



winbond

Automotive Product Selection Guide 2020

Vision Statement

以綠色半導體技術豐富人類生活的隱形冠軍
***Be a hidden champion in providing sustainable
semiconductors to enrich human life.***

winbond

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About Winbond

Winbond Electronics Corporation is a total memory solution provider.

The Company provides customer-driven memory solutions backed by the expert capabilities of product design, R&D, manufacturing, and sales services.

Winbond's product portfolio, consisting of Specialty DRAM, Mobile DRAM and Code Storage Flash, is widely used by tier-1 customers in communication, consumer electronics, automotive and industrial, and computer peripheral markets.

Winbond headquarters in Central Taiwan Science Park(CTSP) and has subsidiaries in the USA, Japan, Israel, China and Hong Kong.

Based on Taichung and new Kaohsiung 12-inch fabs in Taiwan, Winbond keeps pace to develop in-house technologies to provide high-quality memory IC products.



Winbond continues to invest in the development of in-house fabrication process technology, providing constant improvements in the performance, reliability and power consumption of the Winbond product portfolio.

1

Introduction



Advanced memory products for the next generation of road vehicles

- New technology to make cars greener, safer and easier to drive

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The technology of mobility is changing more rapidly now than it has done since the car was invented more than 100 years ago. By 2025, it is likely that some cars on the road will operate without a driver at the steering wheel. Even today, some premium cars can perform important piloting functions on the highway without intervention by the driver. Improvements to driver assistance functions are steadily making the driving experience more pleasant and enjoyable, as well as safer.





At the same time, pressure from the public and from governments to reduce carbon emissions is pushing car manufacturers to electrify their fleets at a fast rate. And users are increasingly demanding the same features inside the car's cabin that they enjoy outside on their smartphones and tablets: large touchscreen displays, instant broadband connection to the internet, and video and graphics content rendered beautifully on high-resolution, high dynamic-range displays.

These are the trends which automotive electronics engineers are responding to today:

- Assisted and increasingly autonomous driving
- Electrification
- Connectivity within the car, between cars, and from the car to the outside world
- Digitization of cockpit and cabin functions such as the instrument cluster and dashboard





Every one of these trends calls for the use of more, higher-performance semiconductors. In memory functions, the sophisticated automotive electronics systems of tomorrow will need higher bandwidth and higher memory density while allowing for the tight cost pressures which affect the automotive industry. Lowering power consumption will also be crucial as automotive manufacturers uncover new ways to save fuel and to extend the driving range of battery-powered electric vehicles.

Winbond, a supplier of Flash and DRAM to the automotive industry, is responding by developing new generations of automotive-qualified memory products which offer the performance, reliability and low power consumption which the automotive industry demands.





This commitment to in-house fabrication of Flash and DRAM wafers gives confidence to automotive customers that Winbond can maintain supply in line with their production plan, even in dynamic market conditions.

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Flash & DRAM Focused Products

New Flash products offer cost and performance advantages

- **NAND Flash innovations cost-effectively meet need for higher memory density in graphics-rich applications**
- **SpiFlash® NOR technology with built-in ECC provides ultra-high performance and reliability**

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As cars become increasingly autonomous, connected and electrified, vehicles are turning into ‘computers on wheels’: today’s cars include many high-performance processors running large and sophisticated software programs. This advanced computing capability calls for high code storage capacity.

The implementation of new features in Advanced Driver Assistance Systems (ADAS), such as adaptive cruise control for highway driving, and automatic collision avoidance, will augment the car’s code base. ADAS software programs containing millions of lines of code require high-capacity code storage memory which operates reliably over the long lifetime of a road vehicle.

In the instrument cluster, automotive OEMs face the same issue: the latest cluster designs use attractive 2D or 3D graphics to display mapping and vehicle status information in a visually appealing way. These graphics operations also call for high memory capacity and high bandwidth.



High-performance automotive-qualified NAND Flash

Winbond's family of high-performance QspiNAND Flash products provides a cost-effective alternative at memory capacities of 1Gb and higher to the NOR Flash traditionally used for automotive code storage. NAND Flash scales better than NOR Flash at these high densities, giving a substantially lower cost-per-bit. And robust Single-Level Cell (SLC) NAND produced at Winbond's own fabrication plants in Taiwan includes built-in Error Correction Code (ECC), providing for high data integrity and long data retention.

Winbond's OctalNAND sets a new benchmark for SLC NAND Flash performance. Featuring an x8 I/O architecture, the new W35N-JW family offers a maximum continuous Read throughput of 240MB/s.

SpiFlash® NOR Flash for ultimate performance

NOR Flash has traditionally been used for automotive code storage because of its long endurance and ultra-low bit error rates. New vehicle-to-infrastructure and other V2X communications systems require this high level of reliability, but also high bandwidth to support mobile broadband connectivity.

The latest SpiFlash® NOR products from Winbond with built-in ECC are available in capacities ranging from 512Mb to 2Gb, and for supply voltages of 3V and 1.8V. They support equivalent clock rates of up to 532MHz in Quad I/O mode.



