S7INS-N MCP Products

MirrorBit™ 1.8 Volt-only Simultaneous Read/Write, Burst-mode Multiplexed Flash Memory: 256 Mb (16 Mb x 16-bit), 128 Mb (8 Mb x 16-bit) and 64 Mb (4 Mb x 16-bit) with Burst-mode Multiplexed pSRAM: 64 Mb (4 Mb x 16-bit), 32 Mb (2 Mb x 16-bit) and 16 Mb (1 Mb x 16-bit)

Data Sheet

ADVANCE INFORMATION

Notice to Readers: The Advance Information status indicates that this document contains information on one or more products under development at Spansion Inc. The information is intended to help you evaluate this product. Do not design in this product without contacting the factory. Spansion Inc. reserves the right to change or discontinue work on this proposed product without notice.

Publication Number S7INS-N_00 **Revision** A **Amendment** 3 **Issue Date** October 10, 2006

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Some data sheets will contain a combination of products with different designations (Advance Information, Preliminary, or Full Production). This type of document will distinguish these products and their designations wherever necessary, typically on the first page, the ordering information page, and pages with DC Characteristics table and AC Erase and Program table (in the table notes). The disclaimer on the first page refers the reader to the notice on this page.

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When a product has been in production for a period of time such that no changes or only nominal changes are expected, the Preliminary designation is removed from the data sheet. Nominal changes may include those affecting the number of ordering part numbers available, such as the addition or deletion of a speed option, temperature range, package type, or V_{IO} range. Changes may also include those needed to clarify a description or to correct a typographical error or incorrect specification. Spansion Inc. applies the following conditions to documents in this category:

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S71NS-N MCP Products

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SPANSION™

ADVANCE INFORMATION

General Description

The S71NS-N Series is a product line of stacked Multi-Chip Product (MCP) packages and consists of the following items:

- One or more S29NS-N flash memory die
- Mux burst-mode pSRAM

The products covered by this document are listed in the table below. For details about their specifications, please refer to their individual datasheet for further details.

	pSRAM			
	Density	**16 Mb**	**32 Mb**	**64 Mb**
Flash	64 Mb	S71NS064NA0		
	128 Mb	S71NS128NA0	S71NS128NB0	S71NS128NC0
	256 Mb		S71NS256NB0	S71NS256NC0

Distinctive Characteristics

MCP Features

- **Power supply voltage of 1.7 V to 1.95 V**
- **Burst Speed: 66 MHz**
- **Package - MCP BGA: 0.5 mm ball pitch**
  - — 8.0 x 9.2 mm, 56 ball for NS064N and NS128N based MCPs
  - — 10.0 x 11.0 mm, 60 ball for NS256N based MCPs
- **Operating Temperature**
  - — Wireless, –25°C to +85°C

For detailed specifications, please refer to the individual data sheets:

Document	Publication Identification Number
S29NS-N	S29NS-N_00
16 M Multiplexed pSRAM Type 2	muxpsram_05
16 M Multiplexed pSRAM Type 3	muxpsram_03
32 M Multiplexed pSRAM Type 3	muxpsram_04
64 M Multiplexed pSRAM Type 3	muxpsram_01

1 Ordering Information

The ordering part number is formed by a valid combination of the following:

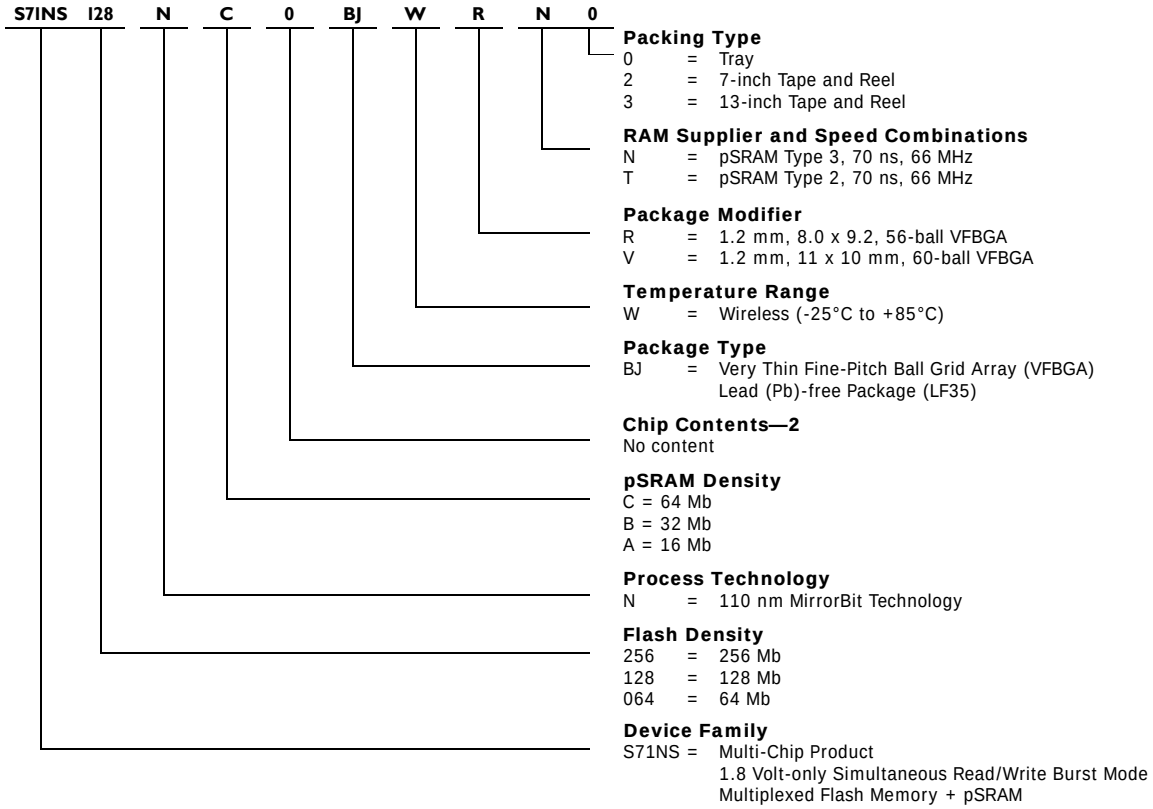


Table 1.1 MCP Configurations and Valid Combinations

Base Ordering Part Number (Note 2)	Package & Temperature	Model Number	Packing Type	pSRAM Type	Flash Speed Options	pSRAM Speed Options
S71NS064NA0	BJW	RT	0, 1, 2	pSRAM Type 2	66 MHz	66 MHz
		RN		pSRAM Type 3	66 MHz	66 MHz
S71NS128NA0		RN		pSRAM Type 3	66 MHz	66 MHz
S71NS128NB0		RN		pSRAM Type 3	66 MHz	66 MHz
S71NS128NC0		RN		pSRAM Type 3	66 MHz	66 MHz
S71NS256NB0		VN		pSRAM Type 3	66 MHz	66 MHz
S71NS256NC0		VN		pSRAM Type 3	66 MHz	66 MHz

Package Marking Note:

The package marking omits the leading S *from the ordering part number.*

Valid Combinations

Valid Combinations list configurations planned to be supported in volume for this device. Consult your local sales office to confirm availability of specific valid combinations and to check on newly released combinations.

2 Input/Output Descriptions

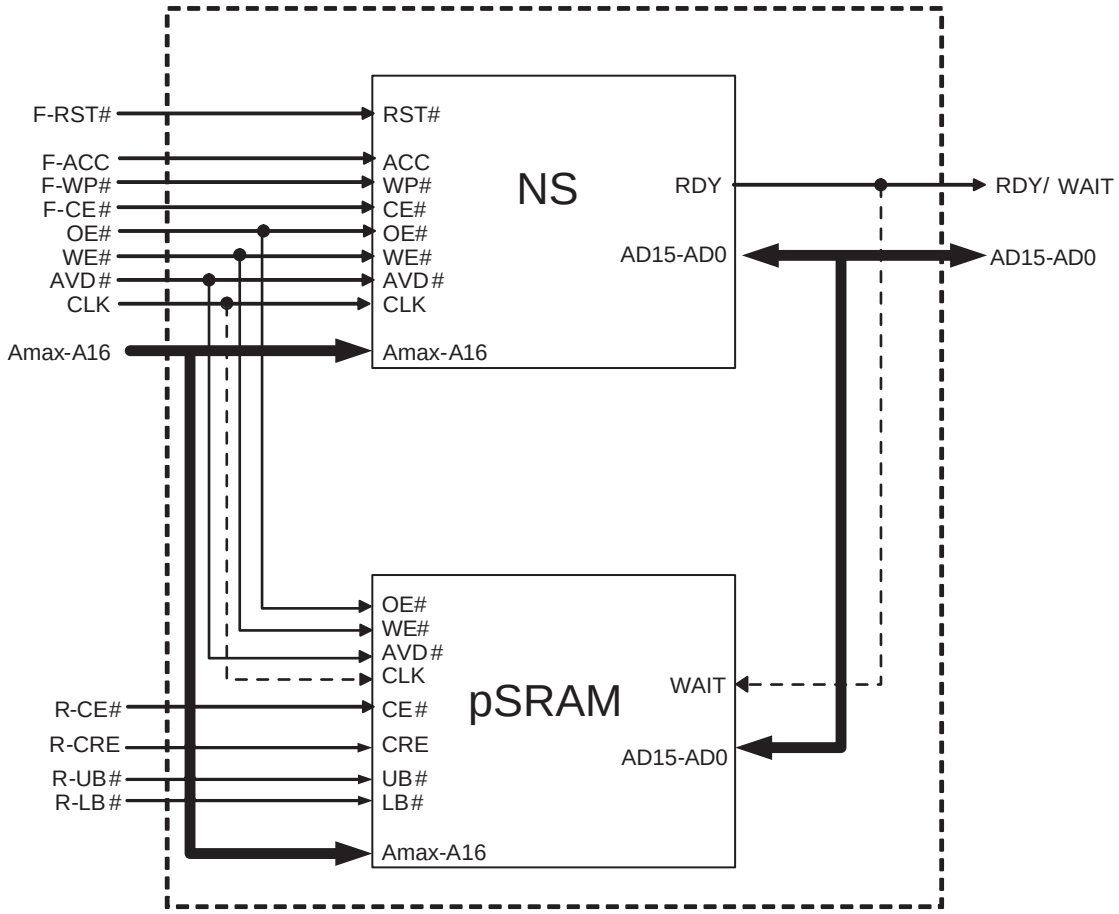
Table 2.1 identifies the input and output package connections provided on the device.

