

QSPI NOR Flash

High-Performance and Low-Power Serial Memory Solutions

Winbond's W25Q QSPI NOR Flash Multi-I/O memories utilize the popular Serial Peripheral Interface (SPI) and are available in densities ranging from 1Mb to 2Gb. These memories have small erasable sectors and offer industry-leading performance. The W25Q family with Dual-I/O and Quad-I/O SPI can deliver even higher eXecute-in-Place (XiP) performance especially when used in the Quad Peripheral Interface (QPI) mode where command, address and data all operate using Quad IO at clock rates up to 104MHz in DTR (Double Transfer Rate) mode achieving a transfer rate of 104MB/s. Faster transfer rates improve boot time and support faster shadowing of code to RAM. New ultra-small form-factor packages are also ideal for space-constrained mobile and handheld applications. Winbond, a leading provider of memory solutions, not only offers a complete range of densities but also ensures longevity support from its own fab, assuring the continuity of high-quality supply.

W25Q QSPI NOR Flash

- 1Mb to 2Gb
- SPI, Dual-SPI, Quad-SPI and QPI
- Uniform 4KB, 32KB & 64KB erase
- Erase and Program Suspend/Resume
- Quad Page Program
- Security features including Lock-down, unique IDs, and one-time-program registers

Features

Wide Range of Applications

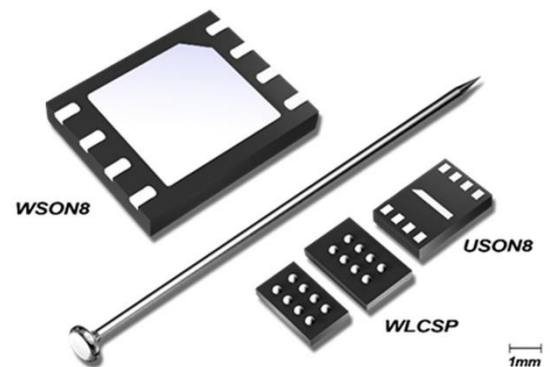
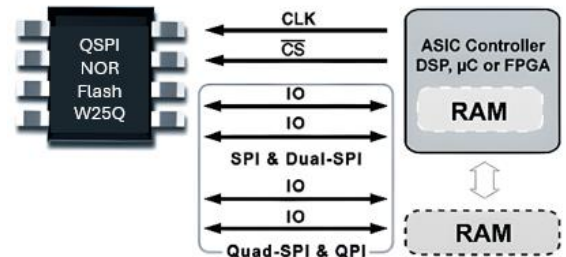
- Desktop PC, Notebook, PC Peripheral Memory, Server, Hard Disk Drive, Printer
- Bluetooth, True Wireless Stereo, Smart Home, Musical Instrument, Game
- 5G, Wifi, XDSL, Surveillance Camera, Gigabit Passive Optical Network, Switch
- Advanced Driving Assistance Systems, Vehicle-to-Everything, Car-AV, Domain Controller, Infotainment, Cluster

Voltage & Package Options

- 3V (2.7~3.6V), 1.8V (1.65~1.95V), and 1.2V (1.14~1.26V)
- Space saving packages including WQFN-12, 4x4 XSON, 8-pin SOP, WSON, VSOP, USON, WLCSP, 16-pin SOP, 24-ball TFBGA
- Known Good Die (KGD)

