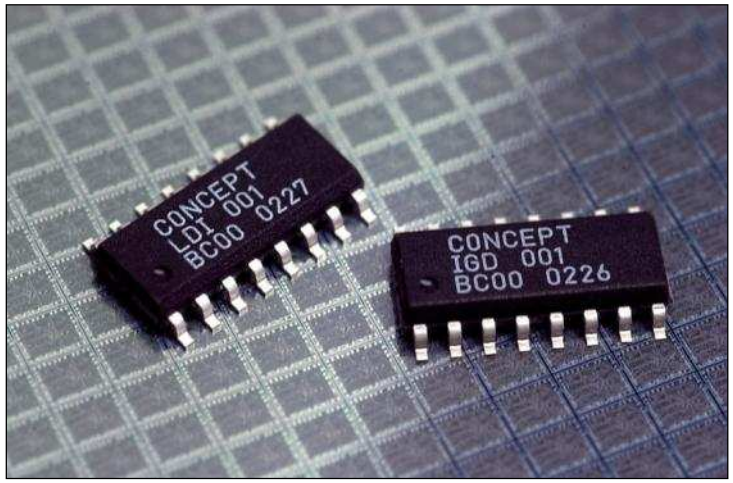
Product Presentation

Februar 2010,

ASIC Chipset
SCALE and SCALE-2



CT-Concept Technologie AG - Schweiz

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Motivation for ASIC Design

Reliability

- Reduce number of components to a minimum
- Reduce number of solder joints to a minimum
- Increase EMI reliability

IGBT driving

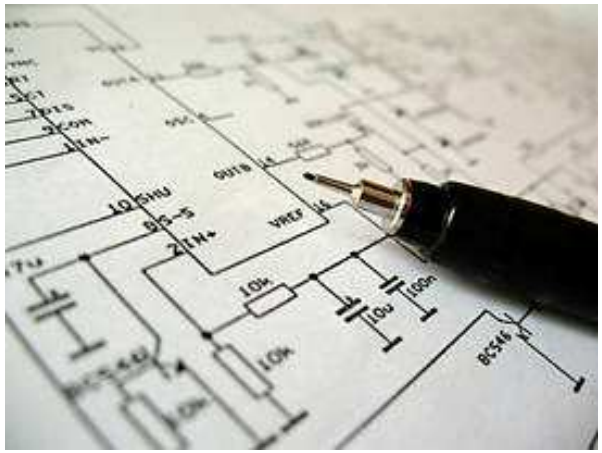
- Optimised switching behaviours
- Able to operate into different voltage classes
- Integration of safety function

Producible

- High yield
- High quantity

Flexibility

- Wide Portfolio
- Different system solution (Core; Plug-and-Play)



