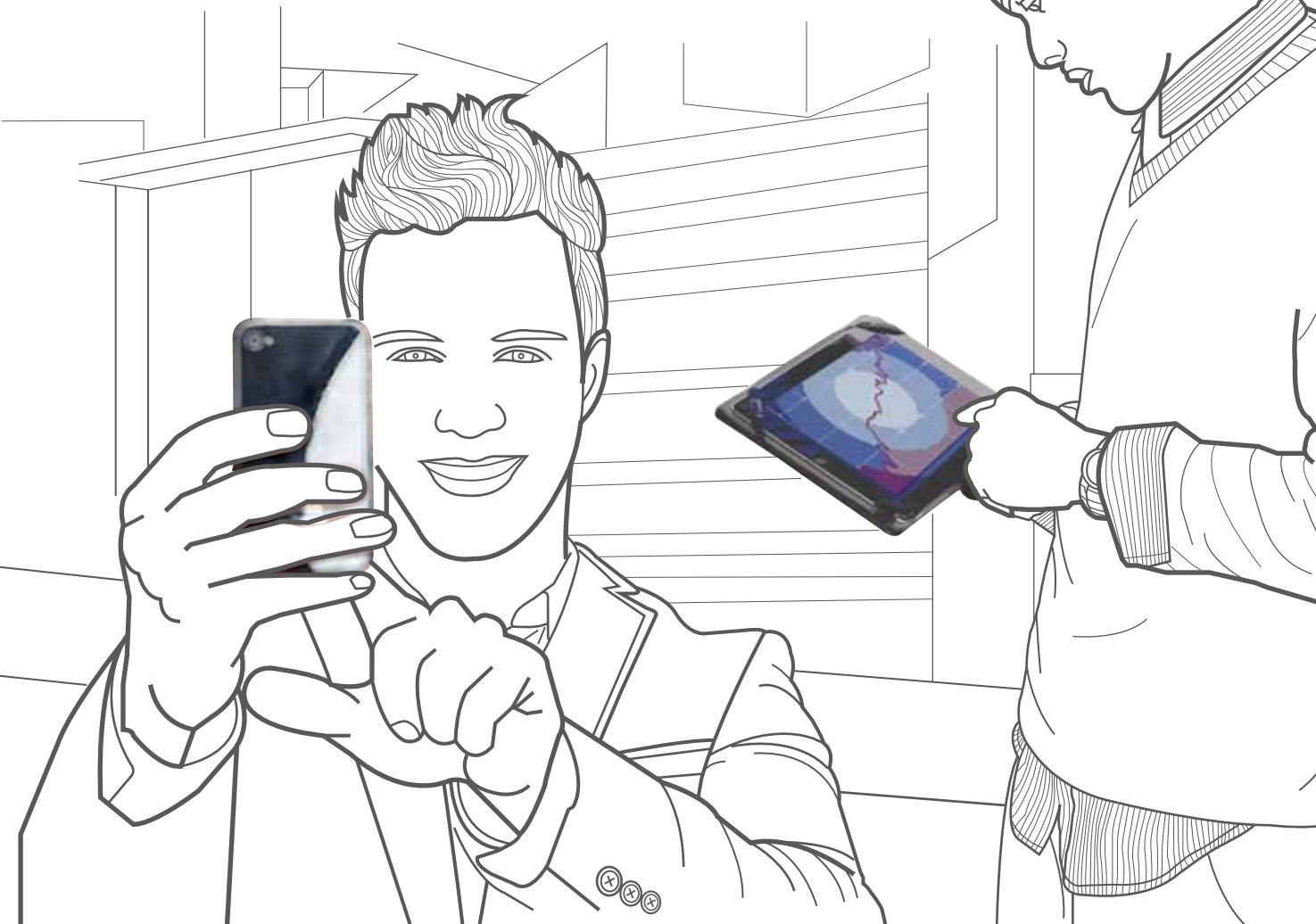# winbond

We Deliver

2014 PRODUCT SELECTION GUIDE

- Mobile DRAM
- Specialty DRAM
- Code Storage Flash Memory

Winbond Electronics Corporation is a worldwide leading supplier of specialty memory IC's. The company provides memory solution backed by the expert capabilities of design, manufacturing and sales services.

Winbond's product portfolio, consisting of Mobile DRAM, Specialty DRAM and Code Storage Flash, is widely used by tier-1 customers in consumer, communication, computer peripheral and automotive markets. Our 300 mm wafer fab keeps pace with advanced process technologies to provide high-quality memory IC products.

The Company was established in September 1987 and listed on Taiwan Stock Exchange in 1995 with headquarter in Central Taiwan Science Park, Taichung, Taiwan . Winbond also has subsidiaries in China, Hong Kong, Israel, Japan and the US.

CONTENTS

Mobile DRAM

- **Low Power SDR SDRAM**
- **Low Power DDR SDRAM**
- **Low Power DDR2 SDRAM**
- **Pseudo SRAM**
- **KGD**

• The products listed above may not be available for all regions.
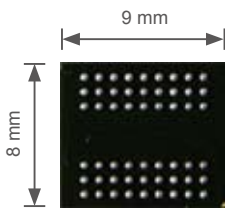 Please contact your local Winbond Sales Representative.

Winbond Electronics Corporation is a leading supplier of semiconductor solutions to the consumer, computer, communications, and electronics product markets. With the latest Buried World Line technology, Winbond developed the mobile DRAM devices with a low IDD current value, which helps Winbond to extend mobile DRAM memory applications beyond the mobile phone and tablet market to areas of mobile consumer electronics and mobile communication.

Winbond mobile DRAM devices support both x16 and x32 data widths. Major features for the families of products shown in the table below include the following: Sequential or Interleave burst、High Clock rate、Standard Self Refresh、Partial-Array Self Refresh (PASR)、Automatic Temperature Compensated Self Refresh Rate(ATCSR)、Deep Power-Down (DPD)、Programmable output buffer driver strength、and Temperature sensor output (TQ). Please refer to the datasheets for specific features. They are ideal for portable multimedia players, eBook Readers, automotive applications, consumer electronics, gaming devices, and mobile devices.
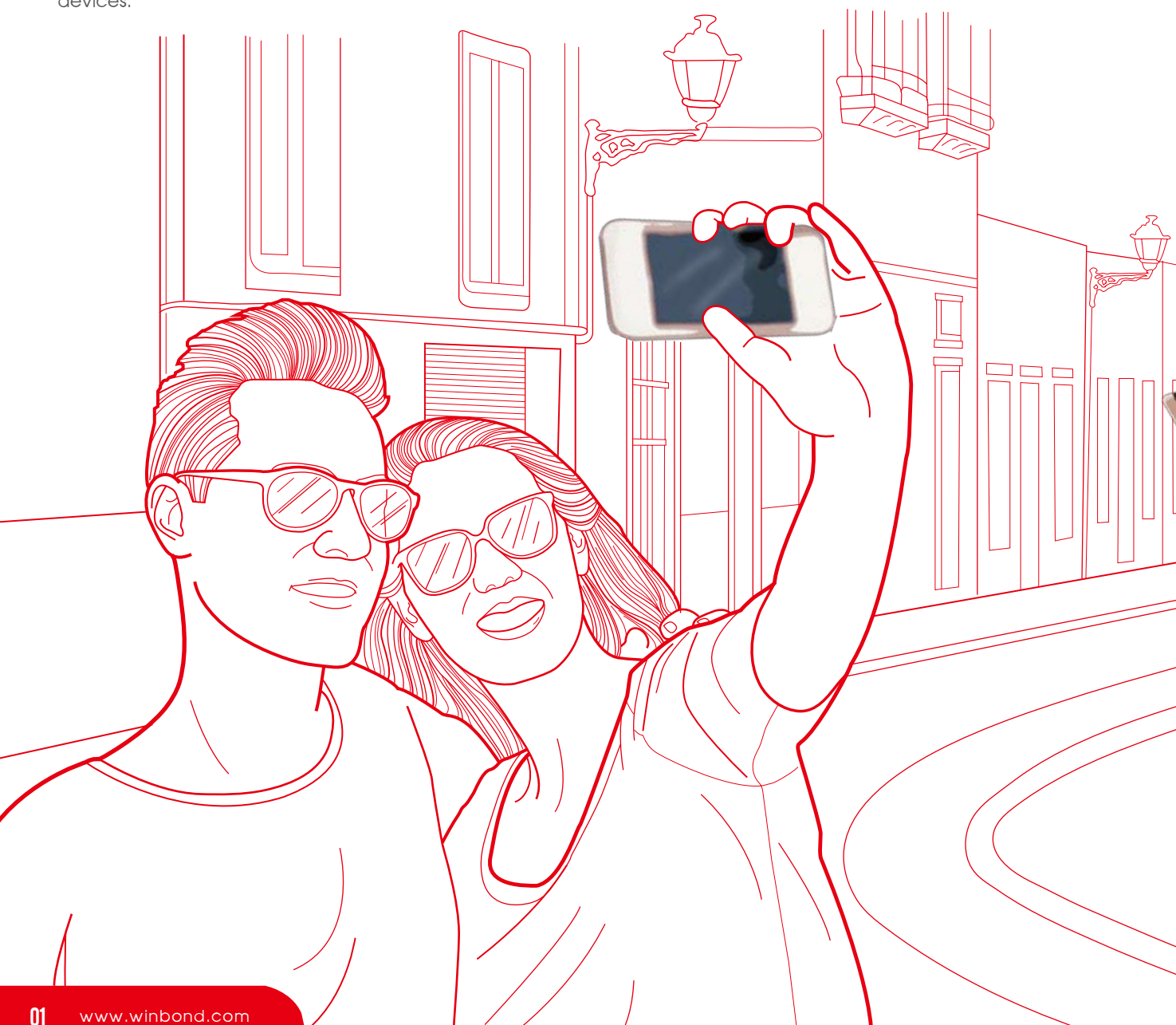
Product	Density	I/O	Ball count	Type	Dimension	Remark
LPSDR	128Mb - 1Gb	X16	54	BGA	8x9	JEDEC standard
		X32	90	BGA	8x13	JEDEC standard
LPDDR	128Mb - 1Gb	X16	60	BGA	8x9	JEDEC standard
		X32	90	BGA	8x13	JEDEC standard
LPDDR2	256Mb - 2Gb	X16 / X32	168	PoP	12x12	JEDEC standard
			134	BGA	10x11.5	JEDEC standard
PSRAM	64Mb- 256Mb	X16	54	BGA	6x8	-

