

# **GOODRAM**

# **DDR4 DIMM ECC 288pin**

**standard temperature**

**DATASHEET**

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## REVISION HISTORY

| VERSION | CHANGES         | DATE       |
|---------|-----------------|------------|
| 1.0     | Initial release | 27.06.2025 |

## TABLE OF CONTENTS

|   |          |
|---|----------|
| <b>REVISION HISTORY .....</b>                   | <b>2</b> |
| <b>TABLE OF CONTENTS .....</b>                  | <b>3</b> |
| <b>PRODUCT OVERVIEW .....</b>                   | <b>4</b> |
| <b>PRODUCT DETAILS .....</b>                    | <b>5</b> |
| <b>PART NUMBERS AND TIMING PARAMETERS .....</b> | <b>6</b> |
| <b>ADDRESSING .....</b>                         | <b>6</b> |
| <b>PHYSICAL DIMENSION.....</b>                  | <b>7</b> |
| <b>STANDARDS &amp; REFERENCES .....</b>         | <b>8</b> |
| <b>SAFETY PRECAUTIONS .....</b>                 | <b>8</b> |
| <b>NOTES ON USAGE.....</b>                      | <b>9</b> |

## PRODUCT OVERVIEW

|                                    |  |
|------------------------------------|--|
| Module Form Factor                 | 288-pin, unbuffered dual in-line memory module (UDIMM) |
| Interface                          | DDR4, JEDEC compliant JESD79-4                         |
| Capacity                           | 8GB, 16GB, 32GB  |
| Fast Data Transfer Rates           | PC4-25600 @3200 MT/s                                   |
| DRAM IC Type                       | 1Gx8, 2Gx8   |
| Power Supply                       | VDD = 1.20V, VPP = 2.5V, VDDSPD = 2.5V                 |
| ECC Support                        | YES  |
| Registered                         | NO   |
| Thermal sensor                     | YES  |
| Temperature range <sup>Note1</sup> | Operating: 0°C ~ +85°C; Storage: -40°C ~ +100°C        |
| Fly-by topology                    | YES  |
| Gold edge contacts                 | YES  |
| RoHS compliant                     | YES  |

Notes:

1. According to IEC-60068-2-1/2/14 standards

## **PRODUCT DETAILS**

### **General Description**

High-speed DDR4 SDRAM modules use DDR4 SDRAM devices with two or four internal memory bank groups. DDR4 SDRAM modules utilizing 4- and 8-bit-wide DDR4 SDRAM devices have four internal bank groups consisting of four memory banks each, providing a total of 16 banks. 16-bit-wide DDR4 SDRAM devices have two internal bank groups consisting of four memory banks each, providing a total of eight banks. DDR4 SDRAM modules benefit from DDR4 SDRAM's use of an 8n-prefetch architecture with an interface designed to transfer two data words per clock cycle at the I/O pins. A single READ or WRITE operation for the DDR4 SDRAM effectively consists of a single 8n-bitwide, four-clock data transfer at the internal DRAM core and eight corresponding n-bitwide, one-half-clock-cycle data transfers at the I/O pins.

DDR4 modules use two sets of differential signals: DQS<sub>t</sub> and DQS<sub>c</sub> to capture data and CK<sub>t</sub> and CK<sub>c</sub> to capture commands, addresses and control signals. Differential clocks and data strobes ensure exceptional noise immunity for these signals and provide precise crossing points to capture input signals.

### **Fly-By Topology**

DDR4 modules use faster clock speeds than earlier DDR technologies, making signal quality more important than ever. For improved signal quality, the clock, control, command and address buses have been routed in a fly-by topology, where each clock, control, command and address pin on each DRAM is connected to a single trace and terminated (rather than a tree structure, where the termination is off the module near the connector). Inherent to fly-by topology, the timing skew between the clock and DQS signals can be easily accounted for by using the write-leveling feature of DDR4.

### **Thermal Sensor Operations**

The temperature from the integrated thermal sensor is monitored and converts into a digital word via the I2C bus. System designers can use the user-programmable registers to create a custom temperature-sensing solution based on system requirements. Programming and configuration details comply with JEDEC standard 21-C page 4.7-1 "Definition of the TSE2002av. Serial Presence Detect with Temperature Sensor".

