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**Continuity of Specifications**

There is no change to this document as a result of offering the device as a Cypress product. Any changes that have been made are the result of normal document improvements and are noted in the document history page, where supported. Future revisions will occur when appropriate, and changes will be noted in a document history page.

**Continuity of Ordering Part Numbers**

Cypress continues to support existing part numbers. To order these products, please use only the Ordering Part Numbers listed in this document.

**For More Information**

Please contact your local sales office for additional information about Cypress products and solutions.

**ADVANCE****S76MS-2**

## 1 Gb, 512 Mb x16, 1.8 V NAND Flash Memory and DRAM

### Features

- Power Supply Voltage of 1.7V to 1.95V
- Burst Speeds
  - DDR DRAM = 200 MHz (max)
- Device Bus Width
  - NAND: x16
  - DDR SDRAM: x16
- Operating Voltage
  - NAND: 1.7V to 1.95V
  - DDR SDRAM: 1.7V to 1.95V
- Density
  - 1-Gb NAND Flash Memory
  - 512-Mb SDRAM LPDDR
- Packages
  - 8 x 9 x 1 mm, 130-Ball MCP
- Operating Temperature
  - Industrial, –40°C to +85°C

### General Description

This document contains information on the S76MS-2 MCP stacked products. Refer to the S34MS-2 data sheet ([S34MS01G2\\_04G2](#)) for full electrical specifications of the flash memory component.

The S76MS Series is a product line of stacked products (MCPs), and consists of:

- S76MS Multi-Chip Product (MCP) 1.8V NAND Flash Memory
- DDR DRAM on Split Bus

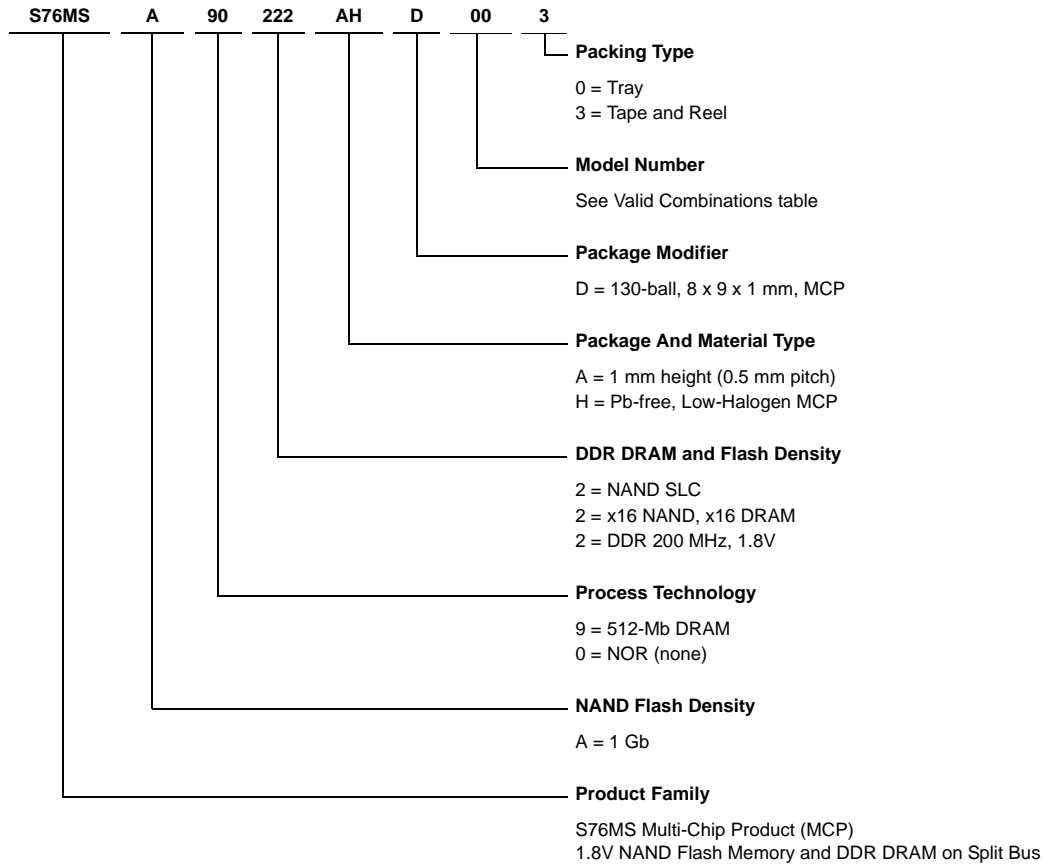
The products covered by this document are listed in the table below.

