INTERSIL SPACE PRODUCTS

FPGA Power Solutions, Switching Regulators, LDOs, CAN Transceivers, Multiplexers, Temperature Sensors, Voltage References, Radiation-Tolerant Plastic ICs
Intersil (now Renesas) history and experience in the space and defense industries spans almost seven decades beginning with the founding of Radiation, Inc. in 1950. Today, we continue to support and release new SMD-based, Class-V/Q radiation hardened (rad hard) products for Hi-Reliability, and Space marketplaces.

The low dose rate ionizing dose response of semiconductors has become a key issue in space applications. We are addressing this changed market by wafer-by-wafer low dose rate acceptance testing as a complement to current high dose rate acceptance testing.

All of our SMD products are MIL-PRF-38535/QML compliant and are 100% burned in.

By leveraging our latest technology for the consumer marketplace, Intersil space products group is releasing Class V/Q products that are revolutionizing the Hi-Reliability and Space marketplaces.

### Intersil Space IC Benefits

#### Highest Standards

As a major supplier to the military and aerospace industries, our Intersil product development methodologies reflect experience designing products to meet the highest standards for reliability and performance in challenging environments. Intersil products can be found in virtually every satellite shipped into space.

- All products are MIL-PRF-38535/QML compliant
- All products are 100% burned in
- Consistent design and manufacturing in our MIL-PRF-38535-qualified facility in Palm Bay, Florida
- We are one of only a few RHA Defense Logistics Agency (Land and Maritime) QML suppliers
- All products are fully Class V (space level) compliant
- All products are on individual DLA SMD drawings

#### Reliable, Proven Supply Chain

Proven proprietary processes and package technologies, shipping over 1 billion ICs per year.

- Strong technology development
  - Proprietary process and package technologies
- Multi-sourcing strategy
  - Sourcing from multiple leading-edge semiconductor foundries and assembly/test partners ensures a steady product supply and reduced risk
- Industry-leading quality & reliability metrics
  - Billion+ ICs shipped every year
  - Less than 1.0 DPPM (defective parts per million) and improving
  - Decades of experience handling military/space products and delivering world-class quality and reliability metrics
  - ISO/TS16949 and AEC-Q100
  - MIL-PRF-38535 compliant and 100% burned in

#### Assured Product Supply

Long life cycles ensure steady flow of product. We still support customer programs with products in production for over 40 years.
TID (Total Ionizing Dose)
TID is the progressive, long-term ionizing radiation damage caused by protons, electrons and other sources. Total ionizing dose testing of semiconductor components has historically been performed at ‘qualification’ dose rates in the 50–300rad(Si)/s. Modern sub-micron technologies tend to be more resistant to total dose effects.

Our approach: TID hardness is tested and guaranteed on a wafer-by-wafer basis to MIL-STD-883 Method 1019 using an in-house Gammascell 220™ 60Co irradiator. This testing is done at both high dose rates (50rad(si)/s) and low dose rates (0.01rad(Si)/s).

SEE (Single-Event Effects)
The intense heavy ion environment encountered in space applications can cause a variety of effects in electronic circuitry, including Single-Event Transient (SET), Single-Event Latchup (SEL) and Single-Event Burnout (SEB). These Single-Event Effects (SEE) can lead to system-level performance issues including disruption, degradation and destruction.

Our approach: SEE characterizations are performed at Texas A&M. To view our complete ELDRS and SEE test reports, go to: www.intersil.com

ELDRS (Enhanced Low Dose Rate Sensitivity) Program
We are performing wafer-by-wafer production testing qualification at both low and high dose rate under biased and unbiased conditions.
All EH product shipments will now come with Group C and E variables data in the data package.

**STANDARD DATA PACKAGE**

**RAD-HARD FPGA POWER SOLUTIONS**

Due to its flexibility in design and cost effectiveness compared to ASICs, FPGA based systems have become increasingly common in space applications as the requirement to do more on board processing is increasing.

