

Comparing Micron N25Q128A with Macronix MX25L12835F

1. Introduction

This application note serves as a guide to compare Micron N25Q128A with Macronix MX25L12835F 3V 128Mb SPI flash. The document does not provide detailed information on each individual device, but highlights the similarities and differences between them. The comparison covers the general features, performance, command codes, and other differences.

If common features are used in standard traditional modes, they may need only minimal software modification..

The information provided in this document is based on datasheets listed in Section 9. Newer versions of the datasheets may override the contents of this document.

1. Features

Table 1-1: Feature Comparison

Feature	Macronix MX25L12835F	Micron N25Q128A
VCC Voltage Range	2.7V-3.6V	2.7V-3.6V
Normal Read Clock Frequency	50MHz	54MHz
Maximum Clock Frequency ⁽¹⁾	133MHz	108MHz
Configurable Dummy Cycle	YES	YES
Sector Size	4KB/32KB/64KB	4KB/64KB
Program Buffer Size	256Byte	256Byte
Security OTP	512Byte	64Byte
Program/Erase Suspend & Resume	YES	YES
Wrap Around Read Mode	YES	YES
XIP / Performance Enhanced Mode	YES	YES ⁽³⁾
XIP / Performance Enhanced Mode Set at Power-on	-	YES ⁽³⁾
Fast Boot Mode	YES	-
Adjustable Output Drivers	YES	YES
S/W Reset Command	YES	YES
HOLD#/RESET# Pin	Reset#	Hold#/Reset#
Block Protection Mode (BP bits)	Top/Bottom	Top/Bottom
Individual Sector Protection (Volatile) ⁽²⁾	YES	YES
Individual Sector Protection (Non-Volatile)	YES	-
Password Protection option	YES	-
Deep Power Down	YES	-
Program/Erase Cycles	100K	100K

Notes:

1. Maximum clock frequency with 10 dummy cycles.

2. Please see App Note section 4-4 for detailed comparison of Individual Sector Protection.

3. Macronix supports 1-4-4 and 4-4-4 mode XIP; Micron supports XIP in all fast read modes.



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Table 1-2: Read Performance

I/O Mode	Macronix MX25L12835F			Micron N25Q128A		
	Default Dummy Cycles	Max Speed @ Default Dummy Cycles	Max Speed 10 Dummy Cycles	Default Dummy Cycles	Max Speed @ Default Dummy Cycles	Max Speed 10 Dummy Cycles
Fast Read (1-1-1)	8	104MHz	133MHz	8	108MHz	108MHz
Dual Output (DREAD) (1-1-2)	8	104MHz	133MHz	8	108MHz	108MHz
Dual I/O (2READ) (1-2-2)	4	84MHz	133MHz	8	108MHz	108MHz
Dual Peripheral Interface (2-2-2)	-	-	-	9	108MHz	108MHz
Quad Output (QREAD) (1-1-4)	8	104MHz	133MHz	8	108MHz	108MHz
Quad I/O (4READ) (1-4-4)	6	84MHz	133MHz	10	108MHz	108MHz
Quad Peripheral Interface (QPI) (4-4-4)	6	84MHz	133MHz	11	108MHz	108MHz



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3. Package and Pinout

Table 3-1: Packages

Packages	Macronix MX25L12835F	Micron N25Q128A
8-WSON (6x5mm)	YES	YES
8-WSON (8x6mm)	YES	YES
8-SOP (209mil)	YES	YES
16-SOP (300mil)	YES	YES
24-TFBGA (5x5 grid)	(1)	YES

Note

1. This package may be available in the MX25L12855FXD family. Please contact Macronix for availability.

Table 3-2: Pin Definition Comparison

Package / Pin#	Macronix MX25L12835F	Micron N25Q128A	Comments
8-SOP and 8-WSON			
Pin #3	WP#/SIO2	W#/ V _{PP} /DQ2	Macronix does not support V _{PP} .
Pin #7	RESET#/SIO3	HOLD#/DQ3	HOLD# not supported by Macronix. Dedicated Micron part numbers offer RESET# instead of HOLD#.
16-SOP			
Pin #1	DNU#/SIO3	HOLD#/DQ3	HOLD# not supported by Macronix. Dedicated Micron part numbers offer RESET# instead of HOLD#.
Pin #4, 5, 6,	NC	DNU	DNU means "Do Not Use"
Pin #3	RESET#	DNU	DNU means "Do Not Use". RESET# has an internal pull-up and may be left unconnected.
Pin #9	WP#/SIO2	W#/ V _{PP} /DQ2	Macronix does not support V _{PP} .



