VDIC MAGNETORESISTIVES RANDOM ACCESS MEMORY

VDMR8M32XS68XX8V35 USER MANUAL

Version : B0

Contents

VDIC-MRAM

HIGH-SPEED   3.3V   256K × 32bit

MAGNETORESISTIVES RANDOM ACCESS MEMORY

1. DESCRIPTION

The VDMR8M32XS68XX8V35 is a 8 × 1,048,576-bit high-speed access time, high-density Magnetoresistives Random Access Memory device. Manufactured with VDIC Very Dense SiP technology, this Die stacks eight 1-Mbit MRAM Dies. It is organized as eight independent dies of 128K x 8bit wide data interface.

The VDMR8M32XS68XX8V35 offers MRAM compatible 35ns read/write timing with unlimited endurance. Data is always non-volatile for greater than 20-years. Data is automatically protected on power loss by low-voltage inhibit circuitry to prevent writes with voltage out of specification. The VDMR8M32XS68XX8V35 is the ideal memory solution for applications that must permanently store and retrieve critical data and programs quickly.

The VDMR8M32XS68XX8V35 has eight dies. Each die can be selected separately with dedicated #CEn. Low interconnect parasitic capacitance of the stacking technology, by reducing the connection length, allows this MRAM module to be useful for a variety of high bandwidth, high performance and high density memory system applications.

The VDMR8M32XS68XX8V35 is available in a 68-pin SOP package.

2. FEATURES

-Fast 35ns Read/Write Cycle

-SRAM Compatible Timing, Uses Existing SRAM Controllers Without Redesign

-Unlimited Read & Write Endurance

-Data Always Non-volatile for >20-years at storage temperature

-One Memory Replaces Flash, SRAM, EEPROM and BBSRAM in a system for simpler, more efficient design

