



A passion for performance.

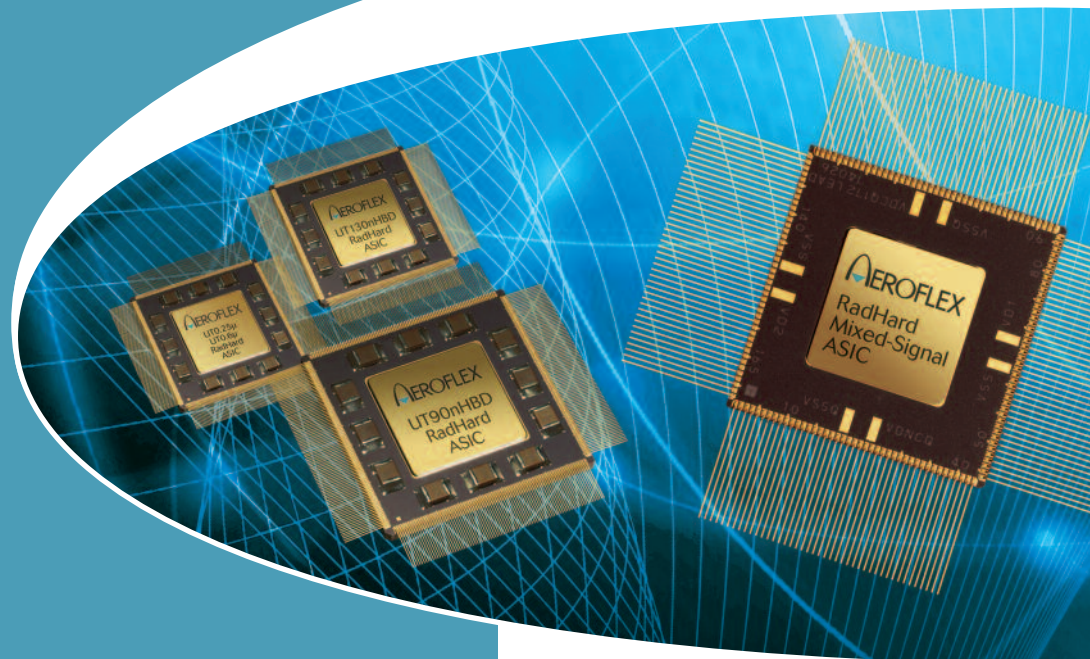
Digital and Mixed-Signal
custom, semi-custom,
off-the-shelf designs
with Aeroflex Gaisler IP

Guaranteed radiation
performance

QML-V, QML-Q, Mil-Aero,
medical, industrial grades

Category 1A
Trusted Accreditation

“Integrating the Signal
Chain”



RadHard and HiRel ASICS

Digital and Mixed-Signal

RadHard ASICs

- Fabless business model for mask generation and wafer fabrication.
 - All other design, manufacturing and quality assurance steps occur in house.
- Numerous mature foundry processes available.
- Aeroflex proprietary ASIC libraries & IP.
 - Access to commercial libraries & IP as well.
- Industry standard EDA design tools and design flow.
- Assured long term supplier of integrated circuit products
- Specialized development and qualification of RadHard ASIC technologies.
- Trusted, CAT1A Accredited, Design through Qualification

AEROFLEX GAISLER – SOC Building Block IP

- LEON3/4 SPARC V8 Processor
- LEON3/4 FT SPARC V8 Processor
- GRLIB portable IP library
- GRFPU IEEE-754 floating-point unit
- GRPCI Master/Target PCI bridge
- GRETH 10/100/1000 Mbit Ethernet MAC
- USB host controller
- USB device controller
- SpaceWire controller
- SpaceWire router
- GR1553 AHB IF for 1553
- Spacecraft Data Handling
- I²C - Inter-IC Bus interfaces
- Serial Peripheral Interface
- AES/ECC Cryptography
- CAN controllers
- Memory controllers

30 YEARS AND MOVING FORWARD

Aeroflex Microelectronic Solutions – HiRel has a 30-year history of cost-effective RadHard and commercial ASIC solutions for the most critical applications. To meet the new demands of the digital world, Aeroflex offers proven RadHard Mixed-Signal ASIC capabilities, expanding our products to a full range of custom solutions - from FPGA conversions to complete Mixed-Signal system-level solutions, from high-voltage 0.6 μ m CMOS to dense 90 nm CMOS.

