



Integrated Circuits for Modern Spacecraft Power Management

SPACE IC GmbH

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Managing Directors:

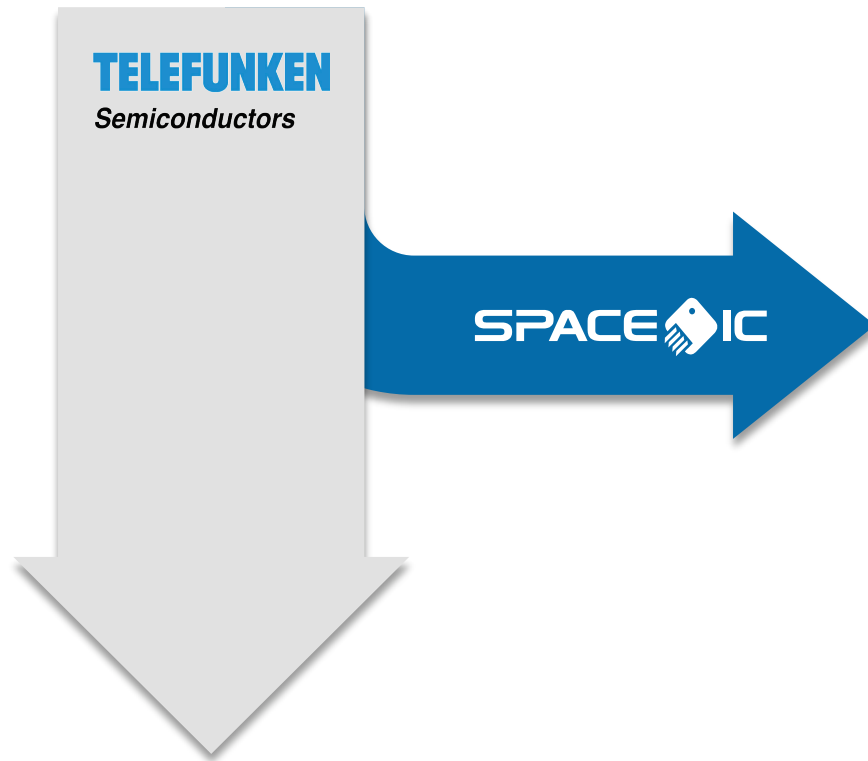
Volodymyr Burkhay ▪ Uwe Gieselmann ▪ Marko Reuter ▪ André Rocke
Register: Hannover ▪ Amtsgericht Hannover ▪ HRB 210911



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



Founder Team & Management Board:



Headquarter:

SICAN Technology Park
in the Northwest of
Hannover, Germany





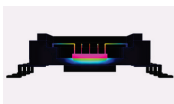
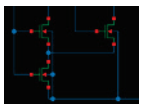
Technical and Application Focus

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

IC Product Development

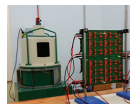
Chip Development:

- IC Spec
- IC Design
- Package Design
- Prototyping



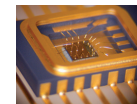
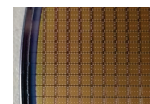
Testing:

- Screening
- Evaluation
- Qualification



Manufacturing:

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

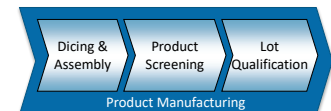


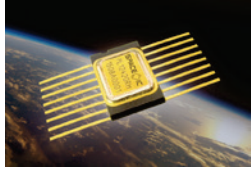
Service:

- Mixed-Signal ASIC Service



- Manufacturing Service



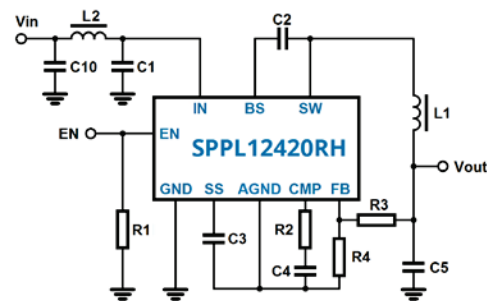


SPACE IC develops and manufactures ICs for space:
high-reliability · radiation-hard · analog and mixed-signal · ITAR/EAR-free

Power Management

DC power conversion, conditioning and protection:

- DC/DC Regulators
- HV Gate Drivers
- Over-Voltage Protections
- Over-Current Protections

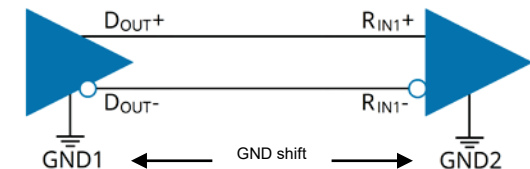


2A point-of-load DC/DC converter

Interfaces

Robust data interfaces:

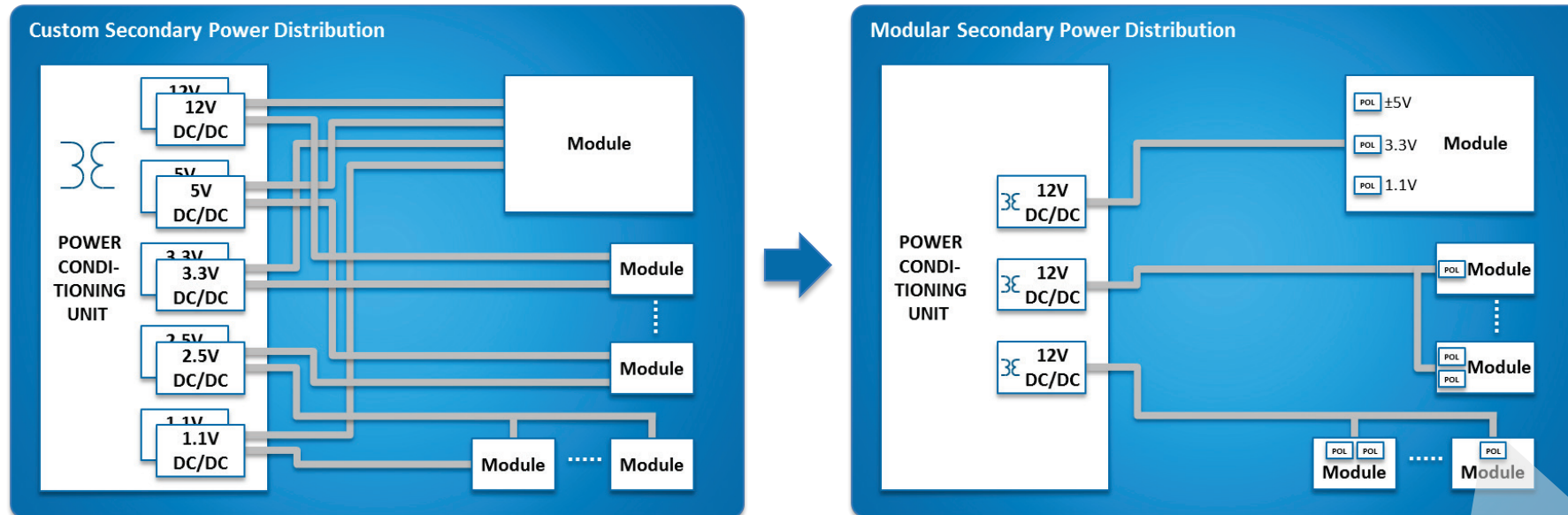
- Extended Common-Mode LVDS (for SpaceWire)
- High-Speed Serial I/Os
- CAN Bus Line I/O
- CAN System IC



