Good memory

Green Environment

We protect the environment
with our products

hynix

We protect the environment with our products

Corporate Profile

Hynix Semiconductor is a leading supplier of advanced semiconductor memory solutions and Image sensor products. We design, develop, manufacture and market a wide variety of DRAM and NAND Flash memories and CMOS Image Sensors (CIS). These memory components are essential in today's leading-edge computing, consumer and wireless communications applications. Image Sensors are used in a wide range of portable consumer electronics products such as handsets and handheld games.

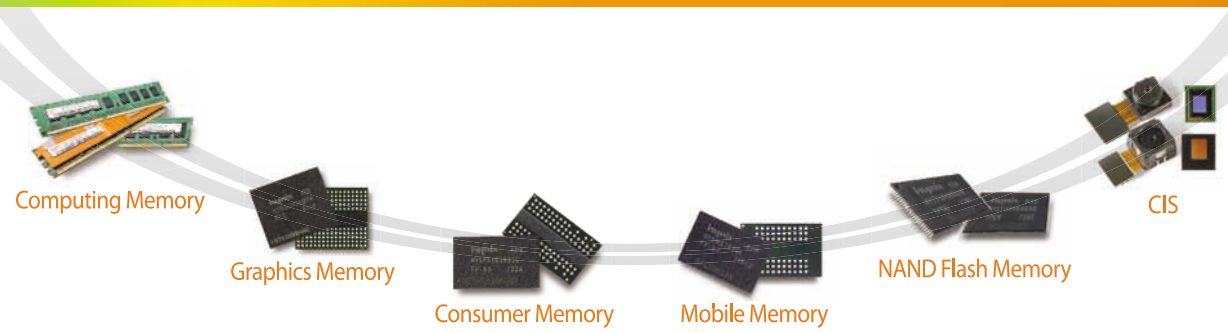
- DRAM and NAND Flash memories are focus products
- CMOS Image Sensors will diversify Hynix product portfolio
- 2009 Revenues of USD $6.2B
- Market capitalization of USD $11.7B as of December 2009
- Global presence with 3 manufacturing sites and 30 sales offices worldwide
- 20,200 employees worldwide

hynix Good memory

The simply designed symbolic mark of superposition of two circles implies Hynix's will to develop environment-friendly products.
The image of a sprout and green wings representing reborn nature symbolizes Hynix's volitional environmental management initiative. The 'Eco-mark' conveys our passions to contribute to customers and society with ecological practices (Environment Consciousness Outreach), and environmental awareness of each employee (Environment Creates Ourselves).

ECO Eco memory

HYNIX PRODUCTS



Recent Accomplishments

2010 02 Developed 26nm 64Gb NAND Flash memory
01 Developed the World's First 2Gb Mobile Low Power DDR2 DRAM

2009 12 Introduced the World's First 40nm Class 2Gb GDDR5 DRAM
11 Acquired Intel Validation for 40nm Class 2Gb DDR3 Products
10 Introduced the Second Generation 1Gb DDR3
08 Introduced 4Gb Mobile DDR SDRAM Supported on Intel's Moorestown Platform
04 Developed the world's first Low Power-High Speed Mobile 1Gb DDR2 DRAM
03 Announced the world's first 8GB 2-Rank DDR3 R-DIMM validation
02 Developed the world's first 44nm DDR3 DRAM
01 Acquired Intel validation for the world's first ultra-high speed DDR3 based module for servers 4GB ECC UDIMM

2008 12 Developed the World's First 2Gb Mobile DRAM
11 Introduced Industry's Fastest 7Gbps, 1Gb GDDR5 Graphics DRAM
04 Developed the world's fastest Mobile LPDDR2
02 Introduced 2-Rank 8GB DDR2 RDIMM
01 Announced 800MHz, 1GB/2GB UDIMM Validation

2007 11 Acquired Intel validation for 1Gb DDR2 DRAM
Developed industry's first 1Gb GDDR5 DRAM
09 Developed the world's first NAND Flash MCP with 24 stacked chips
08 Developed industry's fastest, smallest 1Gb Mobile DRAM
05 Acquired the industry's first validation on DDR3 DRAMs from Intel
03 Developed the world's fastest ECC Mobile DRAM
01 Developed the fastest memory module based on 'Wafer Level Package' technology

2006 12 Announced industry's first 60nm 1Gb DDR2 800MHz based modules
Developed the world's fastest 200MHz 512Mb mobile DRAM
09 Launched 300mm research fab line
03 Acquired the industry's first validation on 80nm 512Mb DDR2 DRAMs from Intel
01 Announced joint development plan of DOC H3 (new generation DiskOnChip embedded flash drive) with M-Systems

2005 12 Developed the world's first 512Mb GDDR4, the industry's fastest and highest density graphics DRAM
11 Launched the industry's first JEDEC standard 8GB DDR2 R-DIMM
04 Launched Hynix-ST joint venture construction in Wuxi City, Jiangsu Province, China

2004 03 Developed the industry's first ultra-high speed DDR SDRAM 550MHz
Acquired 1Gb DDR2 SDRAM validation from Intel
02 Developed NAND Flash memory

2003 08 Developed the world's first DRAM 1Gb DDR2
07 Developed the world's first ultra-high speed DDR500
06 Acquired the industry's first Intel validation for 512Mb DDR400
05 Launched production on 0.10-micron process technology
Launched volume production of ultra-low power 256 Mb SDRAM
04 Signed agreement with STMicroelectronics to cooperate in NAND flash memory business
03 Introduced the world's first commercially applicable mega-level FeRAM

2002 10 Developed 0.10-micron 512MB DDR
08 Developed the world's first high-density, wide-bandwidth 256MB DDR
06 Developed the world's first 256MB SDR SDRAM for high-end consumer application
03 Developed 1G DDR DRAM module

2001 12 Developed the world's first 128Mb DDR SDRAM for graphics
08 Completed spun-off from Hyundai Group
03 Changed the Company name to "Hynix Semiconductor Inc."

1999 10 Merged LG Semiconductor Co., Ltd.
1998 09 Developed 64M DDR synchronous DRAM
1997 05 Developed the world's first 1G synchronous DRAM
1995 10 Developed the world's first 256M SDRAM
1993 09 Acquired ISO 9001 certification on semiconductor category
1992 09 Developed 64M DRAM
1991 08 Developed 16Mb DRAM
1989 09 Developed 4M DRAM
1988 01 Developed 1M DRAM
1986 04 Established Semiconductor Research Institute
1985 10 Started mass production of 256K DRAM
1983 02 Founded Hyundai Electronics Industries Co., Ltd.

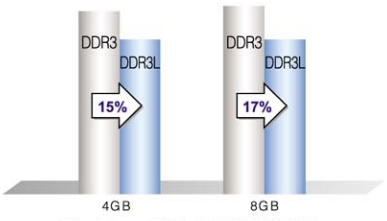
Main Memory

DDR3

General Description

The soon-to-be mainstream, DDR3 SDRAM, can transfer data twice as fast as the current generation DDR2 SDRAM's. DDR3 SDRAM boasts high performance and low power consumption. It supports data transfer rate up to 1.6Gb/s and operates at a lower power supply voltage of 1.5V compared to DDR2. The DDR3 SDRAM is eco-friendly for it can operate at even lower voltage of 1.35V contributing to lower power dissipation and extended battery life in mobile systems. The low-power operation of DDR3L, 1.35V operable DDR3 SDRAM, is also beneficial to high-density memory systems such as servers and data centers. Using Hynix low-power memory modules can help customers reduce power consumption and utility expenditures, improve reliability and reduce carbon emission. Hynix plans to offer DDR3 densities from 1Gb to 4Gb, and is currently supporting up to 2Gb DDR3. Hynix's DDR3 modules exploit functions such as ZQ calibration, fly-by topology, dynamic on-die-termination, and levelization to ensure better signal integrity which guarantees higher performance.

DDR3 vs. DDR3L Power Comparison (Watt)

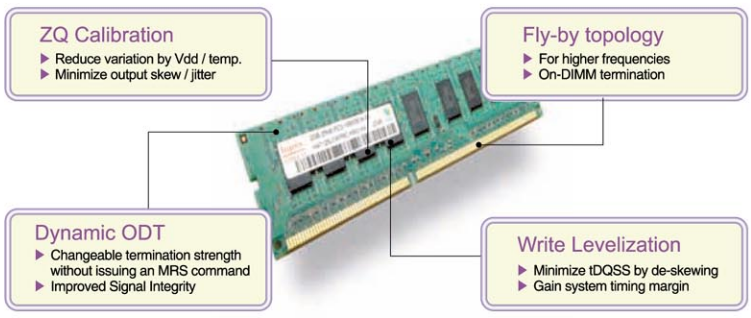


Calculation with 2Rx4 RDIMM, 1333Mbps

DDR2 vs. DDR3

Features	DDR2	DDR3 / DDR3L
Data Rate	400, 533, 667, 800Mbps	800,1066,1333,1600Mbps
VDD / VDDQ	1.8V +0.1V / -0.1V	1.5V±0.075V (DDR3) 1.35V+0.1V / -0.067V (DDR3L)
Support Density	256Mb ~ 4Gb	1Gb ~ 4Gb
Bank	512Mb : 4 Bank 1Gb : 8 Bank	8 Bank
Data Pre-fetch	4 bit	8 bit
Package Type	60 FBGA for x4 / x8 84 FBGA for x16	78 FBGA for x4 / x8 96 FBGA for x16
Interface	SSTL-18	SSTL -15
DQS Signaling	Single / Differential	Differential Only
Driver Calibration	Off-Chip Driver Calibration	Self calibration with ZQ pin
DQS-CLK De-Skewing	No	Yes (Write Leveling)
On Die Termination	Yes	Yes / Dynamic ODT
Reset pin	No	Yes (Soft power-up)

Key Features of High Speed Interface



hynix Good memory

Main Memory

General Description

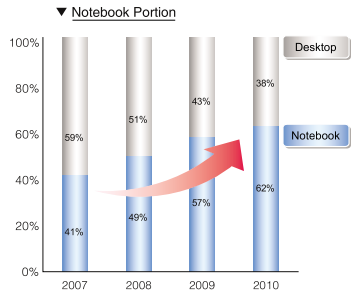
Users now demand a powerful, full-featured mobile system, with low power consumption, extended battery life and connectivity. There is a lot of concern about protecting the environment and it is quickly becoming one of the top priorities. Highly virtualized applications such as data centers, servers and supercomputers, could take advantage of the low power features of the DDR3 SDRAM to enable cooler, power efficient systems.

Hynix is responding to the industry demand for eco-friendly or 'green' products that reduce power consumption, utility expenditures, improve reliability and reduce carbon emissions. The new Hynix 1.5V 1Gb DDR3 features 25% lower power consumption than legacy or competing solutions. The 1.35V (DDR3L) product will yield an additional 20% power savings. It will be an attractive solution for applications requiring compliance to energy star specifications. This product would also be ideal in mobile applications, such as notebooks, where it markedly extends battery life.

