SPACE IC

High-reliability integrated circuits

Company Presentation

ESCCON 11-13 March 2019

ESTEC/ESA, Noordwijk, The Netherlands

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Register: Hannover ▪ Amtsgericht Hannover ▪ HRB 210911

Company

- Foundation of **SPACE IC** in 2014 by experts from the TELEFUNKEN IC product development
- **SPACE IC** exclusively takes over development and manufacturing of **rad-hard IC products** from TELEFUNKEN

TELEFUNKEN
Semiconductors

SPACE IC

Founder Team & Management Board:


V. Burkhay


U. Gieselmann


M. Reuter


A. Rocke

Headquarter:

SICAN Technology Park in the Northwest of Hannover, Germany

Overview

SPACE IC

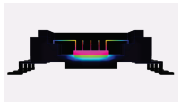
Technical and Application Focus

- Space-Grade Analog and Mixed-Signal Integrated Circuits for **Power Management** and **Robust Data Interfaces**

IC Product Development

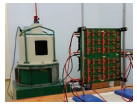
Chip Development:

- IC Spec
- IC Design
- Package Design
- Prototyping

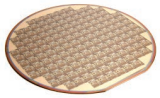
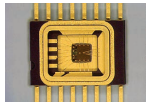
Testing:

- Screening
- Evaluation
- Qualification

Manufacturing:

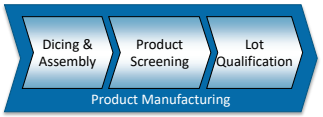
- Chip Foundry
- Wafer Test
- Dicing
- Assembly
- Screening
- Qualification Testing

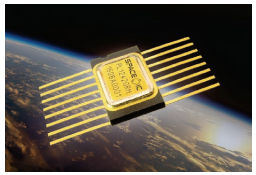
Service:

- Mixed-Signal ASIC Service

- Manufacturing Service



Technical Focus



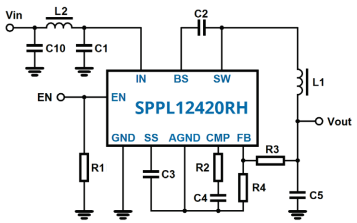
SPACE IC develops and manufactures ICs for space:

high-reliability · radiation-hard · analog and mixed-signal · ITAR/EAR-free

Power Management

DC power conversion, conditioning and protection:

- DC/DC Regulators
- LU Protection
- HV Gate Driver

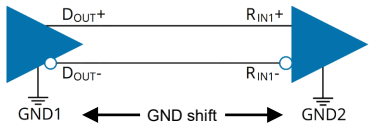


2A point-of-load DC/DC converter

Interfaces

Robust data interfaces:

