Technical Note

SFDP for MT25Q Family

Introduction

The serial Flash discoverable parameter (SFDP) standard enables a consistent method to describe serial Flash device function and feature capabilities in internal parameter tables. Host system software can query the standard parameter tables and enable adjustments to accommodate features that vary from one vendor to another.

The SFDP standard defines a common parameter table that describes important device characteristics and serial access methods used to read the parameter table data.

Micron's SFDP table information aligns with JEDEC-standard JESD216 for serial Flash discoverable parameters. The latest JEDEC standard includes revision 1.6. Micron's MT25Q production parts, beginning week 42 (2014), will include SFDP data that aligns with revision 1.6.

Refer to JEDEC-standard JESD216B for a complete overview of the SFDP table definition. Refer to any MT25Q family data sheet for conditions not specified here.

Serial Flash Data Parameter – Header Structure

The table below shows the MT25Q family SFDP data. Data in these tables is read by the READ SERIAL FLASH DISCOVERY PARAMETER operation (5Ah).

Table 1: SFDP Header Structure

Description		Byte Address	Bits	Data				
				128Mb	256Mb	512Mb	1Gb	2Gb
SFDP signature		00h	7:0	53h	53h	53h	53h	53h
		01h	7:0	46h	46h	46h	46h	46h
		02h	7:0	44h	44h	44h	44h	44h
		03h	7:0	50h	50h	50h	50h	50h
Parameter revision	Minor	04h	7:0	06h	06h	06h	06h	06h
	Major	05h	7:0	01h	01h	01h	01h	01h
Number of parameter headers		06h	7:0	01h	01h	01h	01h	01h
Unused		07h	7:0	FFh	FFh	FFh	FFh	FFh
Parameter ID(0)		08h	7:0	00h	00h	00h	00h	00h
Parameter minor revision		09h	7:0	06h	06h	06h	06h	06h
Parameter major revision		0Ah	7:0	01h	01h	01h	01h	01h
Parameter length (in DW)		0Bh	7:0	10h	10h	10h	10h	10h
Parameter table pointer		0Ch	7:0	30h	30h	30h	30h	30h
		0Dh	7:0	00h	00h	00h	00h	00h
		0Eh	7:0	00h	00h	00h	00h	00h
Parameter 1 ID MSB		0Fh	7:0	FFh	FFh	FFh	FFh	FFh
Parameter 2 ID LSB		10h	7:0	84h	84h	84h	84h	84h
Parameter revision	Minor	11h	7:0	00h	00h	00h	00h	00h
	Major	12h	7:0	01h	01h	01h	01h	01h
Parameter length (in DW)		13h	7:0	02h	02h	02h	02h	02h
Parameter table pointer		14h	7:0	80h	80h	80h	80h	80h
		15h	7:0	00h	00h	00h	00h	00h
		16h	7:0	00h	00h	00h	00h	00h
Parameter 2 ID MSB		17h	7:0	FFh	FFh	FFh	FFh	FFh
Parameter 3 ID LSB		18h	7:0	03h	03h	03h	FFh	FFh
Parameter revision	Minor	19h	7:0	00h	00h	00h	FFh	FFh
	Major	1Ah	7:0	01h	01h	01h	FFh	FFh
Parameter length (in DW)		1Bh	7:0	02h	02h	02h	FFh	FFh
Parameter table pointer		1Ch	7:0	00h	00h	00h	FFh	FFh
		1Dh	7:0	01h	01h	01h	FFh	FFh
		1Eh	7:0	00h	00h	00h	FFh	FFh
Parameter 3 ID MSB		1Fh	7:0	FFh	FFh	FFh	FFh	FFh

Note: 1. Others locations from 20h to 2Fh contain FFh.