The new design philosophy adopted on the second generation 1Gb DDR3, will also be applied to future high density DRAM components from Hynix. The new 44nm process along with Hynix's design optimization and internal signaling innovations, reduces power consumption and enhances performance. Devices operating at 1.5V and 1.35V (Low Voltage) exhibit similar performance characteristics. The demand for low power consumption in both mobile system like notebooks and server systems such as datacenters, is the emerging trend.

Hynix's strategy is to satisfy customers needs for reduced power consumption and improved performance with technology advancements such as this 40nm class product.

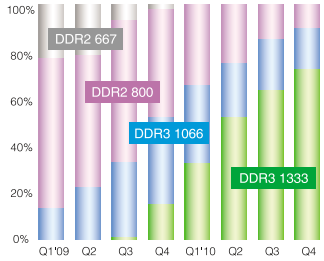
Transition to Notebook Form Factor



Source: Hynix Marketing

A crossover to mobile computers from the traditional desktop has already occurred. Declining prices is the primary driving factors, especially in light of the current global economic conditions. Mobility and weight are other features that make mobile computers attractive to consumers, in addition to the computing power that now rival desktops

Speed Transition in Notebook



Source: Hynix Marketing

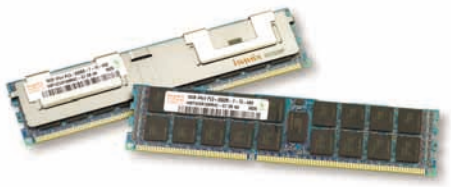
The technology leap from DDR2 to DDR3 doubles system performance. As DDR3 offers superior performance and power savings, notebooks are rapidly adopting DDR3 memory.

With rapid transition trend to DDR3, processor makers are also supporting DDR3 platforms up to speeds of 1333Mbps.

Hynix estimates DDR3 1333Mbps portion in notebook will be around 70% by the second half of 2010.

SODIMM

Density	4GB So-DIMM
Organization	512Mx64
Speed	1333 Mbps
Number of Rank	2 Ranks



RDIMM

Density	16GB RDIMM
Organization	2Gx72
Speed	1066 Mbps
Number of Rank	4 Ranks

Main Memory
Product Line-up

DDR2 SDRAM MODULE (240pin-UDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.8V	4GB	512Mx64	256Mx8	DDR2 800-666	HMP351U6AFR8C-S6	FBGA (60ball)	2	30mm	Now
		512Mx72	256Mx8	DDR2 800-666	HMP351U7AFR8C-S6	FBGA (60ball)	2	30mm	Now
	2GB	256Mx64	128Mx8	DDR2 800-555	HYMP125U64CP8-S5	FBGA (60ball)	2	30mm	Now
					HMP125U6EFR8C-S5	FBGA (60ball)	2	30mm	Now
					HMP125U6NFR8C-S5	FBGA (60ball)	2	30mm	Q2 '10
		256Mx72	128Mx8	DDR2 800-555	HYMP125U72CP8-S5	FBGA (60ball)	2	30mm	Now
					HMP125U7EFR8C-S5	FBGA (60ball)	2	30mm	Now
	1GB	128Mx64	128Mx8	DDR2 800-555	HYMP112U64CP8-S5	FBGA (60ball)	1	30mm	Now
					HMP112U6EFR8C-S5	FBGA (60ball)	1	30mm	Now
					HMP112U6NFR8C-S5	FBGA (60ball)	1	30mm	Q2 '10
		128Mx72	128Mx8	DDR2 800-555	HYMP112U72CP8-S5	FBGA (60ball)	1	30mm	Now
					HMP112U7EFR8C-S5	FBGA (60ball)	1	30mm	Now
	512MB	64Mx64	64Mx16	DDR2 800-555	HYMP164U64CP6-S5	FBGA (60ball)	1	30mm	Now

DDR2 SDRAM MODULE (240pin-RDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.8V	8GB	1Gx72	512Mx4	DDR2 800-666	HMP31GP7AFR4C-S6	FBGA (60ball)	2	30mm	Now
			256Mx4 (DDP)	DDR2 667-555	HYMP31GP72CMP4-Y5	FBGA (63ball)	4	30mm	Now
	4GB	512Mx72	256Mx4	DDR2 800-555	HYMP151P72CP4-S5	FBGA (60ball)	2	30mm	Now
					HMP151P7EFR4C-S5	FBGA (60ball)	2	30mm	Now
			256Mx8	DDR2 800-555	HMP351P7AFR8C-S5	FBGA (60ball)	2	30mm	Now
	2GB	256Mx72	128MX8	DDR2 800-555	HYMP125P72CP8-S5	FBGA (60ball)	2	30mm	Now
					HMP125P7EFR8C-S5	FBGA (60ball)	2	30mm	Now
			256MX4	DDR2 800-555	HYMP125P72CP4-S5	FBGA (60ball)	1	30mm	Now
					HMP125P7EFR4C-S5	FBGA (60ball)	1	30mm	Now
			128Mx8	DDR2 667-555	HYMP112P72CP8-Y5	FBGA (60ball)	1	30mm	Now

DDR2 SDRAM MODULE (240pin-VLP RDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.8V	4GB	512Mx72	256x4(DDP)	DDR2 667-555	HYMP351P72CMP4L-Y5	FBGA (63ball)	2	18.3mm	Now
	2GB	256Mx72	256MX4	DDR2 800-555	HYMP125P72CP4L-S5	FBGA (60ball)	2	18.3mm	Now
					HMP125V7EFR4C-S5	FBGA (60ball)	2	18.3mm	Now
	1GB	128Mx72	128Mx8	DDR2 800-555	HYMP112P72CP8L-S5	FBGA (60ball)	1	18.3mm	Now
					HMP112V7EFR8C-S5	FBGA (60ball)	2	18.3mm	Now

DDR2 SDRAM MODULE (240pin-FBDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.8V	8GB	1Gx72	512Mx4 (DDP)	DDR2 800-666	HMP31GF7EMR4C-S6xx	FBGA (63ball)	4	30.35mm	Now
					HYMP31GF72CMP4xx-S6	FBGA (63ball)	4	30.35mm	Now
			512Mx4	DDR2 800-666	HMP31GF7AFR4C-S6xx	FBGA (60ball)	2	30.35mm	Now
	4GB	512Mx72	256Mx4	DDR2 800-555	HMP151F7EFR4C-S5xx	FBGA (60ball)	2	30.35mm	Now
					HYMP151F72CP4xx-S5	FBGA (60ball)	2	30.35mm	Now
			128Mx8	DDR2 800-555	HMP151F7EFR8C-S5xx	FBGA (60ball)	4	30.35mm	Now
					HYMP151F72CP8xx-S5	FBGA (60ball)	4	30.35mm	Now
	2GB	256Mx72	128MX8	DDR2 800-555	HMP125F7EFR8C-S5xx	FBGA (60ball)	2	30.35mm	Now
					HYMP125F72CP8xx-S5	FBGA (60ball)	2	30.35mm	Now
	1GB	128Mx72	128Mx8	DDR2 800-555	HMP112F7EFR8C-S5xx	FBGA (60ball)	1	30.35mm	Now
					HYMP112F72CP8xx-S5	FBGA (60ball)	1	30.35mm	Now
1.55V	8GB	1Gx72	512Mx4	DDR2 667-555	HMP31GL7AFR4C-Y5xx	FBGA (60ball)	2	30.35mm	Now
	4GB	512Mx72	256Mx4	DDR2 667-555	HMP151L7EFR4C-Y5xx	FBGA (60ball)	2	30.35mm	Now
					HYMP151L72CP4xx-Y5	FBGA (60ball)	2	30.35mm	Now
	2GB	256Mx72	128MX8	DDR2 667-555	HMP125L7EFR8C-Y5xx	FBGA (60ball)	2	30.35mm	Now
					HYMP125L72CP8xx-Y5	FBGA (60ball)	2	30.35mm	Now
	1GB	128Mx72	128Mx8	DDR2 667-555	HMP112L7EFR8C-Y5xx	FBGA (60ball)	1	30.35mm	Now
					HYMP112L72CP8xx-Y5	FBGA (60ball)	1	30.35mm	Now

■ FBD P/N xx : (AMB vender)(Revison) ■ AMB vender N: intel, D: IDT, E NEC

DDR2 SDRAM MODULE (200pin-SODIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.8V	4GB	512Mx64	256Mx8	DDR2 800-666	HMP351S6AFR8C-S6	FBGA (60ball)	2	30mm	Now
	2GB	256Mx64	128Mx8	DDR2 800-555	HYMP125S64CP8-S5	FBGA (60ball)	2	30mm	Now
					HMP125S6EFR8C-S5	FBGA (60ball)	2	30mm	Now
					HMP125S6NFR8C-S5	FBGA (60ball)	2	30mm	Q2 '10
	1GB	128Mx64	64Mx16	DDR2 800-555	HYMP112S64CP6-S5	FBGA (60ball)	2	30mm	Now
					HMP112S6EFR6C-S5	FBGA (60ball)	2	30mm	Now
	512MB	64Mx64	64Mx16	DDR2 800-555	HYMP164S64CP6-S5	FBGA (60ball)	1	30mm	Now
					HMP164S6EFR6C-S5	FBGA (60ball)	1	30mm	Now

Main Memory
Product Line-up

DDR3 SDRAM MODULE(240pin-UDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.5V	4GB	512Mx64	256Mx8	1333-999	HMT351U6BFR8C-H9	FBGA (82ball)	2	30mm	Now
		512Mx72	256Mx8	1333-999	HMT351U7BFR8C-H9	FBGA (82ball)	2	30mm	Now
	2GB	256Mx64	128Mx8	1333-999	HMT125U6TFR8C-H9	FBGA (78ball)	2	30mm	Now
			256Mx8	1333-999	HMT325U6BFR8C-H9	FBGA (82ball)	1	30mm	Now
		256Mx72	128Mx8	1333-999	HMT125U7TFR8C-H9	FBGA (78ball)	2	30mm	Now
			256Mx8	1333-999	HMT325U7BFR8C-H9	FBGA (82ball)	1	30mm	Now
	1GB	128Mx64	128Mx8	1333-999	HMT112U6TFR8C-H9	FBGA (78ball)	1	30mm	Now
		128Mx72	128Mx8	1333-999	HMT112U7TFR8C-H9	FBGA (78ball)	1	30mm	Now
1.35V	4GB	512Mx72	256Mx8	1333-999	HMT351U7BFR8A-H9	FBGA (82ball)	2	30mm	Now
	2GB	256Mx72	256Mx8	1333-999	HMT325U7BFR8A-H9	FBGA (82ball)	1	30mm	Now
			128Mx8	1333-999	HMT125U7TFR8A-H9	FBGA (78ball)	2	30mm	Now
	1GB	128Mx72	128Mx8	1333-999	HMT112U7TFR8A-H9	FBGA (78ball)	1	30mm	Now