Table 2.1 Input/Output Descriptions

Symbol	Description	Flash	RAM
AMAX – A16	Address inputs	X	X
ADQ15 – ADQ0	Multiplexed Address/Data	X	X
OE#	Output Enable input. Asynchronous relative to CLK for the Burst mode.	X	X
WE#	Write Enable input.	X	X
V_{SS}	Ground	X	X
NC	No Connect; not connected internally	X	X
RDY	Ready output. Indicates the status of the Burst read. The WAIT# pin of the pSRAM is tied to RDY.	X	X
CLK	Clock input. In burst mode, after the initial word is output, subsequent active edges of CLK increment the internal address counter. Should be at V_{IL} or V_{IH} while in asynchronous mode	X	X
AVD#	Address Valid input. Indicates to device that the valid address is present on the address inputs. Low = for asynchronous mode, indicates valid address; for burst mode, causes starting address to be latched. High = device ignores address inputs	X	X
F-RST#	Hardware reset input. Low = device resets and returns to reading array data	X	
F-WP#	Hardware write protect input. At V_{IL}, disables program and erase functions in the four outermost sectors. Should be at V_{IH} for all other conditions.	X	
F-ACC	Accelerated input. At V_{HH}, accelerates programming; automatically places device in unlock bypass mode. At V_{IL}, disables all program and erase functions. Should be at V_{IH} for all other conditions.	X	
R-CE1#	Chip-enable input for pSRAM.		X
F-CE#	Chip-enable input for Flash. Asynchronous relative to CLK for Burst Mode.	X	
R-CRE	Control Register Enable (pSRAM).		X
F-VCC	Flash 1.8 Volt-only single power supply.	X	
R-VCC	pSRAM Power Supply.		X
R-UB#	Upper Byte Control (pSRAM).		X
R-LB#	Lower Byte Control (pSRAM)		X
DNU	Do Not Use		

3 MCP Block Diagram

Figure 3.1 MCP Block Diagram



Note: *The CLK and WAIT signals on the pSRAM are not present on the pSRAM Type 2; therefore, for those MCP's, those signals will only be connected to the NS flash, but not to the pSRAM. Also, on this pSRAM, the CRE signal will not be present at all.*

4 Connection Diagrams/Physical Dimensions

This section contains the I/O designations and package specifications for the S71NS-N.

