

VDIC DDR3 SYNCHRONOUS DYNAMIC RAM

VD3D16G72XB199XX2WH USER MANUAL

Version : A3

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Zhuhai Orbita Aerospace Science & Technology Co. , Ltd.

Add: Orbita Tech Park, NO.1 Baisha Road, Tangjia Dongan,

Zhuhai, Guangdong, China 519080

Tel: +86-756-3391979 Fax: +86-756-3391980

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VDIC-DDR3 SDRAM

HIGH-SPEED 1.35V/1.5V 256M×72bit

SYNCHRONOUS DYNAMIC RAM

1. DESCRIPTION

The VD3D16G72XB199XX2WH is a 16Gbit DDR3 SDRAM high-density System-in-Package memory module. It is organized with 5 chips, of which 4 4Gbit(256Mx16bit) chips form 64bit and 1 chip is used as 8-bit ECC. The three-dimensional packaging technology is used to interconnect the multi-layer memory circuits to form a high-density DDR3 memory module with high reliability, high stability and miniaturization. It is particularly well suited for use in high reliability, high performance and high density system applications, such as servers or workstations.

2. FEATURES

- Organized as 256M×72
- Supply voltage 1.35V+0.1V, -0.067V
 - Backward compatible to 1.5V
- System frequency up to 667MHz
- 8n-Bit pre-fetch architecture
- Programmable CAS Latency
- Programmable Additive Latency: 0, CL-1, CL-2
- Programmable Burst Length: 4 and 8
- Programmable Burst Sequence: Sequential or Interleave
- BL switch on the fly
- Auto Self Refresh(ASR)
- OCD (Off-Chip Driver Impedance Adjustment)
- Dynamic ODT (On-Die Termination)
- Up to 200MHz in DLL off mode
- Package: 199-ball BGA(22mm x 30mm)
- Available temperature range :
 - 0°C~+70°C
 - -40°C~+85°C
 - -40°C~+105°C

