

QSPI NAND Flash

Robust Performance -

Throughput up to **83MB/s** with Continuous Read

Winbond's QSPI NAND Flash provides excellent reliability and performance for embedded designers in need of higher-density code storage. Available in densities ranging from 512Mb to 8Gb, the W25N QSPI NAND features a Quad SPI interface with x1, x2, or x4 bus widths and supports 1.8V or 3V operation. This makes it a cost-effective alternative to high-density NOR Flash when storage needs exceed 512Mb.

The W25N series offers faster programming and erase times, with compact packaging that is up to 80% smaller than ONFI NAND, helping to reduce PCB space and overall production costs. It also ensures seamless integration into existing SPI-based designs, providing a dependable and budget-friendly solution without compromising system performance.



ONFI NAND Flash

80% Package Size Reduction

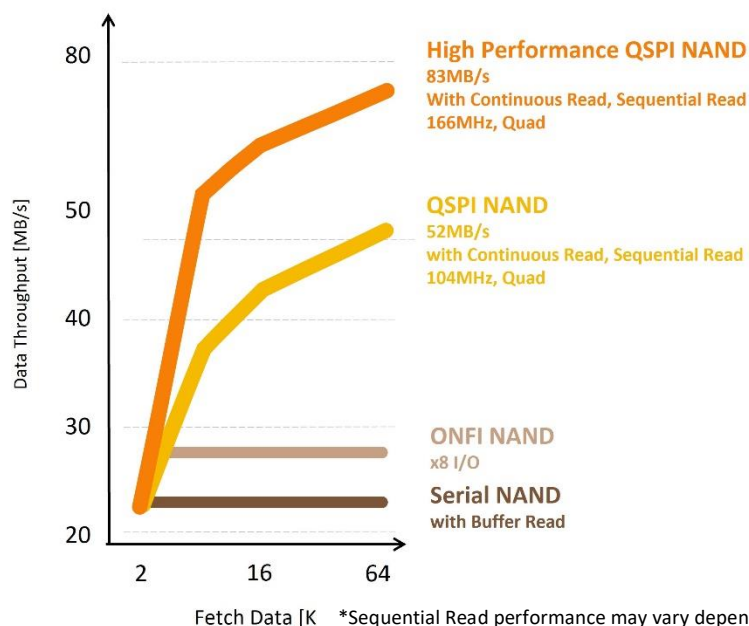


QSPI NAND Flash

High-Speed Performance with Robust Reliability

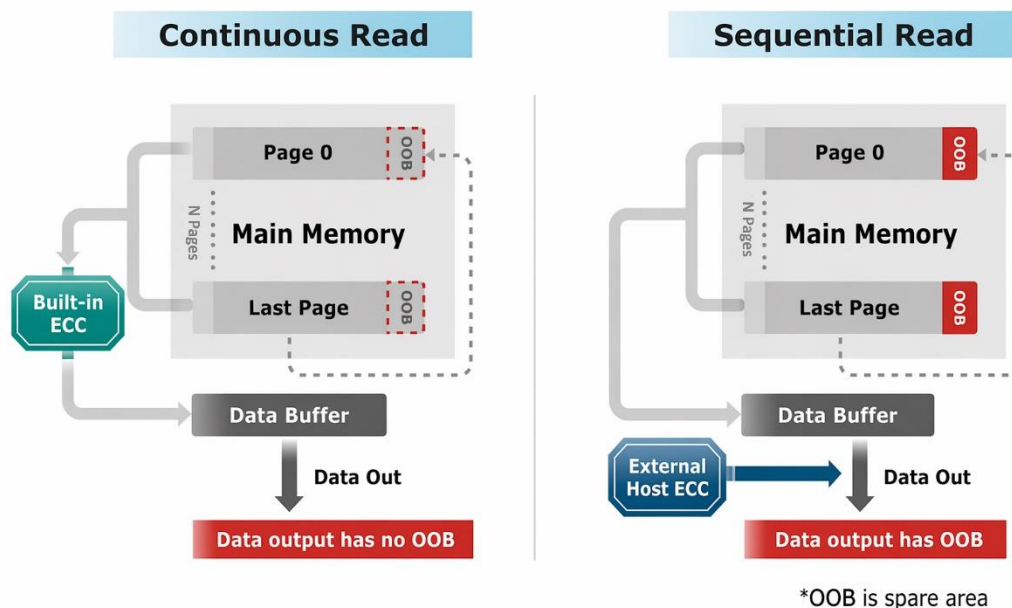
Winbond's QSPI NAND Flash are designed to deliver fast and reliable code execution for demanding systems. Code stored in Flash can be efficiently transferred to DRAM using Continuous Read and Sequential Read modes, enabling high-speed execution with minimal latency.