Equally important is the power solution of these multi-rail digital loads. The power supply must be stable and efficient even in the harsh environments of space which includes total ionizing dose and single event effects. Coupled in the need for a smaller, light-weight power solution and you will find us at the forefront developing leading edge point-of-load (POL) regulators that meet the demands to power these high performance FPGA's.

For more information see an application note AN1947 "Intersil’s Radiation Hardened Low Power FPGA Power Solutions" and AN1707 "Intersil’s Radiation Hardened FPGA Power Solutions".

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**Complete Solutions for Powering Rad-Hard FPGAs**

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**SWITCHING REGULATORS**

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
<th>Class</th>
<th>DLA SMD</th>
<th>High Dose Rate (HDR) (krad(Si))</th>
<th>Low Dose Rate (LDR) (krad(Si))</th>
<th>Qualification Level</th>
<th>Single Event Latchup (MeV/mg/cm²)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISL70001ASEH</td>
<td>SEE Hardened 6A Synchronous Buck Regulator</td>
<td>V, IPRO70</td>
<td>5962-03225</td>
<td>100</td>
<td>500</td>
<td>QML Class V</td>
<td>86.4</td>
<td>44 Le CGP</td>
</tr>
<tr>
<td>ISL70002SEH</td>
<td>SEE Hardened 12A Synchronous Buck Regulator with Current Sharing</td>
<td>V, IPRO70</td>
<td>5962-12202</td>
<td>100</td>
<td>500</td>
<td>QML Class V</td>
<td>86.4</td>
<td>64 Le CGP</td>
</tr>
<tr>
<td>ISL70003ASEH</td>
<td>SEE Tolerant 2V to 13.2V, 9A Buck Regulator</td>
<td>V, IPRO70</td>
<td>5962-14203</td>
<td>100</td>
<td>500</td>
<td>QML Class V</td>
<td>86.4</td>
<td>64 Le CGP</td>
</tr>
</tbody>
</table>

**POWER SEQUENCING**

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
<th>Class</th>
<th>DLA SMD</th>
<th>High Dose Rate (HDR) (krad(Si))</th>
<th>Low Dose Rate (LDR) (krad(Si))</th>
<th>Qualification Level</th>
<th>Single Event Latchup (MeV/mg/cm²)</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td>ISL73321SEH</td>
<td>Quad Power Supply Sequencer</td>
<td>V, IPRO70</td>
<td>5962-17225</td>
<td>100</td>
<td>75</td>
<td>QML Class V</td>
<td>86</td>
<td>18 Le CFP</td>
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<tr>
<td>ISL73921SEH</td>
<td>Quad Power Supply Sequencer</td>
<td>V, IPRO70</td>
<td>5962-17225</td>
<td>100</td>
<td>75</td>
<td>QML Class V</td>
<td>86</td>
<td>18 Le CFP</td>
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</table>

**LDO**

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
<th>Class</th>
<th>DLA SMD</th>
<th>High Dose Rate (HDR) (krad(Si))</th>
<th>Low Dose Rate (LDR) (krad(Si))</th>
<th>Qualification Level</th>
<th>Single Event Latchup (MeV/mg/cm²)</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td>ISL75051ASEH</td>
<td>3A, Radiation Hardened, Positive, Ultra Low Dropout Regulator</td>
<td>V, IPRO70</td>
<td>5962-12172</td>
<td>100</td>
<td>50</td>
<td>QML Class V</td>
<td>86.3</td>
<td>18 Le CFP</td>
</tr>
</tbody>
</table>

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**RAD-HARD QML SMD**

**Device Description**

- **Voltage**: 1.5V Core Voltage, 3.3V Auxiliary Voltage, 1.5V-3.3V I/O Voltage
- **Part Types**: Rad Tolerant FPGA
  - ISL70003ASEH
  - ISL70002SEH
  - ISL70001ASEH
- **Quality Assurance**: EN, EN, EN
- **Functional Test**: VIN, VOUT
- **Applications**: AN1947, AN1707