-Stack of eight 1Mbit MRAM

-Organized as 8 dies of 128K x 8 bit memory

-Two independent Die Select

-3.3 Volt Power Supply

-Automatic Data Protection on Power Loss

- Industrial, Automotive Temperatures

- 68-lead SOP   package

3. BLOCK DIAGRAM
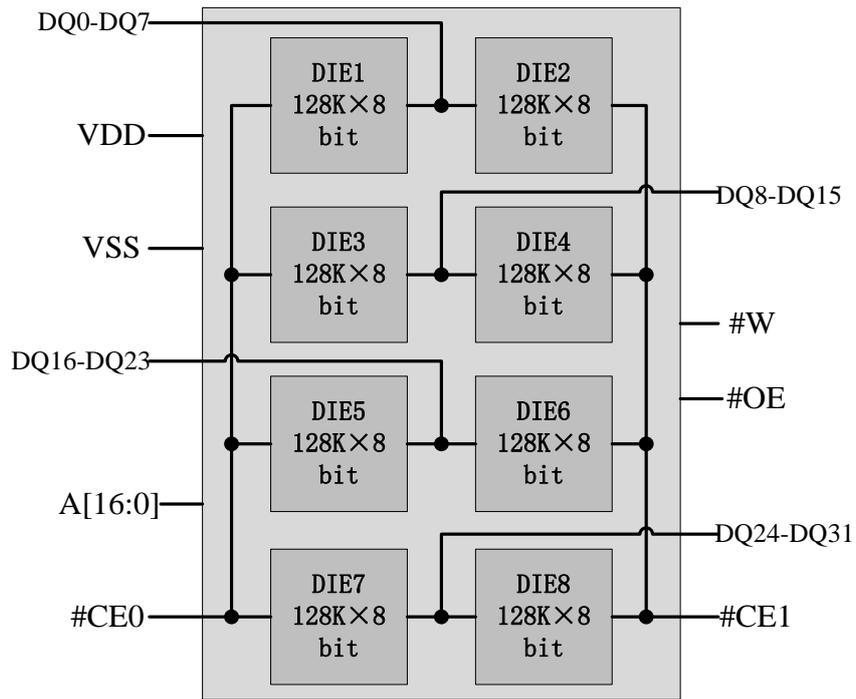
(All other signals are common to the eight memories)

4. PIN DESCRIPTIONS

Pin Id	Pin #		Pin Id
DQ9	1	68	DQ15
DQ8	2	67	DQ14
DQ17	3	66	DQ23
DQ16	4	65	DQ22
#CE1	5	64	DQ30
NC	6	63	DQ31
DC	7	62	DC
NC	8	61	NC
A0	9	60	DC
A1	10	59	DQ24
A2	11	58	DQ25
A3	12	57	A16
A4	13	56	A15
#CE0	14	55	#OE
DQ0	15	54	DQ7
DQ1	16	53	DQ6
VDD	17	52	VSS
VSS	18	51	VDD
DQ2	19	50	DQ5
DQ3	20	49	DQ4
#W	21	48	DC
A5	22	47	A14
A6	23	46	A13
A7	24	45	A12
A8	25	44	A11
A9	26	43	A10
DC	27	42	DC
DC	28	41	DC
DQ27	29	40	DQ28
DQ26	30	39	DQ29
DQ19	31	38	DQ21
DQ18	32	37	DQ20
DQ11	33	36	DQ13
DQ10	34	35	DQ12
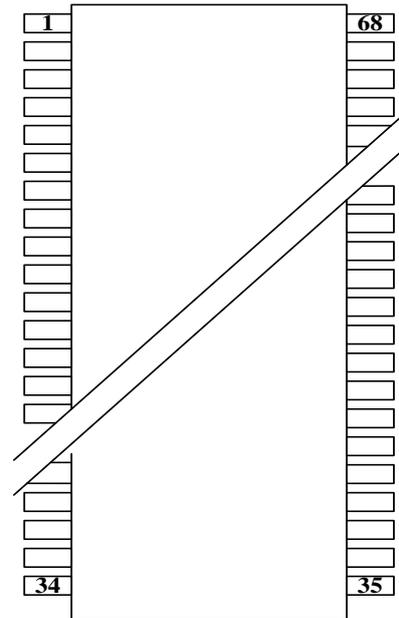
Pin	Name	Function
#CE0	Die select	Disables or enables memory operation for die1,die3,die5 and die 7
#CE1	Die select	Disables or enables memory operation for die2,die4,die6 and die 8
A0 ~ A16	Address	17-bit addresses
#W	Write enable	Enables write operation common to all memory dies
#OE	Output enable	Enables data output common to all memory dies
DQ0~ DQ31	Data input/output	Data inputs/outputs 32-bit wide bus
VDD/VSS	Power supply/ground	Power and ground for the input/output buffers and core logic.
NC	No connection	These pins are recommended to be left No Connection on the device.
DC	Do not connect	These pins do not connect

5. ELECTRICAL SPECIFICATIONS

5.1. ABSOLUTE MAXIMUM RATINGS

This device contains circuitry to protect the inputs against damage caused by high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage greater than the maximum rated voltages to these high-impedance (Hi-Z) circuits.

The device also contains protection against external magnetic fields. Precautions should be taken to avoid application of any magnetic field more intense than the maximum field intensity specified in the maximum ratings.

Characteristics	Symbol	Maxinmum ratings	Unit
Voltage on V_{DD} supply relative to Vss	V_{DD}	-0.5 to +4.0	V
Voltage on any pin relative to Vss	V_{IN}	-0.5 to VDD +0.5	V
Power Dissipation	P_D	< 1.5	W
Operating Temperature Range	T_{OPR}	-45~ +95	℃
Storage Temperature Range	T_{STG}	-55 to +150	℃

5.2. RECOMMENDED DC OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{DD}	3.0	3.3	3.6	V
Input voltage	V_{IH}	2.2	——	V_{DD}+0.3	V
	V_{IL}	-0.5	——	0.8	V

