

Space Products



Radiation Hardened Power Management For Space Applications

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Q3 CY03

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When failure is not an option

Product Line Overview

- **Development Roadmap is being executed for a family of standard power building block Radiation Hardened ICs.**
- **Combines internal Intersil strengths to provide a new to the world capability.**
 - ***∞* Synergy with commercial and industrial product/process developments**

Current Strategy Rad Hard Star*Power

- **Introduce new-to-the-world Radiation Hardened, tested and guaranteed Power Management functions.**
 - ❧ RH chip-set building blocks for easy custom designs
 - ❧ RSG process will ensure stable post-rad performance over temp.
 - ❧ All products compliant to MIL-PRF-38535
- **Actively solicit customer inputs and design partners in product definition and development.**
 - ❧ Contact us to discuss your specific requirements (packaging, pinouts, etc.)
 - ❧ awilli02@Intersil.com

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New Products

- ❧ HS-139RH Quad Comparator
- ❧ HS-4423RH MOS Driver
- ❧ HS-4424RH MOS Driver
- ❧ HS-1825ARH Regulating PWM
- ❧ HS-117RH Voltage Regulator (now in TO-39)
- ❧ IS-2100ARH Bridge Driver
- ❧ HS-4080ARH Bridge Driver
- ❧ IS-2981RH Source Driver
- ❧ IS-1009RH Voltage Reference
- ❧ IS-1715ARH Comp Fet Driver
- ❧ IS-705RH uP Supervisory Ckt
- ❧ IS-1845ASRH Current mode PWM
- ❧ IS-139ASRH SEU Hard Quad Comparator
- ❧ ISL7 4422ARH Rad Hard 9A MOS Driver
- ❧ ISL7 2991RH Rad Hard LDO Regulator
- ❧ IS-1825ASRH SEU Hard PWM
- ❧ ISL7 124SRH SEU Hard Op Amp



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HS-139RH Quad Comparator

- **Pin for pin replacement for 139 industry standard types**
 - ❧ Available in DIP and Flatpack packages
- **Guaranteed and tested to 300kRAD**
- **Immune to SEL**
- **Other Linear applications include:**
 - ❧ Multivibrators
 - ❧ MOS Clock Timers
 - ❧ Simple A/D Converters
- ***Available Now!***

HS-4423RH MOS Driver

HS-4424RH MOS Driver

- **Pin Compatible With 4423 industry standard types**
 - ❧ **High Output Current (3A peak), 12V to 18V Supply Range**
 - ❧ **Standard TTL, CMOS and high voltage input compatibility**
- **Configurable as dual or high-drive single MOSFET driver**
- **Applications: Power Switching, Conversion, Motor Control**
- **Immune to SEL**
- **Designed to drive all Intersil Rad Hard FS series MOSFETs.**
- **Tested and guaranteed to 300K RAD**
 - ❧ **Performance specs simulated with 4300pF load.**
- **Available Now!**

HS-442XRH MOS Driver Family

- **HS9- 4423RH - Inverting Driver with 10V LVLO
Available Now!**
- **HS9 - 4423BRH - Inverting Driver with 7.5V LVLO
Available Now!**
- **HS9 - 4424RH - Non Inverting Driver with 10V LVLO
Available Now!**
- **HS9 - 4424BRH - Non Inverting Driver with 7.5V LVLO
Available Now!**
- **ALL TESTED AND GUARANTEED TO 300K RADS !**

ALL AVAILABLE NOW!

HS-1825ARH Regulating PWM

- **Pulse Width Modulator For Switching Power Supply, Servo Apps**

HS-1825ARH.

- **Features improved tolerances/drift.**
- **Immune to SEL**
- **Tested and guaranteed to 300K RAD**
- **Can be used to control the HS-442XRH Dual FET Drivers, or direct drive Intersil FS series MOSFETs.**

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IS-1825ASRH: Single Event and Total Dose Hardened PWM

Tested and guaranteed to 300krads(Si) total dose

- Latch-up immune due to dielectrically isolated RSG process
- SEU immune to an LET=35MeV/mg/cm²
- Functionally equivalent to industry standard 1825A types
- Oscillator frequencies to 1MHz
- High peak output current drive (1A typical)
- Low start-up current (300uA max)
- Improved soft-start compared with commercial 1825A types
- Minimum pulse width (200-500ns) associated with commercial units has been eliminated
- Programmable leading edge blanking
- 16 lead DIP and 20 lead flatpack packages

IS-1845ASRH also Available Now!