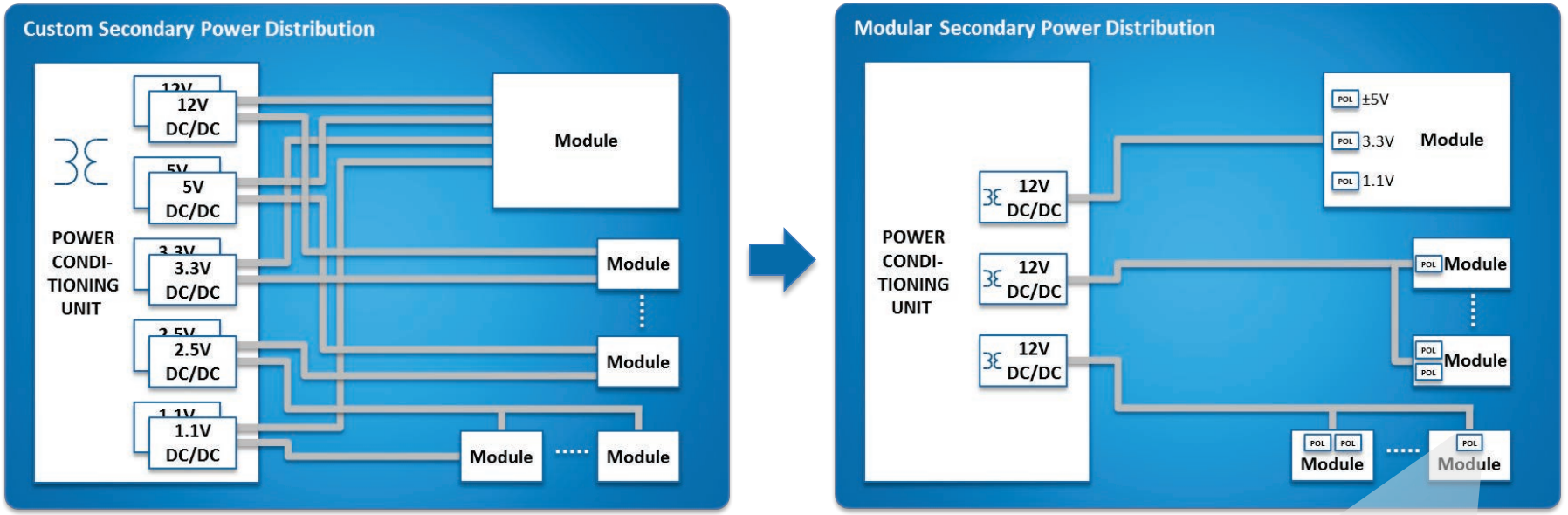
- Extended Common-Mode LVDS (for SpaceWire)
- CAN Bus Line I/O
- CAN System IC



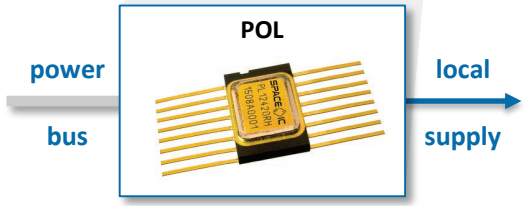
fast box-to-box communication

Power Management Evolution

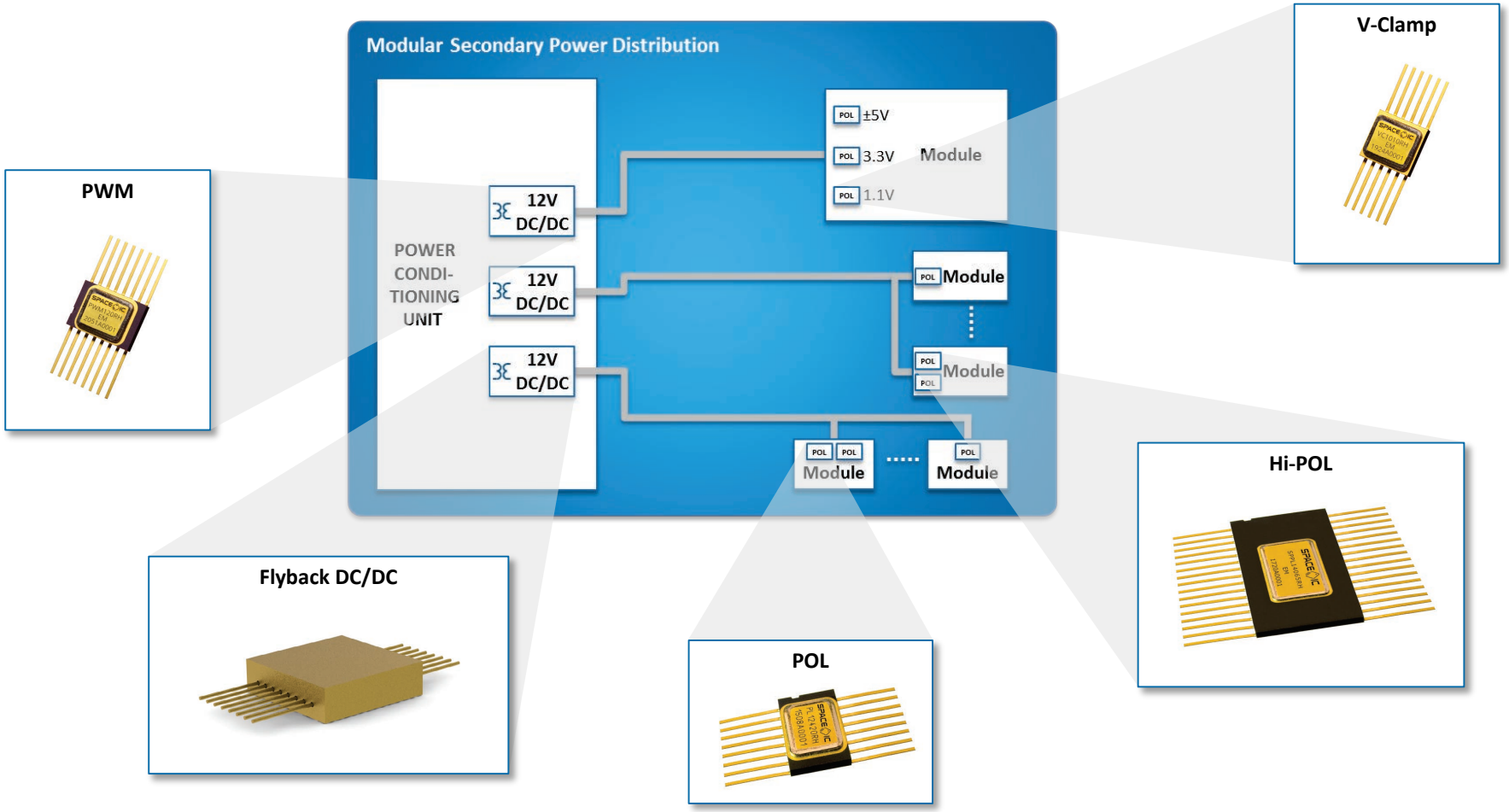
Power Distribution Evolution:



- Modular approach with standard intermediate power busses & standard power interfaces
- Highly efficient & accurate power conversion at point-of-load
- Weight & volume of few power rails; lower current



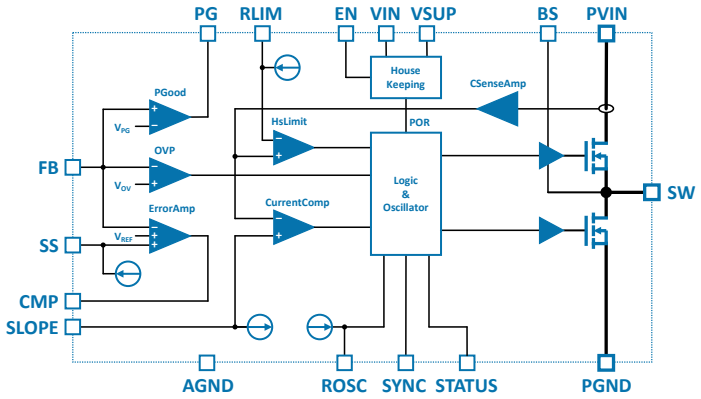
Power Management Products



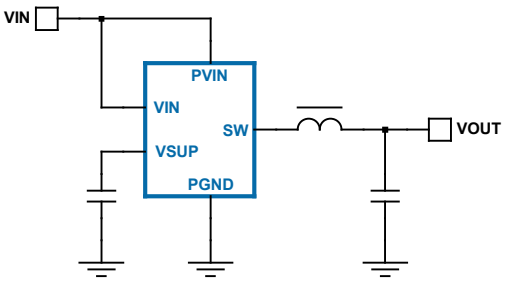
SPACE IC Next-Gen Hi-POL IC

Versatile monolithic POL converter:

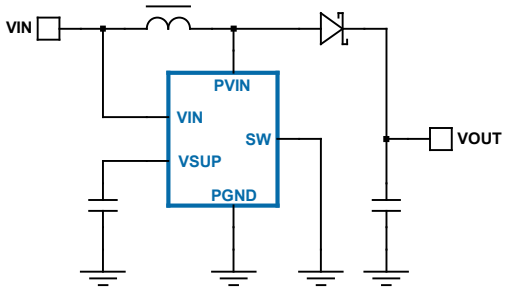
- 8A, 3.3V - 40V
- Adjustable current limit & frequency
- Load sharing capability, frequency sync
- >90% efficiency



