



# Conversion Guide

## Micron EOL M25PE Products

# Converting Micron M25PE to Adesto Solutions

Adesto offers a wide range of highly compatible solutions for the designer, component engineer and sourcing teams that are moving quickly to qualify replacements to the Micron EOL of NOR Flash products.

Adesto is in production with three families that all qualify as compatible alternatives to the Micron M25PE; the DataFlash, DataFlash-L and the Fusion low energy Families.

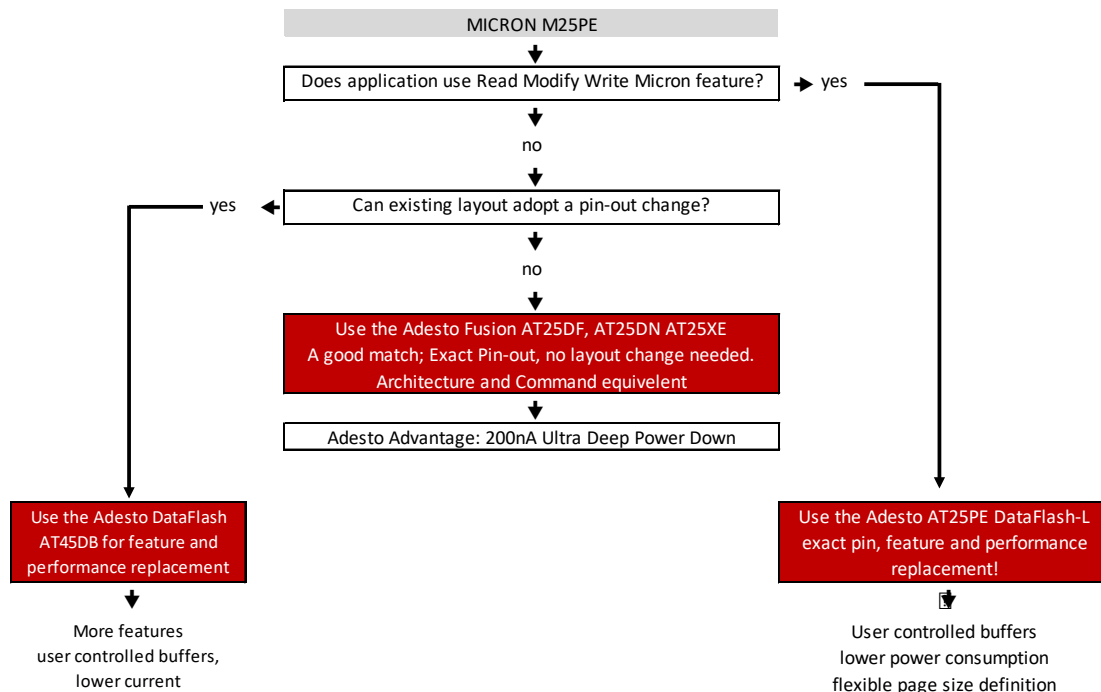
## Compatibility to Micron M25PE

Adesto Family	Adesto Solution	PinOut	AC/DC Performance	Architecture	Commands
DataFlash-L	AT25PExxx	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★
DataFlash	AT45DBxxx	★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★
Fusion	AT25DFxxx AT25DNxxx AT25EXxxx	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★	★ ★

★ ★ ★ ★ = exact fit

★ = PCB/pin-out change required

## Which Adesto Replacement to select?



Contact [miconconvert@adestotech.com](mailto:miconconvert@adestotech.com) for technical assistance, request samples and learn more about the Adesto Longevity Program.

