Products you can count on in the toughest environments

High reliability power management products

www.infineon.com/IRHiRel
For over 30 years, International Rectifier HiRel Products, an Infineon Technologies Company, has offered a unique portfolio of high-reliability power management products for extreme environments, such as those found in space, aerospace, defense, and other industries. Our design, operations and quality systems meet and exceed military standards.

IR HiRel continues to offer excellence and dependability as part of Infineon Technologies. We focus on the quality and reliability of our products so that you can focus on your business.

Agility in a changing environment

IR HiRel offers standard and custom products specifically designed for the tough applications where commercial electronics will not succeed. We have been part of most major defense, civil, and commercial space missions around the world.

We respond to market changes such as the emergence of NewSpace ventures with new, innovative and cost-effective solutions. In addition to market-specific service and support, IR HiRel offers the benefits of being part of Infineon Technologies, a world leader in semiconductor solutions.

Leading the way in high reliability power management

Power semiconductors and electronics for the toughest environments

- High reliability
- Extended life
- Harsh environment
- Mission critical
- High temperature

Product categories

IR HiRel products include a variety of RadHard, RadTolerant, and high-reliability power semiconductors and system solutions:

- RadHard MOSFETs
- Schottkys & Rectifiers
- Power Integrated Circuits (ICs)
- DC/DC Converters
- Solid-State Relays
- Multi-Chip Modules
Power management for the toughest applications

Powering the space economy

International Rectifier HiRel products are used in most space applications with long-life requirements such as most major GPS satellite programs, commercial communication satellites, earth observation satellites, launchers, defense and classified programs. We play a major role in space exploration, supporting the International Space Station, Mars Rovers, the Hubble and James Webb Space Telescopes, Space Launch System, and Orion spacecraft.

Application focus

The need for power management is ever-present in satellites and each system has different power management requirements. That is what we keep in mind when designing our products: enabling us to provide system solutions with engineering, quality and comprehensive application support. IR HiRel power management semiconductors and DC/DC converters are used throughout space and defense systems to manage the main power bus and to power payloads.

World class heritage

› Customers around the world trust our products and our people for the most demanding missions
› Our experts have unparalleled know-how at supporting the most challenging applications with proven solutions
› We offer world-class quality, reliability and support
› Our products operate in extreme environments with long-life expectancies
› We offer innovative technologies and products to solve problems more effectively

The markets we serve

IR HiRel products have been used in over 1,500 satellites orbiting the Earth, space exploration programs, military and civil aviation and defense programs. They are also used in sectors such as oil exploration, undersea communication networks and implantable medical devices.
High reliability discretes and ICs

International Rectifier HiRel Products is a leader in Radiation Hardened (RadHard) power MOSFETs and has continuously brought innovation in silicon design, packaging technology and quality over the last three decades with US DoD DLA QPL products up to MIL-PRF-19500 JANS level.

We have unparalleled understanding of power MOSFET radiation testing and have designed them for improved performance under radiation. IR HiRel offers the broadest catalog of products available in the market, with license-free exportable products as well as radiation hardness ratings up to 1 Mrad(Si) TID and 86 MeV.cm²/mg LET.

IR HiRel new generations of RadHard MOSFETs improve performance and reliability while meeting the changing power requirements of new electronics and applications.

RadHard power MOSFET technologies

IR HiRel has driven innovation and performance in power packaging such as low ohmic TO-254 and TO-257 packages, SMD-0.2 and SupIR™-SMD to make packages more efficient and more reliable, including in system assembly level qualification.

Innovation in packaging

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R9 outperforms the competition with a 30 percent improvement in Figure of Merit. Figure of Merit is $R_{DS(on)} \times Q_G$.

High reliability isolated DC/DC converters

IR HiRel offers a broad catalog of DC/DC converters which are fully qualified and documented, ready to use in aerospace applications and with a tremendous heritage: thanks to these products, you can use your valuable engineering resources in the other critical tasks of your project.

IR HiRel DC/DC converters offer benchmark performance in very compact outlines using proprietary designs. We can customize our standard products and offer fully custom designs based on proven standard topology and platforms.

