

Linecard Italy

**Protec GmbH**  
*High-Rel Electronic Components*

**Protec GmbH** was founded in 1976 and is successful in the sales of High Reliability components.

We are particularly specialised in highly qualified components for industrial, military and space applications.

In instances of obsolescence and supply problems, we can also offer our customers effective solutions with our extensive product and market knowledge.

Our customer orientated warehouse, equipped with a modern ESD protection system, guarantees reliable component supply.

With our design-in and market orientated expertise, we can provide long term support for your projects and applications.

Through our distributor and rep strategy, we are the "extended arm" of our Manufacturers. When required we will put you directly in touch with our manufacturer's specialists.

Our first priority is a long term, successful partnership with our customers and manufacturers.



**We support customers & manufacturers with our expertise in:**

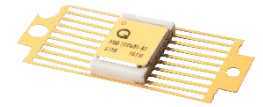
- EUS requirements and licensing processes
- CoC requirements
- Design in support
- Export classifications and rules
- Product trainings

Support and understanding of terms like SLDC, LOT acceptance, PIND, TID, ELDRS, SEE, SEU, SEL, Proton testing and many more industry specific terms.

**ARQUIMEA**

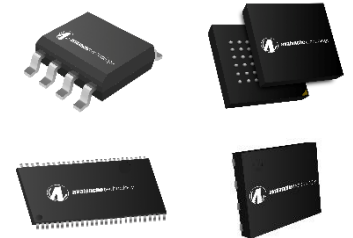


LVDS	EPPL → Quad Driver / Receiver and Dual Transceiver	ESA Qualified
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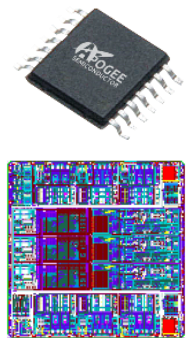
**avalanche** technology

Parallel x32 (Gen 3)	1Gb / 4Gb	75krad
Serial D-QSPI (Gen 3)	1Gb / 2Gb / 4Gb / 8Gb	75krad
Serial QSPI (Gen 1)	4Mb / 8Mb	75krad
Serial (Gen 2)	16Mb	75krad
Parallel x16 (Gen 2)	16MB / 32Mb / 64Mb	75krad



**APOGEE**  
SEMICONDUCTOR

Logic - AND	Quad 2-input / Triple 3-input	30kRad / 80MeV
Logic - NAND	Quad 2-input / Quad Schmitt 2-input / Triple 3-input	30 Krad / 80MeV
Logic - OR	Quad 2-input	30 Krad / 80MeV
Logic - NOR	Quad 2-input / Triple 3-input	30 Krad / 80MeV
Logic - XOR	Quad 2-input	30 Krad / 80MeV
Logic - Inverter	Hex Inverter / Hex Schmitt Inverter / Hex Open-drain Inverter	30 Krad / 80MeV
Logic - Voter	Dual 3-input Majority Voter with Error Output	30 Krad / 80MeV
Logic – Flip-Flop	Dual D Flip-Flop with Async. Clear	30 Krad / 80MeV



**VPT**  
COMPONENTS

Transistors	NPN and PNP Small Single and Power BJTs	up to JANSR/F
Diodes	Zener, TC Zener, Schottky, Ultra Fast, Rectifier	up to JANS
MosFets	RadHard 100V, 150V, 200V, 250V	up to 84MeV

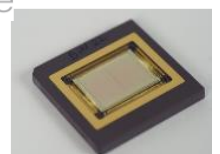


**NanoXplore**



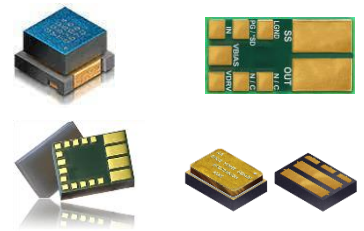
NG-Medium	SpW & DDR 2 PHY	34KLUT
NG-Ultra	Quadcore ARM R52 @ 600MHz 32 HSSL @ 12.5 Gbps / SpW & DDR 3&4 PHY	500KLUT
NG-Ultra300	16 HSSL @ 12.5 Gbps / SpW & DDR 3&4 PHY Embedded ADCs & DACs	290KLUT

