



# M25PXX

## 512 Kbit to 32 Mbit, Low Voltage, Serial Flash Memory With 40 MHz or 50 MHz SPI Bus Interface

DATA BRIEF

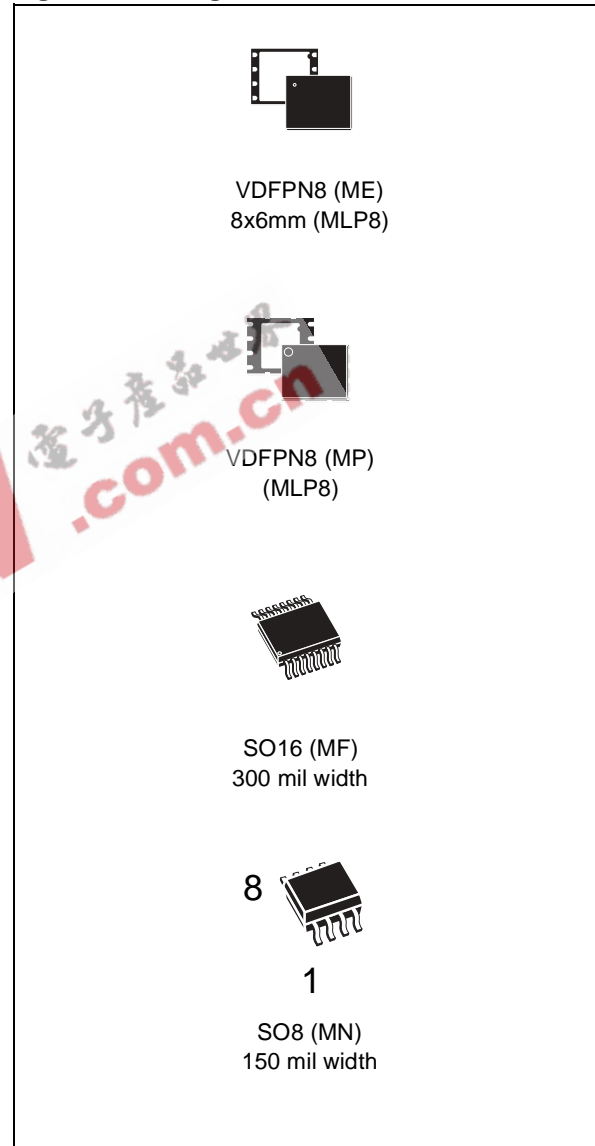
### FEATURES SUMMARY

- 512Kbit to 32Mbit of Flash Memory
- Page Program (up to 256 Bytes) in 1.4ms (typical)
- Sector Erase (256 Kbit or 512Kbit)
- Bulk Erase (512Kbit to 32Mbit)
- 2.7 to 3.6V Single Supply Voltage
- SPI Bus Compatible Serial Interface
- 40MHz to 50MHz Clock Rate (maximum)
- Deep Power-down Mode 1 $\mu$ A (typical)
- Electronic Signatures
  - JEDEC Standard Two-Byte Signature (20xxh)
  - RES Instruction, One-Byte, Signature, for backward compatibility
- More than 100000 Erase/Program Cycles per Sector
- More than 20 Year Data Retention

Table 1. Product List

| Reference | Part Number |
|-----------|-------------|
| M25Pxx    | M25P32      |
|           | M25P16      |
|           | M25P80      |
|           | M25P40      |
|           | M25P20      |
|           | M25P10-A    |
|           | M25P05-A    |

Figure 1. Packages



## M25PXX

### SUMMARY DESCRIPTION

The M25Pxx is a 512Kbit to 32Mbit (2M x 8) Serial Flash Memory, with advanced write protection mechanisms, accessed by a high speed SPI-compatible bus.

The memory can be programmed 1 to 256 bytes at a time, using the Page Program instruction.

The memory is organized as a number of sectors, each containing 256 or 128 pages. Each page is 256 bytes wide.

The whole memory can be erased using the Bulk Erase instruction, or a sector at a time, using the Sector Erase instruction.