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**Shipper/Pack Slip**

- **Customer Part Number**: X X X X X
- **Intersil Part Number**: X X X X X
- **Lot Date Code / Trace Code**: X X X X X
- **Lot Number**: X X X X X
- **Certificate of Conformance**: X X X X X
- **Packaging Information**: X X X X X
- **Screening Data**: X X X X X
- **Post seal thru end of 100% screening operations**: X X
- **Test Operations**: X X
- **Test Methods**: X X
- **Quantity of units in/lot by operation**: X X
- **Date of each test**: X X
- **PDA as applicable**: X X
- **Visual Inspection**: X X X X
- **Document Review**: X X X X X
- **Screening Variables & Delta Data - Variables data for all read/record and/or delta operations pre/post burn-in/HDC are provided on electronic media.**: X X
- **Group A Attributes (located in Screening Attributes Data if performed)**: X X
- **Group B Attributes Summary**: X X
- **Group C Attributes Summary**: X X
- **Group D Attributes**: X X
- **Group E Attributes Data for HDR & LDR - Variables data for all read/record operations pre/post test are provided on electronic media.**: X X
- **SEM C & Photos**: X X X X
- **Radiation C & C (High Dose Rate and/or Low Dose Rate)**
  - HDR: HDR, HDR & LDR
  - X-Ray Report: X X

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**All EH product shipments will now come with Group C and E variables data in the data package.**
RAD-HARD POWER

GaN FET Drivers

Space Industry’s First Radiation-Hardened 100V and 200V GaN FET Power Supply Solutions

The ISL70040SEH low side Gallium Nitride (GaN) field effect transistor (FET) driver and ISL70023SEH and ISL70024SEH GaN FETs enable primary and secondary DC/DC converter power supplies in launch vehicles and satellites, as well as downhole drilling and high reliability industrial applications. These devices power ferite switch drivers, motor control driver circuits, heater control modules, embedded command modules, and satellites, as well as downhole drilling and high reliability industrial applications. These devices power ISL70024SEH GaN FETs enable primary and secondary DC/DC converter power supplies in launch vehicles.

The ISL7040SEH low side Gallium Nitride (GaN) field effect transistor (FET) driver and ISL70023SEH and ISL70024SEH GaN FETs enable primary and secondary DC/DC converter power supplies in launch vehicles and satellites, as well as downhole drilling and high reliability industrial applications. These devices power ferite switch drivers, motor control driver circuits, heater control modules, embedded command modules, and satellites, as well as downhole drilling and high reliability industrial applications. These devices power ISL70024SEH GaN FETs enable primary and secondary DC/DC converter power supplies in launch vehicles.

Key Features of ISL70023SEH and ISL70024SEH GaN FETs

- Very low RDSon at 5mΩ (typ) - ISL70023SEH, and 6mΩ (typ) - ISL70024SEH
- Ultra low total gate charge 14nC (typ) - ISL70023SEH, and 45mΩ (typ) - ISL70024SEH
- SEE hardness at LET 86MeV•cm²/mg:
  - ISL70023SEH, VGS = 0V
- Full military temperature range operation
  - TA = -55°C to +125°C
- Radiation hardness assurance (wafer-by-wafer):
  - SEE hardness at LET = 86MeV•cm²/mg:
  - High Dose Rate (HDR) (50-300rad(Si)/s): 100krad(Si)
  - Low Dose Rate (LDR) (0.01rad(Si)/s): 75krad(Si)
- Precision voltage monitoring
- Power-off POLs in reverse order or simultaneously
- Single resistor sets the rising and falling delay
- Wide operating voltage range from 4.5V to 13.2V
- Up to 14.7V logic inputs (regardless of VDD level)
- Breakdown voltage 100V
- High voltage outputs up to -40V
- Low VCE saturation of 1.5V with IC of 530mA
- Integrated 5-bit to 32-channel decoder and level shifting circuit
- High collector current outputs to 600mA
- Low Vce saturation of 1.5V with IC of 530mA
- High voltage outputs up to -40V
- VDD supply range of 3V to 5.5V

Benefits of GaN Power Transistors

- Intersil products offer an order of magnitude better performance.

