



Application Note

Eon Flash

EN29SL160 vs. EN39SL160



Eon Silicon Solution Inc.

1. INTRODUCTION

The application note introduces how to implement a system design from Eon EN29SL160 Flash to EN39SL160 Flash.

2. GENERAL FUNCTION COMPARISON TABLE:

The following table is major features of these two devices.

Features	EN29SL160	EN39SL160
voltage range	1.65 ~ 2.2	1.65 ~ 1.95
Pin to Pin	48-pin TSOP (Type 1) 48-ball 6mm x 8mm TFBGA 48-ball 5mm x 6 mm WFBGA	48-pin TSOP (Type 1) 48-ball 6mm x 8mm TFBGA (F6 = NC) 48-ball 4mm x 6 mm WFBGA
Access time	90ns	70ns
Sector Architecture	8K Byte/4K Word x 8 sector + 64K Byte/32K Word X 31 sectors boot sectors at Top or Bottom	512 sectors of 2K-word 32 blocks of 32K-word
Byte/Word mode	Yes	Yes 48-ball TFBGA and WFBGA only support Word Mode
Write protect (WP#) function	The outermost two 4K word Boot Sector	The first or last blocks
VID and VHH Max	9.0V – 11.0V	9.0V – 11.0V
CFI Compliant	None	Yes
Erase Suspend/Resume	Yes	Yes
Minimum endurance cycle	100K	100K
Package	48-pin TSOP (Type 1) 48-ball 6mm x 8mm TFBGA 48-ball 5mm x 6 mm WFBGA 48-ball 5mm x 6 mm WLGA	48-pin TSOP (Type 1) 48-ball 6mm x 8mm TFBGA (F6 = NC) 48-ball 4mm x 6 mm WFBGA



3. HARDWARE CONSIDERATIONS

3.1 I_{CC} comparison

Current	EN29SL160		EN39SL160		Unit
	Typ	Max	Typ	Max	
Read I _{CC1}	12	22	5	10	mA
Write I _{CC4}	15	30	15	25	mA
Standby I _{CC2}	0.2	5.0	0.2	5.0	μA

3.2 48-ball (6mm x 8mm) TFBGA package ball out comparison

Ball out	EN29SL160-90BIP	EN39SL160-70BIP
F6	Byte#	NC

For EN39SL160-70BIP, all of the ball-out are the same as EN29SL160-90BIP except F6. Although EN39SL160-70BIP doesn't support the Byte# function, but it can pin to pin compatible with SST39WF1601/02 at the same time.

3.3 48-ball WFBGA package outline comparison

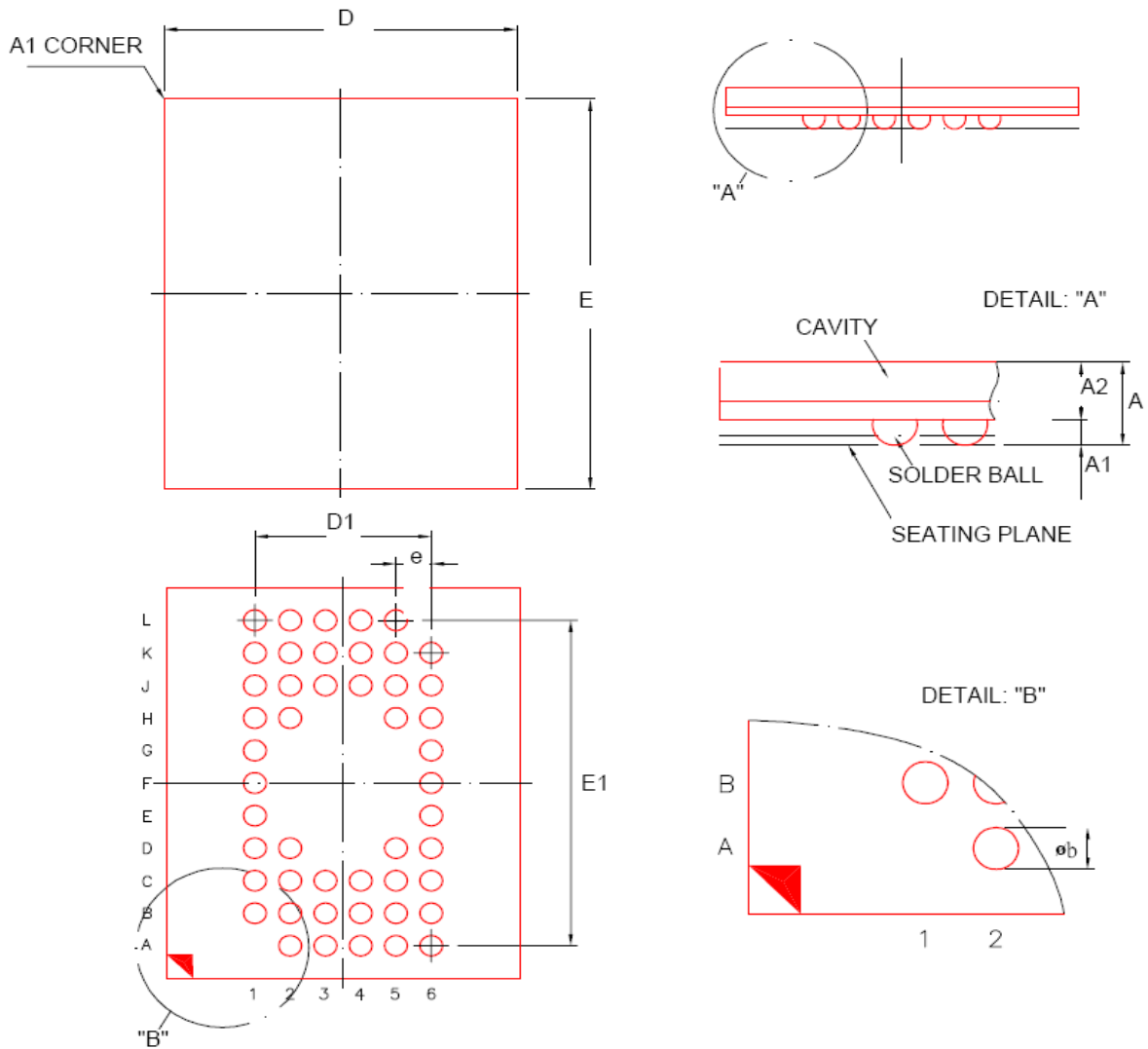
Part No.	EN29SL160-90MIP	EN39SL160-70NIP
Package Outline	(5mm x 6mm) WFBGA D = 5.0 ± 1	(4mm x 6mm) WFBGA D = 4.0 ± 1