5.3. DC ELECTRICAL CHARACTERISTICS

Parameters	Symbol	Test Conditions	Min	Max	Unit
Output voltage low level	V_{OL}	I_{OL}= +4mA	——	0.4	V
Output voltage high level	V_{OH}	I_{OL}= -4mA	2.4	——	V

6. TYPICAL APPLICATION
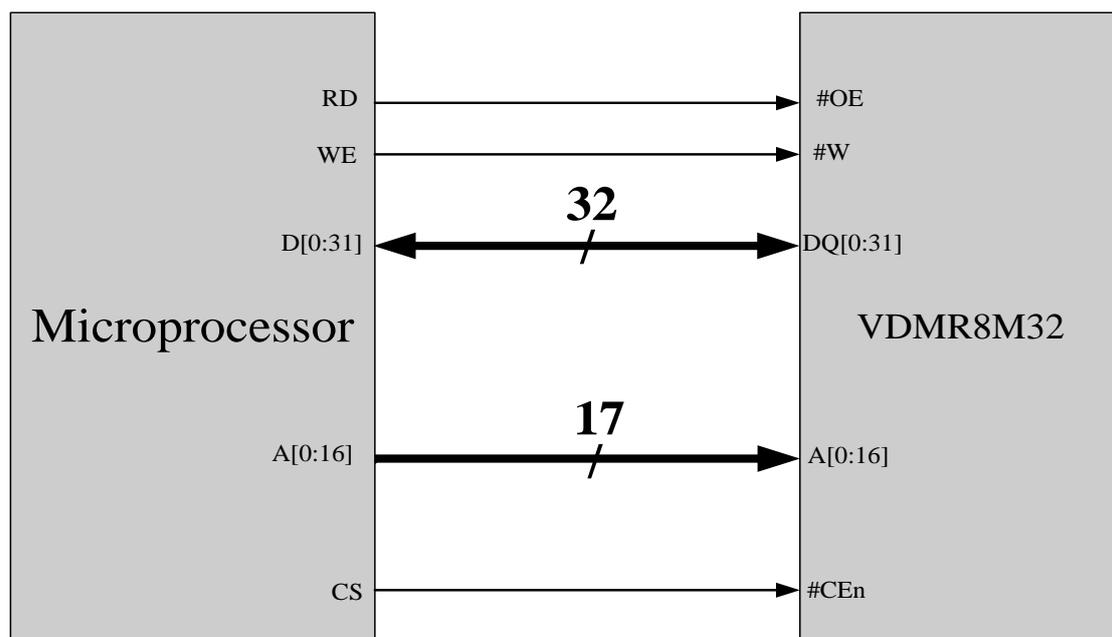
7. ORDERING INFORMATION

1	2	3	4	5	6	7	8	9	10	11	12	13
<u>VD</u>	<u>MR</u>	<u>8M</u>	<u>32</u>	<u>V</u>	<u>S</u>	<u>68</u>	<u>E</u>	<u>E</u>	<u>8</u>	<u>V</u>	<u>35</u>	_

VDIC

MRAM

Capability：8M bit

Bus Width：32bit

R= Radiation Data Tested;
V= Generic Radiation Data Available

Package: S=SOP

68=68 Pin

Temperature::E=0～70℃;I=-40～85℃;S=Specific

Quality: E= Sample；B= Industry; S= Space

Stacking Layer:8=8layer

Power Supply :V=3.3V

Speed:35= 35ns

**-I、-K or blank space=First Version**

Part Number	Capacity (bit)	Bus Width (bit)	Radiation			Packaging	Temperature (℃)
			TID[1]	SEL[2]	SEU[3]		
VDMR8M32VS68EE8V35	8M	32	-	-	-	SOP68	0 ～ + 70
VDMR8M32VS68IB8V35	8M	32	-	-	-	SOP68	-40 ～ + 85
VDMR8M32RS68SS8V35	8M	32	>60	<40	>37	SOP68	-45 ～ + 95