Serial Flash Data Parameter – Basic Properties

Table 2: Parameter Table – Flash Basic Properties

Description	Byte Address	Bits	Data				
			128Mb	256Mb	512Mb	1Gb	2Gb
Minimum sector erase sizes	30h	1:0	01b	01b	01b	01b	01b
Write granularity		2	1	1	1	1	1
WRITE ENABLE command required for writing to volatile status registers		3	0	0	0	0	0
WRITE ENABLE command selected for writing to volatile status registers		4	0	0	0	0	0
Not used		7:5	111b	111b	111b	111b	111b
4KB ERASE command	31h	7:0	20h	20h	20h	20h	20h
Supports 1-1-2 FAST READ	32h	0	1	1	1	1	1
Address bytes		2:1	00b	01b	01b	01b	01b
Supports double transfer rate clocking		3	1	1	1	1	1
Supports 1-2-2 FAST READ		4	1	1	1	1	1
Supports 1-4-4 FAST READ		5	1	1	1	1	1
Supports 1-1-4 FAST READ		6	1	1	1	1	1
Not used		7	1	1	1	1	1
Reserved	33h	7:0	FFh	FFh	FFh	FFh	FFh
Flash size (bits)	34h	7:0	FFh	FFh	FFh	FFh	FFh
	35h	7:0	FFh	FFh	FFh	FFh	FFh
	36h	7:0	FFh	FFh	FFh	FFh	FFh
	37h	7:0	07h	0Fh	1Fh	3Fh	7Fh
1-4-4 FAST READ dummy cycle count	38h	4:0	01001b	01001b	01001b	01001b	01001b
1-4-4 FAST READ number of mode bits		7:5	001b	001b	001b	001b	001b
1-4-4 FAST READ command code	39h	7:0	EBh	EBh	EBh	EBh	EBh
1-1-4 FAST READ dummy cycle count	3Ah	4:0	00111b	00111b	00111b	00111b	00111b
1-1-4 FAST READ number of mode bits		7:5	001b	001b	001b	001b	001b
1-1-4 FAST READ command code	3Bh	7:0	6Bh	6Bh	6Bh	6Bh	6Bh
1-1-2 FAST READ dummy cycle count	3Ch	4:0	00111b	00111b	00111b	00111b	00111b
1-1-2 FAST READ number of mode bits		7:5	001b	001b	001b	001b	001b
1-1-2 FAST READ command	3Dh	7:0	3Bh	3Bh	3Bh	3Bh	3Bh

Table 2: Parameter Table – Flash Basic Properties (Continued)

Description	Byte Address	Bits	Data				
			128Mb	256Mb	512Mb	1Gb	2Gb
1-2-2 FAST READ dummy cycle count	3Eh	4:0	00111b	00111b	00111b	00111b	00111b
1-2-2 FAST READ number of mode bits		7:5	001b	001b	001b	001b	001b
1-2-2 Command code	3Fh	7:0	BBh	BBh	BBh	BBh	BBh
Supports 2-2-2 FAST READ	40h	0	1	1	1	1	1
Reserved		3:1	111b	111b	111b	111b	111b
Supports 4-4-4 FAST READ		4	1	1	1	1	1
Reserved		7:5	111b	111b	111b	111b	111b
Reserved	43:41h	31:8	FFFFFFh	FFFFFFh	FFFFFFh	FFFFFFh	FFFFFFh
Reserved	45:44h	15:0	FFFFh	FFFFh	FFFFh	FFFFh	FFFFh
2-2-2 FAST READ dummy cycle count	46h	4:0	00111b	00111b	00111b	00111b	00111b
2-2-2 FAST READ number of mode bits		7:5	001b	001b	001b	001b	001b
2-2-2 FAST READ command code	47h	7:0	BBh	BBh	BBh	BBh	BBh
Reserved	49:48h	15:0	FFFFh	FFFFh	FFFFh	FFFFh	FFFFh
4-4-4 FAST READ dummy cycle count	4Ah	4:0	01001b	01001b	01001b	01001b	01001b
4-4-4 FAST READ number of mode bits		7:5	001b	001b	001b	001b	001b
4-4-4 FAST READ command code	4Bh	7:0	EBh	EBh	EBh	EBh	EBh
Sector Type 1 size	4Ch	7:0	0Ch	0Ch	0Ch	0Ch	0Ch
Sector Type 1 command code	4Dh	7:0	20h	20h	20h	20h	20h
Sector Type 2 size	4Eh	7:0	10h	10h	10h	10h	10h
Sector Type 2 code	4Fh	7:0	D8h	D8h	D8h	D8h	D8h
Sector Type 3 size	50h	7:0	0Fh	0Fh	0Fh	0Fh	0Fh
Sector Type 3 code	51h	7:0	52h	52h	52h	52h	52h
Sector Type 4 size	52h	7:0	00h	00h	00h	00h	00h
Sector Type 4 code	53h	7:0	00h	00h	00h	00h	00h