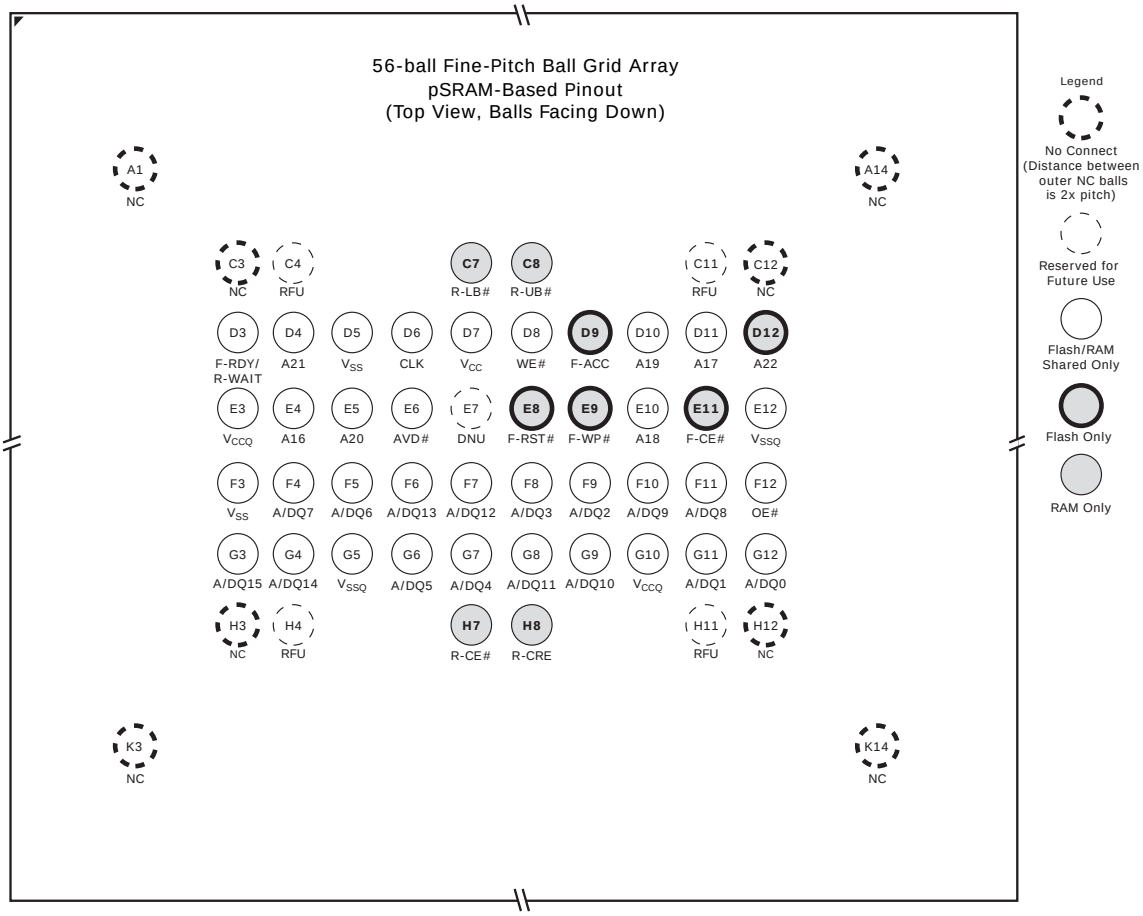
4.1 Special Handling Instructions for FBGA Packages

Special handling is required for Flash Memory products in FBGA packages.

Flash memory devices in FBGA packages may be damaged if exposed to ultrasonic cleaning methods. The package and/or data integrity may be compromised if the package body is exposed to temperatures above 150°C for prolonged periods of time.

4.2 Connection Diagrams

4.2.1 pSRAM Based Pinout, 56-Ball, VFBGA



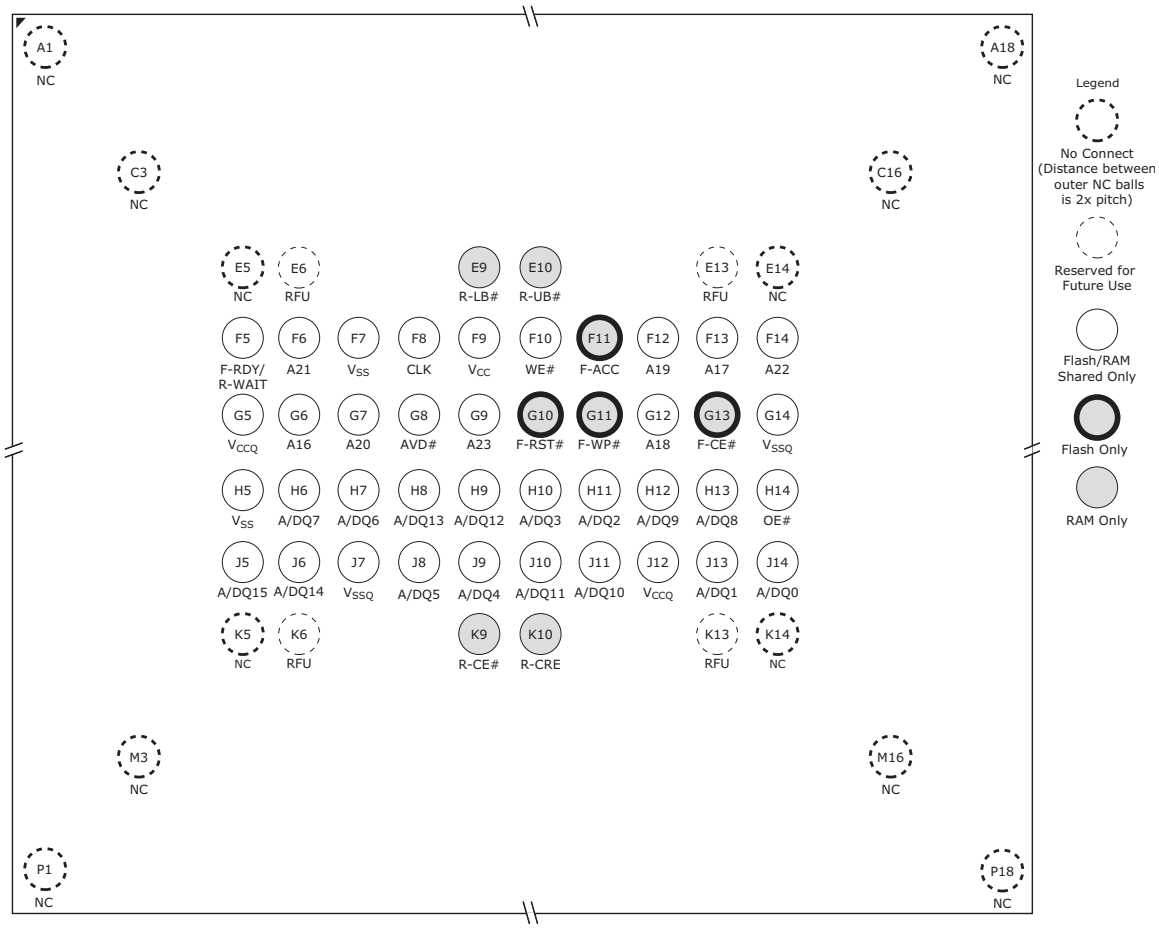
Notes:

1. *Addresses are shared between Flash and RAM depending on the density of the pSRAM.*
2. *CLK and WAIT signals are Flash only for the S71NS064NA0-RT, while on that MCP, the CRE signal won't exist.*

MCP	Flash-Only Addresses	Shared Addresses	Shared ADQ Pins
S71NS128NC0	A22	A21-A16	ADQ15 – ADQ0
S71NS128NB0	A22-A21	A20-A16	ADQ15 – ADQ0
S71NS128NA0	A22-A20	A19-A16	ADQ15 – ADQ0
S71NS064NA0	A21-A20	A19-A16	ADQ15 – ADQ0

Figure 4.1 pSRAM Based Pinout, 56-Ball, VFBGA

4.2.2 pSRAM Based Pinout, 60-Ball, VFBGA



Note: *Addresses are shared between Flash and RAM depending on the density of the pSRAM.*

MCP	Flash-Only Addresses	Shared Addresses	Shared ADQ Pins
S71NS256NC0	A23-A22	A21–A16	ADQ15 – ADQ0
S71NS256NB0	A23-A21	A20-A16	ADQ15 – ADQ0

Figure 4.2 pSRAM Based Pinout, 60-Ball, VFBGA

4.2.3 Look Ahead Connection Diagram
112-ball x16 MUX NOR Flash + x16 MUX pSRAM on Shared Bus and x16 NAND Interface ORNAND on Bus 2