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## Adesto Recommended Replacements- Pin Compatible

Micron Device	Adesto Replacement	Available	Alternate Adesto Replacement	Available	Take Advantage of Adesto Low Energy
M25PE10	AT25PE20	Sep 2017	AT25DF011-or-AT25XE011	Now	✓
M25PE20	AT25PE20	Sep 2017	AT25DF021A-or-AT25XE021A	Now	✓
M25PE40	AT25PE40	Oct 2017	AT25DF041B-or-AT25XE041B	Now	✓
M25PE80	AT25PE80	Nov 2017			
M25PE16	AT25PE16	Dec 2017			

*The Alternate Adesto Solutions shown above can be used for applications that do not utilize the single command 0Ah Page Erase/Page Erase operation (reference Performance Comparison section in this Guide)*

## Part Number Cross-Reference

*Note: This cross reference includes solutions for both types of applications that may or may not use the Micron Page Write (0Ah) Page Erase/Page Write single command.*

Micron Part Number	ALTERNATE Adesto Part# <sup>2</sup> EXACT PIN-OUT MATCH	Available	EXACT replacement Adesto Part# <sup>3</sup> EXACT PIN-OUT MATCH	Available <sup>1</sup>	ALTERNATE Adesto Part# <sup>4</sup>	Available
M25PE10-VD11	AT25DN011-DWF	Now	AT25PE20-DWF	Sep-17	AT45DB021E-DWF	Now
M25PE10-VMN6P	AT25DN011-SSHF-T	Now	AT25PE20-SSHN-T	Sep-17	AT45DB021E-SSHN-T	Now
M25PE10-VMN6TP	AT25DN011-SSHF-T	Now	AT25PE20-SSHN-T	Sep-17	AT45DB021E-SSHN-T	Now
M25PE20-V6D11	AT25DF021A-DWF	Now	AT25PE20-DWF	Sep-17	AT45DB021E-DWF	Now
M25PE20-VMN6P	AT25DF021A-SSHN-T	Now	AT25PE20-SSHN-T	Sep-17	AT45DB021E-SSHN-T	Now
M25PE20-VMN6TP	AT25DF021A-SSHN-T	Now	AT25PE20-SSHN-T	Sep-17	AT45DB021E-SSHN-T	Now
M25PE20-VMN6TPBA	AT25DF021A-SSHN-T	Now	AT25PE20-SSHN-T	Sep-17	AT45DB021E-SSHN-T	Now
M25PE40-VMN6P	AT25DF041B-SSHN-T	Now	AT25PE40-SSHN-T	Sep-17	AT45DB041E-SSHN-T	Now
M25PE40-VMN6TP	AT25DF041B-SSHN-T	Now	AT25PE40-SSHN-T	Sep-17	AT45DB041E-SSHN-T	Now
M25PE40-VMN6TPBA	AT25DF041B-SSHN-T	Now	AT25PE40-SSHN-T	Sep-17	AT45DB041E-SSHN-T	Now
M25PE40-VMP6TG	AT25DF041B-MHN-T	Now	AT25PE40-MHN-T	Sep-17	AT45DB041E-MHN-T	Now
M25PE40-VMW6G	AT25DF041B-SHN-T	Now	AT25PE40-SHN-T	Sep-17	AT45DB041E-SHN-T	Now
M25PE40-VMW6TG	AT25DF041B-SHN-T	Now	AT25PE40-SHN-T	Sep-17	AT45DB041E-SHN-T	Now
M25PE80-VMN6P			AT25PE80-SSHN-T	Oct-17	AT45DB081E-SSHN-T	Now
M25PE80-VMN6TP			AT25PE80-SSHN-T	Oct-17	AT45DB081E-SSHN-T	Now
M25PE80-VMN6TPBA			AT25PE80-SSHN-T	Oct-17	AT45DB081E-SSHN-T	Now
M25PE80-VMP6G			AT25PE80-MHN-T	Oct-17	AT45DB081E-MHN-T	Now
M25PE80-VMP6TG			AT25PE80-MHN-T	Oct-17	AT45DB081E-MHN-T	Now
M25PE80-VMW6G			AT25PE80-SHN-T	Oct-17	AT45DB081E-SHN-T	Now
M25PE80-VMW6TG			AT25PE80-SHN-T	Oct-17	AT45DB081E-SHN-T	Now
M25PE16-VMP6G			AT25PE16-MHN-T	Dec-17	AT45DB161E-MHF-T	Now
M25PE16-VMP6TG			AT25PE16-MHN-T	Dec-17	AT45DB161E-MHF-T	Now
M25PE16-VMW6G			AT25PE16-SHF-T	Dec-17	AT45DB161E-SHN-T	Now
M25PE16-VMW6TG			AT25PE16-SHF-T	Dec-17	AT45DB161E-SHN-T	Now