### DDR Specification Reference

Density	Reference Name	Cypress Documentation
		Publication Number
512 Mb	512-Mb (32M x 16-bit) DDR DRAM	SDM512D200E3R

## 1. Ordering Information

The order number (Valid Combination) is formed by the following:

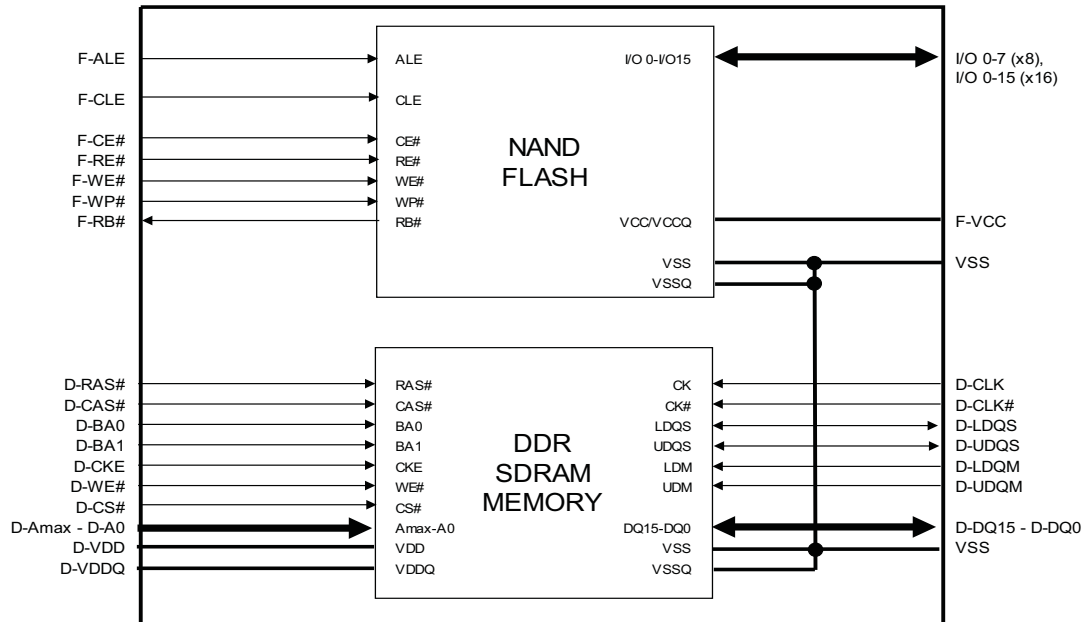


### 1.1 Valid Combinations

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.

Base OPN	Package	Model Number	Packing Type	Temp Range	Flash Density	DDR DRAM Density	DRAM Speed (MHz)	DRAM Specification	Package
S76MSA90222	AHD	00	0, 3	Industrial	1 Gb	512 Mb	200	SDM512D200E3R	8 x 9 x1 mm, 130-ball MCP