DDR3 SDRAM MODULE(240pin-RDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.5V	16GB	2Gx72	1Gx4 (DDP)	1333-999	HMT42GR7BMR4C-H9	FBGA (82ball)	4	30mm	Now
	8GB	1Gx72	512Mx4	1333-999	HMT31GR7BFR4C-H9	FBGA (82ball)	2	30mm	Now
			256Mx8	1333-999	HMT31GR7BFR8C-H9	FBGA (82ball)	4	30mm	Now
	4GB	512Mx72	256Mx8	1333-999	HMT351R7BFR8C-H9	FBGA (82ball)	2	30mm	Now
			512Mx4	1333-999	HMT351R7BFR4C-H9	FBGA (82ball)	1	30mm	Now
			256Mx4	1333-999	HMT151R7TFR4C-H9	FBGA (78ball)	2	30mm	Now
	2GB	256Mx72	256Mx8	1333-999	HMT325R7BFR8C-H9	FBGA (82ball)	1	30mm	Now
			256Mx4	1333-999	HMT125R7TFR4C-H9	FBGA (78ball)	1	30mm	Now
			128Mx8	1333-999	HMT125R7TFR8C-H9	FBGA (78ball)	2	30mm	Now
	1GB	128Mx72	128Mx8	1333-999	HMT112R7TFR8C-H9	FBGA (78ball)	1	30mm	Now
1.35V	16GB	2Gx72	1Gx4 (DDP)	1333-999	HMT42GR7BMR4A-H9	FBGA (82ball)	4	30mm	Q2 '10
	8GB	1Gx72	512Mx4	1333-999	HMT31GR7BFR4A-H9	FBGA (82ball)	2	30mm	Now
			256Mx8	1333-999	HMT31GR7BFR8A-H9	FBGA (82ball)	4	30mm	Now
	4GB	512Mx72	256Mx8	1333-999	HMT351R7BFR8A-H9	FBGA (82ball)	2	30mm	Now
			128Mx8	1333-999	HMT151R7TFR8A-H9	FBGA (78ball)	4	30mm	Now
			256Mx4	1333-999	HMT151R7TFR4A-H9	FBGA (78ball)	2	30mm	Now
	2GB	256Mx72	256Mx8	1333-999	HMT325R7BFR8A-H9	FBGA (82ball)	1	30mm	Now
			256Mx4	1333-999	HMT125R7TFR4A-H9	FBGA (78ball)	1	30mm	Now
			128Mx8	1333-999	HMT125R7TFR8A-H9	FBGA (78ball)	1	30mm	Now
	1GB	128Mx72	128Mx8	1333-999	HMT112R7TFR8A-H9	FBGA (78ball)	1	30mm	Now

DDR3 SDRAM MODULE(240pin-VLP RDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.5V	8GB	1Gx72	1Gx4(DDP)	1333-999	HMT41GV7BMR4C-H9	FBGA (82ball)	2	18.75mm	Now
			512Mx8(DDP)	1333-999	HMT41GV7BMR8C-H9	FBGA (82ball)	4	18.75mm	Now
	4GB	512Mx72	512Mx4(DDP)	1333-999	HMT351V7BMR4C-H9	FBGA (78ball)	2	18.75mm	Now
			256Mx8	1333-999	HMT351V7BFR8C-H9	FBGA (82ball)	2	18.75mm	Now
	2GB	256Mx72	256Mx4	1333-999	HMT125V7TFR4C-H9	FBGA (78ball)	1	18.75mm	Now
			128Mx8	1333-999	HMT125V7TFR8C-H9	FBGA (78ball)	2	18.75mm	Now
			256Mx8	1333-999	HMT325V7BFR8C-H9	FBGA (82ball)	1	18.75mm	Now
	1GB	128Mx72	128Mx8	1333-999	HMT112V7TFR8C-H9	FBGA (78ball)	1	18.75mm	Now
1.35V	8GB	1Gx72	1Gx4(DDP)	1333-999	HMT41GV7BMR4A-H9	FBGA (82ball)	2	18.75mm	Q2 '10
			512Mx8(DDP)	1333-999	HMT41GV7BMR8A-H9	FBGA (82ball)	4	18.75mm	Q2 '10
	4GB	512Mx72	512Mx4(DDP)	1333-999	HMT351V7BMR4A-H9	FBGA (78ball)	2	18.75mm	Now
			256Mx8	1333-999	HMT351V7BFR8A-H9	FBGA (82ball)	2	18.75mm	Now
	2GB	256Mx72	256Mx4	1333-999	HMT125V7TFR4A-H9	FBGA (78ball)	1	18.75mm	Now
			128Mx8	1333-999	HMT125V7TFR8A-H9	FBGA (78ball)	2	18.75mm	Now
			256Mx8	1333-999	HMT325V7BFR8A-H9	FBGA (82ball)	1	18.75mm	Now
	1GB	128Mx72	128Mx8	1333-999	HMT112V7TFR8A-H9	FBGA (78ball)	1	18.75mm	Now

DDR3 SDRAM MODULE(204pin-SODIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	PACKAGE	RANK	HEIGHT	AVAILABILITY
1.5V	4GB	512Mx64	256Mx8	1333-999	HMT351S6BFR8C-H9	FBGA (82ball)	2	30mm	Now
	2GB	256Mx64	128Mx8	1333-999	HMT125S6TFR8C-H9	FBGA (78ball)	2	30mm	Now
			256Mx8	1333-999	HMT325S6BFR8C-H9	FBGA (82ball)	1	30mm	Now
			128Mx16	1333-999	HMT325S6BFR6C-H9	FBGA (96ball)	2	30mm	Now
	1GB	128Mx64	128Mx8	1333-999	HMT112S6TFR8C-H9	FBGA (78ball)	1	30mm	Now
			64Mx16	1333-999	HMT112S6BFR6C-H9	FBGA (96ball)	2	30mm	Now
1.35V	4GB	512Mx64	256Mx8	1333-999	HMT351S6AFR8A-H9	FBGA (82ball)	2	30mm	Now
	2GB	256Mx64	256Mx8	1333-999	HMT325S6AFR8A-H9	FBGA (82ball)	1	30mm	Now

Graphics Memory

General Description

Since the world's first Graphics DDR SDRAM was introduced in 1999, Hynix has played a leadership role in the Graphics memory market by offering cost effective and high performance products.

Hynix's newly introduced 44nm 2Gb GDDR5 offers designers 7Gbps speed (bandwidth of 28GB/sec with 32 I/O) required for high end graphics.

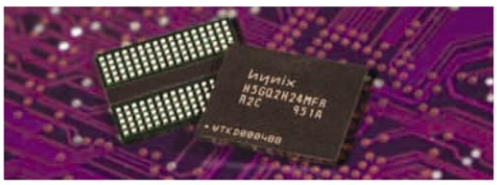
In addition to improved speed and higher density, the power consumption on the 2Gb GDDR5 is significantly reduced since it operates on 1.35V power supply. This results in an estimated 20% reduction in power consumption compared to the 1.5V products, meeting Hynix's goal of developing eco-friendly products.

The 2Gb GDDR5 will meet the needs of high-end desktop and notebook graphics applications. It will also be suitable in super computers designed with a General Purpose GPU architecture, where the 2Gb GDDR5 will serve as high bandwidth memory to the GPU.

Hynix has maintained its leadership in graphics memory with the world's first 66nm 1Gb GDDR5 in 2007 followed by the 54nm 1Gb GDDR5 in 2008, and 44nm 2Gb GDDR5 in early 2010.

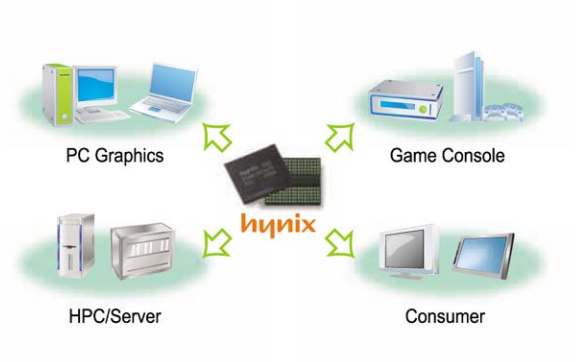
Hynix also supports GDDR3, DDR3 and DDR2 products for performance and mainstream market. Hynix will provide more values for customers success with the higher performance, quality and technology leadership.

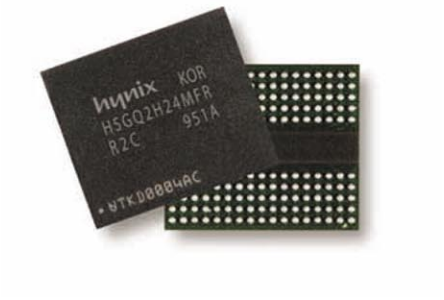
44nm 2Gb GDDR5 Features



Items	2Gb GDDR5 (44nm)
Op. Frequency	Up to 7.0 Gbps
Power Supply	VDD(Q) = 1.5V & 1.35V
I / O	X32 / X16
Package	FBGA 170 ball (12x14)
Banks / Prefetch	16 Banks / 8 bit
Interface	POD_15

Graphics Applications





Graphics Product Features Comparison

Items	DDR2	DDR3	GDDR3	GDDR5
VDD(Q)	1.8V	1.5V	1.8V	1.5V
Speed	Up to 600MHz	Up to 1.0GHz	Up to 1.3GHz	Up to 7.0 Gbps
Burst length	4 / 8	4 / 8	4 / 8	8 only
Package	84 ball FBGA	96 ball FBGA	136 ball FBGA	170 ball FBGA
Density	512Mb / 1Gb	1Gb / 2Gb	512Mb / 1Gb	1Gb / 2Gb
I / O	x16	x16	x32	x32 / x16
Banks	4(512Mb) / 8(1Gb)	8	8	16
BST (Boundary Scan Test)	No	No	Yes	Yes

Graphics Memory Product Line-up

DDR2 SDRAM

DENSITY	ORG.	SPEED	PART NUMBER	PACKAGE	FEATURE	AVAILABILITY
1Gb	64Mx16	500MHz (2.0ns)	H5PS1G63EFR-20L	FBGA (84ball)	8Bank, 1.8V / 1.8V	Now
		400MHz (2.5ns)	H5PS1G63EFR-25C	FBGA (84ball)	8Bank, 1.8V / 1.8V	Now
		400MHz (2.5ns)	HY5PS1G1631CFR-25C	FBGA (84ball)	8Bank, 1.8V / 1.8V	Now
512Mb	32Mx16	600MHz (1.6ns)	H5PS5162FFR-16C	FBGA (84ball)	4Bank, 2.0V / 2.0V	Now
		500MHz (2.0ns)	H5PS5162FFR-20C	FBGA (84ball)	4Bank, 2.0V / 2.0V	Now
		500MHz (2.0ns)	H5PS5162FFR-20L	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now
		400MHz (2.5ns)	H5PS5162FFR-25C	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now
		500MHz (2.0ns)	HY5PS121621CFP-2	FBGA (84ball)	4Bank, 2.0V / 2.0V	Now
		450MHz (2.2ns)	HY5PS121621CFP-22	FBGA (84ball)	4Bank, 2.0V / 2.0V	Now
		400MHz (2.5ns)	HY5PS121621CFP-25	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now
		350MHz (2.8ns)	HY5PS121621CFP-28	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now
		300MHz (3.3ns)	HY5PS121621CFP-33	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now