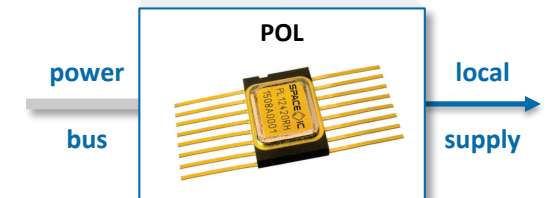
fast box-to-box communication

Power Management Evolution

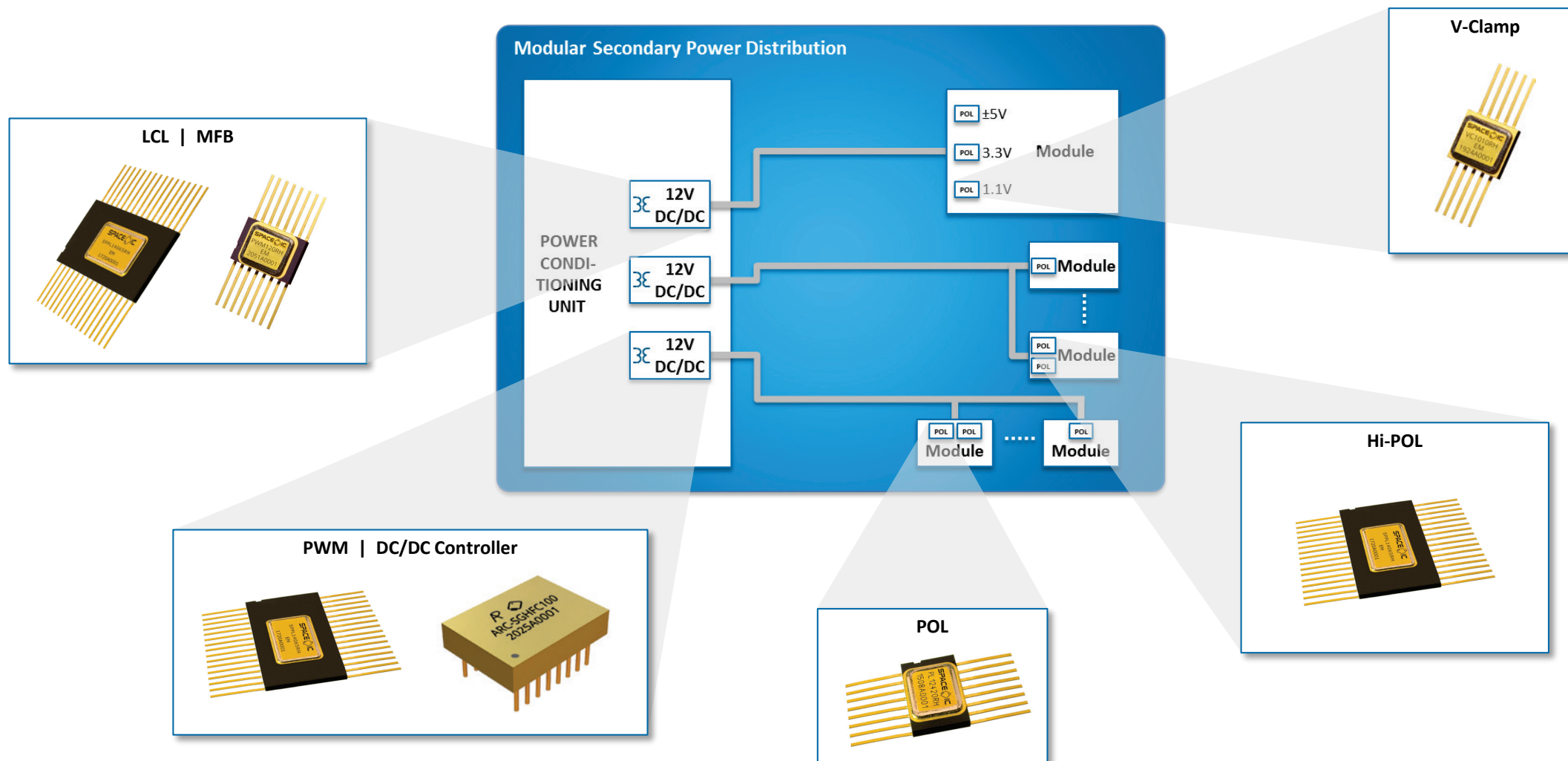
Local Power Distribution Evolution:



- 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

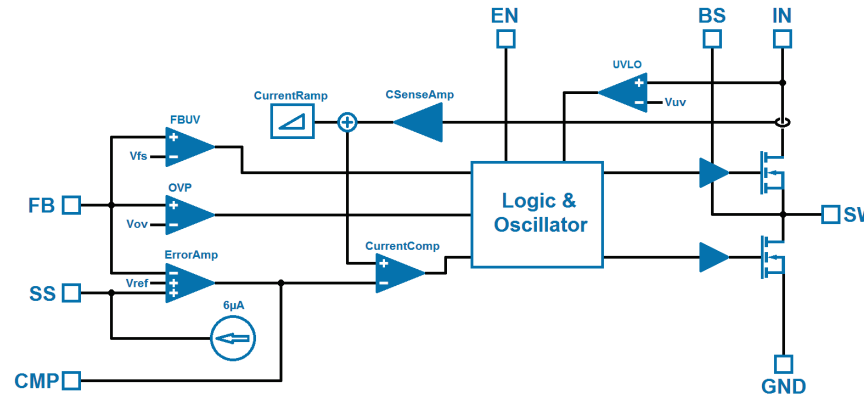


POL Converter IC

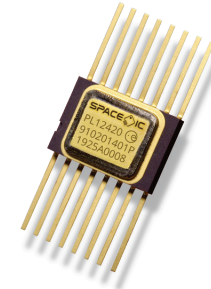
ESCC No. 9102/014

Monolithic Point-of-Load converter:

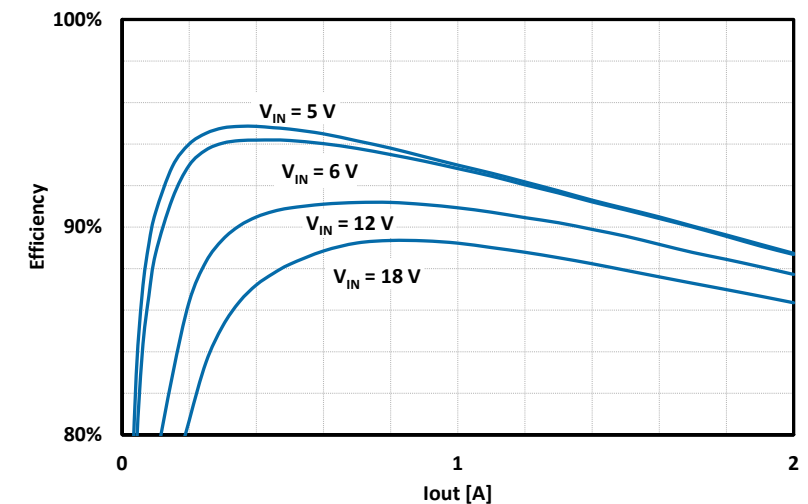
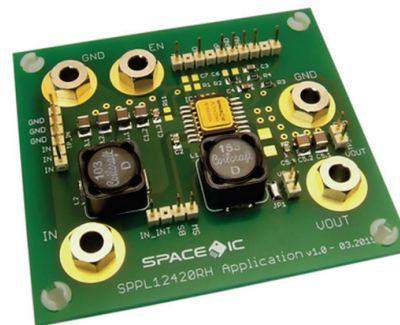
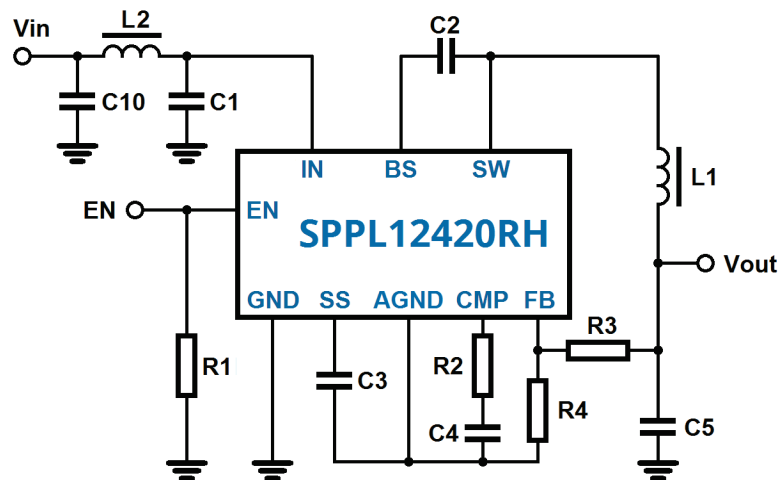
- 2A, $V_{IN} = 4.5V - 24V$, $V_{FB} = 0.92V$
- >90% efficiency
- Load sharing capability
- TID > 40 krad(Si)
- SEE: $V_{IN} < 14V$
- **ESCC certified**



ESCC P/N: 910201401P



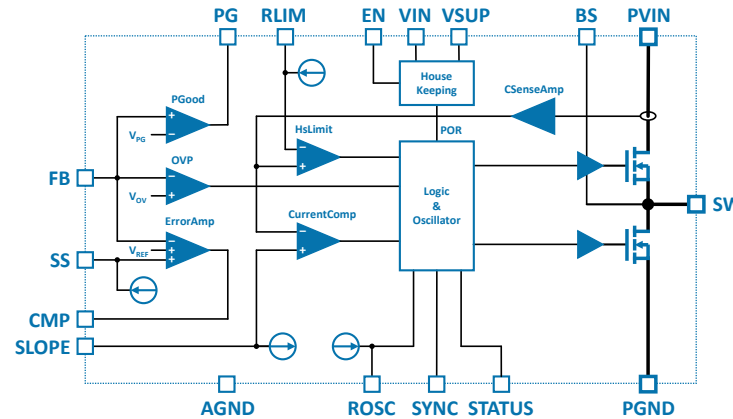
CFP-16 with heatsink



High-Power POL Converter IC

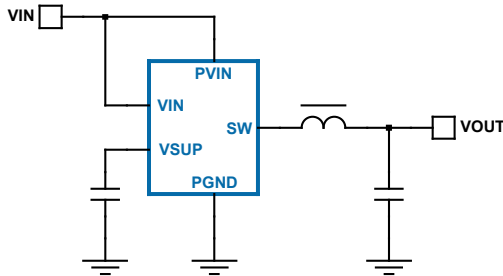
Versatile high-power monolithic POL converter:

- 8A, $V_{IN} = 3.3V - 40V$, $V_{FB} = 0.8V$
- >90% efficiency
- Adjustable current limit & frequency
- Load sharing capability, frequency sync
- TID > 180 krad(Si), $V_{FB} +4\%$
- SEE: $V_{IN} < 20V$ @ LET = 60 MeV·cm²/mg