Comprehensive product offering for automotive customers

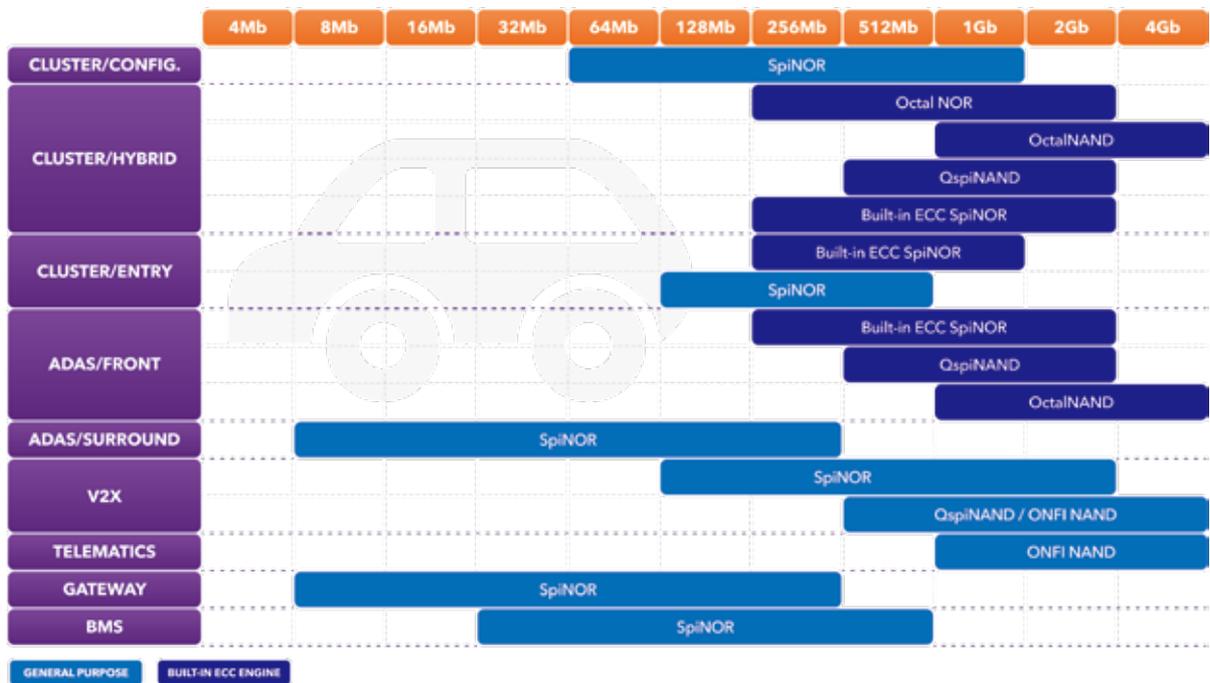
Looking more broadly across the range of automotive use cases, Winbond has built a portfolio of SpiNOR and NAND Flash products which meets the needs of any application. Winbond’s range of AEC-Q100 qualified Flash parts includes products rated as Grade 3 (operating at up to 85°C), Grade 2 (up to 105°C) and Grade 1 (up to 125°C), available in densities up to 1Gb in SpiNOR and up to 8Gb in QspiNAND Flash.

Automotive Flash parts include Winbond’s proven ECC engine which provides an assurance of data integrity sufficient for safety- and mission-critical functions in a vehicle.

	Automotive Grade 3	Automotive Grade 2	Automotive Grade 1
Temperature Range	-40°C~85°C	-40°C~105°C	-40°C~125°C
Part # Example	W25Q64JVSSBQ	W25Q64JVSSAQ	W25Q64JVSSSQ
AEC-Q100 Compliant	Yes	Yes	Yes
Change Control (PPAP)	Optional	Optional	Optional



WINBOND FLASH USAGE IN AUTOMOTIVE





DRAM for the connected smart car

- High speed, low power: new LPDDR4 products feature x16 SDP and x32 DDP data widths
- High performance 4Gb DDR4 introduced in 2020

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Demand for increasing connectivity, autonomy, electrification and graphics-based user interfaces are leading car manufacturers to embed ever more sophisticated software in Advanced Driver Assistance Systems (ADAS), V2X communications systems, infotainment devices and the instrument cluster.

These systems run on high-speed microcontrollers and processors: to maintain high performance and to support instant boot, these devices require fast external memory. At the same time, the drive to reduce fuel consumption or to extend the driving range of battery-powered electric vehicles (EVs) is boosting demand for low-power alternatives to conventional synchronous DRAM memories.

Winbond is addressing the need for high performance and low power with a suite of new DRAM product introductions.





DRAM for highest performance

Winbond DDR3 in a new high capacity of 4Gb became available for sampling now. Supporting data widths of x8 and x16, Winbond's DDR3 offers data rates up to 2133MT/s. An even higher-speed option, DDR4 in densities up to 4Gb, is coming on stream now.