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IS-2100ARH Half Bridge Driver

- **Rad Hard version of the Intersil HIP2100 Half Bridge Driver**
 - ***Improved higher voltage operation***
 - ☞ **1.5A (typical) Output Drive**
 - ☞ **130V (max) phase voltage**
 - ☞ **150V (max) bootstrap supply voltage**
 - ☞ **SEU immune to a LET of 82MeV/mg/cm²**
 - ☞ **Immune to SEL**
 - ☞ **Applications: PWM controller/servo drivers, synchronous rectified power converters.**
 - ☞ **Will drive IR FS series Rad Hard MOSFETs**
 - ☞ **Functionally similar to IR2110**

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HS-4080ARH Full Bridge Driver

- **RAD HARD version of Intersil HIP4080A**
- **Bootstrap supply max voltage to 98V**
- **65nS (max) rise & fall times with 1000pF load**
- **User programmable dead time**
- **Single supply operating range of 12V to 18V**
- **Optimized for TTL level input signals**
- **Drives most Rad Hard, FS,FR & Star*Power Fets**
- **Tested and guaranteed to 300K RADs**

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HS-1715ARH

Complementary Switch FET Driver

- **Designed for Use in Synchronous Rectification Circuits**
 - ❧ Complimentary High Current Outputs
 - ❧ Independently Programmable Delays
 - ❧ Single PWM/TTL Compatible Input
 - ❧ Frequencies Up to 1 MHz.
- **Constructed on RSG Process**
 - ❧ Complete Latch-up Immunity
 - ❧ QML Class V Compliant
- **Applications: Synchronous Rectification in switching Power Supplies, DC-DC Conversion.**
- ***AVAILABLE NOW***

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HS-117RH Voltage Regulator

- **Compatible with 117 industry standard types**
 - ❧ **100V I/O Differential Voltage capability**
 - ❧ **Adjustable from 1.2V to within 3V of the supply**
 - ❧ **Features thermal shutdown and output current limiting**
- **Immune to SEL**
- **Industry Standard TO-257 packaging**
- **SMD.5 package also available (HSYM-117RH)**

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TO-39 Packaging Available NOW

IS-2981RH Octal Source Driver

- **Rad Hard replacement for obsoleted Allegro UDN2981**
- **Recommended for high side switching applications**
- **100K Rad**
- **300mA drive per channel**
- **TTL and CMOS compatible inputs**
- **VCC max 80V**
- **replaces discretes**
- **18 pin DIP packaging**

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IS-1009RH Precision 2.5 Volt Reference

- **Guaranteed to 300K RAD Total Dose**
- **SEL Immune DI processing**

- **QML Class V compliant**
- **Features -**
 - ❧ **0.2% Initial Tolerance max**
 - ❧ **Guaranteed Temperature Stability (over temp and rad)**
 - ❧ **0.6 ohm Dynamic Impedance**
 - ❧ **Wide Operating Current Range**
 - ❧ **TO-206AB (TO-46 outline)**
 - ❧ **SMD.5**

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IS-705RH uP Supervisory Circuit

- **Applications: Flight Computers, critical power monitoring**
 - ❧ **Initiates CPU reset signals**
 - ❧ **Reliable Rad Hard replacement for discrete solutions**
 - ❧ **100K Rad Total Dose**
 - ❧ **Latch-up immunity**
 - ❧ **QML Class V Compliant**
 - ❧ **Supply voltage range of 1-5.5V**
 - ❧ **4.65V Threshold monitor**
 - ❧ **8 pin Flatpak Package**

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IS-139ASRH Quad Comparator

- **Specially SEU Hardened version of standard 139 function**
 - ❧ **SEU Hard to LET >82**
 - ❧ **20 pin Flatpack Packaging**
- **Guaranteed and tested to 300kRAD**
- **Immune to SEL**
- **Other Linear applications include:**
 - ❧ **Multivibrators**
 - ❧ **MOS Clock Timers**
 - ❧ **Simple A/D Converters**

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ISL74422ARH – SEE Hardened 9A, Non-Inverting FET Driver (Available Now!)

- **QML Class V equivalent of the industry standard 4422**
- **Fabricated on Rad Hard Silicon Gate (RSG) Process**
 - ✧ **Latchup immune, (dielectrically isolated devices)**
 - ✧ **SEU hardened by design to 80MeV/mg/cm²**
 - ✧ **300K rad tested and guaranteed**
- **Designed to drive all FS series MOSFETs.**
 - ✧ **9A peak output current, 90nsec (typ) into 10,000pF**
- **Input is Zener-clamped to allow a negative input voltage to –5V**
- **Input logic voltage supply (LVS) & logic ground are isolated from output driver supply pins for improved on-chip noise immunity**
- **The VS and GND pins are not internally connected, the OUT pins are not internally connected**
- **Applications: Power Switching, Motor Control**

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Rad Hard Low Dropout Negative Adjustable Regulator

- **IS-2991ARH**

- Tested and guaranteed to 300K Rad
- Output remains within spec tolerance up to LET 82w/47uF
- Drop out Voltage <1.0V w/1.5A load , +/-5% regulation
- On/Off pin for remote shutdown (CMOS/TTL)
- Adjustable current limit input
- 28 pin flat pack
- **Applications Include:**
 - Spacecraft distributed power (point of use) regulator
 - Power switching or strobe (utilizes On/Off pin)
 - DC/DC converters

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Rad Hard Quad Operational Amplifier



- **ISL7124SRH**

- Tested and guaranteed to a total dose of 300krad(Si)
- Single-event hardened to an LET=36MeV/mg/cm² (Delta Vo<1V)
- Single supply voltage range (5V to 30V)
- Input common mode voltage range includes ground
- Input offset voltage (+/-10mV max)
- Input offset current (+/-150nA max)
- 14 lead flat pack
- **Applications Include:**
 - Single supply implementation of op-amp circuits
 - General analog signal processing