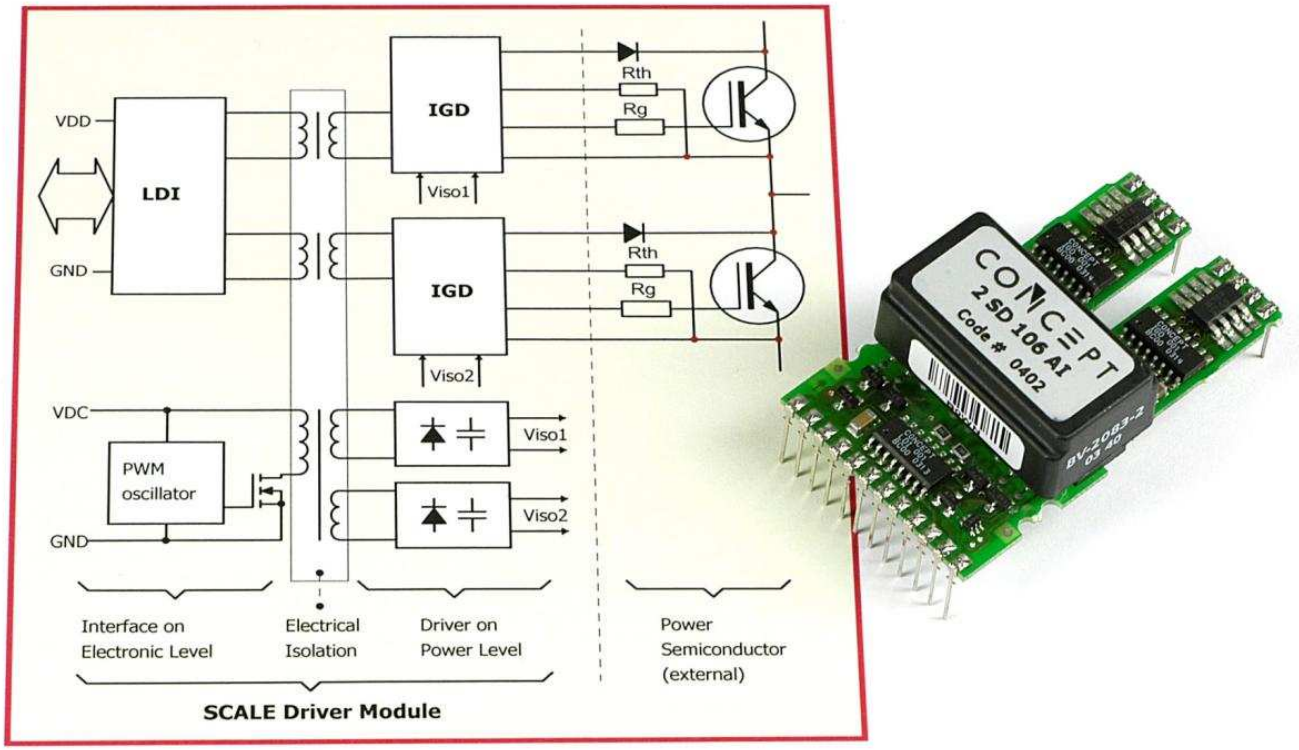
SCALE Chipset- Principle

LDI

- Logic to Driver Interface

IGD

- Intelligent Gate Driver

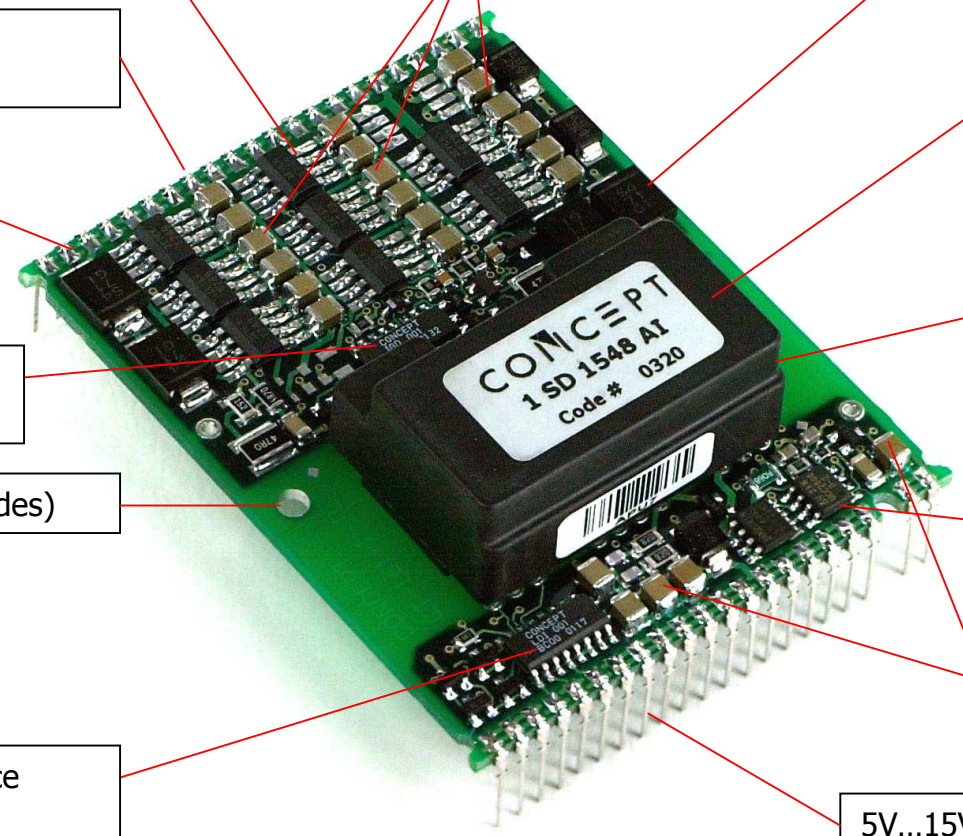


SCALE Chipset

SCALE features

- Any isolation voltage
- High gate currents up to >48A
- Symmetrical delay 350ns
- Direct- or half-bridge mode
- Half-bridge mode with dead-time generation
- High dv/dt immunity >100 kV/µs
- MTTF □ 68 mio. hours / Chip @ 50°C
- TTL and CMOS compatible inputs
- 5V...15V interface without external compone
- Failure memory
- Open collector failure outputs
- Active common mode noise suppression

SCALE chipset – 1SD1548AI



±48A output stage, supporting advanced active clamping

Low inductance gate-emitter interconnection

4-layer printed circuit board with 3 power planes

SCALE Intelligent gate driver IGD001

Additional fixing hole (both sides)

