

# DDR4 SDRAM SODIMM

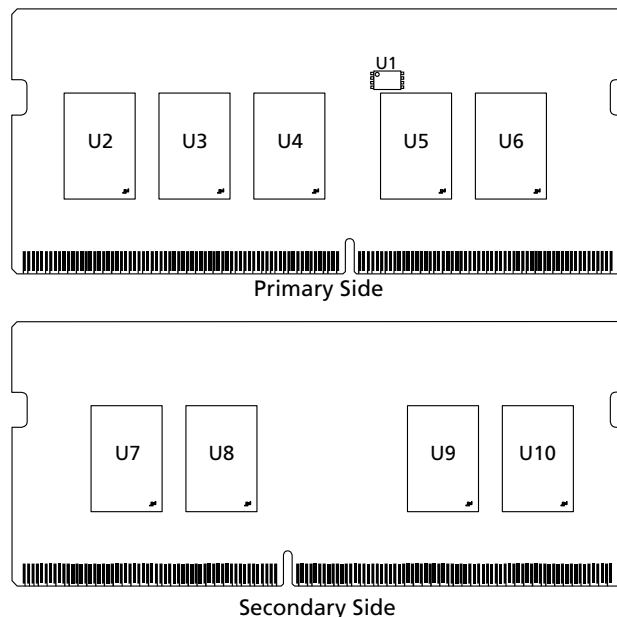
## Addendum

### MTA9ASF2G72HZ – 16GB

#### Features

- DDR4 functionality and operations supported as defined in the component data sheet
- 260-pin, small-outline dual in-line memory module (SODIMM)
- Fast data transfer rate: PC4-3200
- 16GB (2 Gig x 72)
- $V_{DD} = 1.20V$  (NOM)
- $V_{PP} = 2.5V$  (NOM)
- $V_{DDSPD} = 2.5V$  (NOM)
- Supports ECC error detection and correction
- Nominal and dynamic on-die termination (ODT) for data, strobe, and mask signals
- Low-power auto self refresh (LPASR)
- Data bus inversion (DBI) for data bus
- On-die  $V_{REFDQ}$  generation and calibration
- Single-rank
- On-board I<sup>2</sup>C temperature sensor with integrated serial presence-detect (SPD) EEPROM
- 16 internal banks; 4 groups of 4 banks each
- Fixed burst chop (BC) of 4 and burst length (BL) of 8 via the mode register set (MRS)
- Selectable BC4 or BL8 on-the-fly (OTF)
- Gold edge contacts
- Halogen-free
- Fly-by topology
- Terminated control, command, and address bus

**Figure 1: 260-Pin SODIMM (R/C D2)**



#### Options

- Operating temperature
  - Commercial ( $0^{\circ}C \leq T_{OPER} \leq 95^{\circ}C$ )
- Package
  - 260-pin DIMM (halogen-free)
- Frequency/CAS latency
  - 0.625ns @ CL = 22 (DDR4-3200)

#### Marking

None

Z

-3G2

**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



## 16GB (x72, ECC, SR) 260-Pin DDR4 SODIMM Features

**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/ Data Rate	Clock Cycles (CL- <sup>n</sup> RCD- <sup>n</sup> RP)
MTA9ASF2G72HZ-3G2__	16GB	2 Gig x 72	25.6 GB/s	0.625ns/3200 MT/s	22-22-22

- Notes:
1. The data sheet for the base device can be found at [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: MTA9ASF2G72HZ-3G2B2.