With Continuous Read mode operating at 166MHz, these devices achieve throughput of up to 83MB/s and also support DTR (Double Transfer Rate) for enhanced performance.



Optimized Read Access with Minimal Latency

Both Continuous and Sequential Read modes allow access to the entire memory array using a single read instruction. By eliminating latency between page reads, data output remains seamless across page and block boundaries, ensuring smooth and consistent performance.



Built-In Data Integrity and Reliability Features

Winbond's QSPI NAND Flash integrates several hardware-based reliability enhancements:

- **Built-in ECC (Error Correcting Code)** to detect and correct errors internally, reducing processing load on the host controller
- **Read Level Setting (Read Retry)** to dynamically adjust read voltage levels, improving data readability and extending product lifespan
- **Bad Block Management Lookup Table (BBM LUT)** to manage and replace bad blocks, enabling access to more consecutive good blocks.

Ideal for High-Performance Applications

With its combination of high-speed data transfer, advanced read functionality, and robust data integrity features, the W25N QSPI NAND Flash is a dependable solution for code storage in high-performance systems. It is especially well-suited for **industrial, networking, and other performance-critical applications**.

Please note: NAND Flash memory requires a controller to manage various functions related to error detection and correction, as well as memory block management. Winbond's QSPI NAND features built-in ECC, which handles error detection and correction, thereby offloading these tasks from the controller.

Winbond QSPI NAND Flash Memory Selection Guide (Industrial Grade)

