

# Technical Note

## Migrating from Micron M25PE to Micron MT25Q 128Mb

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### Introduction

The purpose of this technical note is to compare the features of Micron<sup>®</sup> M25PE Flash memory devices with the Micron<sup>®</sup> MT25QL128 Flash memory devices. The feature comparisons on memory architecture, package options, signal descriptions, command set, electrical specifications, and device identification are described.

This document is written based on the device information available at publication time. In case of inconsistency, information contained in the relevant data sheet supersedes the information in this technical note. This technical note does not provide detailed device information. The standard density specific device data sheet provides a complete description of device functionality, operating modes, and specifications.



## General Features

**Table 1: Comparison of Features**

<b>Features</b>	<b>M25PE</b>	<b>MT25QL128</b>
Densities	4Mb–16Mb	128Mb
Program	1 to 256 bytes	1 to 256 bytes
Sector architecture	Uniform sector: 64KB	Uniform sector: 64KB
Subsector	Uniform sector: 4KB	Uniform subsector: 4KB, 32KB
Endurance	100,000 cycle	100,000 cycle
Retention	20 years	20 years
V <sub>CC</sub> range	2.7V to 3.6V	2.7V to 3.6V
Industrial temperature range	–40 to +85°C	–40 to +85°C

## Package Configurations

**Table 2: Package Configurations**

Package	Short Name	M25PE			MT25Q
		4Mb	8Mb	16Mb	128Mb
8-pin SOP2, 208 mil	SO8W	Yes	Yes	Yes	Yes
W-PDFN-8 6mm × 5mm (MLP8 6mm × 5mm)	WDFN/6x5 <sup>1</sup>	Yes	Yes	Yes	Yes

Note: 1. DFN solutions for M25PE and MT25Q are compatible in terms of land pattern.

## Signal Descriptions

M25PE	MT25QL128	Type	Description
S#	S#	Input	Chip select
C	C	Input	Serial clock
DQ0	DQ0	Input or I/O	M25PE: Serial data input, MT25Q: I/O
DQ1	DQ1	Output or I/O	M25PE: Serial data output, MT25Q: I/O
W#	W#/DQ2	Input or I/O	M25PE: Write protect, MT25Q: Write protect and I/O
RESET#	HOLD#/DQ3	Input	M25PE: RESET, MT25Q: HOLD or I/O
–	RESET# <sup>2</sup>	Input	Reset
V <sub>CC</sub>	V <sub>CC</sub>	Supply	Power supply
V <sub>SS</sub>	V <sub>SS</sub>	Supply	Ground

- Notes:
1. M25PE devices do not support dual or quad I/O functionality.
  2. A dedicated reset pin is available on MT25QL128 for T-PBGA24 and SO16W packages. This signal has an internal pullup resistor and may be left unconnected if not used.

## Commands

**Table 3: Command Set**

Command	Command Code		Note
	M25PE	MT25QL128	
<b>WRITE Operations</b>			
WRITE ENABLE	06h	06h	
WRITE DISABLE	04h	04h	
<b>READ ID</b>			
READ DEVICE ID	9Fh	9Fh/9Eh	
<b>REGISTER OPERATIONS</b>			
READ STATUS REGISTER	05h	05h	
WRITE STATUS REGISTER	01h	01h	
WRITE TO LOCK REGISTER	E5h	E5h	
READ LOCK REGISTER	E8h	E8h	
<b>READ</b>			
READ	03h	03h	
FAST READ	0Bh	0Bh	
<b>PROGRAM</b>			
PAGE PROGRAM	02h	02h	
PAGE WRITE	0Ah	N/A	1
<b>ERASE</b>			
PAGE ERASE	DBh	N/A	2
4KB SUBSECTOR ERASE	20h	20h	
SECTOR ERASE	D8h	D8h	
BULK ERASE	C7h	C7h/60h	
<b>DEEP POWER DOWN Operations</b>			
ENTER DEEP POWER DOWN	B9h	B9h	
RELEASE FROM DEEP POWER DOWN	ABh	ABh	

- Notes:
1. Byte alterability (by PAGE WRITE command) is not supported on MT25QL128
  2. Page erasability (by PAGE ERASE command) is not supported on MT25QL128