DDR3 SDRAM

DENSITY	ORG.	SPEED	PART NUMBER	PACKAGE	FEATURE	AVAILABILITY
2Gb	128Mx16	1,000MHz (1.0ns)	H5TQ2G63BFR-N0C	FBGA (96ball)	8Bank, 1.5V / 1.5V	Now
		900MHz (1.1ns)	H5TQ2G63BFR-11C	FBGA (96ball)	8Bank, 1.5V / 1.5V	Now
		800MHz (1.2ns)	H5TQ2G63BFR-12C	FBGA (96ball)	8Bank, 1.5V / 1.5V	Now
1Gb	64Mx16	900MHz (1.1ns)	H5TS1G63BFR-11C	FBGA (96ball)	8Bank, 1.8V / 1.8V	Now
		800MHz (1.2ns)	H5TS1G63BFR-12C	FBGA (96ball)	8Bank, 1.8V / 1.8V	Now
		800MHz (1.2ns)	H5TQ1G63BFR-12C	FBGA (96ball)	8Bank, 1.5V / 1.5V	Now
		700MHz (1.4ns)	H5TQ1G63BFR-14C	FBGA (96ball)	8Bank, 1.5V / 1.5V	Now
		800MHz (1.2ns)	H5TS1G63AFR-12C	FBGA (96ball)	8Bank, 1.8V / 1.8V	Now
		700MHz (1.4ns)	H5TS1G63AFR-14C	FBGA (96ball)	8Bank, 1.8V / 1.8V	Now
		600MHz (1.6ns)	H5TS1G63AFR-16C	FBGA (96ball)	8Bank, 1.8V / 1.8V	Now
		700MHz(1.4ns)	H5TQ1G63AFR-14C	FBGA (96ball)	8Bank, 1.5V / 1.5V	Now
		600MHz (1.6ns)	H5TQ1G63AFR-16C	FBGA (96ball)	8Bank, 1.5V / 1.5V	Now
		500MHz (2.0ns)	H5TQ1G63AFR-20C	FBGA (96ball)	8Bank, 1.5V / 1.5V	Now

GDDR3 SDRAM

DENSITY	ORG.	SPEED	PART NUMBER	PACKAGE	FEATURE	AVAILABILITY
1Gb	32Mx32	1,200MHz (0.8ns)	H5RS1H23MFR-N2C	FBGA (136ball)	8banks, 1.9V / 1.9V	Now
		1,000MHz (1.0ns)	H5RS1H23MFR-N0C	FBGA (136ball)	8banks, 1.9V / 1.9V	Now
		900MHz (1.1ns)	H5RS1H23MFR-11C	FBGA (136ball)	8banks, 1.8V / 1.8V	Now
		700MHz (1.4ns)	H5RS1H23MFR-14C	FBGA (136ball)	8banks, 1.8V / 1.8V	Now
512Mb	16Mx32	1,300MHz (0.77ns)	H5RS5223DFR-N3C	FBGA (136ball)	8Bank, 2.05V / 2.05V	Now
		1,200MHz (0.8ns)	H5RS5223DFR-N2C	FBGA (136ball)	8Bank, 2.05V / 2.05V	Now
		1,000MHz (1.0ns)	H5RS5223DFR-N0C	FBGA (136ball)	8Bank, 2.05V / 2.05V	Now
		900MHz (1.1ns)	H5RS5223DFR-11C	FBGA (136ball)	8Bank, 1.8V / 1.8V	Now
		700MHz (1.4ns)	H5RS5223DFR-14C	FBGA (136ball)	8Bank, 1.8V / 1.8V	Now
		500MHz (2.0ns)	H5RS5223DFR-20C	FBGA (136ball)	8Bank, 1.8V / 1.8V	Now
		1,300MHz (0.77ns)	H5RS5223CFR-N3C	FBGA (136ball)	8Bank, 2.05V / 2.05V	Now
		1,200MHz (0.8ns)	H5RS5223CFR-N2C	FBGA (136ball)	8Bank, 2.05V / 2.05V	Now
		1,000MHz (1.0ns)	H5RS5223CFR-N0C	FBGA (136ball)	8Bank, 2.05V / 2.05V	Now
		900MHz (1.1ns)	H5RS5223CFR-11C	FBGA (136ball)	8Bank, 1.8V / 1.8V	Now
		700MHz (1.4ns)	H5RS5223CFR-14C	FBGA (136ball)	8Bank, 1.8V / 1.8V	Now
		500MHz (2.0ns)	H5RS5223CFR-20C	FBGA (136ball)	8Bank, 1.8V / 1.8V	Now
		700MHz (1.4ns)	H5RS5223CFR-14L	FBGA (136ball)	8Bank, 1.5V / 1.5V	Now
		550MHz (1.8ns)	H5RS5223CFR-18C	FBGA (136ball)	8Bank, 1.5V / 1.5V	Now

GDDR5 SDRAM

DENSITY	ORG.	SPEED	PART NUMBER	PACKAGE	FEATURE	AVAILABILITY
2Gb	64Mx32	6.0Gbps	H5GQ2H24MFR-R0C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Q3 '10
		5.5Gbps	H5GQ2H24MFR-T3C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Q3 '10
		5.0Gbps	H5GQ2H24MFR-T2C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Q3 '10
1Gb	32Mx32	6.0Gbps	H5GQ1H24AFR-R0C	FBGA (170ball)	16Bank, TBD	Now
		5.5Gbps	H5GQ1H24AFR-T3C	FBGA (170ball)	16Bank, 1.5V /1.5V	Now
		5.0Gbps	H5GQ1H24AFR-T2C	FBGA (170ball)	16Bank, 1.5V /1.5V	Now
		4.5Gbps	H5GQ1H24AFR-T1C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Now
		4.0Gbps	H5GQ1H24AFR-T0C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Now
		3.2Gbps	H5GQ1H24AFR-T2L	FBGA (170ball)	16Bank, 1.35V / 1.35V	Now

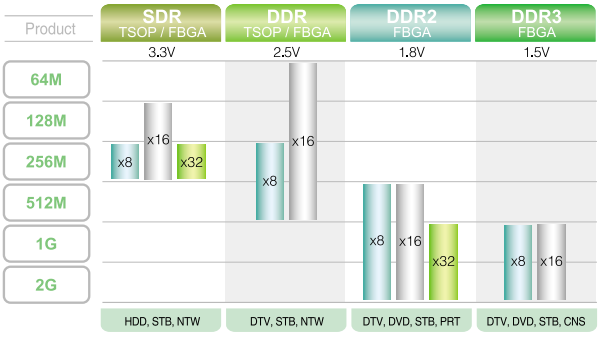
Consumer Memory

General Description

We now live in the Digital Era. Digital televisions, DVD and Set-Top Box give us rich entertainment, while Car navigation systems provide comfort and convenience. All of these digital consumer appliances need semiconductor memory for performance improvement, power savings and size reduction. Hynix has full line-up of DRAM (Dynamic RAM) to meet the needs of a wide range of consumer applications. Hynix offers a family of SDRAM (Synchronous DRAM) in 128Mb~256Mb densities, packaged in TSOP-II and FBGA offered at industrial temperature range of -40℃ to 85℃ and featuring very low power consumption. DDR, DDR2 and DDR3 SDRAMs (Double Data Rate SDRAMs) are available for high-end consumer applications requiring higher data transfer rates. In many applications, such as Digital Television and Set-Top-Box, SDR SDRAM has been replaced by DDR, DDR2 and DDR3 SDRAM technologies.

Sometimes, the most important things are not be visible. Although hidden from view, Hynix Consumer memories have been used in a variety of applications offered by a number of companies to realize a multitude of miracles.

Consumer DRAM Readiness

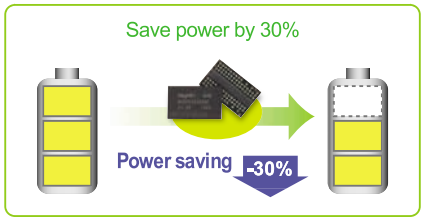


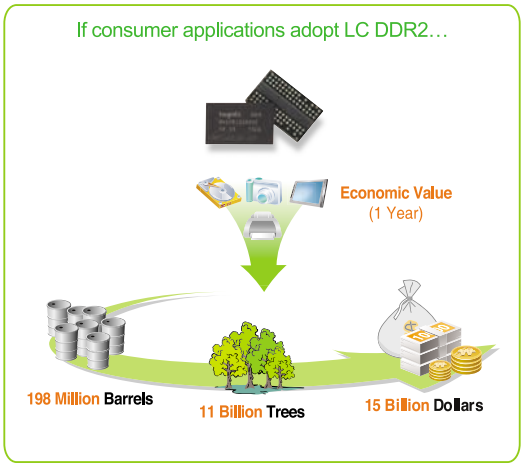
※ Industrial Grade Temperature Range (- 40℃ ~ 85℃) and Low power options are available

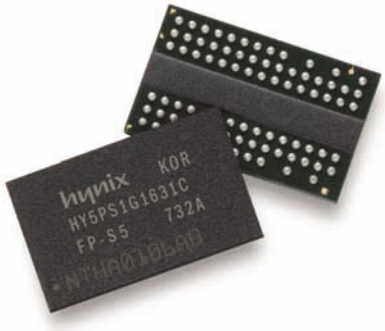
HDD : Hard Disk Drive
DTV : Digital TV
CNS : Car navigation
NTW : Network
PRT : Printer
DPF : Digital Photo Frame
STB : Set Top Box
DVD : Digital Video Disk

