



DESIGN-IN WITH WINBOND 32M(W19B32XMT/B) PRODUCT

Table of Contents-

1.	GENERAL DESCRIPTION	2
2.	DETAIL DESCRIPTION	2
2.1	Function	2
2.2	Command	3
2.3	Pin Assignment.....	4
2.4	VID and VHH Comparison.....	5
3.	CONCLUSION	5
4.	VERSION HISTORY	6

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1. GENERAL DESCRIPTION

The W19B32XMT/B is a 32Mbit, 2.7~3.6(3.0~3.6) volt dual bank CMOS flash memory organized as 4M × 8 or 2M × 16 bits. For flexible erase capability, the 32 Mbit of data are divided into eight 8KB, and sixty-three 64KB sectors. The word-wide (× 16) data appears on DQ15-DQ0, and byte-wide (× 8) data appears on DQ7-DQ0. The device can also be programmed and erased by using standard EPROM programmers.

In this application note, there are two major parts to identify the difference between Winbond 32Mbit Flash and the equivalent parts of AMD.

2. DETAIL DESCRIPTION

The detail device function, command, and pin assignment for Winbond W19B32XMT/B and AMD AM29DL32XGT/B comparison are described in the following tables.

2.1 Function

FUNCTION COMPARISON		Winbond W19B32XMT/B	AMD AM29DL32XGT/B
Memory Size		32M bits	32M bits
Command Sets		AMD-like	AMD-like
Sector Architecture	322 Bank1 (4 Mbit)	8 x 8K / 7 x 64 K Bytes	8 x 8K / 7 x 64 K Bytes
	323 Bank1 (8 Mbit)	8 x 8K / 15 x 64 K Bytes	8 x 8K / 15 x 64 K Bytes
	324 Bank1 (16 Mbit)	8 x 8K / 31 x 64 K Bytes	8 x 8K / 31 x 64 K Bytes
	322 Bank2 (28 Mbit)	56 x 64 K Bytes	56 x 64 K Bytes
	323 Bank2 (24 Mbit)	48x 64 K Bytes	48x 64 K Bytes
	324 Bank2 (16 Mbit)	32 x 64 K Bytes	32 x 64 K Bytes
Unlock Bypass Program Command		YES	YES
External H/W Protect Pins		YES	YES
Chip (Sector) Erase		YES	YES
Sector protection/unprotection		YES	YES
CFI (Common Flash Interface)		YES	YES
Device ID (322T/B) /Manufacturer ID		10h(T), 92h(B)/DAh	55h(T), 56h(B)/01h
Device ID (323T/B) /Manufacturer ID		13h(T), 94h(B)/DAh	50h(T), 53h(B)/01h
Device ID (324T/B) /Manufacturer ID		16h(T), 97h(B)/DAh	5Ch(T), 5Fh(B)/01h
VPP For Fast Programming		YES	YES
Operation Voltage		2.7~3.6V	3 V only
Access Time		90 nS	70/90/120 nS
Erase Suspend/ Resume		YES	YES
Simultaneous Read/ Write		YES	YES
Security Sector		256 Bytes	256 Bytes
CFI	Primary OEM Command set	Data = 0006h, Add = 26h	Data = 0002h, Add = 26h
Process Technology		0.18 μm	0.17 μm

DESIGN-IN WITH WINBOND 32M (W19B32XMT/B) PRODUCT



2.2 Command

Please note that the command sets of Winbond W19B32XMT/B is fully compatible with AMD AM29DL32XGT/B. The Command definitions are as following table.