Specific temperature range can be requested

3. BLOCK DIAGRAM

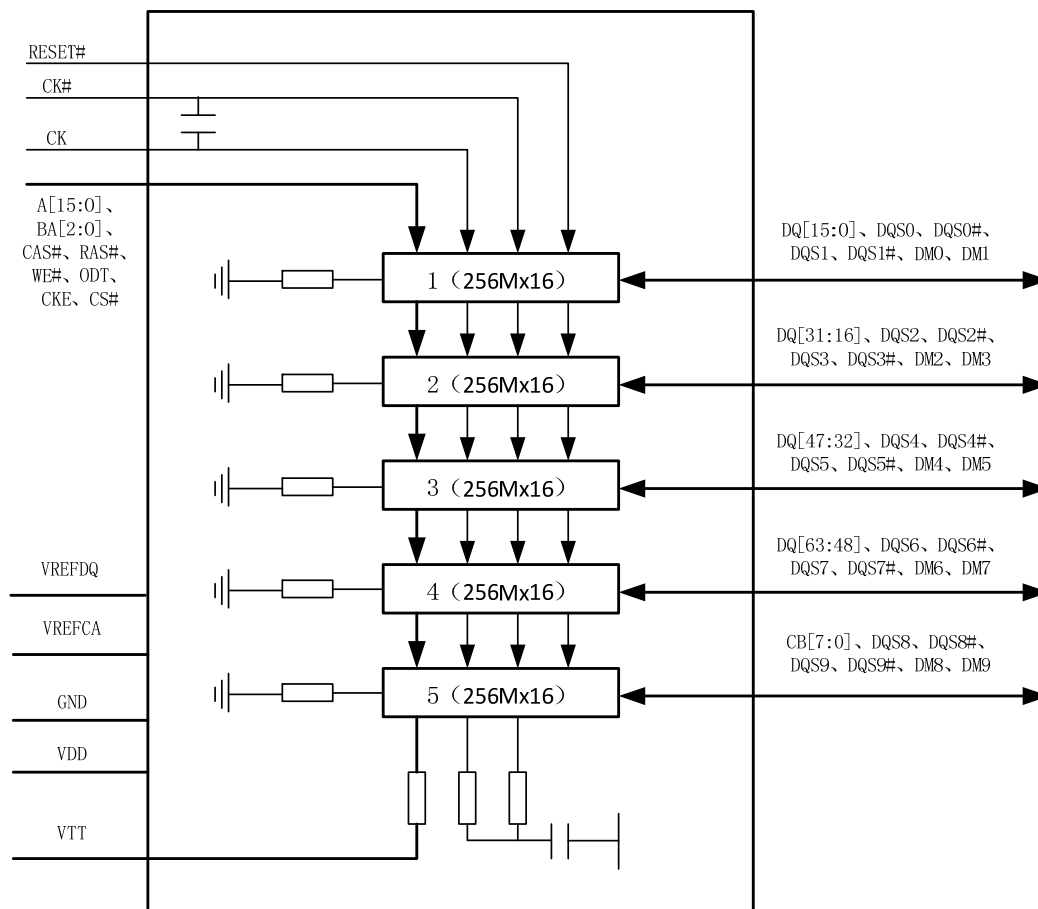


Figure 1 Functional block diagram

4. PIN DESCRIPTIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13
A		GND	DQ39	DQ37	DQ33	DQ35	DM4	DQ40	DQ42	DQ46	DQS5#	DQS5	GND
B	VTT	VTT	VDD	GND	VDD	GND	DM7	DQ59	DQ57	DQ61	DQ44	DQS6	DQ36
C	VTT	VTT	DQ52	DQ54	DQ50	DQ48	VDD	GND	VDD	DQ63	DQ55	DQS6#	DQ38
D	VTT	VTT	DQ13	DQ15	DQ9	DM1	DQS1	DQS1#	DQ12	DQ14	DQ53	DQS4	DQS4#
E	VTT	VTT	DQ11	NC						DQ10	DQ49	GND	DQ34
F	GND	VDD	GND	VDD						DQ8	DQ51	VDD	DQ32
G	VDD	GND	GND	NC						GND	DM6	DM5	GND
H	NC	GND	DQ2	DQ0						DM0	GND	DQ56	DQ47
J	NC	VDD	DQ6	DQS0						DQ1	VDD	DQS7#	DQS7
K	NC	GND	DQ4	DQS0#						DQ3	CK	DQ60	DQ45
L	ODT	RAS#	VREFDQ	VREFDQ						DQ7	CK#	DQ62	DQ41
M	CS#	CAS#	GND	A10						DQ5	GND	DQ58	DQ43
N	BA0	WE#	VDD	A15/RFU						GND	VDD	CB3	DQ26
P	A3	BA2	GND	A12						VREFCA	VREFCA	CB5	DQ30
R	A5	A0	VDD	A1						NC	VDD	CB7	DQ28
T	A7	A2	GND	A11						NC	GND	DQS3	DQS3#
U	GND	A9	RESET#	A14	A8	A6	A4	BA1	CKE	DM2	DM8	DQ24	CB1
V	NC	A13	NC	DQ20	DQ22	DQ16	VDD	GND	NC	DQS2	DQS2#	DQ19	DQ17
W	VDD	GND	DQS9	NC	DQ18	DM3	DQ25	DQ27	DQ29	DQ31	DQS8#	DQ23	DQ21
Y	VDD	GND	DQS9#	DM9	GND	VDD	CB0	CB2	CB6	CB4	DQS8	VDD	GND

Top View

Figure 2 199-Ball BGA (Top View)

Table 1 Pin Descriptions

Pin Name	Type	Description
A0 ~ A14	Input	15-bit address inputs.
A15/RFU	Input	Reserved for future use, as an NC pin inside the memory module.
BA0~BA2	Input	3-bit Bank Address inputs.
A10/AP	Input	Auto-precharge input.
A12/BC#	Input	Burst Chop input.
CS#	Input	Chip select
RESET#	Input	Active Low Asynchronous Reset input.
CAS#	Input	CAS# Command input.
RAS#	Input	RAS# Command input.
WE#	Input	WE# Command input.
ODT	Input	On Die Termination input.
CK,CK#	Input	Differential clock inputs.

Pin Name	Type	Description
CKE	Input	Clock Enable input.
DM0~DM9	Input	Data Mask input.DM0 for DQ0~DQ7; DM1 for DQ8~DQ15; and so on.DM8 for CB0~CB7.
DQS0~DQS9 , DQS0#~DQS9#	Input/Output	Data Strobe(Differential signals):output with read data,input with write data.DQS0,DQS0# for DQ0~DQ7;DQS1,DQS1# for DQ8~DQ15;and so on.DQS8,DQS8# for CB0~CB7.
DQ0~DQ63	Input/Output	Data Input/Output.
CB0~CB7	Input/Output	Data Input/Output.Data interface for ECC.
VDD	Supply	Power Supply
GND	Supply	Ground.
VREFDQ	Supply	Reference voltage for DQ.
VREFCA	Supply	Reference voltage for CA.
VTT	Supply	Power Supply for VTT.VTT =1/2*VDD.
NC		No Connect:No internal electrical connection is present.