High-speed, medium-density DDR3 and DDR4 SDRAM is ideal for use in applications such as:

- Gateways
- V2X
- ADAS
- Telematics
- Infotainment
- Instrument cluster



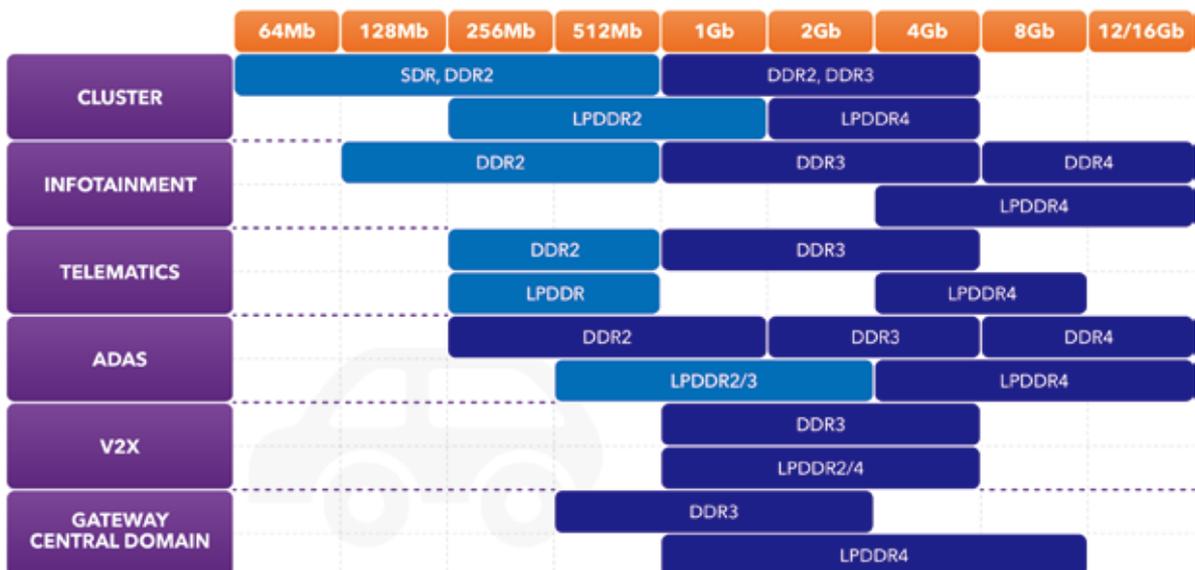


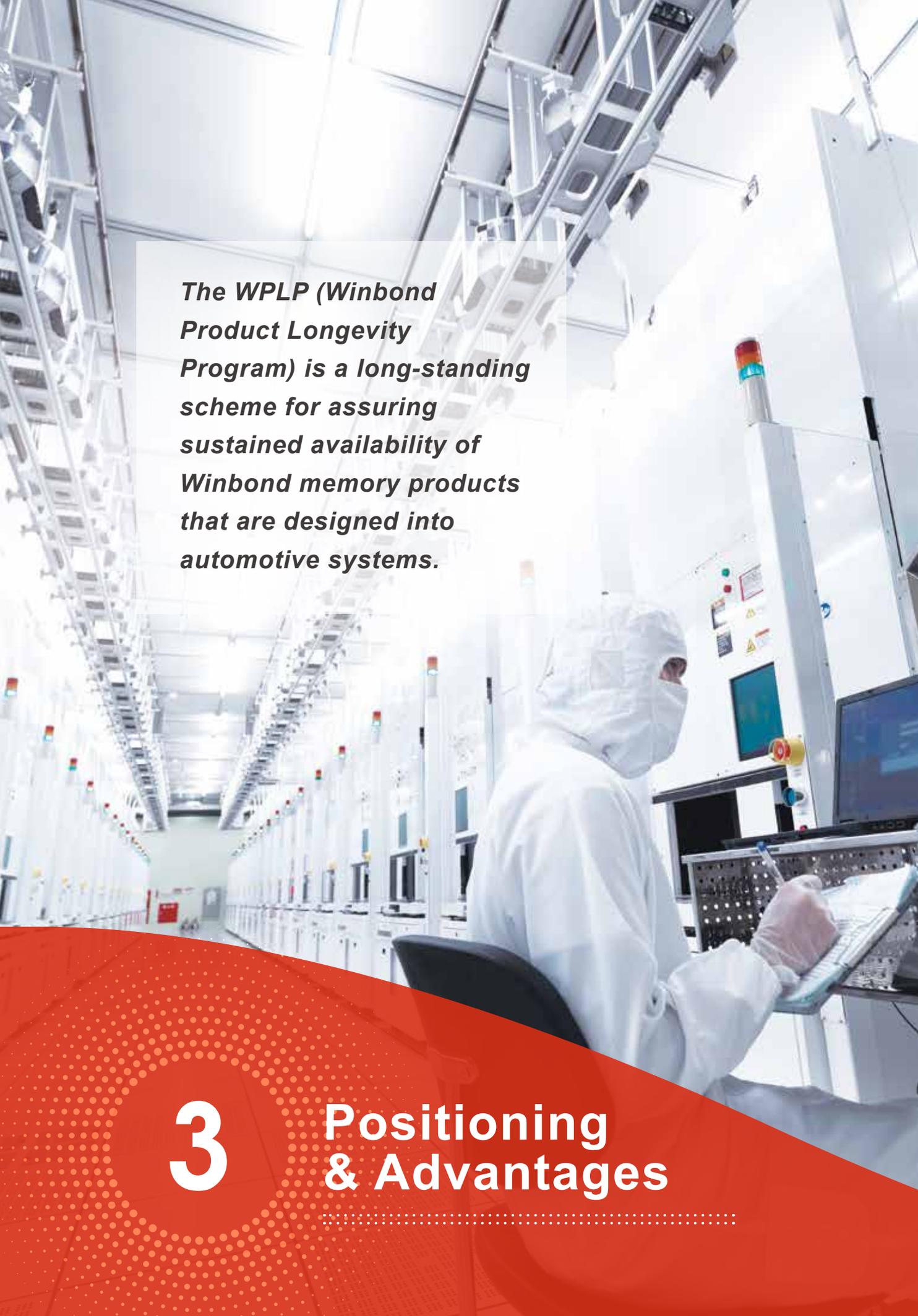
High-speed DRAM for low-power operation

The JEDEC-compliant LPDDR4 products from Winbond provide for high-speed memory operations at a low supply voltage of 1.8V/1.1V, and just 0.6V in quiescent mode.

The latest LPDDR4 products from Winbond include a 2Gb LPDDR4 device with a x16 interface, and a 4Gb, x32 product. LPDDR4 products in densities up to 8Gb and with data width up to x32 are under development. High-performance LPDDR4 is ideal for use in applications such as the instrument cluster, infotainment, telematics and ADAS.

WINBOND DRAM USAGE IN AUTOMOTIVE



A worker in a white cleanroom suit is seated at a workstation in a large industrial facility. The worker is looking at a laptop and writing on a clipboard. The background shows long rows of machinery with overhead lighting and various control panels.

The WPLP (Winbond Product Longevity Program) is a long-standing scheme for assuring sustained availability of Winbond memory products that are designed into automotive systems.

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Positioning & Advantages

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A trusted memory supplier to the world's leading automotive OEMs

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Winbond is the world leader in the market to supply NOR Flash and SLC NAND Flash products. In addition, it is responsible for many of the most important innovations in low-power mobile DRAM technology.

This leading position, and its long track record of producing high-quality, high-reliability semiconductor devices at its own 12" wafer fabrication plant in Taiwan, have led 14 of the world's top 15 automotive OEMs to choose Winbond as a supplier of memory products.

The Winbond quality promise is assured by a comprehensive set of automotive industry certificates and qualifications:

- IATF 16949
- ISO 9001 v2015
- Membership of AEC-Q100 and JEDEC Automotive committees

In 2019, Winbond was also certified compliant with the ISO 26262 functional safety standard.



Continued investment in fabrication for security of supply

Winbond continues to invest in the development of in-house fabrication process technology, providing constant improvements in the performance, reliability and power consumption of the Winbond product portfolio.

This commitment to in-house fabrication of Flash and DRAM wafers gives confidence to automotive customers that Winbond can maintain supply in line with their production plan, even in dynamic market conditions.

This means that automotive customers can rely on Winbond to maintain a secure and reliable supply, and to limit the risk of disruption to production schedules because of supply shortages.