GaN FET Drivers

<table>
<thead>
<tr>
<th>Product</th>
<th>Class</th>
<th>High Dose (HDR) krad(Si)</th>
<th>Low Dose (LDRS) krad(Si)</th>
<th>SEL (MV/mg/cm²)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISL70040SEH</td>
<td>V, (PRO)</td>
<td>100krad(Si)</td>
<td>75krad(Si)</td>
<td>-</td>
<td>86 CLCC8</td>
</tr>
<tr>
<td>ISL70040SEH</td>
<td>V, (PRO)</td>
<td>-</td>
<td>75krad(Si)</td>
<td>-</td>
<td>86 CLCC8</td>
</tr>
<tr>
<td>ISL70023SEH</td>
<td>V, (PRO)</td>
<td>100krad(Si)</td>
<td>75krad(Si)</td>
<td>100V</td>
<td>CLCC4</td>
</tr>
<tr>
<td>ISL70023SEH</td>
<td>V, (PRO)</td>
<td>100krad(Si)</td>
<td>75krad(Si)</td>
<td>200V</td>
<td>CLCC4</td>
</tr>
</tbody>
</table>

Sequencers

Radiation-Hardened Quad Power Supply Sequencers

The ISL72813SEH radiation-hardened 32-channel driver reduces the size, weight and power of satellite command and telemetry systems. The device integrates the decoder, level shifter and driver array in a single monolithic IC, allowing satellite manufacturers to significantly increase system capacity and reduce solution size by 50%.

The ISL72813SEH offers a 4x higher density channel count compared to the nearest competitor, and the integrated level shifter eliminates several peripheral components.

- Acceptance tested to 50krad(Si) LDR, wafer-by-wafer, HDR radiation tolerance of 100krad(Si)
- Integrated 5-bit to 32 channel decoder and level shifting circuit
- High collector current outputs to 600mA
- Low Vce saturation of 1.5V with IC of 530mA
- High voltage outputs up to -40V
- VDD supply range of 3V to 5.5V

Source Drivers

Single-Chip Rad-Hard Driver with Integrated Decoder

The ISL72813SEH rad hard 32-channel driver reduces the size, weight and power of satellite command and telemetry systems. The device integrates the decoder, level shifter and driver array in a single monolithic IC, allowing satellite manufacturers to significantly increase system capacity and reduce solution size by 50%.

The ISL72813SEH offers a 4x higher density channel count compared to the nearest competitor, and the integrated level shifter eliminates several peripheral components.

- Acceptance tested to 50krad(Si) LDR, wafer-by-wafer, HDR radiation tolerance of 100krad(Si)
- Integrated 5-bit to 32 channel decoder and level shifting circuit
- High collector current outputs to 600mA
- Low Vce saturation of 1.5V with IC of 530mA
- High voltage outputs up to -40V
- VDD supply range of 3V to 5.5V

<table>
<thead>
<tr>
<th>Device</th>
<th>Number of Channels</th>
<th>Maximum Vcc</th>
<th>Maximum Ic</th>
<th>Vcc (SAT)</th>
<th>Vcc (Leakage)</th>
<th>Level Shifter</th>
<th>Integrated Decoder</th>
<th>Parallel Drive Capability</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISL72813SEH</td>
<td>32</td>
<td>42V</td>
<td>530mA</td>
<td>1.5V</td>
<td>530mA</td>
<td>Yes</td>
<td>Yes (32 Decoder)</td>
<td>No</td>
<td>44-Le CLCC</td>
</tr>
</tbody>
</table>

Reduce Solution Size by 50%
Radiation Hardened

**RAD-HARD ANALOG**

### Can Transceivers

Industry’s First Rad Tolerant 3.3V CAN Transceivers for Satellite Communications

The ISL7202xSEH CAN transceivers provide reliable serial data transmission between a CAN controller and CAN bus at speeds up to 1Mbps. Up to 120 ISL7202xSEH ICs can be connected to a single CAN bus to reduce cabling/harness size, weight and power (SWAP) costs, allowing system engineers to increase satellite functionality and eliminate the extra cabling and tradeoffs associated with current point-to-point interface solutions.