Table 2: Parameter Table – Flash Basic Properties (Continued)

Description	Byte Address	Bits	Data				
			128Mb	256Mb	512Mb	1Gb	2Gb
Multiplier from typical erase time to maximum erase time	57h:54h	3:0	0100b	0100b	0100b	0100b	0100b
Sector Type 1 Erase, Typical time		8:4	00010b	00010b	00010b	00010b	00010b
		10:9	01b	01b	01b	01b	01b
Sector Type 2 Erase, Typical time		15:11	01001b	01001b	01001b	01001b	01001b
		17:16	01b	01b	01b	01b	01b
Sector Type 3 Erase, Typical time		22:18	00110b	00110b	00110b	00110b	00110b
		24:23	01b	01b	01b	01b	01b
Sector Type 4 Erase, Typical time		29:25	00000b	00000b	00000b	00000b	00000b
		31:30	00b	00b	00b	00b	00b
Multiplier from typical time to maximum time for page or byte PROGRAM	5Bh:58h	3:0	1011b	1011b	1011b	1011b	1011b
Page size		7:4	1000b	1000b	1000b	1000b	1000b
Page Progr Typical time		12:8	01110b	01110b	01110b	01110b	01110b
		13	0b	0b	0b	0b	0b
Byte Program Typical time, first byte)		17:14	1110b	1110b	1110b	1110b	1110b
		18	0b	0b	0b	0b	0b
Byte Program Typical time, additional byte (1)		22:19	0000b	0000b	0000b	0000b	0000b
		23	0b	0b	0b	0b	0b
Chip Erase, Typical time		28:24	01001b	10100b	00001b	00001b	00001b
		30:29	10b	10b	11b	11b	11b
Reserved		31	1b	1b	1b	1b	1b
Prohibited operations during PROGRAM SUSPEND	5Fh:5Ch	3:0	1100b	1100b	1100b	1100b	1100b
Prohibited operations during ERASE SUSPEND		7:4	1010b	1010b	1010b	1010b	1010b
Reserved		8	1b	1b	1b	1b	1b
PROGRAM RESUME to SUSPEND interval (2)		12:9	0000b	0000b	0000b	0000b	0000b
SUSPEND in progress program maximum latency		17:13	11000b	11000b	11000b	11000b	11000b
		19:18	01b	01b	01b	01b	01b
ERASE RESUME to SUSPEND interval		23:20	0010b	0010b	0010b	0010b	0010b
SUSPEND in progress erase maximum latency		28:24	11000b	11000b	11000b	11000b	11000b
		30:29	01b	01b	01b	01b	01b
SUSPEND RESUME supported		31	0b	0b	0b	0b	0b
PROGRAM RESUME command	60h	7:0	7Ah	7Ah	7Ah	7Ah	7Ah
PROGRAM SUSPEND command	61h	7:0	75h	75h	75h	75h	75h

Table 2: Parameter Table – Flash Basic Properties (Continued)