Aeroflex RadHard ASICs have flown before on Cassini, Mars Rover, GOES-R, Iridium, Milstar, P-91, the International Space Station, and many classified satellites. Aeroflex's commercial Mixed-Signal ASICs are currently installed in medical, security, and industrial applications. With Aeroflex's new custom RadHard Mixed-Signal solutions, system designers do not need to settle for more costly and power-hungry FPGA solutions.

By leveraging our high-volume commercial and RadHard product knowledge, our Aeroflex Gaisler portfolio, our proprietary advanced RadHard techniques, and the strength of our foundry partners, Aeroflex has the experience, technology, and motivation to assure your program success. Aeroflex remains committed to assured supply from 0.6 μ m to 90 nm.

FLEX ENGAGEMENT MODELS

Aeroflex has proven experience in converting FPGAs into RadHard ASICs. As FPGAs (most recently the 1020, 1040 and 1280) become obsolete, Aeroflex has converted many Flex Engagement Models to ASICs. Examples include Actel RH1020, RH1280, RT54SX32S/72S, RTAX250S/1000S/2000S, Xilinx XC2/3/4000, and Virtex-II/-IIPro/-4/-5.

We offer these benefits.

- CML/SSTL/LVDS/PLL capability
- Chip capacitors on packages
- SEU of $<2E-12$ error/bit-day
- SEL of >128 MeV on 0.6 μ m process*
- SEL of >110 MeV on 0.25 μ m process*
- Actel compatible 84, 172, 208, 256, 352 CQFPs, 624 CCGA
- Xilinx compatible CQFP, Flip Chip, CCGA, PBGA, LGA pinouts

