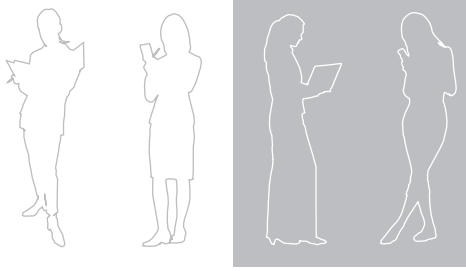
Good memory

IIIC.CC

Connect your world through our Memory

hynix

Dream of a Rich Future is Now Reality



Corporate Profile

Hynix Semiconductor is a leading supplier of advanced semiconductor memory and Image Sensor products.
We design, develop, manufacture and market a wide variety of DRAM and NAND Flash memories, and CMOS Image Sensors (CIS).
Memory components are an essential part of leading-edge Computing, Consumer, Communication and Wireless applications.
Image Sensors are used in a wide range of wireless communications and handheld consumer applications

- DRAM and NAND Flash memories are focus products
- CMOS Image Sensors will diversify product portfolio
- 2008 Revenues of USD$6.2bn
- Market capitalization of USD$2.4bn as of December 2008
- Global presence with 4 manufacturing sites and 26 sales offices worldwide
- 21,400 employees worldwide

Recent Accomplishments

2009~2008

2009

03 · Developed and acquired Intel validation for 2-Rank 8GB DDR3 RDIMM

02 · Developed the World's First 44nm DDR3 DRAM

2008

12 · Developed the World's First 2Gb Mobile DRAM

11 · Introduced Industry's Fastest 7Gbps, 1Gb GDDR5 Graphics DRAM

08 · Completed Construction of 300mm Fabrication Plant of 3rd Factory in Cheongju

· Demonstrated World's First 16GB 2-Rank R-DIMM Using MetaRAM™ Technology

04 · Developed the world's fastest Mobile LPDDR2

02 · Introduced 2-Rank 8GB DDR2 RDIMM

01 · Signed an agreement for joint R&D for next-generation non-volatile memory technology with Numonyx

· Announced 800MHz, 1GB / 2GB UDIMM Intel Validation

2007

2007

11 · Signed a partnership agreement with Siliconfile Technologies Inc. to cooperate on CMOS Image Sensor business

· Acquired Intel validation for 1Gb DDR2 DRAM

· Developed industry's first 1Gb GDDR5 DRAM

10 · Signed PRAM technology and licensing agreement with Ovonyx

09 · Developed world's first 24 stack NAND Flash multi-chip package

08 · Signed ZRAM technology and licensing agreement with Innovative Silicon

· Developed industry's fastest, smallest 1Gb Mobile DRAM

Main Memory _ p_4
Graphics Memory _ p_8
Consumer Memory _ p_10
Mobile Memory _ p_12
NAND Flash Memory_ p_14
CIS p_17

2007

05 · Acquired the industry's first validation on DDR3 DRAM from Intel

03 · Signed cross licensing agreement with Sandisk and signed MOU for joint development of x4 NAND Flash technology

· Developed the world's fastest ECC Mobile DRAM

01 · Founded sales subsidiary in India (HSIS)

· Developed world's fastest memory module based on 'wafer level package' technology

2006~2004

2006

12 · Announced industry's first 60nm 1Gb DDR2 800MHz based modules

· Developed the world's fastest 200MHz 512Mb Mobile DRAM

09 · Opened 300mm R&D (3R) fab in Icheon

04 · Founded manufacturing company in China (HSMC)

2005

04 · Established JV with ST Micro in China (HSSL)

01 · Signed strategic alliance with ProMOS

2004

10 · Transferred non-memory product lines to MagnaChip Semiconductor Ltd.

08 · Signed cooperative agreement with Wuxi City, China to build chip plant

2003~1983

2003

06 · Established Environment / Safety / Health Lab

04 · Established strategic joint development alliance with STMicro for NAND Flash

2001

03 · Changed corporate name to 'Hynix Semiconductor Inc.'

1999

10 · Merged with LG Semicon

1983

02 · Established Hyundai Electronics Industries Co., Ltd.

Main Memory

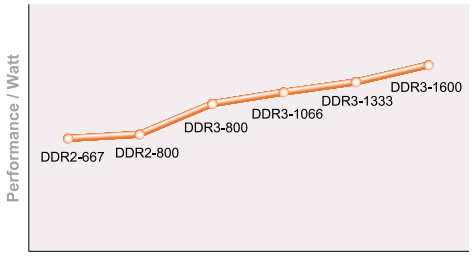
DDR3

DDR3

General Description

The next generation main memory standard, DDR3 SDRAM, can transfer data twice as fast as the current generation DDR2 DRAM'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 is also of benefit to high-density memory systems such as servers and data centers.
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.

DDR2 vs. DDR3 Performance / Watt Comparison

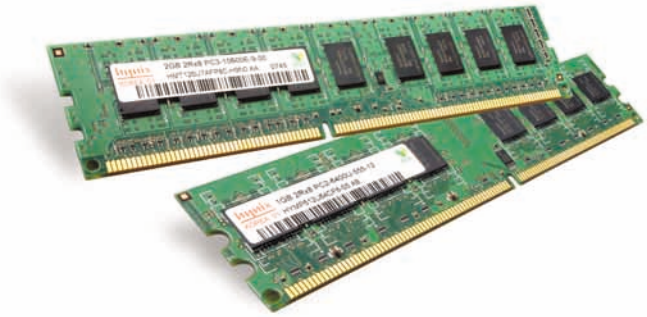


Source : Hynix Technical Marketing

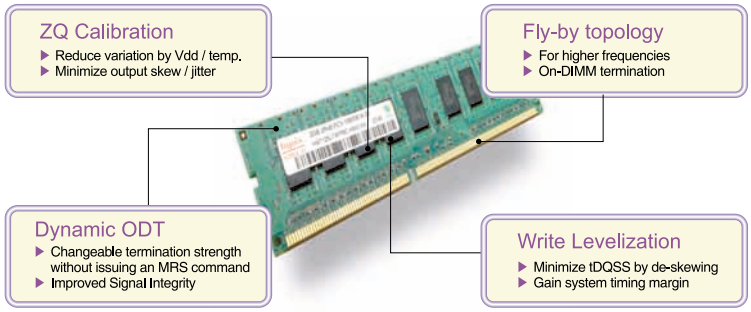
DDR2 vs. DDR3

Subject	DDR2	DDR3
Data Rate	400, 533, 667, 800 Mbps	800, 1066, 1333, 1600 Mbps
VDD / VDDQ	1.8V ± 0.1V	1.5V ± 0.075V
Support Density	256Mb ~ 4Gb	512Mb ~ 4Gb
Bank	512Mb : 4 Bank / 1Gb : 8 Bank	8 Bank
Data Pre-fetch	4 bit	8 bit
Package Type	60FBGA for x4 / x8, 84FBGA for x16	78FBGA for x4 / x8, 96FBGA 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)

Experience High Speeds!



Key Features of High Speed Interface



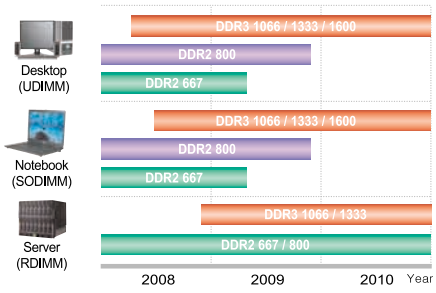
Main Memory

PC memory & Server Memory

General Description

It is well known that demand for Notebook PCs has exceeded Desktop PCs. Users now demand a powerful, full-featured mobile system, with low power consumption, extended battery life and connectivity. New portable form factors such as Netbook have emerged in the PC market. Relatively low price point is the primary driving factor, especially in light of the current global economic conditions. Mobility and weight are other features that make this product attractive to consumers.
Servers are now consolidating and adopting Virtualization technology to lower TCO (Total Cost of Ownership), with lower hardware costs and efficiencies. Higher speeds and higher density memory would be key requirements in a Virtualized server environment.

DDR2 / DDR3 Speed Migration



Hynix has always been at the leading edge of memory innovation. Hynix is currently supplying 66nm 1Gb DDR2/DDR3 and has started ramping 54nm 1Gb DDR2/DDR3 production.
Hynix offers DDR3 Registered DIMMs which provide higher memory density, speed and memory bandwidth, and reliability for high performance servers.
Hynix is also developing 1.35V DDR3 RDIMMs for lower power consumption in server platforms.

