KVR16LS11/4
4GB 1Rx8 512M x 64-Bit PC3L-12800
CL11 204-Pin SODIMM

DESCRIPTION
This document describes ValueRAM's 512M x 64-bit (4GB) DDR3L-1600 CL11 SDRAM (Synchronous DRAM), 1Rx8, low voltage, memory module, based on eight 512M x 8-bit FBGA components. The SPD is programmed to JEDEC standard latency DDR3-1600 timing of 11-11-11 at 1.35V or 1.5V. This 204-pin SODIMM uses gold contact fingers. The electrical and mechanical specifications are as follows:

FEATURES
● JEDEC standard 1.35V (1.28V ~ 1.45V) and 1.5V (1.425V ~ 1.575V) Power Supply
● VDDQ = 1.35V (1.28V ~ 1.45V) and 1.5V (1.425V ~ 1.575V)
● 800MHz fCK for 1600Mb/sec/pin
● 8 independent internal bank
● Programmable CAS Latency: 11, 10, 9, 8, 7, 6, 5
● Programmable Additive Latency: 0, CL - 2, or CL - 1 clock
● 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: Height1.18" (30mm), double sided component
● Lead Free RoHS Compliant

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
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<tbody>
<tr>
<td>CL(IDD)</td>
<td>11 cycles</td>
</tr>
<tr>
<td>Row Cycle Time (tRCmin)</td>
<td>48.125ns (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>35ns (min.)</td>
</tr>
<tr>
<td>Maximum Operating Power</td>
<td>(1.35V) = 2.376 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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*Power will vary depending on the SDRAM.

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MODULE DIMENSIONS:

All measurements are in millimeters.
(Tolerances on all dimensions are ±0.12 unless otherwise specified)