*/1 Estimated availability date*

*/2 No layout change required. Pin Compatible replacement for applications NOT using the Micron Page Write (0Ah) Page Erase/Page Write single command*

*/3 EXACT replacement; no layout change required. Features the Page Write (0Ah)Page Erase/Page Write single command.*

*/4 Features the Page Write (0Ah) Page Erase/Page Write single command  
Requires layout change due to pin-out difference between Micron M25PE and the DataFlash AT45DB family*

Architecture				
	Micron	Adesto DataFlash	Adesto DataFlash-L	Adesto Fusion
<b>Product Name</b>	<b>M25PE10</b>	<b>AT45DB021E</b>	<b>AT25PE20</b>	<b>AT25DN011 OR AT25DF011 OR AT25XE011</b>
Main Memory Size bytes	131,072	262,144	262,144	131,072
Page Size	256 bytes	256 / 264 byte	256 bytes	256 bytes
# of Pages	512	1024	1024	512
Sector Size	64KB	32KB	32KB	32KB
# of Sectors	2	8	8	4
Memory Buffer Size	256 byte	256 / 264 byte	256 / 264 byte	-
# of Data buffers (SRAM)	1	1	1	-
<b>Product Name</b>	<b>M25PE20</b>	<b>AT45DB021E</b>	<b>AT25PE20</b>	<b>AT25DF021A OR AT25XE021A</b>
Main Memory Size bytes	262,144	262,144	262,144	262,144
Page Size	256 bytes	256 / 264 byte	256 bytes	256 bytes
# of Pages	1024	1024	1024	1024
Sector Size	64KB	32KB	32KB	64KB
# of Sectors	4	8	8	4
Memory Buffer Size	256 byte	256 / 264 byte	256 / 264 byte	-
# of Data buffers (SRAM)	1	1	1	-

\*Take advantage of 2 Data Buffers, Flexible page architecture 256 or 264 byte and the Ultra Deep Power Down of Adesto over Micron on new designs

Architecture Continued ↓

## Architecture

	Micron	Adesto DataFlash	Adesto DataFlash-L	Adesto Fusion
<b>Product Name</b>	<b>M25PE40</b>	<b>AT45DB041E</b>	<b>AT25PE40</b>	<b>AT25DF041B OR AT25XE041B</b>
Main Memory Size bytes	524,288	524,288	524,288	524,288
Page Size	256 bytes	256 / 264 byte	256 bytes	256 bytes
# of Pages	2048	2048	2048	2048
Sector Size	64KB	64KB	64KB	64KB
# of Sectors	8	8	8	8
Memory Buffer Size	256 byte	256 / 264 byte	256 / 264 byte	-
# of Data buffers (SRAM)	1	2	2	-
<b>Product Name</b>	<b>M25PE80</b>	<b>AT45DB081E</b>	<b>AT25PE80</b>	<b>AT25DF081B</b>
Main Memory Size bytes	1,081,344	1,081,344	1,081,344	1,081,344
Page Size	256 bytes	256 / 264 byte	256 bytes	256 bytes
# of Pages	2048	2048	2048	2048
Sector Size	64KB	64KB	64KB	64KB
# of Sectors	16	16	16	16
Memory Buffer Size	256 byte	256 / 264 byte	256 / 264 byte	256 byte
# of Data buffers (SRAM)	1	2	2	1
<b>Product Name</b>	<b>M25PE16</b>	<b>AT45DB161E</b>	<b>AT25PE16</b>	<b>AT25DF161A</b>
Main Memory Size bytes	2,097,152	2,097,152	2,097,152	2,097,152
Page Size	256 bytes	512 / 528 byte	512 / 528 byte	256 bytes
# of Pages	2048	2048	2048	2048
Sector Size	64KB	128KB	128KB	128KB
# of Sectors	32	16	16	16
Memory Buffer Size	256 byte	512 / 528 byte	512 / 528 byte	256 byte
# of Data buffers (SRAM)	1	2	2	1