SODIMM

Your notebook just got a little lighter and faster
Portable computing applications can benefit from Hynix's proprietary packaging technology used in high density SODIMMs.

SODIMM Features

- 512MB ~ 4GB DDR3 SODIMMs in volume production
- Industry standard thickness allows easy installation
- Applications include Notebooks in all form factors, Slim PC's, All-in-One PC's and UMPCs
- Speeds up to 800MHz DDR2
- Speeds up to 1600MHz DDR3

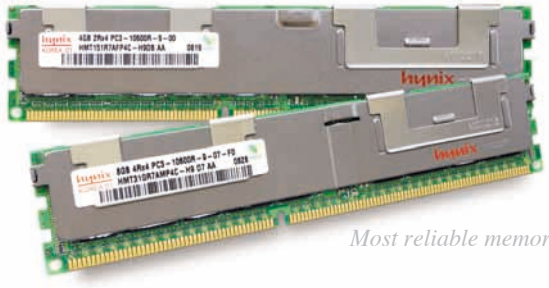
High Density in small packages!

RDIMM

Improve reliability of your server systems with Hynix Registered DIMMs.

RDIMM Features

- 1GB ~ 16GB DDR3 RDIMMs in volume production
- Industry standard thickness allows easy installation
- Low-power operation for servers and datacenters
- Speeds up to 800MHz DDR2
- Speeds up to 1333MHz DDR3



Most reliable memory!

Main Memory Product Line-up

DDR2 SDRAM MODULE (240pin-UDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
1.8V	4GB	512Mx64	256Mx8	DDR2 800-666	HMP351U6AFR8C-S6	FBGA (60ball)	2	30mm	Now
				DDR2 667-555	HMP351U6AFR8C-Y5	FBGA (60ball)	2	30mm	Now
		512Mx72	256Mx8	DDR2 800-666	HMP351U7AFR8C-S6	FBGA (60ball)	2	30mm	Now
				DDR2 667-555	HMP351U7AFR8C-Y5	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
		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
		128Mx72	128Mx8	DDR2 800-555	HYMP112U72CP8-S5	FBGA (60ball)	1	30mm	Now
					HMP112U7EFR8C-S5	FBGA (60ball)	1	30mm	Now
		128Mx64	64Mx8	DDR2 800-555	HMP512U6FFP8C-S5	FBGA (60ball)	2	30mm	Now
		128Mx72	64Mx8	DDR2 800-555	HMP512U7FFP8C-S5	FBGA (60ball)	2	30mm	Now

DDR2 SDRAM MODULE (240pin-RDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
1.8V	8GB	1Gx72	512Mx4	DDR2 800-555	HMP31GP7AFR4C-S5	FBGA (60ball)	2	30mm	Now
			512Mx4 (DDP)	DDR2 800-555	HMP31GP7EMR4C-S5	FBGA (63ball)	4	30mm	Now
				DDR2 667-555	HYMP31GP72CMP4-Y5	FBGA (63ball)	4	30mm	Now
					HMP31G7EMR4C-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
	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
			128Mx4	DDR2 667-555	HMP525P7FFP4C-Y5	FBGA (60ball)	2	30mm	Now

DDR2 SDRAM MODULE (240pin-VLP RDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
1.8V	8GB	1Gx72	1Gx4 (QDP)	DDR2 667-555	HYMP41GP72CNP4L-Y5	FBGA (65ball)	4	18.3mm	Now
				DDR2 533-444	HYMP41GP72CNP4L-C4	FBGA (65ball)	4	18.3mm	Now
			1Gx4 (DDP)	DDR2 800-555	HMP41GV7AMR4C-S5	FBGA (63ball)	4	18.3mm	Now
				DDR2 667-555	HMP41GV7AMR4C-Y5	FBGA (63ball)	4	18.3mm	Now
	4GB	512Mx72	512Mx4 (DDP)	DDR2 800-555	HYMP351P72CMP4L-S5	FBGA (63ball)	2	18.3mm	Now
					HMP351V7EMR4C-S5	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

DDR2 SDRAM MODULE (240pin-FBDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
1.8V	8GB	1Gx72	512Mx4 (DDP)	DDR2 800-555	HMP31GF7EMR4C-S5xx	FBGA (63ball)	4	30.35mm	Now
					HYMP31GF72CMP4xx-S5	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
			128MX4	DDR2 800-555	HMP525F7FFP4C-S5xx	FBGA (60ball)	2	30.35mm	Now
					HYMP525F72CP4xx-S5	FBGA (60ball)	2	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

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

DDR2 SDRAM MODULE (240pin-SODIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
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
					HMP125S6EFR8-S5	FBGA (60ball)	2	30mm	Now
	1GB	128Mx64	64Mx16	DDR2 800-555	HYMP112S64CP6-S5	FBGA (60ball)	2	30mm	Now
					HMP112S6EFR6-S5	FBGA (60ball)	2	30mm	Now
			128Mx8	DDR2 667-555	HYMP512S64CP8-Y5	FBGA (60ball)	2	30mm	Now

"Not all products are listed here. Please contact local sales administrator for the complete list of products."

Main Memory Product Line-up

DDR3 SDRAM MODULE (240pin-UDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
1.5V	4GB	512Mx64	256Mx8	1333-999	HMT351U6MFR8C-H9	FBGA (82ball)	2	30mm	Now
					HMT351U6AFR8C-H9	FBGA (82ball)	2	30mm	Now
		512Mx72	256Mx8	1333-999	HMT351U7MFR8C-H9	FBGA (82ball)	2	30mm	Now
					HMT351U7AFR8C-H9	FBGA (82ball)	2	30mm	Now
	2GB	256Mx64	128Mx8	1333-999	HMT125U6AFP8C-H9	FBGA (78ball)	2	30mm	Now
					HMT125U6BFR8C-H9	FBGA (78ball)	2	30mm	Now
		256Mx72	128Mx8	1333-999	HMT125U7AFP8C-H9	FBGA (78ball)	2	30mm	Now
					HMT125U7BFR8C-H9	FBGA (78ball)	2	30mm	Now
	1GB	128Mx64	128Mx8	1333-999	HMT112U6AFP8C-H9	FBGA (78ball)	1	30mm	Now
					HMT112U6BFR8C-H9	FBGA (78ball)	1	30mm	Now
		128Mx72	128Mx8	1333-999	HMT112U7AFP8C-H9	FBGA (78ball)	1	30mm	Now
					HMT112U7BFR8C-H9	FBGA (78ball)	1	30mm	Now

DDR3 SDRAM MODULE (240pin-RDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
1.5V	16GB	2Gx72	1Gx4 (DDP)	1066-777	HMT42GR7AMR4C-G7	FBGA (82ball)	4	30mm	Q3 '09
			512Mx8	1333	HMT42GR7AUP4C-HE	FBGA (82ball)	2	30mm	Q3 '09
			(MetaRAM DDP)	1066	HMT42GR7AUP4C-GC	FBGA (82ball)	2	30mm	Q3 '09
	8GB	1Gx72	512Mx4 (Planar)	1333-999	HMT31GR7AFR4C-H9	FBGA (82ball)	2	30mm	June '09
			256Mx8	1066-777	HMT31GR7AFR8C-G7	FBGA (82ball)	4	30mm	June '09
			512Mx4 (DDP)	1066-777	HMT31GR7AMP4C-G7	FBGA (78ball)	4	30mm	Now
					HMT31GR7BMR4C-G7	FBGA (78ball)	4	30mm	April '09
			256Mx8 (MetaRAM DDP)	1333	HMT31GR7AUP4C-HF	FBGA (78ball)	2	30mm	May '09
				1066	HMT31GR7AUP4C-GC	FBGA (78ball)	2	30mm	Now
	4GB	512Mx72	256Mx8	1333-999	HMT351R7AFR8C-H9	FBGA (82ball)	2	30mm	June '09
			128Mx8	1066-777	HMT151R7AFP8C-G7	FBGA (78ball)	4	30mm	Now
					HMT151R7BFR8C-G7	FBGA (78ball)	4	30mm	Now
			256Mx4	1333-999	HMT151R7AFP4C-H9	FBGA (78ball)	2	30mm	Now
					HMT151R7BFR4C-H9	FBGA (78ball)	2	30mm	Now
	2GB	256Mx72	256Mx4	1333-999	HMT125R7AFP4C-H9	FBGA (78ball)	1	30mm	Now
					HMT125R7BFR4C-H9	FBGA (78ball)	1	30mm	Now
			256Mx8	1333-999	HMT325R7AFR8C-H9	FBGA (82ball)	1	30mm	June '09
			128Mx8	1333-999	HMT125R7AFP8C-H9	FBGA (78ball)	1	30mm	Now
					HMT125R7BFR8C-H9	FBGA (78ball)	1	30mm	Now
			256Mx8	1066-777	HMT325R7AFR8C-G7	FBGA (82ball)	1	30mm	June '09
			128Mx8	1066-777	HMT125R7AFP8C-G7	FBGA (78ball)	1	30mm	Now
					HMT125R7BFR8C-G7	FBGA (78ball)	1	30mm	Now

