

# DDR4 SDRAM UDIMM

## Addendum

### MTA8ATF2G64AZ – 16GB

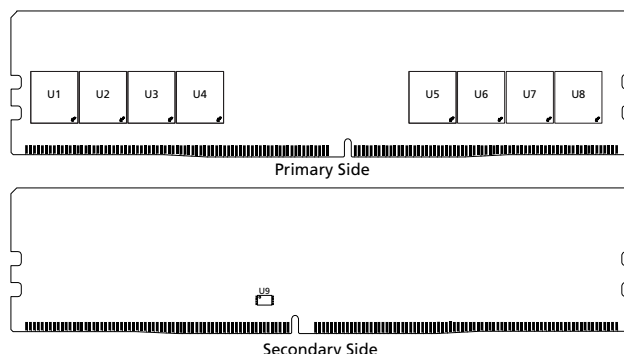
## Introduction

Information provided here is in addition to or supercedes information provided in the Micron DDR4 UDIMM Core data sheet.

## Features

- DDR4 functionality and operations supported as defined in the component data sheet
- Features and specifications supported in the Micron DDR4 UDIMM core data sheet
- 288-pin, unbuffered dual in-line memory module (UDIMM)
- Fast data transfer rate: PC4-2666, PC4-3200
- 16GB (2 Gig x 64)
- Data bus inversion (DBI) for data bus
- Single-rank
- On-board I<sup>2</sup> serial presence-detect (SPD) EEPROM
- 16 internal banks; 4 groups of 4 banks each

**Figure 1: 288-Pin UDIMM (MO-309 R/C A2)**



## Options

- Operating temperature
  - Commercial (0°C ≤ T<sub>OPER</sub> ≤ 95°C)
- Package
  - 288-pin DIMM (halogen-free)
- Frequency/CAS latency
  - 0.625ns @ CL = 22 (DDR4-3200)
  - 0.75ns @ CL = 19 (DDR4-2666)

## Marking

None  
Z  
-3G2  
-2G6

**Table 1: Addressing**

| Parameter                     | 16GB                       |
|-------------------------------|----------------------------|
| Row address                   | 128K A[16:0]               |
| Column address                | 1K A[9:0]                  |
| Device bank group address     | 4 BG[1:0]                  |
| Device bank address per group | 4 BA[1:0]                  |
| Device configuration          | 16Gb (2 Gig x 8), 16 banks |
| Module rank address           | CS0_n                      |

**Table 2: Part Numbers and Timing Parameters – 16GB Modules**

Base device: MT40A2G8,<sup>1</sup> 16Gb DDR4 SDRAM

| Part Number <sup>2</sup> | Module Density | Configuration | Module Bandwidth | Memory Clock/<br>Data Rate | Clock Cycles<br>(CL-nRCD-nRP) |
|--------------------------|----------------|---------------|------------------|----------------------------|-------------------------------|
| MTA8ATF2G64AZ-3G2__      | 16GB           | 2 Gig x 64    | 25.6 GB/s        | 0.625ns/3200 MT/s          | 22-22-22                      |
| MTA8ATF2G64AZ-2G6__      | 16GB           | 2 Gig x 64    | 21.3 GB/s        | 0.75ns/2666 MT/s           | 19-19-19                      |

- Notes:
1. The data sheet for the base device can be found on [micron.com](http://micron.com).
  2. All part numbers end with a two-place code (not shown) that designates component and PCB revisions. Consult factory for current revision codes. Example: MTA8ATF2G64AZ-3G2B1.