SCALE Logic-to-driver interface LDI001

Large ceramic capacitors stabilize secondary side

Secondary rectifier of the 15W DC/DC converter

Molded transformer with 21mm creepage distance

All insulation materials according to UL V0

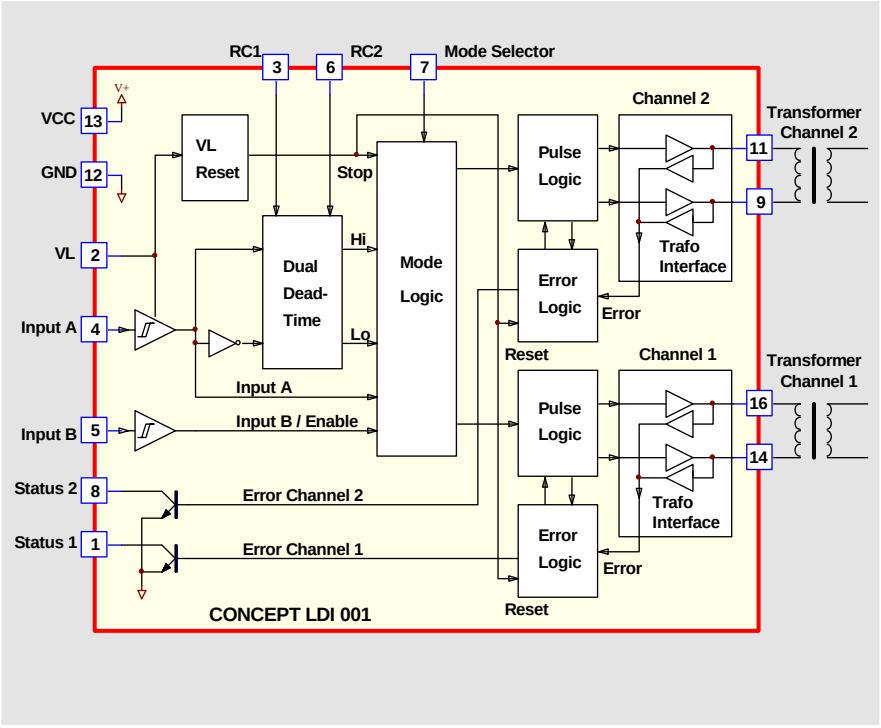
Primary side of the 15W DC/DC converter

large ceramic capacitors stabilize primary side

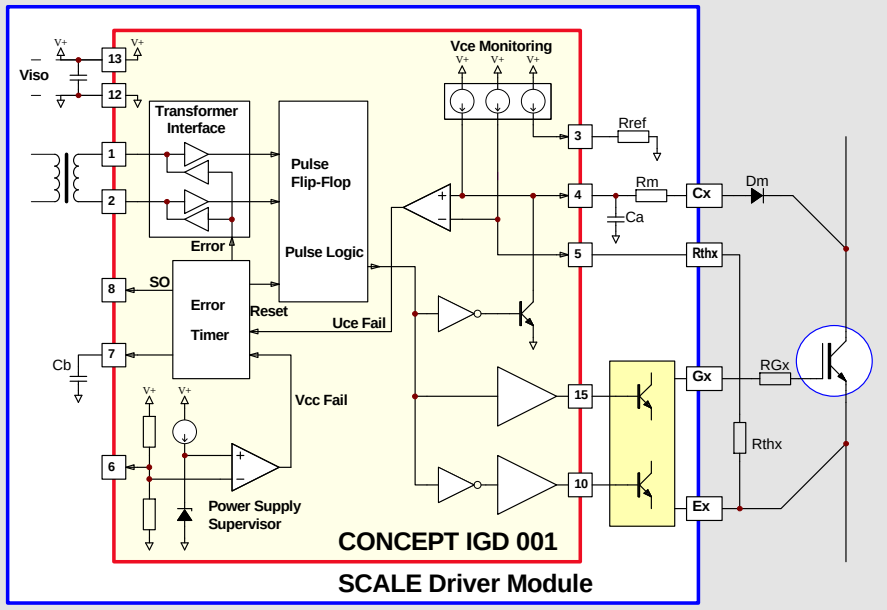
5V…15V logic compatible interface

SCALE Chipset

LDI SCALE chip



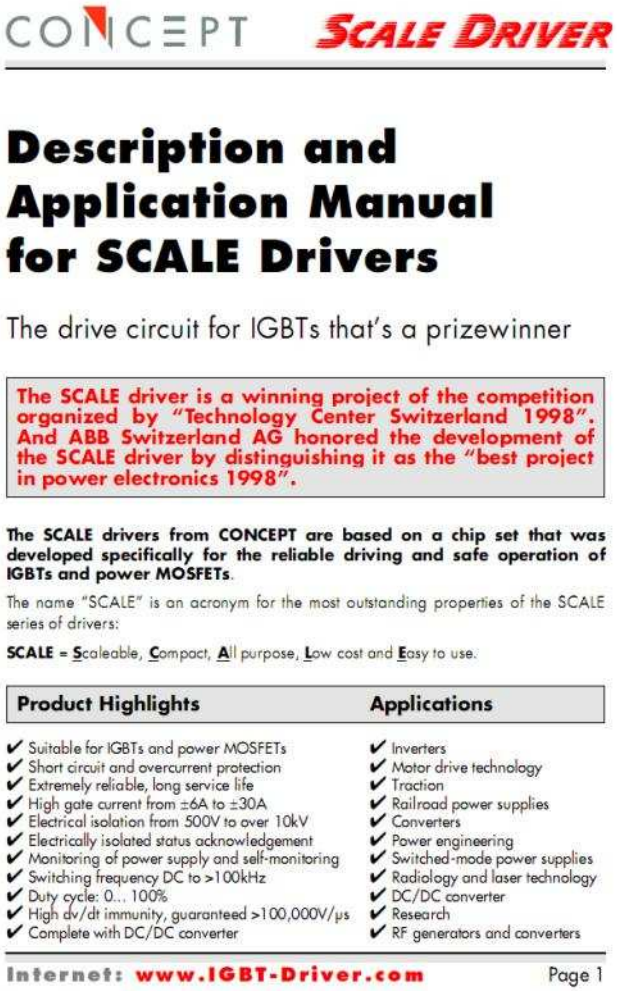
IGD SCALE chip



SCALE Application Manual

www.IGBT-DRIVER.com

- Support/ Application Notes/ First Generation SCALE Drivers
- Products/ First generation SCALE driver cores



CONCEPT SCALE DRIVER

Description and Application Manual for SCALE Drivers

The drive circuit for IGBTs that's a prizewinner

The SCALE driver is a winning project of the competition organized by "Technology Center Switzerland 1998". And ABB Switzerland AG honored the development of the SCALE driver by distinguishing it as the "best project in power electronics 1998".

The SCALE drivers from CONCEPT are based on a chip set that was developed specifically for the reliable driving and safe operation of IGBTs and power MOSFETs.

The name "SCALE" is an acronym for the most outstanding properties of the SCALE series of drivers:

SCALE = **S**caleable, **C**ompact, **A**ll purpose, **L**ow cost and **E**asy to use.

Product Highlights	Applications
✔ Suitable for IGBTs and power MOSFETs	✔ Inverters
✔ Short circuit and overcurrent protection	✔ Motor drive technology
✔ Extremely reliable, long service life	✔ Traction
✔ High gate current from ±6A to ±30A	✔ Railroad power supplies
✔ Electrical isolation from 500V to over 10kV	✔ Converters
✔ Electrically isolated status acknowledgement	✔ Power engineering
✔ Monitoring of power supply and self-monitoring	✔ Switched-mode power supplies
✔ Switching frequency DC to >100kHz	✔ Radiology and laser technology
✔ Duty cycle: 0... 100%	✔ DC/DC converter
✔ High dv/dt immunity, guaranteed >100,000V/µs	✔ Research
✔ Complete with DC/DC converter	✔ RF generators and converters

Internet: www.IGBT-Driver.com Page 1

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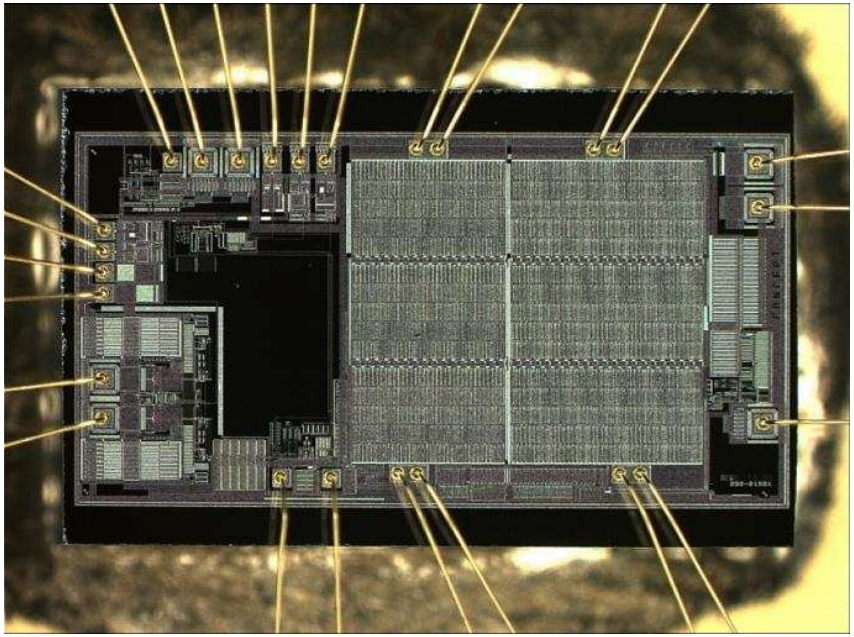
SCALE-2 Design