## 2. Product Block Diagram

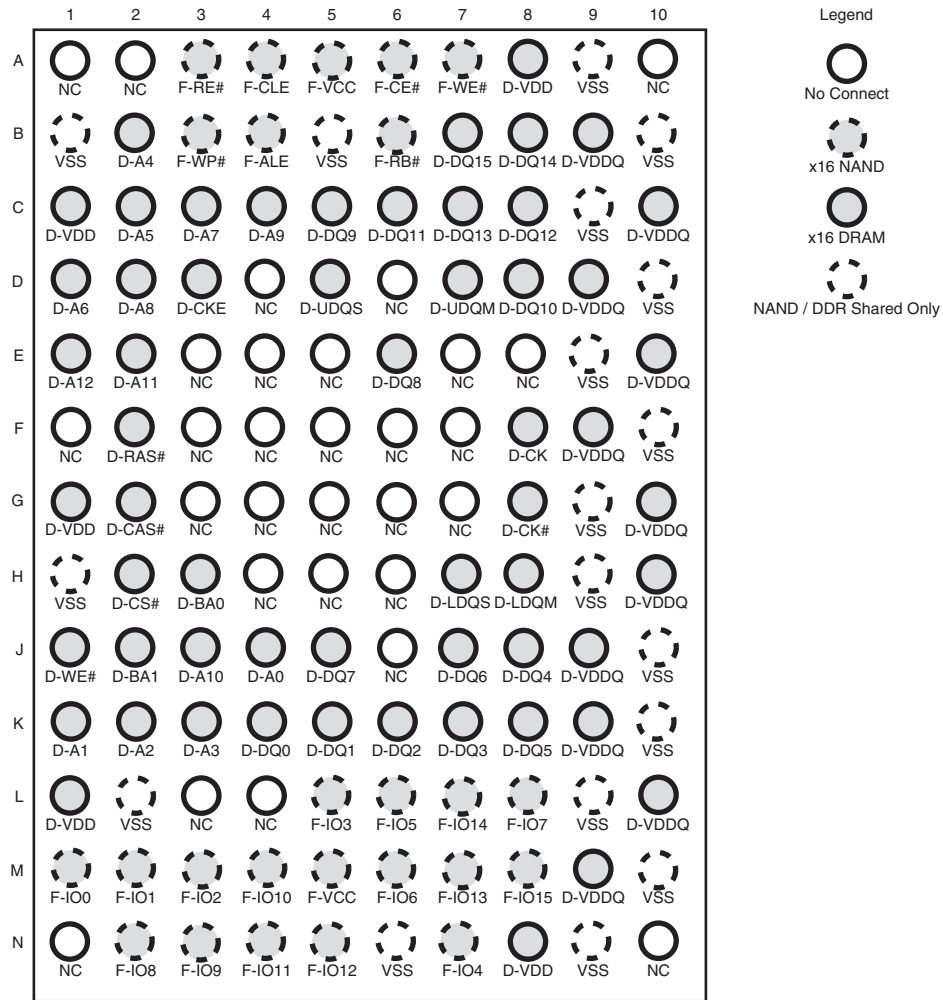


**Note:**

1. Amax indicates highest address bit for memory component.

### 3. Connection Diagrams

**Figure 3.1** 130-Ball Ball Grid Array MCP



MCP	DDR DRAM Density
S76MSA90222	512 Mb

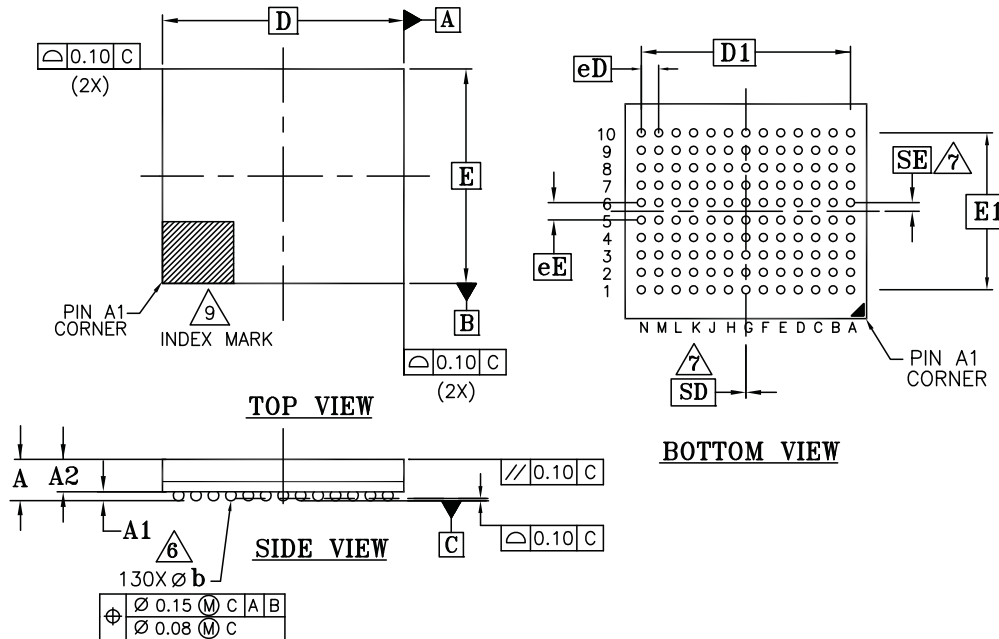
## 4. Input / Output Descriptions

**Figure 4.1** Input / Output Descriptions

Symbol	Description	NAND	DRAM
ADQ15 – ADQ0	Flash Multiplexed Address and Data	X	
D-DQ15 – D-DQ0	Dram Data Input/Output		X
F-CE#	Flash Chip-enable Input.	X	
D-CK#	Clock Input		X
D-CS#	DRAM Chip Select		X
F-RE#	Read Enable	X	
F-RB#	Ready Busy	X	
D-WE#	DRAM Write Enable Input		X
F-WE#	Flash Write Enable Input	X	
F-WP#	Write Protect	X	
F-CLE	Command Latch Enable	X	
F-ALE	Address Latch Enable	X	
D-CAS#	DRAM Column Address Strobe		X
D-CLK#	DDR Clock for Negative Edge of CLK		X
D-CLK	DRAM System Clock		X
D-CKE	DRAM Clock Enable		X
D-BA1 – BA0	DRAM Bank Select		X
F-VCC	Flash Device Power Supply (1.7V to 1.95V)	X	
D-RAS#	DRAM Row Address Strobe		X
D-Amax – D-A0	DRAM Address Inputs.		X
D-VDD	Power Supply		X
D-UDQS	DRAM Upper Data Strobe, output with read data and input with write data		X
D-LDQS	DRAM Lower Data Strobe, output with read data and input with write data		X
D-UDQM – D-LDQM	DRAM Data Input Mask		X
LDQS, UDQS	Data Strobe		X
VDDQ	Power for IO Buffer		X
VSS	Ground	X	X
VSSQ	Ground for IO Buffer	X	