Green Solution

LC (Low Current) DDR2 provides a Green Solution
- Eco-friendly & Low power consumption







hynix Good memory

Consumer Memory Product Line-up

SDR SDRAM

DENSITY	ORG.	PART NUMBER	SPEED	POWER	OPERATION TEMP.	PACKAGE	VOLTAGE	AVAILABILITY
128Mb	x16	HY57V281620FTP	5 / 6 / 7 / H	Normal / Low	0~70 / -40~85 [℃]	TSOP	3.3V	Now
	x16	HY5V26FFP	5 / 6 / 7 / H	Normal / Low	0~70 / -40~85 [℃]	FBGA	3.3V	Now
	x16	H57V1262GTR	50 / 60 / 70 / 75	Normal / Low	0~70 / -40~85 [℃]	TSOP	3.3V	Now
	x16	H57V1262GFR	50 / 60 / 70 / 75	Normal / Low	0~70 / -40~85 [℃]	FBGA	3.3V	Now
256Mb	x8	HY57V56820FTP	6 / H	Normal / Low	0~70 / -40~85 [℃]	TSOP	3.3V	Now
	x16	HY57V561620FTP	6 / H	Normal / Low	0~70 / -40~85 [℃]	TSOP	3.3V	Now
	x16	HY5V56FFP	6 / H	Normal / Low	0~70 / -40~85 [℃]	FBGA	3.3V	Now
	x32	HY5V52AFP	6 / H	Normal / Low	0~70 / -40~85 [℃]	FBGA	3.3V	Now
	x8	H57V2582GTR	50 / 60 / 70 / 75	Normal / Low	0~70 / -40~85 [℃]	TSOP	3.3V	Now
	x16	H57V2562GTR	50 / 60 / 70 / 75	Normal / Low	0~70 / -40~85 [℃]	TSOP	3.3V	Now
	x16	H57V2562GFR	50 / 60 / 70 / 75	Normal / Low	0~70 / -40~85 [℃]	FBGA	3.3V	Now
	x32	H57V2622GMR	60 / 70 / 75	Normal / Low	0~70 / -40~85 [℃]	FBGA	3.3V	Now

DDR SDRAM

DENSITY	ORG.	PART NUMBER	SPEED	POWER	OPERATION TEMP.	PACKAGE	VOLTAGE	AVAILABILITY
64Mb	x16	H5DU6462CTR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
128Mb	x16	HY5DU281622FTP	4 / 5 / D43 / D4 / J / H	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x16	H5DU1262GTR	FA / FB / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
256Mb	x8	HY5DU568822FTP	4 / D43 / J	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x16	HY5DU561622FTP	4 / D43 / J	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x16	HY5DU561622FFP	4 / D43 / J	Normal / Low	0~70 / -40~85 [℃]	FBGA	2.5V	Now
	x8	H5DU2582GTR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x16	H5DU2562GFR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	FBGA	2.5V	Now
	x8	H5DU2582GTR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x16	H5DU2562GFR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	FBGA	2.5V	Now
512Mb	x8	HY5DU128822DTP	D43 / J / K / H / L	Normal Power	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x8	HY5DU12822DFP	D43 / J / K / H / L	Normal Power	0~70 / -40~85 [℃]	FBGA	2.5V	Now
	x16	HY5DU121622DTP	D43 / J / K / H / L	Normal Power	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x16	HY5DU121622DFP	D43 / J / K / H / L	Normal Power	0~70 / -40~85 [℃]	FBGA	2.5V	Now
	x8	H5DU5182ETR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x8	H5DU5182EFR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	FBGA	2.5V	Now
	x16	H5DU5162ETR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	TSOP	2.5V	Now
	x16	H5DU5162EFR	FA / E3 / E4 / J3 / K2 / K3	Normal / Low	0~70 / -40~85 [℃]	FBGA	2.5V	Now

DDR2 SDRAM

DENSITY	ORG.	PART NUMBER	SPEED	POWER	OPERATION TEMP.	PACKAGE	VOLTAGE	AVAILABILITY
512Mb	x8	H5PS5182FFR	E3 / C4 / Y4 / Y5 / S6 / S5	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
	x16	H5PS5162FFR	E3 / C4 / Y4 / Y5 / S6 / S5 / G7	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
1Gb	x8	HY5PS1G831CFP	E3 / C4 / Y5 / S6 / S5	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
	x8	H5PS1G83EFR	E3 / C4 / Y5 / S6 / S5	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
	x16	HY5PS1G1631CFP	E3 / C4 / Y5 / S6 / S5	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
	x16	H5PS1G63EFR	E3 / C4 / Y5 / S6 / S5 / G7	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
	x32	H5PS1GC2FMR	E3 / C4 / Y5 / S6	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
2Gb	x8	H5PS2G83AFR	E3 / C4 / Y5 / S6 / S5	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
	x16	H5PS2G63EMR	Y5 / S6	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now
	x32	H5PS2GC3FMR	Y5 / S6	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.8V	Now

Note : At tOPER 85~95℃, Double refresh rate is required.

DDR3 SDRAM

DENSITY	ORG.	PART NUMBER	SPEED	POWER	OPERATION TEMP.	PACKAGE	VOLTAGE	AVAILABILITY
1Gb	x8	H5TQ1G83BFR	S5 / S6 / G7 / G8 / H9 / PB	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.5V	Now
	x16	H5TQ1G63BFR	S5 / S6 / G7 / G8 / H9 / PB	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.5V	Now
2Gb	x8	H5TQ2G83AFR	S5 / S6 / G7 / G8 / H9	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.5V	Now
	x8	H5TQ2G83BFR	S5 / S6 / G7 / G8 / H9 / PB	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.5V	Now
	x16	H5TQ2G63BFR	S5 / S6 / G7 / G8 / H9 / PB	Normal / Low	0~95 / -40~95 [℃] Note	FBGA	1.5V	Now

Note : At tOPER 85~95℃, Double refresh rate is required.

Mobile Memory

General Description

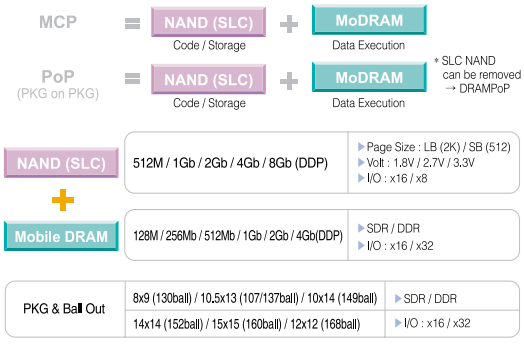
Hynix Mobile Memory technology unleashes the best mobile experience on the go. As mobile devices get smaller, sleeker, and lighter than ever, consumers will be able to choose from a wide range of mobile devices to keep them connected, entertained, informed, and productive. As consumers life styles become more mobile, there is ever increasing demand for connectivity. Mobile devices will require high performance memories, with very low power consumption for extended battery life. Devices that use Hynix Mobile Memory enables everything you love on-the-go. Hynix Mobile Memory products offered in small footprint packages have superior power saving features useful in all handheld devices such as cellular phones, PDAs, MP3 players, etc. Hynix Mobile Memories are ideal for portable applications which require very low power consumption. Hynix's Mobile Business Group offers a broad variety of products enabling our customers to deliver next-generation devices in time to market

Mobile DRAM

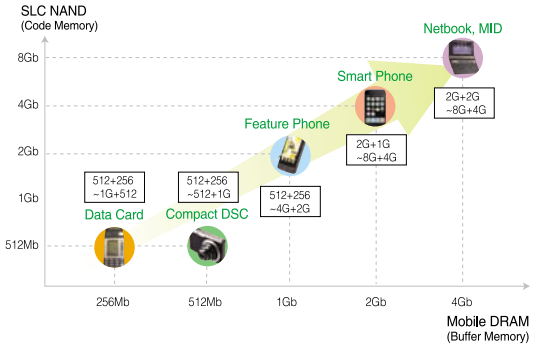
- **Broad Product Line**: SDR / DDR, x16 / x32 organizations, 128Mb to 2Gb densities
- **Diverse Packaging Options**: Discrete, KGD (Known Good Die), MCP (Multi Chip Package), PoP (Package on Package)
- **Small Form Factor Packages**: For use in the most space-constrained handheld applications
- **Low Power Features**: Programmable Drive strength, Partial Array Self Refresh, Temperature Compensated Self Refresh
- **Major Applications**: Mobile Phone, PDA, MP3 Player, Digital Still Camera, MID(Mobile Internet Device), PND(Portable Navigation Device), Personal Media Player (PMP), Handheld Game Console, e-book
- LPDDR2 will be the next generation mainstream. Hynix set the standard for LPDDR2 technology along with LPDDR

MCP

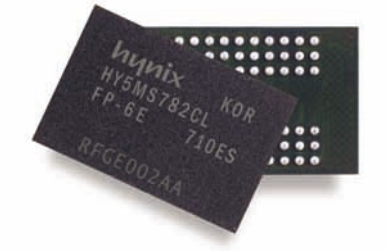
- Small Form Factor package saves space in Handheld Devices
- High Capacity Data Storage, High Speed, with Low Power Consumption
- In-house manufacturing provides cost efficient solutions in a timely manner
- Major Application - Mobile Phone, Smartphone, PDA Phone, Digital Still Camera, MID (Mobile Internet Device), Wireless LAN Card, Handheld Game Console, Netbook



MCPs in Mobile Application



MCP Line-up



e-NAND

- **e-NAND** : Combination of NAND Flash and the Flash Controller with MMC interface, in a single package
- Simple read / write memory using standard MMC 4.3 / 4.4 protocol interface.
- No additional firmware for NAND management required
- Controller includes NAND software such as FTL, ECC, FAT-16/32

hynix Good memory

Mobile Memory Product Line-up

Mobile SDR

DENSITY	ORG.	SPEED	PART NUMBER	PACKAGE	FEATURE	AVAILABILITY
2Gb	64M x 16	166MHz (6.0ns)	H55S2G62MFP-60M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S2G62MFP-75M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
	32M x 32	166MHz (6.0ns)	H55S2G22MFP-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S2G22MFP-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
	32M x 32 (reduced page size)	166MHz (6.0ns)	H55S2G32MFP-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S2G32MFP-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
1Gb	64M x 16	166MHz (6.0ns)	H55S1G62AFR-60M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S1G62AFR-75M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H55S1G62MFP-60M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S1G62MFP-75M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
	32M x 32	166MHz (6.0ns)	H55S1G22AFR-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S1G22AFR-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H55S1G22MFP-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S1G22MFP-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
	32M x 32 (reduced page size)	166MHz (6.0ns)	H55S1G32AFR-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S1G32AFR-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H55S1G32MFP-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S1G32MFP-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
512M	32M x 16	166MHz (6.0ns)	H55S5162EFR-60M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S5162EFR-75M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H55S5162DFR-60M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S5162DFR-75M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
	16M x 32	166MHz (6.0ns)	H55S5122EFR-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S5122EFR-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H55S5122DFR-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S5122DFR-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
256Mb	16M x 16	166MHz (6.0ns)	H55S2562JFR-60M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S2562JFR-75M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
	8M x 32	166MHz (6.0ns)	H55S2622JFR-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S2622JFR-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
128Mb	8M x 16	166MHz (6.0ns)	H55S1262EFP-60M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S1262EFP-75M	FBGA (54ball)	4Bank, 1.8V / 1.8V	Now
	4M x 32	166MHz (6.0ns)	H55S1222EFP-60M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H55S1222EFP-75M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now

