Honeywell Microelectronics

Honeywell is recognized as an industry leader in reliable, radiation-hardened electronics due to our unwavering commitment to meet customer requests and superior technology. Honeywell provides the best combination of cost and schedule while reducing program risk.

Find out more
Learn more about Honeywell Rad Hard Microelectronics solutions at www.honeywellmicroelectronics.com

For additional general information on Microelectronics, please visit:
aerospace.honeywell.com/microelectronics

For more technical inquiries about Honeywell’s Microelectronics, please contact us at:
MicroelectronicsTechnicalInquiries@honeywell.com

A comprehensive range of radiation hardened integrated circuit solutions
Honeywell – Your Total Integrated Circuit (IC) Provider

To endure harsh environments in space, including total dose radiation, transient phenomena and extreme temperatures, aerospace systems require intelligent, radiation-hardened components. Honeywell’s products and foundry services offer benefits beyond a high reliability radiation hardened construction to ensure systems perform accurately under severe radiation environments and operating conditions. Honeywell’s Silicon On Insulator (SOI) CMOS process offers high levels of integration, minimized power dissipation and high performance to enable reliable, cost-effective products for space military and commercial markets.

Our customers benefit from Honeywell’s high reliability ASIC, System-on-Chip (SoC) and MultiChip Module solutions to facilitate reduction in size, weight and power. These products are designed, manufactured and tested in a QML Space Qualified Trusted Foundry. These include extended access to multiple mature technologies for long term product availability.

SOI CMOS Delivers Low Noise and High Performance Ideal for Digital and Mixed Signal ICs

150nm Radiation Hardened QML Process and Products

- 3.125Gb/s SERDES, Endpoint and Switch capabilities
- 14 Bit ADC, 125MS/s
- Digital ASICs with 10M+ gates, Structured Arrays
- 16M Monolithic SRAM, 64M MCM SRAM
- 1M, 16M, 64M MPRAM
- DDR3 Memory Interface

Features
- Silicon On Insulator (SOI) CMOS Technology
- Four Process Nodes
  - SOI4: 0.8μm, 5V
  - SOI4-HT 0.8μm, 5V, up to 225°C
  - SOI5 0.35μm, 3.3V and 2.5V
  - S150 0.15μm, 1.8V, 2.5V, 3.3V
- ISO-9001, AS-9100, QML Qualified and a Trusted Foundry
- Space, Military and Industrial applications
- Process Design Kit (PDKit), including SPICE models, Design and Layout Rules
- Cadence, Spectre, HSPECT, Cadence Tools
- N-Linear Caps and MIM Caps
- Precision Chrome Silizium (CrSiN) resistor (S150 excluded)
- Temp Range: -55°C to +125°C Standard
  - S55°C to +225°C SOI4-HT
- Low volume engagements
- Wafer process longevity to accommodate your long term production needs and minimize process obsolescence concerns

Foundry Capabilities

For non-digital applications, take advantage of the high integration 0.15μm, 0.35μm and 0.8μm rad-hard SOI CMOS fabrication process using Honeywell’s wafer foundry. Honeywell foundry offering can be utilized to create multiple die on the same mask set to save significant costs for our customers.

Honeywell’s S150 Foundry offering includes Die Stitching capability to enable the creation of very large die arrays for Readout Only Integrated Circuit (ROIC) applications. To augment the ROIC applications, we have extended the temperature range of our S150 modeling capabilities to cryogenic temperatures. We are also developing Through Silicon Via (TSV) capability to enable wafer and die stacking.

Conversion Services

Complex designs now developed on Field Programmable Gate Arrays (FPGAs) do not always have a clear path to flight hardware. The designs may be too large for flight qualified FPGAs. This may lead to using multiple FPGAs which increases power consumption and area. Honeywell can optimize your design by converting the single or multiple designs into a single ASIC saving cost, power and area.

FPGA to ASIC Conversion:

This conversion process delivers a form, fit, and function replacement of FPGAs using space-qualified rad-hard ASIC technology. Honeywell has established a “FPGA conversion process” with scalable resources to meet the demands of the space industry.

This “process” enables a seamless path to convert FPGAs to Honeywell’s SOI-based ASICs. Several FPGAs can be converted to a single ASIC to significantly reduce cost and improve performance.

To address obsolete parts issues or reduce the cost of a design implemented in a FPGA, Honeywell can convert your design into a new IC.

Complete Packaging Solutions

A wide variety of packaging options are available from leaded ceramic flatpacks, wirebond, flip chip, ceramic Land Grid Array, BGA, CCA. Size and power reduction can be attained using QML qualified stacked die process and Multi-Chip Modules.