5. DC OPERATING CONDITIONS

5.1. ABSOLUTE MAXIMUM DC RATINGS

Table 2 Absolute Maximum DC Ratings

Symbol	Parameter	Rating	Unit
VDD	Voltage on VDD pin relative to GND	-0.4 ~ 1.975	V
V _{IN} , V _{OUT}	Voltage on any pin relative to GND	-0.5~ 1.975	V
P _{DMAX}	Power dissipation	3	W
T _{STG}	Storage temperature	-55 ~ +150	°C

5.2. Recommended DC Operating Conditions

Table 3 Recommended DC Operating Conditions

Symbol	Parameter	Min	Typ	Max	Unit
VDD	Supply Voltage	1.283	1.35	1.45	V
		1.425	1.5	1.575	
VTT	Reference mid point	0.49×VDD	0.5×VDD	0.51×VDD	V
VREFCA	Reference voltage for CMD、ADD	0.49×VDD	0.5×VDD	0.51×VDD	V
VREFDQ	Reference voltage for DQ、DM	0.49×VDD	0.5×VDD	0.51×VDD	V
F	Clock Frequency			667	MHz

6. Electrical Characteristics

Table 4 Electrical Characteristics

Parameter	Symbol	Value	Unit
Operating Current(One bank active)	IDD1	500	mA
Precharge power-down standby current	IDD2P0	100	mA
Active power-down current	IDD3P	275	mA