* All SDRAM is Available For Lead Free or Lead & Halogen Free

Mobile DDR

DENSITY	ORG.	SPEED	PART NUMBER	PACKAGE	FEATURE	AVAILABILITY
2Gb	64M x 16	200MHz (5.0ns)	H5MS2G62MFR-EBM	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS2G62MFR-J3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
	32M x 32	200MHz (5.0ns)	H5MS2G22MFR-EBM	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS2G22MFR-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
	32M x 32 (reduced page size)	200MHz (5.0ns)	H5MS2G32MFR-EBM	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS2G32MFR-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
1Gb	64M x 16	200MHz (5.0ns)	H5MS1G62AFR-E3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS1G62AFR-J3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		200MHz (5.0ns)	H5MS1G62MFP-E3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS1G62MFP-J3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS1G62MFP-K3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
	32M x 32	200MHz (5.0ns)	H5MS1G22AFR-E3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS1G22AFR-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		200MHz (5.0ns)	H5MS1G22MFP-E3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS1G22MFP-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS1G22MFP-K3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
	32M x 32 (reduced page size)	200MHz (5.0ns)	H5MS1G32AFR-E3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS1G32AFR-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		200MHz (5.0ns)	H5MS1G32MFP-E3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS1G32MFP-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS1G32MFP-K3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
512Mb	32M x 16	200MHz (5.0ns)	H5MS5162EFR-E3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS5162EFR-J3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		200MHz (5.0ns)	H5MS5162DFR-E3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS5162DFR-J3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS5162DFR-K3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
	16M x 32	200MHz (5.0ns)	H5MS5122EFR-E3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS5122EFR-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		200MHz (5.0ns)	H5MS5122DFR-E3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS5122DFR-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS5122DFR-K3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
256Mb	16M x 16	200MHz (5.0ns)	H5MS2562JFR-E3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS2562JFR-J3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS2562JFR-K3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
	8M x 32	200MHz (5.0ns)	H5MS2622JFR-E3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		166MHz (6.0ns)	H5MS2622JFR-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS2622JFR-K3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
128Mb	8M x 16	166MHz (6.0ns)	H5MS1262EFP-J3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS1262EFP-K3M	FBGA (60ball)	4Bank, 1.8V / 1.8V	Now
	4M x 32	166MHz (6.0ns)	H5MS1222EFP-J3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now
		133MHz (7.5ns)	H5MS1222EFP-K3M	FBGA (90ball)	4Bank, 1.8V / 1.8V	Now

* All SDRAM is Available For Lead Free or Lead & Halogen Free

NAND Flash Memory

General Description

Hynix provides a broad range of NAND Flash products density from 128Mb to 256Gb with various types of packaging (TSOP, VLGA and FBGA). Due to the proliferation of digital content, NAND Flash memory products are used in a wide variety of applications such as MP3, PMP, Digital camera, Camcorder, Memory card, USB flash drive and other consumer electronics such as Game console, Navigation. Currently, Hynix NAND Flash Memory is being widely adopted in the mobile handset applications and we are also developing PC storage solutions based on the NAND Flash chips. To meet the growing demand for high capacity and improved performance in mobile applications, Hynix is offering HiFFS (Flash File System) software with eHiFFS system that enhances NAND chip performance and reliability.

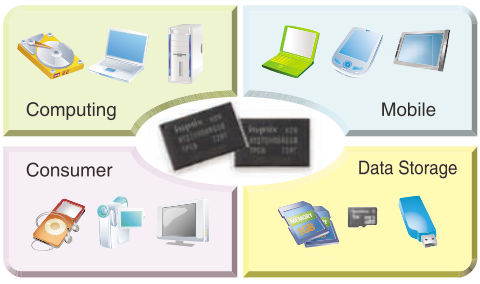
NAND Flash Key Features

Features		F48 16G MLC	F41 32G MLC	F32 32G MLC
Voltage		3.3V	3.3V	3.3V
Organization		X8	X8	x8
Page & Block size (P/B)		4KB+128B / 512KB	4KB+224B / 512KB	8KB+448B / 2MB
tRC(min) / tWC (min)		25ns	25ns	25ns
tR (max)		60us	60us	200us
Program time (typ.)		800us	1000us	1600us
Erase time (typ.)		2.5ms	3ms	2.5ms
Operating current	MONO / DDP	15mA(typ.) ~ 30mA(max)	30mA(typ.) ~ 50mA(max)	30mA(typ.) ~ 50mA(max)
	QDP / DSP	20mA(typ.) ~ 40mA(max)	30mA(typ.) ~ 50mA(max)	30mA(typ.) ~ 60mA(max)
Function	Copyback	O with Data out	O with Data out	O with Data out
	Cache Program	-	O	O
	Cache Read	-	O	O
	2 Plane Op.	Write, Read & Erase	Write, Read & Erase	Write, Read & Erase
Special / Function	Enhanced Data Out	O	O	O
	OTP	O	O	O
	Unique ID	O	O	O

Endurance / Package

E/W Cycles / Retention	5K / 10 years	5K / 10 years	3K / 10 years (TBD)
NOP	1	1	1
Package	TSOP / VLGA / COP	VLGA	VLGA / TSOP

NAND Flash Applications



Hynix NAND Flash

Cell Type	SLC	MLC	TLC
Specification	High Performance / Low Density	Middle Performance / Middle Density	Low Performance / High Density
Package	TSOP LGA FBGA	TSOP LGA	LGA
Max Density	TSOP 8GB LGA 16GB	TSOP 16GB LGA 32GB	LGA 32GB

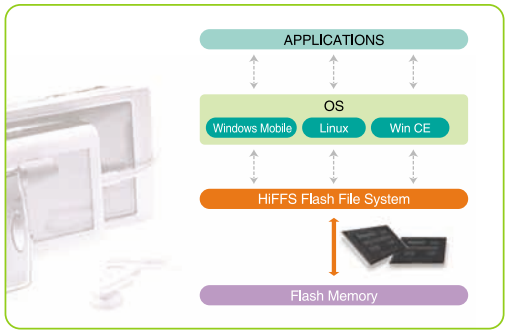
Software Support

HiFFS Software

HiFFS is a Flash file system solution for mobile applications. HiFFS is the essential system software for electronic devices which has Flash memory storage such as mobile phones, PDAs, MP3 players, PMPs, digital TVs, and digital camcorders.

Features

- Flash memory file system solution for mobile embedded system
- Higher performance and reliability
- Fully compatible with FAT 12 / 16 / 32 file system standards
- Journaling error recovery mechanism
- Support various Nand Flash memory types such as small block, large block, MLC and SLC and TLC.
- Efficient bad block management and wear-leveling
- Support UMS(USB Mass Storage) and external Flash memory cards
- Higher read/write performance
- Fast booting
- Support various operating systems such as WinCE, Linux, Non-OS, Windows Mobile



Hynix SSD

SSD (Solid State Drive)

SSD is one of the fastest growing NAND applications in the world. Because of its strengths - Speed, Performance, Reliability, and Power Consumption - many computing devices such as MID, Net Book, Notebook, Server System, etc have replaced conventional hard drives with SSD. Hynix offers SSM (Solid State Module) and SSD for mobile and personal computing devices.

SSD Key Features

Features	Solid State Module	Solid State Drive (2.5", 1.8")
Standard ATA / IDE Bus Interface	SATA 3.0Gbps	
Capacities	16GB, 32GB, 64GB	128GB, 256GB
Dimension	54×39×4mm	1.8" : 52.8×77×5mm 2.5" : 69.9×100×7mm
Sustained Performance - 128KB, MAX	Read: 100MB/s Write: 80MB/s	Read: 200MB/s Write: 140MB/s
Random Performance - 4KB, MAX	Read: 12117 IOPS (48MB/s) Write: 263 IOPS (1.1MB/s)	Read: 12500 IOPS (50MB/s) Write: 4000 IOPS (16MB/s)
Power Consumption	Active: 0.6W Stand-by: 0.35W	Active: 2.0W Stand-by: 0.35W
Voltage	5.0V (3.3V)	5.0V (2.5") / 3.3V (1.8")
Temperature Range	0℃ to 70℃ for Operating -55℃ to 90℃ for Storage	0℃ to 70℃ for Operating -55℃ to 95℃ for Storage
MTBF	1,000,000 Hrs	
BER	1 error in 10^{14} bits transferred	

NAND Flash
Product Line-up

NAND Flash SLC COMPONENT

PRODUCT	DENSITY	TECH.	BLOCK SIZE	STACK	VCC/ORG	PACKAGE	AVAILABILITY	REMARK
HY27US08281A	128Mb	90nm	16KB	Mono	3.3V / x8	TSOP/ USOP	Now	
HY27US08561A	256Mb	90nm	16KB	Mono	3.3V / x8	TSOP / USOP / FBGA	Now	
HY27US08121B	512Mb	70nm	16KB	Mono	3.3V / x8	TSOP / USOP / FBGA	Now	
H27U518S2C	512Mb	57nm	16KB	Mono	3.3V / x8	TSOP	Now	
HY27US081G1M	1Gb	70nm	16KB	Mono	3.3V / x8	USOP	Now	
HY27US081G1A	1Gb	57nm	16KB	Mono	3.3V / x8	TSOP	Now	
HY27UF081G2A	1Gb	70nm	128KB	Mono	3.3V / x8	TSOP / USOP / FBGA	Now	
HY27US081G2A	1Gb	70nm	128KB	Mono	1.8V / x8	FBGA	Now	
H27U1G8F2B	1Gb	48nm	128KB	Mono	3.3V / x8	TSOP, FBGA	Now	
H27U1G8F2B	1Gb	48nm	128KB	Mono	1.8V / x8	FBGA	Now	
HY27UF082G2A	2Gb	70nm	128KB	Mono	3.3V / x8	TSOP / LGA	Now	
HY27UF082G2B	2Gb	57nm	128KB	Mono	3.3V / x8	TSOP, FBGA	Now	
HY27UF084G2B	4Gb	57nm	128KB	Mono	3.3V / x8	TSOP	Now	
HY27UG088G5(D)B	8Gb	57nm	128KB	DDP	3.3V / x8	TSOP / LGA	Now	2CE / Dual CH.
HY27UH08AG5B	16Gb	57nm	128KB	QDP	3.3V / x8	TSOP	Now	2CE