\*Take advantage of 2 Data Buffers, Flexible page architecture 256 or 264 byte and the Ultra Deep Power Down of Adesto over Micron on new designs

## Pin Assignment Comparison

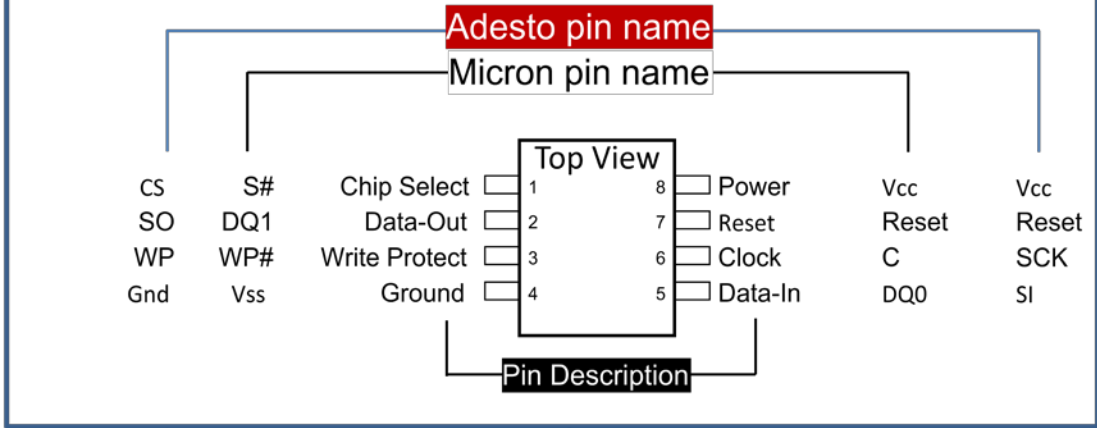
Adesto has several memory solutions that can replace the Micron M25PE family of products, ranging from densities as small as 512Kbit to 32 Mbit and with lower energy consumption and wider operating voltage than Micron.

While the Adesto AT25PE family offers an exact pin-out match to the Micron M25PE, the designer and component engineer may want to consider the advantages of our Fusion series (AT25DFxxx and AT25EXxxx). The following diagrams compare the pin configuration for all Adesto product families compared to the Micron M25PE.

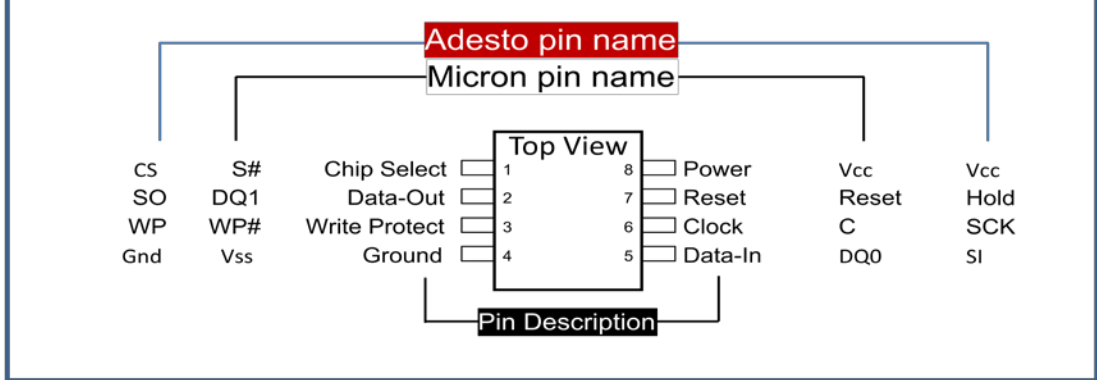
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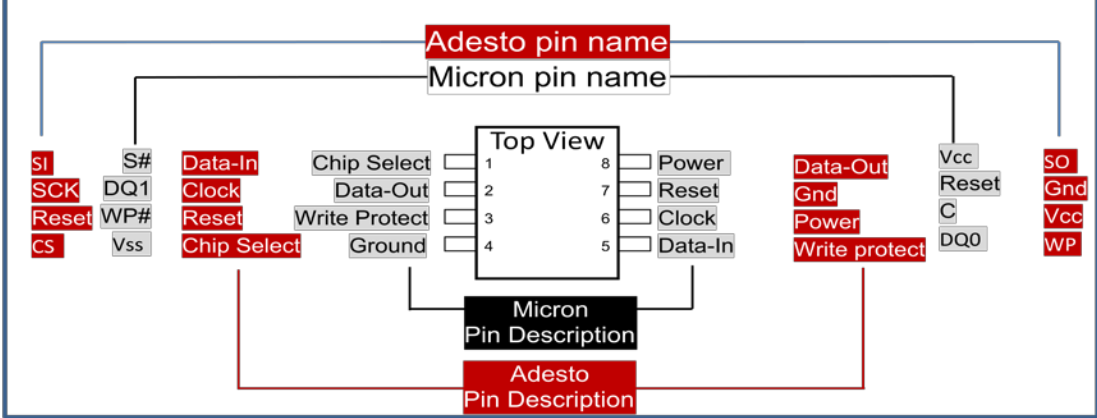
**Pin Assignment Comparison:**  
 Micron M25PE to *Adesto DataFlash-Lite AT25PE*  
*Adesto pinout is an exact match*