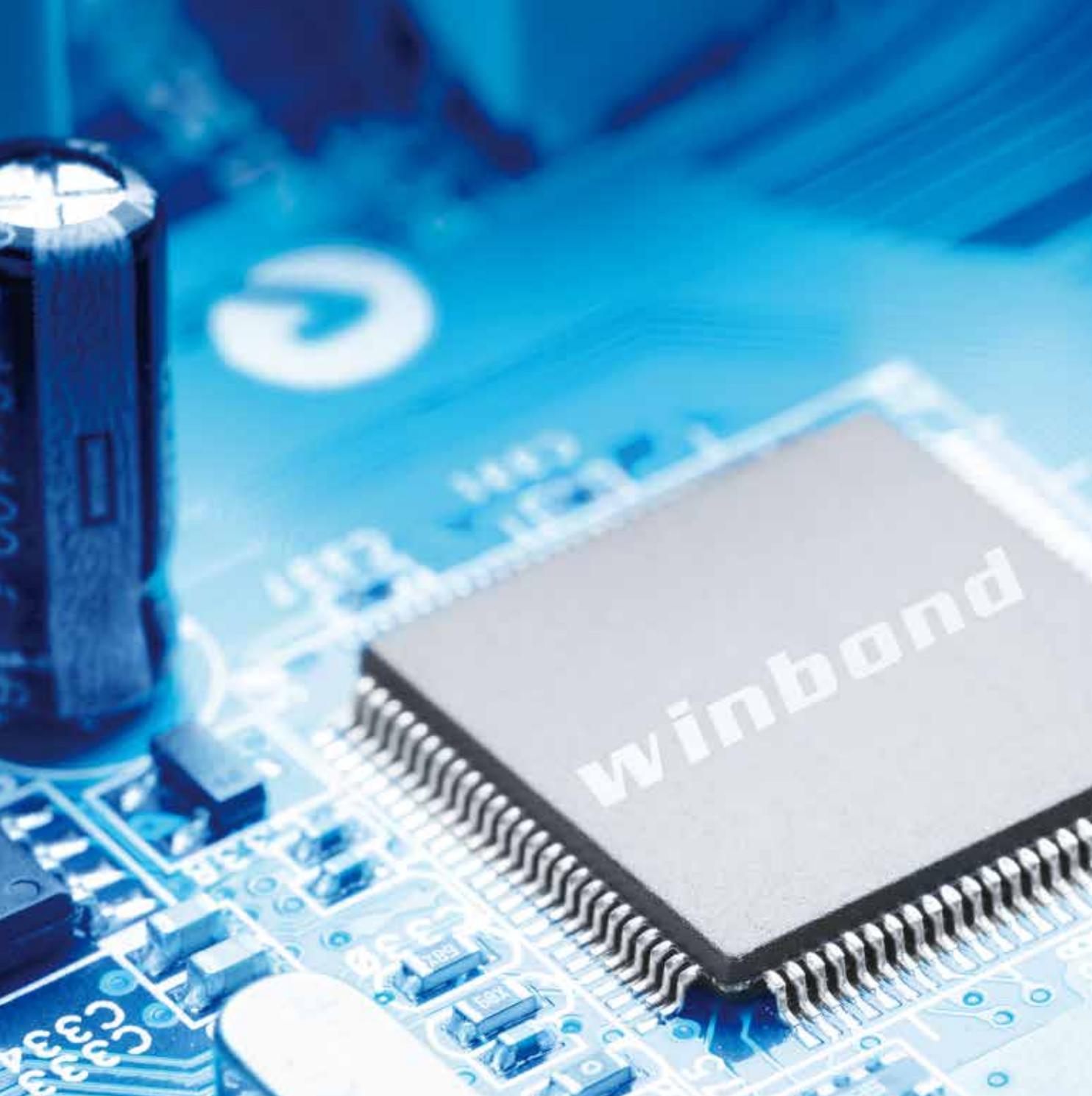


Support for long automotive life cycles

The WPLP (Winbond Product Longevity Program) is a long-standing scheme for assuring sustained availability of Winbond memory products that are designed into automotive systems. This longevity program supports the long production lifetimes of automotive products, which can extend to ten years for specialty or industrial vehicles.

Under the WPLP, Winbond guarantees that selected products will be available in mass production for a minimum of ten years from the date of the product's introduction. Automotive-grade products are subject to 12 months' notice of end-of-life (EOL) and the placement of final orders, and 24 months' notice of the final shipment date





4

Automotive Product Brief



Automotive Product Brief

Code Storage Flash Memory

Serial NOR Flash

2Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W25H02JV	2.7V - 3.6V	104MHz	-40°C ~ 85°C	SPI / QPI / DTR, On-Chip ECC	UD

1Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W25H01JV	2.7V - 3.6V	104MHz	-40°C ~ 105°C	SPI / QPI / DTR, On-Chip ECC	UD
W25Q01NW	1.65V - 1.95V	133MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	UD
W25Q01NW_DTR	1.65V - 1.95V	133MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	UD

512Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q512NW	1.65V - 1.95V	133MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	UD
W25Q512NW_DTR	1.65V - 1.95V	133MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	UD
W25Q512JV	2.7V - 3.6V	104MHz	-40°C ~ 105°C	SPI, 4 I/O Fixed	P
W25Q512JV_DTR	2.7V - 3.6V	104MHz	-40°C ~ 105°C	SPI / QPI / DTR	P
W25M512JW	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI, Simultaneous Operation	P

256Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25H256JV	2.7V - 3.6V	104MHz	-40°C ~ 85°C	SPI / QPI / DTR, On-Chip ECC	P
W25Q256JV	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	3 or 4-Byte Addressing Modes, 4 I/O Fixed	P
W25Q256JV_DTR	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P
W25Q256JW	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q256JW_DTR	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P

Status : P= Mass Production, S= Samples, UD= Under Development

128Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q128JV	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q128JV_DTR	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P
W25Q128JW	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q128JW_DTR	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P

64Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q64JV	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q64JV_DTR	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P
W25Q64JW	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q64JW_DTR	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P

32Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q32JV	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q32JV_DTR	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P
W25Q32JW	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q32JW_DTR	1.7V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P

16Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q16JV	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q16JV_DTR	2.7V - 3.6V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P
W25Q16DV	2.7V - 3.6V	84MHz	-40°C ~ 105°C / 125°C	SPI with Single, Dual, Quad I/O	P
W25Q16DW	1.7V - 1.95V	80MHz	-40°C ~ 105°C / 125°C	SPI with Single, Dual, Quad I/O	P
W25Q16JW	1.65V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI, 4 I/O Fixed	P
W25Q16JW_DTR	1.65V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI / DTR	P
W25Q16FW	1.65V - 1.95V	104MHz	-40°C ~ 105°C / 125°C	SPI / QPI	P

8Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q80DV	2.7V - 3.6V	80MHz	-40°C ~ 125°C	SPI with Single, Dual, Quad I/O	P
W25Q80EW	1.65V - 1.95V	104MHz	-40°C ~ 85°C	SPI with Single, Dual, Quad I/O	P

4Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q40CV	2.7V - 3.6V	80 / 104MHz	-40°C ~ 125°C	SPI with Single, Dual, Quad I/O	P
W25Q40EW	1.65V - 1.95V	104MHz	-40°C ~ 85°C	SPI with Single, Dual, Quad I/O	P

Status : P= Mass Production, S= Samples, UD= Under Development

2Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q20CV	2.7V - 3.6V	80 / 104MHz	-40°C ~ 125°C	SPI with Single, Dual, Quad I/O	P
W25Q20EW	1.65V - 1.95V	104MHz	-40°C ~ 85°C	SPI with Single, Dual, Quad I/O	P

1Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25Q10EW	1.65V - 1.95V	104MHz	-40°C ~ 85°C	SPI with Single, Dual, Quad I/O	P

QspiNAND Flash

2Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W25M02GV	2.7V - 3.6V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard Serial Interface with x1 / x2 / x4 Bus Width	P
W25N02JW	1.7V - 1.95V	STR166MHz / DTR83MHz	-40°C ~ 85°C -40°C ~ 105°C	SPI / QPI / DTR, On-Chip ECC	P

1Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W25N01GV	2.7V - 3.6V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard Serial Interface with x1/x2/x4 Bus Width	P
W25N01JW	1.7V - 1.95V	STR166 MHz / DTR83 MHz	-40°C ~ 85°C -40°C ~ 105°C	SPI / QPI / DTR, On-Chip ECC	P

512Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W25N512GV	2.7V - 3.6V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard Serial Interface with x1 / x2 / x4 Bus Width	P
W25N512GW	1.7V - 1.95V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard Serial Interface with x1 / x2 / x4 Bus Width	S

High Performance QspiNAND Flash

2Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W25N02JW	1.7V - 1.95V	STR166MHz / DTR83MHz	-40°C ~ 85°C -40°C ~ 105°C	SPI / QPI / DTR, On-Chip ECC	P

1Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W25N01JW	1.7V - 1.95V	STR166MHz / DTR83MHz	-40°C ~ 85°C -40°C ~ 105°C	SPI / QPI / DTR, On-Chip ECC	P

Status : P= Mass Production, S= Samples, UD= Under Development

OctalNAND Flash

2Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W35N02JW	1.7V - 1.95V	STR166MHz / DTR120 MHz	-40°C ~ 85°C -40°C ~ 105°C	SPI / DTR, On-Chip ECC	UD

1Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W35N01JW	1.7V - 1.95V	STR166MHz / DTR120MHz	-40°C ~ 85°C -40°C ~ 105°C	SPI / DTR, On-Chip ECC	UD

SLC NAND Flash

8Gb

Part No.	Voltage	Speed	I/O	Temperature	Features	Status
W29N08GV	2.7V - 3.6V	40MHz	x8	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	P
W29N08GZ	1.7V - 1.95V	40MHz	x8	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	UD
W29N08GW	1.7V - 1.95V	40MHz	x16	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	UD

4Gb

Part No.	Voltage	Speed	I/O	Temperature	Features	Status
W29N04GV	2.7V - 3.6V	40MHz	x8	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	P
W29N04GZ	1.7V - 1.95V	40MHz	x8	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	UD
W29N04GW	1.7V - 1.95V	40MHz	x16	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	UD

2Gb

Part No.	Voltage	Speed	I/O	Temperature	Features	Status
W29N02GV	2.7V - 3.6V	40MHz	x8	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	P
W29N02GZ	1.7V - 1.95V	29MHz	x8	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	S
W29N02GW	1.7V - 1.95V	29MHz	x16	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	S

Status : P= Mass Production, S= Samples, UD= Under Development

1Gb

Part No.	Voltage	Speed	I/O	Temperature	Features	Status
W29N01HV	2.7V - 3.6V	40MHz	x8	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	P
W29N01HZ	2.7V - 3.6V	40MHz	x8	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	S
W29N01HW	1.7V - 1.95V	40MHz	x16	-40°C ~ 85°C -40°C ~ 105°C	High Quality Single Level Cell (SLC) Technology Standard ONFI NAND Command Set	S

SpiStack® Flash

1Gb QspiNAND

Boost NOR	Part No.	Voltage	I/O	Page Size	Speed	Temperature	Status
16Mb Serial NOR	W25M161AV	2.7V - 3.6V	x4 / x4	128K+4KByte	104MHz	-40°C ~ 85°C	UD
16Mb Serial NOR	W25M161AW	1.7V - 1.95V	x4 / x4	128K+4KByte	104MHz	-40°C ~ 85°C	UD
32Mb Serial NOR	W25M321AV	2.7V - 3.6V	x4 / x4	128K+4KByte	104MHz	-40°C ~ 85°C	S
32Mb Serial NOR	W25M321AW	1.7V - 1.95V	x4 / x4	128K+4KByte	104MHz	-40°C ~ 85°C	UD
64Mb Serial NOR	W25M641AV	2.7V - 3.6V	x4 / x4	128K+4KByte	104MHz	-40°C ~ 85°C	UD
64Mb Serial NOR	W25M641AW	1.7V - 1.95V	x4 / x4	128K+4KByte	104MHz	-40°C ~ 85°C	UD
128Mb Serial NOR	W25M121AV	2.7V - 3.6V	x4 / x4	128K+4KByte	104MHz	-40°C ~ 85°C	UD
128Mb Serial NOR	W25M121AW	1.7V - 1.95V	x4 / x4	128K+4KByte	104MHz	-40°C ~ 85°C	UD