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4. Performance

Table 4-1: AC Parameter Comparison

Parameter	Symbol		Condition	Macronix MX25L12835F	Micron N25Q128A
	Macronix	Micron			
Clock High Time	tCH	tCH	min	3.3ns	4ns
Clock Low Time	tCL	tCL	min	3.3ns	4ns
Clock Low to Output Valid	tCLQV	tCLQV	max @10pF	-	5ns
			max @15pF	6ns	-
			max @30pF	8ns	7ns
Data In Setup Time	tDVCH	tDVCH	min	2ns	2ns
Data In Hold Time	tCHDX	tCHDX	min	3ns	3ns
Page Program Time (256 Bytes)	tPP	tPP	typ	0.6ms	0.5ms
			max	3ms	5ms
Erase 4KB Subsector/Sector	tSSE	tSE	typ	43ms	250ms
			max	200ms	800ms
Erase 32KB Sector	tBE32	-	typ	190ms	-
			max	1s	-
Erase 64KB Sector/Block	tBE	tSE	typ	340ms	700ms
			max	2s	3s
Bulk Erase / Chip Erase	tCE	tBE	typ	72s	170s
			max	160s	250s

Table 4-2: DC Parameter Comparison

Parameter	Symbol		Condition	Macronix MX25L12835F	Micron N25Q128A
	Macronix	Micron			
Leakage Current	ILI/ILO	ILI/ILO	max	+/- 2uA	+/- 2uA
Standby Current	ISB1	ICC1	typ	15uA	-
			max	60uA	100uA
VCC Read Current (Fast Read)	ICC1	ICC3	max @ 108MHz (Quad I/O)	-	20mA
			max @ 104MHz (Quad I/O)	20mA	-
			max @ 84MHz	15mA	-
			max @ 54MHz	-	6mA
VCC Program Current	ICC2	ICC4	max	25mA	20mA
VCC Write Status Register Current	ICC3	ICC5	max	20mA	20mA
VCC Erase Current	ICC4,5	ICC6	max	25mA	20mA



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5. Command Code

Table 5-1: Command Code Comparison

Instruction Type	Instruction	Description	Macronix MX25L12835F	Micron N25Q128A
Read ID	RDID	Read Identification	9Fh	9Eh/9Fh
	REMS	Read Electronic Manufacturer ID & Signature	90h	-
Read	READ	Read Data Bytes	03h	03h
	FAST_READ	Read Data Bytes at Higher Speed	0Bh	0Bh
	DOFR	Dual Output Fast Read	3Bh	3Bh
	DIOFR	Dual Input/Output Fast Read	BBh	BBh
	QOFR	Quad Output Fast Read	6Bh	6Bh
	QIOFR	Quad Input/Output Fast Read	EBh	EBh
	RDSFDP	Read Serial Flash Discoverable Parameters	5Ah	5Ah
	Write	WREN	Write Enable	06h
WRDI		Write Disable	04h	04h
PP		Page Program	02h	02h
-		Dual Input Fast Program (1-1-2)	-	A2h
-		Dual I/O Fast Program (1-2-2)	-	D2h
-		Quad Input Fast Program (1-1-4)	-	32h
4PP		Quad Page Program (1-4-4)	38h	12h
SE		Sector Erase 4KB	20h	20h
BE 32K		Block Erase 32KB	52h	-
SE 64K		Block Erase 64KB	D8h	D8h
CE		Chip Erase	60 or C7h	C7h
Register	RDSR	Read Status Register	05h	05h
	RDCR	Read Configuration Register	15h	-
	WRSR	Write Status Register	01h	01h
	RDSCUR	Read Security Register	2Bh	-
	WRSCUR	Write Security Register	2Fh	-
	RFSR	Read Flag Status Register	-	70h
	CLFSR	Clear Flag Status Register	-	50h
	-	Read Non-volatile Configuration Register	-	B5h
	-	Write Non-volatile Configuration Register	-	B1h
	-	Read Volatile Configuration Register	-	85h
	-	Write Volatile Configuration Register	-	81h
	-	Read Enhance Volatile Configuration Register	-	65h
	-	Write Enhance Volatile Configuration Register	-	61h
OTP	ENSO	Enter Secured OTP	B1h	-
	EXSO	Exit Secured OTP	C1h	-
	ROTP	Read OTP Area	-	4Bh
	POTP	Program OTP Area	-	42h