High Performance

- 166MHz Clock Rate, Dual/Quad-SPI/QPI
- Fast-boot with XiP code execution



Winbond QSPI NOR Flash Selection Guide ^{1,2,3}

Density	Winbond Part # ²	Quad SPI	Clock MHz	Features ³	Voltage	Package ⁴
2Gb	W25Q02RVxxJQ/M	•	133	SPI / Quad / DTR	3V	xx=(SF, ZH, TB)
	W25Q02RWxxJM/V	•	166	SPI / Quad / DTR	1.8V	xx=(SF, ZH, TB)
1Gb	W25Q01RVxxJQ/M	•	133	SPI / Quad / DTR	3V	xx=(SF, ZH, TB)
	W25Q02RWxxJQ/N/M/V	•	166	SPI / Quad / DTR	1.8V	xx=(SF, ZE, TB)
512Mb	W25Q51RVxxJQ/N/M	•	133	SPI / Quad / DTR	3V	xx=(CF, CP, CE, CB)
	W25Q51RWxxJQ/N/M/V	•	166	SPI / Quad / DTR	1.8V	xx=(CF, CE, CB)
	W25Q52PYxxIH/J	•	133	SPI / Quad / DTR / 1.2V I/O	1.8V	xx=(SF, TB)
	W25Q51NExxIG	•	104	SPI / Quad / DTR	1.2V	xx=(CF,CE,CB)
256Mb	W25Q25RVxxJQ/N/M	•	133	SPI / Quad / DTR	3V	xx=(CF, CE, CB)
	W25Q25RWxxJQ/M	•	166	SPI / Quad / DTR	1.8V	xx=(CF, CP, CE, CB)
	W25Q25PYxxIM/Q	•	133	SPI / Quad / DTR / 1.2V I/O	1.8V	xx=(SF ⁶ ,ZN,TB)
	W25Q25PWxxIM/Q	•	166	SPI / Quad / DTR	1.8V	xx=(SS,ZP,ZE,XG ⁶ ,TB ⁶ ,BY ⁶)
	W25Q256JWxxIM/Q	•	133	SPI / Quad / DTR	1.8V	x=(F,E,C ⁶ ,P,B ⁶ ,Y ⁶)
	W25Q25NExxIG	•	104	SPI / Quad / DTR	1.2V	xx=(SF, ZE, ZP, BY)
128Mb	W25Q12RVxxJQ/N/M	•	133	SPI / Quad / DTR	3V	xx=(CF, CS, CP, CE, CB)
	W25Q12RWxxJQ/M	•	166	SPI / Quad / DTR	1.8V	xx=(CF, CS, CP, CJ)
	W25Q13PYxxIH/J	•	133	SPI / Quad / DTR / 1.2V I/O	1.8V	xx=(CF, CB, CJ)
	W25Q12PWxxIM/Q/H	•	166	SPI / Quad / DTR	1.8V	xx=(SS,SF,ZP,ZE,UU,XG ⁶ ,BY,TB ⁶)
	W25Q128JWxxIM/Q	•	133	SPI / Quad / DTR	1.8V	x=(S,F,P,E,C ⁶ ,B ⁶ ,Y ⁶)
	W25Q12NExxIG	•	104	SPI / Quad	1.2V	xx=(SS, ZP, XG, BY)
64Mb	W25Q64RVxxJQ/N/M	•	133	SPI / Quad / DTR	3V	xx=(CN, CS, XG, CP, CJ)
	W25Q64RWxxJQ/M	•	166	SPI / Quad / DTR	1.8V	xx=(CN, CS, CP, CJ)
	W25Q64PYxxIH/J	•	133	SPI / Quad / DTR / 1.2V I/O	1.8V	xx=(CB, BY)
	W25Q64PWxxIM/Q	•	166	SPI / Quad / DTR	1.8V	xx=(SN,SS,SF,UX,UU,ZP,XG ⁶ ,TB ⁶ ,BY ⁶)
	W25Q64JWxxIM/Q	•	133	SPI / Quad / DTR	1.8V	xx=(SS,ZP,ZE,UU,XG ⁶ ,TB ⁶ ,BY ⁶)
	W25Q65NExxIG	•	133	SPI / Quad / DTR	1.2V	xx=(SS, UU, XG, BY)
32Mb	W25Q33RVxxJQ/M	•	133	SPI / Quad / DTR	3V	xx=(SN,SS,UU, XG, ZP)
	W25Q32RWxxJQ/M	•	166	SPI / Quad / DTR	1.8V	xx=(CN, CS, UU, CP, CJ)
	W25Q33PYxxIM/IQ	•	133	SPI / Quad / DTR/ 1.2V I/O	1.8V	xx=(ZN, BY ⁶)
	W25Q33PWxxIM/Q	•	166	SPI / Quad / DTR	1.8V	xx=(SN,SS,ZP,XH,UU,BY ⁶)
	W25Q32RLxxJM/Q	•	133	SPI / Quad / DTR	3V	xx=(SN,SS,ZP,XH)
	W25Q32JWxxIM/Q	•	133	SPI / Quad / DTR	1.8V	xx=(SN,SS,ZP,UU ⁶ ,XG ⁶ ,TC ⁶ ,TB ⁶ , BY ⁶)
	W25Q32NExxIG	•	133	SPI / Quad / DTR	1.2V	xx=(SN,SS,UU,BY)
16Mb	W25Q16PYxxIM/IQ	•	133	SPI / Quad / DTR/ 1.2V I/O	1.8V	xx=(ZN, BY ⁶)
	W25Q16PWxxIM/Q	•	166	SPI / Quad / DTR	1.8V	xx=(SN,SS,ZP,XH,UU,BY ⁶)
	W25Q16RVxxJM/Q	•	133	SPI / Quad / DTR	3V	xx=(SN,SS,ZP,XH)
	W25Q16RLxxJM/Q	•	133	SPI / Quad / DTR	3V	xx=(SN,SS,ZP,XH)
	W25Q16JWxxIM/Q	•	133	SPI / Quad / DTR	1.8V	xx=(SN,SS,ZP,XH,UU,BY ⁶)
	W25Q16NExxIG	•	133	SPI / Quad / DTR	1.2V	xx=(SN, SS, XH, UX, BY)
8Mb	W25Q80PYxxIM/IQ	•	133	SPI / Quad / DTR/ 1.2V I/O	1.8V	xx=(ZN, BY ⁶)
	W25Q80PWxxIM/Q	•	166	SPI / Quad / DTR	1.8V	xx=(SN,SS,ZP,ZT,XH,UU,BY ⁶)
	W25Q80RVxxJM/Q ⁷	•	133	SPI / Quad / DTR	3V	xx=(SN,SS,ZP,XH)
	W25Q80RLxxJM/Q	•	133	SPI / Quad / DTR	3V	xx=(SN,SS,ZP,XH)

