Aerospace Memory

Q4 2019

Cypress Roadmap
# Aerospace Memory Portfolio

**Radiation Hardened | Latch-up Immune | QML-V\(^1\) Certified**

<table>
<thead>
<tr>
<th>Fast Async SRAM</th>
<th>Sync SRAM</th>
<th>Nonvolatile NOR</th>
<th>FRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-ECC(^2)</td>
<td>ECC(^2)</td>
<td>QDR(^{\text{II+}})/QDR(^{\text{II++}})</td>
<td>Serial I/O</td>
</tr>
<tr>
<td>CYRS104x</td>
<td>CYRS106x</td>
<td>CYRS108x</td>
<td>CYRS15x102Q</td>
</tr>
<tr>
<td>4Mb; 3.3 V</td>
<td>16Mb; 1.8-5.0 V</td>
<td>64Mb; 1.8-5.0 V</td>
<td>2Mb; 2.0-3.6 V</td>
</tr>
<tr>
<td>12 ns; x8</td>
<td>10 ns; x8, x16, x32</td>
<td>12 ns; x8, x16, x32</td>
<td>40 MHz; SPI</td>
</tr>
</tbody>
</table>

- CYRS4141x
  - 144Mb; 1.2 V; 667 MHz
  - x18, x36; Burst 2

- CYRS274x
  - 288Mb; 1.8 V; 250 MHz
  - x18, x36; Burst 2.4

- CYRS264x
  - 144Mb; 1.8 V; 250 MHz
  - x18, x36; Burst 2.4

- CYRS141B512x
  - 512Mb; 3.0 V
  - DDR QSPI; 133MHz

- CYRS15B102Q
  - 2Mb; 2.0-3.6 V
  - 40 MHz; SPI

- CYRS156B256x
  - 256Mb; 3.0 V
  - DDR QSPI; 133MHz

- CYRS15x102
  - 2Mb; 2.0-3.6 V
  - 60 ns; x16

1. Qualified Manufacturers List Level V, per military specification MIL-PRF-38535
2. Error-correcting code

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**Status**
- **Concept**
- **Development**
- **Sampling**
- **Production**

**Availability**
- **2020**
- **2021**
72Mb QDR®-II+ SRAM with RadStop™

Applications
Payload processing and reconfigurable computing platforms

Features
▪ Maximum frequency of operation/throughput: 250 MHz/36 Gbps
▪ Burst sizes: 2, 4
▪ Bus-width configurations: x18, x36
▪ Military temperature grade: -55°C to +125°C
▪ Two independent unidirectional data ports for read/write enable concurrent transactions
▪ Maximum throughput with double data rate (DDR) data ports
▪ Output impedance matching input (ZQ) matches the device outputs to system data bus impedance
▪ Bit-interleaving to eliminate multi-bit errors
▪ I/O signaling standards: 1.5 – 1.8 V (HSTL)
▪ Controller available for Xilinx and Microsemi FPGAs
▪ Total ionizing dose: 300 Krad
▪ Heavy-ION single-event latch-up (SEL): 120 linear energy transfer (LET) MeV-cm²/mg
▪ Heavy-ION single-event upset (SEU): 1.34E-07 (geosynchronous) error/bit-day
▪ QML-V²-qualified (DLAM³ part number: 5962F11201/02VXA)

Availability
Non-Space-Qualified Prototypes (CYPT154x): Now
QML-V Space-Qualified Devices (CYRS154x): Now

Collateral
Cypress Datasheet: 72-Mbit SRAMs w/ RadStop™
DLAM Datasheet: 72-Mbit SRAMs w/ RadStop

1 Cypress’s proprietary design and process technology that increases radiation-resistance resistance
2 Qualified Manufacturers List Level V, per military specification MIL-PRF-38535
3 Defense Logistics Agency Land and Maritime, Columbus, OH
144Mb QDR®-II+ SRAM with RadStop™

**Applications**
Payload processing and reconfigurable computing platforms

**Features**
- Maximum frequency of operation/throughput: 250 MHz/36 Gbps
- Burst sizes: 2, 4
- Bus-width configurations: x18, x36
- Military temperature grade: −55°C to +125°C
- Two independent unidirectional data ports for read/write enable concurrent transactions
- Maximum throughput with double data rate (DDR) data ports
- Output impedance matching input (ZQ) matches the device outputs to system data bus impedance
- Featuring On-Die-Termination
- I/O signaling standards: 1.5 – 1.8 V (HSTL)
- Controller available for Xilinx and Microsemi FPGAs
- Total ionizing dose: 200 Krad
- Heavy-Ion single-event latch-up (SEL): 120 linear energy transfer (LET) MeV-cm sq/mg
- Heavy-Ion single-event upset (SEU): 3.34E-07 (geosynchronous) error/bit-day
- QML-V²-qualified (DLAM³ part number: 5962R18214VXF/18215VXF)

**Availability**
Non-Space-Qualified Prototypes (CYPT264x/164x): Now
QML-V Space-Qualified Devices (CYRS264x/164x): Now

1 Cypress’s proprietary design and process technology that increases radiation-resistance
2 Qualified Manufacturers List Level V, per military specification MIL-PRF-38535
3 Defense Logistics Agency Land and Maritime, Columbus, OH

**Collateral**
- Cypress Datasheet: Release pending
- DLAM Datasheet: Release pending
4Mb Fast SRAM with RadStop™

**Applications**
Payload processing, sensors and switches

**Features**
- Access time: 10 ns (85°C), 12 ns (125°C)
- Bus-width configuration: x8
- Operating voltage: 3.3 V
- Military temperature grade: −55°C to +125°C
- Bit-interleaving to eliminate multi-bit errors
- Package: 36-pin ceramic flat pack (CFP)
- Total ionizing dose: 300 Krad
- Heavy-ION single-event latch-up (SEL): 120 linear energy transfer (LET) MeV-cm sq/mg
- Heavy-ION single-event upset (SEU): 5.0E-08 (geosynchronous) error/bit-day
- QML-V qualified (DLAM part number: 5962F1123501VXC)

**Collateral**
- Cypress Datasheet: 4-Mbit SRAM w/ RadStop™
- DLAM³ Datasheet: 4-Mbit SRAM w/ RadStop

**Availability**
- Non-Space-Qualified Prototypes (CYPT1049): Now
- QML-V Space-Qualified Devices (CYRS1049): Now

**CYRS1049DV33: Radiation Hard 4M Fast Asynchronous SRAM**