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ISL74422BRH – SEE Hardened 9A, Non-Inverting FET Driver with UVLO (Available Soon)

- **QML Class V equivalent of the industry standard 4422**
- **Fabricated on RSG (Rad-Hard Silicon Gate) process**
 - **300krad tested and guaranteed**
 - **Latchup: Immune via dielectric isolation**
 - **SEU: Hardened by design for LET=80MeV/mg/cm²**
- **Drives 10000pF load with typical rise/fall times of 100ns**
- **Input logic supply/ground pins are isolated from output driver supply/ground pins for improved on-chip noise performance**
- **Undervoltage lockout ensures predictable turn-on/turn-off**
- **Input switch levels compatible with 5V logic**
- **Applications: DC-DC converters, motor control**

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NEW PRODUCT ROADMAP



IS-2981RH

8-Ch, High Side Driver

IS-139ASRH

SEU Hardened Comp

IS2-117RH

RH reg T0-39

ISL706RH

4.35 Supervisory

IS-1009RH

2.5V Reference

ISL7 4422ARH

9A Fet Driver

ISL7124SRH

RH Op Amps

IS-1843ASRH

7.9/8V 100% DC

IS-1715ARH

Comp Fet Driver

IS-2100ARH

Half Bridge Dr 150V

ISL74422BRH

9A Fet Dr with UVLO

IS-1844ASRH

10/16V w/50% DC

IS-705RH

uP Supervisory

IS-2991RH

LDO Reg

ISL7119RH

RH fast comparator

IS-1823ASRH

1825A w/100% DC PWM

IS-1845ASRH

7.9/8.0V 50% DC PWM

IS-1825ASRH

SEU Hardened PWM

ISL7137RH

Adj Neg V Reg

IS-1823BSRH

23A 10/16V LVLO

HS-201HSRH

Quad SPST SWITCH

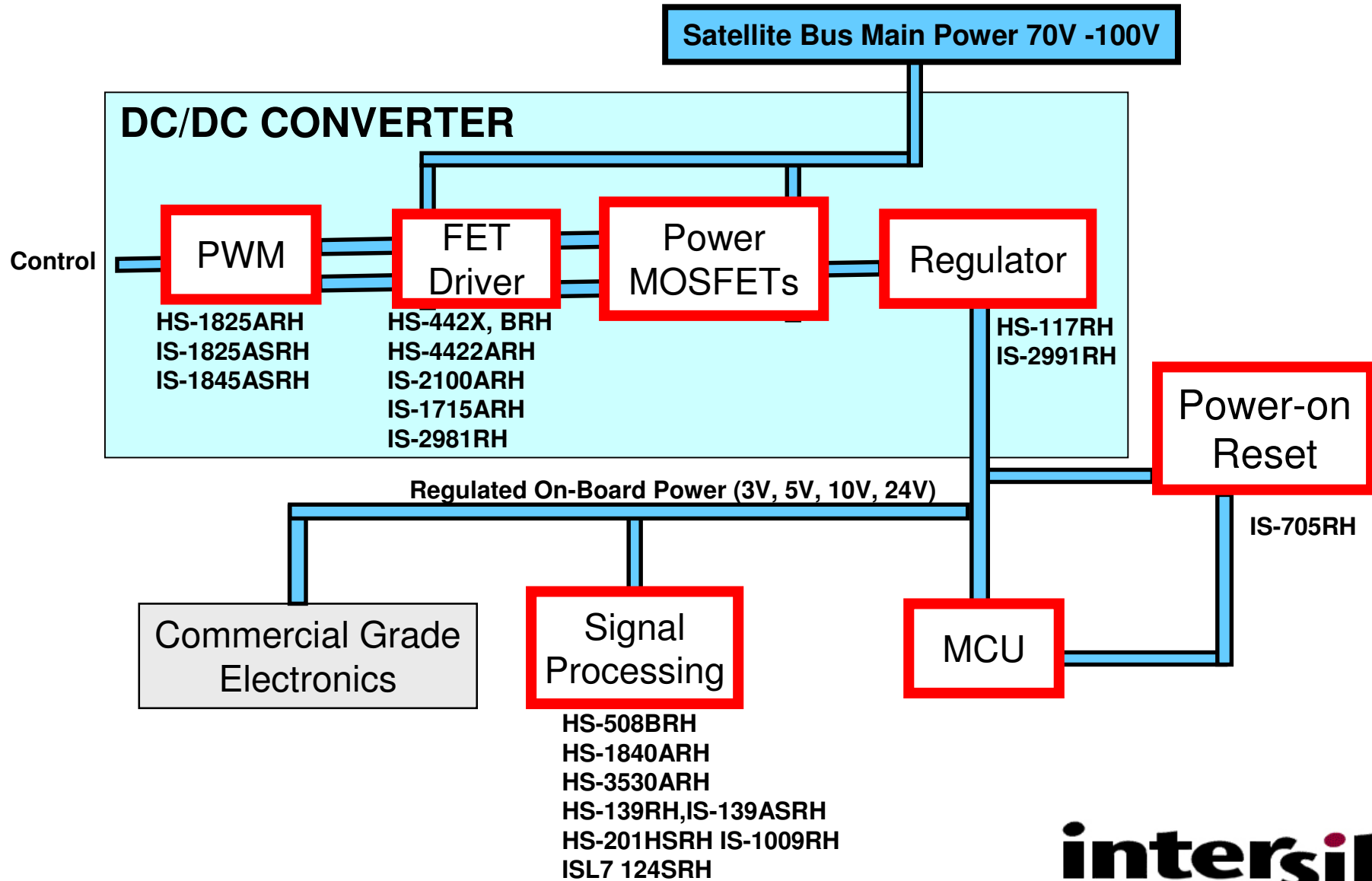
HS-26CLV3XRH

3.3V RS422

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Radiation Hardened Power Management For Space Applications