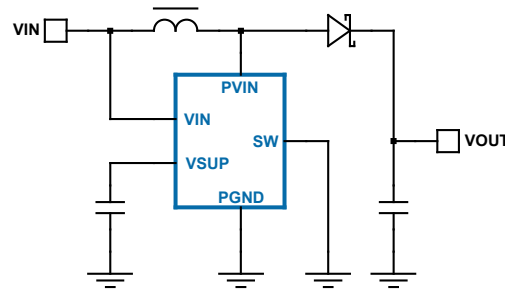


CFP-32 with heatsink

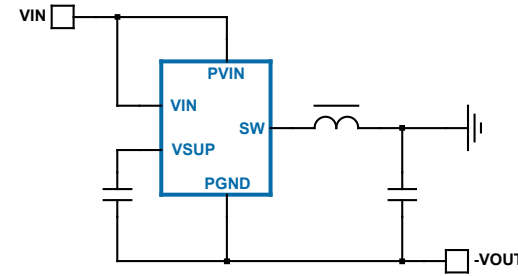
Buck:



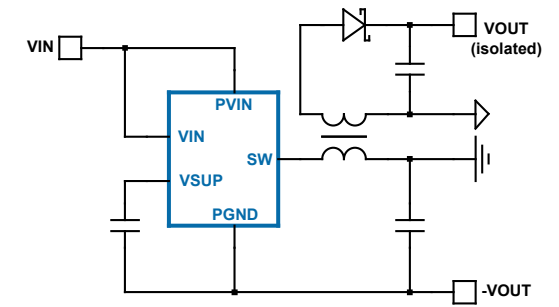
Boost:



Buck-Boost:

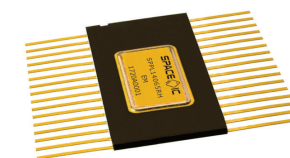
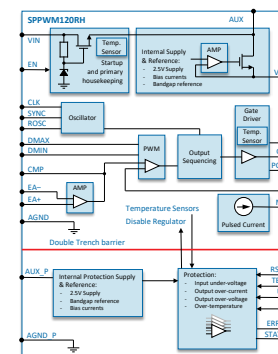


Isolated Buck:

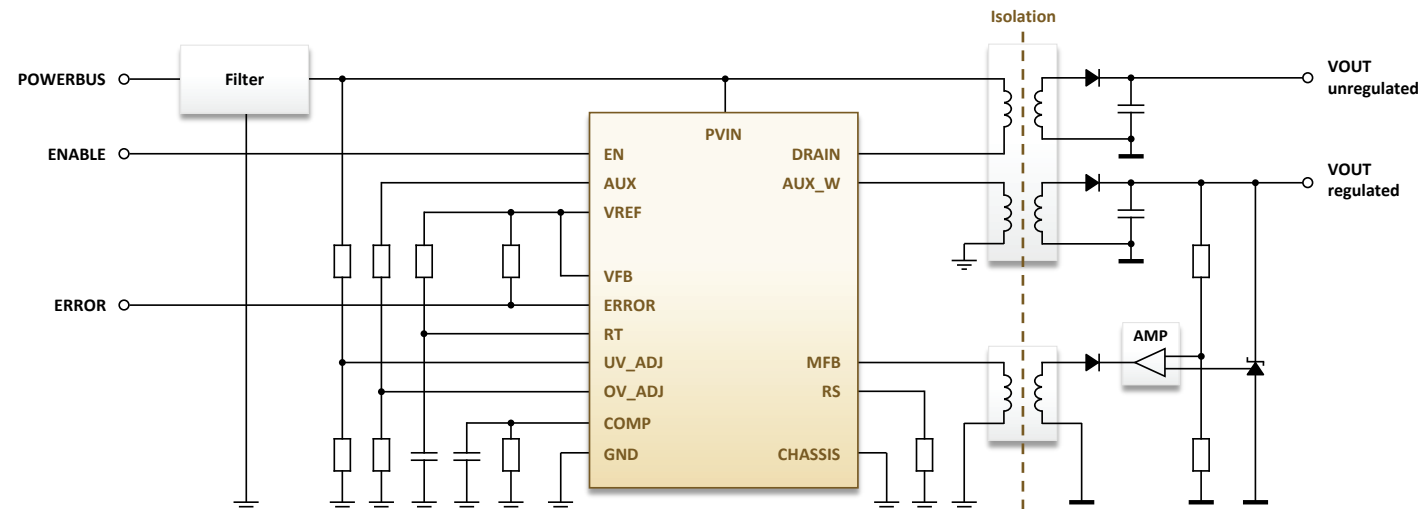
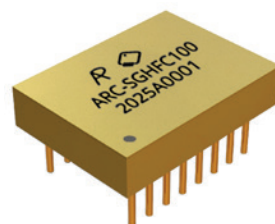
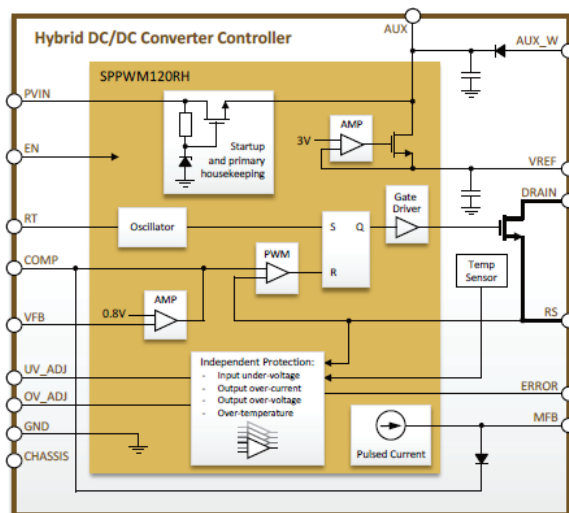