7. TYPICAL APPLICATION

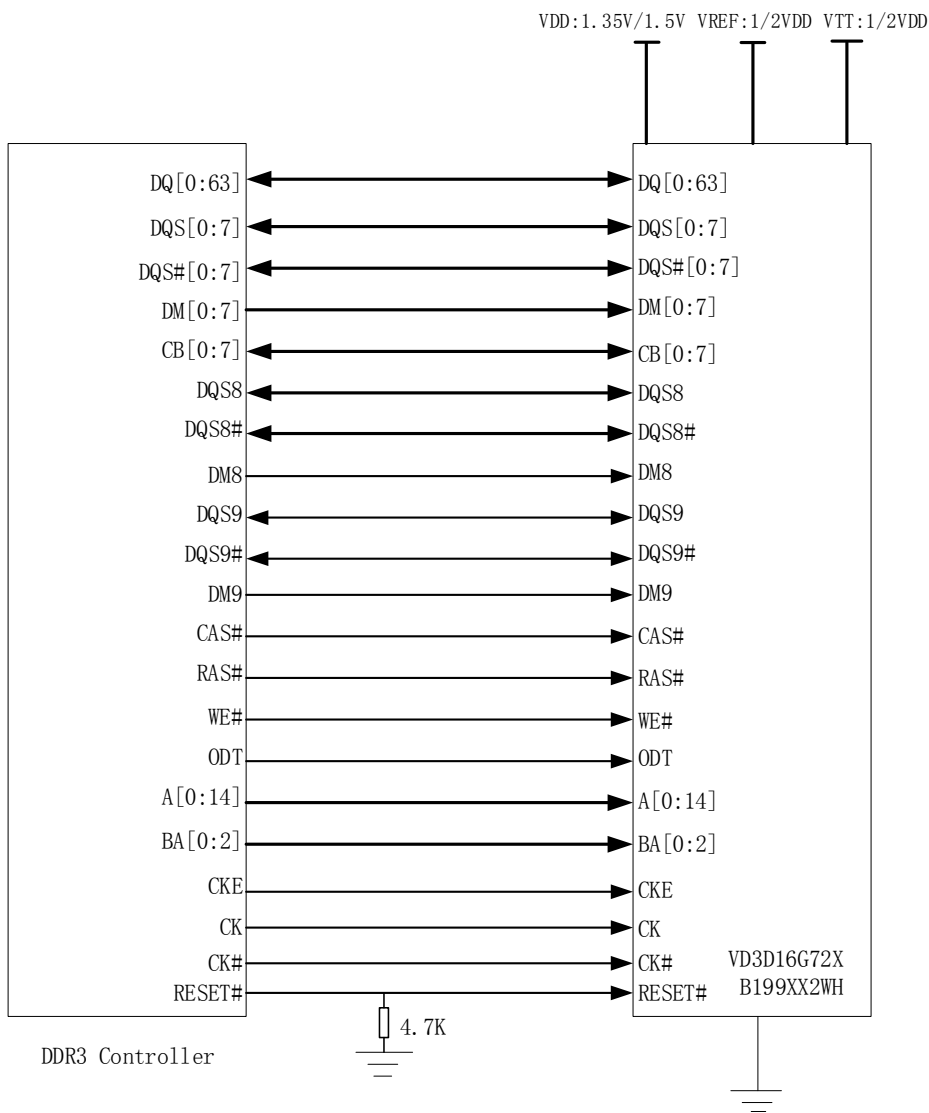


Figure 3 Typical Application

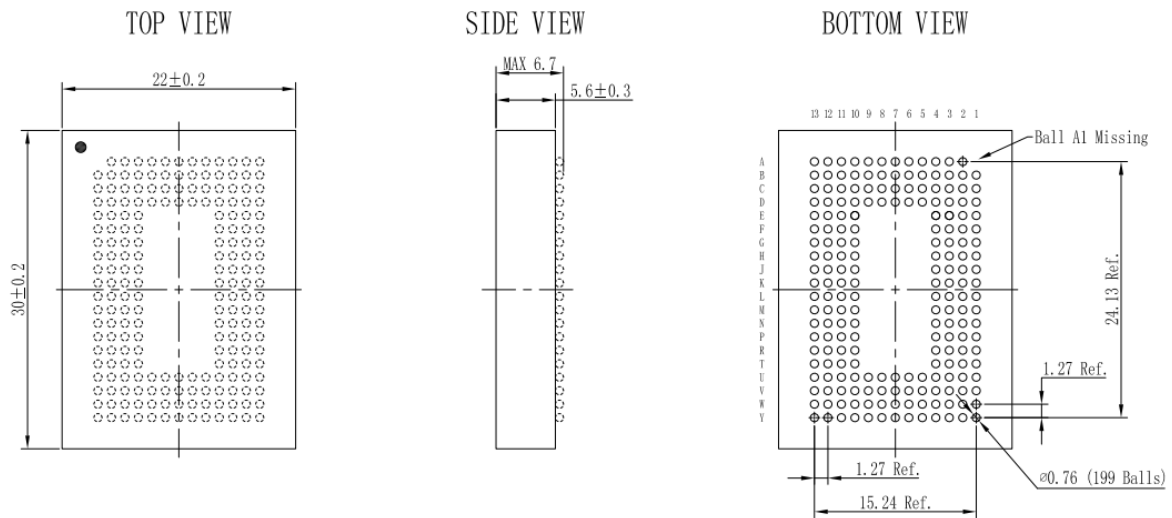
8. ORDERING INFORMATION

1	2	3	4	5	6	7	8	9	10	11	12	13
<u>VD</u>	<u>3D</u>	<u>16G</u>	<u>72</u>	<u>X</u>	<u>B</u>	<u>199</u>	<u>X</u>	<u>X</u>	<u>2</u>	<u>W</u>	<u>H</u>	-
VDIC												
DDR3 SDRAM												
Capability: 16G bit												
Bus Width: 72bit												
R= Radiation Data Tested; V= Generic Radiation Data Available												
Package: BGA												
Pin Quantity: 199 Pin												
Temperature: E=0℃~70℃; I= -40℃~85℃; S =-40℃~105℃												
Quality: E= Sample; B= Industry; S= Space												
Stacking Layer: 2 layer												
Power Supply: 1.5V												
Frequency: 667MHz												
Version: First Version												

Table 5 Ordering Information

Part Number	Capacity (bit)	Bus Width (bit)	Radiation Tolerance			Package	Temperature Range (°C)
			TID Krad(Si)	SEL MeV.cm ² /mg	SEU MeV.cm ² /mg		
VD3D16G72VB199EE2WH	16G	72	-	-	-	BGA199	0~+70
VD3D16G72VB199IB2WH			-	-	-		-40~+85
VD3D16G72RB199SS2WH			> 100	> 60	0.4		-40~+105

9. PACKAGE DIMENSIONS



Notes:

1. All Dimensions are in mm

Figure 4 Package Dimensions

10. REVISION HISTORY

Table 6 Revision history

Revision	Date	Description of Change
A0	Sept, 2019	PRODUCT MANUAL release
A1	Nov, 2019	Fixed pin list errors
A2	Aug, 2020	Update functional block diagram
A3	Mar, 2021	Update TID and SEE