



Hybrid electric and electric cars

Electromobility driven by semiconductor innovations



Stepping up to the energy challenge

The need to conserve natural resources, reduce emissions and raise energy efficiency has become a major public concern. Amidst worries about dependence on oil and climate change, demand for electricity continues to soar. According to the International Energy Association, worldwide demand for electrical energy is set to rise by more than 60% over the next 20 years.

The way forward does not necessarily lie in producing more electricity, but in wasting less of it. To sustain our current economic model into the future, we need to optimize energy efficiency across the entire power chain, stretching from generation through distribution to actual consumption. In other words, industry is challenged to develop smart solutions enabling climate-neutral sourcing, intelligent distribution through smart grids and efficiency-aware applications and appliances.





Spotlight on personal mobility

Personal mobility is a big contributor to CO₂ emissions. Consequently, a current focus on energy efficiency is placing the spotlight on cars. The growing number of cars on our roads each year is forcing industry players and policy-makers to explore alternative forms of mobility with a smaller CO₂ footprint.

One extremely effective way of reducing carbon emissions involves electrifying the drivetrain of cars. The advantages of Electric Vehicles (EV) include higher energy efficiency of the drivetrain, lower noise levels and zero tailpipe emissions when powered solely by the battery.

In order for EVs to be truly viable, however, various challenges must be overcome. These include the high initial cost of the battery and the lower driving range. Widespread acceptance also hinges on a standardized infrastructure for recharging with uniform connectors and charging voltages, for instance. And – most importantly – intelligent energy concepts are key to achieving environmental goals. EVs must be part of a smart electricity grid which relies on Information Technology (IT) to increase efficiency, reliability and interoperability.

Semiconductors key enablers in “Going smart”

Semiconductors play a key role in building more intelligence into the energy cycle. Underpinned by our sense of environmental responsibility and strategic focus on energy efficiency, mobility and security, we are already delivering the semiconductor innovations required to resolve these challenges and design intelligent power networks, accelerating the paradigm shift towards electromobility on the road. When it comes to building tomorrow’s electric infrastructure, our semiconductor solutions will form the backbone of the enabling smart grid, allowing drivers to recharge intelligently, pay securely and feed power back into the electricity grid.

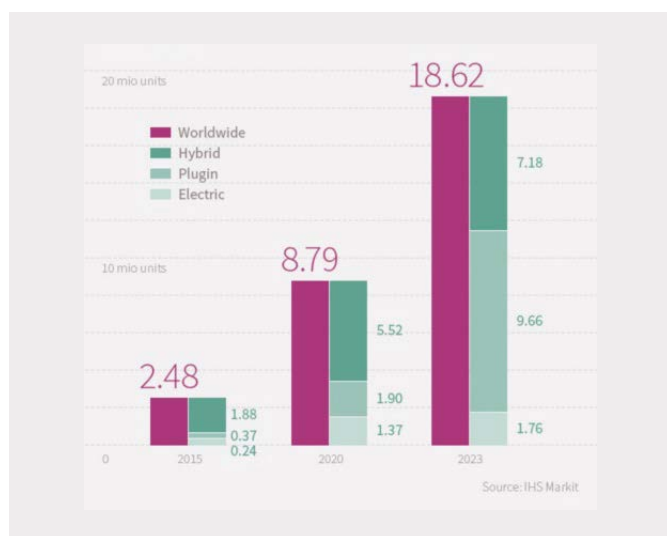


Moving forward

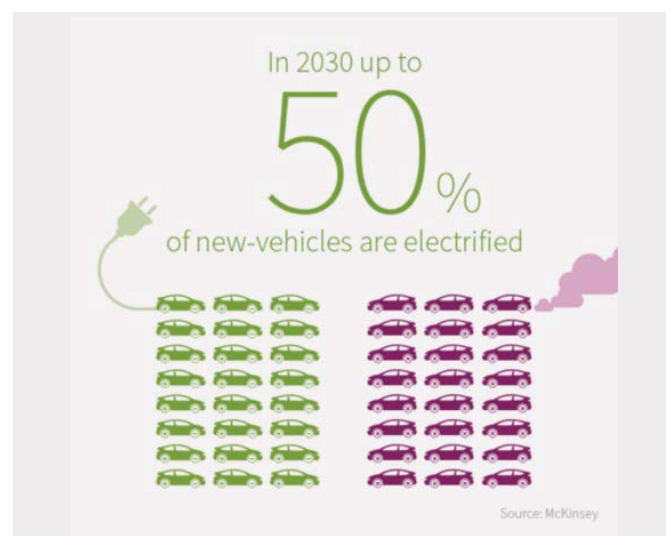
The transition to a new age of mobility will be a gradual one. As we move beyond the Carbon Age and our dependence on fossil fuels, Hybrid Electric Vehicles (HEV) will play an important role alongside lower-carbon combustion engines during the transitional period. Although electric drivetrains are already more energy-efficient than combustion models, further improvements are still required.