* maximum rate possible with test equipment @ 125°C

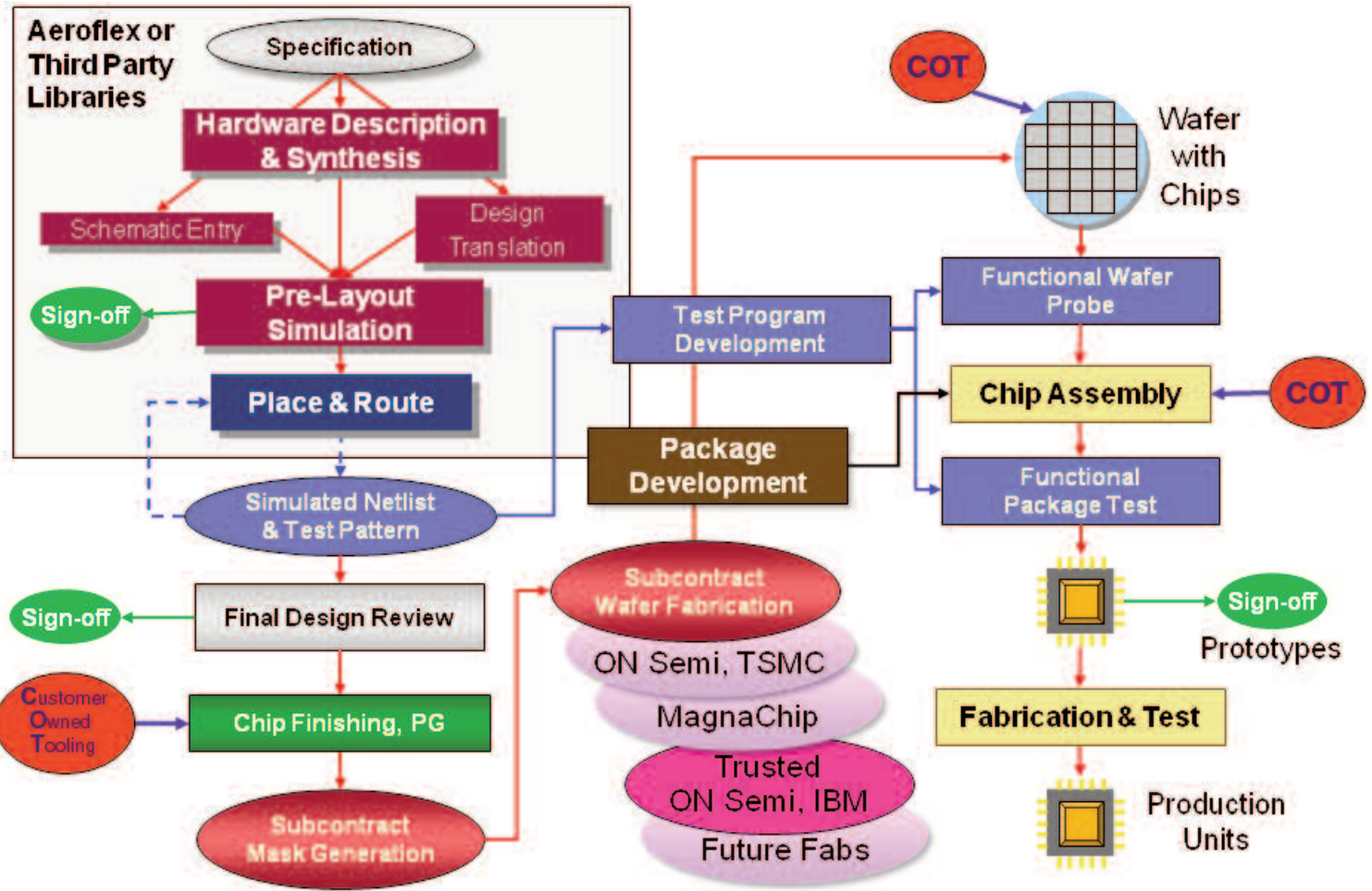
Aeroflex Process Technology

TECHNOLOGY	90nm CMOS	130nm CMOS	180nm CMOS	0.25µm CMOS	0.35µm CMOS	0.6µm CMOS
PARAMETERS						
Metal layers	6-9 Cu	6-8 Al/Cu	5-6 Al/Cu	4-5 Al/Cu	3-4 Al/Cu	3 Al/Cu
Capacitors	MiM	MiM	MiM	MiM	MiM/PIP	PIP
High-value resistors	No	Yes	Yes	Yes	Yes	Yes
Vertical NPN bipolar	No	No	Yes	Yes	Yes	Yes
Substrate PNP bipolar	Yes	Yes	Yes	Yes	Yes	Yes
HV CMOS support	No	No	5 V (self-aligned)	Yes	10 V (self-aligned)	20 V (ext drain)
Thick metal inductor	No	Yes	Yes	No	Yes	No
Digital/analog supply voltages (DVdd, AVdd; Vss=0)	2.5, 1.8, 1.2, 1.0	3.3, 2.5, 1.8, 1.5, 1.2	5.0, 3.3, 1.8	3.3, 2.5	10.0, 5.0, 3.3	5.0, 3.3, 2.5
Alternate analog supply voltages (AVdd/AVss)			±2.5, ±1.65, ±0.9		±5, ±2.5, ±1.65	
Maximum toggle frequency	33 GHz	5 GHz	2.4 GHz	1 GHz	375 MHz	215 MHz
Power dissipation - nW/gate - MHz; 20% duty cycle	7	10	20	40	150	320
Gate delay 25°C (ps)	6	20	50	65	140	225
Usable gates (NAND2 equivalent)	15-50 M	10-15 M	8 M	3 M	1.5 M	500 K
Typical signal I/O	~1024	~1024	~1024	~512	~425	~400
Flip-chip I/O available	Yes	Yes	Yes	No	No	No
Cold sparing	Yes	No	Yes	Yes	Yes	Yes
Full 5V compliance	No	No	Yes	No	Yes	Yes
5V tolerance	No	No	Yes	Yes	Yes	Yes
Example analog IP (full custom analog available)	SerDes Temp Sensor PLL	ADCs, DACs PLL	Band-gap, Volt. reg. Comp/op-amps, ADCs, DACs, PLL, VCO RC oscillator	Band-gap, Volt. reg. ADCs, DACs PLL	Band-gap, Volt. reg. Comp/op-amps, DACs, ADCs, PLL, VCO	Band-gap, Volt. reg. Comp/op-amps PLL/DLL
SRAM compiled	Yes	Yes	Yes	No	No	No
Non-volatile memory			Flash* EEPROM* RadHard OTP Metal Fuse**		Flash* EEPROM* RadHard OTP Metal Fuse**	
Special I/O	SSTL, MGT, CML, LVDS, PCI, PCI, SerDes	SSTL, MGT, CML, LVDS, PCI	SSTL, MGT, CML, LVDS, PCI, USB1.1	SSTL, MGT, CML, LVDS PCI	SSTL, MGT, CML, LVDS, PCI, RS232/ RS485 (±5V), USB1.1	SSTL, MGT, CML, LVDS, PCI
Total ionizing dose Rads(Si)	30-300 K	30-300 K	30-300 K	30-300 K	30-300 K	30-300 K
SEL (MeV-cm ² /mg) @ Vdd max and 125°C	>100	>110	>110	>110	>110	>128
Reliability (FIT rate)	<50	<20	<10	<10	<10	<5
Wafer foundry quality level	QML-Q&V	QML-Q/Q+	QML-Q/Q+	QML-Q&V	QML-Q&V	QML-Q&V
Trusted foundry level	CAT1A					CAT1A