## Electrical Characteristics

**Table 4: DC Characteristics**

Parameter	Symbol	M25PE		MT25QL128		Units
		Typ	Max	Typ	Max	
Standby current	$I_{CC1}$	–	50	15	50	$\mu\text{A}$
Deep power-down current	$I_{CC2}$	–	10	5	30	$\mu\text{A}$
Operating current (READ) at maximum frequency	$I_{CC3}$	–	8	–	16 mA at 133 MHz 8mA at 54 MHz	mA
Operating current (PAGE PROGRAM)	$I_{CC4}$	–	15	–	35	mA
Operating current (ERASE)	$I_{CC6}$	–	15	–	35	mA

**Table 5: DC Voltage Specifications**

Parameter	Symbol	M25PE		MT25QL128		Units
		Min	Max	Min	Max	
Input LOW voltage	$V_{IL}$	–0.5	$0.3 \times V_{CC}$	–0.5	$0.3 \times V_{CC}$	V
Input HIGH voltage	$V_{IH}$	$0.7 \times V_{CC}$	$0.2 + V_{CC}$	$0.7 \times V_{CC}$	$0.4 + V_{CC}$	V
Output LOW voltage <sup>1</sup>	$V_{OL}$	–	0.4	–	0.4	V
Output HIGH voltage <sup>2</sup>	$V_{HH}$	$V_{CC} - 0.2$	–	$V_{CC} - 0.2$	–	V

- Notes: 1. Test condition:  $I_{OL} = 1.6\text{mA}$ .  
2. Test condition:  $I_{OH} = -100\mu\text{A}$ .

**Table 6: AC Specifications**

Parameter	Symbol	M25PE		MT25QL128	
		Min	Max	Min	Max
Clock frequency (FAST READ)	$f_C$	DC	75 MHz	DC	133 MHz
Clock frequency (READ commands)	$f_R$	DC	54 MHz	DC	54 MHz



**Table 7: Program and Erase Specifications**

Parameter	Symbol	M25PE		MT25QL128		Units
		Typ	Max	Typ	Max	
PAGE PROGRAM (256 bytes)	t <sub>PP</sub>	0.8	3	0.12	2.8	ms
64KB SECTOR ERASE	t <sub>SE</sub>	1	5	0.15	1	s
4KB SUBSECTOR ERASE	t <sub>SSE</sub>	0.08	0.15	0.05	0.4	s
4Mb BULK ERASE	t <sub>BE</sub>	8	10			s
8Mb BULK ERASE	t <sub>BE</sub>	10	20			s
16Mb BULK ERASE	t <sub>BE</sub>	25	60			s
128Mb BULK ERASE	t <sub>BE</sub>			38	144	s



## Device identification

Table 8: Read Identification Summary

Parameter		M25PE	MT25QL128
Manufacturer ID		20h	20h
Memory type		80h	BAh
Memory capacity	4Mb	13h	
	8Mb	14h	
	16Mb	15h	
	128Mb		18h
<b>UID</b>			
Extended device ID (EDID) + Customized factory data (CFD) length		N/A <sup>1</sup>	10h <sup>2</sup>
EDID + Device configuration information			2 byte
CFD			14 bytes (factory programmed)

- Notes:
1. UID is optional for other M25PE
  2. Refer to the MT25QL128 data sheet for more information about the UID, EDID, and CFD.



## Part Numbers

**Table 9: Cross-Reference Part Numbers**

<b>M25PE Part Number</b>	<b>MT25QL128 Part Number</b>	<b>Density</b>	<b>Package</b>
M25PE40-VMW6TG	MT25QL128ABA1ESE-0SIT	4Mb	SO8W
M25PE40-VMP6TG	MT25QL128ABA1EW7-0SIT	4Mb	DFN/6x5
M25PE80-VMW6xG	MT25QL128ABA1ESE-0SIT	8Mb	SO8W
M25PE80-VMP6TG	MT25QL128ABA1EW7-0SIT	8Mb	DFN/6x5
M25PE16-VMW6xG	MT25QL128ABA1ESE-0SIT	16Mb	SO8W
M25PE16-VMP6xG	MT25QL128ABA1EW7-0SIT	16Mb	DFN/6x5

Note: 1. Refer to the packaging information for "x" in the part number of M25PE (T = Tape and reel, Blank = Tube).





## **Revision History**

### **Rev. B – 06/17**

- Change memory type for M25PE in device identification table

### **Rev. A – 05/17**

- Initial release

8000 S. Federal Way, P.O. Box 6, Boise, ID 83707-0006, Tel: 208-368-4000  
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