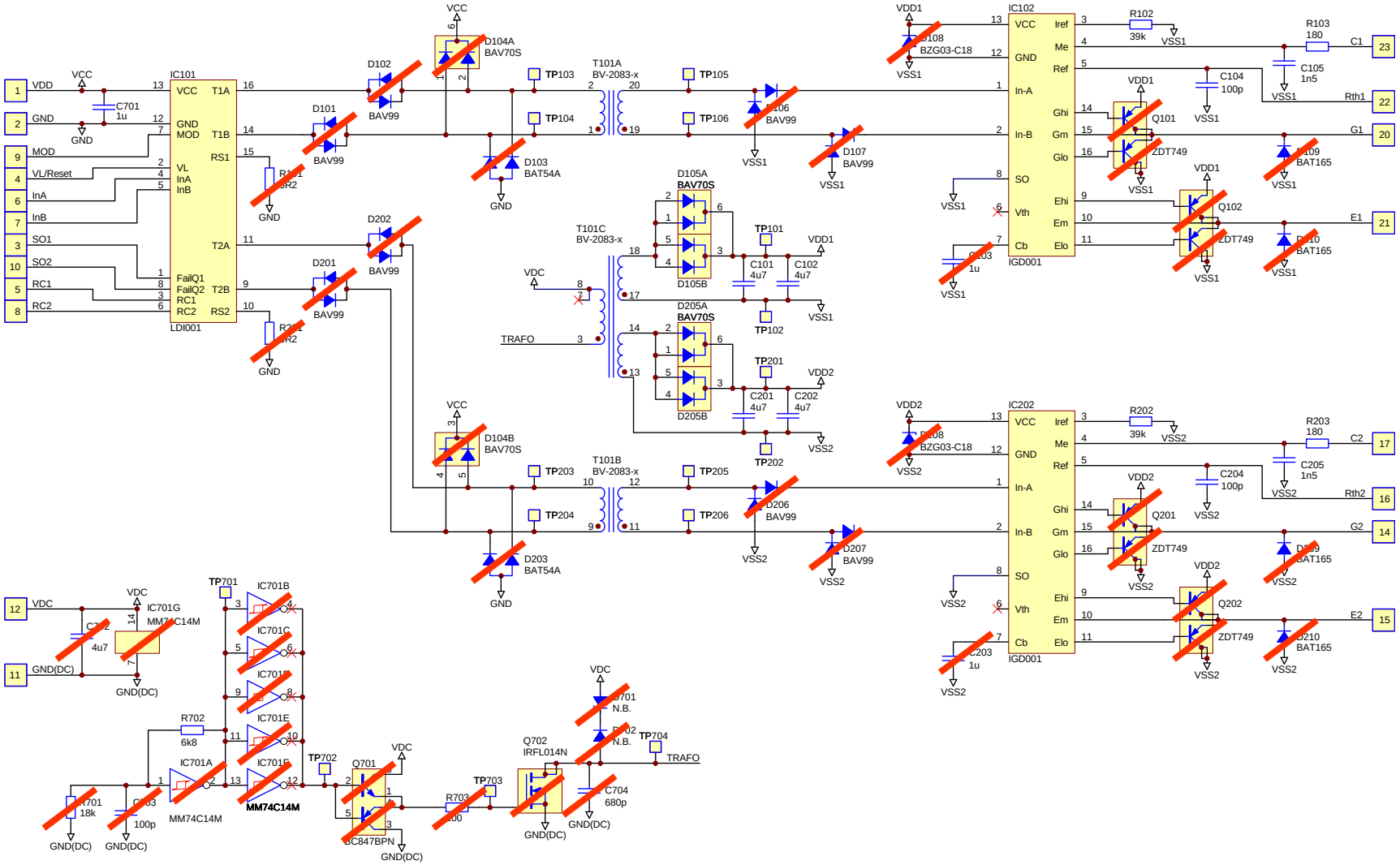
- Consequent improvement of Scale technology.
- Highest integration
- Scalable IGBT and MOSFET gate driver
- Embedded DC/DC control and power transistors
- Embedded 8A output IGBT gate drive booster
- Made for easy paralleling of IGBT`s
- Less components =higher reliability



