Replacing the Cypress CY62168EV30LL-45BVXI (2Mb x 8) MoBL SRAM with Everspin’s MR4A08BCMA35 MRAM

EVERSPIN MRAM MEMORY
Everspin is the worldwide leader in designing, manufacturing, and commercially shipping discrete Magnetoresistive RAM (MRAM) into markets and applications where data persistence and integrity, low latency, and security are paramount.

RELIABLE SUPPLY
Everspin is a long term, reliable manufacturer of MRAM products and operates a fabrication facility in Chandler, Arizona.

OVERVIEW
The Everspin 16Mb MRAM M4A08BCMA35 can operate with the Cypress 16Mb SRAM CY62168EV30LL slower timing, but also allows the system designer to take advantage of MRAM’s faster random access cycle time. The M4A08Bxxx35 is available in 44 Pin TSOP2 and 48-BGA.

BENEFITS OF MR4A08BCMA35
Upgrading to Everspin MRAM provides many benefits over Cypress SRAM:
- Faster Random Access Operation Times
- High Reliability and Data Retention
- Unlimited Read/Write Endurance
- No Wear-out Concern
- Competitive Pricing
- Stable Manufacturing Supply Chain
- Standard TSOP2 and BGA package

GENERAL CONSIDERATIONS FOR REPLACING SRAM WITH MRAM
Everspin’s Toggle Magnetoresistive RAM (MRAM) is essentially non-volatile SRAM. Replacing SRAM with MRAM in any application adds non-volatility without compromise of performance or function. Replacing a non-volatile or battery-backed SRAM with MRAM will provide instant 20-year data retention without the overhead of storing data to a non-volatile cell or the expense and space of a battery backup power source.
CONSIDERATIONS FOR REPLACING CYPRESS CY6218EV30LL-45BVXi MoBL SRAM with EVERSPIN MR4A08BCMA35 MRAM

Designers considering a replacement of CY62168EV30LL-45BVXi with MR4A08BMA35 need to consider differences in package size and timing.

### Table 1 – Overview: CY62168EV30LL-45BVXi vs. MR4A08BMA35

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CY62168EV30LL-45BVXi</th>
<th>MR4A08BMA35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package</td>
<td>48 Ball VFBGA</td>
<td>48 Ball BGA</td>
</tr>
<tr>
<td><strong>Size and Height</strong></td>
<td>6 x 8 x 1.0 mm</td>
<td>10 x 10 x 1.27 mm</td>
</tr>
<tr>
<td><strong>Pinout / Footprint</strong></td>
<td>See Figure 1 and Table 2 below</td>
<td>Per JEDEC J-STD-020D.1</td>
</tr>
<tr>
<td><strong>Solder Profile</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Firmware / Timing</strong></td>
<td>0ns Address Hold Time</td>
<td>12ns Minimum Address Hold Time. See Figure 2 below</td>
</tr>
</tbody>
</table>
Replacing the Cypress CY62168EV30LL-45BVXI MoBL SRAM with Everspin MR4A08B MRAM

Figure 1 – Pinout/Footprint Comparison and Considerations
6 x 8 Ball Grid Array, 0.75 mm Pitch

Table 2 – Pin Function Comparison

<table>
<thead>
<tr>
<th>Ball #</th>
<th>Cypress</th>
<th>Everspin</th>
<th>Everspin Definition</th>
<th>Everspin Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>NC</td>
<td>DC</td>
<td>Do Not Connect</td>
<td>Prefer to float or pulled low</td>
</tr>
<tr>
<td>A6</td>
<td>CE#</td>
<td>DC</td>
<td>Do Not Connect</td>
<td>Function of CE2# is not available on the Everspin device. Prefer to float or pulled low.</td>
</tr>
<tr>
<td>B2</td>
<td>NC</td>
<td>DC</td>
<td>Do Not Connect</td>
<td>Prefer to float or pulled low</td>
</tr>
<tr>
<td>B6</td>
<td>NC</td>
<td>DC</td>
<td>Do Not Connect</td>
<td>Prefer to float or pulled low</td>
</tr>
<tr>
<td>E3</td>
<td>NC</td>
<td>DC</td>
<td>Do Not Connect</td>
<td>Prefer to float or pulled low</td>
</tr>
</tbody>
</table>
Circuit Design Recommendation for an MoBL SRAM and MRAM Compatible Layout

The recommended circuit design below will accommodate both the MoBL SRAM and MRAM with a single PCB layout.
The Address Hold Time (Everspin Write Recovery Time, tWHAX) for the MR4A08B is a minimum of 12ns compared to 0ns minimum for CY62168EV30LL-45BVXI.
Replacing the Cypress CY62168EV30LL-45BVXI MoBL SRAM with Everspin MR4A08B MRAM

Everspin Technologies, Inc.

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