**Pin Assignment Comparison:**  
 Micron M25PE to *Adesto Fusion Products (AT25DF, AT25DN, AT25XE)*



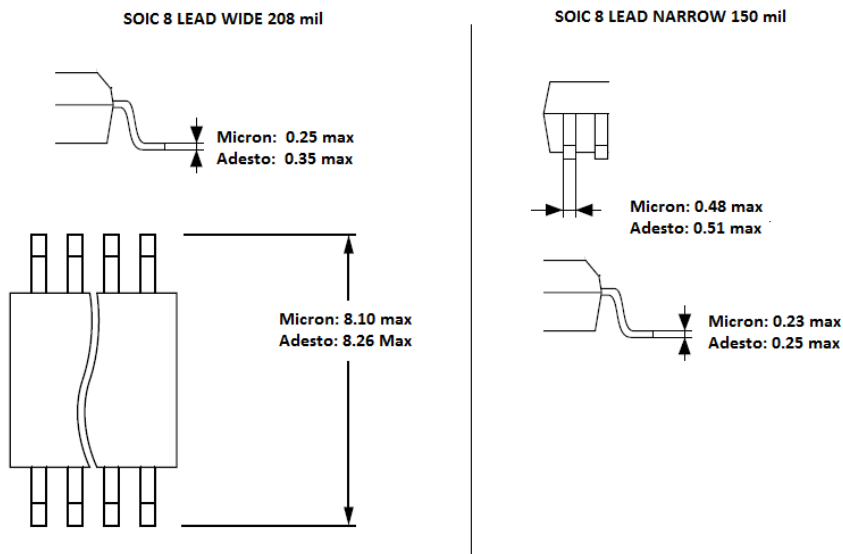
**Pin Assignment Comparison:**  
 Micron M25PE to *Adesto DataFlash AT45DB*



## Device Package

Package Type	Micron Nomenclature	Adesto Nomenclature	Dimensional Comparison
Dual Flat No Lead MLP 8 TERMINAL	VQFPN (Pkg Code MP)	<b>8MA1 (Pkg Code M)</b>	Fully Compatible Replacement
SOIC 8 LEAD NARROW 150 mil	SO8N (Pkg Code MN)	<b>8S1 (Pkg Code SS)</b>	Fully Compatible Replacement*
SOIC 8 LEAD WIDE 208 mil	SO8W (Pkg Code MW)	<b>8S2 (Pkg Code S)</b>	Fully Compatible Replacement*