DDR3 SDRAM MODULE (240pin-VLP RDIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
1.5V	8GB	1Gx72	1Gx4 (DDP)	1066-777	HMT41GV7AMR4C-G7	FBGA (82ball)	4	18.75mm	Q3 '09
	4GB	512Mx72	512Mx4 (DDP)	1333-999	HMT351V7AMP4C-H9	FBGA (78ball)	2	18.75mm	Now
					HMT351V7BMR4C-H9	FBGA (78ball)	2	18.75mm	Apr '09
			256Mx8 (DDP)	1066-777	HMT351V7AMR8C-G7	FBGA (78ball)	4	18.75mm	Now
					HMT351V7BMR8C-G7	FBGA (78ball)	4	18.75mm	Apr '09
			512Mx4 (Planar)	1333-999	HMT351V7AFR8C-H9	FBGA (82ball)	2	18.75mm	Q3 '09
	2GB	256Mx72	256Mx4	1333-999	HMT125V7AFP4C-H9	FBGA (78ball)	1	18.75mm	Now
					HMT125V7BFR4C-H9	FBGA (78ball)	1	18.75mm	Now
	2GB	256Mx72	128Mx8	1333-999	HMT125V7AFP8C-H9	FBGA (78ball)	2	18.75mm	Now
					HMT125V7BFR8C-H9	FBGA (78ball)	2	18.75mm	Now

DDR3 SDRAM MODULE (240pin-SODIMM)

VDD	MODULE DENSITY	MODULE ORG.	BASED COM.	SPEED	PART NUMBER	COMPONENT PKG.	#OF RANK	HEIGHT	AVAIL.
1.5V	4GB	512Mx64	256Mx8	1333-999	HMT351S6AFR8C-H9	FBGA (82ball)	2	30mm	Q3 '09
	2GB	256Mx64	128Mx8	1333-999	HMT125S6AFP8C-H9	FBGA (78ball)	2	30mm	Now
					HMT125S6BFR8C-H9	FBGA (78ball)	2	30mm	Now
	1GB	128Mx64	64Mx16	1333-999	HMT112S6AFP6C-H9	FBGA (96ball)	2	30mm	Now
					HMT112S6BFR6C-H9	FBGA (96ball)	2	30mm	Now

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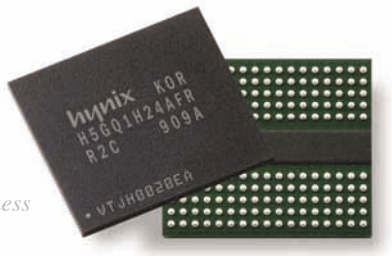
The information in this product brochure is subject to change. Up to date information on our products and technologies may be obtained from our website. www.hynix.com

Graphics Memory



Experience the Richness of Entertainment

54nm 1Gb GDDR5 General Information

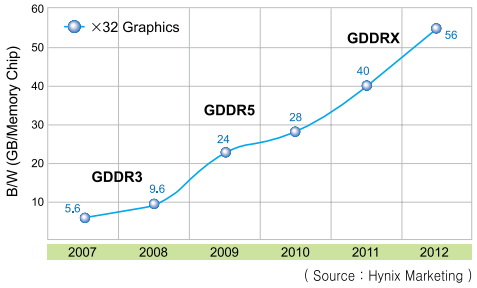
Product	1Gb GDDR5 (54nm Tech)
Bit Organization	16Bank × 2Mbit × 32 I/O 16Bank × 4Mbit × 16 I/O
Op. Frequency	Up to 7Gbps
Power Supply	VDD(Q) = 1.5V
Package	FBGA 170 ball (12mm × 14mm)
Interface	POD_15
Function	Refresh : 8192 cycle / 32ms CL = 5 ~ 20, BL = 8 Burst Type : Sequential Data Mask @ Write

General Description

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

Last November Hynix introduced the world's fastest 1Gb GDDR5 Graphics DRAM. The newly introduced 1Gb GDDR5 is built on the company's leading edge 54 nm process technology. It operates at 7Gbps which is 40% improvement compared to 66nm 5Gbps GDDR5, and processes up to 28GB/s (Gigabyte per seconds). It is also designed to minimize power consumption at 1.35V power supply. This product is ideal in high-end applications including high-end PC and next generation game consoles which require higher graphic performance and quality to deliver a rich entertainment experience to the end user.

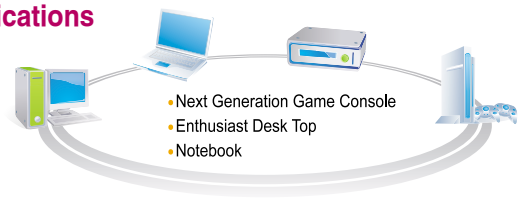
Hynix also supports GDDR3, DDR3 and DDR2 products for performance and mainstream markets.
Hynix will contribute more values for our customers success with the higher performance, quality and technology leadership.



(Source : Hynix Marketing)

Picture 1. **Graphic Memory Bandwidth Trend**

Applications



Graphics Product Spec. Comparison

Features	DDR2	DDR3	GDDR3	GDDR5
VDD	1.8V	1.5V / 1.8V	1.8V	1.35V / 1.5V
Burst length	4 / 8	4 / 8	4 / 8	8 only
Package	84 ball FBGA	96 ball FBGA	136 ball FBGA	170 ball FBGA
Density	512M / 1G	512M / 1G	512M / 1G	512M / 1G
I / O	X16	X16	X32	X32 / X16
Banks	4(512M) / 8(1G)	8	4 / 8	8 / 16
BST	No	No	Yes	Yes
Data rate	DDR to CLK	DDR to CLK	DDR to CLK	DDR to WCLK / QDR to CLK
Command rate	SDR	SDR	SDR	SDR
Address rate	SDR	SDR	SDR	DDR

Graphics Memory Product Line-up

GRAPHICS DDR2 SDRAM

DENSITY	ORG.	SPEED	PART NUMBER	PKG.	FEATURE	AVAIL.
1Gb	64M×16	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	32M×16	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
256Mb	16M×16	600MHz (1.6ns)	HY5PS561621BFP-16	FBGA (84ball)	4Bank, 2.0V / 2.0V	Now
		500MHz (2.0ns)	HY5PS561621BFP-2	FBGA (84ball)	4Bank, 2.0V / 2.0V	Now
		500MHz (2.0ns)	HY5PS561621BFP-2L	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now
		450MHz (2.2ns)	HY5PS561621BFP-22	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now
		400MHz (2.5ns)	HY5PS561621BFP-25	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now
		350MHz (2.8ns)	HY5PS561621BFP-28	FBGA (84ball)	4Bank, 1.8V / 1.8V	Now