- ISL72026SEH
  - Loopback feature which provides a node diagnostic mode
- ISL72027SEH
  - Split mode feature which helps improve EMI/EMC
- ISL72028SEH
  - Low power shutdown mode

### Multiplexers

Rad Tolerant 5V Multiplexers that Deliver Best-in-Class Performance for Space Flight Systems

The ISL71830/31SEH 5V rad hard multiplexers provide data acquisition systems with the industry’s best ESD protection, and deliver lower R<sub>ON</sub> and input leakage for reduced power consumption and higher signal integrity.

The 16-channel ISL71830SEH and 32-channel ISL71831SEH multiplexers provide a “cold spare” redundant capability, allowing the connection of 2-3 additional unpowered multiplexers to a common data bus.

### Instrumentation Amplifiers

36V In-Amp with Integrated ADC Driver

The ISL70617SEH rad hard in-amp integrates a rail-to-rail output differential ADC driver to provide the industry’s highest sensor signal processing performance for communication satellites. Its high integration and best-in-class performance reduces system size, weight and power (SWAP) costs, and speeds time to market.

The ISL70517SEH joins the ISL70617SEH, and offers similar features but implements a differential input and rail-to-rail single-ended output.

- Low input offset of 30µV and low input bias current of 0.2nA
- Programmable gain from 0.1 to 10,000 via two external resistors
- Excellent CMRR and PSRR of 120dB typical for attenuating, gaining and filtering sensor signals to improve signal quality
- Wide operating range from ±4V to ±18V
- Low dose rate (0.01rad(Si)/s) radiation tolerance of 75krad(Si)

### Rad-Hard Multiplexers Product Highlights

<table>
<thead>
<tr>
<th>Device</th>
<th>Channels</th>
<th>Supply Voltage</th>
<th>Rin (typ)</th>
<th>Off Switch Leakage (max)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISL71840SEH</td>
<td>16</td>
<td>30V</td>
<td>&lt;500Ω</td>
<td>100nA</td>
<td>28 LD CFP</td>
</tr>
<tr>
<td>ISL71841SEH</td>
<td>32</td>
<td>30V</td>
<td>&lt;500Ω</td>
<td>100nA</td>
<td>48 Ld CQFP</td>
</tr>
<tr>
<td>ISL71830SEH</td>
<td>16</td>
<td>5V</td>
<td>&lt;120Ω</td>
<td>120nA</td>
<td>28 LD CFP</td>
</tr>
<tr>
<td>ISL71831SEH</td>
<td>32</td>
<td>5V</td>
<td>&lt;120Ω</td>
<td>120nA</td>
<td>48 Ld CQFP</td>
</tr>
</tbody>
</table>

### Complete Space Grade Analog Signal Chain

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**Complete Space Grade Analog Signal Chain**
The ISL71xxxM family of radiation-tolerant plastic-package ICs is designed to support the emerging field of small satellites that will provide solutions such as high-speed Internet connections to hundreds of millions of users in communities, governments, and businesses worldwide. Fleets of hundreds of small satellites will create mega-constellation networks to deliver broadband Internet links from low Earth orbit (LEO) to every corner of the globe, including rural areas without wireless connectivity access.

Our rad-tolerant plastic packaging flow leverages the company’s more than 60 years of spaceflight experience developing rad hard (>75krad) and rad-tolerant (<75krad) products for extremely harsh environments. The upfront radiation effects characterization and AEC-Q100 automotive-like qualification gives customers the utmost confidence to design Intersil radiation-tolerant plastic parts into cost-sensitive small satellites for LEO mission profiles up to five-years. The ISL71xxxM are also well suited for high altitude (>40km) avionic systems, launch vehicles that are prone to heavy ions, and medical equipment where radiation is a concern.