NAND Flash MLC COMPONENT

PRODUCT	DENSITY	TECH.	BLOCK SIZE	STACK	VCC/ORG	PACKAGE	AVAILABILITY	REMARK
HY27UT084G2A	4Gb	57nm	256KB	Mono	3.3V / x8	TSOP	Now	
HY27UT088G2A	8Gb	57nm	256KB	Mono	3.3V / x8	TSOP	Now	
H27U8G8T2B	8Gb	48nm	512KB	Mono	3.3V / x8	TSOP	Now	
HY27UU08AG5A	6Gb	57nm	256KB	DDP	3.3V / x8	TSOP	Now	2CE
H27UAG8T2M	16Gb	48nm	512KB (4KB Page)	Mono	3.3V / x8	TSOP / VLGA	Now	
H27UAG8T2A	16Gb	41nm	512KB (4KB Page)	Mono	3.3V / x8	TSOP	Now	
HY27UW08CGFA	64Gb	57nm	256KB	DSP	3.3V / x8	TSOP DSP	Now	4CE
HY27UV08BG5A	32Gb	57nm	256KB	QDP	3.3V / x8	TSOP	Now	2CE
H27UBG8U5M	32Gb	48nm	512KB (4KB Page)	DDP	3.3V / x8	TSOP	Now	2CE
H27UBG8U5A	32Gb	41nm	512KB (4KB Page)	DDP	3.3V / x8	TSOP	Now	
H27UBG8T2M	32Gb	41nm	512KB (4KB Page)	Mono	3.3V / x8	VLGA	Now	
H27UBG8T2A	32Gb	32nm	2MB (8KB Page)	SDP	3.3V / x8	TSOP / VLGA	Now	
H27UCG8V5M	64Gb	48nm	512KB (4KB Page)	QDP	3.3V / x8	TSOP / VLGA	Now	2CE
H27UCG8VFA	64Gb	41nm	512KB (4KB Page)	QDP	3.3V / x8	TSOP	Now	
H27UCG8UDM	64Gb	41nm	512KB (4KB Page)	DDP	3.3V / x8	VLGA	Now	Dual CH.
H27UCG8UDA	64Gb	32nm	2MB (8KB Page)	DDP	3.3V / x8	TSOP / VLGA	2Q'10	Dual CH. LGA
H27UDG8WFM	128Gb	48nm	512KB (4KB Page)	ODP	3.3V / x8	LSOP	Now	4CE
H27UDG8WFMTR-BC	128Gb	48nm	512KB (4KB Page)	DSP	3.3V / x8	TSOP DSP	Now	4CE
H27UDG8YFMXR-BC	128Gb	48nm	512KB (4KB Page)	ODP	3.3V / x8	LLGA	Now	4CE
H27UDG8VEM	128Gb	41nm	512KB (4KB Page)	QDP	3.3V / x8	VLGA	Now	4CE, Dual CH.
H27UDG8VEA	128Gb	32nm	2MB (8KB Page)	QDP	3.3V / x8	TSOP / VLGA	2Q'10	Dual CH. LGA
H27UEG8YEM	256Gb	41nm	512KB (4KB Page)	ODP	3.3V / x8	LLGA	Now	4CE, Dual CH.
H27UEG8YEA	256Gb	32nm	2MB (8KB Page)	ODP	3.3V / x8	TSOP / VLGA	2Q'10	Dual CH. LGA

NAND Flash TLC COMPONENT

PRODUCT	DENSITY	TECH.	BLOCK SIZE	STACK	VCC/ORG	PACKAGE	AVAILABILITY	REMARK
H2EUCG8N11YR-C	64Gb	48nm	768KB (192 Block)	DDP	3.3V / x8	VLGA	EOL	Emulated NAND
H2EUDG8P11XR-C	128Gb	48nm	768KB (192 Block)	QDP	3.3V / x8	LLGA	EOL	Emulated NAND
H2EUAG8M2MYR-C	16Gb	41nm	768KB (192 Block)	SDP	3.3V / x8	VLGA	TBD	Emulated NAND

e-NAND COMPONENT

PRODUCT	DENSITY	BASE COMPONENT			VCC/ORG	VERSION	AVAILABILITY	REMARK
		TECH.	DENSITY	STACK				
H26M01002MAR	512MB	57nm	4Gb	1	3.3V / x8	MMC 4.2	Now	
H26M11002AAR	1GB	57nm	8Gb	1	3.3V / x8	MMC 4.2	Now	
H26M11001BAR	1GB	48nm	8Gb	1	3.3V / x8	MMC 4.3	Now	
H26M21002BAR	2GB	48nm	16Gb	1	3.3V / x8	MMC 4.2	Now	
H26M21001CAR	2GB	41nm	16Gb	1	3.3V / x8	MMC 4.3	Now	
H26M32002BAR	4GB	48nm	16Gb	2	3.3V / x8	MMC 4.2	Now	
H26M32001CAR	4GB	41nm	16Gb	2	3.3V / x8	MMC 4.3	Now	
H26M44002AAR	8GB	48nm	16Gb	4	3.3V / x8	MMC 4.2	Now	
H26M42001BAR	8GB	41nm	32Gb	2	3.3V / x8	MMC 4.3	Now	
H26M54001AJR	16GB	41nm	32Gb	4	3.3V / x8	MMC 4.3	Now	
H26M68001MJR	32GB	41nm	32Gb	8	3.3V / x8	MMC 4.3	Now	

uSD COMPONENT

PRODUCT	DENSITY	BASE COMPONENT			VCC/ORG	VERSION	AVAILABILITY	REMARK
		TECH.	DENSITY	STACK				
H24U1GTM3ARH	1GB	48nm	8Gb	1	3.3V / x4	Class-4	Now	
H24U2GTM1BRH	2GB	41nm	16Gb	1	3.3V / x4	Class-4	Now	
H24U4GUM1ARH	4GB	41nm	16Gb	2	3.3V / x4	Class-6	Now	
H24U8GVM1MRH	8GB	41nm	16Gb	4	3.3V / x4	Class-6	Now	
H24UAGYM1MRH	16GB	41nm	16Gb	4	3.3V / x4	Class-6	Now	

CIS
CMOS Image Sensor

General Description

Cameras are now embedded in every consumer application. From cell phones to Laptops, taking pictures or streaming self video images to friends are part of everyday life. Through Hynix CIS, these images can be realized with improved clarity and more lively ways. Delivering an important moment of one's life is a pleasure one can never part with.
The year 2010 will be a milestone for Hynix CIS product line as it gears up toward being the market leader. Hynix is enhancing its technical excellence in accelerating technology development to provide advanced quality products and meet the next level of customer needs

Applications

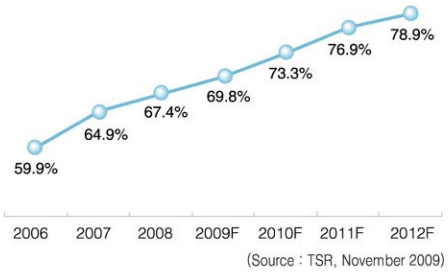
- Camera Phone
- Dual-camera products
- Web cams
- Other mobile gadgets

CMOS Image Sensor

CMOS image sensor is a device that converts an optical image to an electrical signal using a CMOS technology. CMOS technology enables integration of image sensing and digital signal processing on the same chip, resulting in faster, smaller, less expensive, and lower power image sensing devices.

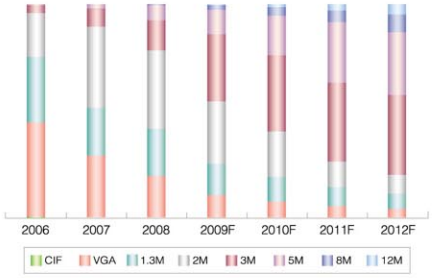
CMOS image sensor market has a high growth potential, with demand expected to rise by 10 percent annually through 2012.
Its main applications are camera phones, digital still cameras and, video conferencing systems, but the market for CMOS image sensor is rapidly diversifying into applications such as surveillance systems, automotive cameras, and medical equipment.

Camera Attachment Ratio of Mobile Phones



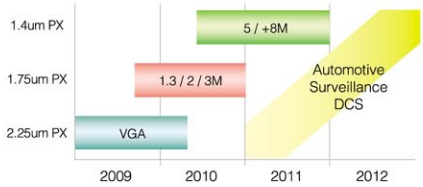
(Source : TSR, November 2009)

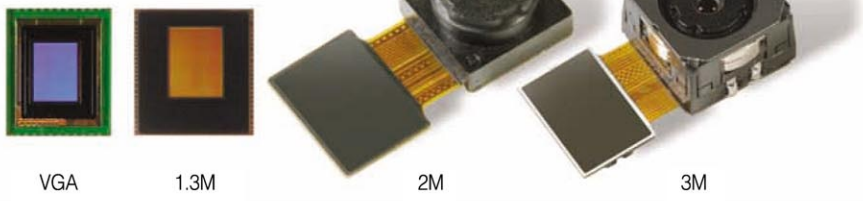
Camera Phone Resolution Trend (Main Camera)



(Source : TSR, November 2009)

Hynix CMOS Image Sensor Technology Migration & New Applications





VGA 1.3M 2M 3M

CMOS Image Sensor
Product Line-up and Key Features

VGA (YACBAA0S / YACBAC1S / YACBA11S)

Pixel Size	2.25um × 2.25um	SNR	39dB
Array Format (Active)	640H × 480V	Dynamic Range	60dB
Optical Format	1/10-inch	ADC	On-chip, 10-bit
Imaging Area	1.44mm × 1.08mm	Data Rate	12 megapixels per second (master clock, 24MHz)
Color Filter Array	RGB Bayer color filters	Features	Auto Exposure, Auto White Balance, Black Level Calibration, Dead pixel Correction , Windowing, Sub-Sampling, Image Scaling, Image Flip, Anti-Flicker, Noise Reduction , Edge Enhancement, Brightness, Color Saturation , Gamma Correction, Color Correction, Lens Shading Correction
Scan Mode	Progressive		
Frame Rate	30-fps @ 24MHz		
Shutter	Electronic rolling Shutter (ERS)		
Supply Voltage	Digital I/O: 1.7V × 3.0V Digital Core: 1.7V — 1.9V Analog & Pixel: 2.6V — 3.0V	Power Consumption	100mW (Typical)
Window size	Programmable (including VGA, QVGA, CIF, QCIF)	Operating Temp. Range	-20℃ to 60℃
Flash Support	Xenon and LED		
Sensitivity	0.750V / LuxSec		

1.3M (YACC6A1S)

Pixel Size	1.75um	SNR	TBD
Optical Format	1/6-inch	Dynamic Range	TBD
Array Format (Active)	1280H × 1024V	ADC	On-chip, 10-bit
Imaging Area	2.296mm × 1.848mm	Features	Auto Exposure, Auto White Balance, Black Level Calibration, Dead pixel Correction , Windowing, Sub-Sampling, Image Scaling, Image Flip, Anti-Flicker, Noise Reduction , Edge Enhancement, Brightness, Color Saturation , Gamma Correction, Color Correction, Lens Shading Correction
Color Filter Array	RGB Bayer color filters		
Scan Mode	Progressive		
Frame Rate	20fps @ SXGA, 30fps @ 720P, 40fps @ VGA		
Shutter	Electronic rolling Shutter (ERS)		
Supply Voltage	Digital I/O: 1.7V — 3.0V Digital Core: 1.7V — 1.9V Analog & Pixel: 2.6V — 3.0V	Power Consumption	TBD
Window size	Programmable	Operating Temp. Range	-20℃ to 60℃
Flash Support	Xenon and LED		
Sensitivity	TBD		