■ SDRx16_54BGA   ■ DDRx16_60BGA   ■ SDR/DDRx32_90BGA

9 mm   9 mm   13 mm

8 mm   8 mm   8 mm
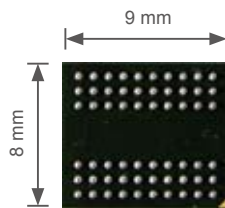
■ LPDDR2_168WFBGA   ■ LPDDR2_134 VFBGA

12 mm   11.5 mm

12 mm   10 mm
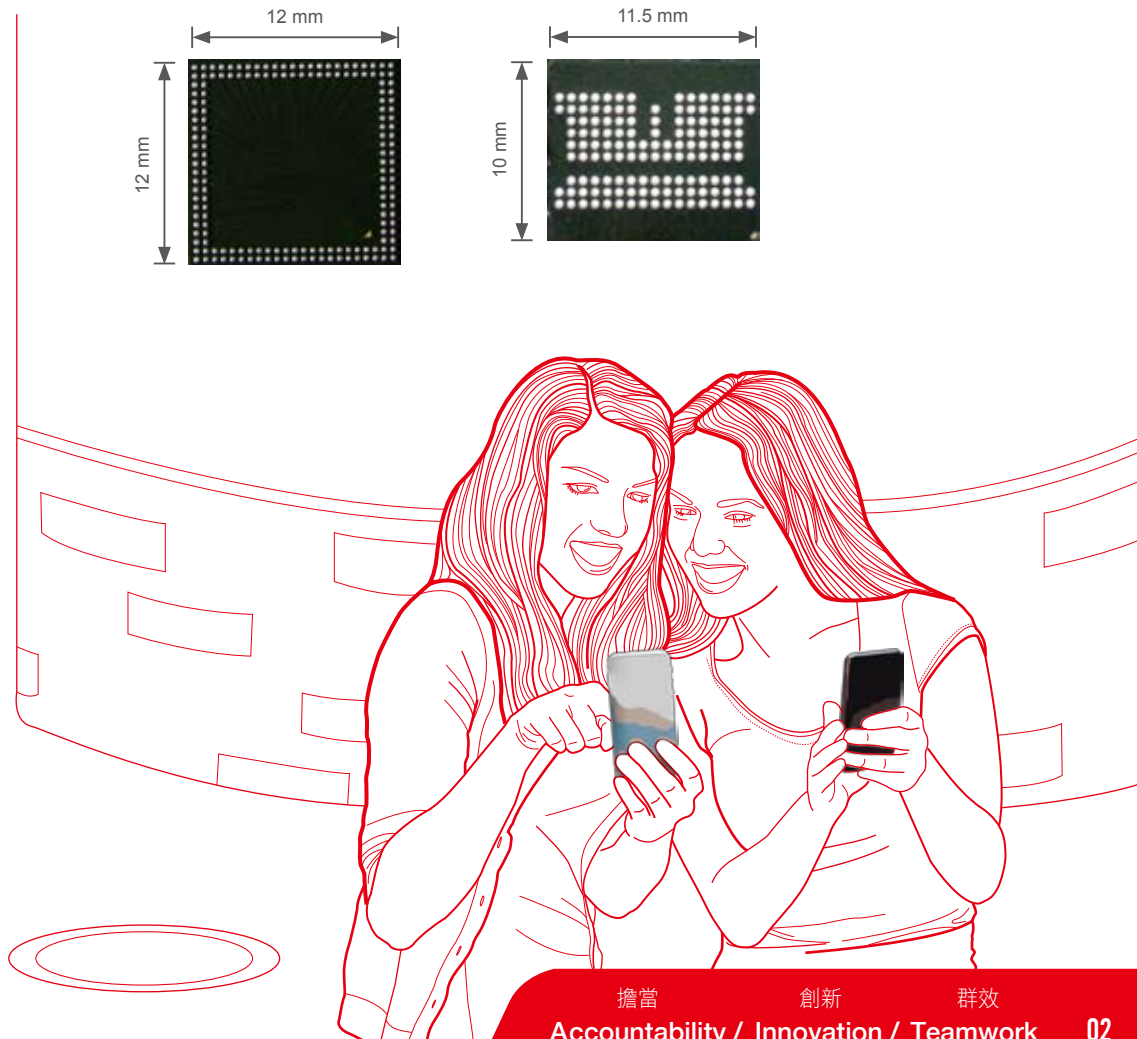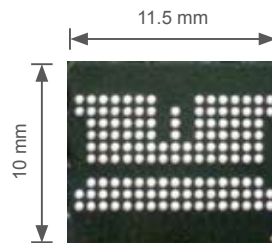
Mobile DRAM

Low Power SDR SDRAM

128Mb LPSDR (PKG)

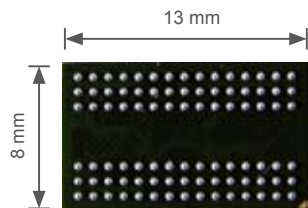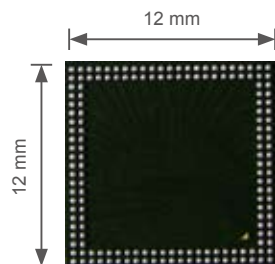| Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W987D6HBGX	8Mbit x16	1.8V / 1.8V	133 / 166 MHz -25~85c / -40~85c	54VFBGA	P	-
W987D2HBJX	4Mbit x32			90VFBGA		
W987D6HBGA	8Mbit x16		133 / 166 MHz -40~85c / -40~105c	54VFBGA (SAC305)	P	P
W987D2HBJA	4Mbit x32			90VFBGA (SAC305)		

256Mb LPSDR (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W988D6FBGX	16Mbit x16	1.8V / 1.8V	133 / 166 MHz -25~85c / -40~85c	54VFBGA	P	-
W988D2FBJX	8Mbit x32			90VFBGA		
W988D6FBGA	16Mbit x16		133 / 166 MHz -40~85c / -40~105c	54VFBGA (SAC305)	P	S (Q2/'14)
W988D2FBJA	8Mbit x32			90VFBGA (SAC305)		

512Mb LPSDR (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W989D6KBGX	32Mbit x16	1.8V / 1.8V	133 / 166 MHz -25~85c / -40~85c	54VFBGA	P	-
W989D2KBJX	16Mbit x32			90VFBGA		
W989D6KBGA	32Mbit x16		133 / 166 MHz -40~85c / -40~105c	54VFBGA (SAC305)	P	P
W989D2KBJA	16Mbit x32			90VFBGA (SAC305)		

1Gb LPSDR (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W98AD6KBGX	64Mbit x16	1.8V / 1.8V	133 / 166 MHz -25~85c / -40~85c	54VFBGA	S (Q2/'14)	-
W98AD2KBJX	32Mbit x32			90VFBGA		
W98AD6KBGA	64Mbit x16		133 / 166 MHz -40~85c / -40~105c	54VFBGA (SAC305)	S (Q2/'14)	S (Q2/'14)
W98AD2KBJA	32Mbit x32			90VFBGA (SAC305)		

Status[1]: P= Mass Production, S (Time)= Samples (Ready Time), UD (Time)= Under Development (Ready Time), N= Not recommended for new designs
RoHS[2]: All Winbond products are "Green", Halogen-Free and RoHS compliant packaging. Refer to the datasheet for details and specifications.