## PART NUMBERS AND TIMING PARAMETERS

| PART NUMBER      | MODULE DENSITY | CONFIGURATION | MODULE BANDWIDTH | MEMORY CLOCK / DATA RATE | CLOCK CYCLES (CL- <sup>T</sup> RCD- <sup>T</sup> RP) |
|------------------|----------------|---------------|------------------|--------------------------|--|
| W-MEM3200E4D832G | 32GB           | 2Gx8 DR       | 25600MB/s        | 0.63ns/3200 MT/s         | 22-22-22   |
| W-MEM3200E4S816G | 16GB           | 2Gx8 SR       | 25600MB/s        | 0.63ns/3200 MT/s         | 22-22-22   |
| W-MEM3200E4D816G | 16GB           | 1Gx8 DR       | 25600MB/s        | 0.63ns/3200 MT/s         | 22-22-22   |
| W-MEM3200E4S88G  | 8GB            | 1Gx8 SR       | 25600MB/s        | 0.63ns/3200 MT/s         | 22-22-22   |

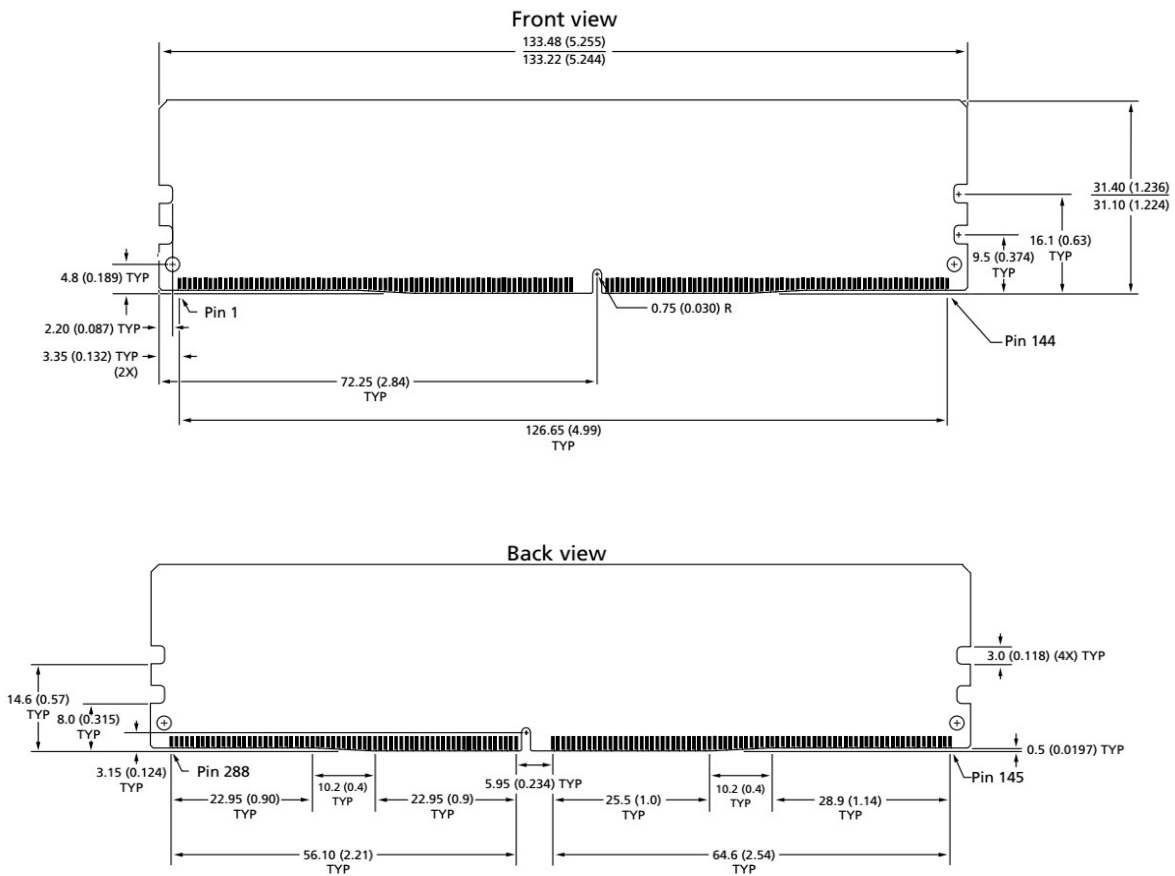
SR – Single Rank      DR – Dual Rank      C – standard temperature      I – Extended Temperature