Impulse



**EPC · SPACE**

<b>GaN FETs</b>	40V to 300V	$R_{on}$ 4 to 400m $\Omega$
<b>GaN Driver</b>		
<b>GaN Power Stages</b>		



**FLUX**

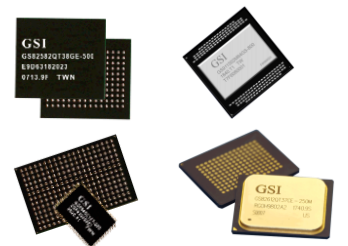


<b>Chokes</b>	ESA Technology Flow Qualified	
<b>Transformers</b>	ESA Technology Flow Qualified	
<b>Inductors</b>	ESA Technology Flow Qualified	



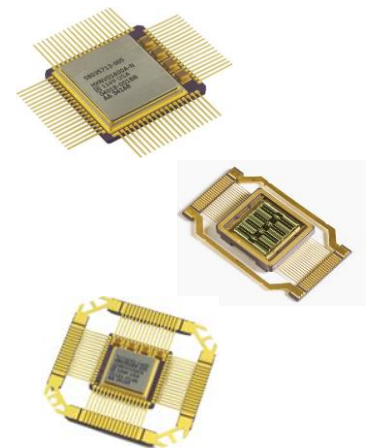
**GSI TECHNOLOGY**

<b>SRAM also RadTolerant</b>	SigmaQuad-II+ (x18 / x32 configuration) 350 MHz	288M / 144M / 72M
<b>SRAM also RadTolerant</b>	SyncBurst & NBT (x18 / x32 configuration) 333 MHz	144M / 72M / 36M
<b>APU</b>	High Speed Paralell Computing for SAR, Imaging and AI Applications	



**Honeywell**

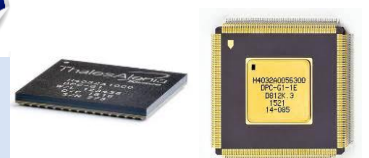
<b>SRAM</b>	QML-Q and V (x8 or x32 configurations)	256k to 64M
<b>MRAM</b>	QML-Q and V (x8 or x16 configuration)	16M / 1M
<b>SER/DES</b>	1-4 Lines or 1-8 Lines	up to 3,125GB/s
<b>RS422</b>	Quad Driver and Reciever	20Mb/s
<b>LVDS</b>	Quad Driver and Reciever	100MHz
<b>Processors</b>	HX1750 & HXRHPPC Microprocessor	
<b>Logic</b>	Quad 2-input NAND	
<b>ADC</b>	12 Bit Monolithic / Low Power	20 MSPS
<b>DAC</b>	12 Bit Monolithic	
<b>Comparator</b>	Common mode 0V to 5V / Input Offset Voltage +/-24mV	
<b>Analog MUX</b>	8-Channel	$R_{ON} < 60\Omega$



**dpc**  
Digital Programmable Controller

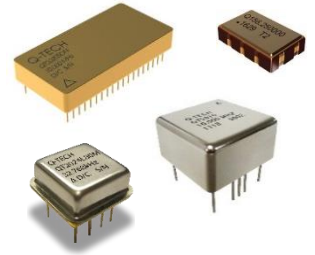


<b>DPC G1</b>	16bit openMSP430 – Digital Programmable Controller >60krad / SEL >72.2MeV / SEU >40MeV 16 ADCs / 3DAC / 108 IO / PLL / PWM / Low Power 3x 30MIPS / MIL-1553 / CAN / UART / -55 to 125°C	$\mu$ Controller
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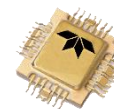
<b>XO</b>	CMOS, TTL, LVDS, LVPECL	Single & Multiple Outputs
<b>TCXO</b>	HCMOS, Sine	±0,5ppm
<b>VCXO</b>	HCMOS, Sine	
<b>OCXO</b>	CMOS, Sine	±10ppb
<b>SAW</b>	Sine 400MHz to 1,3GHz - low phase noise	300krad
<b>MCXO</b>	CMOS or Sine 5 to 80MHz 1pps	50krad
<b>New Space XO</b>	QT780, QT723 and QT735 Series	50krad
<b>Specialty Oscillators</b>	combined OCXO, MCXO, TCXO, SO, VCXO, PLL & crystal filters in modules	



