



Application Note

Spancion Flash S29AL004D to Eon Flash EN29LV400A



Eon Silicon Solution Inc.

1. INTRODUCTION

The application note introduces how to implement a system design from Spansion S29AL004D Flash to Eon EN29LV400A Flash.

2. GENERAL FUNCTION COMPARISON TABLE:

The following table is major features of these two devices.

| Features | EN29LV400A | S29AL004D |
|--|---|---|
| voltage range | 2.7 ~ 3.6 | 2.7 ~ 3.6 |
| VID | 10.5 to 11.5 | 11.5 to 12.5 |
| Pin to Pin | compatible (for 48 TSOP) Compatible (for 48 TFBGA) | compatible (for 48 TSOP) Compatible (for 48 TFBGA) |
| Byte/Word mode | Yes | Yes |
| Boot Sectors | Byte mode: 16 kbyte+ 2 x 8 kbyte+ 32 kbyte+ 7 x 64kbyte Word mode: 8 kword+ 2 x 4 kword+ 16 kword+ 7 x 32kword | Byte mode: 16 kbyte+ 2 x 8 kbyte+ 32 kbyte+ 7 x 64kbyte Word mode: 8 kword+ 2 x 4 kword+ 16 kword+ 7 x 32kword |
| Typical active read current | 7mA | 9mA |
| Typical program/erase current | 15mA | 20mA |
| Access times | as fast as 45 ns | as fast as 55 ns |
| Typical Sector Erase Time | 0.5s | 0.7s |
| Autoselect command during erase suspend mode | No | Yes |
| Multi sector erase | No | Yes |
| Minimum endurance cycle | 100K | 1,000K (typ.) |
| Package | 48-pin 12mm x 20mm TSOP 48 ball 6mm x 8mm TFBGA | 48-pin 12mm x 20mm TSOP 48 ball 6.15mm x 8.15mm FBGA 44 pin 28.2mm x 16mm SOP |



3. HARDWARE CONSIDERATIONS

3.1 I_{CC} comparison

| Current | EN29LV400A | | S29AL004D | | Unit |
|--------------------------|------------|-----|-----------|-----|------|
| | Typ | Max | Typ | Max | |
| Read I _{CC1} | 7 | 12 | 9 | 16 | mA |
| Write I _{CC3} | 15 | 30 | 20 | 35 | mA |
| Standby I _{CC2} | 1 | 5.0 | 0.2 | 5.0 | μA |

3.2 Max VID comparison

S29AL004D VID range is 11.5V and 12.5V. But EN29LV400A VID range is 10.5V~11.5V.

Any voltage level higher than 11.5V would damage the device, possibly.

4. SOFTWARE CONSIDERATIONS

Except manufacture ID, there is no difference in Device ID, and Autoselect functions for EN29LV400A and S29AL004D are the same.

4.1 Manufacturer, Device Identification and Autoselect Information

For EN29LV400A autoselect mode table

| Description | Mode | \overline{CE} | \overline{OE} | \overline{WE} | A17 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 |
| Device ID (top boot block) | Word | L | L | H | X | X | V _{ID} | X | X | L | X | L | H | 22h | B9h |
| | Byte | L | L | H | | | | | | | | | | X | B9h |
| Device ID (bottom boot block) | Word | L | L | H | X | X | V _{ID} | X | X | L | X | L | H | 22h | BAh |
| | Byte | L | L | H | | | | | | | | | | X | BAh |
| 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.



For S29AL004D autoselect mode table

| Description | Mode | CE# | OE# | WE# | A17 to A12 | A11 to A10 | A9 | A8 to A7 | A6 | A4 to A5 | A3 to A2 | A1 | A0 | DQ8 to DQ15 | DQ7 to DQ0 |
|--|------|-----|-----|-----|------------|------------|-----------------|----------|----|----------|----------|----|----|-------------|-------------------|
| Manufacturer ID: Spansion | | L | L | H | X | X | V _{ID} | X | L | X | L | L | L | X | 01h |
| Device ID: S29AL004D (Top Boot Block) | Word | L | L | H | X | X | V _{ID} | X | L | X | L | L | H | 22h | B9h |
| | Byte | L | L | H | | | | | | | | | | X | B9h |
| Device ID: S29AL004D (Bottom Boot Block) | Word | L | L | H | X | X | V _{ID} | X | L | X | L | L | H | 22h | BAh |
| | Byte | L | L | H | | | | | | | | | | X | BAh |
| Sector Protection Verification | | L | L | H | SA | X | V _{ID} | X | L | X | L | H | L | X | 01h (protected) |
| | | | | | | | | | | | | | | X | 00h (unprotected) |

L = Logic Low = V_{IL}, H = Logic High = V_{IH}, SA = Sector Address, X = Don't care.

4.2. Continuous Sector Erasure

The EN29LV400A doesn't support Continuous Sector Erasure function. Users must issue another sector erase command for the next sector to be erased after the previous one is completed for EN29LV400A.



5. PERFORMANCE DIFFERENCES

5.1 Power-on and Reset Timings

| Parameter | Description | Test Setup | EN29LV400A | S29AL004D |
|---------------------|--|------------|------------|-----------|
| t _{VCS} | Vcc Setup Time | Min. | 50µs | 50µs |
| t _{RP} | RESET# Pulse Width | Min. | 500ns | 500ns |
| t _{RH} | Reset# High Time Before Read | Min. | 50ns | 50ns |
| t _{RB} | RY/BY# Recovery Time | Min. | 0ns | 0ns |
| t _{READY1} | Reset# Pin Low (During Embedded Algorithms) to Read or Write | Max. | 20µs | 20µs |
| t _{READY2} | Reset# Pin Low (NOT During Embedded Algorithms) to Read or Write | Max. | 500ns | 500ns |

5.2 ERASE AND PROGRAM PERFORMANCE

The erasing and programming performance comparison.

| Parameter | EN29LV400A | | S29AL004D | | Unit | |
|-----------------------|------------|-----|-----------|-----|------|-----|
| | Typ | Max | Typ | Max | | |
| Sector Erase Time | 0.5 | 10 | 0.7 | 10 | sec | |
| Chip Erase Time | 5 | 100 | 11 | - | sec | |
| Byte Programming Time | 8 | 300 | 7 | 210 | µs | |
| Word Programming Time | 8 | 300 | 7 | 210 | µs | |
| Chip Programming Time | Byte | 4.2 | 12.6 | 4.2 | 12.5 | sec |
| | Word | 2.1 | 6.3 | 2.9 | 8.5 | sec |



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Revisions List

| Revision No | Description | Date |
|-------------|-----------------|------------|
| A | Initial Release | 2009/06/23 |