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Table 5-1: Command Code Comparison - Continued

Instruction Type	Instruction	Description	Macronix MX25L12835F	Micron N25Q128A
QPI	EQIO	Enable QPI	35h	-
	RSTQIO	Reset (Exit) QPI	F5h	-
	QPIID	QPI ID Read	AFh	AFh
Others	PGM/ERS Suspend	Program or Erase Suspend	B0h	75h
	PGM/ERS Resume	Program or Erase Resume	30h	7Ah
	RSTEN	Reset Enable	66h	66h
	RST	Reset Memory	99h	99h
	DP	Deep Power Down	B9h	-
	RDP	Release From Deep Power Down	ABh	-
	WPSEL	Write Protect Selection (OTP)	68h	-

6. Manufacturer and Device ID

ID Type		Macronix MX25L12835F	Micron N25Q128A
Manufacturer ID		C2h	20h
Device ID	Memory Type	20h	BAh
	Memory Capacity	18h	18h
Unique ID		N/A	17 Bytes



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9. References

Table 9-1 shows the datasheet versions used for comparison in this application note. For the most current, detailed Macronix specification, please refer to the Macronix Website at <http://www.macronix.com>.

Table 9-1: Datasheet Version

Datasheet	Location	Date Issued	Version
MX25L12835F	Macronix Website	DEC. 26, 2012	1.1
n25q_128mb_3V_65nm	Micron Website	APR. 2013	0

10. Appendix

Table 10-1 shows the basic part number and package information cross reference between Macronix MX25L12835F and Micron N25Q128 parts.

Table 10-1: Part Number Cross Reference

Macronix Part No.	Micron Part No.	Package	Dimension	Note
MX25L12835FM2I-10G	N25Q128A13ESE40	8-SOP	209 mil	Hold# pin, Micron XIP
MX25L12835FM2I-10G	N25Q128A23ESE40	8-SOP	209 mil	Hold# pin, basic XIP
MX25L12835FM2I-10G	N25Q128A33ESE40	8-SOP	209 mil	Reset# pin, Micron XIP
MX25L12835FM2I-10G	N25Q128A43ESE40	8-SOP	209 mil	Reset# pin, basic XIP
MX25L12835FMI-10G	N25Q128A13ESF40	16-SOP	300 mil	Hold# pin, Micron XIP
MX25L12835FMI-10G	N25Q128A23ESF40	16-SOP	300 mil	Hold# pin, basic XIP
MX25L12835FMI-10G	N25Q128A33ESF40	16-SOP	300 mil	Reset# pin, Micron XIP
MX25L12835FMI-10G	N25Q128A43ESF40	16-SOP	300 mil	Reset# pin, basic XIP
MX25L12835FMI-10G	N25Q128A13BSF40	16-SOP	300 mil	Hold# pin, Micron XIP
MX25L12835FMI-10G	N25Q128A23BSF40	16-SOP	300 mil	Hold# pin, basic XIP
MX25L12835FZNI-10G	N25Q128A13EF740	8-WSON	6 x 5 mm	Hold# pin, Micron XIP
MX25L12835FZNI-10G	N25Q128A23EF740	8-WSON	6 x 5 mm	Hold# pin, basic XIP
MX25L12835FZNI-10G	N25Q128A33EF740	8-WSON	6 x 5 mm	Reset# pin, Micron XIP
MX25L12835FZNI-10G	N25Q128A43EF740	8-WSON	6 x 5 mm	Reset# pin, basic XIP
MX25L12835FZ2I-10G	N25Q128A13EF840	8-WSON	8 x 6 mm	Hold# pin, Micron XIP
MX25L12835FZ2I-10G	N25Q128A23EF840	8-WSON	8 x 6 mm	Hold# pin, basic XIP
MX25L12835FZ2I-10G	N25Q128A33EF840	8-WSON	8 x 6 mm	Reset# pin, Micron XIP
MX25L12835FZ2I-10G	N25Q128A43EF840	8-WSON	8 x 6 mm	Reset# pin, basic XIP
MX25L12835FZ2I-10G	N25Q128A13BF840	8-WSON	8 x 6 mm	Hold# pin, Micron XIP
MX25L12835FZ2I-10G	N25Q128A23BF840	8-WSON	8 x 6 mm	Hold# pin, basic XIP

11. Revision History

Revision	Description	Date
1.0	Initial Release	June 6, 2013



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APPLICATION NOTE

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