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## DQ Map

**Table 3: Component-to-Module DQ Map (R/C-A2)**

| Component Reference Number | Component DQ | Module DQ | Module Pin Number | Component Reference Number | Component DQ | Module DQ | Module Pin Number |
|----------------------------|--------------|-----------|-------------------|----------------------------|--------------|-----------|-------------------|
| U1                         | 0            | 3         | 157               | U2                         | 0            | 11        | 168               |
|                            | 1            | 1         | 150               |                            | 1            | 9         | 161               |
|                            | 2            | 2         | 12                |                            | 2            | 10        | 23                |
|                            | 3            | 0         | 5                 |                            | 3            | 8         | 16                |
|                            | 4            | 7         | 155               |                            | 4            | 15        | 166               |
|                            | 5            | 5         | 148               |                            | 5            | 13        | 159               |
|                            | 6            | 6         | 10                |                            | 6            | 14        | 21                |
|                            | 7            | 4         | 3                 |                            | 7            | 12        | 14                |
| U3                         | 0            | 19        | 179               | U4                         | 0            | 27        | 190               |
|                            | 1            | 17        | 172               |                            | 1            | 25        | 183               |
|                            | 2            | 18        | 34                |                            | 2            | 26        | 45                |
|                            | 3            | 16        | 27                |                            | 3            | 24        | 38                |
|                            | 4            | 23        | 177               |                            | 4            | 31        | 188               |
|                            | 5            | 21        | 170               |                            | 5            | 29        | 181               |
|                            | 6            | 22        | 32                |                            | 6            | 30        | 43                |
|                            | 7            | 20        | 25                |                            | 7            | 28        | 36                |
| U5                         | 0            | 35        | 249               | U6                         | 0            | 43        | 260               |
|                            | 1            | 33        | 242               |                            | 1            | 41        | 253               |
|                            | 2            | 34        | 104               |                            | 2            | 42        | 115               |
|                            | 3            | 32        | 97                |                            | 3            | 40        | 108               |
|                            | 4            | 39        | 247               |                            | 4            | 47        | 258               |
|                            | 5            | 37        | 240               |                            | 5            | 45        | 251               |
|                            | 6            | 38        | 102               |                            | 6            | 46        | 113               |
|                            | 7            | 36        | 95                |                            | 7            | 44        | 106               |
| U7                         | 0            | 51        | 271               | U8                         | 0            | 59        | 282               |
|                            | 1            | 49        | 264               |                            | 1            | 57        | 275               |
|                            | 2            | 50        | 126               |                            | 2            | 58        | 137               |
|                            | 3            | 48        | 119               |                            | 3            | 56        | 130               |
|                            | 4            | 55        | 269               |                            | 4            | 63        | 280               |
|                            | 5            | 53        | 262               |                            | 5            | 61        | 273               |
|                            | 6            | 54        | 124               |                            | 6            | 62        | 135               |
|                            | 7            | 52        | 117               |                            | 7            | 60        | 128               |

## I<sub>DD</sub> Specifications

**Table 4: DDR4 I<sub>DD</sub> Specifications and Conditions (0°C ≤ T<sub>C</sub> ≤ 85°C) – 16GB (Die Revision E)**

Values are for the MT40A2G8 DDR4 SDRAM only and are computed from values specified in the 16Gb (2 Gig x 8) component data sheet

| Parameter                                                             | Symbol             | 3200 | 2666    | Units |
|-----------------------------------------------------------------------|--------------------|------|---------|-------|
| One bank ACTIVATE-PRECHARGE current                                   | I <sub>DD0</sub>   | 480  | 464     | mA    |
| One bank ACTIVATE-PRECHARGE, Word Line Boost, I <sub>pp</sub> current | I <sub>PP0</sub>   | 24   | 24      | mA    |
| One bank ACTIVATE-READ-PRECHARGE current                              | I <sub>DD1</sub>   | 568  | 552     | mA    |
| Precharge standby current                                             | I <sub>DD2N</sub>  | 400  | 384     | mA    |
| Precharge standby ODT current                                         | I <sub>DD2NT</sub> | 432  | 416     | mA    |
| Precharge power-down current                                          | I <sub>DD2P</sub>  | 344  | 344     | mA    |
| Precharge quiet standby current                                       | I <sub>DD2Q</sub>  | 376  | Iwooley | mA    |
| Active standby current                                                | I <sub>DD3N</sub>  | 488  | 472     | mA    |
| Active standby I <sub>pp</sub> current                                | I <sub>PP3N</sub>  | 16   | 16      | mA    |
| Active power-down current                                             | I <sub>DD3P</sub>  | 400  | 384     | mA    |
| Burst read current                                                    | I <sub>DD4R</sub>  | 1296 | 1168    | mA    |
| Burst write current                                                   | I <sub>DD4W</sub>  | 1024 | 936     | mA    |
| Burst refresh current (1x REF)                                        | I <sub>DD5R</sub>  | 544  | 544     | mA    |
| Burst refresh I <sub>pp</sub> current (1x REF)                        | I <sub>PP5R</sub>  | 32   | 32      | mA    |
| Self refresh current: Normal temperature range (0°C to +85°C)         | I <sub>DD6N</sub>  | 456  | 456     | mA    |
| Self refresh current: Extended temperature range (0°C to +95°C)       | I <sub>DD6E</sub>  | 904  | 904     | mA    |
| Self refresh current: Reduced temperature range (0°C to +45°C)        | I <sub>DD6R</sub>  | 192  | 192     | mA    |
| Auto self refresh current (25°C)                                      | I <sub>DD6A</sub>  | 144  | 144     | mA    |
| Auto self refresh current (45°C)                                      | I <sub>DD6A</sub>  | 192  | 192     | mA    |
| Auto self refresh current (75°C)                                      | I <sub>DD6A</sub>  | 408  | 408     | mA    |
| Auto self refresh current (95°C)                                      | I <sub>DD6A</sub>  | 904  | 904     | mA    |
| Auto self refresh I <sub>pp</sub> current                             | I <sub>PP6X</sub>  | 48   | 48      | mA    |
| Bank interleave read current                                          | I <sub>DD7</sub>   | 1512 | 1464    | mA    |
| Bank interleave read I <sub>pp</sub> current                          | I <sub>PP7</sub>   | 64   | 64      | mA    |
| Maximum power-down current                                            | I <sub>DD8</sub>   | 304  | 304     | mA    |

