



DESIGN-IN WITH WINBOND 32M (W19B(L)320ST/B) PRODUCT

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1. GENERAL DESCRIPTION

The W19B(L)320ST/B is a 32Mbit, 2.7~3.6(3.0~3.6) volt 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 and MXIC.

2. DETAIL DESCRIPTION

The detail device function, command, and pin assignment for Winbond W19B(L)320ST/B and AMD AM29LV320D and MX29LV320T/B comparison are described in the following tables.

2.1 Function

FUNCTION COMPARISON	Winbond W19B(L)320ST/B	AMD AM29LV320D	MXIC MX29LV320T/B
Memory Size	32M bits	32M bits	
Command Sets	AMD-like	AMD-like	
Sector Architecture	8 x 8K / 63 x 64 K Bytes	8 x 8K / 63 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 /Manufacturer ID (Top)	BAh / DAh	F6h / 01h	A7h / C2h
Device ID /Manufacturer ID (Bottom)	2Ah / DAh	F7h / 01h	A8h / C2h
VPP For Fast Programming	YES	YES	
Erase Suspend/ Resume	YES	YES	
Security Sector	256 Bytes	256 Bytes	64 Kbytes
Process Technology	0.18 um	0.23 um	0.18um

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2.2 Command

Please note that the command sets of Winbond W19B(L)320ST/B is fully compatible with AMD Am29LV320D and MX29LV320T/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 (note 6)		1	RA	RD										
Reset (note 7)		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		AAA		555		AAA	
Sector Erase	Word	6	555	AA	2AA	55	555	80	555	AA	2AA	55	SA	30
	Byte		AAA		555		AAA		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											

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2.3 Pin Assignment

Table 1 shows the pin assignment of 48-pin TSOP package; while, 48-ball TFBGA pin assignment is shown in Table 2. See the following for details.

Table 1. 48-pin TSOP Comparison

AMD Am29LV320D MXIC MX29LV320T/B	Winbond W19B(L)320ST/B	PIN ASSIGNMENT		Winbond W19B(L)320ST/B	AMD Am29LV320D MXIC MX29LV320T/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

2.4 Vid and VHH Comparison

VID ON #RESET PIN (SECTOR PRO/UNPRO)	Winbond W19B(L)320ST/B	AMD AM29LV320D	MXIC MX29LV320T/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	

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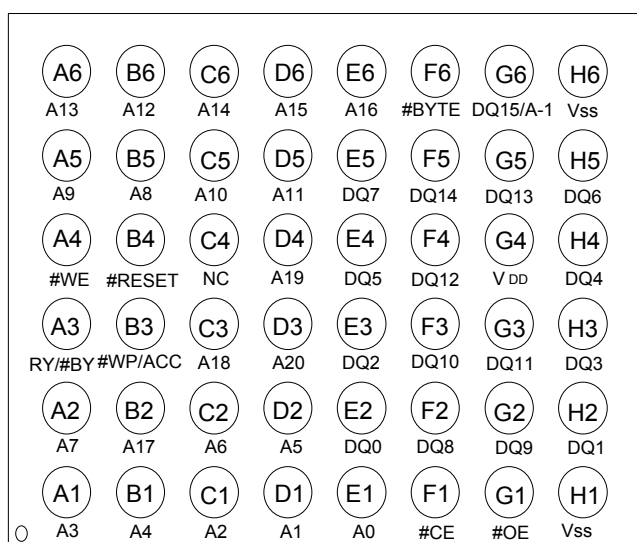


Table 2. 48-ball TFBGA Comparison

PART	PACKAGE DIMENSION		
	Dimension (mm)	Ball Pitch (mm)	Ball Diameter (mm)
Winbond/ W19B(L)320ST/B	8 x 11	0.8	0.45 ±0.05
AMD/ Am29LV320D	6 x 12	0.8	0.30 ±0.05
MXIC/ MX29LV320T/B	8 x 9	0.8	0.30 ±0.05

Figure 1. 48-ball TFBGA Pin Assignment

48-Ball TFBGA (Top View, Balls Face Down)



3. CONCLUSION

The Winbond W19B(L)320ST/B is fully compatible with AMD Am29LV320D MXIC MX29LV320T/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 V_{PP} is not required. The unique cell architecture of the W19B(L)320ST/B results in fast program/erase operations with extremely low current consumption. The W19B(L)320ST/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 W19B(L)320ST/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.

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4. VERSION HISTORY

VERSION	DATE	PAGE	DESCRIPTION
A1	Mar. 01, 2004	-	Initial Issued
A2	Apr. 13, 2004	All	Add MX29LV320T/B to compare with our product
		4	Change the ball pitch of W19B(L)320ST/B from 0.45 mm to 0.8 mm
		4	Change the Dimension of Am29LV320D from 6x11 to 6x12



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