\* Reference below figures for dimensional comparison

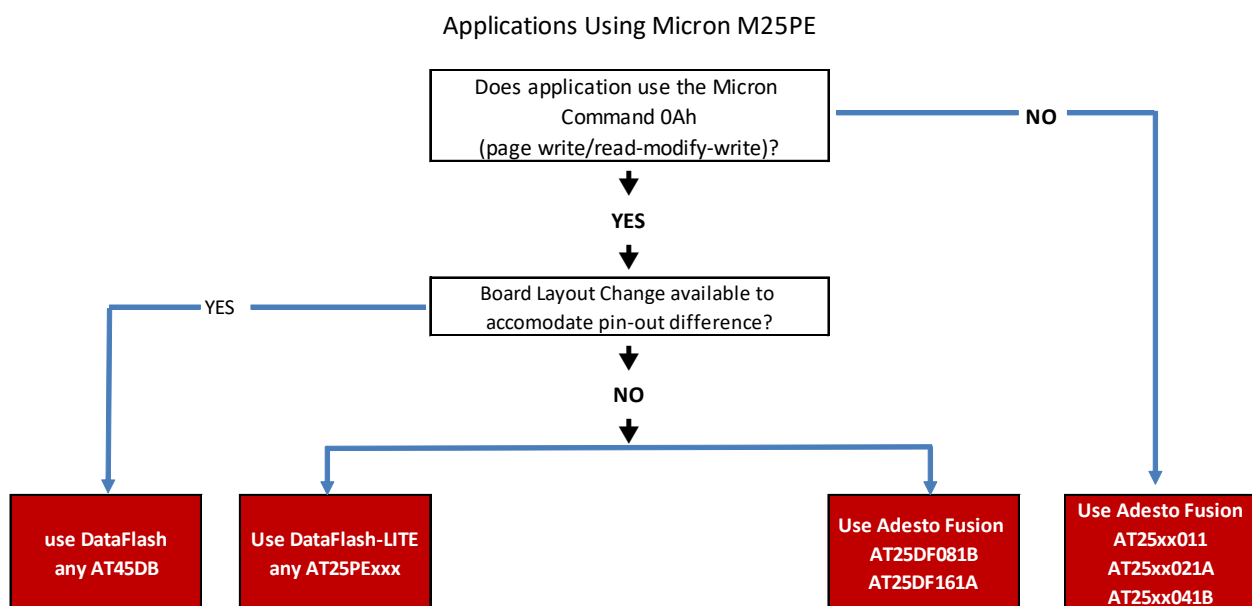


## Command Set Comparison

Adesto has several memory solutions that can replace the Micron M25PE family of products. The Op codes may vary between each family of solutions, therefore a separate comparison table is provided for the Adesto DataFlash, DataFlash-L and the Fusion as compared to the Micron M25PE.

It should be noted that the Micron 25PE Page-Erase product possesses the 0Ah page write command. Both the Adesto DataFlash and DataFlash-L solutions have this same command as either 82h or 58h code shown in the following comparison table(s).

Shown below is a quick check to identify which Adesto product solution may be best suited for the application.



## Op Code Comparison

### *Adesto AT25PE DATAFLASH-L vs Micron M25PE*

Function	Micron Op Code	Adesto Op Code	
Write Enable	06h	02h	
Write Disable	04h	3Dh + 2Ah + 7Fh + A9h	
Read ID	9Fh	9Fh	
Read Status Register	05h	D7h	
Read Data Bytes	03h	03h	Adesto Continuous Array Read low power mode- 0 dummy byte compatible with Micron
Read Data Bytes @ higher speed	0Bh	0Bh	Adesto Continuous Array Read- high frequency 1 dummy byte compatible with Micron
Page Write Supports read-modify-write function	0Ah	58h	
Page Program	02h	88h	
Sector Erase	D8h	7Ch	
Bulk Erase	C7h	C7h + 94h + 80h + 9Ah	
Deep Power Down	B9h	B9h	
Release from Deep Power Down	ABh	ABh	
Ultra Deep Power Down	not available	79h	