<b>ADC</b>	Base-Band up to Ka-Band	35GHz 12.8GSps
<b>DAC</b>	Base-Band up to Ka-Band	12b 12GSps
<b>DDR4</b>	4GB and 8GB, 100krad >60MeV	Up to ECSS Class 1
<b>Processors</b>	LS1046-Space (ARM A72 @ 1.8GHz) Power PC P2020 and P8548	
<b>SiP Modules</b>	QLS1046 and DDR4 Module	



<b>Amplifiers</b>	LNAs, Driver Apms, Power Apms, Gain Blocks	
<b>SPDT</b>	1MHz to 60GHz	
<b>Radiation Dosimeters</b>	hybrid microcircuit measures (TID)	
<b>DSA</b>	PE94302 - 0.25MHz to 4MHz (6Bits / 64 states)	
<b>Freq. Multiplier</b>	TDFM001000 25GHz MMIC Freq. Doubler	
<b>Limiters</b>	MMIC 10MHz to 6GHz / 100W	Rad Tolerant
<b>Mixers</b>	double-balanced passive mixer MMIC 18-46 GHz	
<b>Prescalers</b>	RF prescaler family divide ratio 2, 4 or 8 / dc to 13.5GHz	
<b>PLLs / Synthesizers /VCO</b>	integer-N and fractional-N	
<b>Power Modules</b>	Load Switch (isolated Driver) 650V – 60A – 25mOhm	46MeV/100krad
<b>POLs 2A to 10A</b>	Vin 4.6-6V / Vout 1-3.6V	



**SEMICORA**  
A DIVISION OF OSI OPTOELECTRONICS

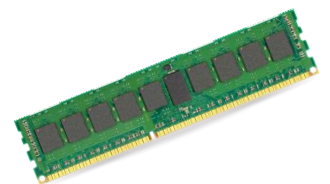
<b>Transistors</b>	2N3810, 2N2920, 2N2857, 2N2369, 2N3637 and more	up to JANSR/F
<b>Diodes</b>	1N5802, 1N5804, 1N5806, 1N5614, 1N5615	JANS & HC / KC die



**viking**  
TECHNOLOGY

(Non Space only no radiation guarantee)

<b>DRAM Modules</b>	DDR5 (coming soon), DDR4, DDR3, DDR2, DRAM	up to 32GB
<b>STORAGE (Flash/SSD)</b>	2.5 in. SSD, 1.8 in. SSD, M.2 SSD, slimSATA, etc.	
<b>Rugged Memory</b>	ParallelCell MCP, ParallelSSD	
<b>Persistent Memory</b>	DDR4 NVDIMM, Energy SubSystems (ESS)	



**EPSON**

<b>Inertial Measurement Unit (IMU)</b>	Low Noise, High Stability, Wide Dynamic Range (New Space)
<b>Vibration sensor</b>	High performance Vibration sensors (New Space)
<b>Accelerometer</b>	High dynamic range, low drift & digital output (New Space)



**ZES**  
ZERO-ERROR SYSTEMS

<b>3A PoL (Point of Load)</b>	$V_{in} 2,5 \text{ to } 5V$ / $V_{out} 0.8 \text{ to } V_{in} -0,5V$	100krad/110MeV
<b>ZES100 (LDAP)</b>	Latchup Detection and Protection / EP Package QFN32L	300krad/110MeV
<b>ZSOM-M01</b>	System on Module (ARM M0+ Module for LEO Missions)	RadTolerant
<b>ZES400 Quad Voter</b>	1,8 to 5V Supply / EP Package QFN28L	300krad/110MeV



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**UK & IRELAND  
LINECARD**

available here

[WWW.PROTEC-SEMI.COM](http://WWW.PROTEC-SEMI.COM)