Rad Hard Power Management ICs

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Rad Hard Logic Product Line Overview

Portfolio includes Class V, QML SMDs

- ACS/ACTS:**
- CD4000:**
- HCS/HCTS:**

All devices are available in Ceramic Flatpack and Sidebrazed DIP packages.

- Class V inspected and radiation qualified die available for all types.**

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Rad Hard Logic Product Line Overview

Wide Range of Functions Available

- Buffers and Counters**
- Decoders/Encoders**
- Flip-Flops and Gates**
- Latches**
- Multiplexers**
- Registers and Switches**
- Special Functions**

Applications Include:

- Multiplexing of Analog Signals or Digital Data**
- Sensor Output Signal Conditioning**
- Comparator and Level Detection and Timing**

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Systems Using Intersil Rad Hard Logic

- A2100
- Cassini
- DMSP
- GALILEO
- GlobalStar
- GOES
- GPS
- Iridium
- Mars Global Surveyor
- Mars Observer
- Mars Pathfinder
- MilStar
- MSTAT
- ODYSSEY
- SMTS
- SOHO
- Sojourner
- Space Station
- TELSTAR
- TIROS

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Rad Hard Advanced Logic

- Guaranteed and Tested to 300kRAD(Si).**
- Fabricated on 1.25 Micron Silicon on Sapphire (SOS) CMOS Process.**
- Packaged in Ceramic Flatpacks and Sidebrazed DIP**
 - Die available**
- ACTS is TTL compatible; ACS is CMOS compatible.**

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Rad Hard Advanced Logic

- **Advanced (ACS/ACTS) Family Features**
 - Silicon on sapphire (SOS) process, 1.25 micron
 - QML Compliant, MIL-PRF-38535 Class V Screened
 - Superior Radiation Tolerance, Totally Latch-up Immune
 - Total Dose 300KRADs
 - SEU100MeV
 - Higher Speed than Bulk AC/ACT
 - T_{PLH} or T_{PHL} = 12ns
 - High Output Current
 - IOH/IOL = + or - 12mA (22mA is typical)

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Rad Hard Advanced Logic

- Screening
- Intersil Rad Hard ACS/ACTSxxxMSR devices are manufactured on a 1.25um Rad Hard SOS CMOS process, which is QML Class V qualified, then assembled and screened in full compliance with MIL-PRF-38535 in Palm Bay, Florida. The screening specs are controlled by SMDs, and MIL-PRF-38535.
- Radiation Guarantees
- Intersil tests samples from EACH wafer to verify its specific radiation hardness and guarantees 300kRAD Total Dose performance. Process characterization guarantees a Single Event Upset LET of 100MeV/(mg/cm²).
- Performance Specifications
- Intersil SMDs state that post radiation, devices pass ALL the specs listed in the SMD at room temp.

The Intersil logo consists of the word "intersil" in a bold, lowercase, sans-serif font. The letter "i" is lowercase, while "ntersil" are uppercase. A red horizontal line is positioned below the letters "ntersil".

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Rad Hard High Speed Logic Features/Advantages

- HCS/HCTS (SOS) Family**
 - QML Compliant, MIL-PRF-38535 Class V Screened
 - Superior Radiation Tolerance, Totally Latch-up Immune
 - Total Dose 200KRADs
 - SEU100MeV
 - Higher Speed than Bulk HC/HCT
 - T_{PLH} or T_{PHL} = 15nsvs 22ns for Bulk HC/HCT
 - High Output Current
 - IOL = 35mAvs 6mA for Bulk HC/HCT
.....vs 12mA for LS and ALS

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Rad Hard High Speed Logic

- **Screening**
- Intersil Rad Hard HCS/HCTSxxxMSR devices are manufactured on a 3.0um Rad Hard SOS CMOS process, which is QML Class V qualified, then assembled and screened in full compliance with MIL-PRF-38535 in Palm Bay, Florida. The screening specs are controlled by SMDs, and MIL-PRF-38535.
- **Radiation Guarantees**
- Intersil tests samples from EACH wafer to verify its specific radiation hardness and guarantees 200kRAD Total Dose performance. Process characterization guarantees a Single Event Upset LET of 100MeV/(mg/cm²).
- **Performance Specifications**
- Intersil SMDs state that post radiation, devices pass ALL the specs listed in the SMD at room temp.