Part Number	Density (bits)	Clock Frequency (MHz)	Min. Operating Voltage (V)	Max. Operating Voltage (V)	Min. Operating Temp. (°C)	Max. Operating Temp. (°C)	Page Size (Bytes)	Spare Area (Bytes)	Built-in ECC (bits)	Double Transfer Rate (DTR MHz)	Default Read Mode	Alternate Read Mode	Package
W25N08MWZEIG	8G	166	1.7	1.95	-40	85	4096	256	8	83	Buffer Read	Continuous Read	VSON8 8x6mm
W25N08MWTBIG	8G	166	1.7	1.95	-40	85	4096	256	8	83	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N08LVZEIG	8G	133	2.7	3.6	-40	85	4096	256	8	66	Buffer Read	Continuous Read	WSON8 8x6mm
W25N08LVZEIT	8G	133	2.7	3.6	-40	85	4096	256	8	66	Continuous Read	Buffer Read	WSON8 8x6mm
W25N08LVTBIG	8G	133	2.7	3.6	-40	85	4096	256	8	66	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N08LWZEIG	8G	104	1.7	1.95	-40	85	4096	256	8		Buffer Read	Continuous Read	WSON8 8x6mm
W25N08LWTBIG	8G	104	1.7	1.95	-40	85	4096	256	8		Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N04MWZEIG	4G	166	1.7	1.95	-40	85	4096	256	8	83	Buffer Read	Continuous Read	WSON8 8x6mm
W25N04MWTBIG	4G	166	1.7	1.95	-40	85	4096	256	8	83	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N04LWZEIG	4G	104	1.7	1.95	-40	85	4096	256	8		Buffer Read	Continuous Read	WSON8 8x6mm
W25N04LWZEIE ⁽¹⁾	4G	104	1.7	1.95	-40	85	4096	256	8		Buffer Read	Sequential Read	WSON8 8x6mm
W25N04LWTBIG	4G	104	1.7	1.95	-40	85	4096	256	8		Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N04LVCEIE ²	4G	133	2.7	3.6	-40	85	4096	256	8	66	Buffer Read	Sequential Read	WSON8 8x6mm
W25N04LVCEIG	4G	133	2.7	3.6	-40	85	4096	256	8	66	Buffer Read	Continuous Read	WSON8 8x6mm
W25N04LVCEIT	4G	133	2.7	3.6	-40	85	4096	256	8	66	Continuous Read	Buffer Read	WSON8 8x6mm
W25N04LVCBIG	4G	133	2.7	3.6	-40	85	4096	256	8	66	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N02MWZEIG	2G	166	1.7	1.95	-40	85	2048	128	8	83	Buffer Read	Continuous Read	WSON8 8x6mm
W25N02MWTBIG	2G	166	1.7	1.95	-40	85	2048	128	8	83	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N02LVCEIG	2G	133	2.7	3.6	-40	85	2048	128	8	66	Buffer Read	Continuous Read	WSON8 8x6mm
W25N02LVCEIT	2G	133	2.7	3.6	-40	85	2048	128	8	66	Continuous Read	Buffer Read	WSON8 8x6mm
W25N02LVCBIG	2G	133	2.7	3.6	-40	85	2048	128	8	66	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N02LVCEIE ⁽¹⁾	2G	133	2.7	3.6	-40	85	2048	128	8	66	Buffer Read	Sequential Read	WSON8 8x6mm
W25N02LWCEIE ⁽¹⁾	2G	104	1.7	1.95	-40	85	2048	128	8		Buffer Read	Sequential Read	WSON8 8x6mm
W25N02LWCEIG	2G	104	1.7	1.95	-40	85	2048	128	8		Buffer Read	Continuous Read	WSON8 8x6mm
W25N02LWCBIG	2G	104	1.7	1.95	-40	85	2048	128	8		Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N02JWZEIF	2G	166	1.7	1.95	-40	85	2048	64	1	83	Buffer Read	Continuous Read	WSON8 8x6mm
W25N02JWTBIF	2G	166	1.7	1.95	-40	85	2048	64	1	83	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N01JWSFIG ⁽¹⁾	1G	166	1.7	1.95	-40	85	2048	64	1	80	Buffer Read	Continuous Read	SOP16 300mil
W25N01JWZEIG	1G	166	1.7	1.95	-40	85	2048	64	1	80	Buffer Read	Continuous Read	WSON8 8x6mm
W25N01JWZEIT	1G	166	1.7	1.95	-40	85	2048	64	1	83	Continuous Read	Buffer Read	WSON8 8x6mm
W25N01JWTBIG ⁽¹⁾	1G	166	1.7	1.95	-40	85	2048	64	1	80	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N01JWSFIT ⁽¹⁾	1G	166	1.7	1.95	-40	85	2048	64	1	80	Continuous Read	Buffer Read	SOP16 300mil
W25N01JWZEIT ⁽¹⁾	1G	166	1.7	1.95	-40	85	2048	64	1	80	Continuous Read	Buffer Read	WSON8 8x6mm
W25N01JWTBIT ⁽¹⁾	1G	166	1.7	1.95	-40	85	2048	64	1	80	Continuous Read	Buffer Read	TFBGA24 8x6mm(5x5-1)
W25N01KVZPIR	1G	104	2.7	3.6	-40	85	2048	64	4		Buffer Read	-	WSON8 6x5mm
W25N01KVZEIR	1G	104	2.7	3.6	-40	85	2048	64	4		Buffer Read	-	WSON8 8x6mm
W25N01KVZPIU ⁽¹⁾	1G	104	2.7	3.6	-40	85	2048	96	4		Sequential Read	Buffer Read	WSON8 6x5mm
W25N01KVZUIU ⁽¹⁾	1G	104	2.7	3.6	-40	85	2048	96	4		Sequential Read	Buffer Read	WSON8 8x6mm
W25N01KVZPIE ⁽¹⁾	1G	104	2.7	3.6	-40	85	2048	96	4		Buffer Read	Sequential Read	WSON8 6x5mm
W25N01KVZEIE ⁽¹⁾	1G	104	2.7	3.6	-40	85	2048	96	4		Buffer Read	Sequential Read	WSON8 8x6mm
W25N512GVFIG ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Buffer Read	Continuous Read	SOP16 300mil
W25N512GVPIG ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Buffer Read	Continuous Read	WSON8 6x5mm
W25N512GVEIG	512M	166	2.7	3.6	-40	85	2048	64	1		Buffer Read	Continuous Read	WSON8 8x6mm
W25N512GVBIG ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N512GVFIT ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Continuous Read	Buffer Read	SOP16 300mil
W25N512GVPIT ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Continuous Read	Buffer Read	WSON8 6x5mm
W25N512GVEIT	512M	166	2.7	3.6	-40	85	2048	64	1		Continuous Read	Buffer Read	WSON8 8x6mm
W25N512GVBIT ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Continuous Read	Buffer Read	TFBGA24 8x6mm(5x5-1)