PWM Controller IC and DC/DC Hybrid

- $V_+ = 14V - 120V$ with automated start-up
- **2x gate driver** with independent supply
Si, GaN and SiC FET compatible
- Independent protection built in
- TID > 180 krad(Si), $V_{FB} +4\%$
- SEE: no destructive events @ LET = 60 MeV·cm²/mg

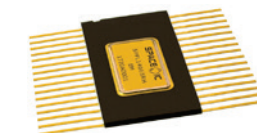
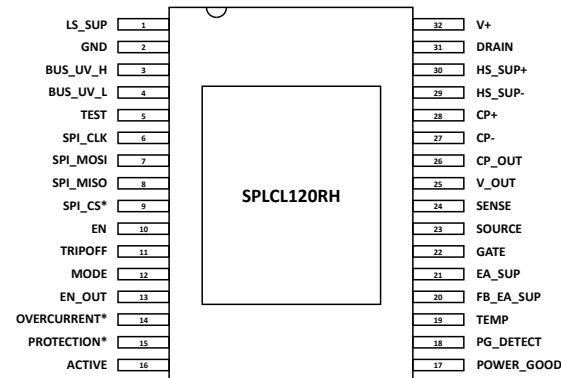


CFP-32

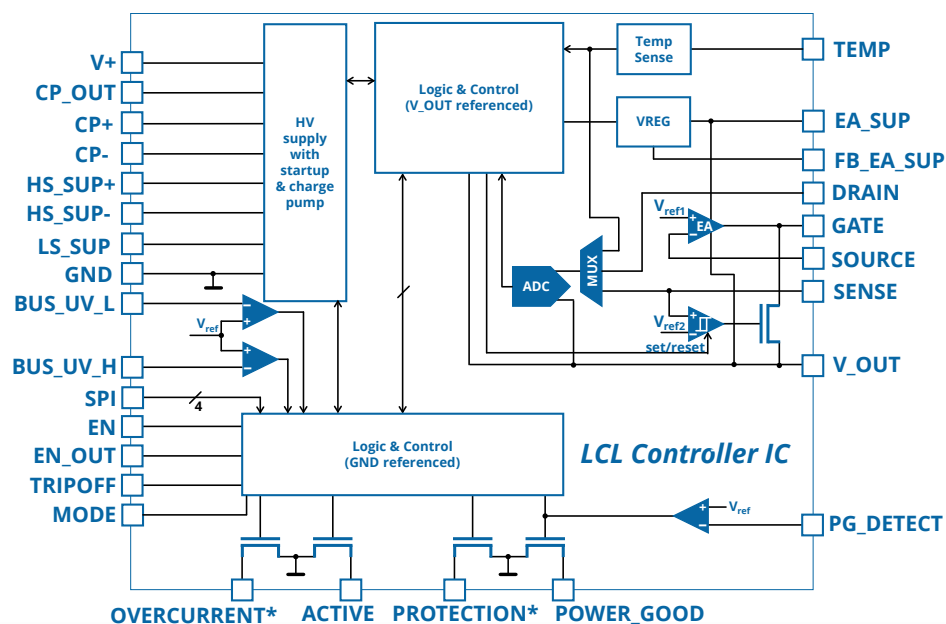


LCL Controller IC for N-channel FETs