2M (YACD5B1S)

Pixel Size	1.75um × 1.75um	ADC	On-chip, 10-bit
Optical Format	1/5-inch	Data Rate	36 megapixels per second (Internal PLL clock = 72MHz)
Array Format (Active)	1600H × 1200V	Features	Auto Exposure, Auto White Balance, Black Level Calibration, Dead pixel Correction , Edge Data for Auto Focus, Motion Data for Anti-shaking, Windowing, Sub-Sampling, Image Scaling, Image Flip, Anti-Flicker, Noise Reduction, Strobe Control, Edge Enhancement, Brightness , Color Saturation, Gamma Correction, Color Correction, Lens Shading Correction
Imaging Area	2.80mm × 2.10mm		
Color Filter Array	RGB Bayer color filters		
Scan Mode	Progressive		
Frame Rate	Max 15-fps @ full resolution		
Shutter	Electronic rolling Shutter (ERS)		
Supply Voltage	Digital I/O: 1.7V — 3.0V Digital Core: 1.7V — 1.9V Analog & Pixel: 2.6V — 3.0V	Power Consumption	TBD
Window size	Programmable (including UXGA, SVGA, QSVGA)	Operating Temp. Range	-20℃ to 60℃
Flash Support	Xenon and LED		
Sensitivity	700mV / lux.sec		
SNR	38dB		
Dynamic Range	60dB		

3M (YACE4A1S)

Pixel Size	1.75um × 1.75um	Dynamic Range	60dB
Optical Format	1/4-inch	ADC	On-chip, 10-bit
Array Format (Active)	2048H × 1356V	Features	Auto Exposure, Auto white balance, Black level calibration, Dead pixel Correction , Auto Focus Control, Anti-Shaking, Windowing, Sub-Sampling, Image Scaling, Image Flip, Anti-flicker, Noise Reduction, Strobe Control, Edge Enhancement , Brightness, Color Saturation Gamma Correction, Color Correction Lens Shading Correction, MCU Embeded, JPEG Encoder with thumbnail support
Imaging Area	3.640mm × 2.744mm		
Color Filter Array	RGB Bayer color filters		
Scan Mode	Progressive		
Frame Rate	15-fps @ QXGA, 30-fps @ XGA		
Shutter	Electronic rolling Shutter (ERS)		
Supply Voltage	Digital I/O: 1.7V — 3.0V Digital Core: 1.7V — 1.9V Analog & Pixel: 2.6V — 3.0V	Power Consumption	80mW (Active, est.), 7μA (Standby, est.)
Window size	Programmable	Operating Temp. Range	-20℃ to 60℃
Sub-Sampling	1/2, 1/4		
Sensitivity	0.475V / lux-sec @ 550nm (est.)		
SNR	32dB (est.)		

Global Sales Network

HEADQUARTERS & FACTORY

■ **HYNIX SEMICONDUCTOR INC. (H.S.I)**

HEADQUARTERS & FACTORY
San 136-1, Ami-Ri, Bubal-Eub, Icheon-si,
Kyoungki-Do, Korea 467-701
Tel: 82-31-630-4114 Fax: 82-31-630-4103

MARKETING & SALES DIVISION
891 Daechi-dong, Kangnam-gu, Seoul,
135-738, Korea
Tel: 82-2-3459-5114 Fax: 82-2-3459-5987/8

CHEONGJU FACTORY
1, Hyangjeong-dong, Hungduk-gu, Cheongju-si,
Chungbuk, 361-725, Korea
Tel: 82-43-270-3114 Fax: 82-43-270-2145

AMERICA

■ **HYNIX SEMICONDUCTOR AMERICA INC. (H.S.A)**
3101 North First Street, San Jose, CA 95134, U.S.A
Tel: 1-408-232-8000 Fax: 1-408-232-8103

ATLANTA OFFICE
907 Santa Anita Drive Woodstock, GA 30189, U.S.A
Tel: 1-678-445-7768 Fax: 1-678-445-8120

AUSTIN OFFICE
4201 West Parmer Lane Bldg. B, Suite 280 Austin,
TX 78727, U.S.A
Tel: 1-512-339-5731 Fax: 1-512-821-3730

CHICAGO OFFICE
1920 North Thoreau Drive Suite 170 Schaumburg,
IL 60173 U.S.A
Tel: 1-847-925-0190 Fax: 1-847-925-0196

DALLAS OFFICE
1701 Gateway Blvd, Suite 357 Richardson,
TX 75080, U.S.A
Tel: 1-972-690-4969 Fax: 1-972-690-1065

DENVER OFFICE
2308 Hearth Drive #28 Evergreen CO 80439
Tel: 1-303-679-3515

GLENDALE OFFICE
500 N. Central Avenue, Suite 810 Glendale, CA 91203
Tel: 1-818-242-7420 Fax: 1-818-242-7421

HOUSTON OFFICE
13455 Cutton Rd Suite 1-I Houston, TX 77069, U.S.A
Tel: 1-281-444-4908 Fax: 1-281-444-4918

NEW YORK OFFICE
10 Lafayette Court, Suite 10A Fishkill, NY 12524, U.S.A
Tel: 1-845-896-0353 Fax: 1-845-896-0577

RALEIGH OFFICE
5511 Capital Center Drive, Suite 330 Raleigh,
NC 27606, U.S.A
Tel: 1-919-859-1244 Fax: 1-919-859-3137

EUROPE

■ **HYNIX SEMICONDUCTOR DEUTSCHLAND GMBH. (H.S.D)**
Am Prime Parc 13 Kelsterbacher Str.16 D-65479
Raunheim Germany
Tel: 49-6142-921-100 / 206
Fax: 49-6142-921-290 / 214

MILANO OFFICE
Via Alessandro Volta 18, 20094 Corsico, Milano, Italy
Tel: 39-2-4862-0502 Fax: 39-2-4586-4733

MOSCOW OFFICE
123242, Moscow, Krasnaya Presnya str., 13, 5th fl,
room 33, Russia
Tel: 7-495-924-52-84 Fax: 7-495-924-52-84

PARIS OFFICE
Bureaux de Sevres-2 rue Troyon 92316 SEVRES Cedex,
Paris, France
Tel: 33-141-14-83-41 Fax: 33-141-14-83-40

STOCKHOLM OFFICE
Flygfaltsgaten 1, SE-12830 Skarpnack
Stockholm, Sweden
Tel: 46-8-605-7290 Fax: 46-8-605-2640

HELSINKI OFFICE
Technopolis, Innopoli 2, Tekniikkatie 14, 02150, Espoo,
Finland
Tel: 358-46-712-1081 Fax: 358-712-1080

■ **HYNIX SEMICONDUCTOR U.K. LTD. (H.S.U)**
241 Brooklands Road, Weybridge, Surrey KT13 0RH, U.K
Tel: 44-1932-827-700 Fax: 44-1932-827-745~7

LIMERICK OFFICE
3rd Floor, Ivernia Hall, 97 Henry Street Limerick, Ireland
Tel: 353-61-400-755 Fax: 353-61-400-757

STIRLING OFFICE
Office 2/1 Springfield House Laurel Hill Business Park
Laurel Hill Stirling, FK 7 9JQ, Scotland, U.K
Tel: 44-1932-827-750 Fax: 44-1932-827-759

ASIA

■ **HYNIX NUMONYX SEMICONDUCTOR LTD. (H.N.S.L)**
Lot K7, Wuxi Export Processing Zone in Wuxi New
District, Wuxi, Jiangsu Province, China
Tel: 86-510-8520-8888
Fax: 86-510-8520-8181 / 8282

■ **HYNIX SEMICONDUCTOR JAPAN INC. (H.S.J)**
23F SHIROYAMA TRUST TOWER, 4-3-1 Toranomon,
Minatoku, Tokyo, Japan
Tel: 81-3-6403-5500 Fax: 81-3-6403-5590 / 5591

OSAKA OFFICE
12 th Fl., Sumitomo Seimei Shin-Osaka Higashiguchi
Bldg., 1-19-4 Higashinakajima, Higashiyodogawa-Ku
Osaka 533-0033, Japan
Tel: 81-6-4809-8851 Fax: 81-6-4809-8966

■ **HYNIX SEMICONDUCTOR ASIA PTE. LTD. (H.S.S)**
7 Temasek Boulevard #42-02, Suntec City Tower 1,
Singapore 038987
Tel: 65-6338-5966 Fax: 65-6336-5911 / 5922

PENANG OFFICE
Unit 17 lower level 5, Hotel Equatorial Penang 1 Jalan
Bukit Jambul Bayan Lepas 11900 Penang, Malaysia
Tel: 60-04-643-2428 Fax: 60-04-643-2432

■ **HYNIX SEMICONDUCTOR INDIAN SUBCONTINENT PVT LTD. (H.S.I.S)**
Unit 10, Level 8, Innovator Building, ITPB(International
Technology Park Bangalore), Whitefield Road,
Bangalore, 560066, India
Tel: 91-80-4126-5271~2 Fax: 91-80-4126-5274

■ **HYNIX SEMICONDUCTOR HONG KONG LTD. (H.S.H)**
Suite 2401, 24F., Central Plaza, 18 Harbour Road
Wanchai, Hong Kong
Tel: 852-2971-1600 Fax: 852-2971-1622

■ **HYNIX SEMICONDUCTOR TAIWAN INC. (H.S.T)**
Lite-On Technology Building 11F, No. 392,
Ruey Kuang Road, Neihu, Taipei 11492 Taiwan, R.O.C
Tel: 886-2-8752-2300 Fax: 886-2-8752-8368

HSINCHU OFFICE
Chang Yih Group Building 5F, No.417,
Sec. 2, Gongdao 5th Rd., Hsinchu City, Taiwan, R.O.C
Tel: 886-2-8752-2300 Fax: 886-2-8752-8370

■ **HYNIX SEMICONDUCTOR (Shanghai) CO., LTD. (H.S.C.S)**
Room 2702-2705, Maxdo Center, No.8, Xing Yi RD,
Changning Zone, Shanghai, China
Tel: 86-21-5208-0505 Fax: 86-21-5208-0802

BEIJING OFFICE
Room1401 Landmark Building, 8 North Dongsanhuan
Road, Chaoyang District, Beijing 100004, China
Tel: 86-10-6590-6546 Fax: 86-10-6590-0908

SHENZHEN OFFICE
Room1906-1909, Fu Chun Dong Fang Building
No 7006 ShenNan Road, ShenZhen, China
Tel: 86-755-8257-1591 Fax: 86-755-8257-1584

hynix Good memory

hynix Good memory

www.hynix.com