Winbond QSPI NAND Flash Memory Selection Guide (Industrial Grade)

Part Number	Density (bits)	Clock Frequency (MHz)	Min. Operating Voltage (V)	Max. Operating Voltage (V)	Min. Operating Temp. (°C)	Max. Operating Temp. (°C)	Page Size (Bytes)	Spare Area (Bytes)	Built-in ECC (bits)	Double Transfer Rate (DTR MHz)	Default Read Mode	Alternate Read Mode	Package
W25N512GVFIR ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Buffer Read	-	SOP16 300mil
W25N512GVPIR ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Buffer Read	-	WS0N8 6x5mm
W25N512GVEIR ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Buffer Read	-	WS0N8 8x6mm
W25N512GVBIR ⁽¹⁾	512M	166	2.7	3.6	-40	85	2048	64	1		Buffer Read	-	TFBGA24 8x6mm(5x5-1)
W25N512GWFIT ⁽¹⁾	512M	104	1.7	1.95	-40	85	2048	64	1		Continuous Read	Buffer Read	SOP16 300mil
W25N512GWPIR ⁽¹⁾	512M	104	1.7	1.95	-40	85	2048	64	1		Continuous Read	Buffer Read	WS0N8 6x5mm
W25N512GWEIR ⁽¹⁾	512M	104	1.7	1.95	-40	85	2048	64	1		Continuous Read	Buffer Read	WS0N8 8x6mm
W25N512GWBIR ⁽¹⁾	512M	104	1.7	1.95	-40	85	2048	64	1		Continuous Read	Buffer Read	TFBGA24 8x6mm(5x5-1)
W25N512GWYIT	512M	104	1.7	1.95	-40	85	2048	64	1		Continuous Read	Buffer Read	WLCSP (48-ball)
W25N512GWFIR	512M	104	1.7	1.95	-40	85	2048	64	1		Buffer Read	-	SOP16 300mil
W25N512GWPIR ⁽¹⁾	512M	104	1.7	1.95	-40	85	2048	64	1		Buffer Read	-	WS0N8 6x5mm
W25N512GWEIR	512M	104	1.7	1.95	-40	85	2048	64	1		Buffer Read	-	WS0N8 8x6mm
W25N512GWBIR ⁽¹⁾	512M	104	1.7	1.95	-40	85	2048	64	1		Buffer Read	-	TFBGA24 8x6mm(5x5-1)
W25N512GWYIR	512M	104	1.7	1.95	-40	85	2048	64	1		Buffer Read	-	WLCSP (48-ball)

See datasheet for further technical information. This is subject to change without notice.