## Op Code Comparison

### *Adesto AT45DB DATAFLASH vs Micron M25PE*

Function	Micron Op Code	Adesto Op Code	
Write Enable	06h	02h or 83h	Adesto 02h command is for Main Memory BYTE Programming. The Adesto 82h command is for Main Memory PAGE Programming
Write Disable	04h	3Dh + 2Ah + 7Fh + A9h	Enable Sector Protection Command
Read ID	9Fh	9Fh	
Read Status Register	05h	D7h	
Read Data Bytes	03h	01h	Adesto Continuous Array Read low power mode- 0 dummy byte compatible with Micron
Read Data Bytes @ higher speed	0Bh	0Bh	Adesto Continuous Array Read- high frequency 1 dummy byte compatible with Micron
Page Write Supports read-modify-write function	0Ah	82h	
Page Program	02h	88h	
Sector Erase	D8h	7Ch	
Bulk Erase	C7h	C7h + 94h + 80h + 9Ah	
Deep Power Down	B9h	Abh	
Release from Deep Power Down	ABh	79h	
Ultra Deep Power Down	not available	79h	

## Op Code Comparison

*Adesto AT25DF, AT25XE, AT25DN FUSION vs Micron M25PE*

Function	Micron Op Code	Adesto Op Code
Write Enable	06h	06h
Write Disable	04h	04h
Read ID	9Fh	9Fh
Read Status Register	05h	05h
Read Data Bytes	03h	03h
Read Data Bytes @ higher speed	0Bh	0Bh
Page Write Supports read-modify-write function	0Ah	available only on the AT25DF081B and AT25DF161A 8 & 16 Mbit versions (see note 1)
Page Program	02h	02h
Sector Erase	D8h	D8h
Bulk Erase	C7h	C7h
Deep Power Down	B9h	B9h
Release from Deep Power Down	ABh	Abh
Ultra Deep Power Down	not available	79h

NOTE 1: All Adesto FUSION products are highly compatible if the applications using the Micron M25PE DOES NOT require the 0Ah command.

<b>Function &amp; Performance (Micron M25PE vs all recommended Adesto Replacements)</b>		<b>RECOMMENDED REPLACEMENTS</b>					
<b>Parameter</b>		<b>M25PE</b>	<b>AT25PE</b>	<b>AT45DB</b>	<b>AT25DN</b>	<b>AT25DF</b>	<b>AT25XE</b>
Operating Voltage	2.7V to 3.6V	✓	✓	✓	✓	✓	✓
Operating Voltage	1.65V to 3.6V	✗	✓	✓	✗	✓	✓
Operating Voltage	2.3V to 3.6V	✗	✓	✓	✓	✓	✓
Max Clock Freq	75 MHz	✓	✓	✓	✓	✓	✓
Max Clock Freq	85 MHz	✗	✓	✓	✓	✓	✓
Max Clock Freq	104 MHz	✗	✓	✓	✓	✓	✓
Read Status Register	Assert Chip Select, load Op Code Deassert Chip Select = standby mode	✓	✓	✓	✓	✓	✓
Enter Deep Power Down Mode	Assert Chip Select, load Op Code Deassert Chip Select	✓	✓	✓	✓	✓	✓
Exit Deep Power Down Mode	Assert Chip Select, load Op Code Deassert Chip Select, Delay = t <sub>RES</sub>	✓	✓	✓	✓	✓	✓
Protection Mode-Software	Deep Power Down Command, Write Disable Command with Write Protect asserted (hardware) Block Protect Bits SRWD (Write Disable)	✓	✓	✓	✓	✓	✓
Power Up Timing Maximum (time delay to write instruction)	t <sub>PUW</sub> (ms)	10	3	3	3	3	3
Power Up Min Threshold (V <sub>WI</sub> or V <sub>POR</sub> )	V <sub>WI</sub> (V)	1.5 to 2.5	1.45 to 1.6	1.45 to 1.6	1.6 to 2.2	1.45 to 1.6	1.45 to 1.6
Minimum Delay Vcc minimum to Read Operation (t <sub>VCSL</sub> )	t <sub>VCSL</sub> (μs)	30	70	70	70	70	70
Read Mfgr ID	Assert Chip Select, load Op Code Deassert Chip Select = standby mode	✓	✓	✓	✓	✓	✓
Current-Standby	(μA) Maximum	50	40	40	40	40	40
Current-Deep Power Down	(μA) [Typical / Max]	[- / 10]	[6 / 12]	[4.5 / 12]	[7.5 / 15]	[5 / 15]	[4.5 / 15]
Current- Ultra Deep Power Down	(μA) [Typical / Max]	✗	[0.5 / 2]	[0.4 / 1]	[0.35 / 0.6]	[0.2 / 0,6]	[0.2 / 0,6]
Mfg ID 3 byte Code	See Mfgr ID Table		See Mfgr ID Table				