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## DQ Map

**Table 3: Component-to-Module DQ Map (PCB 2450, 2974, 3219, 3239)**

Component Reference Number	Component DQ	Module DQ	Module Pin Number	Component Reference Number	Component DQ	Module DQ	Module Pin Number
U2	0	3	21	U3	0	19	63
	1	0	8		1	17	49
	2	2	20		2	18	62
	3	1	7		3	16	50
	4	6	16		4	22	58
	5	4	4		5	21	45
	6	7	17		6	23	59
	7	5	3		7	20	46
U4	0	CB7	104	U5	0	38	183
	1	CB4	88		1	36	170
	2	CB6	100		2	39	182
	3	CB5	87		3	37	169
	4	CB3	105		4	35	186
	5	CB1	91		5	32	174
	6	CB2	104		6	34	187
	7	CB0	92		7	33	173
U6	0	55	225	U7	0	56	237
	1	52	211		1	58	249
	2	54	224		2	57	236
	3	53	212		3	59	250
	4	50	228		4	61	233
	5	49	215		5	62	245
	6	51	229		6	60	232
	7	48	216		7	63	246
U8	0	40	195	U9	0	29	67
	1	42	207		1	30	79
	2	41	194		2	28	66
	3	43	208		3	31	80
	4	44	191		4	24	70
	5	47	204		5	26	83
	6	45	190		6	25	71
	7	46	203		7	27	84



Table 3: Component-to-Module DQ Map (PCB 2450, 2974, 3219, 3239) (Continued)

Component Reference Number	Component DQ	Module DQ	Module Pin Number	Component Reference Number	Component DQ	Module DQ	Module Pin Number
U10	0	12	24				
	1	15	37				
	2	13	25				
	3	14	38				
	4	9	29				
	5	10	41				
	6	8	28				
	7	11	42				

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

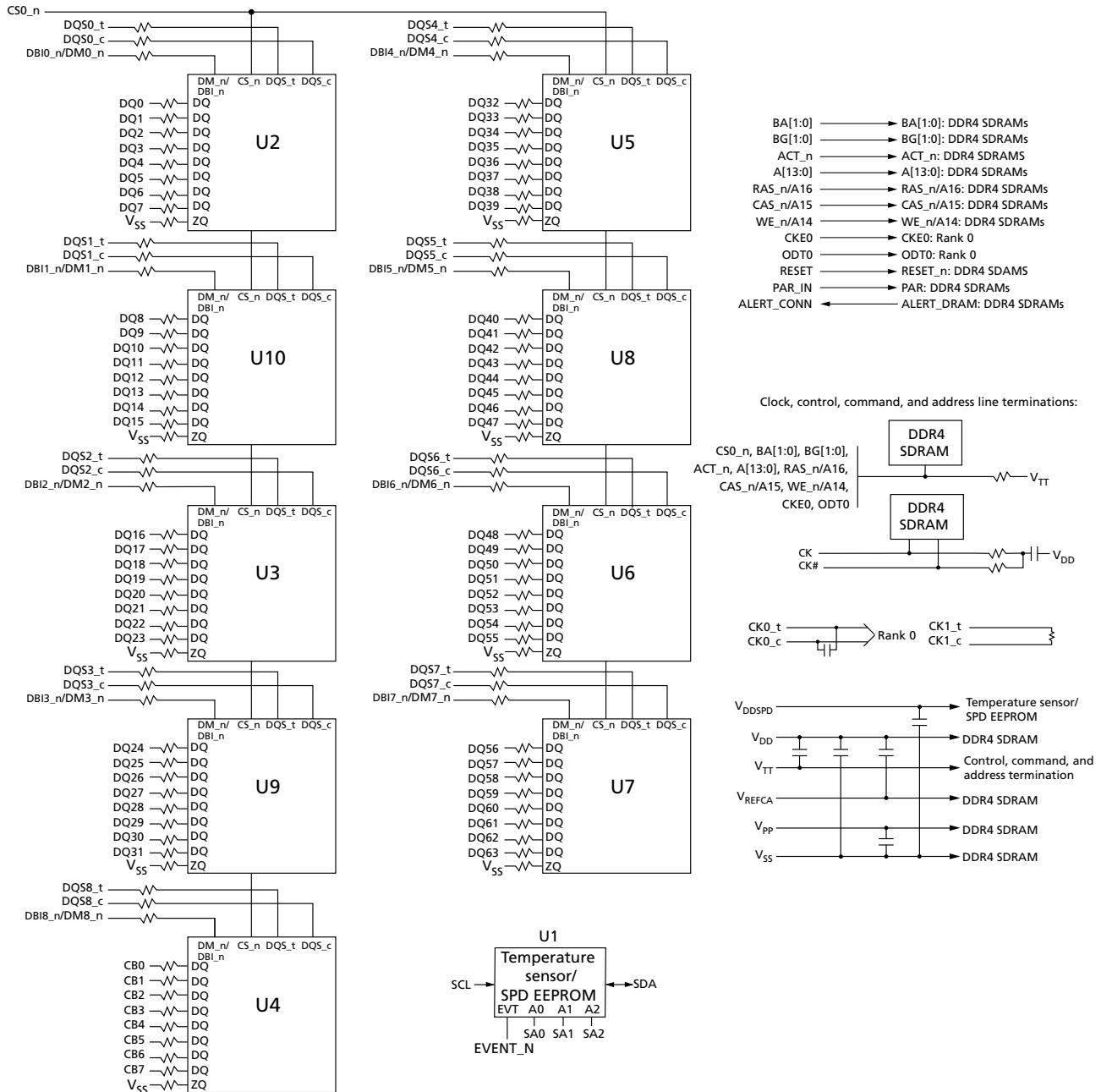
**Table 4: DDR4 I<sub>DD</sub> Specifications and Conditions – 16GB (Die Revision B)**