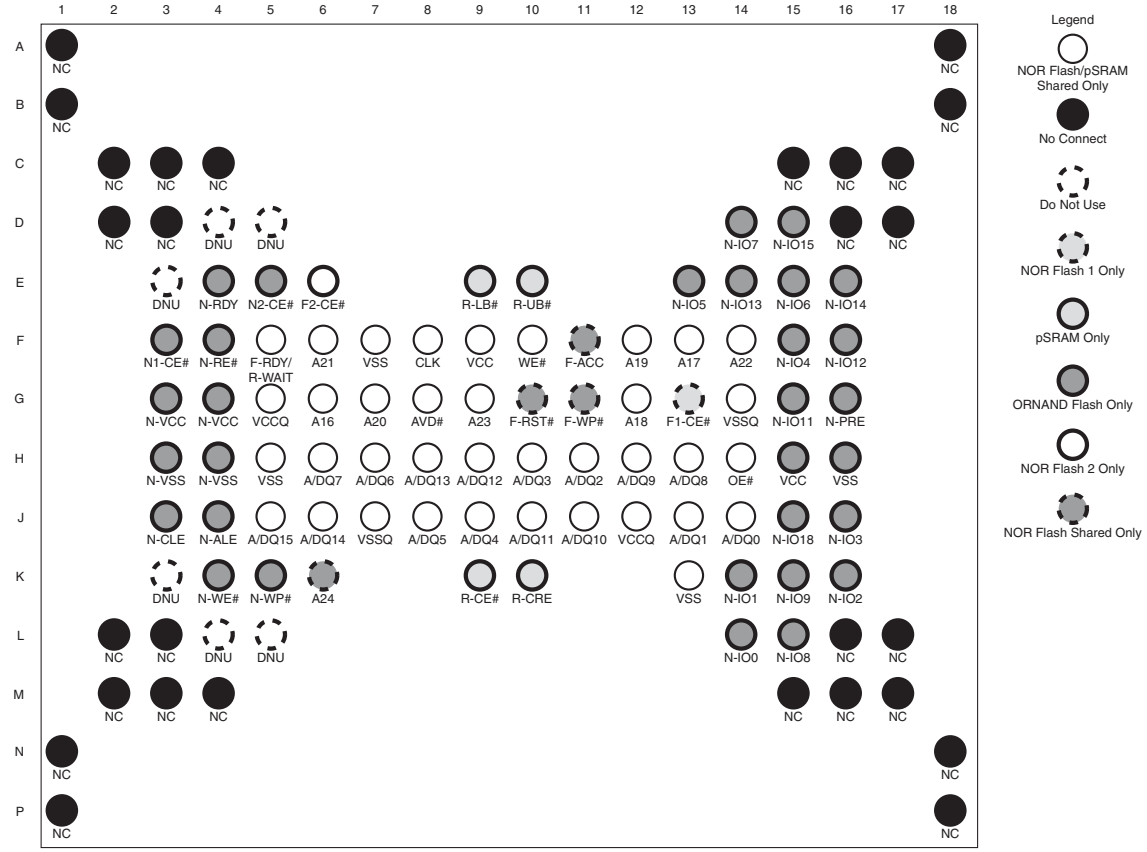
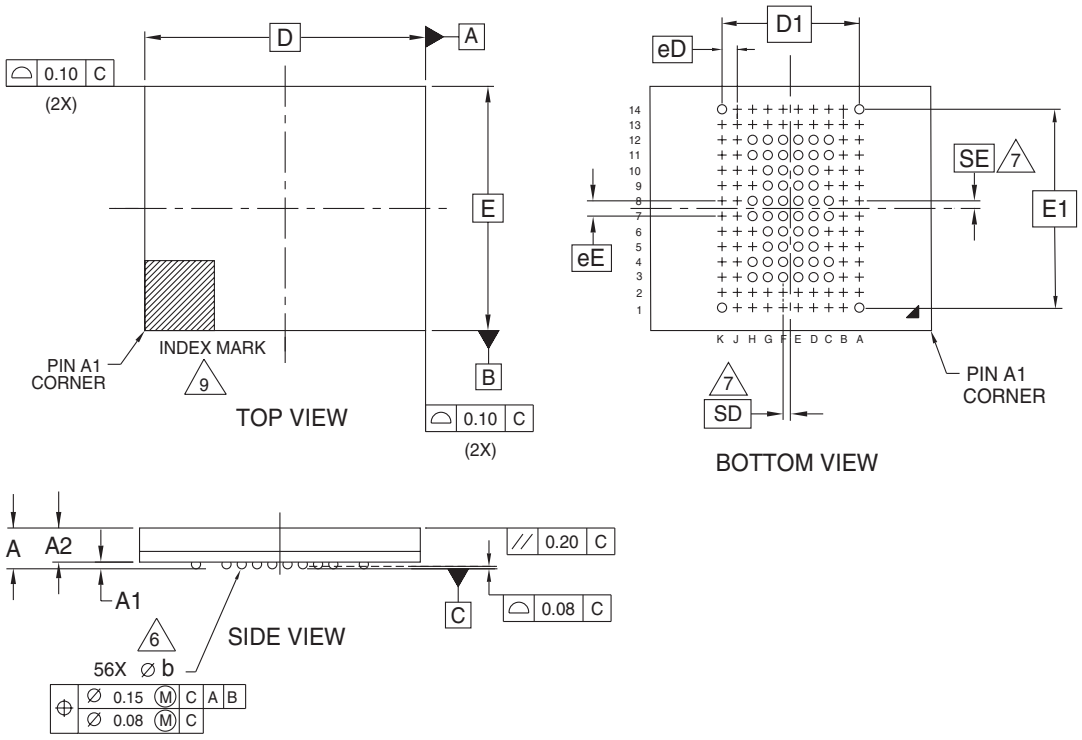


Figure 4.3 Look Ahead Connection Diagram
112-ball x16 MUX NOR Flash + x16 MUX pSRAM on Shared Bus and x16 NAND Interface ORNAND on Bus 2