GRAPHICS DDR3 SDRAM

DENSITY	ORG.	SPEED	PART NUMBER	PKG.	FEATURE	AVAIL.
1Gb	64M×16	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
512Mb	32M×16	1,000MHz (1.0ns)	H5TS5163MFR-N0C	FBGA (96ball)	4Bank, 1.8V / 1.8V	Now
		900MHz (1.1ns)	H5TS5163MFR-11C	FBGA (96ball)	4Bank, 1.8V / 1.8V	Now
		800MHz (1.2ns)	H5TS5163MFR-12C	FBGA (96ball)	4Bank, 1.8V / 1.8V	Now
		700Mhz (1.4ns)	H5TS5163MFR-14C	FBGA (96ball)	4Bank, 1.8V / 1.8V	Now
		800MHz (1.2ns)	H5TQ5163MFR-12C	FBGA (96ball)	4Bank, 1.5V / 1.5V	Now
		700Mhz (1.4ns)	H5TQ5163MFR-14C	FBGA (96ball)	4Bank, 1.5V / 1.5V	Now
		600MHz (1.6ns)	H5TQ5163MFR-16C	FBGA (96ball)	4Bank, 1.5V / 1.5V	Now
		500MHz (2.0ns)	H5TQ5163MFR-20C	FBGA (96ball)	4Bank, 1.5V / 1.5V	Now

GRAPHICS GDDR3 SDRAM

DENSITY	ORG.	SPEED	PART NUMBER	PKG.	FEATURE	AVAIL.
1Gb	32M×32	1,300MHz (0.77ns)	H5RS1H23MFR-N3C	FBGA (136ball)	8banks, 1.9V / 1.9V	Now
		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	16M×32	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

GRAPHICS GDDR5 SDRAM

DENSITY	ORG.	SPEED	PART NUMBER	PKG.	FEATURE	AVAIL.
1Gb	32M×32	6.0Gbps	H5GQ1H24AFR-R0C	FBGA (170ball)	16Bank, TBD	Q2 '09
		5.5Gbps	H5GQ1H24AFR-T3C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Q2 '09
		5.0Gbps	H5GQ1H24AFR-T2C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Q2 '09
		4.5Gbps	H5GQ1H24AFR-T1C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Q2 '09
		4.0Gbps	H5GQ1H24AFR-T0C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Q2 '09
		4.5Gbps	H5GQ1H24MJ(F)R-T1C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Now
		4.0Gbps	H5GQ1H24MJ(F)R-T0C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Now
		3.6Gbps	H5GQ1H24MJ(F)R-N8C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Now
		3.2Gbps	H5GQ1H24MJ(F)R-N6C	FBGA (170ball)	16Bank, 1.5V / 1.5V	Now
512Mb	16M×32	4.5Gbps	H5GQ5223MFR-T1C	FBGA (170ball)	8Bank, 1.5V / 1.5V	Now
		4.0Gbps	H5GQ5223MFR-T0C	FBGA (170ball)	8Bank, 1.5V / 1.5V	Now
		3.6Gbps	H5GQ5223MFR-N8C	FBGA (170ball)	8Bank, 1.5V / 1.5V	Now
		3.2Gbps	H5GQ5223MFR-N6C	FBGA (170ball)	8Bank, 1.5V / 1.5V	Now

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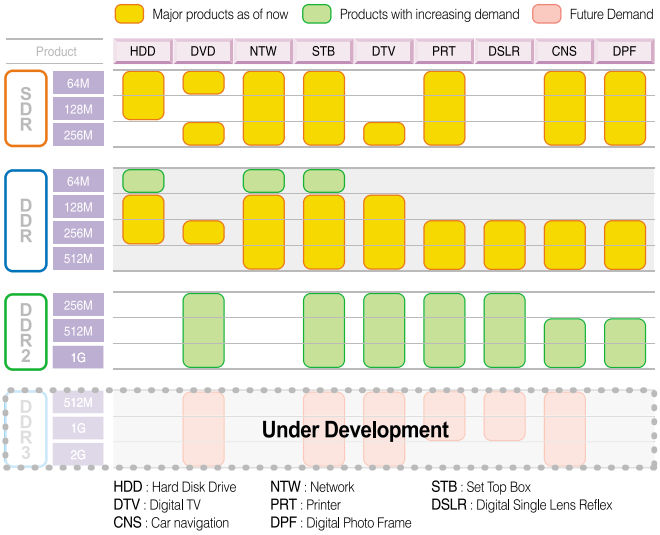
Consumer Memory

General Description

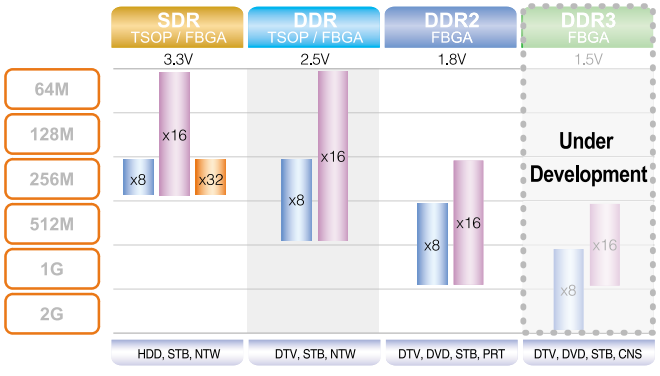
We now live in the Digital Era. Digital televisions, DVD and Set-Top Box give us rich entertainment, while Car navigation systems provide comfort and convenience. All of these digital consumer appliances need semiconductor memory for performance improvement, power savings and size reduction.
Hynix has 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 64Mb~256Mb densities, packaged in TSOP-II & FBGA offered at industrial range temperature range of -40°C to 85°C and featuring very low power consumption. DDR & DDR2 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, SDRAM has been replaced by DDR & DDR2 SDRAM technologies.

Sometimes, the most important things may 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 Usage Map



Consumer DRAM Readiness



※ All products above are supporting Industrial Temperature as - 40℃ ~ 85℃ & Low power part

Good things come in small packages!

Consumer Memory Product Line-up

SDR SDRAM

DENSITY	ORG.	PART NUMBER	SPEED	POWER	PKG.	VOL.	AVAIL.
64Mb	x16	HY57V641620FTP	5 / 6 / 7 / H	Normal / Low	TSOP	3.3V	Now
	x16	HY57V66FFP	5 / 6 / 7 / H	Normal / Low	FBGA	3.3V	Now
	x16	HY5V66FF6P	5 / 6 / 7 / H	Normal Power	FBGA	3.3V	Now
	x16	H57V6462GTR	50 / 60 / 75 / A3	Normal Power	TSOP	3.3V	Q3 '09
	x16	H57V6462GFR	50 / 60 / 75 / A3	Normal Power	FBGA	3.3V	Q3 '09
128Mb	x16	HY57V281620FTP	5 / 6 / 7 / H	Normal / Low	TSOP	3.3V	Now
	x16	HY5V26FFP	5 / 6 / 7 / H	Normal / Low	FBGA	3.3V	Now
	x16	H57V1262GTR	50 / 60 / 75 / A3	Normal Power	TSOP	3.3V	Q3 '09
	x16	H57V1262GFR	50 / 60 / 75 / A3	Normal Power	FBGA	3.3V	Q3 '09
256Mb	x8	HY57V56820FTP	6 / H	Normal / Low	TSOP	3.3V	Now
	x16	HY57V561620FTP	6 / H	Normal / Low	TSOP	3.3V	Now
	x16	HY5V56FFP	6 / H	Normal / Low	FBGA	3.3V	Now
	x32	HY5V52AFP	6 / H	Normal / Low	FBGA	3.3V	Now
	x8	H57V2582GTR	50 / 60 / 75 / A3	Normal Power	TSOP	3.3V	Q3 '09
	x16	H57V2562GTR	50 / 60 / 75 / A3	Normal Power	FBGA	3.3V	Q3 '09
	x16	H57V2562GFR	50 / 60 / 75 / A3	Normal Power	FBGA	3.3V	Q3 '09