**Rad-Tolerant Power**

**6A Synchronous Buck Regulator with Integrated MOSFETs**

The ISL71001M rad-tolerant 6A synchronous buck regulator with integrated MOSFETs delivers high peak efficiency up to 95%, and steps down 5V and 3.3V primary rails to POL inputs as low as 0.8V for FPGAs, CPLDs, DSPs, CPUs and peripheral I/Os.

**KEY SPECIFICATIONS**

- VIN range: 3V to 5.5V
- VOUT range: 0.6V to 85% of VIN
- Up to 94% efficiency
- 1% output voltage accuracy
- Input UVLO, output UVLO, and OCP protection

**PACKAGE**

- 10mm x 10mm, 64-lead QFP with e-pad

**BENEFITS**

- Radiation-tolerant to 30krad(Si) and SEE characterized
- Redundant control loop for class leading SET performance
- Ease of use: Integrated MOSFETs and compensation
- 1MHz switching frequency for reduced filter size

**Rad-Tolerant Analog**

**CAN BUS TRANSCEIVER**

The ISL71026M radiation-tolerant 3.3V CAN transceiver provides serial data transmission at speeds up to 1Mbps. Up to 120 transceivers can be connected to a single CAN bus to reduce cabling/harness size, weight and power (SWAP) costs for satellite command and telemetry systems.

**OPERATIONAL AMPLIFIERS**

The ISL71444M is ideal for applications requiring both high DC accuracy and AC performance, and the ISL71218M is ideal for single-supply applications where input operation at ground is important.

**VOLTAGE REFERENCES**

The ultra low noise rad-tolerant ISL71010B50 and ISL71010B25 precision voltage references are ideal for high-end instrumentation, data acquisition, and processing applications requiring high DC precision where low noise performance is critical.
## PRODUCTS SELECTION TABLE

For a complete list of Intersil Space & Harsh Environment products, visit www.intersil.com/space

### Rad-Hard Analog EH Products

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
<th>Class</th>
<th>DLA SMD</th>
<th>High Dose Rate (HDR) krad(Si)</th>
<th>Low Dose Rate (ELDR) krad(Si)</th>
<th>Qualification Level</th>
<th>Single Event Latchup (MeV/mg/cm²)</th>
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</thead>
<tbody>
<tr>
<td><strong>COMPARATORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS-130EH</td>
<td>Quad Voltage Comparator V, /PROTO</td>
<td>5962-95613</td>
<td>300</td>
<td>50</td>
<td>OML Class V SEL free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IS-1300EH</td>
<td>Single Event Quad Voltage Comparators V, Q</td>
<td>5962-01510</td>
<td>300</td>
<td>Report Available</td>
<td>OML Class V SEL free</td>
<td></td>
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<tr>
<td>ISL7109EH</td>
<td>High Speed Dual Voltage Comparator V, Q</td>
<td>5962-01715</td>
<td>300</td>
<td>50</td>
<td>OML Class V SEL free</td>
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<tr>
<td><strong>SWITCH/MUX</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>HS-1840AEH</td>
<td>16 Channel CMOS Analog Multiplexer with High-Z Analog Input Protection V, Q</td>
<td>5962-95630</td>
<td>300</td>
<td>50</td>
<td>OML Class V SEL free</td>
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<tr>
<td>HS-18400EH</td>
<td>16 Channel BiCMOS Analog Multiplexer with High-Z Analog Input Protection V</td>
<td>5962-95630</td>
<td>300</td>
<td>50</td>
<td>OML Class V SEL free</td>
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<tr>
<td>HS-2015SEH</td>
<td>High Speed, Quad SPDT CMOS Analog Switch V, Q</td>
<td>5962-95618</td>
<td>300</td>
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<td>OML Class V SEL free</td>
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<tr>
<td>HS-303SEH</td>
<td>CMOS Dual SPDT Analog Switch V, Q</td>
<td>5962-95613</td>
<td>300</td>
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<td>OML Class V SEL free</td>
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<tr>
<td>HS-3032EH</td>
<td>CMOS Dual SPDT Analog Switch V</td>
<td>5962-95613</td>
<td>300</td>
<td>50</td>
<td>OML Class V SEL free</td>
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<tr>
<td>HS-502BEH</td>
<td>8 Channel CMOS Analog Multiplexer with Overvoltage Protection V, Q</td>
<td>5962-96742</td>
<td>300</td>
<td>50</td>
<td>OML Class V SEL free</td>
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<td></td>
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<tr>
<td>HS-1830SEH</td>
<td>16-Channel Analog Multiplexer V, Q</td>
<td>5962-15247</td>
<td>75</td>
<td>OML Class V SEL free</td>
<td>90</td>
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<tr>
<td>HS-1838SEH</td>
<td>32-Channel Analog Multiplexer V</td>
<td>5962-15248</td>
<td>75</td>
<td>OML Class V SEL free</td>
<td>90</td>
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<td>ISL72090EH</td>
<td>3.3V CAN Transmitter, 1Mbps, Listen Mode, Loopback, 3.3V CAN Transmitter, 1Mbps, Listen Mode, Split Termination Output</td>
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<td>Radiation Hardened, 2-Terminal Temperature Transducer V, /PROTO</td>
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Rad-Hard Power EH Products