COMMAND SEQUENCE		CYCLE	BUS CYCLES											
			FIRST		SECOND		THIRD		FOURTH		FIFTH		SIXTH	
			ADDR	DATA	ADDR	DATA	ADDR	DATA	ADDR	DATA	ADDR	DATA	ADDR	DATA
Read		1	RA	RD										
Reset		1	XXX	F0										
Normal Program	Word	4	555	AA	2AA	55	555	A0	PA	PD				
	Byte		AAA		555		AAA							
Unlock Bypass	Word	3	555	AA	2AA	55	555	20						
	Byte		AAA		555		AAA							
Unlock Bypass Program		2	XXX	A0	PA	PD								
Unlock Bypass Reset		2	XXX	90	XXX	00								
Chip Erase	Word	6	555	AA	2AA	55	555	80	555	AA	2AA	55	555	10
	Byte		AAA		555		AAA		555		AAA			
Sector Erase	Word	6	555	AA	2AA	55	555	80	555	AA	2AA	55	SA	30
	Byte		AAA		555		AAA		555					
Erase Suspend		1	XXX	B0										
Erase Resume		1	XXX	30										
Security Sector Factory Protect	Word	4	555	AA	2AA	55	555	90	X03	99/19				
	Byte		AAA		555		AAA		X06					
Sector/Sector Block Protect Verify	Word	4	555	AA	2AA	55	555	90	X02	00/01				
	Byte		AAA		555		AAA		X04					
Enter Security Sector Region	Word	3	555	AA	2AA	55	555	88						
	Byte		AAA		555		AAA							
Exit Security Sector Region	Word	4	555	AA	2AA	55	555	90	XXX	00				
	Byte		AAA		555		AAA							
Common Flash Interface (CFI) Query	Word	1	55	98										
	Byte		AA											

DESIGN-IN WITH WINBOND 32M (W19B32XMT/B) PRODUCT



2.3 Pin Assignment

Table 1 shows the pin assignment of 48-pin TSOP package, the pin assignment of 48-ball TFBGA is shown in Table 2 and comparison of package dimension is shown in Figure 1. See the following for details.

Table 1. 48-pin TSOP Comparison

AMD AM29DL32XGT/B	Winbond W19B32XMT/B	PIN ASSIGNMENT		Winbond W19B32XMT/B	AMD AM29DL32XGT/B
A15	A15	1	WINBOND 48 TSOP STANDARD PINOUT	48	A16
A14	A14	2		47	#BYTE
A13	A13	3		46	Vss
A12	A12	4		45	DQ15/A -1
A11	A11	5		44	DQ7
A10	A10	6		43	DQ14
A9	A9	7		42	DQ6
A8	A8	8		41	DQ13
A19	A19	9		40	DQ5
A20	A20	10		39	DQ12
#WE	#WE	11		38	DQ4
#RESET	#RESET	12		37	VDD
NC	NC	13		36	DQ11
#WP/ACC	#WP/ACC	14		35	DQ3
RY/#BY	RY/#BY	15		34	DQ10
A18	A18	16		33	DQ2
A17	A17	17		32	DQ9
A7	A7	18		31	DQ1
A6	A6	19		30	DQ8
A5	A5	20		29	DQ0
A4	A4	21		28	#OE
A3	A3	22		27	Vss
A2	A2	23		26	#CE
A1	A1	24		25	A0

Table 2. 48-ball TFBGA Comparison

PART	PACKAGE DIMENSION			BALL COMPATIBLE
	Dimension (mm)	Ball Pitch (mm)	Ball Diameter (mm)	
Winbond/ W19B32XMT/B	8 x 11	0.8	0.45 ±0.05	Compatible
AMD/ AM29DL32XGT/B	6 x 12	0.8	0.30 ±0.05	Compatible