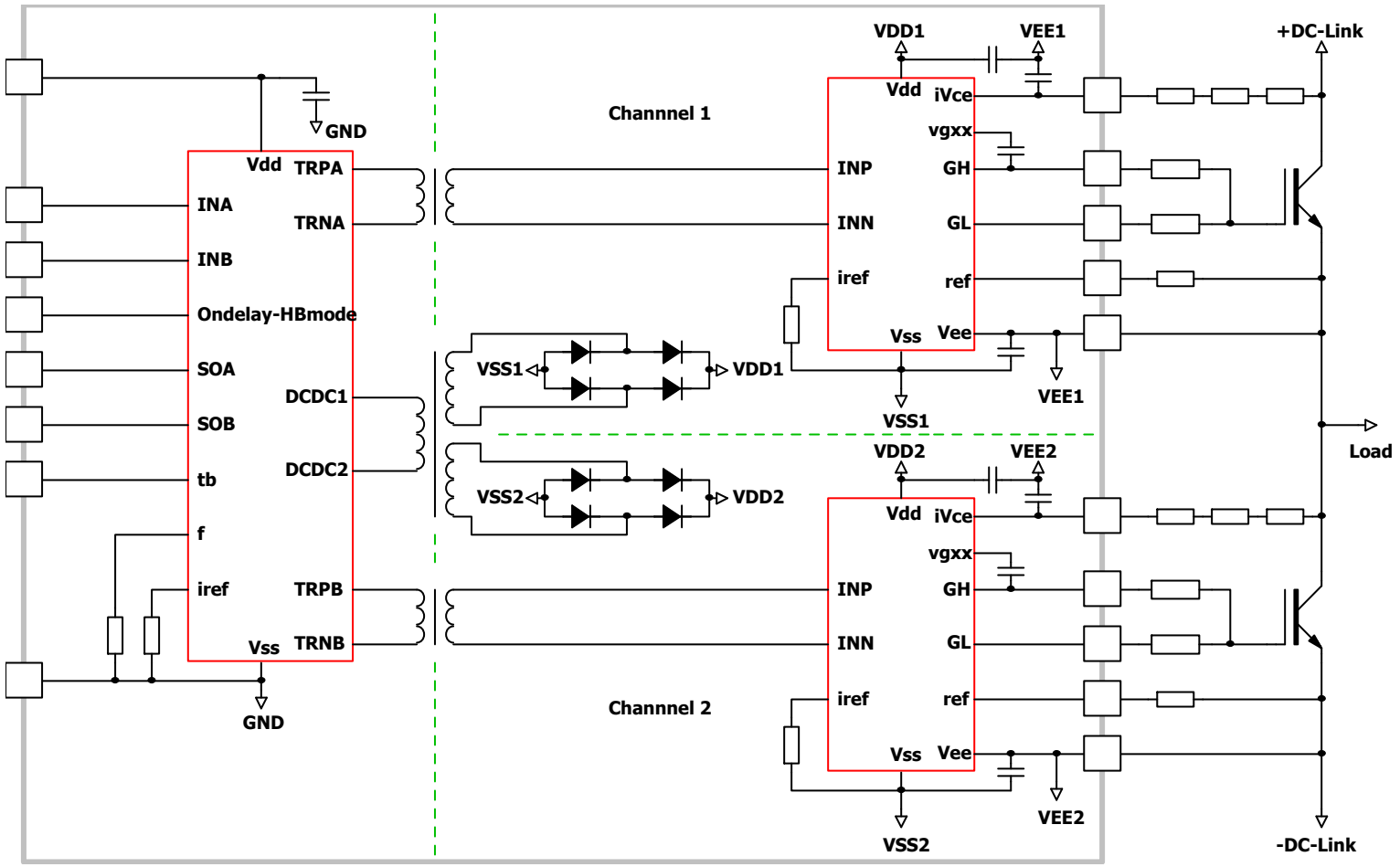
SCALE-2 Features

- Full-custom ASIC chip-set in high-voltage mixed signal C-MOS technology
- Compatible SCALE Cores and SCALE- Plug-and-Play drivers
- Delays 80ns ±4ns, jitter ±1ns
- 90% less components than conventional drivers
- Integrated 8A N-Channel output stage, enhancement to 60A with one N-Channel Dual-MOSFET
- Integrated, advanced active clamping (AAC)
- IGBT short circuit protection
- +15V / -7...-15V gate voltage
- Regulated secondary DC/DC Voltage
- Integrated DC/DC converter controller in primary ASIC
- All inputs and outputs ESD protected (without external components)
- Versions with transformer or fiber-optic interfaces
- Product line with conventional transformers and with planar transformers

