KVR13N9S8/4
4GB 1Rx8 512M x 64-Bit PC3-10600
CL9 240-Pin DIMM

DESCRIPTION
This document describes ValueRAM's 512M x 64-bit (4GB) DDR3-1333 CL9 SDRAM (Synchronous DRAM), 1Rx8 memory module, based on eight 512M x 8-bit DDR3-1333 FBGA components. The SPD is programmed to JEDEC standard latency DDR3-1333 timing of 9-9-9 at 1.5V. This 240-pin DIMM uses gold contact fingers. The electrical and mechanical specifications are as follows:

FEATURES
• JEDEC standard 1.5V (1.425V ~1.575V) Power Supply
• VDDQ = 1.5V (1.425V ~ 1.575V)
• 667MHz fCK for 1333Mb/sec/pin
• 8 independent internal bank
• Programmable CAS Latency: 9, 8, 7, 6
• Programmable Additive Latency: 0, CL - 2, or CL - 1 clock
• Programmable CAS Write Latency(CWL) = 7 (DDR3-1333)
• 8-bit pre-fetch
• Burst Length: 8 (Interleave without any limit, sequential with starting address “000” only), 4 with tCCD = 4 which does not allow seamless read or write [either on the fly using A12 or MRS]
• Bi-directional Differential Data Strobe
• Internal(self) calibration: Internal self calibration through ZQ pin (RZQ : 240 ohm ± 1%)
• On Die Termination using ODT pin
• Average Refresh Period 7.8us at lower than TCASE 85°C, 3.9us at 85°C < TCASE ≤ 95°C
• Asynchronous Reset
• PCB: Height 0.740” (18.75mm) or 1.180” (30.00mm)

Important Information: The module defined in this data sheet is one of several configurations available under this part number. While all configurations are compatible, the DRAM combination and/or the module height may vary from what is described here.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
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<tbody>
<tr>
<td>CL(DD)</td>
<td>9 cycles</td>
</tr>
<tr>
<td>Row Cycle Time (tRCmin)</td>
<td>49.125ns (min.)</td>
</tr>
<tr>
<td>Refresh to Active/Refresh Command Time (tRFCmin)</td>
<td>260ns (min.)</td>
</tr>
<tr>
<td>Row Active Time (tRASmin)</td>
<td>36ns (min.)</td>
</tr>
<tr>
<td>Maximum Operating Power</td>
<td>TBD W*</td>
</tr>
<tr>
<td>UL Rating</td>
<td>94 V - 0</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0°C to 85°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-55°C to +100°C</td>
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</tbody>
</table>

*Power will vary depending on the SDRAM used.
MODULE DIMENSIONS:

[Diagram showing module dimensions with units in millimeters]