AA |               |
|                   | 256 MB  |                   | HYC3N2560NO0oAA1AA |               |

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On our Internet websites:

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