

# Memory Module Specifications

## KSM32ES8/16MF

16GB 1Rx8 2G x 72-Bit PC4-3200

CL22 288-Pin DIMM

### DESCRIPTION

Kingston's KSM32ES8/16MF is a 2G x 72-bit (16GB) DDR4-3200 CL22 SDRAM (Synchronous DRAM), 1Rx8, ECC, memory module, based on nine 2G x 8-bit FBGA components. The SPD is programmed to JEDEC standard latency DDR4-3200 timing of 22-22-22 at 1.2V. Each 288-pin DIMM uses gold contact fingers. The electrical and mechanical specifications are as follows:

### FEATURES

- Power Supply: VDD = 1.2V Typical
- VDDQ = 1.2V Typical
- VPP = 2.5V Typical
- VDDSPD = 2.2V to 3.6V
- 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 VREFDQ generation and calibration
- Single-rank
- On-board I2 serial presence-detect (SPD) EEPROM
- Temperature sensor with integrated SPD
- 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)
- Fly-by topology
- Terminated control command and address bus
- PCB: Height 1.23" (31.25mm)
- RoHS Compliant and Halogen-Free

### SPECIFICATIONS

|  |                   |
|--|-------------------|
| CL(IDD)  | 22 cycles         |
| Row Cycle Time (tRCmin)                          | 45.75ns(min.)     |
| Refresh to Active/Refresh Command Time (tRFCmin) | 350ns(min.)       |
| Row Active Time (tRASmin)                        | 32ns(min.)        |
| Maximum Operating Power                          | *                 |
| UL Rating  | 94 V - 0          |
| Operating Temperature                            | 0° C to +85° C    |
| Storage Temperature                              | -55° C to +100° C |

\*See IDD Specifications (page 2)