Note: 1. When T<sub>C</sub> > 85°C, the I<sub>DD</sub> and I<sub>pp</sub> values must be derated. Refer to the base device data sheet I<sub>DD</sub> and I<sub>pp</sub> specification tables for derating values for the applicable die-revision.

**Table 5: DDR4 I<sub>DD</sub> Specifications and Conditions (0°C ≤ T<sub>C</sub> ≤ 85°C) – 16GB (Die Revision B)**

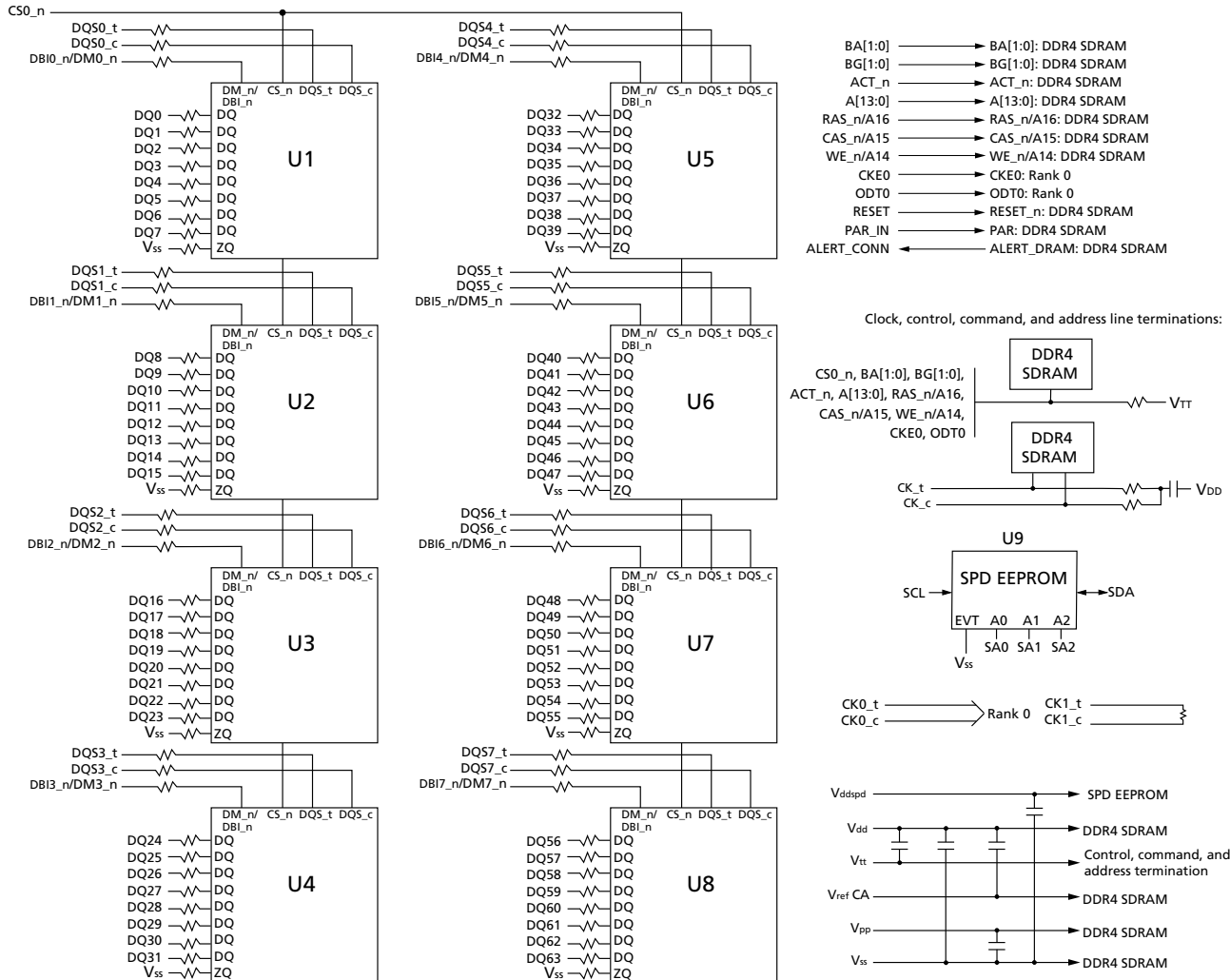
Values are for the MT40A2G8 DDR4 SDRAM only and are computed from values specified in the 16Gb (2 Gig x 8) component data sheet