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	Units
One bank ACTIVATE-PRECHARGE current	I <sub>DD0</sub>	567	mA
One bank ACTIVATE-PRECHARGE, wordline boost, I <sub>pp</sub> current	I <sub>PP0</sub>	36	mA
One bank ACTIVATE-READ-PRECHARGE current	I <sub>DD1</sub>	666	mA
Precharge standby current	I <sub>DD2N</sub>	468	mA
Precharge standby ODT current	I <sub>DD2NT</sub>	504	mA
Precharge power-down current	I <sub>DD2P</sub>	387	mA
Precharge quiet standby current	I <sub>DD2Q</sub>	423	mA
Active standby current	I <sub>DD3N</sub>	720	mA
Active standby I <sub>pp</sub> current	I <sub>PP3N</sub>	27	mA
Active power-down current	I <sub>DD3P</sub>	621	mA
Burst read current	I <sub>DD4R</sub>	1818	mA
Burst write current	I <sub>DD4W</sub>	1647	mA
Distributed refresh current (1x REF)	I <sub>DD5R</sub>	729	mA
Distributed refresh I <sub>pp</sub> current (1x REF)	I <sub>PP5R</sub>	45	mA
Self refresh current: Normal temperature range (0°C to 85°C)	I <sub>DD6N</sub>	666	mA
Self refresh current: Extended temperature range (0°C to 95°C)	I <sub>DD6E</sub>	1161	mA
Self refresh current: Reduced temperature range (0°C to 45°C)	I <sub>DD6R</sub>	234	mA
Auto self refresh current (25°C)	I <sub>DD6A</sub>	135	mA
Auto self refresh current (45°C)	I <sub>DD6A</sub>	234	mA
Auto self refresh current (75°C)	I <sub>DD6A</sub>	657	mA
Auto self refresh current (95°C)	I <sub>DD6A</sub>	1161	mA
Auto self refresh I <sub>pp</sub> current	I <sub>PP6X</sub>	81	mA
Bank interleave read current	I <sub>DD7</sub>	1764	mA
Bank interleave read I <sub>pp</sub> current	I <sub>PP7</sub>	90	mA
Maximum power-down current	I <sub>DD8</sub>	360	mA