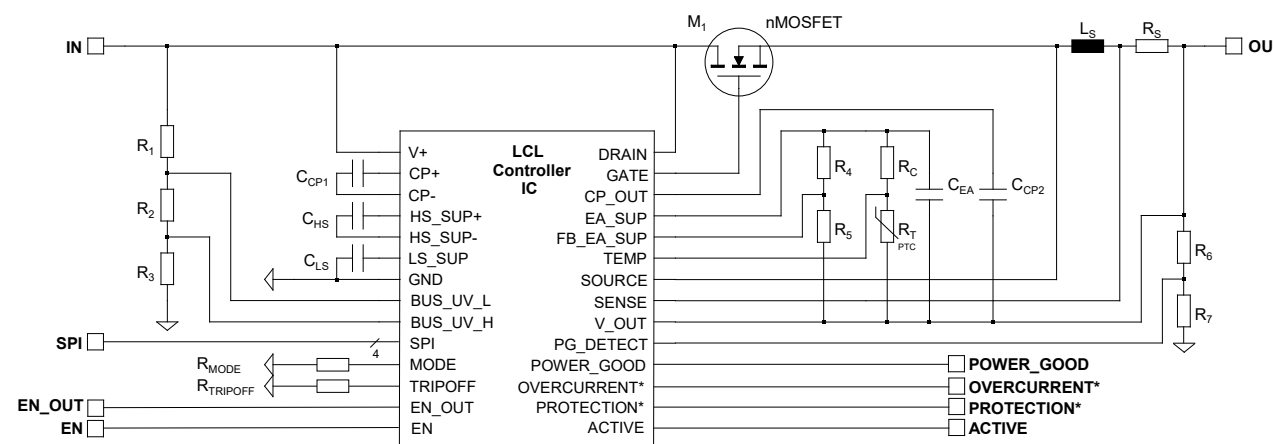
- $V_+ = 14V - 120V$ bus voltage
- Si, GaN and SiC FET compatible
- Double-isolating bus protection
- Redundant telemetries
- Configurable by SPI
- TID > 100 krad(Si)



CFP-32



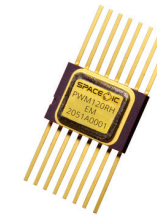
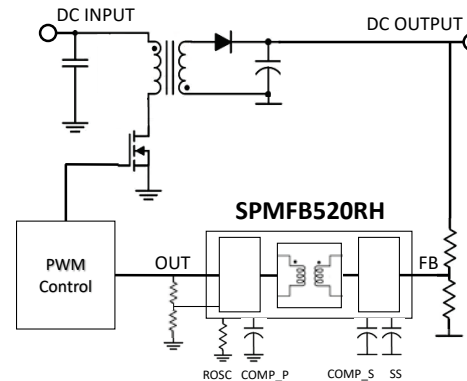
Typical application:



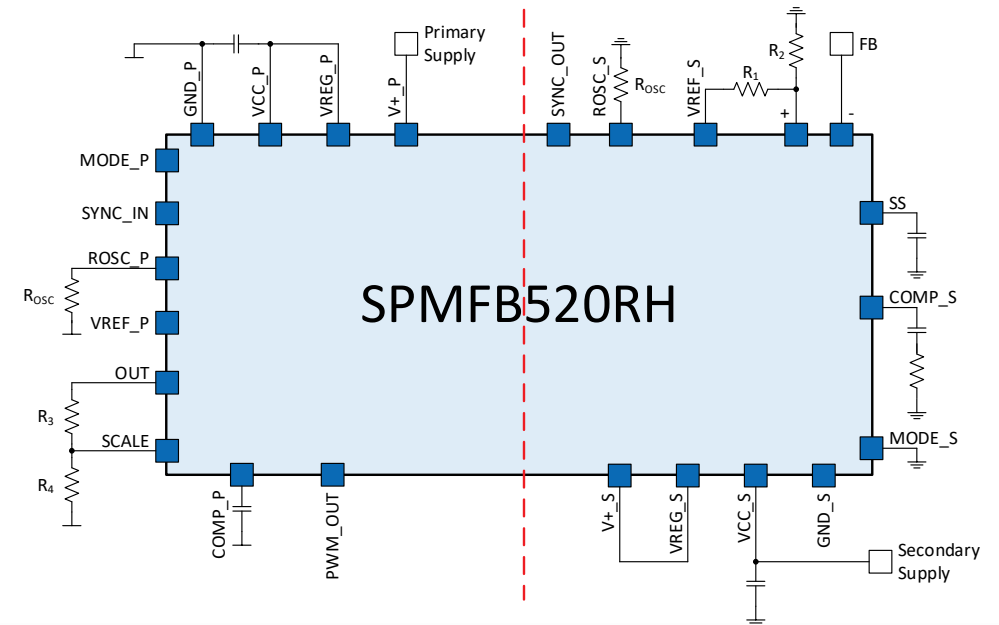
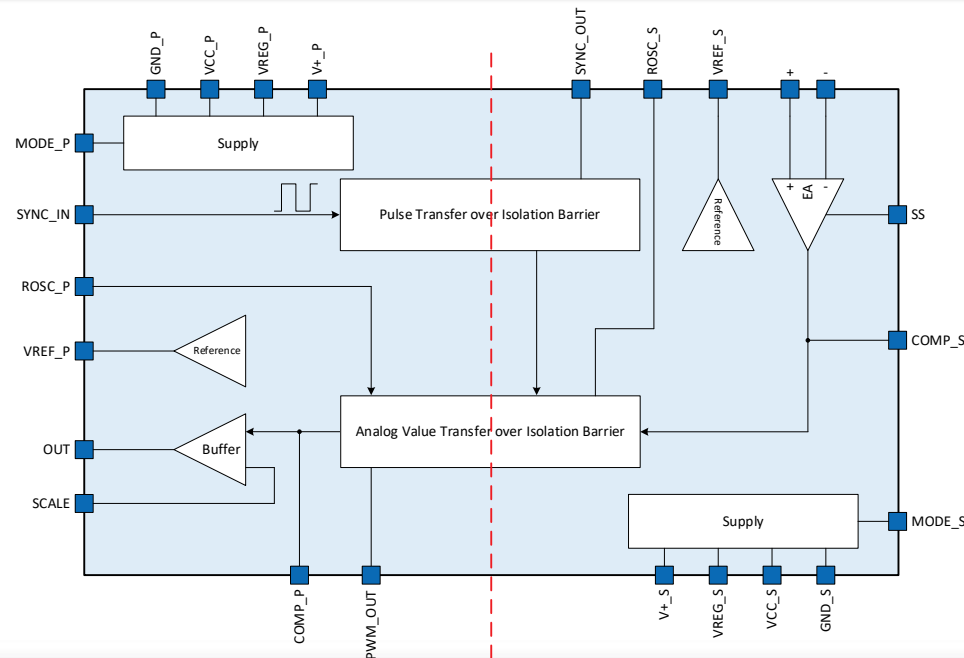
Isolated Magnetic Feedback IC