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Rad Hard CD4000 Logic

- Guaranteed and Tested to 100kRAD(Si).**
- Manufactured on a Hardened 7uM Bulk CMOS Process.**
- Sidebrazed DIP and Ceramic Flatpack Packaging.**
 - Class V inspected and radiation qualified die available**
- 5V, 10V, and 15V Parametric Ratings.**

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Rad Hard CD4000 Logic Specifications

- 100% Tested for Quiescent Current at 20V**
- Maximum Input Current**
 - Leakage of 1uA at 18V Over Full Temp Range
 - 100 nA at 18V at Room Temp
- Standardized Symmetrical Output Characteristics**
- 5V, 10V, and 15V Parametric Ratings**
- Noise Margin Over Full Package-Temperature Range**
 - 1V at Vdd = 5V
 - 2V at Vdd = 10V
 - 2.5V at Vdd = 15V

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Rad Hard CD4000 Logic How Neutron Irradiation Helps

- Neutron Irradiated CD4000**
 - **Several Types Available as Neutron Irradiated.**
 - **Offers Latch-up Protection of Bulk CMOS Devices**
 - **Attenuates the Current Gain (Beta) of the Bipolar Transistors to Less than Unity**
 - **Reduces Minority-Carrier Lifetime.**
 - **Less Susceptible to Latch-up Due to Transient Radiation.**
 - **The SMD device type number denotes this feature:**
 - **Non-Neutron Irradiated: SMD device type 01**
 - **Neutron Irradiated: SMD device type 02**

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Rad Hard CD4000 Logic

- Screening
- Intersil Rad Hard CD4xxxBxMSR devices are manufactured on a 7.0um Rad Hard Bulk CMOS process, which is QML Class V qualified, then assembled and screened in full compliance with MIL-PRF-38535 in Palm Bay, Florida. The screening specs are controlled by SMDs, and MIL-PRF-38535.
- Radiation Guarantees
- Intersil tests samples from each wafer to verify its specific radiation hardness and guarantees 100kRAD Total Dose performance. Process characterization guarantees a Single Event Upset LET of 75 MeV/(mg/cm²).
- Performance Specifications
- Intersil SMDs state that post radiation, devices pass ALL the specs listed in the SMD at room temp.

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Product Line Overview - Rad Hard Memories & Microprocessors

Portfolio includes:

- Programmable Read-Only Memory (64K PROMs)
- Intel 80C86 Family of 16-bit Microprocessors & Peripherals

- RTX2010RH Microcontroller (planned withdrawn)
- 82C85RH (withdrawn)
- All MD8XCXX/7 (withdrawn)
except MD8259/7
- 82C37ARH (withdrawn)

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Rad Hard Memories & Microprocessors

– PROMs

- HS-6664RH 8Kx8 PROM
- HS-6617RH 2Kx8 PROM (OBSOLETE)

– SRAMs

- HS-65647RH 8Kx8 SRAM (OBSOLETE)
- HS-65643RH 64Kx1 SRAM (TO BE WITHDRAWN)

– Microcontroller

- HS-RTX2010RH (TO BE WITHDRAWN)

– Microprocessor & Peripherals

- HS-80C86RH 16-bit uP & HS-82CxxRH Peripherals

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Rad Hard Memories/Micro's - HS-6664RH PROM

- World's ONLY radiation hardened nichrome fuse-link synchronous PROM**
 - 8K x 8 architecture
 - 1.25uM AVLSI1R process with nichrome fuse layer
 - 50ns typical access time
 - Guaranteed at 300kRAD(Si)
 - Field programmable supported by Data I/O Unisite

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Rad Hard Memories/Micro's - HS-6664RH PROM (cont'd)

- Advantages

- Intersil has a proven reliable product designed into many systems
- Intersil' technology has traveled outside the solar system!

- Availability

- JEDEC Standard EE PROM Pinout
- Compliant 28 pin DIP and Flatpack packages
- Offered to both Class V (-Q) and Class Q (-8) QML SMD flows
- /PROTO grade available for engineering verification.

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Space Products

Rad Hard Memories/Micro's -HS-RTX2010RH

- PLANNED WITHDRAWN**
- World's first space qualified 16 Bit Microcontroller**
 - 300kRAD guaranteed
 - 1.2uM CMOS/SOS Process
 - Single Event Upset Critical LET > 120 MeV/mg/cm²
 - 8 MIPS Throughput
 - Direct execution of Fourth Language
- Applications include:**
 - Embedded Control
 - Interplanetary Probes
 - Earth Atmospheric Probes

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Rad Hard Memories/Micro's - HS-RTX2010RH (cont'd)

- Availability

- **84 Pin Quad Flatpack (HS9-) and Pin Grid Array (HS8-)**
- **QML SMD Class V (-Q) and Class Q (-8)**
- **/PROTO grade available for engineering design work**

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Rad Hard Memories/Micro's HS-RTX2010RH (cont'd)

- Development system tools**
 - Microprocessor Engineering Ltd. 44 1 703 631441
- C Compiler support**
 - Highland Software highlandsoft@compuserve.com
- There is no inside Intersil applications support**
 - We can fax a list of 3rd party support companies
- SMD 5962F95635**
- In addition to a datasheet (available on the Intersil web site and AnswerFAX), a Programmer's Reference Manual is available through our Marcom Group.**

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HS-RTX2010RH 3rd Party Support Service

- There is no inside Intersil applications support for this device, as noted on page 13 on the data sheet. The support that exists is 3rd party. We are simply manufacturing the silicon to SMD specs.