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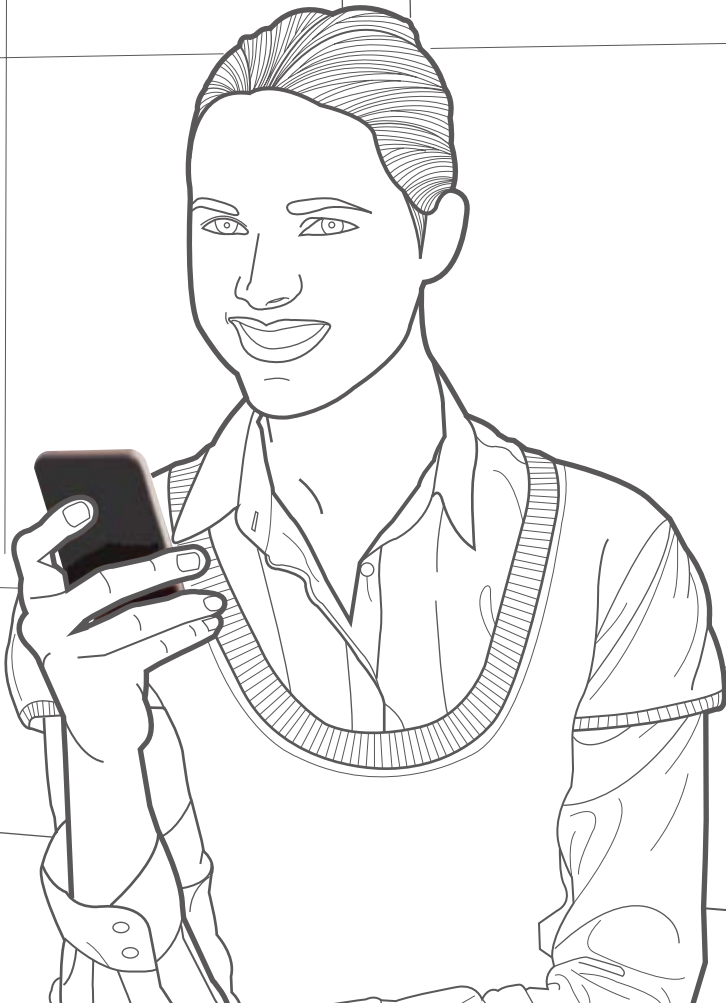
Low Power DDR SDRAM

128Mb LPDDR (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W947D6HBHX	8Mbit x16	1.8V / 1.8V	166 / 200 MHz -25~85c / -40~85c	60VFBGA	P	-
W947D2HBJX	4Mbit x32			90VFBGA		
W947D6HBHA	8Mbit x16		166 / 200 MHz -40~85c / -40~105c	60VFBGA (SAC305)	P	P
W947D2HBJA	4Mbit x32			90VFBGA (SAC305)		

256Mb LPDDR (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W948D6FBHX	16Mbit x16	1.8V / 1.8V	166 / 200 MHz -25~85c / -40~85c	60VFBGA	P	-
W948D2FBJX	8Mbit x32			90VFBGA		
W948D6FBHA	16Mbit x16		166 / 200 MHz -40~85c / -40~105c	60VFBGA (SAC305)	P	S (Q2/'14)
W948D2FBJA	8Mbit x32			90VFBGA (SAC305)		

擔當　　　創新　　　群效

Accountability / Innovation / Teamwork　04

Mobile DRAM

512Mb LPDDR (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W949D6KBHX	32Mbit x16	1.8V / 1.8V	166 / 200 MHz -25~85c / -40~85c	60VFBGA	P	-
W949D2KBJX	16Mbit x32			90VFBGA		
W949D6KBHA	32Mbit x16		166 / 200 MHz -40~85c / -40~105c	60VFBGA (SAC305)	P	P
W949D2KBJA	16Mbit x32			90VFBGA (SAC305)		

1Gb LPDDR (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W94AD6KBHX	64Mbit x16	1.8V / 1.8V	166 / 200 MHz -25~85c / -40~85c	60VFBGA	P	-
W94AD2KBJX	32Mbit x32			90VFBGA		
W94AD6KBHA	64Mbit x16		166 / 200 MHz -40~85c / -40~105c	60VFBGA (SAC305)	P	P
W94AD2KBJA	32Mbit x32			90VFBGA (SAC305)		

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Low Power DDR2 SDRAM

256Mb LPDDR2 (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W978H6KBQX	16Mbit x16	1.8V / 1.2V	333 / 400 MHz -25~85c / -40~85c	168 PoP	S(Q1/'14)	-
W978H2KBQX	8Mbit x32					
W978H6KBVX	16Mbit x16			134 BGA		
W978H2KBVX	8Mbit x32					
W978H6KBQA	16Mbit x16		333 / 400 MHz -40~85c / -40~105c	168 PoP (SAC305)	S(Q1/'14)	S (Q1/'14)
W978H2KBQA	8Mbit x32					
W978H6KBVA	16Mbit x16			134 BGA (SAC305)		
W978H2KBVA	8Mbit x32					

512Mb LPDDR2 (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W979H6KBQX	32Mbit x16	1.8V / 1.2V	333 / 400 MHz -25~85c / -40~85c	168 PoP	P	-
W979H2KBQX	16Mbit x32					
W979H6KBVX	32Mbit x16			134 BGA	S(Q1/'14)	
W979H2KBVX	16Mbit x32					
W979H6KBQA	32Mbit x16		333 / 400 MHz -40~85c / -40~105c	168 PoP (SAC305)	P	S (Q1/'14)
W979H2KBQA	16Mbit x32					
W979H6KBVA	32Mbit x16			134 BGA (SAC305)	S(Q1/'14)	
W979H2KBVA	16Mbit x32					

1Gb LPDDR2 (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W97AH6KBQX	64Mbit x16	1.8V / 1.2V	333 / 400 MHz -25~85c / -40~85c	168 PoP	P	-
W97AH2KBQX	32Mbit x32					
W97AH6KBVX	64Mbit x16			134 BGA		
W97AH2KBVX	32Mbit x32					
W97AH6KBQA	64Mbit x16		333 / 400 MHz -40~85c / -40~105c	168 PoP (SAC305)	P	S (Q1/'14)
W97AH2KBQA	32Mbit x32					
W97AH6KBVA	64Mbit x16			134 BGA (SAC305)		
W97AH2KBVA	32Mbit x32					

2Gb LPDDR2 (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W97BH6KBQX	128Mbit x16	1.8V / 1.2V	333 / 400 MHz -25~85c / -40~85c	168 PoP	P	N
W97BH2KBQX	64Mbit x32					
W97BH6KBVX	128Mbit x16			134 BGA		
W97BH2KBVX	64Mbit x32					

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Mobile DRAM

Pseudo SRAM

64Mb Pseudo SRAM (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W966D6HBG	4Mbit x16 CRAM	1.8V / 1.8V	133MHz / 70ns -40~85c	54VFBGA	P	-
W956D6HBC	4Mbit x16 CRAM-ADM					

128Mb Pseudo SRAM (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W967D6HBG	8Mbit x16 CRAM	1.8V / 1.8V	133MHz / 70ns -40~85c	54VFBGA	P	-
W957D6HBC	8Mbit x16 CRAM-ADM					

256Mb Pseudo SRAM (PKG)

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W968D6DAG	16Mbit x16 CRAM	1.8V / 1.8V	133MHz / 70ns -40~85c	54VFBGA	P	-
W958D6DBC	16Mbit x16 CRAM-ADM					

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Contact us: PSRAM@winbond.com