Vehicles combining an electric drive with a compact battery and complementary internal combustion engine basically will pave the way for all-Electric Vehicles (EV). Drivetrain electrification calls for high-power semiconductors designed to automotive quality standards. Expertise in both power semiconductors and automotive electronics is thus essential to successfully serve the emerging HEV and EV market.

Hybrid- and electric vehicles



A driving force of innovation



Although the combustion engine still dominates today's drive train technologies, electrification is emerging as an increasingly strong force in tomorrow's green mobility landscape.



Experience pays

As world leader in advanced power and automotive electronics, we are the only player worldwide who combines both areas of expertise – bundling more than 40 years’ experience in automotive electronics and high-power electronics with more than 15 years’ experience in electromobility. A leading supplier of high-power IGBT modules for drive and traction applications for many decades.

We now have the broadest (H)EV range of power modules and chips dedicated to optimizing overall system cost, minimizing power losses, increasing power density, maximizing power savings, extending mileage and improving battery efficiency. Car makers and system suppliers all over the world already rely on products from Infineon Technologies to drive new innovations.

This bundled experience makes us the ideal partner to drive the trend towards electric cars and benefit from this growing market. Here we project strong revenue growth as the powertrain semiconductor bill-of-materials for an EV/HEV is a multiple higher than the corresponding bill for a combustion engine.

While a car with a conventional internal combustion engine contains an average semiconductor value of US\$352, the value contained in an average hybrid or electric vehicle is approximately US\$700. Here approximately three quarters of the incremental semiconductor content is accounted for by power semiconductors. They are the decisive factor in the high power electric drives and are also the key to cutting costs. Innovative system solutions and in particular the use of silicon carbide-based components have an enormous potential when it comes to making electric driving more affordable.

Our strong commitment to driving efficiency and cost-effectiveness in the industry is reflected in active involvement in a variety of research projects. For instance, we initiated the E3Car (Energy Efficient Electrical Car) European research project. 30 European companies and academic institutes are working together to develop electronic innovations aimed at raising the efficiency bar by 35%.

Leading innovative semiconductor solutions for HEVs/EVs

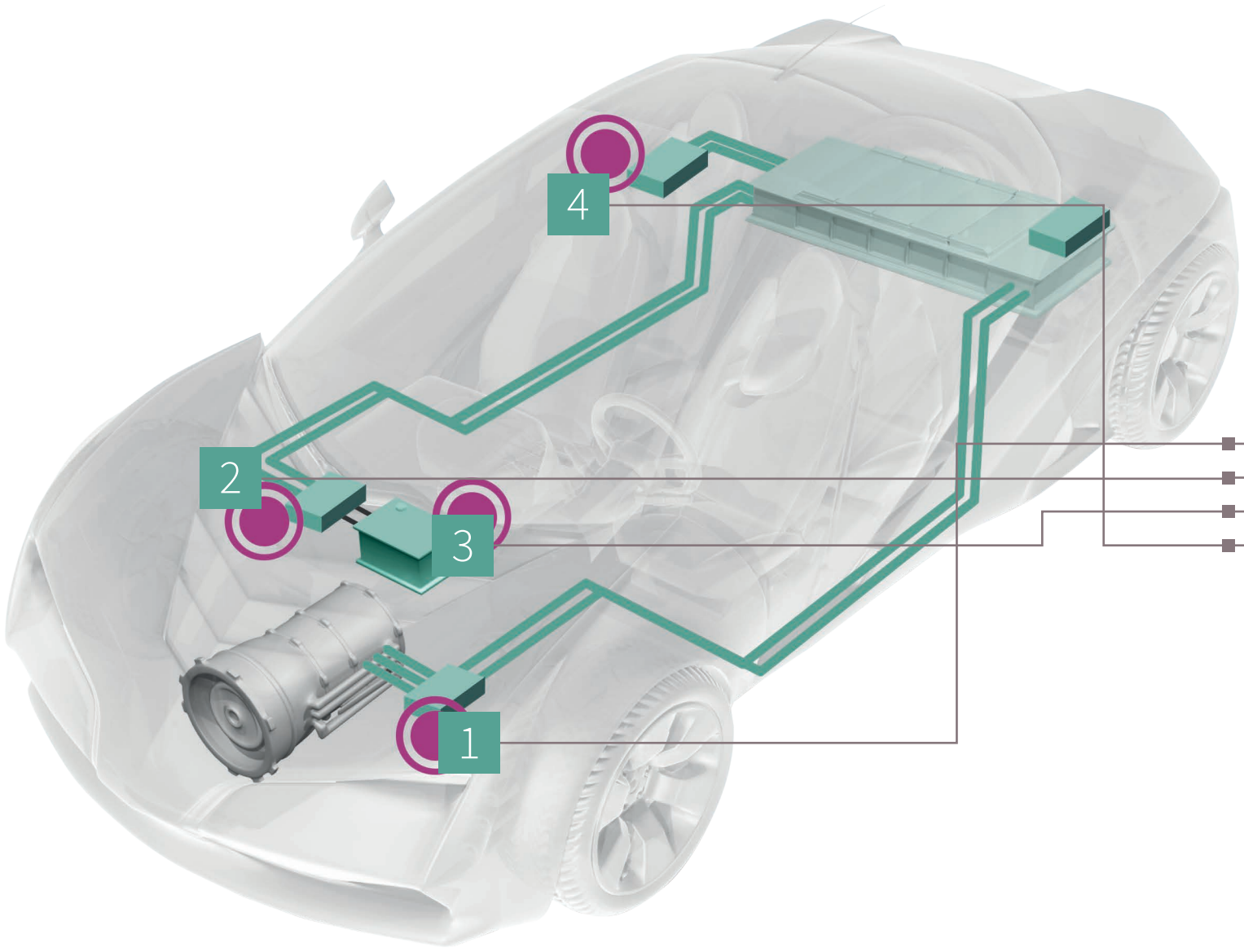
In an electric vehicle, the combustion engine is replaced by an electric motor while in a Hybrid Electrical Vehicle (HEV), the combustion engine is supplemented with an electric motor. Semiconductors are indispensable for all types of electrified powertrains. Regardless of the model, bundled high-power and automotive system expertise is essential to serve this market successfully.