DDR SDRAM

DENSITY	ORG.	PART NUMBER	SPEED	POWER	PKG.	VOL.	AVAIL.
64Mb	x16	H5DU6462CTR	J / D43 / D5	Normal / Low	TSOP	2.5V	Now
	x16	H5DU6462CFR	J / D43 / D5	Normal / Low	FBGA	2.5V	Now
128Mb	x16	HY5DU281622FTP	4 / 5 / D43 / D4 / J / H	Normal / Low	TSOP	2.5V	Now
	x16	H5DU1262GTR	F4 / E3 / E4 / J3 / K2 / K3	Normal / Low	TSOP	2.5V	Q2 '09
	x16	H5DU1262GFR	F4 / E3 / E4 / J3 / K2 / K3	Normal / Low	FBGA	2.5V	Q2 '09
256Mb	x8	HY5DU568822FTP	4 / D43 / J	Normal / Low	TSOP	2.5V	Now
	x16	HY5DU561622FTP	4 / D43 / J	Normal / Low	TSOP	2.5V	Now
	x16	HY5DU561622FFP	4 / D43 / J	Normal / Low	FBGA	2.5V	Now
	x8	H5DU2582GTR	F4 / E3 / E4 / J3 / K2 / K3	Normal Power	TSOP	2.5V	Q3 '09
	x16	H5DU2562GFR	F4 / E3 / E4 / J3 / K2 / K3	Normal Power	FBGA	2.5V	Q3 '09
	x8	H5DU2582GTR	F4 / E3 / E4 / J3 / K2 / K3	Normal Power	TSOP	2.5V	Q3 '09
	x16	H5DU2562GFR	F4 / E3 / E4 / J3 / K2 / K3	Normal Power	FBGA	2.5V	Q3 '09
512Mb	x8	HY5DU128822DTP	D43 / J / K / H / L	Normal Power	TSOP	2.5V	Now
	x8	HY5DU12822DFP	D43 / J / K / H / L	Normal Power	FBGA	2.5V	Now
	x16	HY5DU121622DTP	D43 / J / K / H / L	Normal Power	TSOP	2.5V	Now
	x16	HY5DU121622DFP	D43 / J / K / H / L	Normal Power	FBGA	2.5V	Now
	x8	H5DU5182ETR	F4 / E3 / E4 / J3 / K2 / K3	Normal Power	TSOP	2.5V	Q4 '09
	x8	H5DU5182EFR	F4 / E3 / E4 / J3 / K2 / K3	Normal Power	FBGA	2.5V	Q4 '09
	x16	H5DU5162ETR	F4 / E3 / E4 / J3 / K2 / K3	Normal Power	TSOP	2.5V	Q4 '09
	x16	H5DU5162EFR	F4 / E3 / E4 / J3 / K2 / K3	Normal Power	FBGA	2.5V	Q4 '09

DDR2 SDRAM

DENSITY	ORG.	PART NUMBER	SPEED	POWER	PKG.	VOL.	AVAIL.
256Mb	x16	HY5P5561621BFP	E3 / C4 / Y5 / S5	Normal / Low	FBGA	1.8V	Now
	x16	HY5P5561621BFR	E3 / C4 / Y5 / S5	Normal / Low	FBGA	1.8V	Now
512Mb	x8	HY5PS12821CFP	E3 / C4 / Y4 / Y5 / S5	Normal / Low	FBGA	1.8V	Now
	x8	H5PS5182FFR	E3 / C4 / Y4 / Y5 / S5	Normal / Low	FBGA	1.8V	Now
	x16	HY5PS121621CFP	E3 / C4 / Y4 / Y5 / S5	Normal / Low	FBGA	1.8V	Now
	x16	H5PS5162FFR	E3 / C4 / Y4 / Y5 / S5 / G7	Normal / Low	FBGA	1.8V	Now
1Gb	x8	HY5PS1G831CFP	E3 / C4 / Y5 / S5	Normal / Low	FBGA	1.8V	Now
	x8	H5PS1G83EFR	E3 / C4 / Y5 / S5	Normal / Low	FBGA	1.8V	Now
	x16	HY5PS1G1631CFP	E3 / C4 / Y5 / S5	Normal / Low	FBGA	1.8V	Now
	x16	H5PS1G63EFR	E3 / C4 / Y5 / S5 / G7	Normal / Low	FBGA	1.8V	Now
2Gb	x16	H5PS2G63EMR	Y5 / S5	Normal / Low	FBGA	1.8V	Q3 '09

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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

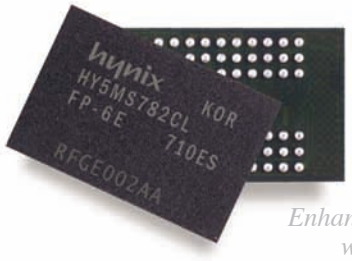
- **Broad Product Line:** SDR / DDR, x16 / x32 organizations, 128Mb to 2Gb densities
- **Diverse Packaging Options:** Discrete, KGD (Known Good Die), MCP (Multi Chip Package), PoP (Package on Package), Ci-MCP (Card Interface MCP)
- **Small Form Factor Packages:** For use in the most space-constrained handheld applications
- **Low Power Features:** Programmable Drive strength, Partial Array Self Refresh, Auto Temperature Compensated Self Refresh mode
- **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

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

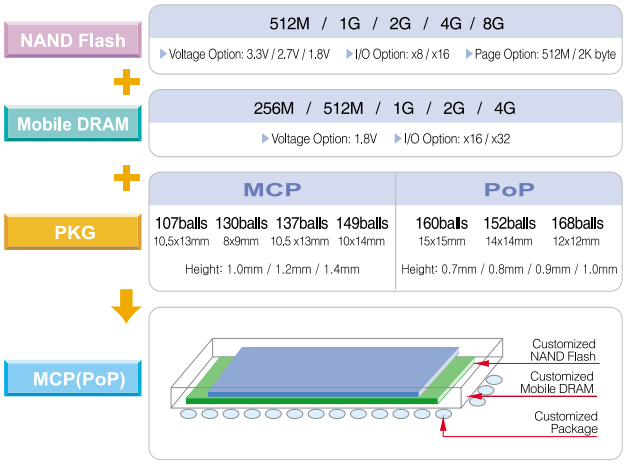
e-NAND

- e-NAND : Combination of NAND Flash and the Flash Controller with MMC interface, in a single package
- Simple read/write memory using standard MMC 4.2 protocol interface.
- No additional firmware for NAND management required
- Controller includes NAND software such as FTL, ECC, FAT-16/32

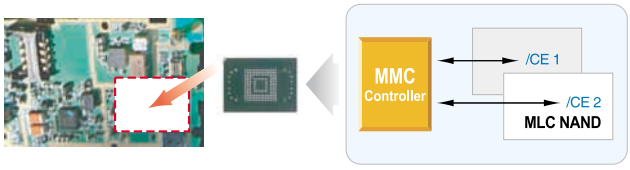


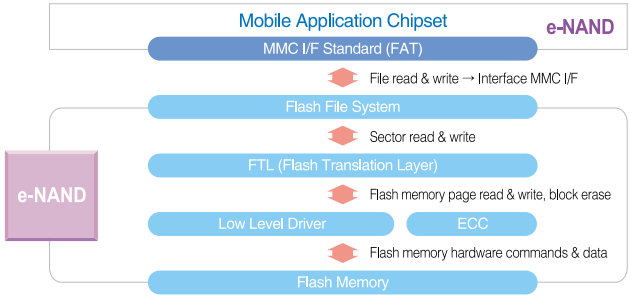
Enhanced Mobility with Small Components!

MCP Line-up



e-NAND Introduction & Concept





Mobile Memory Product Line-up

MOBILE SDR

DENSITY	ORG.	PART NUMBER	SPEED	VOL.	PKG.	AVAIL.
2G	128M×16	H55S2G62MFR-60M	166MHz (6.0ns)	1.8V	FBGA(54ball) / KGD	Now
	64M×32	H55S2G22MFR-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
	64M×32 (reduced page)	H55S2G32MFR-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
1G	64M×16	H55S1G62MFP-60M	166MHz (6.0ns)	1.8V	FBGA(54ball) / KGD	Now
	32M×32	H55S1G22MFP-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
	32M×32 (reduced page)	H55S1G32MFP-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
512Mb	32M×16	HY5S7B6ALFP-6E	166MHz (6.0ns)	1.8V	FBGA(54ball) / KGD	Now
	16M×32	HY5S7B2ALFP-6E	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
	32M×16	H55S5162DFR-60M	166MHz (6.0ns)	1.8V	FBGA(54ball) / KGD	Now
	16M×32	H55S5122DFR-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
	16M×32 (reduced page)	H55S5132DFR-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
256Mb	16M×16	HY5S5B6HLFP-6E	166MHz (6.0ns)	1.8V	FBGA(54ball) / KGD	Now
	8M×32	HY5S5B2CLFP-6E	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
	16M×16	H55S2562JFR-60M	166MHz (6.0ns)	1.8V	FBGA(54ball) / KGD	Now
	8M×32	H55S2622JFR-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
	8M×32 (reduced page)	H55S2532JFR-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now
128Mb	8M×16	H55S1262EFP-60M	166MHz (6.0ns)	1.8V	FBGA(54ball) / KGD	Now
	4M×32	H55S1222EFP-60M	166MHz (6.0ns)	1.8V	FBGA(90ball) / KGD	Now