KGD
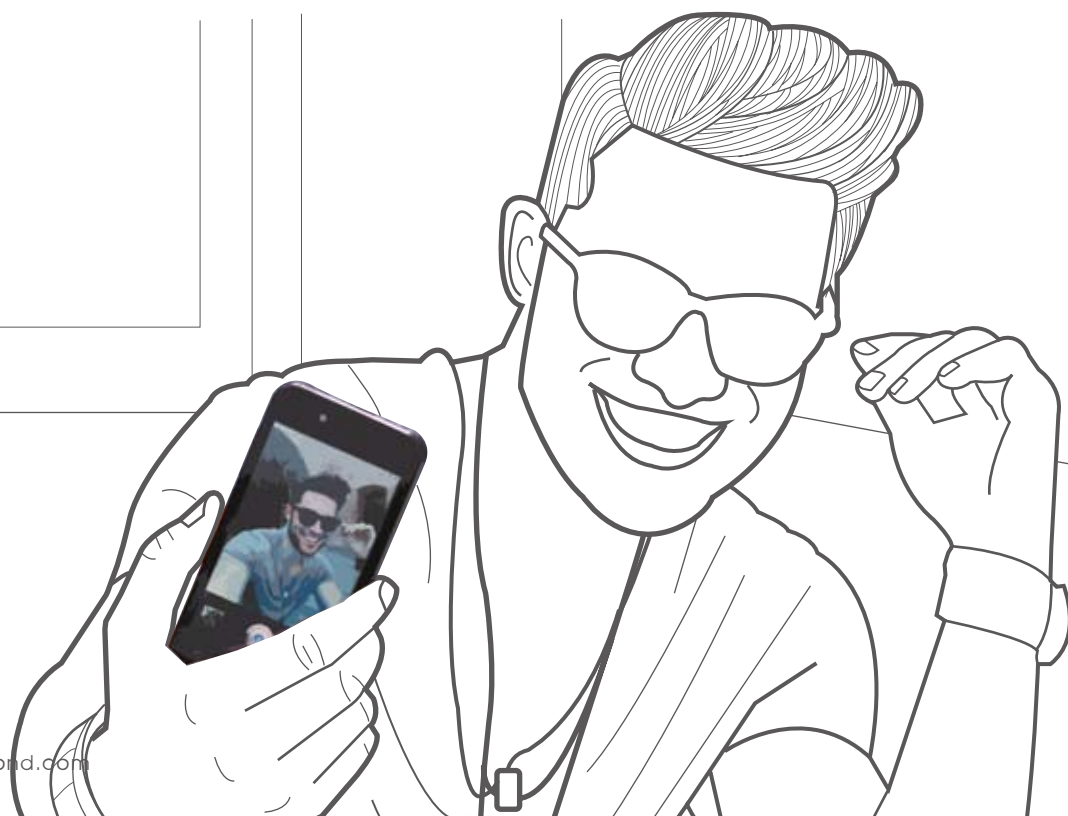
Fully Cover all Consumer Application:

PND/GPS、Smart Phone、Industy PDA/POS、E-Reader、Portable Game Console、3.5G/4G Data Card、AP Router、Pico Porjecter、Automotive、Touch Model、Smart TV、Smart Grid、Monitor System、IP Cam…etc. Providing KGD serves to SiP customers with complete mobile DRAM product such as Mobile SDR、Mobile DDR、Mobile DDR2、pSRAM

Provide Diversification of Low Power Consumption Product:

Support DRAM density as:
-LPSDR/LPDDR: 128Mb to 1Gb
-LPDDR2: 256Mb to 2Gb
-pSRAM: 32Mb to 256Mb
and support steable, lower power consumption for mobile application

Wafer Level high Speed test:

Up to mobile SDR 333Mbps, mobile DDR1 400Mbps, mobile DDR2 1066Mbps, pSRAM 266Mbps
Winbond provides professional advices to KGD customers, including SiP package bonding & power.thermal, mobile DRAM simulation…etc
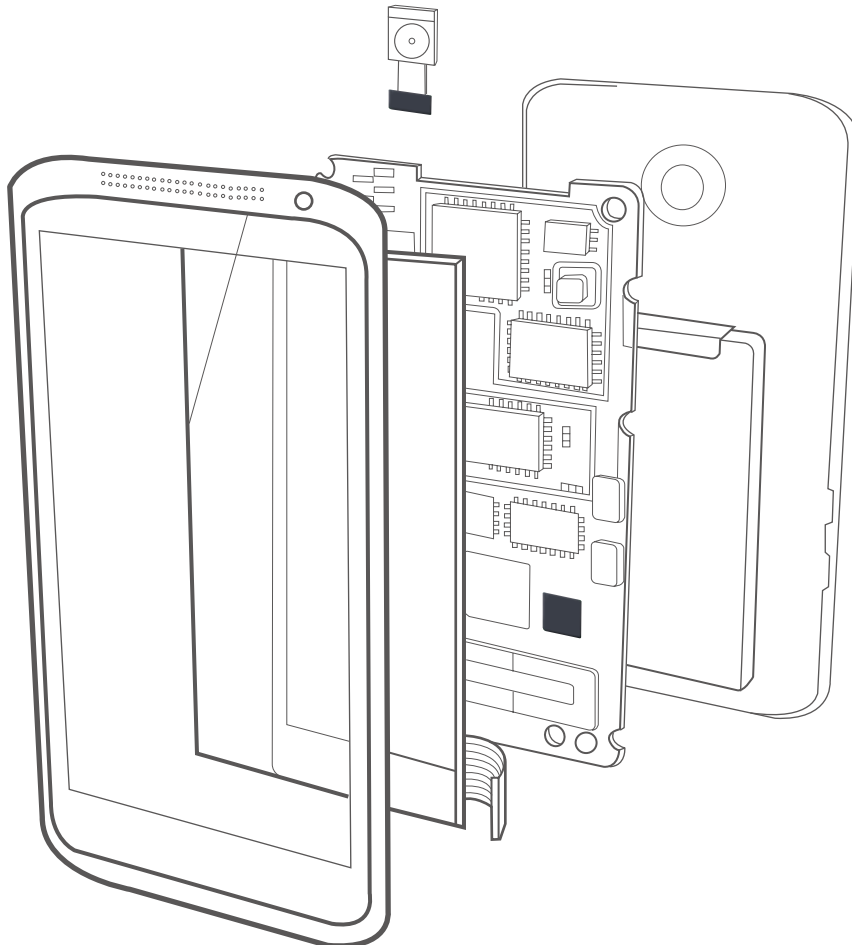
Excellent Quality Control:

100% Burn-In and Test, and qualification of AEC-Q100、TS16949、ISO9001/14001、OHSAS18001 for automotive customers

Product Life Time and Strong Engineering Support:

Owning a 12-inch Fab to quarantee stable long term support with EFA/PFA capability

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Specialty DRAM

- **SDRAM**
- **DDR SDRAM**
- **DDR2 SDRAM**
- **DDR3 SDRAM**
- **KGD**

• The products listed above may not be available for all regions.
  Please contact your local Winbond Sales Representative.

Density

- 16~256Mb SDR
- 32~256Mb DDR
- 128Mb~2Gb DDR2
- 1~2Gb DDR3
- 1Gb GDDR3

Speed

- SDR-200
- DDR-500
- DDR2-1066
- DDR3-1600
- GDDR3-2000

Package

- JEDEC standard
- Special BGA package support on SDR and DDR for portable devices.