SCALE-2 Compare to SCALE

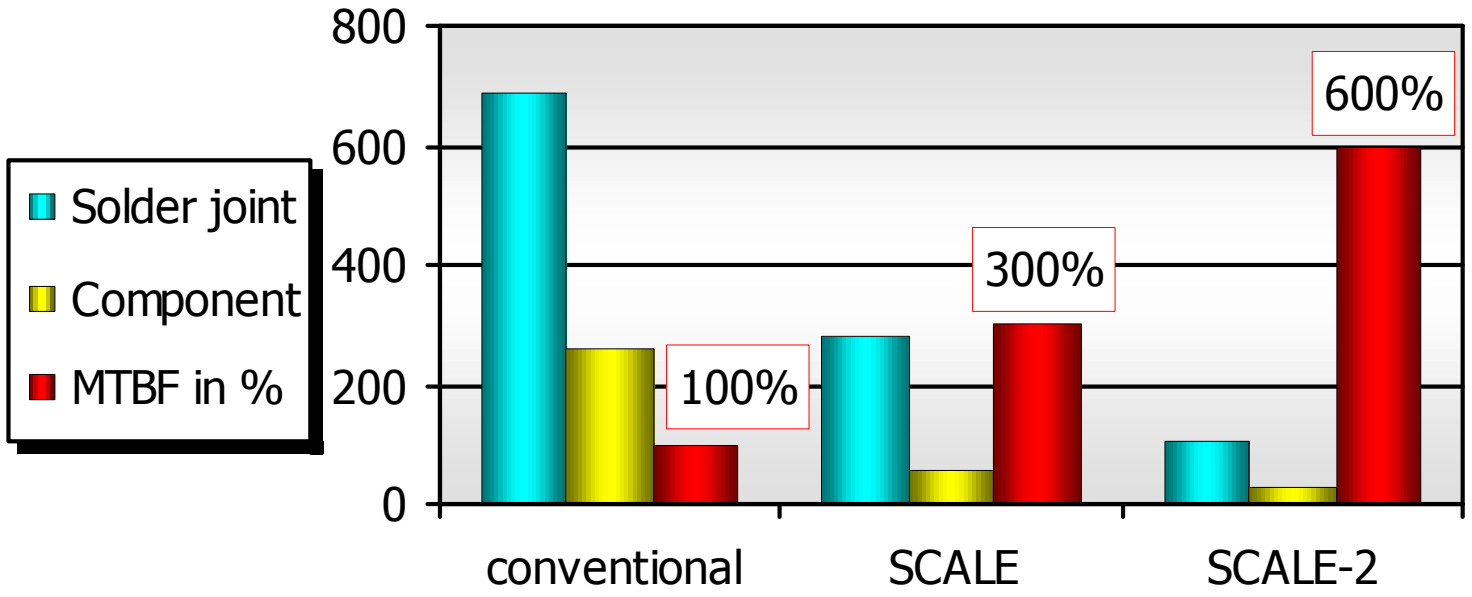


SCALE-2 Chipset with peripheries



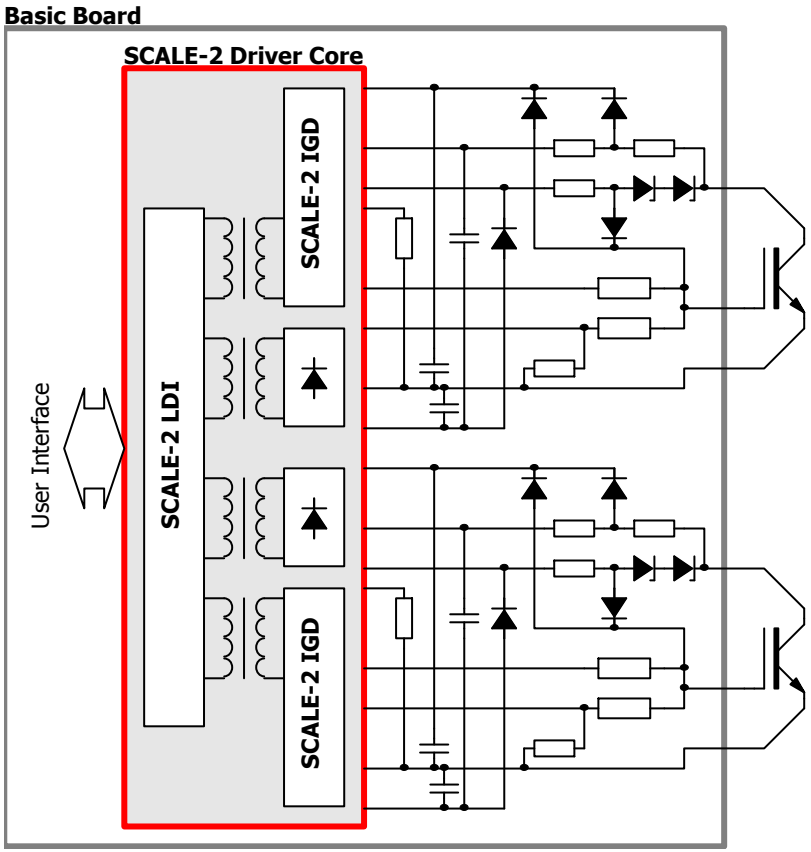
Impact of reliability by Components and Solder Joints

- Reduction of number from components und solder joints by ASIC-integration
- Prognosticated reliability (MTBF) according to MIL-STD 217
- Dual driver-core example



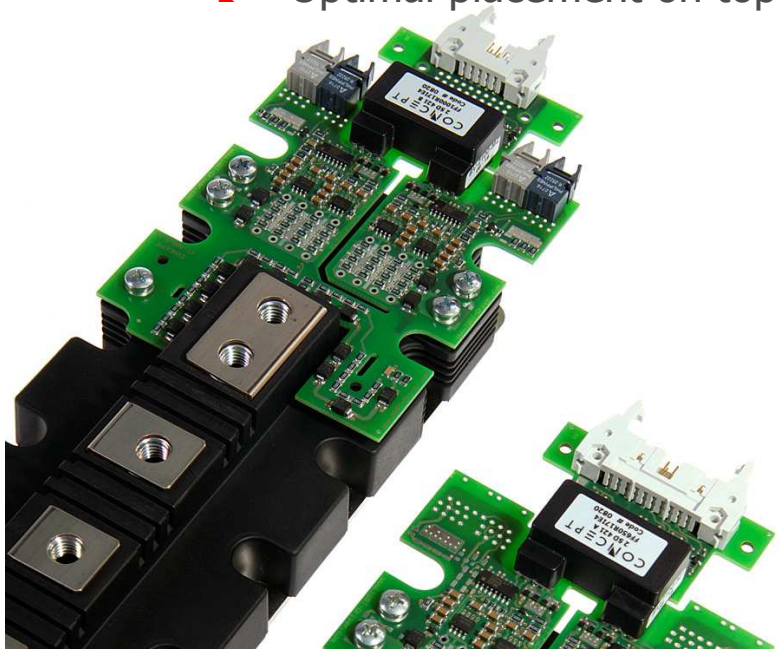
System-Partitioning: Driver-Core

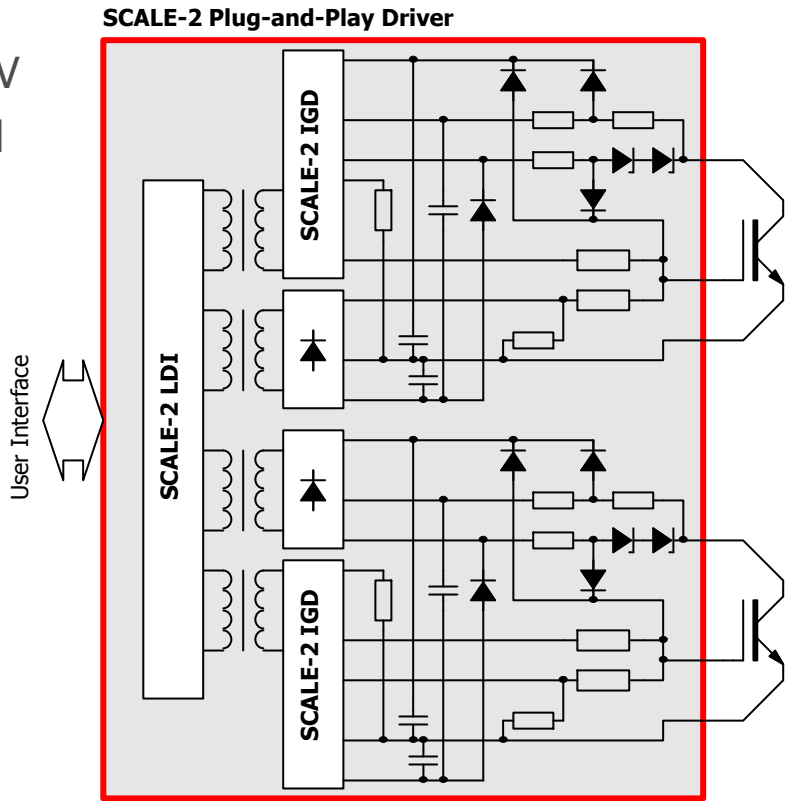
- Flexible adjustment possible by user
- All basic-function at driver-Core
- Core integrated insulated DC/DC-converter
- Free selectable installation position