512Mb Serial NOR (2x256Mb)

Part No.	Voltage	Speed	Temperature	Features	Status
W25M512JW	1.7V - 1.95V	104MHz	-40°C ~ 85°C	SPI / QPI, Simultaneous Operation	UD

2Gb QspiNAND (2x1Gb)

Part No.	Voltage	Speed	Temperature	Features	Status
W25M02GV	2.7V - 3.6V	104MHz	-40°C ~ 85°C	High Quality Single Level Cell (SLC) Technology Standard Serial Interface with x1 / x2 / x4 Bus Width	P

Status : P= Mass Production, S= Samples, UD= Under Development

Authentication Flash

2Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W74M02GV	2.7V - 3.6V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and/or Module Authentication Flash Command and Socket Compatible	UD

1Gb

Part No.	Voltage	Speed	Temperature	Features	Status
W74M01GV	2.7V - 3.6V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	S

512Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W47M51JV	2.7V - 3.6V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	S
W74M51NW	1.7V - 1.95V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	UD

256Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W74M25JV	2.7V - 3.6V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	S
W74M25JW	1.7V - 1.95V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	S

128Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W74M12JV	2.7V - 3.6V	133MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	S
W74M12JW	1.7V - 1.95V	133MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	S

64Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W74M64JV	2.7V - 3.6V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	S
W74M64JW	1.7V - 1.95V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	Device and / or Module Authentication Flash Command and Socket Compatible	S

Status : P= Mass Production, S= Samples, UD= Under Development

0Mb

Part No.	Voltage	Speed	Temperature	Features	Status
W74M00AV	2.7V - 3.6V	80MHz	-40°C ~ 85°C -40°C ~ 105°C	One-Time-Password Authentication Standard SPI Interface	S
W74M00AW	1.7V - 1.95V	104MHz	-40°C ~ 85°C -40°C ~ 105°C	One-Time-Password Authentication Standard SPI Interface	S

Specialty DRAM

SDRAM

16Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9816G6JB	3.3V	166 / 200Mbps	-40°C ~ 95°C -40°C ~ 105°C	1Mbit x 16	P
W9816G6JH					

64Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9864G2JB	2.5V / 3.3V	166 / 200Mbps	-40°C ~ 95°C -40°C ~ 105°C	2Mbit x 32	P
W9864G2JH				2Mbit x 32	
W9864G6JB	3.3V	166 / 200Mbps	-40°C ~ 95°C -40°C ~ 105°C	4Mbit x 16	
W9864G6JT				4Mbit x 16	
W9864G6KH	2.5V / 3.3V	166 / 200Mbps	-40°C ~ 95°C -40°C ~ 105°C	4Mbit x 16	

128Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9812G2KB	3.3V	166Mbps	-40°C ~ 95°C -40°C ~ 105°C	4Mbit x 32	P
W9812G6JB		133 / 166Mbps		8Mbit x 16	
W9812G6KH		133 / 166 / 200Mbps		8Mbit x 16	

256Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9825G6JB	3.3V	133 / 166Mbps	-40°C ~ 95°C -40°C ~ 105°C	16Mbit x 16	P
W9825G6KH		133 / 166 / 200Mbps		16Mbit x 16	

Status : P= Mass Production, S= Samples, UD= Under Development

DDR SDRAM

64Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9464G6KH	2.5V	400Mbps	-40°C ~ 95°C -40°C ~ 105°C	4Mbit x 16	P

128Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9412G6KH	2.5V	400 / 500Mbps	-40°C ~ 95°C -40°C ~ 105°C	8Mbit x 16	P

256Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9425G6KH	2.5V	400 / 500Mbps	-40°C ~ 95°C -40°C ~ 105°C	16Mbit x 16	P

DDR2 SDRAM

128Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9712G6KB	1.8V	666 / 800Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	8Mbit x 16	P

256Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9725G6KB	1.8V	666 / 800 / 1066Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	16Mbit x 16	P
W9725G8KB				32Mbit x 8	

512Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W9751G6KB	1.8V	666 / 800 / 1066Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	32Mbit x 16	P
W9751G8KB				64Mbit x 8	
W9751G6NB				32Mbit x 16	UD
W9751G8NB				64Mbit x 8	UD

1Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W971GG6SB	1.8V	666 / 800 / 1066Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C	64Mbit x 16	P
W971GG8SS				128Mbit x 8	

2Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W972GG6KB	1.8V	666 / 800 / 1066Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	128Mbit x 16	P
W972GG8KS				256Mbit x 8	