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<tr>
<th>Device Description</th>
<th>Class</th>
<th>DLA SMD</th>
<th>High Dose Rate (HDR) (krad(Si))</th>
<th>Low-Dose Rate (ELDRS) (krad(Si))</th>
<th>Single Event Latching (MeV/mg/cm²)</th>
</tr>
</thead>
</table>

**LINEAR REGULATION**
- HS-1512EH Adjustable Positive Voltage Regulator V, /PROTO 5962-89547 300 50 QML Class V 86 SEL free
- ISL706BEH 3.3V µ-Processor Supervisory Circuits V, /PROTO 11213 100 50 QML Class V 86

**MOSFET DRIVERS**
- ISL704A0EH Full Bridge N-Channel FET Driver V 5962-89617 300 50 QML Class V 86 SEL free
- ISL704B0EH Dual, Inverting Power MOSFET Drivers V 5962-89511 300 50 QML Class V 86 SEL free
- ISL704C0EH Dual, Non-Inverting Power MOSFET Drivers V 5962-89560 300 50 QML Class V 86 SEL free
- ISL704D0EH Dual, Non-Inverting Power MOSFET Drivers V 5962-89560 300 50 QML Class V 86 SEL free
- ISL720AEH High Frequency Half Bridge Drivers V, /PROTO 5962-89556 300 50 QML Class V 86 SEL free

**SWITCHING REGULATORS**
- ISL7200A1SEH SEE Hardened 6A Synchronous Buck Regulator V, /PROTO 5962-09225 100 50 QML Class V SEL free
- ISL7200A1SEH SEE Hardened 6A Synchronous Buck Regulator V, /PROTO 5962-09225 100 50 QML Class V SEL free
- ISL7200A2SEH SEE Hardened 12A Synchronous Buck Regulator with Current Sharing V, /PROTO 5962-09225 100 50 QML Class V SEL free
- ISL7200A3SEH SEE Tolerant 3V to 12.2V, 8A Buck Regulator V, /PROTO 5962-09225 100 50 QML Class V SEL free

**SOURCE DRIVER**
- ISL7201AEH 8-Channel Source Driver V, /PROTO 5962-00520 100 50 QML Class V 86 SEL free
- ISL7201SEH 32-Channel Driver Circuit with an Integrated Decoder V, /PROTO 5962-12208 100 50 QML Class V 86 SEL free

**SUPERVISORY**
- ISL7202AEH 5.0V µ-Processor Supervisory Circuits V, /PROTO 11213 100 50 QML Class V 86
- ISL7202AEH 5.0V µ-Processor Supervisory Circuits V, /PROTO 11213 100 50 QML Class V 86
- ISL7202AEH 5.0V µ-Processor Supervisory Circuits V, /PROTO 11213 100 50 QML Class V 86
- ISL7202AEH 3.3V µ-Processor Supervisory Circuits V, /PROTO 11213 100 50 QML Class V 86
- ISL7202AEH 3.3V µ-Processor Supervisory Circuits V, /PROTO 11213 100 50 QML Class V 86