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Density	Winbond Part # ²	Quad SPI	Clock MHz	Features ³	Voltage	Package ⁴
	W25Q81NExxIG	•	133	SPI / Quad / DTR	1.2V	xx=(SN, XH, UX, BY)
4Mb	W25Q40RVxxJM/Q	•	133	SPI / Quad / DTR	3V	xx=(SN,SS,ZP,XH)
	W25Q40RLxxJM/Q	•	133	SPI / Quad / DTR	3V	xx=(SN,SS,ZP,XH)
	W25Q40EWxxIG/E ⁷	•	104	SPI	1.8V	xx=(SN,SS,UX,BY ⁶)
2Mb	W25Q20RLxxJM/Q	•	104	SPI / Quad / DTR	3V	xx=(SN,SS,XH)
	W25Q20EWxxIG/E ⁷	•	104	SPI	1.8V	xx=(SN,UX,BY ⁶)
1Mb	W25Q10RLxxJM/Q	•	104	SPI / Quad / DTR	3V	xx=(SN,SS,XH)
	W25Q10EWxxIG/E ⁷	•	104	SPI	1.8V	xx=(SN,UX,BY ⁶)

1. See data sheet for further technical information. This is subject to change without notice. 2. At the end of the part number, letter "G" represents "Green", Halogen Free and RoHS compliant packaging; letter "Q" represents Green packaging and Quad Enabled as shipping default & fast sector erase time (tSE); letter "F" represents Fast Sector Erase time (tSE); letter "I" represents Industrial Temperature (-40°C to +85°C). 3. Enhanced=SFDP1, Security Registers, Program/Erase Suspend/Resume, Burst Read with Wrap, Non-Volatile & Volatile Status Registers, Complement Array Protection. 4. SN=SO8 150mil, 5V=VSOP8 150mil, SS or S=SO8 208mil, ST or T=VSOP8 208mil, SF or F=SO16 300mil, ZP or P=WSON8 6x5mm, ZE or E=WSON8 8x6mm, TC or C=TFBGA24 8x6mm (4x6 Matrix), TB or B=TFBGA24 8x6mm (5X5 Matrix), UX=USON8 2x3mm, UU=USON8 4x3mm, XG=XSON8 4x4mm, ZT=XSON8 1.5x1.5mm, BY=WLCSP, ZH=VSON-8 8x6-mm, CF=SOP-16 300mil, CP=WSON-8 6x5-mm, CE=WSON-8 8x6-mm, CB=TFBGA-24 8x6mm (5x5-1 Ball Array), CS=SOP-8 208-mil, CJ=WQFN-12 6x5-mm, CN=SOP-8 150mil, XH=XSON-8 2x3x0.4(max.)mm³. KGD Wafer available. 5. Default 4-byte addressing for W25W257FV/JV. 6. Special Order. 7. "E" at the end of the part number is for USON8 package only.

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