Status : P= Mass Production, S= Samples, UD= Under Development

DDR3 SDRAM

1Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W631GG6MB	1.5V	1866 / 2133Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C	64Mbit x 16	P
W631GG8MB				128Mbit x 8	
W631GU6MB	1.35V			64Mbit x 16	
W631GU8MB				128Mbit x 8	
W631GG6NB	1.5V			64Mbit x 16	UD
W631GG8NB				128Mbit x 8	
W631GU6NB	1.35V			64Mbit x 16	
W631GU8NB				128Mbit x 8	

2Gb

Part No.	Voltage	Speed	Temperature	Organization	Status	
W632GG6MB	1.5V	1866 / 2133Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C	128Mbit x 16	P	
W632GG8MB				256Mbit x 8		
W632GU6MB	1.35V			128Mbit x 16		
W632GU8MB				256Mbit x 8		
W632GG6NB	1.5V			128Mbit x 16		UD
W632GG8NB				256Mbit x 8		
W632GU6NB	1.35V			128Mbit x 16		
W632GU8NB				256Mbit x 8		

4Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W634GG6MB	1.5V	1866 / 2133Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C	128Mbit x 16	P
W634GG8MB				256Mbit x 8	
W634GU6MB	1.35V			128Mbit x 16	
W634GU8MB				256Mbit x 8	
W634GG6NB	1.5V			128Mbit x 16	UD
W634GG8NB				256Mbit x 8	
W634GU6NB	1.35V			128Mbit x 16	
W634GU8NB				256Mbit x 8	

DDR4 SDRAM

4Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W664GG8NB	1.2V	2133 / 2400Mbps	-40°C ~ 95°C -40°C ~ 105°C	512Mbit x 8	UD

Mobile DRAM

HyperRAM™

64Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W956D8MB	1.8V / 1.8V	400Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	8Mbit x 8	P
W956A8MB	3V / 3V	333 / 400Mbps		8Mbit x 8	

Status : P= Mass Production, S= Samples, UD= Under Development

128Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W957D8MF	1.8V / 1.8V	400Mbps	-40°C ~ 95°C	16Mbit x 8	S
W957A8MF	3V / 3V	333 / 400Mbps	-40°C ~ 105°C -40°C ~ 115°C	16Mbit x 8	

Low Power DDR SDRAM

512Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W949D6DBH	1.8V / 1.8V	333 / 400Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	32Mbit x16	P
W949D2DBJ				16Mbit x 32	

1Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W94AD6KBH	1.8V / 1.8V	333 / 400Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	64Mbit x 16	P
W94AD2KBJ				32Mbit x 32	

Low Power DDR2 SDRAM

256Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W978H6KBV	1.8V / 1.2V	800 / 1066Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	16Mbit x 16	P
W978H2KBV				8Mbit x 32	

512Mb

Part No.	Voltage	Speed	Temperature	Organization	Status
W979H2KBV	1.8V / 1.2V	800 / 1066Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	32Mbit x 16	P
W979H6KBV				16Mbit x 32	

1Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W97AH6KBV	1.8V / 1.2V	800 / 1066Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	64Mbit x 16	P
W97AH2KBV				32Mbit x 32	
W97AH6NBV				64Mbit x 16	
W97AH6NBV				32Mbit x 32	

2Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W97BH6MBV	1.8V / 1.2V	800 / 1066Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C	128Mbit x 16	P
W97BH2MBV				64Mbit x 32	

Low Power DDR4 SDRAM

1Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W66Ax6NBU	1.8V / 1.1V / 1.1V	3200 / 3733 / 4266Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C	64Mbit x 16	UD

Status : P= Mass Production, S= Samples, UD= Under Development

2Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W66Bx6NBU	1.8V / 1.1V / 1.1V	3200 / 3733 / 4266Mbps	-40°C ~ 95°C	128Mbit x 16	S
W66Bx2NQU			-40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C		UD

4Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W66Cx6NBU	1.8V / 1.1V / 1.1V	3200 / 3733 / 4266Mbps	-40°C ~ 95°C	256Mbit x 16	UD
W66Cx2NQU			-40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C		128Mbit x 32 S

8Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W66Dx2NQU	1.8V / 1.1V / 1.1V	3200 / 3733 / 4266Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C	256Mbit x 32	UD

Low Power DDR4X SDRAM

1Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W66Ax6NBU	1.8V / 1.1V / 0.6V	3200 / 3733 / 4266Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C	64Mbit x 16	UD

2Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W66Bx6NBU	1.8V / 1.1V / 0.6V	3200 / 3733 / 4266Mbps	-40°C ~ 95°C	128Mbit x 16	S
W66Bx2NQU			-40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C		64Mbit x 32 UD

4Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W66Cx6NBU	1.8V / 1.1V / 0.6V	3200 / 3733 / 4266Mbps	-40°C ~ 95°C	256Mbit x 16	UD
W66Cx2NQU			-40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C		128Mbit x 32 S

8Gb

Part No.	Voltage	Speed	Temperature	Organization	Status
W66Dx2NQU	1.8V / 1.1V / 0.6V	3200 / 3733 / 4266Mbps	-40°C ~ 95°C -40°C ~ 105°C -40°C ~ 115°C -40°C ~ 125°C	256Mbit x 32	UD

Status : P= Mass Production, S= Samples, UD= Under Development



Technical Support

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