Interface

- x16/x32 SDR/DDR
- x8/x16 DDR2/DDR3
- x32 GDDR3

Support customized KGD solutions including RDL & wild range power domains

I-temp/Automotive support on SDR/DDR/DDR2/DDR3 products
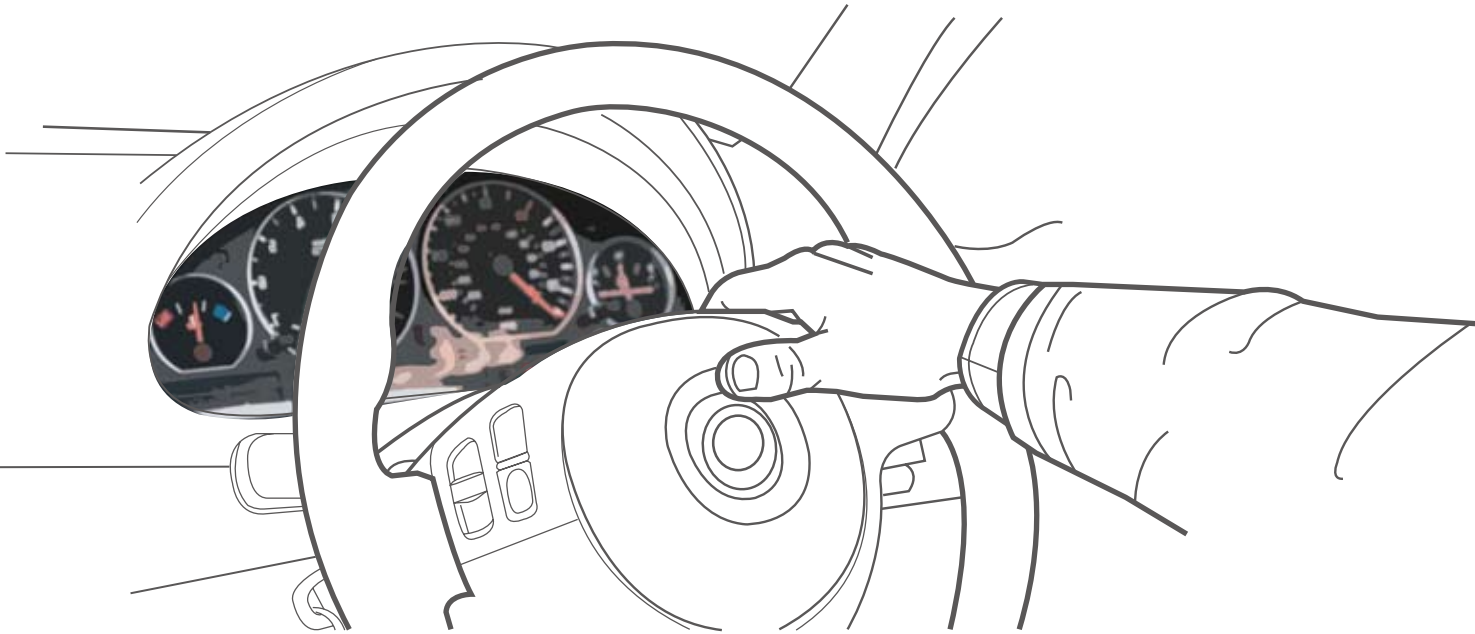
Specialty DRAM

SDRAM

16Mb SDRAM

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9816G6IB	1Mbit x16	3.3V±0.3V	-6/-6I	VFBGA 60	P	P
		2.7V~3.6V	-7			
W9816G6IH	1Mbit x16	3.3V±0.3V	-5	TSOPII 50	P	P
			-6/-6I			
		2.7V~3.6V	-7/-7I			
W9816G6JH	1Mbit x16	3.3V±0.3V	-5	TSOPII 50	UD(Q1/'14)	UD(Q2/'14)
			-6/-6I			
		2.7V~3.6V	-7/-7I			

64Mb SDRAM

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9864G2JH	2Mbit x32	3.3V±0.3V	-5	TSOPII 86	P	P
			-6/-6I/-6A			
		2.7V~3.6V	-7			
W9864G6JB	4Mbit x16	3.3V±0.3V	-6/-6I/-6A	VFBGA 60	P	P
		2.7V~3.6V	-7			
W9864G6JH	4Mbit x16	3.3V±0.3V	-5	TSOPII 54	P	P
			-6/-6I/-6A			
		2.7V~3.6V	-7/-7S			
W9864G6JT	4Mbit x16	3.3V±0.3V	-6/-6I/-6A/-6K	TFBGA 54	P	P
W9864G6KH	4Mbit x16	3.3V±0.3V	-5	TSOP II 54	P	S(Q2/'14)
			-6/6I			
		2.7V~3.6V	-7			
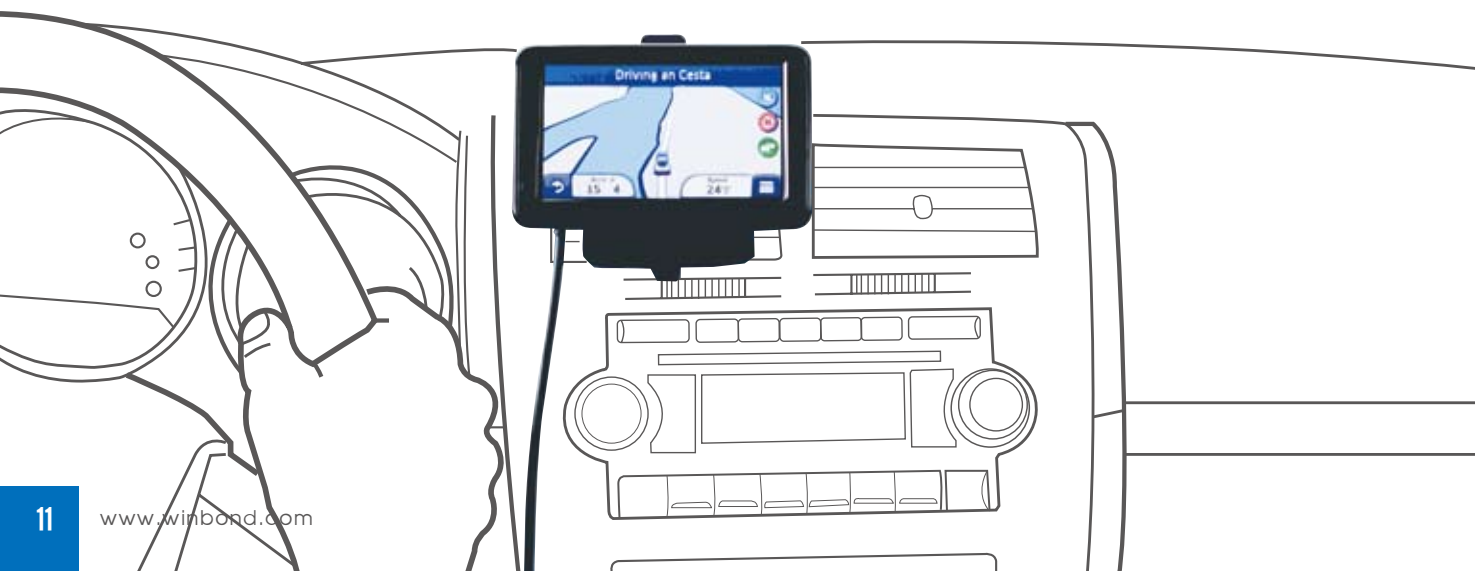
128Mb SDRAM

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9812G6JB	8Mbit x16	3.3V±0.3V	-6/-6I	TFBGA 54	P	P
			-75/75I			
W9812G6JH	8Mbit x16	3.3V±0.3V	-5	TSOP II 54	P	P
			-6/-6I/-6A/-6K			
			-75			
W9812G6KH	8Mbit x16	3.3V±0.3V	-5	TSOP II 54	P	S(Q2/'14)
			-6/6I			
		2.7V~3.6V	-75			

256Mb SDRAM

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9825G2JB	8Mbit x32	3.3V±0.3V	-6	TFBGA 90	P	P
		2.7V~3.6V	-6I			
			-75/75I			
W9825G6JB	16Mbit x16	3.3V±0.3V	-6/-6I/-6A/-6K	TFBGA 54	P	P
			-75			
W9825G6JH	16Mbit x16	3.3V±0.3V	-5	TSOP II 54	P	P
			-6/-6I/-6L/-6A/-6K			
			-75/75L			

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Specialty DRAM

DDR SDRAM

64Mb DDR

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9464G6JH	4Mbitx16	2.4V~2.7V	-4	TSOPII 66	P	P
		2.5V±0.2V	-5/-5I			
W9464G6KH	4Mbitx16	2.4V~2.7V	-4	TSOPII 66	P	S(Q2/'14)
		2.5V±0.2V	-5/-5I			

128Mb DDR

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9412G6JB	8Mbitx16	2.4V~2.7V	-4	TFBGA 60	P	P
		2.5V±0.2V	-5/-5I			
W9412G6JH	8Mbitx16	2.4V~2.7V	-4	TSOPII 66	P	P
		2.5V±0.2V	-5/-5I/-5K			
			-6I			
W9412G6KH	8Mbitx16	2.4V~2.7V	-4	TSOPII 66	P	S(Q2/'14)
		2.5V±0.2V	-5/-5I			

256Mb DDR

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9425G6JB	16Mbitx16	2.5V ±0.2V	-5/-5I	TFBGA 60	P	P
W9425G6JH	16Mbitx16	2.4V~2.7V	-4	TSOPII 66	P	P
		2.5V ±0.2V	-5/-5I/-5A			

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DDR2 SDRAM

128Mb DDR2

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9712G6KB	8Mbitx16	1.8V±0.1V	-18 -25/25I -3	TFBGA 84	P	P
W9712G8JB	16Mbitx8	1.8V±0.1V	-18 -25 -3	WBGA 60	P	P