- C-Compiler support is provided by:
Highland Software, Inc.
PO Box 3396
Indialantic, Fla.32903
(ph) 407-676-3706 highlandsoft@compuserve.com (or) highland@digital.net
(fax) 407-725-2256

- Development system tools are supported by Micro Processor Engineering Ltd. in the UK, their number is 44 1 703 631441.

- Customers may contact these 3rd party support companies for help:

Value Added Re-Sellers

Microprocessor Engineering Ltd., UK,
44 703 631441 Fax 44 703 339691

FORTH Systeme (Angelika Flesch), GER,
49 7667 551 Fax 49 7667 555

Innovative Integration, CA, USA,
805 529 7570 Fax 805 529 7932

- The above information overrides contact information mentioned in the Programmers Reference Manual. The contract we had for the Metsys support mentioned in the literature has expired.

The HS-RTX2010RH is sold to the specifications contained in SMD 5962-95635 and NORs (revisions).

Specifications contained in the Intersil datasheet are obsolete, please refer to SMD.

Value Added Re-Sellers (cont'd)

Silicon Composers, Inc. CA, USA,
415 322 8763

VME, Inc. CA, USA
408 946 3833 Fax 408 946 0351

Software Consulting

FORTH, Inc. CA, USA
213 372 8493 Fax 213 318 7130

Highland Software, Inc.
407 676 3706 Fax 407 725 2256

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Product Line Overview - Rad Hard Data Acquisition

- Intersil offers a portfolio of 22 QML approved, Class Q and Class V, radiation hardened (tested and guaranteed) Data Acquisition functions.**
 - Multiplexers**
 - Switches**
 - Converters**

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Product Line Overview - *Rad Hard Data Acquisition, Multiplexers*

- 6 MUXes offered.
- All are guaranteed and tested Rad Hard.

Device	#OF CHANNELS	PACKAGE OPTIONS	RAD LEVEL	DESCRIPTION
HS-1840ARH	16	Dip, Flatpack	300K	Single 16 Channel, Over Voltage Protected
HS-508ARH	8	Dip, Flatpack	100K	OBSOLETE- REPLACE WITH 508BRH
HS-508BRH	8	Dip, Flatpack	300K	Single 8 Channel, Over Voltage Protected
HS-0509RH	4	Dip	10K	Differential 4 Channel, Fault Protected
HS-0547RH	16	Dip	10K	Differential 8 Channel, Over Voltage Protected
HS-0548RH	8	Dip	10K	Single 8 Channel, Over Voltage Protected
HS-0549RH	4	Dip	10K	Differential 4 Channel, Over Voltage Protected

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Rad Hard Data Acquisition, 16 Channel Multiplexer

- Recently introduced HS-1840ARH 16 Channel Mux
 - Redesign of HS-1840RH.
 - 1840A meets or exceeds all 1840RH specs.
 - Tested and guaranteed to 300K Rad.
 - Improved ESD Protection (1500 Volts).
 - Improved Analog input overvoltage protection spec of $\pm 35V$.
 - High analog input impedance (500Mohm) during power loss.
 - Available in DIP (HS1-) and Flatpack (HS9-) packages, to QML SMD Class V (-Q) and Class Q (-8) flows.
 - /PROTO grade available.

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HS-1840RH to HS-1840ARH PART NUMBER CROSS REFERENCE

Previous

HS-1840RH

Marketing Part # / SMD #

HS9-1840RH-Q
5962R9563001VYC

HS9-1840RH-8
5962R9563001QYC

HS1-1840RH-Q
5962R9563001VXC

HS1-1840RH-8
5962R9563001QXC

HS0-1840RH-Q
(NO SMD AVAILABLE)