**DACH SPACE  
LINECARD**

available here

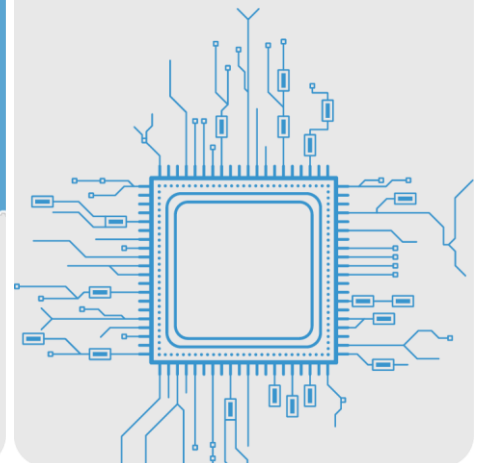
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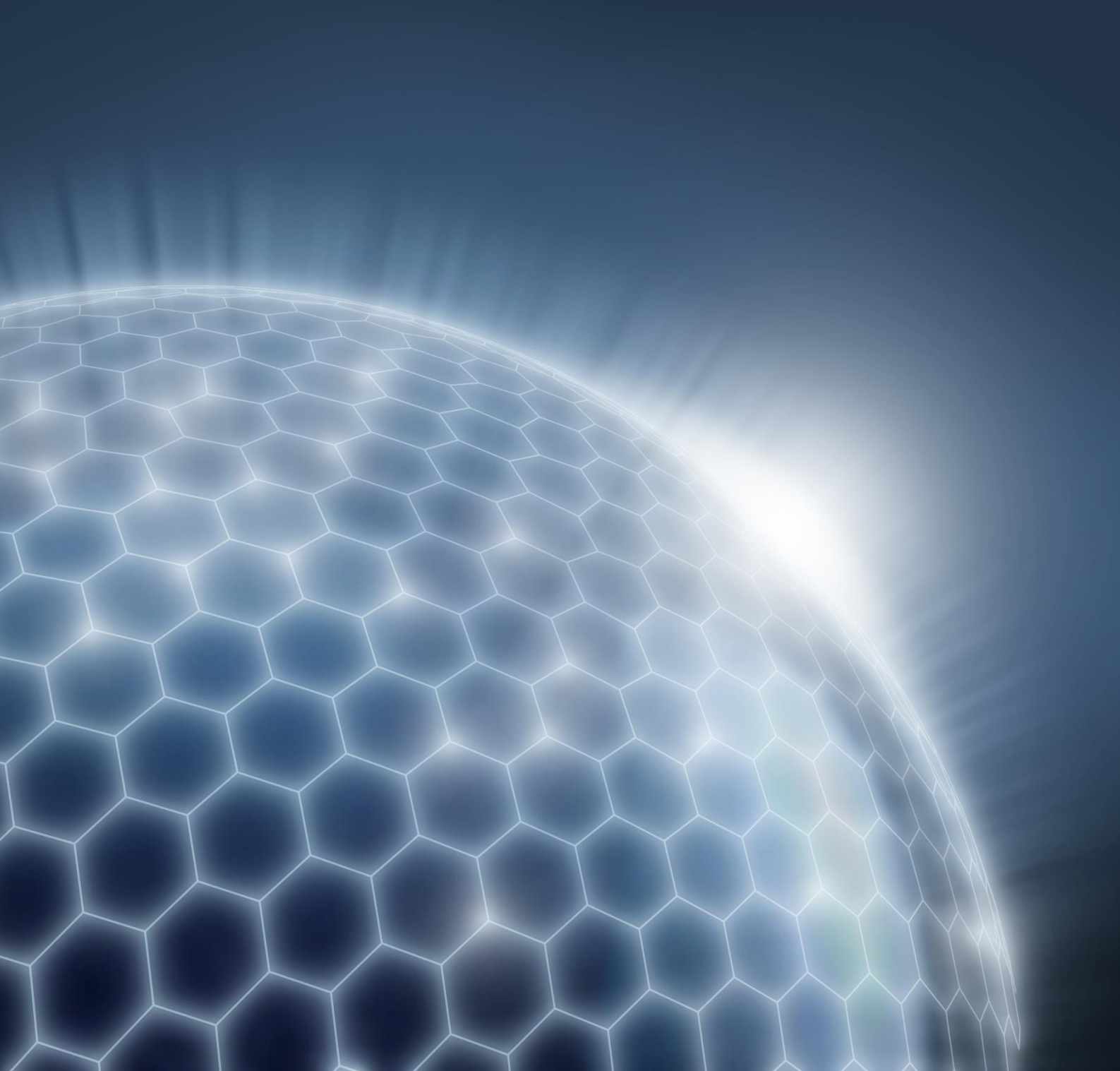


**HISTORICAL BRAND NAMES OF SUPPLIERS**

following Brands are still known, either sold or renamed, we might be able to help you







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*High-Rel Electronic Components*

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