



Automotive Certified SpiFlash Memories

Winbond's Automotive W25X and W25Q SpiFlash® Multi-I/O Memories feature the popular Serial Peripheral Interface (SPI), densities from 2M to 512M-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. Automotive NAND Flash memories are also offered densities of 1Gb and 2Gb serial NAND, and 1Gb through 8Gb of ONFINAND.

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 are 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.



W25X and W25Q SpiFlash Families

- 2M to 4M-bit W25X and 2M to 512M-bit W25Q
- Serial Peripheral Interface (SPI), Dual Output SPI W25X
- SPI, Dual-SPI, Quad-SPI W25Q
- Uniform 4KB, 32KB & 64KB erase
- W25Q family also offers Quad Page Program,
- Erase and Program Suspend/Resume
- Security: Lock-down, ID#, OTP Registers

High Performance

- 104MHz Clock, 416MHz Quad-SPI (50MB/S)
- Fast-boot or execute code (XIP) from SPI

Voltage & Package Options

- 3V, 2.5V & 1.8V operation
- 8-pin & 16-pin SOIC, USON, and WSON packages
- Known Good Die (KGD) Wafers

NAND Flash Family

- Serial NAND is superset compatible with W25Q
- 1G and 2G-bit SPI, Dual-SPI, Quad-SPI W25N
- ONFi NAND 1G-bit through 8G-bit
- Industry standard compatible products & packages

Wide Range of Applications

- Digital Cluster, Rear/Front Camera, ADAS ECU, Radio / Infotainment, Navigation, Bluetooth, GPS, Telematic / Gateway, Data Recorder, DSP, FPGAs and more

	Industrial Plus	Automotive Grade 3	Automotive Grade 2	Automotive Grade 1
Temperature Range	-40°C~105°C	-40°C~85°C	-40°C~105°C	-40°C~125°C
Part # Example	W25Q80DVSSJG	W25Q80DVSSBG	W25Q80DVSSAG	W25Q80DVSSG
AEC-Q100 Compliant	No	Yes	Yes	Yes
Change Control (PPAP)	No	Optional	Optional	Optional