Figure 2. Logic Diagram

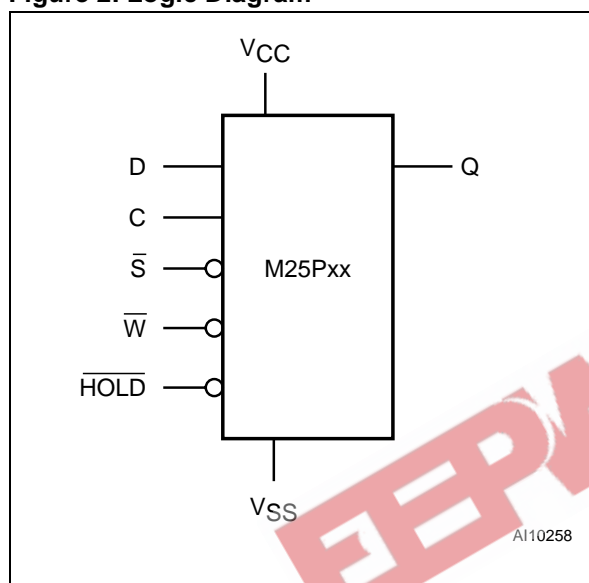
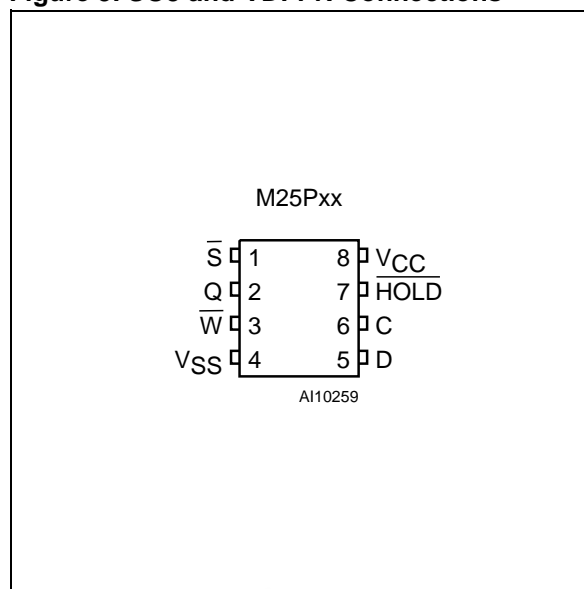


Table 2. Signal Names

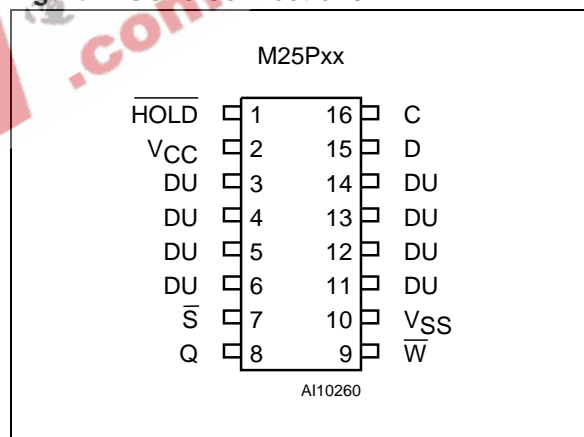
|                 |                    |
|-----------------|--------------------|
| C               | Serial Clock       |
| D               | Serial Data Input  |
| Q               | Serial Data Output |
| $\bar{S}$       | Chip Select        |
| $\bar{W}$       | Write Protect      |
| $\bar{HOLD}$    | Hold               |
| V <sub>CC</sub> | Supply Voltage     |
| V <sub>SS</sub> | Ground             |