Packaging Qualifications

The Honeywell packages are manufactured and screened to meet the demanding electrical, thermal and radiation requirements of space and military applications.

- Design, Assembly, Screening Processes Certified to MIL-PRF-38535 supporting QML-Q, V and Y
- MIL-STD-883 DSC Certified for all screening test methods.
Mixed Signal Products

SOI CMOS provides the benefits of low leakage, low parasitic capacitance and high isolation to mixed signal products. Precision design and a low noise process delivers high performance and radiation hardness. Honeywell mixed signal products support a wide range of applications including data conversion from analog to digital and the inverse, digital to analog.

Mixed Signal

- A/D
  - HMXADC9225: 12 bit, ±0.5 V, ±1.2 V, ±2.5 V, ±5.0 V
  - HMXADC9246: 14 bit, ±0.5 V, ±1.2 V, ±2.5 V, ±5.0 V
- D/A
  - HMXDAC91: 12 bit, ±0.5 V, ±1.2 V, ±2.5 V, ±5.0 V

Digital ASIC and Mixed Signal Products

Honeywell's Application Specific Integrated Circuit (ASIC) product family, fabricated with our patented SOI CMOS technology, provides efficient data processing power in space satellites, avionics and military applications. HX5000 has now expanded to include a lower power 1.6V core operating voltage and Structured Arrays for lower cost and reduced cycle time. Honeywell offers analog and data conversion cells including Analog-to-Digital converters, SerDes (Serializer/Deserializer) and Phase Lock Loop (PLLs) to support mixed signal designs.

Digital ASIC and Mixed Signal

HMXADC9246: Honeywell has developed its second rad-hard, latch-up immune analog to digital data converter. The 14-bit converter operates up to 125 MSPs and consumes only a fraction of the power compared to other comparable QML offerings. Along with our HMXADC9225, Honeywell’s rad-hard data converters cover applications ranging from general purpose, navigation/control, imaging, to direct IF down-conversion.

HMXADC9246

- Part Number: HMXADC9246
- Voltage: 1.8, 3.3 V
- Dose: ±1.2 V, ±2.5 V, ±5.0 V
- Clock: 1.8GHz
- Power: 54K

HMX5000

- Part Number: HMX5000
- Voltage: 2.5, 3.3 V
- Dose: ±1.2 V, ±2.5 V
- Clock: 1.8GHz
- Power: 54K

Expanding and Improving the Range of Products for Space Electronics

MRAM: Honeywell is the first to offer a QML Class V qualified non-volatile MRAM. Honeywell's MRAMs are the only devices that were designed from the ground up for radiation hardness and reliability in space. Our 1Mb, 16Mb, and 64Mb devices are all currently in production and available today.

MRAM

- Part Number: HMXMRAM
- Voltage: 2.5, 3.3 V
- Dose: ±1.2 V, ±2.5 V, ±5.0 V
- Clock: 1.8GHz
- Power: 54K

HMXSRD02 – SLIDER: Honeywell has extended its SerDes-based standard product portfolio to operate with the sRIO protocol. Slider enables 1x/4x sRIO endpoint or switch applications and provides a configurable 8-bit/16-bit wide parallel interface. Along with HXSRD01 – Trvor, Honeywell can be used with all the major serial communication protocols. Serial data rates to 3.125Gbps per channel.

HXSRD02

- Part Number: HMXSRD02
- Voltage: 1.8, 3.3 V
- Dose: ±1.2 V, ±2.5 V
- Clock: 1.8GHz
- Power: 54K

HX5000 ASIC PLATFORM ENHANCEMENTS: Honeywell has also made multiple enhancements to our HX5000 ASIC offerings. We now offer lower nominal ASIC core voltage of 1.6V. This can lower the power by 25 percent with no performance or radiation hardness degradation. We’ve also developed a rad-tolerant, high-density SRAM that is 40 percent smaller than our rad-hard SRAMs enabling ASICs with denser memories. Finally we’ve added a rad-hard 600-800MHz 40-bit DDR3 PHY macrocell to our ASIC library. It includes calibrated impedances and a trained data interface which allows for integration with commercial SRAM and commercial memory controller IP.
SRAM and Non-Volatile MRAM Memory Products

For high speed, low power consumption data storage applications, including strategic systems, Honeywell’s SOI Static Random Access Memory (SRAM) and Non-Volatile Magneto-Resistive RAM (MRAM) family provides reliable solutions. Honeywell has a long history of delivering memory products with superior radiation performance and high reliability in space and missile applications.