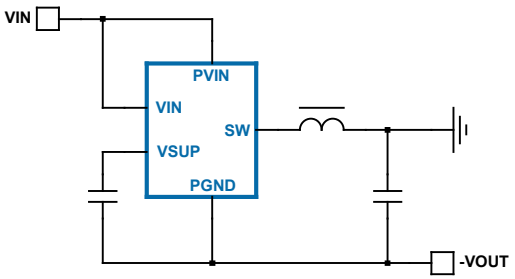
Buck mode:



Boost mode:

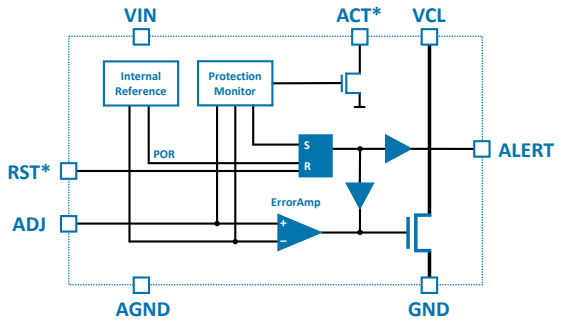


Buck-Boost mode:

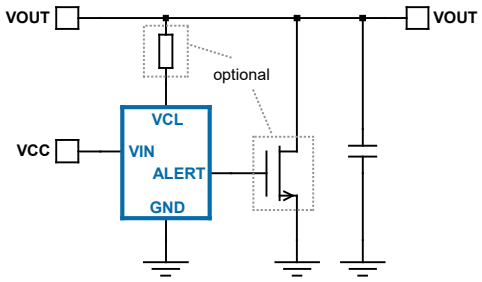


TRP Activity
Voltage Clamp IC

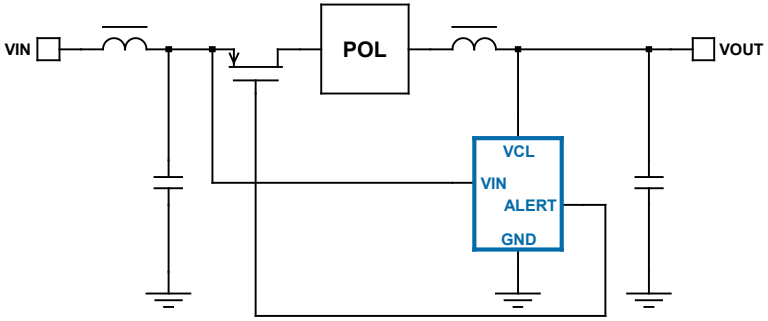
- 10A shunt regulator, up to 10V adjustable clamp voltage
- >18W power dissipation capability (10ms)
- Protection of payload electronics against EOS
- Suitable for power conversion and distribution systems
- Can be used as voltage regulator



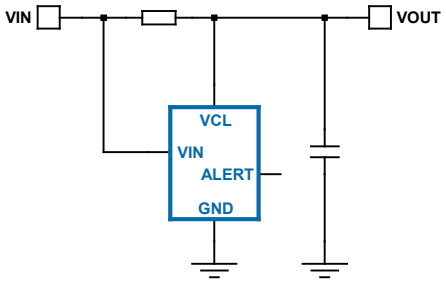
Voltage clamp:



POL protection:



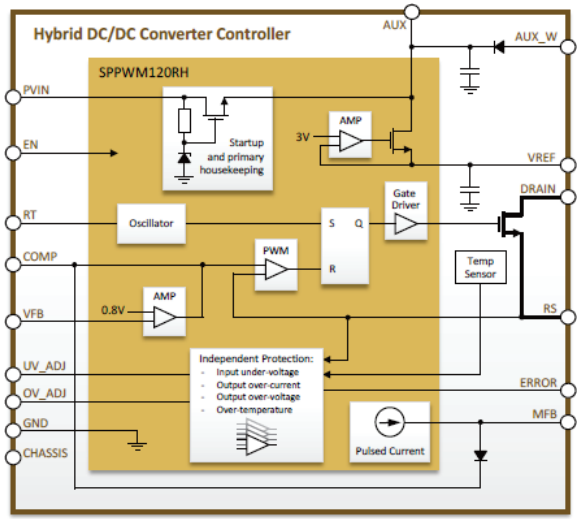
Voltage regulator:

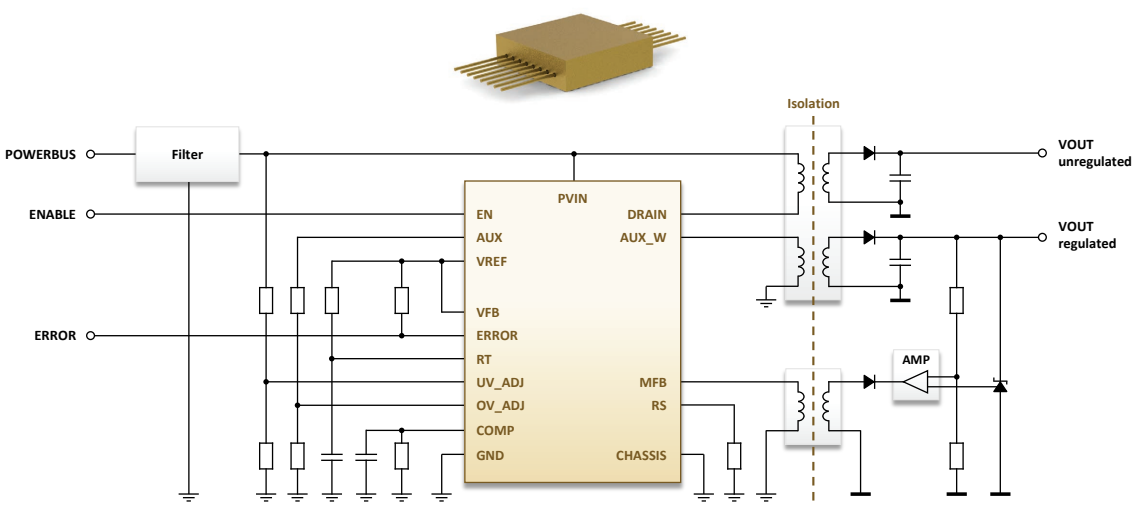


GSTP 6.1 Activity
Flyback DC/DC Hybrid

European Integrated Power Switch ASIC for small DC/DC converters

- Isolated and non-isolated flyback converter topologies
- Up to 15W output power from 18V - 105V input power bus
- DC/DC converter design effort limited to magnetic components, diodes and passives
- SPACE IC SPPWM120RH inside - cooperation project with ARC POWER, Switzerland



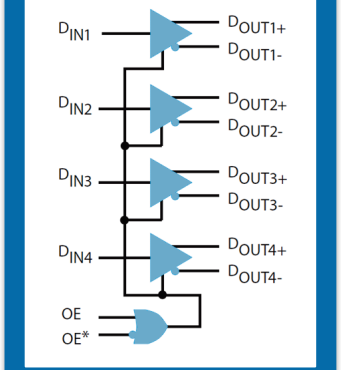


GSTP 6.1 Activity
Extended CM LVDS

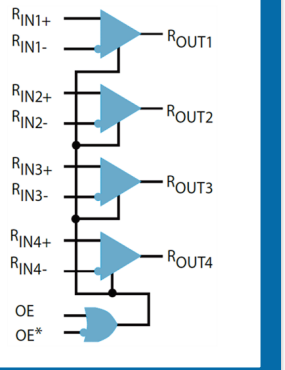
400Mbps quad LVDS line translators

- Extended common-mode capability: -7V to +12V
- Best in market signal performance
- Suitable for **SpaceWire** networks
- Passed biased TID testing >50krad