[1] TID: Total Dose （Krads(Si)）
[2] SEL: LET Threshold （Mev.cm2/mg）
[3] SEU:SEU Threshold （Mev.cm2/mg）

8. PACKAGE DIMENSIONS
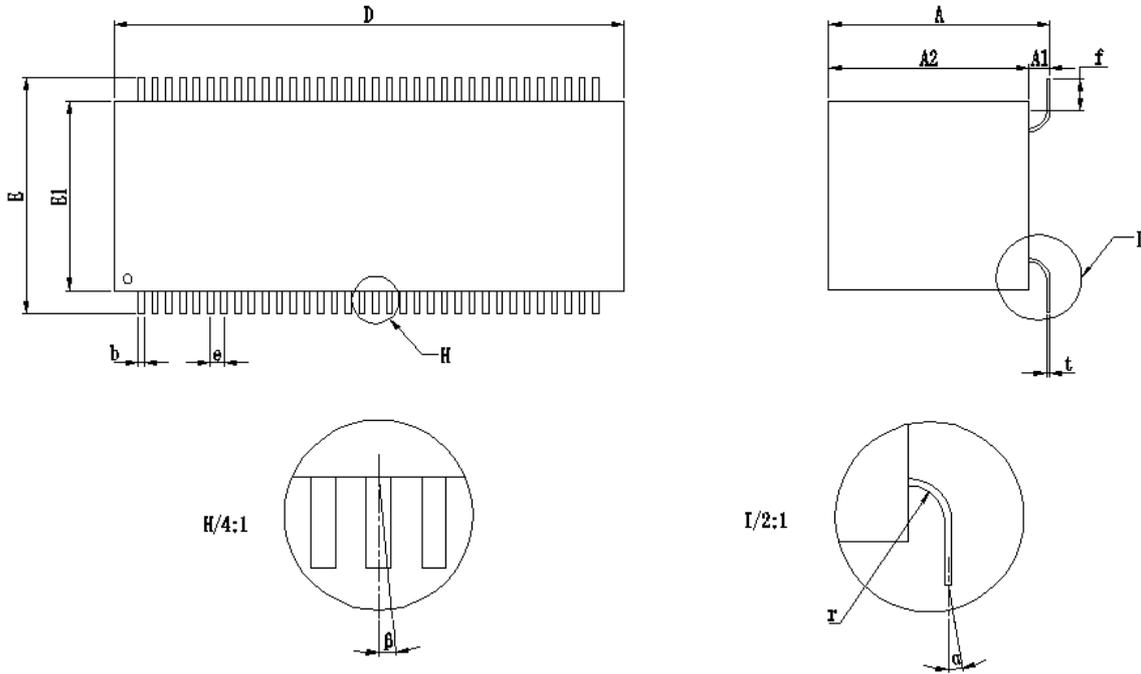
	Min	Max
A	12.60	13.20
A2	11.40	11.90
D	29.50	29.90
E	13.40	13.80
E1	10.80	11.20
f	2.00	
b	0.35	
e	0.80	
r	1.00	
t	0.20	
α	≤ 3°	
β	≤ 3°	
NOTE : 1. Unit : mm 2. A1= A - A2		

9. REVISION HISTORY

Table 1 Revision history

Revision	Date	Description of Change
A0	Nov 3,2015	First Created
A1	Mar 14,2016	Modified the PIN DESCRIPTIONS
A2	Aug 23,2016	Modified the ORDERING INFORMATION
A3	Jan 9,2017	Modified the PACKAGE DIMENSIONS
A4	Oct.25,2017	Changed company's name to Zhuhai Orbita Aerospace Science & Technology Co.，Ltd
A5	Mar 13,2018	Add or reduce the chapters
B0	May 22, 2018	Modified Operating Temperature Range and Storage temperature.