Figure 3. SO8 and VDFPN Connections



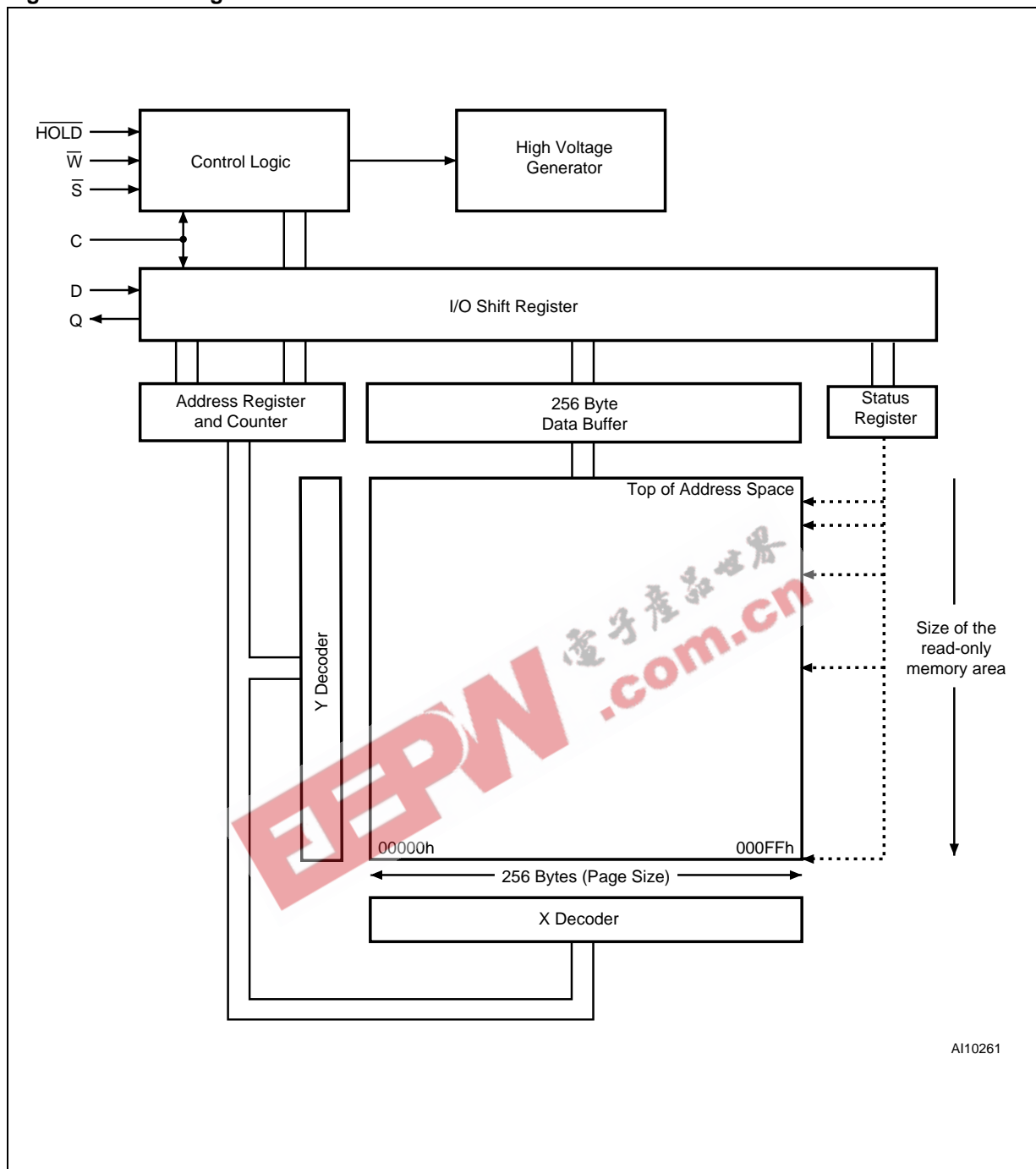
Note: 1. There is an exposed die paddle on the underside of the MLP8 package. This is pulled, internally, to V<sub>SS</sub>, and must not be allowed to be connected to any other voltage or signal line on the PCB.

Figure 4. SO16 Connections



Note: 1. DU = Don't Use

Figure 5. Block Diagram



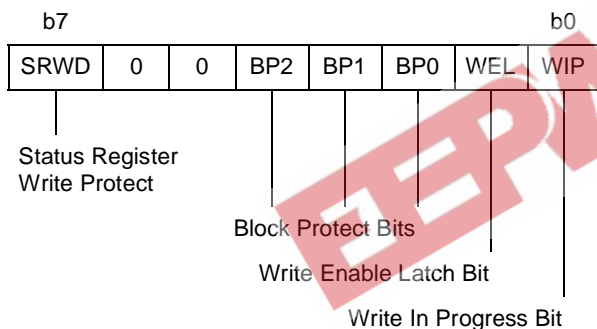
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## M25PXX