HS9-1840RH/SAMPLE
HS9-1840RH/PROTO
HS1-1840RH/SAMPLE
HS1-1840RH/PROTO

PKG/TEMP RANGE

28 LEAD FLATPACK
(-55C TO +125C)

28 LEAD FLATPACK
(-55C TO +125C)

28 LEAD DIP
(-55C TO +125C)

28 LEAD DIP
(-55C TO +125C)

DIE

28 LEAD FLATPACK (+25C)
28 LEAD FLATPACK (-55C TO +125C)
28 LEAD DIP (+25C)
28 LEAD DIP (-55C TO +125C)

New

HS-1840ARH

Marketing Part # / SMD #

HS9-1840ARH-Q
5962F9563002VYC

HS9-1840ARH-8
5962F9563002QYC

HS1-1840ARH-Q
5962F9563002VXC

HS1-1840ARH-8
5962F9563002QXC

HS0-1840ARH-Q
5962F9563002V9A

HS9-1840ARH/SAMPLE
HS9-1840ARH/PROTO
HS1-1840ARH/SAMPLE
HS1-1840ARH/PROTO



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Space Products

HS-508ARH to HS-508BRH PART NUMBER CROSS REFERENCE

Previous

HS-508ARH

Marketing Part # / SMD #

HS9-508ARH-Q
5962R9674201VXC

HS9-508ARH-8
5962R9674201QXC

HS1-508ARH-Q
5962R9674201VEC

HS1-508ARH-8
5962R9674201QEC

HS9-508ARH/PROTO
HS1-508ARH/PROTO

PKG/TEMP RANGE

16 LEAD FLATPACK
(-55C TO +125C)

16 LEAD FLATPACK
(-55C TO +125C)

16 LEAD DIP
(-55C TO +125C)

16 LEAD DIP
(-55C TO +125C)

DIE

16 LEAD FLATPACK (-55C TO +125C)
16 LEAD DIP (-55C TO +125C)

New

HS-508BRH

Marketing Part # / SMD #

HS9-508BRH-Q
5962F9967422VXC

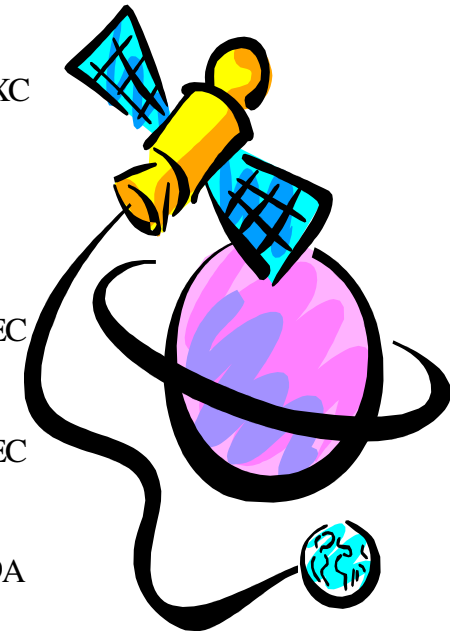
HS9-508BRH-8
5962F96742QXC

HS1-508BRH-Q
5962F9674202VEC

HS1-508BRH-8
5962F9674202QEC

HS0-508BRH-Q
5962F9674202V9A

HS9-508BRH/PROTO
HS1-508BRH/PROTO



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Space Products

Rad Hard Data Acquisition, Switches

HS-3XXRH

- All are tested and guaranteed Rad Hard.
- Available in DIP (HS1-) and Flatpack (HS9-) packages, to QML Class Q (-8) and Class V (-Q) flows
- Low Ron Resistance
 - 30 ohms (pre-Rad, typical at 25 Degrees C)
 - 60 ohms (post-Rad 100K Total Dose, max at 25 Degrees C)
 - Latchup Free

201HSRH Rad Hard SPST CMOS Analog Switch

- Pin compatible with standard HI-201 and 201HS switches
- Tested and guaranteed to 300K Rad
- SEL Immune
- 50 OHM typical Ron
- +/- 17V Overvoltage protection (Power on)
- 110nS typical prop delay
- 16 pin DIP and FP packaging
- Power off high impedance

AVAILABLE NOW!

When failure is not an option

Space Products

Rad Hard Data Acquisition, 8 Bit Flash A/D Converter

OBSOLETE

- **HS-9008RH, 8 Bit Flash A/D (**OBSOLETE**)**
 - **Guaranteed and tested Rad Hard A/D.**
 - **20MHz sampling**
 - **0.5 LSB**
 - **300K RAD**
 - **Offered in Dip (HS1-) and Flatpack (HS9-) packages, to Class V (-Q) and Class Q (-8) QML SMD flows**
 - **/PROTO grade product available for engineering design**
 - **Compatible with our radiation hardened op amps.**

Space Products

Rad Hard Data Acquisition, 12 Bit D/A Converter

- HS-565BRH, 12 Bit D/A**
 - **Guaranteed Rad Hard D/A .**
 - **Hardened version of the industry standard 565 types.**
 - **Intersil' Rad Hard device has guaranteed post rad specs.**
 - **Settles to 0.5 LSB in 500ns MAX**
 - **Latchup Free**
 - **100K Rad**
 - **Offered in Dip (HS1-) and Flatpack (HS9-) packages.**
 - **/PROTO grade product available for design evaluation.**

Space Products

Rad Hard Data Acquisition, Line Driver/Receiver Set

- HS-26C(T)31RH & HS-26C(T)32RH**
 - **Guaranteed Radiation Hardened line driver/receivers!**
 - **Pin replacements for commercially available devices.**
 - **Equivalent to the Non-Rad Hard 26C31/32 and 26LS31/32.**
 - **RS422 Protocol Line Driver/Receiver Chipset.**
 - **300K Rad**
 - **Available in 16 Pin DIPs (HS1-) and Flatpacks (HS9-).**
 - **/PROTO available for customer design.**
 - **“C” Versions are CMOS compatible, i.e., HS1-26C31RH-Q**
 - **“T” Versions are TTL compatible, i.e., HS1-26CT31RH-Q**

▶ *HS-26CLV31RH & HS-26CLV32RH 3.3V*

COMPATABLE VERSIONS NOW AVAILABLE

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Space Products

Product Line Overview - Rad Hard Linear

- Intersil offers a portfolio of QML, Rad Hard tested & guaranteed Linear Products which includes:
 - Op Amps
 - Buffers
 - Sample-and-Hold Op Amps