Typical application:

- $V_+ = 3V - 20V$
- $V_{\text{isolation}} > 500V$
- Isolated DC/DC regulation
- Isolated synchronous rectification
- Analogue voltage and PWM outputs
- TID > 100 krad(Si)

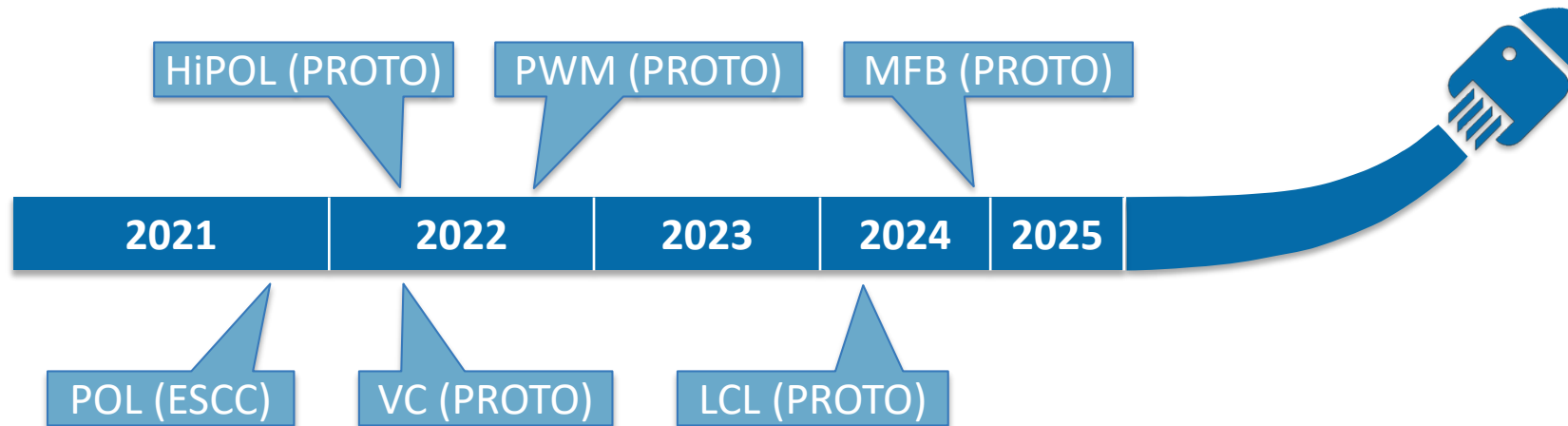


CFP-24



Power Management Product Roadmap

- **POL** switching regulator _____ **SPPL12420RH**
- **Hi-POL** next generation high-power POL product _____ **SPPL14080RH**
- **VC** voltage clamp _____ **SPVC1010RH**
- **PWM** controller with gate driver and start-up _____ **SPPWM120RH**
- **LCL** latching current limiter controller for N-channel FETs _____ **SPLCL120RH**
- **MFB** isolated magnetic feedback control _____ **SPMFB520RH**





***Thank you for
your attention!***

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www.space-ic.com