**Table 3. Instruction Set**

| Instruction | Description   | One-byte Instruction Code |     | Address Bytes | Dummy Bytes | Data Bytes |
|-------------|---|---------------------------|-----|---------------|-------------|------------|
| WREN        | Write Enable  | 0000 0110                 | 06h | 0             | 0           | 0          |
| WRDI        | Write Disable   | 0000 0100                 | 04h | 0             | 0           | 0          |
| RDID        | Read Identification   | 1001 1111                 | 9Fh | 0             | 0           | 1 to 3     |
| RDSR        | Read Status Register  | 0000 0101                 | 05h | 0             | 0           | 1 to ∞     |
| WRSR        | Write Status Register                                       | 0000 0001                 | 01h | 0             | 0           | 1          |
| READ        | Read Data Bytes   | 0000 0011                 | 03h | 3             | 0           | 1 to ∞     |
| FAST_READ   | Read Data Bytes at Higher Speed                             | 0000 1011                 | 0Bh | 3             | 1           | 1 to ∞     |
| PP          | Page Program  | 0000 0010                 | 02h | 3             | 0           | 1 to 256   |
| SE          | Sector Erase  | 1101 1000                 | D8h | 3             | 0           | 0          |
| BE          | Bulk Erase  | 1100 0111                 | C7h | 0             | 0           | 0          |
| DP          | Deep Power-down   | 1011 1001                 | B9h | 0             | 0           | 0          |
| RES         | Release from Deep Power-down, and Read Electronic Signature | 1010 1011                 | ABh | 0             | 3           | 1 to ∞     |
|             | Release from Deep Power-down                                |                           |     | 0             | 0           | 0          |

**Table 4. Status Register Format**



## PART NUMBERING

**Table 5. Ordering Information Scheme**

|  |        |   |   |    |   |   |   |
|--|--------|---|---|----|---|---|---|
| Example:   | M25P80 | – | V | MP | 6 | T | P |
| <b>Device Type</b><br>M25P = Serial Flash Memory for Code Storage  |        |   |   |    |   |   |   |
| <b>Device Function</b><br>32 = 32Mbit (4M x 8)<br>16 = 16Mbit (2M x 8)<br>80 = 8Mbit (1M x 8)<br>40 = 4Mbit (512K x 8)<br>20 = 2Mbit (256K x 8)<br>10-A = 1Mbit (128K x 8)<br>05-A = 512Kbit (64K x 8)                                   |        |   |   |    |   |   |   |
| <b>Operating Voltage</b><br>V = V <sub>CC</sub> = 2.7 to 3.6V  |        |   |   |    |   |   |   |
| <b>Package</b><br>ME = VDFPN8 8x6mm (MLP8)<br>MP = VDFPN8 (MLP8)<br>MF = SO16 (300 mil width)<br>MN = SO8 (150 mil width)  |        |   |   |    |   |   |   |
| <b>Device Grade</b><br>6 = Industrial temperature range, –40 to 85 °C.<br>Device tested with standard test flow<br>3 = Device tested with High Reliability Certified Flow <sup>1</sup> .<br>Automotive temperature range (–40 to 125 °C) |        |   |   |    |   |   |   |
| <b>Option</b><br>blank = Standard Packing<br>T = Tape and Reel Packing   |        |   |   |    |   |   |   |
| <b>Plating Technology</b><br>blank = Standard SnPb plating<br>P = Lead-Free and RoHS compliant<br>G = Lead-Free, RoHS compliant, Sb <sub>2</sub> O <sub>3</sub> -free and TBBA-free  |        |   |   |    |   |   |   |

Note: 1. ST strongly recommends the use of the Automotive Grade devices for use in an automotive environment. The High Reliability Certified Flow (HRCF) is described in the quality note QNEE9801. Please ask your nearest ST sales office for a copy.

For a list of available options (speed, package, etc.) or for further information on any aspect of this device, please contact your nearest ST Sales Office.

## REVISION HISTORY

Table 6. Document Revision History

| Date        | Rev. | Description of Revision |
|-------------|------|-------------------------|
| 08-Oct-2004 | 1.0  | First release           |

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