1) Please contact Winbond for inventory preparation.

Winbond QSPI NAND Flash Memory Selection Guide (Industrial Plus Grade)

Part Number	Density (bits)	Clock Frequency (MHz)	Min. Operating Voltage (V)	Max. Operating Voltage (V)	Min. Operating Temp. (°C)	Max. Operating Temp. (°C)	Page Size (Bytes)	Spare Area (Bytes)	Built-in ECC (bits)	Double Transfer Rate (DTR MHz)	Default Read Mode	Alternate Read Mode	Package
W25N08MWZEJG	8G	166	1.7	1.95	-40	105	4096	256	8	83	Buffer Read	Continuous Read	VSON8 8x6mm
W25N08MWTBJG	8G	166	1.7	1.95	-40	105	4096	256	8	83	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N08LWZEJG	8G	104	1.7	1.95	-40	105	4096	256	8		Buffer Read	Continuous Read	WSO8 8x6mm
W25N08LWTBJG	8G	104	1.7	1.95	-40	105	4096	256	8		Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N04MWZEJG	4G	166	1.7	1.95	-40	105	4096	256	8	83	Buffer Read	Continuous Read	WSO8 8x6mm
W25N04MWTBJG	4G	166	1.7	1.95	-40	105	4096	256	8	83	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N04LWTBJG	4G	104	1.7	1.95	-40	105	4096	256	8		Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N04LWZEJG	4G	104	1.7	1.95	-40	105	4096	256	8		Buffer Read	Continuous Read	WSO8 8x6mm
W25N04LVCEJG	4G	133	2.7	3.6	-40	105	4096	256	8	66	Buffer Read	Continuous Read	WSO8 8x6mm
W25N02LVCEJG	2G	133	2.7	3.6	-40	105	2048	128	8	66	Buffer Read	Continuous Read	WSO8 8x6mm
W25N02JWSFJF ⁽¹⁾	2G	166	1.7	1.95	-40	105	2048	64	1	80	Buffer Read	Continuous Read	SOP16 300mil
W25N02JWZEJF ⁽¹⁾	2G	166	1.7	1.95	-40	105	2048	64	1	80	Buffer Read	Continuous Read	WSO8 8x6mm
W25N02JWBTBJF ⁽¹⁾	2G	166	1.7	1.95	-40	105	2048	64	1	80	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N02JWSFJC ⁽¹⁾	2G	166	1.7	1.95	-40	105	2048	64	1	80	Continuous Read	Buffer Read	SOP16 300mil
W25N02JWZEJC ⁽¹⁾	2G	166	1.7	1.95	-40	105	2048	64	1	80	Continuous Read	Buffer Read	WSO8 8x6mm
W25N02JWBTBJC ⁽¹⁾	2G	166	1.7	1.95	-40	105	2048	64	1	80	Continuous Read	Buffer Read	TFBGA24 8x6mm(5x5-1)
W25N01JWSFJG ⁽¹⁾	1G	166	1.7	1.95	-40	105	2048	64	1	80	Buffer Read	Continuous Read	SOP16 300mil
W25N01JWZEJG ⁽¹⁾	1G	166	1.7	1.95	-40	105	2048	64	1	80	Buffer Read	Continuous Read	WSO8 8x6mm
W25N01JWBTBJG ⁽¹⁾	1G	166	1.7	1.95	-40	105	2048	64	1	80	Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N01JWSFJT ⁽¹⁾	1G	166	1.7	1.95	-40	105	2048	64	1	80	Continuous Read	Buffer Read	SOP16 300mil
W25N01JWZEJT ⁽¹⁾	1G	166	1.7	1.95	-40	105	2048	64	1	80	Continuous Read	Buffer Read	WSO8 8x6mm
W25N01JWBTJT ⁽¹⁾	1G	166	1.7	1.95	-40	105	2048	64	1	80	Continuous Read	Buffer Read	TFBGA24 8x6mm(5x5-1)
W25N01KVZPJR ⁽¹⁾	1G	104	2.7	3.6	-40	105	2048	64	4		Buffer Read	-	WSO8 6x5mm
W25N01KVZEJR ⁽¹⁾	1G	104	2.7	3.6	-40	105	2048	64	4		Buffer Read	-	WSO8 8x6mm
W25N01KVZPJU ⁽¹⁾	1G	104	2.7	3.6	-40	105	2048	96	4		Sequential Read	Buffer Read	WSO8 6x5mm
W25N01KVZEJU ⁽¹⁾	1G	104	2.7	3.6	-40	105	2048	96	4		Sequential Read	Buffer Read	WSO8 8x6mm
W25N01KVZPJE ⁽¹⁾	1G	104	2.7	3.6	-40	105	2048	96	4		Buffer Read	Sequential Read	WSO8 6x5mm