Contact [miconconvert@adestotech.com](mailto:miconconvert@adestotech.com) for technical assistance as well as learning more about the Adesto Longevity Program Request a free Adesto FUSION Memory Sample Set at <http://www.adestotech.com/contact-support/sample-request>

## Download Datasheets

Adesto Brand	Density	Product#	Website Link
DataFlash-L	2 Mb	AT25PE20	Contact <a href="mailto:miconconvert@adestotech.com">miconconvert@adestotech.com</a>
DataFlash-L	4 Mb	AT25PE40	Contact <a href="mailto:miconconvert@adestotech.com">miconconvert@adestotech.com</a>
DataFlash-L	8 Mb	AT25PE80	Contact <a href="mailto:miconconvert@adestotech.com">miconconvert@adestotech.com</a>
DataFlash-L	16 Mb	AT25PE16	Contact <a href="mailto:miconconvert@adestotech.com">miconconvert@adestotech.com</a>
FUSION	512 kb	AT25DN512C	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25DN512C_037.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25DN512C_037.pdf</a>
FUSION	512 kb	AT25DF512C	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25DF512C_030.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25DF512C_030.pdf</a>
FUSION	1 Mb	AT25DN011	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25DN011_038.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25DN011_038.pdf</a>
FUSION	1 Mb	AT25DF011	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25DF011_032-1.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25DF011_032-1.pdf</a>
FUSION	1 Mb	AT25XE011	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25XE011-059.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25XE011-059.pdf</a>
FUSION	2 Mb	AT25DF021A	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25DF021A_042.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25DF021A_042.pdf</a>
FUSION	2Mb	AT25XE021A	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25XE021A-061.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25XE021A-061.pdf</a>
FUSION	4 Mb	AT25DF041B	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25DF041B_040.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25DF041B_040.pdf</a>
FUSION	4 Mb	AT25XE041B	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25XE041B_062.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25XE041B_062.pdf</a>
DATAFLASH	2 Mb	AT45DB021E	<a href="http://www.adestotech.com/wp-content/uploads/doc8789.pdf">http://www.adestotech.com/wp-content/uploads/doc8789.pdf</a>
DATAFLASH	4 Mb	AT45DB041E	<a href="http://www.adestotech.com/wp-content/uploads/doc8783.pdf">http://www.adestotech.com/wp-content/uploads/doc8783.pdf</a>
DATAFLASH	8 Mb	AT45DB081E	<a href="http://www.adestotech.com/wp-content/uploads/DS-45DB081E_028.pdf">http://www.adestotech.com/wp-content/uploads/DS-45DB081E_028.pdf</a>
DATAFLASH	16 Mb	AT45DB161E	<a href="http://www.adestotech.com/wp-content/uploads/doc8782.pdf">http://www.adestotech.com/wp-content/uploads/doc8782.pdf</a>
Standard Flash	8 Mb	AT25SF081	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25SF081_045.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25SF081_045.pdf</a>
Standard Flash	16 Mb	AT25SF161	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25SF161_046.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25SF161_046.pdf</a>
Standard Flash	32 Mb	AT25SF321	<a href="http://www.adestotech.com/wp-content/uploads/DS-AT25SF321_047.pdf">http://www.adestotech.com/wp-content/uploads/DS-AT25SF321_047.pdf</a>