| Parameter                                                             | Symbol             | 3200 | 2666 | Units |
|-----------------------------------------------------------------------|--------------------|------|------|-------|
| One bank ACTIVATE-PRECHARGE current                                   | I <sub>DD0</sub>   | 504  | 488  | mA    |
| One bank ACTIVATE-PRECHARGE, Word Line Boost, I <sub>PP</sub> current | I <sub>PP0</sub>   | 32   | 32   | mA    |
| One bank ACTIVATE-READ-PRECHARGE current                              | I <sub>DD1</sub>   | 592  | 576  | mA    |
| Precharge standby current                                             | I <sub>DD2N</sub>  | 416  | 400  | mA    |
| Precharge standby ODT current                                         | I <sub>DD2NT</sub> | 448  | 432  | mA    |
| Precharge power-down current                                          | I <sub>DD2P</sub>  | 344  | 344  | mA    |
| Precharge quiet standby current                                       | I <sub>DD2Q</sub>  | 376  | 376  | mA    |
| Active standby current                                                | I <sub>DD3N</sub>  | 640  | 624  | mA    |
| Active standby I <sub>PP</sub> current                                | I <sub>PP3N</sub>  | 24   | 24   | mA    |
| Active power-down current                                             | I <sub>DD3P</sub>  | 552  | 544  | mA    |
| Burst read current                                                    | I <sub>DD4R</sub>  | 1616 | 1456 | mA    |
| Burst write current                                                   | I <sub>DD4W</sub>  | 1464 | 1328 | mA    |
| Burst refresh current (1x REF)                                        | I <sub>DD5R</sub>  | 632  | 616  | mA    |
| Burst refresh I <sub>PP</sub> current (1x REF)                        | I <sub>PP5R</sub>  | 40   | 40   | mA    |
| Self refresh current: Normal temperature range (0°C to +85°C)         | I <sub>DD6N</sub>  | 536  | 536  | mA    |
| Self refresh current: Extended temperature range (0°C to +95°C)       | I <sub>DD6E</sub>  | 968  | 968  | mA    |
| Self refresh current: Reduced temperature range (0°C to +45°C)        | I <sub>DD6R</sub>  | 232  | 232  | mA    |
| Auto self refresh current (25°C)                                      | I <sub>DD6A</sub>  | 80   | 80   | mA    |
| Auto self refresh current (45°C)                                      | I <sub>DD6A</sub>  | 232  | 232  | mA    |
| Auto self refresh current (75°C)                                      | I <sub>DD6A</sub>  | 488  | 488  | mA    |
| Auto self refresh current (95°C)                                      | I <sub>DD6A</sub>  | 968  | 968  | mA    |
| Auto self refresh I <sub>PP</sub> current                             | I <sub>PP6X</sub>  | 88   | 88   | mA    |
| Bank interleave read current                                          | I <sub>DD7</sub>   | 1568 | 1520 | mA    |
| Bank interleave read I <sub>PP</sub> current                          | I <sub>PP7</sub>   | 80   | 80   | mA    |
| Maximum power-down current                                            | I <sub>DD8</sub>   | 320  | 320  | mA    |

Note: 1. When T<sub>C</sub> > 85°C, the I<sub>DD</sub> and I<sub>PP</sub> values must be derated. Refer to the base device data sheet I<sub>DD</sub> and I<sub>PP</sub> specification tables for derating values for the applicable die-revision.

## Functional Block Diagram

**Figure 2: Functional Block Diagram (R/C-A2)**



**Note:** 1. The ZQ ball on each DDR4 component is connected to an external 240Ω ±1% resistor that is tied to ground. It is used for the calibration of the component's ODT and output driver.

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