4.3 Physical Dimensions

4.3.1 NLB056—9.2 x 8.0 mm, 56-ball VFBGA



PACKAGE	NLB 056			
JEDEC	N/A			
D x E	9.20 mm x 8.00 mm PACKAGE			
SYMBOL	MIN	NOM	MAX	NOTE
A	---	---	1.20	PROFILE
A1	0.20	---	---	BALL HEIGHT
A2	0.85	---	0.97	BODY THICKNESS
D	9.20 BSC.			BODY SIZE
E	8.00 BSC.			BODY SIZE
D1	4.50 BSC.			MATRIX FOOTPRINT
E1	6.50 BSC.			MATRIX FOOTPRINT
MD	10			MATRIX SIZE D DIRECTION
ME	14			MATRIX SIZE E DIRECTION
n	56			BALL COUNT
Øb	0.25	0.30	0.35	BALL DIAMETER
eE	0.50 BSC.			BALL PITCH
eD	0.50 BSC			BALL PITCH
SD / SE	0.25 BSC.			SOLDER BALL PLACEMENT
	A2 – A13,B1 – B14 C1,C2,C5,C6,C9,C10,C13,C14 D1,D2,D13,D14,E1,E2,E13,E14,F1,F2,F13,F14 G1,G2,G13,G14,H1,H2,H5,H6,H9,H10,H13,H14 J1 – J14, K2 – K13			DEPOPULATED SOLDER BALLS

NOTES:

1. DIMENSIONING AND TOLERANCING METHODS PER ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. BALL POSITION DESIGNATION PER JEP95, SECTION 4.3, SPP-010.
4. e REPRESENTS THE SOLDER BALL GRID PITCH.
5. SYMBOL "MD" IS THE BALL MATRIX SIZE IN THE "D" DIRECTION.

   SYMBOL "ME" IS THE BALL MATRIX SIZE IN THE "E" DIRECTION.

   n IS THE NUMBER OF POPULTED SOLDER BALL POSITIONS FOR MATRIX SIZE MD X ME.

6. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER IN A PLANE PARALLEL TO DATUM C.
7. SD AND SE ARE MEASURED WITH RESPECT TO DATUMS A AND B AND DEFINE THE POSITION OF THE CENTER SOLDER BALL IN THE OUTER ROW.

   WHEN THERE IS AN ODD NUMBER OF SOLDER BALLS IN THE OUTER ROW SD OR SE = 0.000.

   WHEN THERE IS AN EVEN NUMBER OF SOLDER BALLS IN THE OUTER ROW, SD OR SE = e/2
8. "+" INDICATES THE THEORETICAL CENTER OF DEPOPULATED BALLS.
9. A1 CORNER TO BE IDENTIFIED BY CHAMFER, LASER OR INK MARK, METALLIZED MARK INDENTATION OR OTHER MEANS.
10. OUTLINE AND DIMENSIONS PER CUSTOMER REQUIREMENT.

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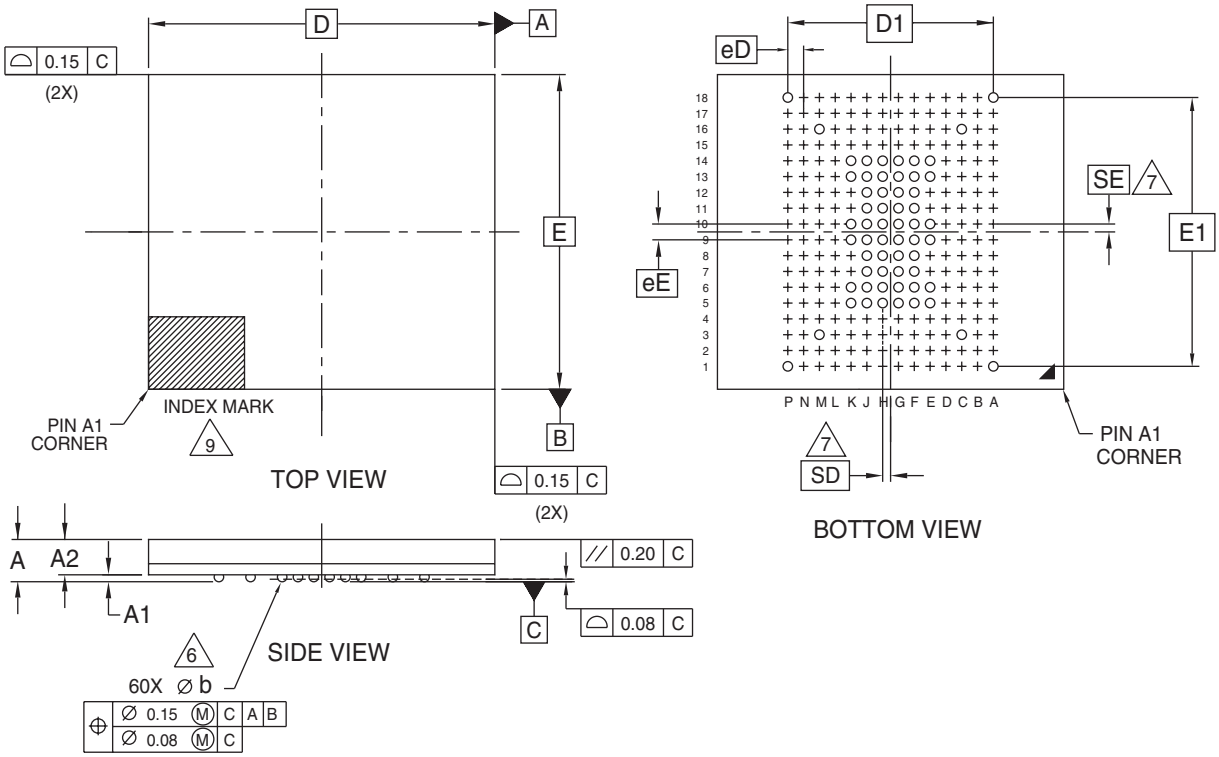
Figure 4.4 Physical Dimensions, NLB056—56-ball VFBGA