MOBILE DDR

DENSITY	ORG.	PART NUMBER	SPEED	VOL.	PKG.	AVAIL.
2Gb	128M×16	H5MS2G62MFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(60ball) / KGD	Now
	64M×32	H5MS2G22MFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now
	64M×32 (reduced page)	H5MS2G32MFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now
1Gb	64M×16	H5MS1G62MFP-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(60ball) / KGD	Now
	32M×32	H5MS1G22MFP-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now
	32M×32 (reduced page)	H5MS1G32MFP-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now
512Mb	32M×16	HY5MS7B6BLFP-6E	DDR333	1.8V	FBGA(60ball) / KGD	Now
	16M×32	HY5MS7B2BLFP-6E	DDR333	1.8V	FBGA(90ball) / KGD	Now
	32M×16	H5MS5162DFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(60ball) / KGD	Now
	16M×32	H5MS5122DFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now
	16M×32 (reduced page)	H5MS5132DFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now
256Mb	16M×16	HY5MS5B6BLFP-6E	DDR333	1.8V	FBGA(60ball) / KGD	Now
	8M×32	HY5MS5B2ALFP-6E	DDR333	1.8V	FBGA(90ball) / KGD	Now
	16M×16	H5MS2562JFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(60ball) / KGD	Now
	8M×32	H5MS2622JFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now
	8M×32 (reduced page)	H5MS2532JFR-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now
128Mb	8M×16	H5MS1262EFP-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(60ball) / KGD	Now
	4M×32	H5MS1222EFP-J3M / E3M	DDR333 / DDR400	1.8V	FBGA(90ball) / KGD	Now

The information in this product brochure is subject to change. Up to date information on our products and technologies may be obtained from our website. www.hynix.com

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, ULGA 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 application 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.

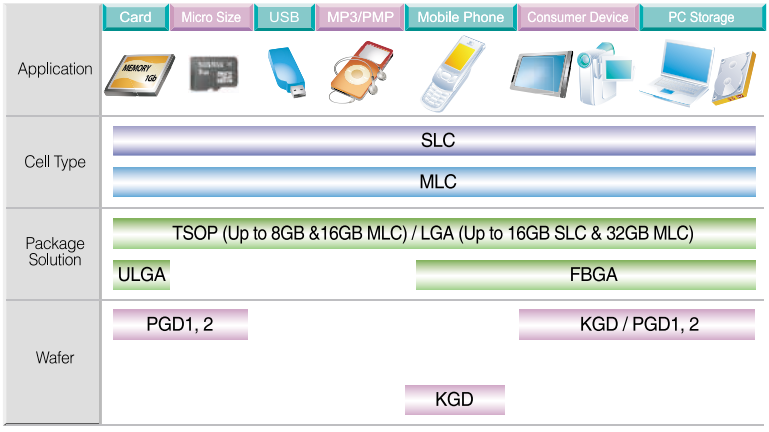
NAND Flash Key Features

Product		48nm 16Gb MLC	41nm 32Gb MLC	3xnm 32Gb MLC
Voltage		3.3V	3.3V	3.3V
Organization		×8	×8	×8
Page & Block size (byte)		4KB + 128B / 512KB	4KB + 224B / 512KB	8KB + 436B / 1MB
tRC (min.) / tWC (min.) 25ns		25ns	25ns	30ns
tR (max)		60us	60us	400us(max)
Program time (typ)		< 800us	1000us(TBD)	1600us(TBD)
Erase time (typ)		2.5ms	2.5ms	1.5ms
Operating Current (ICC)	MONO / DDP	15(typ.) ~ 30mA(max)	20(typ.) ~ 40mA(max)	30(typ.) ~ 50mA(max)
	QDP / DSP	20(typ.) ~ 40mA(max)	20(typ.) ~ 40mA(max)(TBD)	30(typ.) ~ 50mA(max)
Function	Copy-back	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	Extended Data Out	O	O	O
	OTP	O	O	O
	Unique ID	O	O	O

Endurance / PKG

E/W Cycles / Retention	5K / 10years	5K / 10years	TBD
NOP	1	1	TBD
PKG	TSOP / ULGA / DSP	VLGA	VLGA(TBD)

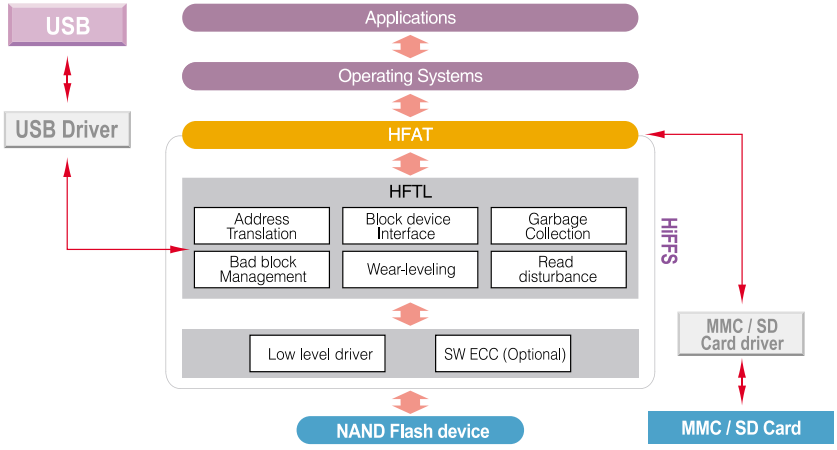
NAND Flash Application



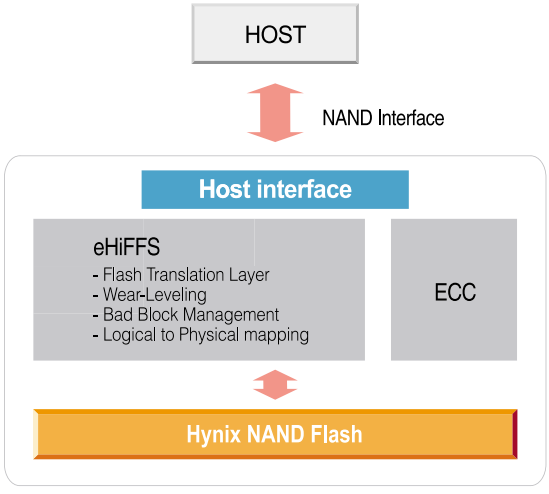
Software Support

HiFFS Software

- The management of data on NAND Flash memory is complicated due to limitations of NAND Flash memory.
- One of the most important limitations of NAND Flash memory is the inability to rewrite data without block erase.
- HiFFS Software solution is required to compensate for erase cycle limitations. Additionally, it extends the life of Hynix NAND Flash with wear-leveling algorithms.
- eHiFFS is the software solution for mobile embedded systems. It is an essential system software for consumer applications including Smart phones, PDAs, MP3 player, PMPs, Digital TVs and Digital Camcoders.



eHiFFS Software



eHiFFS software supports partition manager, logical to physical mapping, wear-leveling, bad block management and prevents read disturbance.

➡ **High Performance / High Reliability / Ease of Portability**

- **Host Interface**
  - Supports various host interfaces (ONFI BA, LBA, eMMC etc...)
  - Option for additional features
- **Robust Flash Management with Hynix proprietary Software (eHiFFS)**
- **High performance interface optimized for Hynix NAND Flash**

NAND Flash Storage
for Fun and Excitement!