DESIGN-IN WITH WINBOND 32M (W19B32XMT/B) PRODUCT



48-ball TFBGA Pin Assignment

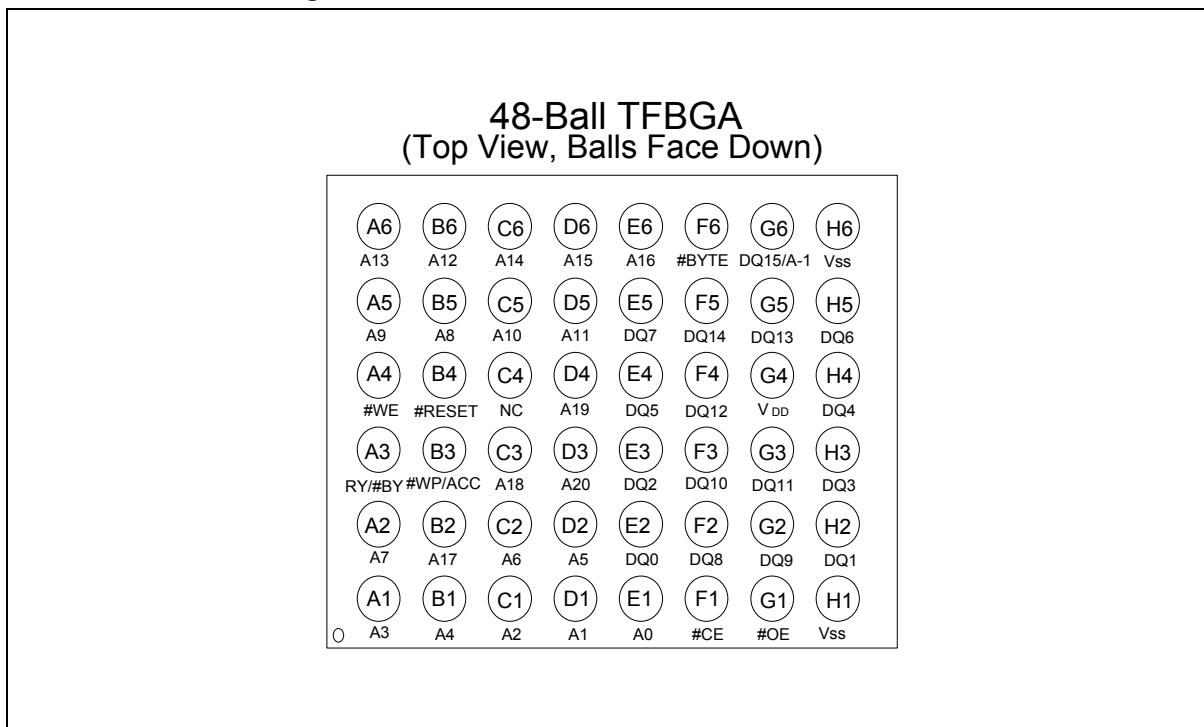


Figure 1.

2.4 VID and VHH Comparison

VID ON #RESET PIN (SECTOR PRO/UNPRO)	Winbond W19B32XMT/B	AMD AM29DL32XGT/B
VHH ON #ACC PIN (ACCELERATED PROGRAM)		
VID	8.5~12.5 V	11.5~12.5 V
VHH	8.5~9.5 V	11.5~12.5 V

3. CONCLUSION

The Winbond W19B32XMT/B is fully compatible with AMD AM29DL32XGT/B in pin assignment, command sets and major functions. The device can be programmed and erased in-system with a standard 2.7~3.6V (3.0~3.6V) power supply. A 12-volt VPP is not required. The unique cell architecture of the W19B32XMT/B results in fast program/erase operations with extremely low current consumption. The W19B32XMT/B is well supported by all famous programmer vendors. (Users can refer to Winbond Flash Application Note-1 about the Programmer support status among Winbond Flash parts.) In addition, Winbond also provides library source code in C for the W19B32XMT/B Flash memories. This enables users to concentrate on writing the high level functions required for their particular applications. The detail software driver information for 32M Flash are described in Winbond Flash Application Note-15.

DESIGN-IN WITH WINBOND 32M (W19B32XMT/B) PRODUCT



4. VERSION HISTORY

VERSION	DATE	PAGE	DESCRIPTION
A1	Apr. 14, 2004	-	Initial Issued



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