*Limited total-ionizing dose environments. Floating Gate Memories such as Flash and EEPROM must be periodically re-written in a total ionizing dose environment for reliability.

** To be QML qualified

RadHard ASIC Design Flow



SUPPORTED DESIGN TOOLS

Aeroflex Colorado Springs actively supports robust and easy-to-use design environments including VHDL and Verilog, using third-party design tools. Aeroflex supports libraries for:

- Cadence
- Mentor Graphics
- MATLAB
- Synopsys
- Full mixed-mode simulation
- many others



RadHard sensor interface solutions

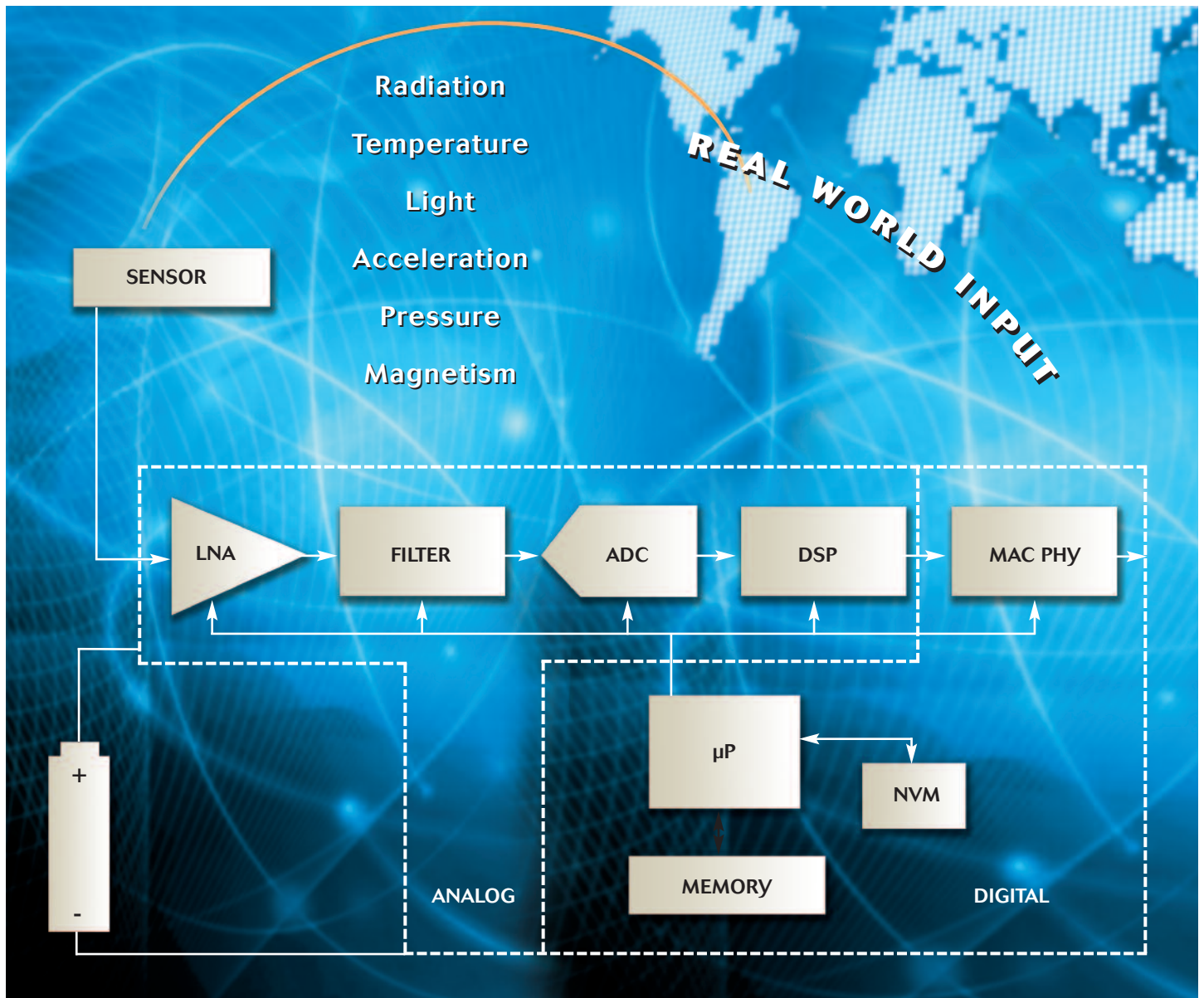
Aeroflex understands that RadHard data conversion solutions must be system oriented. That's why Aeroflex offers Aeroflex Gaisler IP and radiation analysis of photonic sensors using an Aeroflex-proprietary SEE simulator. Using the output of our simulator, we can take into account all radiation-induced noise sources, including the noise generated in the sensor when designing RadHard analog-to-digital conversion ASICs for critical control loop or sensing applications.