NAND Flash Product Line-up

SLC

PRODUCT	TECH	CELL	DENSITY	BLOCK SIZE	STACK	VCC/ORG	PACKAGE	AVAILABILITY	REMARK
HY27US08281A	90nm	SLC	128Mb	16KB	Mono	3.3V / x8	TSOP / USOP	NOW	EOL DEC '10
HY27US08561A	90nm		256Mb	16KB	Mono	3.3V / x8	TSOP / USOP / FBGA	NOW	EOL DEC '10
HY27US08121B	70nm		512Mb	16KB	Mono	3.3V / x8	TSOP / USOP / FBGA	NOW	EOL DEC '09
H27U518S2C	57nm		512Mb	16KB	Mono	3.3V / x8	TSOP	Dec '08	EOL DEC '10
HY27US081G1M	70nm		1Gb	16KB	Mono	3.3V / x8	USOP	NOW	EOL DEC '09
HY27US081G1A	57nm		1Gb	16KB	Mono	3.3V / x8	TSOP	NOW	EOL DEC '10
HY27UF081G2A	70nm		1Gb	128KB	Mono	3.3V / x8	TSOP / USOP / FBGA	NOW	EOL DEC '09
HY27US081G2A	70nm		1Gb	128KB	Mono	1.8V / x8	FBGA	NOW	EOL DEC '09
H27U1G8F2B	48nm		1Gb	128KB	Mono	3.3V / x8	TSOP	Dec '08	EOL DEC '11
HY27UF082G2B	57nm		2Gb	128KB	Mono	3.3V / x8	TSOP / FBGA	NOW	EOL Jun '10
HY27UF084G2B	57nm		4Gb	128KB	Mono	3.3V / x8	TSOP	NOW	EOL Jun '10
HY27UG088G5(D)B	57nm		8Gb	128KB	DDP	3.3V / x8	TSOP / LGA	NOW	2CE / Dual CH.
HY27UH08AG5B	57nm		16Gb	128KB	QDP	3.3V / x8	TSOP	NOW	2CE
H27UAG8F2M	41nm		16Gb	256KB (4KB Page)	Mono	3.3V / x8	ULGA	May '09	
H27UBG8G2M	41nm		32Gb	256KB (4KB Page)	DDP	3.3V / x8	ULGA	Jun '09	2CE
H27UCG8H2M	41nm		64Gb	256KB (4KB Page)	QDP	3.3V / x8	ULGA	Jun '09	2CE

MLC / TLC

PRODUCT	TECH	CELL	DENSITY	BLOCK SIZE	STACK	VCC/ORG	PACKAGE	AVAILABILITY	REMARK
HY27UT084G2A	57nm	MLC	4Gb	256KB	Mono	3.3V / x8	TSOP	NOW	
HY27UT088G2A	57nm		8Gb	256KB	Mono	3.3V / x8	TSOP	NOW	
H27U8G8T2B	48nm		8Gb	512KB	Mono	3.3V / x8	TSOP	NOW	
HY27UU08AG5A	57nm		16Gb	256KB	DDP	3.3V / x8	TSOP	NOW	2CE
H27UAG8T2M	48nm		16Gb	512KB (4KB Page)	Mono	3.3V / x8	TSOP / VLGA	NOW	
H27UAG8T2A	41nm		16Gb	512KB (4KB Page)	Mono	3.3V / x8	TSOP / ULGA	Apr ' 09	
HY27UV08BG5A	57nm		32Gb	256KB	QDP	3.3V / x8	TSOP	NOW	2CE
H27UBG8U5M	48nm		32Gb	512KB (4KB Page)	DDP	3.3V / x8	TSOP	NOW	2CE
H27UBG8T2M	41nm		32Gb	512KB (4KB Page)	Mono	3.3V / x8	VLGA	NOW	
HY27UW08CGFA	57nm		64Gb	256KB	DSP	3.3V / x8	TSOP DSP	NOW	4CE
H27UCG8V5M	48nm		64Gb	512KB (4KB Page)	QDP	3.3V / x8	TSOP / VLGA	NOW	2CE
H27UCG8UDM	41nm		64Gb	512KB (4KB Page)	DDP	3.3V / x8	VLGA	Now	Dual CH.
H27UDG8WFM	48nm		128Gb	512KB (4KB Page)	ODP	3.3V / x8	LSOP	NOW	4CE
H27UDG8WFMTR-BC	48nm		128Gb	512KB (4KB Page)	DSP	3.3V / x8	TSOP DSP	NOW	4CE
H27UDG8YFMXR-BC	48nm		128Gb	512KB (4KB Page)	ODP	3.3V / x8	LLGA	NOW	4CE
H27UDG8VEM	41nm		128Gb	512KB (4KB Page)	QDP	3.3V / x8	VLGA	Now	4CE, Dual CH.
H27UEG8YEM	41nm		256Gb	512KB (4KB Page)	ODP	3.3V / x8	LLGA	Apr ' 09	4CE, Dual CH.
H2EUCG8N11YR-C	48nm		64Gb	768KB (192 Block)	DDP	3.3V / x8	VLGA	Mar ' 09	Emulated NAND
H2EUDG8P11XR-C	48nm		128Gb	768KB (192 Block)	QDP	3.3V / x8	LLGA	Mar ' 09	Emulated NAND
H27UCG8H2M	41nm	TLC	64Gb	256KB (4KB Page)	QDP	3.3V / x8	ULGA	Jun '09	2CE

uSD

PRODUCT	DENSITY	NAND COMPONENT			SPEC.	uSD CLASS	AVAILABILITY	EOL
		TECH.	DENSITY	STACK				
H24U51TM2ARH	512MB	57nm	4Gb	Mono	SD2.0	Class-2	Aug '09	Aug '09
H24U51TM3BRH		48nm	4Gb	Mono	SD2.0	Class-4	TBD	TBD
H24U1GTM1MRQ	1GB	57nm	8Gb	Mono	SD2.0	Class-2	Jun '09	Jun '09
H24U1GTM3ARH		48nm	8Gb	Mono	SD2.0	Class-4	TBD	TBD
H24U2GUM1MRQ	2GB	57nm	8Gb	DDP	SD2.0	Class-2	Jun '09	Jun '09
H24U2GUM3ARH		48nm	8Gb	DDP	SD2.0	Class-6	TBD	TBD
H24U2GTM3BRH		41nm	16Gb	Mono	SD2.0	Class-6 (TBD)	TBD	TBD
H24U4GVM3MRH	4GB	48nm	8Gb	QDP	SD2.0	Class-6	TBD	TBD
H24U4GUM3ARH		41nm	16Gb	DDP	SD2.0	Class-6 (TBD)	TBD	TBD
H24U8GVM3MRH	8GB	41nm	16Gb	QDP	SD2.0	Class-6 (TBD)	TBD	TBD
H24YAGVM3MRH	16GB	41nm	16Gb	ODP	SD2.0	Class-6 (TBD)	TBD	TBD

e-NAND

PRODUCT	DENSITY	NAND COMPONENT			SPEC.	AVAILABILITY
		TECH.	DENSITY	STACK		
H26M01002MAR	512MB	57nm	4Gb	Mono	MMC4.2	NOW
H26M11002MAR	1GB	60nm	8Gb	Mono	MMC4.2	NOW
H26M11002AAR	1GB	57nm	8Gb	Mono	MMC4.2	NOW
H26M11001BAR	1GB	48nm	8Gb	Mono	MMC4.3	Q2
H26M22002AAR	2GB	57nm	8Gb	DDP	MMC4.2	NOW
H26M21002BAR	2GB	48nm	16Gb	Mono	MMC4.2	Q2
H26M21001CAR	2GB	41nm	16Gb	Mono	MMC4.3	End of Q2
H26M34002MAR	4GB	60nm	8Gb	QDP	MMC4.2	NOW
H26M34002AAR	4GB	57nm	8Gb	QDP	MMC4.2	NOW
H26M32002BAR	4GB	48nm	16Gb	DDP	MMC4.2	Q2
H26M32001CAR	4GB	41nm	16Gb	DDP	MMC4.3	Q2
H26M48002MAR	8GB	57nm	8Gb	ODP	MMC4.2	NOW
H26M44002AAR	8GB	48nm	16Gb	QDP	MMC4.2	Q2.
H26M42001BAR	8GB	41nm	32Gb	DDP	MMC4.3	End of Q2
H26M54001AJR	16GB	41nm	32Gb	QDP	MMC4.3	End of Q2
H26M68001MJR	32GB	41nm	32Gb	ODP	MMC4.3	End of Q2

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CIS
(CMOS Image Sensor)

General Description

Hynix entered the CMOS Image Sensor business in 2007, to continue with its long term growth strategy. Through close cooperation with industry-leading business partners and with its expertise in the memory business, Hynix successfully introduced competitive and cost effective image sensors in the following year. Hynix aims to diversify its product portfolio by developing a wide range of higher resolution application-specific products to meet market demand.