256Mb DDR2

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9725G2JB	8Mbitx32	1.8V±0.1V	-25 -3	TFBGA 128	P	P
W9725G6KB	16Mbitx16	1.8V±0.1V	-18 -25/25I/25A/25K -3	WBGA 84	P	P
W9725G8KB	32Mbitx8	1.8V±0.1V	-18 -25 -3	WBGA 60	P	P

512Mb DDR2

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W9751G6KB	32Mbitx16	1.8V±0.1V	-18 -25/25I/25A/25K -3	WBGA 84	P	P
W9751G8KB	64Mbitx8	1.8V±0.1V	-18 -25/25I -3	WBGA 60	P	P

Specialty DRAM

1Gb DDR2

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W971GG6JB	64Mbitx16	1.8V±0.1V	-18 -25/25I/25L/25A/25K -3/-3A	WBGA 84	P	P
W971GG6KB	64Mbitx16	1.8V±0.1V	-18 -25/25I -3	WBGA 84	P	UD
W971GG8JB	128Mbitx8	1.8V±0.1V	-18 -25/25I/25A/25K -3	WBGA 60	P	P
W971GG8KB	128Mbitx8	1.8V±0.1V	-18 -25/25I -3	WBGA 60	P	UD

2Gb DDR2

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W972GG6JB	128Mbitx16	1.8V±0.1V	-18 -25/25I/25A/25K -3/-3A	WBGA 84	P	P
W972GG8JB	256Mbitx8	1.8V±0.1V	-18 -25/25I -3	WBGA 60	P	P

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RoHS[2]: All Winbond products are "Green", Halogen-Free and RoSH compliant packaging. Refer to the datasheet for details and specifications.

Contact us: SDRAM@winbond.com
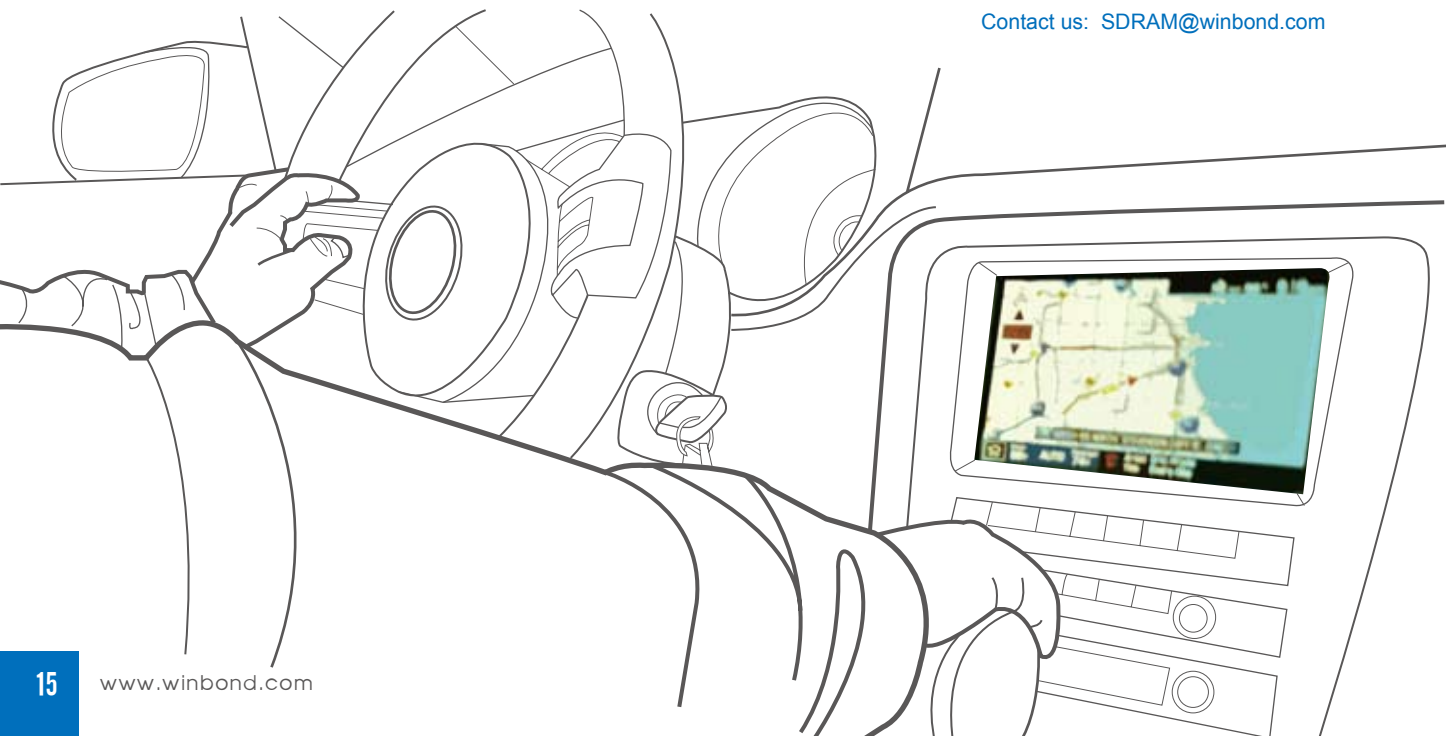
DDR3 SDRAM

1Gb DDR3

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W631GG6KB	64Mbitx16	1.5V±0.075V	-11 -12/12I/12A/12K -15/15I/15A/15K	WBGA 96	P	P
W631GG8KB	128Mbitx8	1.5V±0.075V	-11 -12 -15/15I	WBGA 78	P	P
W631GU6KB	64Mbitx16	1.283V to 1.45V	-12/12I/12A/12K -15/15I/15A/15K	WBGA 96	P	P
W631GU8KB	128Mbitx8	1.283V to 1.45V	-12/12I/12A/12K -15/15I/15A/15K	WBGA 78	P	P

2Gb DDR3

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W632GG6KB	128Mbitx16	1.5V±0.075V	-11 -12/12I -15/15I/15A/15K	WBGA 96	P	P
W632GG8KB	256Mbitx8	1.5V±0.075V	-11 -12/12I/12A/12K -15/15I/15A/15K	WBGA 78	P	P
W632GU6KB	128Mbitx16	1.283V to 1.45V	-12/12I/12A/12K -15/15I/15A/15K	WBGA 96	P	P
W632GU8KB	256Mbitx8	1.283V to 1.45V	-12/12I/12A/12K -15/15I/15A/15K	WBGA 78	P	P

1Gb GDDR3

Part No.	Organization	Voltage	Speed Grade	Package	Status[1,2]	Automotive
W641GG2KB	32Mbitx32	1.8V±0.1V	-12/-14	WBGA 136	P	-

Status[1]: P= Mass Production, S(Time)=Samples(Ready Time), UD (Time)= Under Development(Ready Time), N=Not Recommended For New Design.
RoHS[2]: All Winbond products are "Green", Halogen-Free and RoSH compliant packaging. Refer to the datasheet for details and specifications.

Contact us: SDRAM@winbond.com

KGD

Fully Cover all Consumer Applications:

TV, STB, Networking, Storage, Printer, DSC/DV, GPS, Automotive…etc.
Providing KGD services to SiP customers with complete DRAM product portfolio such as SDRAM, DDR, DDR2, DDR3.

Wafer Level high speed test:

Up to DDR3 1600Mbps, DDR2 1066Mbps, DDR 500Mbps.
Winbond provides professional advices to KGD customers, including SiP package bonding & power/thermal, DRAM simulation,…etc.

Excellent KGD Quality Control:

With AEC-Q100, TS16949, ISO9001/14001, OHSAS18001 certificates for automotive customers.
Owning one 12-inch Fab6 to guarantee stable long-term delivery.

Please Contact DRAM-KGD@winbond.com

Code Storage Flash Memory

- **Serial Flash**
- **Parallel Flash**
- **NAND Flash**
- **KGD**

• The products listed above may not be available for all regions. Please contact your local Winbond Sales Representative.