Winbond Automotive SpiFlash Memory 1,2,3

Density	Winbond Part # 7,8,9	SPI	Quad	Voltage ⁴	Package ⁵
2M-bit	W25X20CVxxJG/BG/AG	•		3V	xx=(SS, SN, ZP ⁶ , UX ⁶)
	W25X20CVxxSG	•		3V	xx=(SS, SN, ZP ⁶ , UX ⁶)
	W25Q20EWxxJG/BG/AG	•	•	1.8V	xx=(SS, SN, ZP ⁶ , UX ⁶)
	W25Q20EWxxSG	•	•	1.8V	xx=(SS, SN, ZP ⁶ , UX ⁶)
4M-bit	W25X/Q40CVxxJG/BG/AG	•	•	3V	xx=(SS, SN, ZP ⁶ , UX ⁶)
	W25X/Q40CVxxSG	•	•	3V	xx=(SS, SN, ZP ⁶ , UX ⁶)
	W25Q40EWxxJG/BG/AG	•	•	1.8V	xx=(SS, SN, ZP ⁶ , UX ⁶)
	W25Q40EWxxSG	•	•	1.8V	xx=(SS, SN, ZP ⁶ , UX ⁶)
8M-bit	W25Q80DVxxJG/BG/AG	•	•	3V	xx=(SS, SN, ZP ⁶ , UX ⁶ , TC ⁶ , TB ⁶)
	W25Q80DVxxSG	•	•	3V	xx=(SS, SN, ZP ⁶ , UX ⁶ , TC ⁶ , TB ⁶)
	W25Q80EWxxJG/BG/AG	•	•	1.8V	xx=(SS, SN, ZP ⁶ , UX ⁶ , TC ⁶ , TB ⁶)
	W25Q80EWxxSG	•	•	1.8V	xx=(SS, SN, ZP ⁶ , UX ⁶ , TC ⁶ , TB ⁶)
16M-bit	W25Q16DV/JVxxJG/BG/AG	•	•	3V	xx=(SS, SN, ZP ⁶ , TC ⁶ , TB ⁶)
	W25Q16DV/JVxxSG	•	•	3V	xx=(SS, SN, ZP ⁶ , TC ⁶ , TB ⁶)
	W25Q16DW/FVxxJG/BG/AG/Q	•	•	1.8V	xx=(SS, SN, ZP ⁶ , TC ⁶ , TB ⁶)
	W25Q16FWxxSG/Q	•	•	1.8V	xx=(SS, SN, ZP ⁶ , TC ⁶ , TB ⁶)
32M-bit	W25Q32BV/FV/JVxxJG/BG/AG/Q	•	•	3V	xx=(SS, SF, ZP, ZE ⁶ , TC ⁶ , TB ⁶)
	W25Q32BV/FV/JVxxSG/Q	•	•	3V	xx=(SS, SF, ZP, ZE ⁶ , TC ⁶ , TB ⁶)
	W25Q32FWxxJQ/BQ/AQ	•	•	1.8V	xx=(SS, SF, ZP, ZE ⁶ , TC ⁶ , TB ⁶)
64M-bit	W25Q64CV/FV/JVxxJG/BG/AG/Q	•	•	3V	xx=(SS, SF, ZP, ZE ⁶ , TC ⁶ , TB ⁶)
	W25Q64CV/FV/JVxxSG/Q	•	•	3V	xx=(SS, SF, ZP, ZE ⁶ , TC ⁶ , TB ⁶)
	W25Q64FWxxJQ/BQ/AQ	•	•	1.8V	xx=(SS, SF, ZP, ZE ⁶ , TC ⁶ , TB ⁶)
128M-bit	W25Q128BV/FV/JVxxJG/BG/AG/Q	•	•	3V	x=(S ⁷ , F, E, C ⁶ , B ⁶)
	W25Q128BV/FV/JVxxSG/Q	•	•	3V	x=(S ⁷ , F, E, C ⁶ , B ⁶)
	W25Q128FWxxJQ/BQ/AQ	•	•	1.8V	x=(S ⁷ , F, E, C ⁶ , B ⁶)
256M-bit	W25Q256FV/JVxxJQ/BQ/AQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
	W25Q256FV/JVxxSQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
	W25H256JVxxJQ/BQ/AQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
	W25H256JVxxSQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
512M-bit	W25H512JVxxJQ/BQ/AQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
	W25M512JVxxJQ/BQ/AQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
	W25M512JVxxSQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
	W25M513JVxxJQ/BQ/AQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
	W25M513JVxxSQ	•	•	3V	x=(F, E, C ⁶ , B ⁶)
1G-bit NAND	W29N01HVxxJNF/BNF/ANF ¹¹			3V	x=(S, D, B ⁶)
	W25N01GVxxJG/BG/AG ¹⁰	•	•	3V	xx=(SF, ZE, TC ⁶ , TB ⁶)
	W29N01HZxxJNF/BNF/ANF ¹¹			1.8V	x=(S, D, B ⁶)
	W25N01GWxxJG/BG/AG ¹⁰	•	•	1.8V	xx=(ZE, TC ⁶ , TB ⁶)
2G-bit NAND	W29N02GVxxJAF/BAF/AAF ¹¹			3V	x=(S, B ⁶)
	W25M02GVxxJG/BG/AG ¹⁰	•	•	3V	xx=(ZE, TC ⁶ , TB ⁶)
	W29N02GZ/WxxJBF/BBF/ABF ¹¹			1.8V	x=(S, B ⁶)
	W25M02GWxxJG/BG/AG ¹⁰	•	•	1.8V	xx=(ZE, TC ⁶ , TB ⁶)
4G-bit NAND	W29N04GVxxJAF/BAF/AAF ¹¹			3V	x=(S, B ⁶)
	W29N04GZ/WxxJBF/BBF/ABF ¹¹			1.8V	x=(S, B ⁶)
8G-bit NAND	W29N08GVxxJAF/BAF/AAF ¹¹			3V	x=(S, B ⁶)

1.- See data sheet for further technical information. Some special features, such as OTP Write Protection, are special order. 2. Subject to change without notice. 3. See data sheet for details on Automotive product specifications. 4. Voltage 3V=2.7-3.6V, 1.8V=1.65-1.95V. 5. "Green" and RoHS compliant packaging. KGD Wafer also available. SN=SO8 150mil, SS or S=SO8 208mil, SF or F=SO16 300mil, ZP or P=WSO8 6x5mm, ZE or EWSO8 8x6mm, UX=USO8 2x3mm, TC or C=TFBGA24 8X6mm (4X6 matrix), TB or B=TFBGA24 8X6mm (5X5 matrix). 6. Special Order. Contact Winbond for availability of products under development and special order products. 7. For W25Q32FV/64FV/128FV/256FV, and for W25Q16JV/32JV/64JV/128JV/256JV/512JV the AG1 (-40 to 125 Deg C - Part number ending with SG) parts will be available in 1Q'2018. 8. For W25Q16FV/32FV/64FV/128FV, the AG1 (-40 to 125 Deg C - Part number ending with SG) parts will be available in 3Q'2018. For W25Q16JV/32JV/64JV/128JV/256JV/512JV and W25Q16FV/32FV/64FV/128FV the AG2 and AG3 parts will be available in 4Q'2017. 9. The temperature grade for Industrial Grade Plus (JG/JQ) & AG2 (AG/AQ) IS -40 TO +105Deg.C, temperature grade for AG3 (BG/BQ) is -40 to +85Deg. C. Temperature grade for AG1 (SG) is -40 to +125 Deg. C. 10. The last character in the part number for Serial NAND can be G or T. 11. For SLC NAND flash the packages offered are: S (TSOP48), D (VFBGA48) and B (VFBGA63).