Open-frame or enclosed PWB power supply units

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High reliability hermetic hybrid DC/DC converters

- General purpose and application specific converters including MIL-STD-461 filters
- Standard and advanced functionality and protections
- License-free exportable RadHard products (EAR-99)
- High temperature DC/DC converters up to 215°C in 1 inch wide package for downhole tools
- MIL-PRF-38534 Class H and K SMD with RHA plan

Proven compact hermetic hybrid packaging for high-reliability

Class K SMD RadHard isolated DC/DC converters

- Lowest, low profile
- Moisture free environment
- Short thermal path
- Mitigates radiated EMI
- Minimizes parasitic impedances
- Ruggedized for shock & vibration

High reliability PWB space level DC/DC converters

The IR HiRel RadHard PWB Power Supply Units (PSU) support high current (>50 A), high power (400 W), complex designs, advanced topology and magnetic design, delivering high-efficiency and overall performance while interfacing smoothly with the satellite bus with optional telemetry. Design practices follow military standards and de-ratings.

We offer a range of standard platforms based on a general design philosophy which can be tailored to the customer’s program requirements. Fully customized designs are also supported. All models and variants are supplied with full analysis data package.

RadHard EPCs for GaN SSPAs

To date we have manufactured thousands of world-class EPCs that feature:

- Small size and weight
- Output sequencing
- Low output ripple
- Output overvoltage Single Point Failure Free
- Integrated active OR-ing

Excellent EMC performance

Excellent efficiency

RadHard PSU for on-board processing, ASICs & FPGAs

- Over 90 percent efficiency
- High power density
- Synchronous rectification
- Lower output voltage to 0.8 V
- High output current to 50 A
- Cold or hot redundancy with built-in O-Ring
- Strong space heritage
- Active OR-ing

IR HiRel PWB DC/DC platforms have also been used to quickly and cost-effectively provide lower specification PSUs for NewSpace constellations while maintaining reliability and radiation tolerance.
High reliability power hybrid modules

IR HiRel offers standard and custom hybrid Multi-Chip Modules (MCM) leveraging its semiconductor, packaging, application, manufacturing and quality expertise. Examples of standard MCM include Rad-Hard Solid State Relays and Linear Voltage Regulators.

**MCM benefits**
- Reduction of footprint and weight
- Improvement of electrical performance
- Reduction of bill of materials, documentation, qualification, procurement and assembly
- Reliable in harsh environment
- Compliant to MIL-PRF-38534 H and K levels

**Custom power modules & assemblies**
- Turnkey design-to-specification and build-to-print hybrid power modules and circuit card assemblies deliver products that fit perfectly to the application in a compact, reliable package
- We follow a gated product development process that provides all necessary analyses and documentation, verification and validation to ensure smooth release to manufacturing and successful qualification

**RadHard solid-state relays**
- Standard and custom
- Multiple outputs, voltage and current
- Metal and ceramic packages

**Applications**
- Solar array motor control
- Heater controls
- Bus switching
- Ground power isolation

**Motor control and power MCM**
- Standard and RadHard
- Hermetic and plastic encapsulated

**Applications**
- Antenna, solar panel, reaction wheel assembly
- Flight control actuators
- Aircraft starter generators
- Thrust Vector actuators

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**Over 30 years of heritage in thousands of programs**

**Select Aeronautics and Defense Programs**
- F-35 JSF
- F-16
- F-22
- Eurofighter
- SAAB Gripen
- AJ-64
- Trident Missile
- Patriot Missile
- THAAD
- M1A2 Tank
- Airbus 320, 380
- Boeing 737, 777, 787

**Select Satellite Platforms and Space Programs**
- GPS II and GPS III
- GOES
- GLONASS
- Galileo
- Iridium NEXT
- MUOS
- MetOp
- Meteosat
- NPOESS
- AELF
- JPSS
- OneWeb

**Select Space Exploration Programs**
- Space Launch System
- Orion Capsule
- International Space Station
- Lunar Reconnaissance Orbiter
- Deep Space Probe
- NASA Mars Rovers
- James Webb Space Telescope
- Hubble Telescope
- ExoMars
Where to buy

Infineon distribution partners and sales offices:
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Service hotline

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› India .............................. 000 800 4402 951 (English)
› USA .............................. 1-866 951 9519 (English/German)
› Other countries .......... 00* 800 951 951 951 (English/German)
› Direct access .............. +49 89 234-0 (interconnection fee, German/English)

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