### Module Assembly

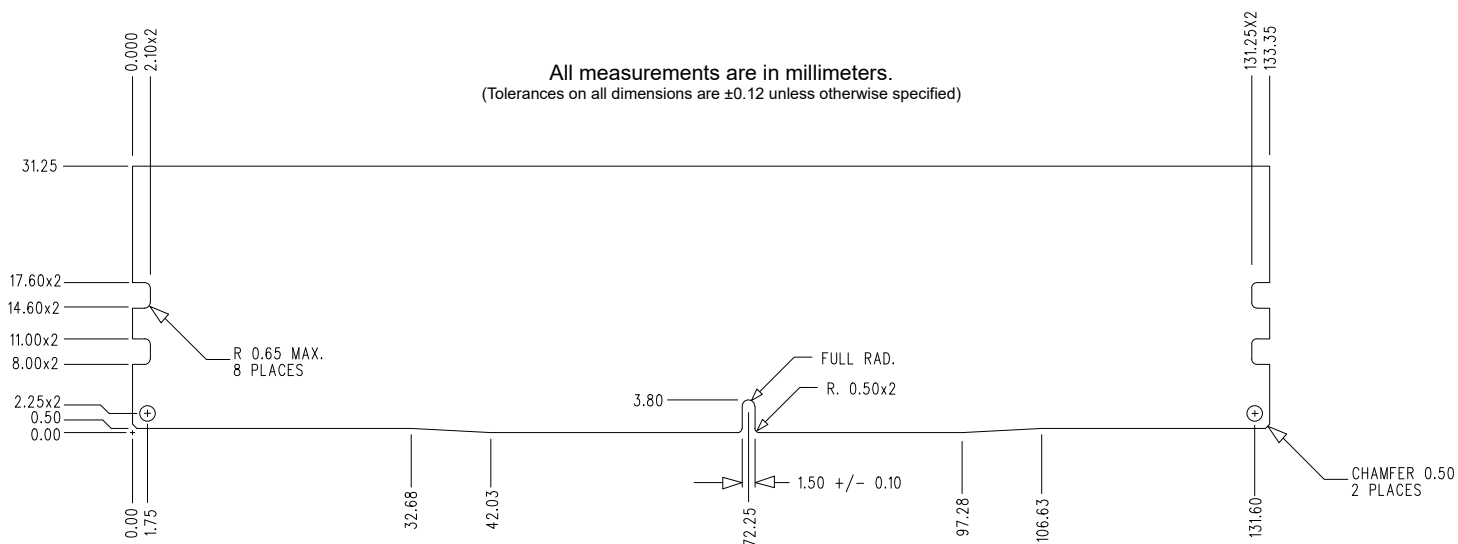
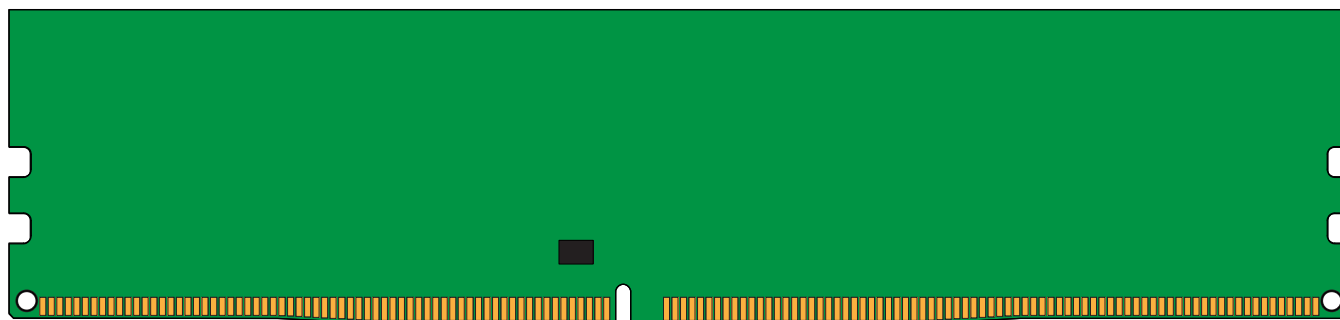
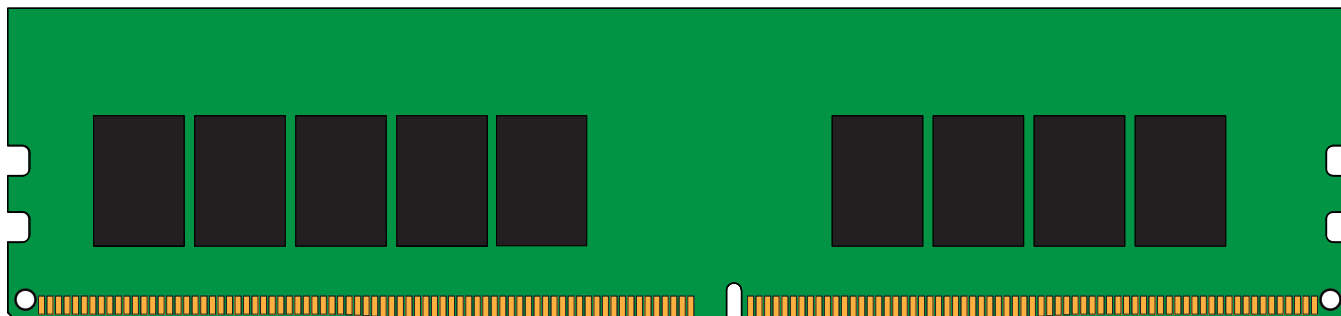
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|----------------------|
| DRAM: MICRON (F-DIE) |
|----------------------|

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## IDD Specifications

| Symbol                   | 3200 | Units |
|--------------------------|------|-------|
| I <sub>DD0</sub>         | 540  | mA    |
| I <sub>PP0</sub>         | 27   | mA    |
| I <sub>DD1</sub>         | 639  | mA    |
| I <sub>DD2N</sub>        | 405  | mA    |
| I <sub>DD2NT</sub>       | 459  | mA    |
| I <sub>DD2P</sub>        | 342  | mA    |
| I <sub>DD2Q</sub>        | 378  | mA    |
| I <sub>DD3N</sub>        | 549  | mA    |
| I <sub>PP3N</sub>        | 18   | mA    |
| I <sub>DD3P</sub>        | 450  | mA    |
| I <sub>DD4R</sub>        | 1260 | mA    |
| I <sub>DD4W</sub>        | 1008 | mA    |
| I <sub>DD5R</sub>        | 612  | mA    |
| I <sub>PP5R</sub>        | 36   | mA    |
| I <sub>DD6N</sub>        | 477  | mA    |
| I <sub>DD6E</sub>        | 810  | mA    |
| I <sub>DD6R</sub>        | 180  | mA    |
| I <sub>DD6A</sub> (25°C) | 99   | mA    |
| I <sub>DD6A</sub> (45°C) | 180  | mA    |
| I <sub>DD6A</sub> (75°C) | 459  | mA    |
| I <sub>DD6A</sub> (95°C) | 810  | mA    |
| I <sub>PP6X</sub>        | 54   | mA    |
| I <sub>DD7</sub>         | 1503 | mA    |
| I <sub>PP7</sub>         | 72   | mA    |
| I <sub>DD8</sub>         | 324  | mA    |

# MODULE DIMENSIONS



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