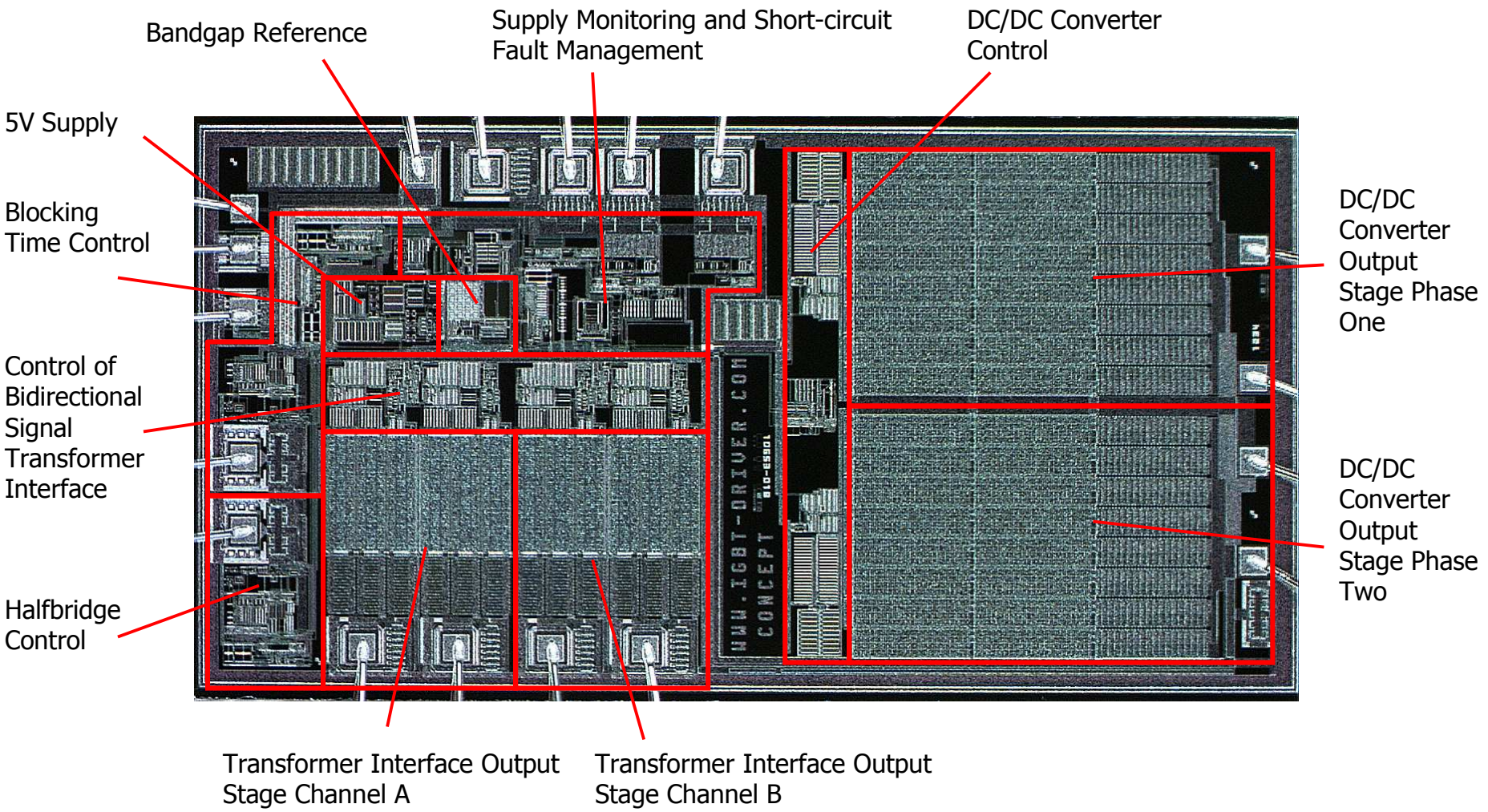
System-Partitioning: Plug-and-Play-Driver

- Complied adjusted and optimised driver
- Optimised IGBT protection
- No additional components
- Integrated DC/DC converter up to 3.3kV
- External DC/DC converter by 4.5kV and 6.5kV IGBTs
- Optimal placement on top of IGBTs