For EN39SL160-70NIP, all of the parameters of 48-ball WFBGA package (for example: ball assignment, ball pitch, ball size and E dimension etc.) are the same as EN29SL160-90MIP except D dimension (from 5mm change to 4mm). But the customer also can replace EN29SL160-90MIP with EN39SL160-70NIP on PCB for system design directly.

The detail information please refers to the table and 48-ball WFBGA package outline are shown below.



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Part No.	EN29SL160-90MIP (5mm x 6mm) WFBGA D = 5.0 ± 1			EN39SL160-70NIP (4mm x 6mm) WFBGA D = 4.0 ± 1		
	DIMENSION IN MM			DIMENSION IN MM		
SYMBOL	MIN.	NOR	MAX	MIN.	NOR	MAX
A	---	---	0.73	---	---	0.73
A1	0.16	0.21	0.26	0.15	0.20	0.25
A2	---	0.436	---	---	0.436	---
D	4.90	5.00	5.10	3.90	4.00	4.10
E	5.90	6.00	6.10	5.90	6.00	6.10
D1	---	2.50	---	---	2.50	---
E1	---	5.00	---	---	5.00	---
e	---	0.50	---	---	0.50	---
ϕb	0.27	0.32	0.37	0.25	0.30	0.35

Note : 1. Coplanarity: 0.1 mm



4. SOFTWARE CONSIDERATIONS

Autoselect functions for EN29SL160 and EN39SL160 are the same except the device ID.

4.1 Manufacturer, Device Identification and Autoselect Information

For EN39SL160 autoselect mode table

Description		CE#	OE#	WE#	A19 to A12	A11 to A10	A9 ²	A8	A7	A6	A5 to A2	A1	A0	DQ8 to DQ15	DQ7 to DQ0
Manufacturer ID: Eon		L	L	H	X	X	V _{ID}	H ¹	X	L	X	L	L	X	1Ch
								L							7Fh
Device ID (top boot block)	Word	L	L	H	X	X	V _{ID}	X	X	L	X	L	H	27h	4Ah
	Byte	L	L	H											X
Device ID (bottom boot block)	Word	L	L	H	X	X	V _{ID}	X	X	L	X	L	H	27h	4Bh
	Byte	L	L	H											X
Block Protection Verification		L	L	H	SA	X	V _{ID}	X	X	L	X	H	L	X	01h (Protected)
														X	00h (Unprotected)

For EN29SL160 autoselect mode table

Description		Mode	CE#	OE#	WE#	A19 to A12	A11 to A10	A9 ²	A8	A7	A6	A5 to A2	A1	A0	DQ8 to DQ15	DQ7 to DQ0
Manufacturer ID: Eon			L	L	H	X	X	V _{ID}	H ¹	X	L	X	L	L	X	1Ch
									L							7Fh
Device ID (top boot block)	Word	L	L	H	X	X	V _{ID}	X	X	L	X	L	H	22h	E4h	
	Byte	L	L	H											X	E4h
Device ID (bottom boot block)	Word	L	L	H	X	X	V _{ID}	X	X	L	X	L	H	22h	E7h	
	Byte	L	L	H											X	E7h
Sector Protection Verification			L	L	H	SA	X	V _{ID}	X	X	L	X	H	L	X	01h (Protected)
															X	00h (Unprotected)

Note:

1. If a manufacturing ID is read with A8=L, the chip will output a configuration code 7Fh. A further Manufacturing ID must be read with A8=H.
2. A9 = VID is for HV A9 Autoselect mode only. A9 must be ≤ V_{cc} (CMOS logic level) for Command Autoselect Mode.