W25N01KVZEJE ⁽¹⁾	1G	104	2.7	3.6	-40	105	2048	96	4		Buffer Read	Sequential Read	WSO8 8x6mm
W25N01KWZPJG ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Buffer Read	Continuous Read	WSO8 6x5mm
W25N01KWZEJG ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Buffer Read	Continuous Read	WSO8 8x6mm
W25N01KWZPJT ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Continuous Read	Buffer Read	WSO8 6x5mm
W25N01KWZEJT ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Continuous Read	Buffer Read	WSO8 8x6mm
W25N01KWZPJR ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Buffer Read	-	WSO8 6x5mm
W25N01KWZEJR ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Buffer Read	-	WSO8 8x6mm
W25N01KWZPJU ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Sequential Read	Buffer Read	WSO8 6x5mm
W25N01KWZEJU ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Sequential Read	Buffer Read	WSO8 8x6mm
W25N01KWZPJE ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Buffer Read	Sequential Read	WSO8 6x5mm
W25N01KWZEJE ⁽¹⁾	1G	104	1.7	1.95	-40	105	2048	64	4		Buffer Read	Sequential Read	WSO8 8x6mm
W25N512GVFJG ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Buffer Read	Continuous Read	SOP16 300mil
W25N512GVPJG ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Buffer Read	Continuous Read	WSO8 6x5mm
W25N512GVEJG ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Buffer Read	Continuous Read	WSO8 8x6mm
W25N512GVBJG ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Buffer Read	Continuous Read	TFBGA24 8x6mm(5x5-1)
W25N512GVFJT ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Continuous Read	Buffer Read	SOP16 300mil
W25N512GVPJT ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Continuous Read	Buffer Read	WSO8 6x5mm
W25N512GVEJT ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Continuous Read	Buffer Read	WSO8 8x6mm
W25N512GVBJT ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Continuous Read	Buffer Read	TFBGA24 8x6mm(5x5-1)
W25N512GVFJR ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Buffer Read	-	SOP16 300mil
W25N512GVPJR ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Buffer Read	-	WSO8 6x5mm
W25N512GVEJR ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Buffer Read	-	WSO8 8x6mm

Winbond QSPI NAND Flash Memory Selection Guide (Industrial Plus Grade)

Part Number	Density (bits)	Clock Frequency (MHz)	Min. Operating Voltage (V)	Max. Operating Voltage (V)	Min. Operating Temp. (°C)	Max. Operating Temp. (°C)	Page Size (Bytes)	Spare Area (Bytes)	Built-in ECC (bits)	Double Transfer Rate (DTR MHz)	Default Read Mode	Alternate Read Mode	Package
W25N512GVBJR ⁽¹⁾	512M	166	2.7	3.6	-40	105	2048	64	1		Buffer Read	-	TFBGA24 8x6mm(5x5-1)

See datasheet for further technical information. This is subject to change without notice.

1) Please contact Winbond for inventory preparation.

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