### Functional Block Diagram

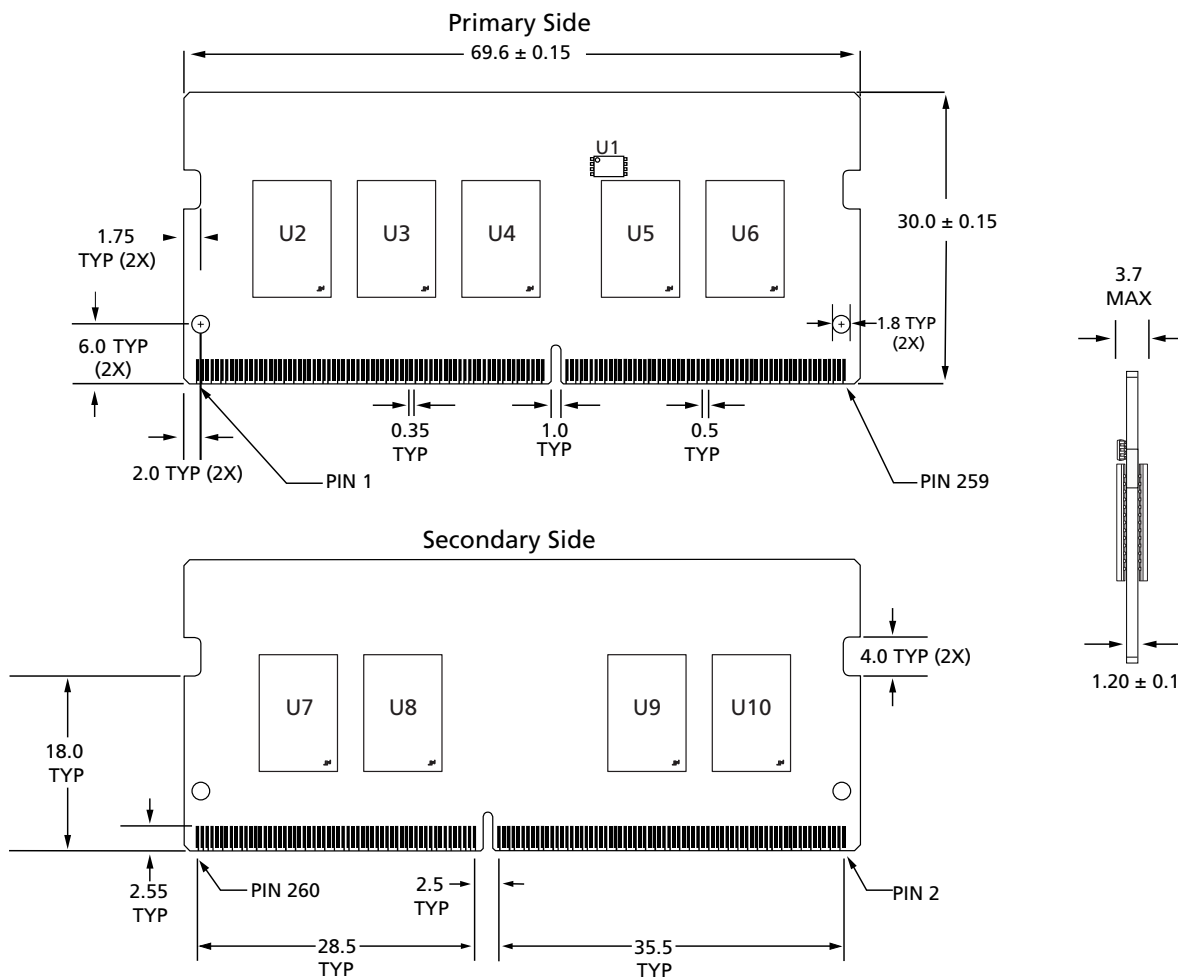
Figure 2: Functional Block Diagram



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

## Module Dimensions

**Figure 3: 260 Pin DDR4 SODIMM - PCB 3233 (R/C D2)**



- Notes:
1. All dimensions are in millimeters; MAX/MIN or typical (TYP) where noted.
  2. Tolerance on all dimensions  $\pm 0.15$ mm unless otherwise specified.
  3. The dimensional diagram is for reference only.

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