4.2. Sector Architecture

EN39SL160:

Uniform Sector Architecture:

- 512 sectors of 2-Kword
- 32 blocks of 32-Kword
- Any sector or block can be erased individually

EN29SL160:

Flexible Sector Architecture:

- Eight 8-Kbyte and thirty-one 64-Kbyte sectors (byte mode)
- Eight 4-Kword and thirty-one 32-Kword sectors (word mode)

4.3. Sector Erasure

EN39SL160: Sector, Block or Chip erasable

EN29SL160: Sector or Chip erasable

Note : In the condition of erasing the boot sector of EN29SL160 to be replaced with EN39SL160, one or several complete sector erase commands [from cycle 1 ~ cycle 6 (Addr./Data = SA/30h)] must be issued in EN39SL160 depending on the sector size. The correlation table is shown below.



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Sector Size	Address Range (x16)	for cycle 6th	
		EN29SL160B	EN39SL160
4KWord	00000h-00FFFh	Issue sector erase (Addr./Data = SA/30h) for sector 0	Issue sector erase (Addr./Data = SA/30h) for sector 0
			Issue sector erase (Addr./Data = SA/30h) for sector 1
4KWord	01000h-01FFFh	Issue sector erase (Addr./Data = SA/30h) for sector 1	Issue sector erase (Addr./Data = SA/30h) for sector 2
			Issue sector erase (Addr./Data = SA/30h) for sector 3
4KWord	02000h-02FFFh	Issue sector erase (Addr./Data = SA/30h) for sector 2	Issue sector erase (Addr./Data = SA/30h) for sector 4
			Issue sector erase (Addr./Data = SA/30h) for sector 5
4KWord	03000h-03FFFh	Issue sector erase (Addr./Data = SA/30h) for sector 3	Issue sector erase (Addr./Data = SA/30h) for sector 6
			Issue sector erase (Addr./Data = SA/30h) for sector 7
4KWord	02000h-02FFFh	Issue sector erase (Addr./Data = SA/30h) for sector 4	Issue sector erase (Addr./Data = SA/30h) for sector 8
			Issue sector erase (Addr./Data = SA/30h) for sector 9
4KWord	03000h-03FFFh	Issue sector erase (Addr./Data = SA/30h) for sector 5	Issue sector erase (Addr./Data = SA/30h) for sector 10
			Issue sector erase (Addr./Data = SA/30h) for sector 11
4KWord	04000h-04FFFh	Issue sector erase (Addr./Data = SA/30h) for sector 6	Issue sector erase (Addr./Data = SA/30h) for sector 12
			Issue sector erase (Addr./Data = SA/30h) for sector 13
4KWord	05000h-05FFFh	Issue sector erase (Addr./Data = SA/30h) for sector 7	Issue sector erase (Addr./Data = SA/30h) for sector 14
			Issue sector erase (Addr./Data = SA/30h) for sector 15
32KWord	08000h-0FFFFh	Issue sector erase (Addr./Data = SA/30h) for sector 8	Issue sector erase (Addr./Data = SA/30h) for sector 16
			Issue sector erase (Addr./Data = SA/30h) for sector 17
			⋮
			Issue sector erase (Addr./Data = SA/30h) for sector 30
			Issue sector erase (Addr./Data = SA/30h) for sector 31
			Issue block erase (Addr./Data = BA/50h) for block 1

Note:

EN29SL160B is bottom sector, for EN29SL160T (top sector) the boot sectors are in high address.



5. PERFORMANCE DIFFERENCES

5.1 Power-on and Reset Timings

Parameter	Description	EN29SL800	EN39SL800
t_{VCS}	Vcc Setup Time	Note*	50 μ s
t_{RP1}	RESET# Pulse Width (During Embedded Algorithms)	Note*	10 μ s
t_{RP2}	RESET# Pulse Width (NOT During Embedded Algorithms)	500ns	500ns
t_{RH}	Reset# High Time Before Read	50ns	50ns
t_{RB1}	RY/BY# Recovery Time (to CE#, OE# go low)	Note*	0ns
t_{RB2}	RY/BY# Recovery Time (to WE# go low)	Note*	50ns
t_{READY1}	Reset# Pin Low (During Embedded Algorithms) to Read or Write	20 μ s	20 μ s
t_{READY2}	Reset# Pin Low (NOT During Embedded Algorithms) to Read or Write	500ns	500ns

Note*: There is no clear description in datasheet.



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Revisions List

Revision No	Description	Date
A	Initial Release	2009/06/11