Serial Flash

SpiFlash® Memories with SPI, Dual-SPI, Quad-SPI and QPI

Winbond's W25X and W25Q SpiFlash® Multi-I/O Memories feature the popular Serial Peripheral Interface (SPI), densities from 512M-bit to 512K-bit, small erasable sectors and the industry's highest performance. The W25X family supports Dual-SPI effectively doubling standard SPI clock rates. The W25Q family is a "superset" of the 25X family with Dual-I/O and Quad-I/O SPI for even higher performance. Clock rates up to 104MHz achieve an equivalent of 416MHz (50M-Byte/S transfer rate) when using Quad-SPI. This is more than eight times the performance of ordinary Serial Flash (50MHz) and even surpasses asynchronous Parallel Flash memories while using fewer pins and less space. Faster transfer rates mean controllers can execute code (XIP) directly from the SPI interface or further improve boot time when shadowing code to RAM. Additionally, some SpiFlash devices offer the new Quad Peripheral Interface (QPI) supporting true Quad Commands for improved XIP performance and simpler controller circuitry. Additionally, new ultra-small form factor packages are ideal for space constrained mobile and handheld applications.

Leading the Serial Flash Market in unit sales and revenue, Winbond TS16949 certified AEC-Q100 qualified memories now support automotive applications. The automobile has transformed into the most sophisticated electronic device in the market. Digital displays in automotive dashboards provide more information about the car, and improve safety. Instant-on and real time 2D/3D image rendering is achieved with fast processors and SpiFlash memories. ADAS (Advanced Driver Assist Systems), comfort, entertainment, and navigation is now available in the center console and this is addressed with SpiFlash memories using small packages for space constrained systems and high density for advanced applications.

Please contact Winbond for automotive datasheet and support.

■ Tiny Serial Flash Packages

■ Winbond Industrial and Automotive Grade Memory

	Industrial	Industrial Plus	Automotive Grade 3	Automotive Grade 2
Temperature Range	-40℃~85℃	-40℃~105℃	-40℃~85℃	-40℃~105℃
Part# Example	W25Q80BVSSIG	W25Q80BVSSJG	W25Q80BVSSBG	W25Q80BVSSAG
AEC-Q100 Compliant	No	No	Yes	Yes
Change Control	No	No	Optional	Optional

Code Storage Flash Memory

512Mbit (64MB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25M512JV	Dual/Quad-SPI, QPI, DTR, Enhanced[3]	2.7V - 3.6V	104	SOIC16 300mil, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix)	UD	UD

256Mbit (32MB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25Q256FV	Dual/Quad-SPI, QPI, Enhanced[3]	2.7V - 3.6V	104	SOIC16 300mil, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix)	P	UD
W25Q257FV	Dual/Quad-SPI, QPI, Enhanced[3], 4-byte addressing	2.7V - 3.6V	104	SOIC16 300mil, WSON8 8X6mm	P	N
W25Q256JV	Dual/Quad-SPI, QPI, DTR, Enhanced[3]	2.7V - 3.6V	104	SOIC16 300mil, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix)	UD	UD

128Mbit (16MB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25Q128FV	Dual/Quad-SPI,QPI, Enhanced[3]	2.7V - 3.6V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix), VSOP8 208mil	P	N
W25R128FV	Dual/Quad-SPI,QPI, RPMC, Enhanced[3]	2.7V - 3.6V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, VSOP8 208mil	P	N
W25Q128JV	Dual/Quad-SPI,QPI, DTR, Enhanced[3]	2.7V - 3.6V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix), VSOP8 208mil	UD	UD
W25Q128FW	Dual/Quad-SPI,QPI, Enhanced[3]	1.65V - 1.95V	104	SOIC8 208mil, SOIC16 300mil, VSOP8 208mil, WSON 6X5mm,	P	N
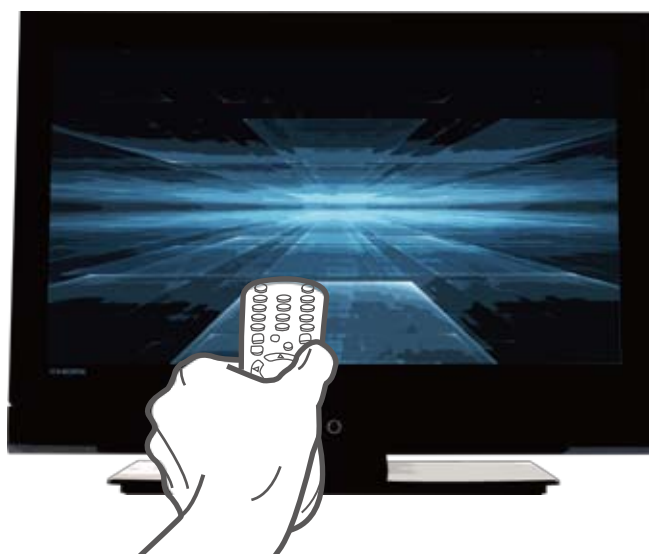
64Mbit (8MB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25Q64FV	Dual/Quad-SPI,QPI Enhanced[3]	2.7V - 3.6V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix), VSOP8 208mil	P	N
W25R64FV	Dual/Quad-SPI,QPI RPMC, Enhanced[3] Enhanced[3], RPMC	2.7V - 3.6V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, VSOP8 208mil	P	N
W25Q64JV	Dual/Quad-SPI,QPI DTR, Enhanced[3]	2.7V - 3.6V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix), VSOP8 208mil	UD	N
W25Q64FW	Dual/Quad SPI, QPI, Enhanced[3]	1.65V - 1.95V	104	SOIC8 208mil, WSON 6X5mm, USON 4x3mm, VSOP8 208mil, WLBGA8	P	UD

32Mbit (4MB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25Q32FV	Dual/Quad-SPI, QPI, Enhanced[3]	2.7V - 3.6V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix), VSOP8 208mil	P	N
W25Q32JV	Dual/Quad-SPI, QPI, DTR, Enhanced[3]	2.7V - 3.6V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, WSON8 8X6mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix), VSOP8 208mil	UD	UD
W25Q32DW	Dual/Quad SPI, QPI, Enhanced[3]	1.65V - 1.95V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, WSON 8X6mm, VSOP8 208mil	N	P
W25Q32FW	Dual/Quad SPI, QPI, Enhanced[3]	1.65V - 1.95V	104	SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, WSON 8X6mm, VSOP8 208mil, XSON8 4x4mm	UD	UD

16Mbit (2MB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25Q16DV	Dual/Quad-SPI Enhanced[3]	2.7V - 3.6V	80/104	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix), VSOP8 150mil, VSOP8 208mil	P	N
W25Q16CL	Dual/Quad SPI, Enhanced[3]	2.3V - 3.6V	50/80	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm, VSOP8 150mil	P	N
W25Q16DW	Dual/Quad SPI, QPI, Enhanced[3]	1.65V - 1.95V	104	SOIC8 150mil, SOIC8 208mil, SOIC16 300mil, WSON 6X5mm, TFBGA24 6X8mm (4x6 Matrix), TFBGA24 6X8mm (5x5 Matrix), VSOP8 150mil, VSOP8 208mil, USON8 4x3mm, WLBGA8	P	P

Code Storage Flash Memory

8Mbit (1MB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25Q80BV	Dual/Quad-SPI Enhanced[3]	2.7V - 3.6V	80/104	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm, USON8 2X3mm	P	P
W25Q80DV	Dual/Quad-SPI Enhanced[3]	2.7V - 3.6V	80/104	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm, USON8 2X3mm, VSOP8 150mil	P	UD
W25Q80BL	Dual/Quad SPI, Fast Write, Enhanced[3]	2.3V - 3.6V	50/80	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm, VSOP8 150mil, USON8 2X3mm	P	N
W25Q80DL	Dual/Quad SPI, Fast Write, Enhanced[3]	2.3V - 3.6V	50/80	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm, VSOP8 150mil, USON8 2X3mm	UD	N
W25Q80BW	Dual/Quad SPI, Fast Write Enhanced[3]	1.65V - 1.95V	80	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm, VSOP8 150mil, USON8 4x3mm, WLBGA8	P	P
W25Q80EW	Dual/Quad SPI, Fast Write Enhanced[3]	1.65V - 1.95V	80	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm, VSOP8 150mil, USON8 4x3mm, WLBGA8	UD	N

4Mbit (512KB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25X40CL	Fast Write, Dual SPI	2.3V - 3.6V	104	SOIC8 150mil, VSOP8 150mil, USON 2X3mm, WSON 6X5mm, SOIC8 208mil	P	N
W25Q40CL	Dual/Quad SPI, Fast Write, Enhanced[3]	2.3V - 3.6V and 2.7V – 3.6V	104	SOIC8 150mil, SOIC8 208mil, USON8 2X3mm	P	N
W25Q40BW	Dual/Quad-SPI Fast Write, Enhanced[3]	1.65V - 1.95V	80	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm,VSOP8 150mil, USON8 2X3mm, USON8 4x3mm	P	P
W25Q40EW	Dual/Quad-SPI Fast Write, Enhanced[3]	1.65V - 1.95V	80	SOIC8 150mil, SOIC8 208mil, WSON 6X5mm,VSOP8 150mil, USON8 2X3mm, USON8 4x3mm	UD	N