**POWER SEQUENCING**
- ISL72321SEH Quad Power Supply Sequencer V, /PROTO 5962-17225 100 75 QML Class V 86
- ISL72321SEH Quad Power Supply Sequencer V, /PROTO 5962-17225 100 75 QML Class V 86

**LDO**
- ISL7265AEH 2A, Radiation Hardened, Positive, Ultra-Low Dropout Regulator V, /PROTO 5962-12121 100 50 QML Class V 86.3
- ISL7265AEH 1.5A, Positive, High Voltage LDO V, /PROTO 5962-12320 100 50 QML Class V 86

**SWITCHING CONTROLLERS**
- HS-1825AEH High-Speed, Dual Output PWM V 5962-89558 300 50 QML Class V SEL free
- ISL7840AEH High Performance Industry Standard Single-Ended Current Mode PWM Controller V, /PROTO 5962-07249 100 50 QML Class V 86
- ISL7840AEH High Performance Industry Standard Single-Ended Current Mode PWM Controller V, /PROTO 5962-07249 100 50 QML Class V 86
- ISL7840AEH High Performance Industry Standard Single-Ended Current Mode PWM Controller V, /PROTO 5962-07249 100 50 QML Class V 86
- ISL7840AEH High Performance Industry Standard Single-Ended Current Mode PWM Controller V, /PROTO 5962-07249 100 50 QML Class V 86

**Rad-Hard Power EH Products (continued)**

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</table>

**GAIN FET DRIVERS**
- ISL72040SEIH Radiation Hardened Low Side GaN FET Driver V, /PROTO 17223 100 75 QML Class V 86
- ISL72040SEIH Radiation Hardened Low Side GaN FET Driver V, /PROTO 17223 100 75 QML Class V 86

**GAIN POWER TRANSISTORS**
- ISL72003SEH 100V, 6A Enhancement Mode GaN Power Transistor V, /PROTO 17223 100 75 QML Class V 86
- ISL72003SEH 100V, 6A Enhancement Mode GaN Power Transistor V, /PROTO 17223 100 75 QML Class V 86
- ISL72004SEH 200V, 7.5A Enhancement Mode GaN Power Transistor V, /PROTO 17223 100 75 QML Class V 86
- ISL72004SEH 200V, 7.5A Enhancement Mode GaN Power Transistor V, /PROTO 17223 100 75 QML Class V 86

**Rad-Tolerant Products**

**CAN BUS TRANSCEIVER**
- ISL71026M 3.3V CAN Transceiver, 1Mbps, Listen Mode, Loopback V, /PROTO 5962-07249 100 30 43 TSSOP14 -55 to 125

**OPERATIONAL AMPLIFIERS**
- ISL71444M 19MHz 40V Quad Rail-to-Rail Input-Output, Low-Power Op Amp V, /PROTO 5962-07249 100 30 43 TSSOP14 -55 to 125
- ISL71218M Dual 36V Precision Single Supply, Rail-to-Rail Output, Low-Power Op Amp V, /PROTO 5962-07249 100 30 43 TSSOP14 -55 to 125

**VOLTAGE REFERENCES**
- ISL7100B50 Ultra Low Noise, 2.5V Precision Voltage Reference V, /PROTO 5962-07249 100 30 43 TSSOP14 -55 to 125
- ISL7100B25 Ultra Low Noise, 2.5V Precision Voltage Reference V, /PROTO 5962-07249 100 30 43 TSSOP14 -55 to 125

**SWITCHING REGULATOR**
- ISL71001M 6A Synchronous Buck Regulator with Integrated MOSFETs V, /PROTO 5962-07249 100 30 43 TSSOP14 -55 to 125
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