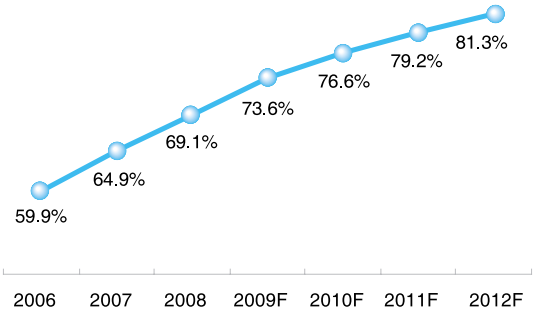
Applications

CMOS Image Sensor

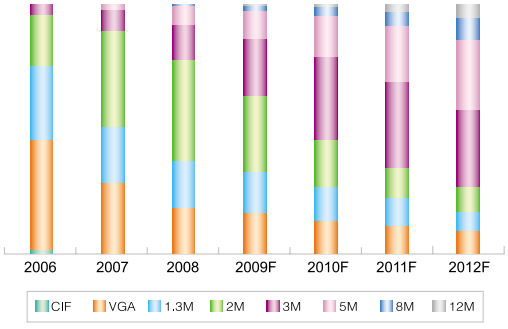
CMOS Image Sensor is a device that converts an optical image to an electrical signal using a CMOS manufacturing technology. CMOS technology allows the integration of the image sensor and digital signal processor on the same chip, resulting in faster, smaller, cost effective and lower power image sensing devices.

CMOS Image Sensor market has high growth potential, with demand expected to rise by 10 percent annually through 2011. Its main applications are camera phones, digital still cameras, and video conferencing systems, but the market for CMOS Image Sensor is rapidly diversifying into various applications including surveillance systems, automotive cameras, and medical system.

Camera Attachment Ratio of Mobile Phones



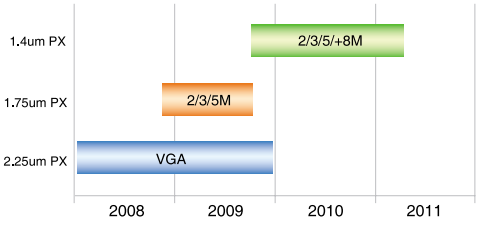
Camera Phone Resolution Trend (Main Camera)



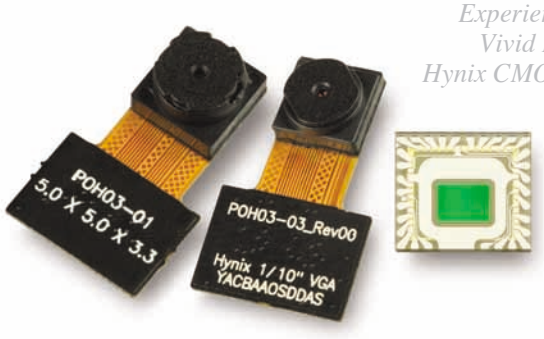
Hynix CMOS Image Sensor

Hynix is now offering CMOS Image Sensors for various consumer applications, delivering outstanding performance and providing innovative and cost-effective solutions. Hynix is continuously enhancing its technological excellence accelerating technology development to provide quality products and meet customers needs.

Hynix CMOS Image Sensor Pixel Technology Migration



Experience Clear and Vivid Images with Hynix CMOS Image Sensors



CIS(CMOS Image Sensor) Product Line-up

CMOS Image Sensor Product Lineup and Key Features

VGA (YACBAA0S)

Pixel Size	2.25um × 2.25um	Sensitivity	0.750V / LuxSec
Array Format (Active)	640H × 480V	SNR	35dB
Optical Format	1/10-inch	Dynamic Range	60dB
Imaging Area	1.44mm × 1.08mm	ADC	on-chip, 10-bit
Color Filter Array	RGB Bayer color filters	Data Rate	12 megapixels per second (master clock, 24MHz)
Scan Mode	Progressive	Programmable	Exposure, white balance, blanking, vertical blanking, color, sharpness, gamma correction, lens shading correction, X-Y image flip, zoom, windowing
Frame Rate	30-fps @ 24MHz	Supply Voltage	Digital I/O: 1.7V ~ 3.0V Digital Core: 1.7V ~ 1.9V Analog & Pixel: 2.6V ~ 3.0V
Shutter	Electronic rolling Shutter (ERS)	Power Consumption	100mW (Typical)
Automatic Function	Exposure, white balance, black level calibration, anti-flicker, color saturation, defect correction, aperture correction	Operating Temp. Range	-20℃ to 70℃
Window size	Programmable (including VGA, QVGA, CIF, QCIF)		
Flash Support	Xenon and LED		

2M (YACD5B1S)

Pixel Size	1.75um × 1.75um	Sensitivity	TBD
Optical Format	1/5-inch	SNR	32dB (est.)
Array Format (Active)	1600H × 1200V	ADC	on-chip, 10-bit
Imaging Area	2.80mm × 2.10mm	Data Rate	36 megapixels per second (Internal PLL clock = 72MHz)
Color Filter Array	RGB Bayer color filters	Programmable	Exposure, white balance, blanking, vertical blanking, color, sharpness, gamma correction, lens shading correction, X-Y image flip, zoom, windowing
Scan Mode	Progressive	Supply Voltage	Digital I/O: 1.7V ~ 3.0V Digital Core: 1.7V ~ 1.9V Analog & Pixel: 2.6V ~ 3.0V
Frame Rate	Max 15-fps @ full resolution	Power Consumption	TBD
Shutter	Electronic rolling Shutter (ERS)	Operating Temp. Range	-20℃ to 70℃
Automatic Function	Exposure, white balance, black level calibration, anti-flicker, color saturation, defect correction, aperture correction		
Window size	Programmable (including UXGA, SVGA, QSVGA)		
Flash Support	Xenon and LED		

3M (YACE4A1S)

Pixel Size	1.75um × 1.75um	SNR	32dB (est.)
Optical Format	1/4-inch	ADC	On-chip, 10-bit
Array Format (Active)	2048H × 1356V	Programmable	Exposure, white balance, blanking, vertical blanking, color, sharpness, gamma correction, lens shading correction, X-Y image flip, zoom, windowing
Imaging Area	TBD	Frame Rate	15-fps @ QXGA / 30-fps @ XGA
Color Filter Array	RGB Bayer color filters	Shutter	Electronic rolling Shutter (ERS)
Scan Mode	Progressive	Supply Voltage	Digital I/O: 1.7V ~ 3.0V Digital Core: 1.7V ~ 1.9V Analog & Pixel: 2.6V ~ 3.0V
Flash Support	Xenon and LED	Power Consumption	80mW (Active) 7μ A (Standby)
Automatic Function	Exposure, white balance, black level calibration, anti-flicker, color saturation, defect correction, aperture correction, Anti-Shaking, Auto Focus Control	Operating Temp. Range	-20℃ to 60℃
Window size	Programmable		
Sub-Sampling	1/2, 1/4		
Sensitivity	0.475V / lux-sec @ 550nm (est.)		

5M (YACF3A1C)

Pixel Size	1.75um × 1.75um	ADC	On-chip, 10-bit
Optical Format	1/3.2 inch	Dynamic Range	TBD
Array Format (Active)	2624H × 1984V	Feature	DPC, Programmable BLC, LCS, Analog / Digital Gain Control, X-Y Flip, Windowing, Sub-sampling, Scaling, Slew Rate control, Exposure Control, Xenon / LED Support
Imaging Area	4.59mm × 3.47mm	Shutter	Electronic rolling Shutter (ERS) With Global Reset Release
Color Filter Array	RGB Bayer color filters	Supply Voltage	Digital I/O: 1.6V ~ 3.1V Digital Core: 1.8V ±10% Analog & Pixel: 2.6V ~ 3.1V
Flash Support	Xenon and LED	Power Consumption	<350mW
Scan Mode	Progressive	Serial Interface	Yes
Frame Rate	15-fps @ QSXGA (Full Resolution)		
Sub Sampling	-		
Operating Temp. Range	-10℃ to 70℃		
Data Interface Format	Bayer (10-bit), MIPI		
Sensitivity	TBD		
SNR	TBD		

Global Sales Network

HEADQUARTERS & FACTORY

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