Description	Byte Address	Bits	Data				
			128Mb	256Mb	512Mb	1Gb	2Gb
RESUME command	62h	7:0	7Ah	7Ah	7Ah	7Ah	7Ah
SUSPEND command	63h	7:0	75h	75h	75h	75h	75h
Reserved	67h:64h	1:0	11b	11b	11b	11b	11b
Status register polling device busy		2	0b	0b	0b	0b	0b
		3	1b	1b	1b	1b	1b
		7:4	1111b	1111b	1111b	1111b	1111b
EXIT DEEP POWER-DOWN to next operation delay		12:8	11101b	11101b	11101b	11101b	11101b
		14:13	01b	01b	01b	01b	01b
EXIT DEEP POWER-DOWN command		22:15	ABh	ABh	ABh	ABh	ABh
ENTER DEEP POWER-DOWN command		30:23	B9h	B9h	B9h	B9h	B9h
Deep power-down supported		31	0b	0b	0b	0b	0b
4-4-4 mode disable sequence	6Bh:68h	3:0	1010b	1010b	1010b	1010b	1010b
4-4-4 mode enable sequence		8:4	10100b	10100b	10100b	10100b	10100b
0-4-4 mode supported		9	1b	1b	1b	1b	1b
0-4-4 mode exit method		15:10	000011b	000011b	000011b	000011b	000011b
0-4-4 mode entry method		19:16	0010b	0010b	0010b	0010b	0010b
Quad enable requirements		22:20	000b	000b	000b	000b	000b
HOLD and WP disable		23	1b	1b	1b	1b	1b
Reserved		31:24	FFh	FFh	FFh	FFh	FFh
Volatile and nonvolatile register and WRITE ENABLE	6Fh: 6Ch	6:0	0000001b	0000001b	0000001b	0000001b	0000001b
Reserved		7	1b	1b	1b	1b	1b
Soft reset and rescue sequence support		13:8	111101b	111101b	111101b	111101b	111101b
EXIT 4-BYTE ADDRESS		23:14	0000000000b	0011110110b	0011110110b	0011110110b	0011110110b
ENTER 4-BYTE ADDRESS		31:24	00000000b	00110110b	00110110b	00110110b	00110110b

Notes:
1. MT25Q 3V and 1.8V devices require only 0.4µs.
2. MT25Q 3V and 1.8V devices require only 5µs; 64µs is declared here as minimum allowed in the standard Serial Flash Discovery Parameter table.
3. Others locations from 70h to 7Fh contain FFh.

Serial Flash Data Parameter – 4-Byte Address Command

Table 3: Parameter Table – 4-Byte Address Command

Description	Byte Address	Bits	Data				
			128Mb	256Mb	512Mb	1Gb	2Gb
4-Byte Address Instruction Table DW1	80h	0	0b	1b	1b	1b	1b
		1	0b	1b	1b	1b	1b
		2	0b	1b	1b	1b	1b
		3	0b	1b	1b	1b	1b
		4	0b	1b	1b	1b	1b
		5	0b	1b	1b	1b	1b
		6	0b	1b	1b	1b	1b
		7	0b	1b	1b	1b	1b
	81h	0	0b	1b	1b	1b	1b
		1	0b	1b	1b	1b	1b
		2	0b	1b	1b	1b	1b
		3	0b	0b	0b	0b	0b
		4	0b	0b	0b	0b	0b
		5	0b	1b	1b	1b	1b
		6	0b	1b	1b	1b	1b
		7	0b	1b	1b	1b	1b
	82h	0	0b	1b	1b	1b	1b
		1	0b	1b	1b	1b	1b
		2	0b	1b	1b	1b	1b
		3	0b	1b	1b	1b	1b
		7:4	1111b	1111b	1111b	1111b	1111b
	83h	7:0	FFh	FFh	FFh	FFh	FFh
4-Byte Address Instruction Table DW2	84h	7:0	FFh	21h	21h	21h	21h
	85h	7:0	FFh	DCh	DCh	DCh	DCh
	86h	7:0	FFh	5Ch	FFh	FFh	FFh
	87h	7:0	FFh	FFh	FFh	FFh	FFh

Note: 1. Others locations from 88h to FFh contain FFh.

Revision History

Rev. B – 08/15

- Added 4-Byte address command information

Rev. A – 10/14

- Initial release

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