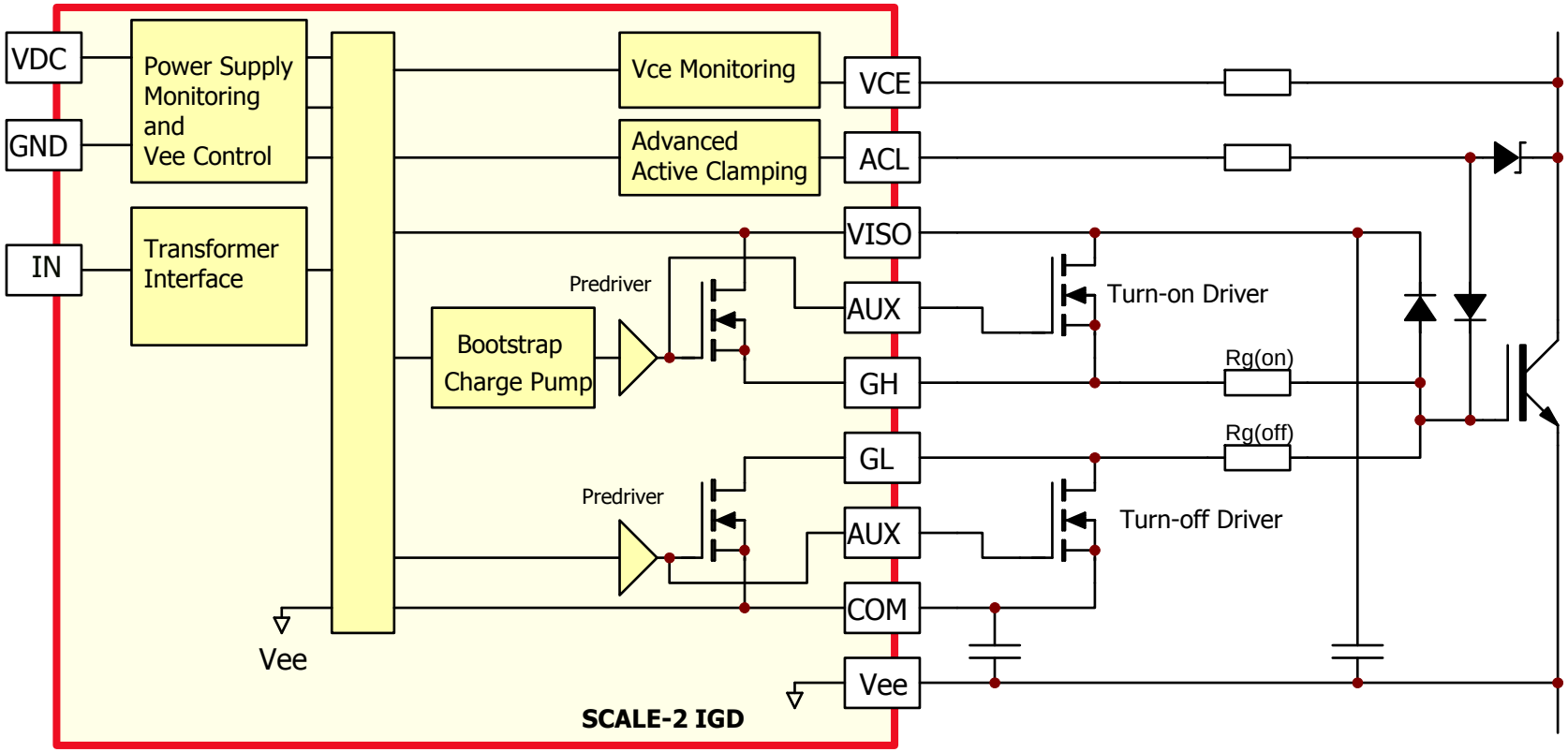




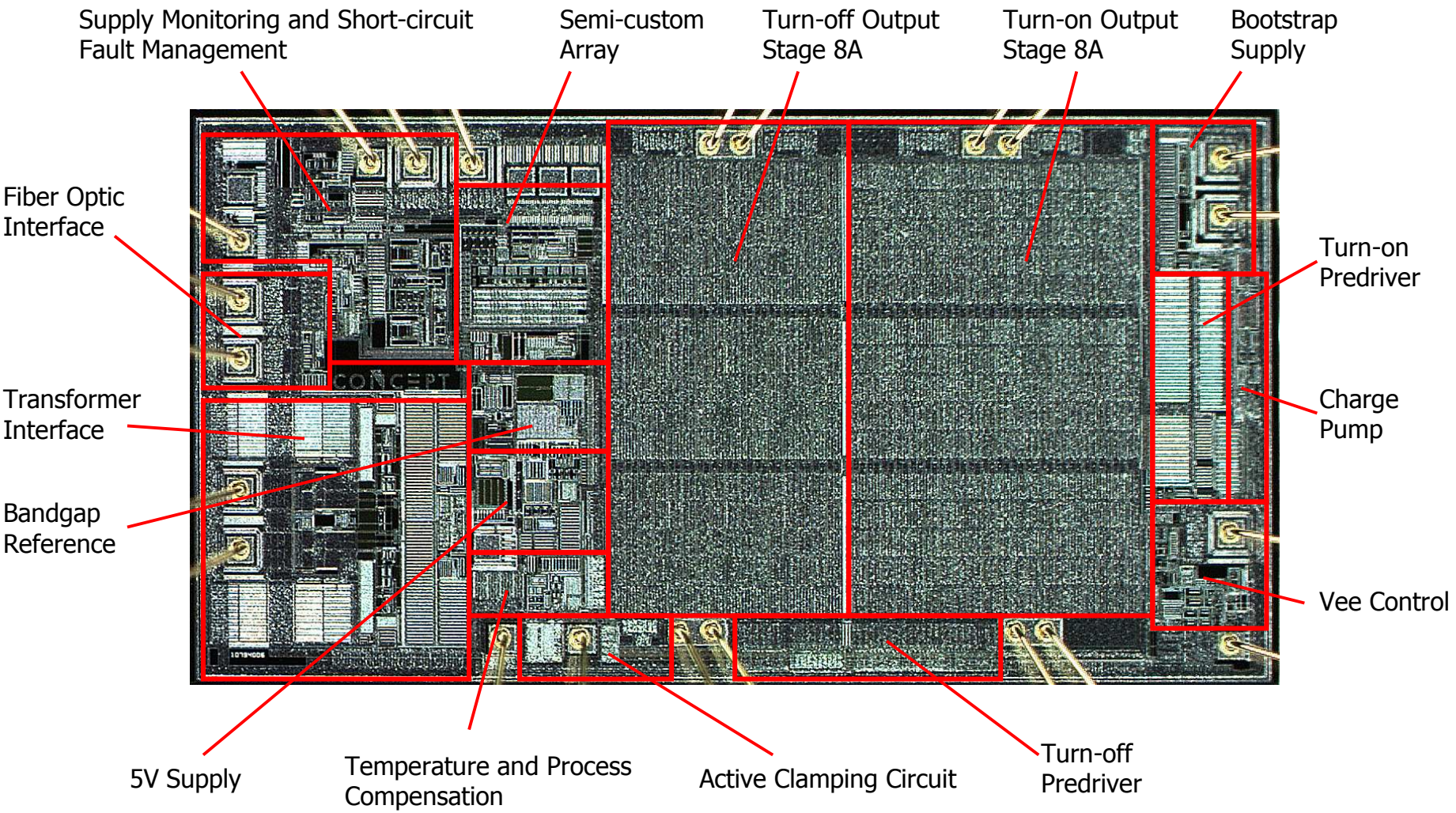
Chip-Image SCALE-2 Logic-to-Driver Interface (LDI)



SCALE-2 IGD



Chip-Image SCALE-2 Intelligent Gate Driver (IGD)



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