## 5. Physical Dimensions

### 5.1 DLC130 —130-Ball Ball Grid Array (BGA) 8.0 x 9.0 mm



#### NOTES:

- DIMENSIONING AND TOLERANCING METHODS PER ASME Y14.5M-1994.
- ALL DIMENSIONS ARE IN MILLIMETERS.
- BALL POSITION DESIGNATION PER JEP95, SECTION 3, SPP-020.
- $\boxed{e}$  REPRESENTS THE SOLDER BALL GRID PITCH.
- 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 POPULATED SOLDER BALL POSITIONS FOR MATRIX SIZE MD X ME.
- $\triangle 6$  DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER IN A PLANE PARALLEL TO DATUM C.
- $\triangle 7$  "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.
- WHEN THERE IS AN EVEN NUMBER OF SOLDER BALLS IN THE OUTER ROW, "SD" = eD/2 AND "SE" = eE/2.
- "+" INDICATES THE THEORETICAL CENTER OF DEPOPULATED BALLS.
- $\triangle 9$  A1 CORNER TO BE IDENTIFIED BY CHAMFER, LASER OR INK MARK, METALLIZED MARK INDENTATION OR OTHER MEANS.

g5023 \ f16-038.69 \ 10.18.13

## 6. Revision History

Spanion Publication Number: S76MS-2\_00

Section	Description
<b>Revision 01 (December 13, 2013)</b>	
	Initial release

## Document History Page

<b>Document Title: S76MS-2 1 Gb, 512 Mb x16, 1.8 V NAND Flash Memory and DRAM</b> <b>Document Number: 002-00688</b>				
Rev.	ECN No.	Orig. of Change	Submission Date	Description of Change
**	—	WIOB	12/13/2013	Initial release
*A	4966214	WIOB	10/15/2015	Updated to Cypress template



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