Rather than have discrete ADCs for each sensing channel, Aeroflex can integrate multiple, independent ADCs on a single ASIC with low cross-talk between channels. Using Aeroflex's substrate-isolated, RadHard analog library, channel-to-channel isolation of >108 dB can be achieved. Multiple, parallel ADCs often save power over highly MUXed solutions, since each ADC can operate at significantly lower frequencies.

Contact Aeroflex today to take advantage of the increased performance, reliability and reduced size and power consumption of our RadHard Mixed-Signal ASICs.

WE CONNECT THE REAL WORLD TO THE DIGITAL WORLD™

EXAMPLES OF A RadHard ASIC SOLUTION

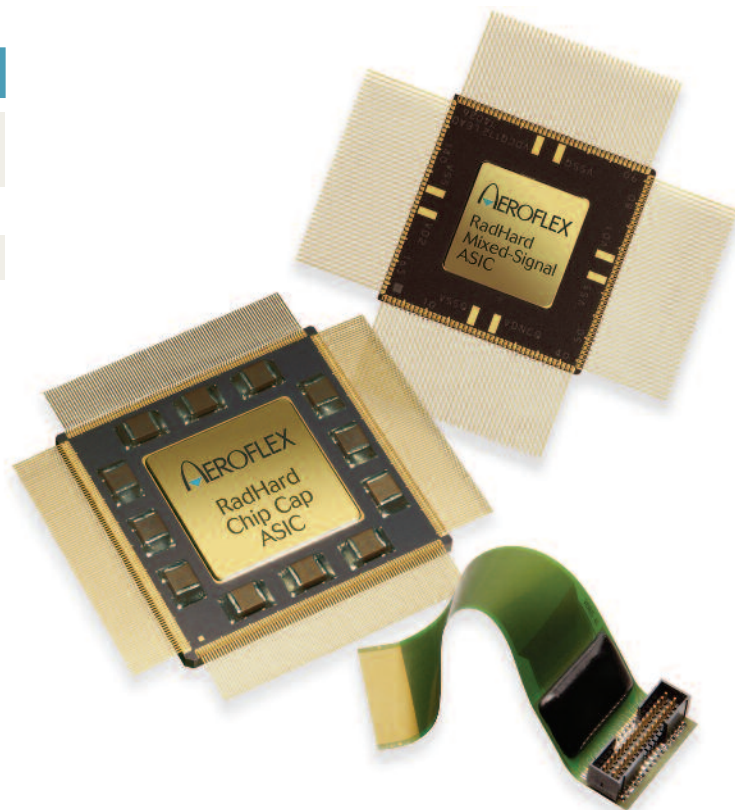


RadHard ASICs

PACKAGING

TYPE	LEADS/DESCRIPTION
CQFP	68, 84, 132, 172, 196, 208, 256, 304, 340, 352
CPGA	281, 299
CLGA/CCGA	472, 624, 1028, 1752
Chip-on-Flex	100 μ lead pitch

Aeroflex also offers custom packages including multi-chip modules, end modules, and all JEDEC packages.



AEROFLEX
A passion for performance.



WEB SITE www.aeroflex.com/radhardasic
www.aeroflex.com/Gaisler

TELEPHONE 1-800-645-8862

Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

Part No. RHASIC 8/11/2015.
Specifications are subject to change without notice.