SPLVDS031

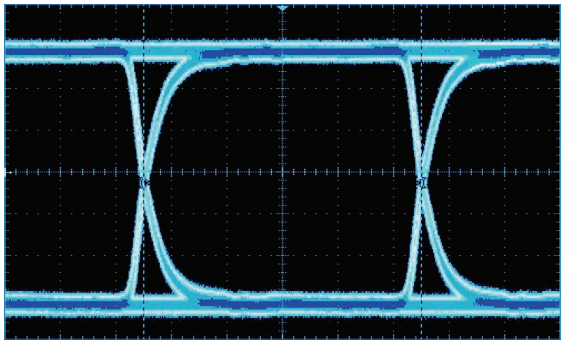


SPLVDS032



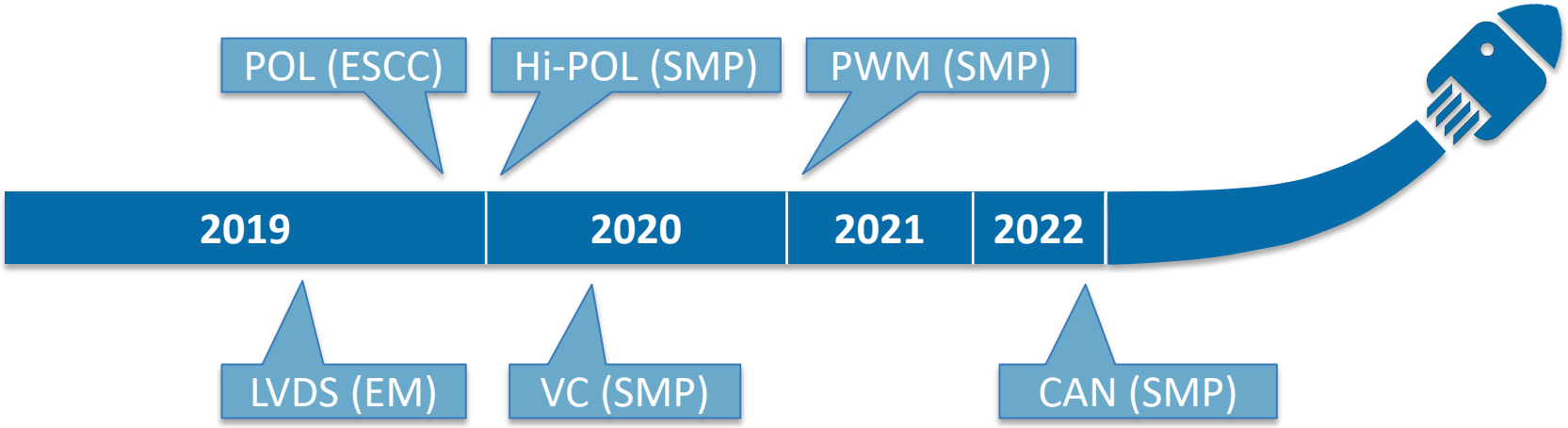
LVDS signal:

- 400Mbps
- PRBS23



Product Roadmap

- **POL** switching regulator (power distribution) — **SPPL12420RH**
- **LVDS** ext. CM transceiver family (datacom) — **SPLVDS031/032/104RH**
- **Hi-POL** next generation POL product — **SPPL14065RH**
- **VC** voltage clamp (power distribution) — **SPVC1010RH**
- **PWM** switching regulator (power distribution) — **SPPWM120RH**
- **CAN** bus transceiver family (datacom) — **SPCANxxxxRH**



NewSpace

Everybody is talking about NewSpace:

- **High cost pressure!**
- High volume?

TRADE-OFF

- Component reliability?
- Product assurance?

Cost saving options:

COTS

- Reasonable for circuits, that are either not critical or protected by rad-hard monitoring & power supply
- NOT reasonable for critical circuits, e.g. power management or LU protection of COTS components
- Definition of risk classes for component types!

HIREL

- High volume
- Low-cost package? → Lead finishing?
- Low-level evaluation, no certification? "European NewSpace Parts List"?
- Low-level lot acceptance?
- Low-level screening?

SPACE IC

Thank you for your attention!

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www.space-ic.com