



### Design-in of the M29W320D 32 Mbit Flash Memory

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#### INTRODUCTION

The M29W320D is an addition to the family of industry standard Flash memories from STMicroelectronics suited for use in most applications. The purpose of this document is to give information on the M29W320D with respect to other devices on the market in order to ensure a wide range of design-ins not only for new applications but also for existing applications which may already use other devices.

#### MAIN FEATURES OF THE STMICROELECTRONICS M29W320D

The M29W320D is an expansion of the STMicroelectronics M29Wxxx family of flash devices. The family includes the following devices: 32Mb, 16Mb, 8Mb, 4Mb, 2Mb and 1Mb. All are available with basically the same features, pin configurations, block organization and command sets.

The M29W320D is available with access times of 70ns (3.0 to 3.6V) and 90ns (2.7 to 3.6V) in the temperature range -40 to 85°C.

The "D" suffix in the sales type indicates that the device is manufactured with a 0.18µm process while the "B" suffix on the smaller memory sizes indicates that the device is manufactured with a 0.35µm process.

The  $V_{PP}/\overline{WP}$  pin is an extra feature on the M29W320D which is not available on the rest of the M29Wxxx family. This pin when raised to 12V can be used to decrease the programming time. If held at 0V it protects the boot block from being erased and in this case has priority over both the protection bit status of that block and over the temporary unprotect operation if the  $\overline{RESET}$  pin is held at 12V.

The most popular package in the terms of design-ins of the M29Wxxx family is the TSOP48 package. The M29W320D continues to support the same TSOP48 package with the basic M29Wxxx pin-configuration. Note that STMicroelectronics does not offer the reverse TSOP48 package on the M29Wxxx family. STMicroelectronics will continue to expand this family using the same TSOP48 package with the M29W640D and higher capacity devices.

The SO44 package is not available.

### REPLACING THE AMD AM29DL323 AND FUJITSU MBM29DL323 WITH STMICROELECTRONICS M29W320D

In most cases the AMD and Fujitsu 32Mb dual-bank flash devices can be directly replaced by the STMicroelectronics M29W320D. The pin configurations are exactly the same and all pin functionalities are very similar. The applicable devices are AMD AM29DL322/323/324 and Fujitsu MBM29DL321/322/323/324.

#### ***When can I use the M29W320D to directly replace the AMD and Fujitsu 32Mb dual-bank devices?***

Many applications using the AMD and Fujitsu devices do not use the dual-bank feature; in this case the M29W320D can be used as a pin for pin replacement device. If the application uses and needs the dual-bank feature then it is not possible to replace the device with the M29W320D.

***What about code changes necessary to use the M29W320D?*** The M29W320D uses basically the same command codes as the AMD and FUJITSU dual bank devices.

Manufacturer and device codes are different : the M29W320D has manufacturer code 0020h and device code 22CAh (M29W320DT) or 22CBh (M29W320DB).

***Are there any other differences?*** Yes, the block organization is different. The M29W320D maintains the M29Wxxx family block organization of 1x8KWord, 2x4KWord, 1x16KWord and 63x32KWord, whereas the AMD and Fujitsu devices have 8x4KWord and 63x32KWord. If the system updates these boot blocks then the updating location may need to be changed. The CFI also contains the information on the block sizes.

***What about special security blocks?*** Both the AMD and Fujitsu devices have security or hidden ROM features where data can be updated by the user outside of the normal memory space. The ST M29W320D does not have this feature. Instead the M29W320D has 64bits of security data written into each device. This security data can be read through the CFI command and can be used to give a unique identity to each device independently of what is normally written in the main code area.

***Is block protection/unprotection the same?*** The AMD and Fujitsu devices use group block protection while the ST M29W320D uses single block protection so each block can be protected separately. Most applications do not use block protection/unprotection, however if your application does then follow application note AN1122 for details on block protection/unprotection.

***What about access times?*** The M29W320D is available with access times of 70ns (3.0 to 3.6V) and 90ns (2.7 to 3.6V) in the temperature range -40 to 85°C. These speeds are similar to those reported in the AMD and Fujitsu datasheets.

### REPLACING THE AMD AM29LV320D WITH STMICROELECTRONICS M29W320D

The AMD AM29LV320D is very similar to the ST M29W320D. Block organization is not exactly the same; refer to the section above for the differences.

The AMD fastest speed class is 90ns (datasheet) while the ST M29W320D fastest speed class available is 70ns.

### PROGRAMMING AND ERASE CONSIDERATIONS FOR THIRD PARTY PROGRAMMERS

As with all STMicroelectronics Flash memory families, when a Program or Erase command is issued the memory will use complex internal algorithms to ensure that the memory cells are correctly programmed or erased and with sufficient margin to read reliably in all conditions.

Third party programmers should set the voltage supply to 3.3V typical and the  $V_{PP}$  voltage to 12V typical (if used) for read, program and erase operations. The supply voltages should only be set to the typical values when in an environment of gang or third party programmers with universal sockets that are designed for use with many different devices.

There are various techniques available to speed up programming: check the cycle time of sending commands is optimized, use the unlock-bypass command to reduce the total number cycles needed, or use the V<sub>PP</sub> pin.

### CONCLUSIONS

The M29W320D is an addition to the family of industry standard Flash memories from STMicroelectronics. It can be designed in many applications including those that currently use dual-bank devices when dual-bank features are not required. It is manufactured with a 0.18 $\mu$ m process to ensure a competitive cost structure, fast access times, and a small package footprint.

### REVISION HISTORY

Date	Version	Revision Details
16-Aug- 2001	-01	First Issue
29-Oct- 2001	-02	Minor corrections to text

## AN1457 - APPLICATION NOTE

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If you have any questions or suggestion concerning the matters raised in this document please send them to the following electronic mail address:

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Please remember to include your name, company, location, telephone number and fax number.

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