4.3.1 NLA060—11.0 x 10.0 mm, 60-ball VFBGA



PACKAGE	NLA 060			
JEDEC	N/A			
D x E	10.95 mm x 9.95 mm PACKAGE			
SYMBOL	MIN	NOM	MAX	NOTE
A	---	---	1.20	PROFILE
A1	0.20	---	---	BALL HEIGHT
A2	0.85	---	0.97	BODY THICKNESS
D	10.95 BSC.			BODY SIZE
E	9.95 BSC.			BODY SIZE
D1	6.50 BSC.			MATRIX FOOTPRINT
E1	8.50 BSC.			MATRIX FOOTPRINT
MD	14			MATRIX SIZE D DIRECTION
ME	18			MATRIX SIZE E DIRECTION
n	60			BALL COUNT
Øb	0.25	0.30	0.35	BALL DIAMETER
eE	0.50 BSC.			BALL PITCH
eD	0.50 BSC			BALL PITCH
SD / SE	0.25 BSC.			SOLDER BALL PLACEMENT
	A2–A17,B1–B18,C1,C2,C4–C15,C17,C18 D1–D18,E1,E2,E3,E4,E7,E8,E11,E12,E15,E16,E17,E18 F1,F2,F3,F4,F15,F16,F17,F18,G1,G2,G3,G4,G15,G16,G17,G18 H1,H2,H3,H4,H15,H16,H17,H18,J1,J2,J3,J4,J15,J16,J17,J18 K1,K2,K3,K4,K7,K8,K11,K12,K15,K16,K17,K18 L1 –L18,M1,M2,M4–M15,M17,M18,N1–N18,P2–P17			DEPOPULATED SOLDER BALLS

NOTES:

1. DIMENSIONING AND TOLERANCING METHODS PER ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. BALL POSITION DESIGNATION PER JEP95, SECTION 4.3, SPP-010.
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   SYMBOL "ME" IS THE BALL MATRIX SIZE IN THE "E" DIRECTION.

   n IS THE NUMBER OF POPULTED SOLDER BALL POSITIONS FOR MATRIX SIZE MD X ME.
6. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER IN A PLANE PARALLEL TO DATUM C.
7. SD AND SE ARE MEASURED WITH RESPECT TO DATUMS A AND B AND DEFINE THE POSITION OF THE CENTER SOLDER BALL IN THE OUTER ROW.

   WHEN THERE IS AN ODD NUMBER OF SOLDER BALLS IN THE OUTER ROW SD OR SE = 0.000.

   WHEN THERE IS AN EVEN NUMBER OF SOLDER BALLS IN THE OUTER ROW, SD OR SE = e/2
8. "+" INDICATES THE THEORETICAL CENTER OF DEPOPULATED BALLS.
9. A1 CORNER TO BE IDENTIFIED BY CHAMFER, LASER OR INK MARK, METALLIZED MARK INDENTATION OR OTHER MEANS.
10. OUTLINE AND DIMENSIONS PER CUSTOMER REQUIREMENT.

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Figure 4.5 Physical Dimensions, NLA060—60-ball VFBGA

5 Revisions

Revision A0 (January 3, 2006)

Initial Release under Publication Identification Number S71NS128NC0_01

Revision A1 (March 1, 2006)

Changed the Publication Identification Number from S71NS128NC0_01 to S71NS-N_00

Added the MCP S71NS064NA0

Revision A2 (June 13, 2006)

Corrected the grid reference for 56-ball connection diagram

Revision A3 (October 10, 2006)

Added the S71NS064NA0-RT - the one using pSRAM Type 2