Space Products

Current Product Offering - Rad Hard Linear - Buffers

- **Programmable High Speed, Low Power, Closed Loop Buffer Amplifier with Output Limiting: HS7B-1115RH-Q.**
- **Dual Programmable High Speed, Low Power, Closed Loop Buffer Amplifier: HS7B-1212RH-Q.**
- **Quad Programmable High Speed Low Power Closed Loop Buffer Amplifier: HS1B-1412RH-Q. (withdrawn)**

Space Products

Current Product Offering - Rad Hard Linear - Op Amps

- Ultra-High Speed Current Feedback Op Amp:
HS7B-1100RH-Q.
- Ultra-High Speed Current Feedback Op Amp with Offset Adjust:
HS7B-1120RH-Q.
- High Speed Low Power Current Feedback Op Amp with
Programmable Output Limiting: HS7B-1135RH-Q.
- High Speed Low Power Current Feedback Op Amp with Output
Disable: HS7B-1145RH-Q.
- High Speed Low Power Current Feedback Dual Op Amp with
Output Disable: HS1B-1245RH-Q (**withdrawn**).

- 1410RH (**withdrawn**)

Space Products

Current Product Offering (cont'd) - Rad Hard Linear - Op Amps & Sample/Holds

- High Performance Op Amp
 - HS1B- & HS2-2700RH-Q, (2400RH-Q withdrawn)
- High Impedance Op Amp
 - HS7B-2600RH-Q
- High Slew Rate Op Amps
 - HS7B- & HS9-2510RH-Q (withdrawn) and HS2- & HS7B-2520RH-Q
- High Impedance Wide Band Op Amps
 - HS7B-2620RH-Q (withdrawn) and HS7B-2622RH-Q
- Fast Sample & Hold
 - HS1B-2420RH (withdrawn)

Space Products

Released Products - Rad Hard Linear

HS9-5104ARH

Low Noise Quad Op Amp

HS-22620RH

Dual, Wideband Op Amp

HS9-6254RH

**Ultra High Speed Transistor Array
(HS1 version planned withdrawn)**

HS-OP470ARH

Low Noise Precision Quad Op Amp

ALL
AVAILABLE
NOW

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Space Products

Rad Hard Linear - HS9-5104ARH

- Rad Hard Low Noise Quad Op Amp**
 - Tested and guaranteed rad hard to 100Krad
 - Quad reduces part count on boards (cost, area, etc.)
 - Low noise figures make it good for:
 - Instrumentation Amplifiers
 - Integrators
 - Active Filters
- Now available in a 14-Lead Flatpack!**
 - Industry standard pinout
 - Formerly only available in DIP
- Flatpack samples in stock for ordering!**

When failure is not an option

Space Products

Rad Hard Linear - HS-22620RH

- **Rad Hard Dual Wideband Op Amp**
 - **Tested and guaranteed rad-hard to 300KRad.**
 - **Dual reduces part count on boards (cost, area, etc.)**
 - **Highly accurate signal processing.**
 - **High input impedance**
 - **Low offset voltage**
 - **Low bias current**
 - **Applications include:**
 - **RF Amplifiers**
 - **Pulse Amplifiers**
 - **High-Q Active Filters**
- **Available in 18-Lead Flatpack**
- **Datasheet on Website**

When failure is not an option

Space Products

Rad Hard Linear - HS-6254RH (HS1 version Withdrawn)

- Rad Hard Ultra High-Speed NPN Transistor Array**
 - Tested and guaranteed Rad Hard to 300KRad.
 - Single event latchup immune.
 - 5 Transistors on a single monolithic substrate.
 - Transistor gain bandwidth of 8GHz.
 - Low noise, low cross-transistor leakage.
 - Applications include
 - High Speed Amplifiers
 - Mixers
 - Converters
- Available in 16-Lead Flatpack and DIP**

Space Products

Rad Hard Linear - HS-OP470ARH

- Rad-Hard Low Noise Quad Op Amp**
 - Tested and guaranteed rad-hard to 100Krad
- Industry standard OP-470 RH1014 pin out.**
 - Quad reduces part count on boards (cost, area, etc.)
- Low noise figures make it good for:**
 - Instrumentation Amplifiers
 - Integrators
 - Active Filters
- Available now in 14-Lead Flatpack**

When failure is not an option

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Space Products

Rad Hard Linear - HS-139RH

- Rad Hard Quad Voltage Comparator**
 - Pin for pin replacement for industry standard LM139
 - Available now
 - Guaranteed and tested to 300kRAD
 - Immune to Low Dose Rate Radiation effects
 - Available in DIP and Flatpack packages
 - Other Linear applications include:
 - Multivibrators
 - MOS Clock Timers
 - Simple A/D Converters

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Space Products

Rad Hard Linear - HS-3530ARH

- Rad Hard Low Power Programmable Op Amp
 - Tested and guaranteed rad-hard to 300kRAD
 - Power dissipation, slew rate, bandwidth, noise, and input DC parameters are programmable with external resistor or current source.
 - Good to +/-3V supplies.
 - Typical Applications include:
 - Active Filtering
 - Sample and Hold Circuits
 - Oscillators/Demodulators
- Available in 10-Lead Flatpack and 8-Lead Can (TO-99)