2Mbit (256KB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25X20CL	Fast Write, Dual SPI	2.3 - 3.6V and 2.7-3.6V	50/104	SOIC8 150mil, WSON 6X5mm, VSOP8 150mil, USON8 2X3mm	P	N
W25Q20BW	Dual/Quad SPI, Fast Write, Enhanced[3]	1.65 - 1.95V	80	SOIC8 150mil, WSON 6X5mm, VSOP8 150mil, USON8 2X3mm	P	N
W25Q20EW	Dual/Quad SPI, Fast Write, Enhanced[3]	1.65 - 1.95V	80	SOIC8 150mil, WSON 6X5mm, VSOP8 150mil, USON8 2X3mm	UD	N

1Mbit (128KB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25X10CL	Fast Write, Dual SPI	2.3 – 3.6V and 2.7 – 3.6V	50/104	SOIC8 150mil, WSON 6X5mm, VSOP8 150mil, USON8 2X3mm	P	N
W25Q10EW	Dual/Quad SPI, Fast Write	1.65 - 1.95V	80	SOIC8 150mil, WSON 6X5mm, VSOP8 150mil, USON8 2X3mm	UD	N

512Kbit (64KB)

Part No.	Features	Voltage	Clock (MHz)	Package(s)	Status[1,2]	Automotive
W25X05CL	Fast Write, Dual SPI	2.3V - 3.6V	104	SOIC8 150mil, TSSOP8 173mil, USON 2x3mm	P	N

Status[1]: P= Mass Production, S (Time)=Samples (Ready Time), UD (Time)=Under Development (Ready Time), N=Not recommended for new designs
RoHS[2]: All Winbond Flash products are "Green", Halogen-Free and RoHS compliant packaging. Refer to the datasheet for details and specifications.
Enhanced[3] = SFDP, Security Registers, Program/Erase Suspend/Resume, Word Read Quad I/O, Burst Read with Wrap, Non-Volatile & Volatile Registers, Complement Array Protection

Contact us: SpiFlash@winbond.com

擔當   創新   群效
Accountability / Innovation / Teamwork

Code Storage Flash Memory

• The products listed above may not be available for all regions.
Please contact your local Winbond Sales Representative.

Parallel Flash

Parallel Flash Memory – W29GL Family

Winbond's W29GL family of 3-Volt Page-Mode Parallel Flash memories are offered in densities from 512Mb to 32Mb and support industry standard interfaces, architectures and packages. They are drop-in replacements to the popular x29GL products available in the industry, with no firmware change. The W29GL family also offers faster program and erase times, which can improve production throughput and enable faster firmware updates. Winbond s Parallel Flash products are ideal for a wide variety of applications requiring the higher performance of a parallel bus width and page mode operation.

W29GL Page Mode Parallel Flash Family

- 512Mb to 32Mb densities
- Compatible with Industry Standard x29GL products
- 2.7V to 3.6V operation; also supports VIO at 1.8V
- x8/x16 data bus configuration
- 70/90ns read access time, 25ns page mode access time
- Provides many sector protection mechanisms
- o Offers additional security of code/data
- o -40 to +85 operation range

Package Options

- Industry standard packages for 32Mb & 64Mb densities
- o 48-pin TSOP (Top/Bottom Boot)
- o 48-ball VFBGA (Top/Bottom Boot)
- o 56-pin TSOP (High/Low Sector protect)
- o 64-ball LFBGA (Top/Bottom Boot, High/Low Sector protect)
- Industry standard packages for 128Mb to 512Mb densities
- o 56-pin TSOP (High/Low Sector protect)
- o 64-ball LFBGA (High/Low Sector protect)

Special Features

- Drop-in replacement of Industry Standard x29GL
- o No firmware change needed
- Saves 40% erase time and 60% program time
- o Improves production throughput
- o Faster firmware updates

Wide Range of Applications

- Networking, Storage, Set-Top-Box, DSL and Cable modems
- Wireless routers, Digital TV, Industrial, Automotive
- PC peripherals, Printer, Mobile phones, Cameras and more

Sector Erase Type (Typ)

Save 40% Erase Time

mSec

Industry Standard · Winbond
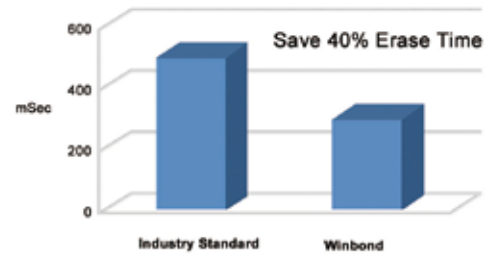
Effective Word Program Time (Typ)

Save 60% Program Time

µSec

Industry Standard · Winbond
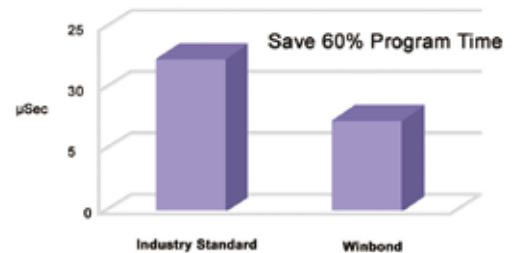
Code Storage Flash Memory

512Mbit[3] (64MB)

Part No.	Secure Sectors		Speed (ns)	Package(s)	Status[1,2]	Automotive
	Boot/Uniform Sectors	Sector Location				
W29GL512PH	Uniform Sector	High Sector	90	LFBGA64 TSOP56	UD	UD
W29GL512PL		Low Sector				
W29GL512SH		High Sector			UD	UD
W29GL512SL		Low Sector				

256Mbit[3] (32MB)

Part No.	Secure Sectors		Speed (ns)	Package(s)	Status[1,2]	Automotive
	Boot/Uniform Sectors	Sector Location				
W29GL256PH	Uniform Sector	High Sector	90	LFBGA64 TSOP56	UD	UD
W29GL256PL		Low Sector				
W29GL256SH		High Sector		TSOP56	UD	UD
W29GL256SL		Low Sector		LFBGA64 TSOP56		

128Mbit (16MB)

Part No.	Secure Sectors		Speed (ns)	Package(s)	Status[1,2]	Automotive
	Boot/Uniform Sectors	Sector Location				
W29GL128CH	Uniform Sector	High Sector	90	LFBGA64 TSOP56	P	UD
W29GL128CL		Low Sector		LFBGA64 TSOP56		

64Mbit (8MB)

Part No.	Secure Sectors		Speed (ns)	Package(s)	Status[1,2]	Automotive
	Boot/Uniform Sectors	Sector Location				
W29GL064CB	Bottom Boot	Bottom two sectors	70/90	LFBGA64 TFBGA48 TSOP48	P	UD
W29GL064CH	Uniform Sector	High Sector		LFBGA64 TSOP56		
W29GL064CL		Low Sector				
W29GL064CT	Top Boot	Top two sectors		LFBGA64 TFBGA48 TSOP48		

32Mbit (4MB)

Part No.	Secure Sectors		Speed (ns)	Package(s)	Status[1,2]	Automotive
	Boot/Uniform Sectors	Sector Location				
W29GL032CB	Bottom Boot	Bottom two sectors	70/90	LFBGA64 TFBGA48 TSOP48	P	UD
W29GL032CH	Uniform Sector	High Sector		LFBGA64 TSOP56		
W29GL032CL		Low Sector				
W29GL032CT	Top Boot	Top two sectors		LFBGA64 TFBGA48 TSOP48		

Status[1]: P= Mass Production, S (Time)=Samples (Ready Time), UD (Time)=Under Development (Ready Time), N=Not recommended for new designs
RoHS[2]: All winbond Flash products are "Green", Halogen-Free and RoHS compliant packaging. Refer to the datasheet for details and specifications.
Availability[3]: Please contact Winbond for avaliability of these products and packages.

Contact us: ParallelFlash@winbond.com

NAND Flash

We will be offering SLC NAND Flash products starting in 2014. For furthr information please contact Winbond sales.
NANDFlash@winbond.com

KGD

We offer various types of Parallel Flash and Serial Flash KGD (Known Good Die) products. For further information please contact
Flash-KGD@winbond.com.

NOTE

winbond

www.winbond.com

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