Technical Note

Migrating from Micron M25PX to Micron MT25Q 128Mb

Introduction

The purpose of this technical note is to compare the features of Micron® M25PX Flash memory devices with the Micron® 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

Features	M25PX	MT25QL128
Densities	8Mb–64Mb	128Mb
Program	1 to 256 bytes	1 to 256 bytes
Sector architecture	Uniform sector: 64KB	Uniform sector: 64KB
Subsector	Uniform subsector: 4KB	Uniform subsector: 4KB, 32KB
Endurance	100,000 cycle	100,000 cycle
Retention	20 years	20 years
V_{CC} range	8Mb: 2.3V to 3.6V 16Mb to 64Mb: 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	M25PX				MT25Q
		8Mb	16Mb	32Mb	64Mb	128Mb
8-pin SOP2, 208 mil	SO8W	Yes	Yes	Yes	No	Yes
16-pin SOP2, 300 mil	SO16W	No	No	No	Yes	Yes
W-PDFN-8 6mm × 5mm (MLP8 6mm × 5mm)	WDFN/6x5[1]	No	Yes	No	No	Yes

Note: 1. DFN solutions for M25P and MT25Q are compatible in terms of land pattern.

Signal Descriptions

M25PX	MT25QL128	Type	Description
S#	S#	Input	Chip select
C	C	Input	Serial clock
DQ0	DQ0	I/O	I/O
DQ1	DQ1	I/O	I/O
W#/V_{PP}	W#/DQ2	Input or I/O	M25PX: Write protect and enhanced program supply voltage, MT25Q: Write protect and I/O
HOLD#	HOLD#/DQ3	Input	M25PX: HOLD, MT25Q: HOLD or I/O
–	RESET#[2]	Input	Reset
V_{CC}	V_{CC}	Supply	Power supply
V_{SS}	V_{SS}	Supply	Ground

Notes:
1. M25PX devices do not support 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	
	M25PX	MT25QL128
WRITE Operations		
WRITE ENABLE	06h	06h
WRITE DISABLE	04h	04h
READ ID		
READ DEVICE ID	9Fh/9Eh	9Fh/9Eh
REGISTER OPERATIONS		
READ STATUS REGISTER	05h	05h
WRITE STATUS REGISTER	01h	01h
WRITE TO LOCK REGISTER	E5h	E5h
READ LOCK REGISTER	E8h	E8h
READ		
READ	03h	03h
FAST READ	0Bh	0Bh
DUAL OUTPUT FAST READ	3Bh	3Bh
OTP AREA Operations		
READ OTP (Read 64 bytes of OTP area)	4Bh	4Bh
PROGRAM OTP (Program 64 bytes of OTP area)	42h	42h
PROGRAM		
PAGE PROGRAM	02h	02h
DUAL INPUT FAST PROGRAM	A2h	A2h
ERASE		
4KB SUBSECTOR ERASE	20h	20h
SECTOR ERASE	D8h	D8h
BULK ERASE	C7h	C7h/60h
DEEP POWER DOWN Operations		
ENTER DEEP POWER DOWN	B9h	B9h
RELEASE FROM DEEP POWER DOWN	ABh	ABh

Electrical Characteristics

Table 4: DC Characteristics

Parameter	Symbol	M25PX		MT25QL128		Units
		Typ	Max	Typ	Max	
Standby current	I_{CC1}	–	50	15	50	µA
Deep power-down current	I_{CC2}	–	10	5	30	µA
Operating current (READ) at maximum frequency	I_{CC3}	–	8	–	16 at 133 MHz 8 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	M25PX		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[1]	V_{OL}	–	0.4	–	0.4	V
Output HIGH voltage[2]	V_{HH}	V_{CC} - 0.2	–	V_{CC} - 0.2	–	V

Notes:
1. Test condition: I_{OL} = 1.6mA.
2. Test condition: I_{OH} = –100µA.

Table 6: AC Specifications

Parameter	Symbol	M25PX		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	M25PX		MT25QL128		Units
		Typ	Max	Typ	Max	
PAGE PROGRAM (256 bytes)	^{t}PP	0.8	5	0.12	2.8	ms
64KB SECTOR ERASE	^{t}SE	0.6	3	0.15	1	s
4KB SUBSECTOR ERASE	^{t}SSE	0.07	0.15	0.05	0.4	s
8Mb BULK ERASE	^{t}BE	8	80			s
16Mb BULK ERASE	^{t}BE	15	80			s
32Mb BULK ERASE	^{t}BE	34	80			s
64Mb BULK ERASE	^{t}BE	68	160			s
128Mb BULK ERASE	^{t}BE			38	144	s

Device identification

Table 8: Read Identification Summary

Parameter		M25PX	MT25QL128
Manufacturer ID		20h	20h
Memory type		71h	BAh
Memory capacity	8Mb	14h	
	16Mb	15h	
	32Mb	16h	
	64Mb	17h	
	128Mb		18h
UID			
Extended device ID (EDID) + Customized factory data (CFD) length		N/A[1]	10h[2]
EDID + Device configuration information			2 byte
CFD			14 bytes (factory programmed)

Notes:
1. UID is optional for other M25PX.
2. Refer to the MT25QL128 data sheet for more information about the UID, EDID, and CFD.

Part Numbers

Table 9: Cross-Reference Part Numbers

M25PX Part Number	MT25QL128 Part Number	Density	Package
M25PX80-VMW6TG	MT25QL128ABA1ESE-0SIT	8Mb	SO8W
M25PX16-VMW6xG	MT25QL128ABA1ESE-0SIT	16Mb	SO8W
M25PX16-VMP6xG	MT25QL128ABA1EW7-0SIT	16Mb	DFN/6x5
M25PX32-VMW6F/E	MT25QL128ABA1ESE-0SIT	32Mb	SO8W
M25PX64-VMF6P	MT25QL128ABA8ESF-0SIT	64Mb	SO16W

Note: 1. Refer to the packaging information for "x" in the part number of M25PX (T = Tape and reel, Blank = Tube).

Revision History

Rev. B – 06/17

- Change memory type for M25PX in device identification table

Rev. A – 05/17

- Initial release

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