Non-Volatile Magneto-Resistive Random Access Memory (MRAM)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Configuration</th>
<th>Voltage (V)</th>
<th>Maximum Access/Write (MHz)</th>
<th>Single-Event Upset (upsets/byte/day)</th>
<th>Prompt-Dose Upset (upsets/byte/day)</th>
<th>Prompt-Dose Survivability (rad[Si]/s)</th>
<th>Latency</th>
<th>Package</th>
<th>Qualified</th>
<th>SMID No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HXN010001</td>
<td>8k x1</td>
<td>3.3</td>
<td>&lt;1x10^-10</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>64 CFP</td>
<td>NA</td>
<td></td>
<td>5962-13121</td>
</tr>
<tr>
<td>HXN010002</td>
<td>16k x2</td>
<td>3.3</td>
<td>&lt;1x10^-10</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>64 CFP</td>
<td>NA</td>
<td></td>
<td>5962-13121</td>
</tr>
<tr>
<td>HXN010003</td>
<td>4k x4</td>
<td>3.3</td>
<td>&lt;1x10^-10</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>64 CFP</td>
<td>NA</td>
<td></td>
<td>5962-13121</td>
</tr>
</tbody>
</table>

Static Random Access Memory (SRAM)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Configuration</th>
<th>Voltage (V)</th>
<th>Maximum Access/Write (MHz)</th>
<th>Single-Event Upset (upsets/byte/day)</th>
<th>Prompt-Dose Upset (upsets/byte/day)</th>
<th>Prompt-Dose Survivability (rad[Si]/s)</th>
<th>Latency</th>
<th>Package</th>
<th>Qualified</th>
<th>SMID No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HX6256</td>
<td>32k x8</td>
<td>5.0</td>
<td>&lt;25</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>28 CFP</td>
<td>38 CFP</td>
<td></td>
<td>5962-95845</td>
</tr>
<tr>
<td>HX4256</td>
<td>32k x8</td>
<td>3.3</td>
<td>&lt;20</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>28 CFP</td>
<td>38 CFP</td>
<td></td>
<td>5962-95845</td>
</tr>
<tr>
<td>HX5256</td>
<td>32k x8</td>
<td>3.3</td>
<td>&lt;20</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>32 CFP</td>
<td>40 CFP</td>
<td></td>
<td>5962-95837</td>
</tr>
<tr>
<td>HXL2208</td>
<td>128k x8</td>
<td>3.3</td>
<td>&lt;35</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>32 CFP</td>
<td>40 CFP</td>
<td></td>
<td>5962-95823</td>
</tr>
<tr>
<td>HX5356</td>
<td>128k x8</td>
<td>3.3</td>
<td>&lt;35</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>32 CFP</td>
<td>40 CFP</td>
<td></td>
<td>5962-95823</td>
</tr>
<tr>
<td>HX6228</td>
<td>128k x8</td>
<td>5.0</td>
<td>&lt;25</td>
<td>1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>32 CFP</td>
<td>40 CFP</td>
<td></td>
<td>5962-95823</td>
</tr>
</tbody>
</table>

Processors

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Configuration</th>
<th>Voltage (V)</th>
<th>Clock Frequency (MHz)</th>
<th>Single-Event Upset (upsets/byte/day)</th>
<th>Prompt-Dose Upset (upsets/byte/day)</th>
<th>Prompt-Dose Survivability (rad[Si]/s)</th>
<th>Latency</th>
<th>Package</th>
<th>Qualified</th>
<th>SMID No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HX1750</td>
<td>16-bit</td>
<td>5.0</td>
<td>40</td>
<td>100k</td>
<td>&lt;1x10^-10</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>121 PDA</td>
<td>112 LCC</td>
</tr>
<tr>
<td>HXRHPPC</td>
<td>32-bit [08x]</td>
<td>3.3</td>
<td>80</td>
<td>300k</td>
<td>&lt;1.5x10^-10</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>240 CFP</td>
<td>255 LGA</td>
</tr>
</tbody>
</table>

Digital Logic

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Configuration</th>
<th>Voltage (V)</th>
<th>Prop Delay (ns)</th>
<th>Single-Event Upset (upsets/byte/day)</th>
<th>Prompt-Dose Upset (upsets/byte/day)</th>
<th>Prompt-Dose Survivability (rad[Si]/s)</th>
<th>Latency</th>
<th>Package</th>
<th>Qualified</th>
<th>SMID No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HXNAND200</td>
<td>Quad 2-input</td>
<td>3.3</td>
<td>4.0 (typ), 6.0 (max)</td>
<td>300k</td>
<td>&lt;1x10^-10</td>
<td>1x10^-10</td>
<td>Immune</td>
<td>14 pin CFP</td>
<td>QML V, Q</td>
<td>5962-07A07</td>
</tr>
</tbody>
</table>