## ADDRESSING

| DDR4<br>PARAMETER             | SINGLE RANK |              | DUAL RANK    |             |              |
|-------------------------------|-------------|--------------|--------------|-------------|--------------|
|                               | 8GB         | 16GB         | 8GB          | 16GB        | 32GB         |
| Row address                   | 64K A[15:0] | 128K A[16:0] | 32K A[14:0]  | 64K A[15:0] | 128K A[16:0] |
| Column address                | 1K A[9:0]   | 1K A[9:0]    | 1K A[9:0]    | 1K A[9:0]   | 1K A[9:0]    |
| Device bank group address     | 4 BG[1:0]   | 4 BG[1:0]    | 4 BG[1:0]    | 4 BG[1:0]   | 4 BG[1:0]    |
| Device bank address per group | 4 BA[1:0]   | 4 BA[1:0]    | 4 BA[1:0]    | 4 BA[1:0]   | 4 BA[1:0]    |
| Device configuration          | 8Gb (1Gx8)  | 16Gb (2Gx8)  | 4Gb (512Mx8) | 8Gb (1Gx8)  | 16Gb (2Gx8)  |
| Module rank address           | CS0_n       | CS0_n        | 2 CS_n[1:0]  | 2 CS_n[1:0] | 2 CS_n[1:0]  |

## PHYSICAL DIMENSION

Dimensions: 133.35mm (L) \* 31.25mm (W)



**Note:**

1. All dimensions are in millimeters (inches). MAX/MIN or typical (TYP) where noted.
2. The dimensional diagram is for reference only. Refer to JEDEC document for additional design dimensions.

## STANDARDS & REFERENCES

The following table is to list out the standards that have been adopted for designing the product.

| STANDARD USED | ACRONYM/SOURCE   |
|---------------|--|
| RoHS          | Restriction of Hazardous Substances Directive                                  |
| CE            | Consumer electronics certification; please contact us for further information. |

## SAFETY PRECAUTIONS

Do not bend, crush, drop or place heavy objects on top of the Product. Do not use tweezers, pliers or similar items that could damage the Product. Take particular care when inserting or removing the Product. Stop using the Product when the Product does not work properly. Failure to follow these instructions could result in fire, damage to the Product and/or other property, and/or personal injury including burns and electric shock.

Keep out of reach of small children. Accidental swallowing may cause suffocation or injury. Contact a doctor immediately if you suspect a child has swallowed the Product.

Do not directly touch the interface pins, put them in contact with metal, strike them with hard objects or cause them to short. Do not expose to static electricity.

Do not disassemble or modify the Product. This may cause electric shock, damage to the Product or fire.

## NOTES ON USAGE

DRAM (Dynamic Random Access Memory) modules are a type of volatile memory that requires constant power to retain data. When power is lost, all stored data is irreversibly erased.

To ensure proper operation, DRAM modules must be installed and used in accordance with the technical guidelines of the specific device. Using the memory contrary to the recommendations or exceeding the parameters specified in the documentation may lead to system malfunctions or even damage to the memory or the device itself.

DRAM modules are intended for general-purpose use, as well as selected server applications, as specified in the manufacturer's documentation.

They are not intended for critical applications where failure could result in loss of life, personal injury, significant property damage, environmental disasters, or serious social or economic consequences. This specifically includes medical equipment, life-support systems, flight control systems, nuclear energy systems, or any other application where product failure could lead to the aforementioned outcomes. The manufacturer assumes no responsibility for any damages resulting from the use of DRAM modules in such applications.