As the world leader in advanced power electronics and a world leader in automotive electronics, our know-how and system expertise puts us in a perfect position to provide innovative, high-performance semiconductor solutions with best-in-class technologies for hybrid and electric vehicles.

Drawing on our long-standing experience in the development of leading IGBT power modules and high-efficiency technologies for the industrial market, we have developed dedicated, automotive-qualified high-power modules for

highest power densities and efficiency. Our broad product portfolio enables a smooth transition across all power classes from mild HEV to high-power EV. Suitable for all electric drivetrain architectures, our offering comprises discrete components, power semiconductors, microcontrollers, sensors and high-power modules.

Thanks to our system expertise, we are able to provide complete chipsets offering optimized performance and reduced overall system costs. Our semiconductor solutions for (H)EV are proof of the exceptional quality and reliability that the world’s leading automotive manufacturers have come to know and expect from Infineon. And we are proud to be able to deliver market-leading (H)EV solutions already today. By offering innovative and highly efficient products of outstanding quality, we are driving innovative electrified powertrain solutions geared towards more sustainable mobility choices.



Application overview

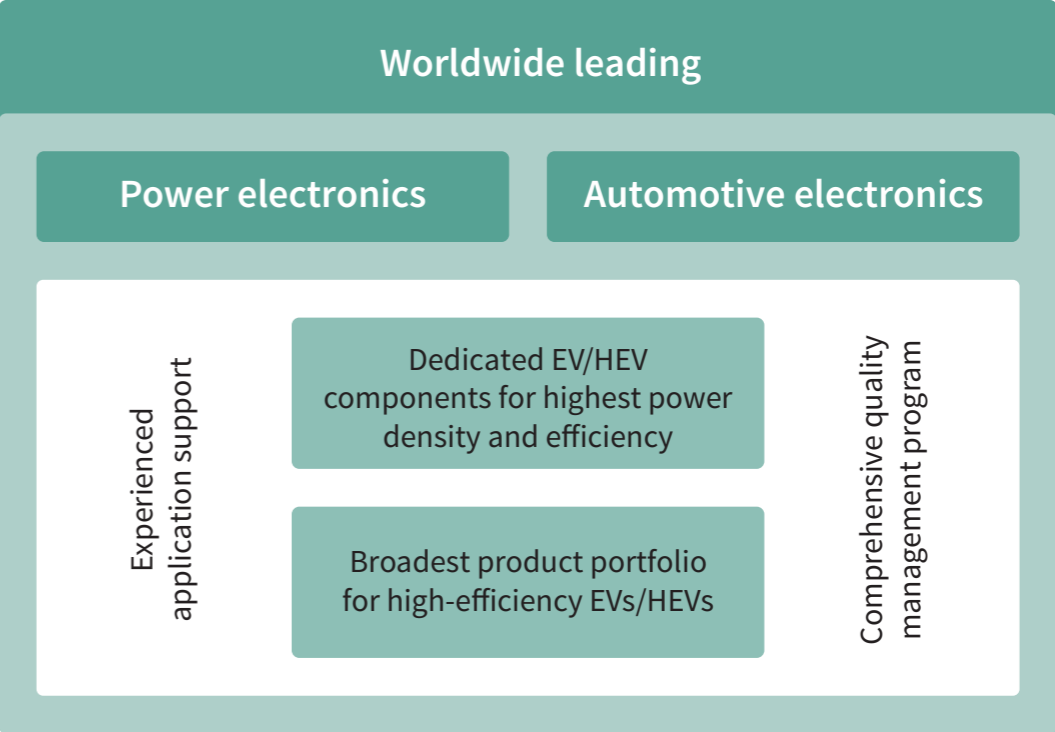


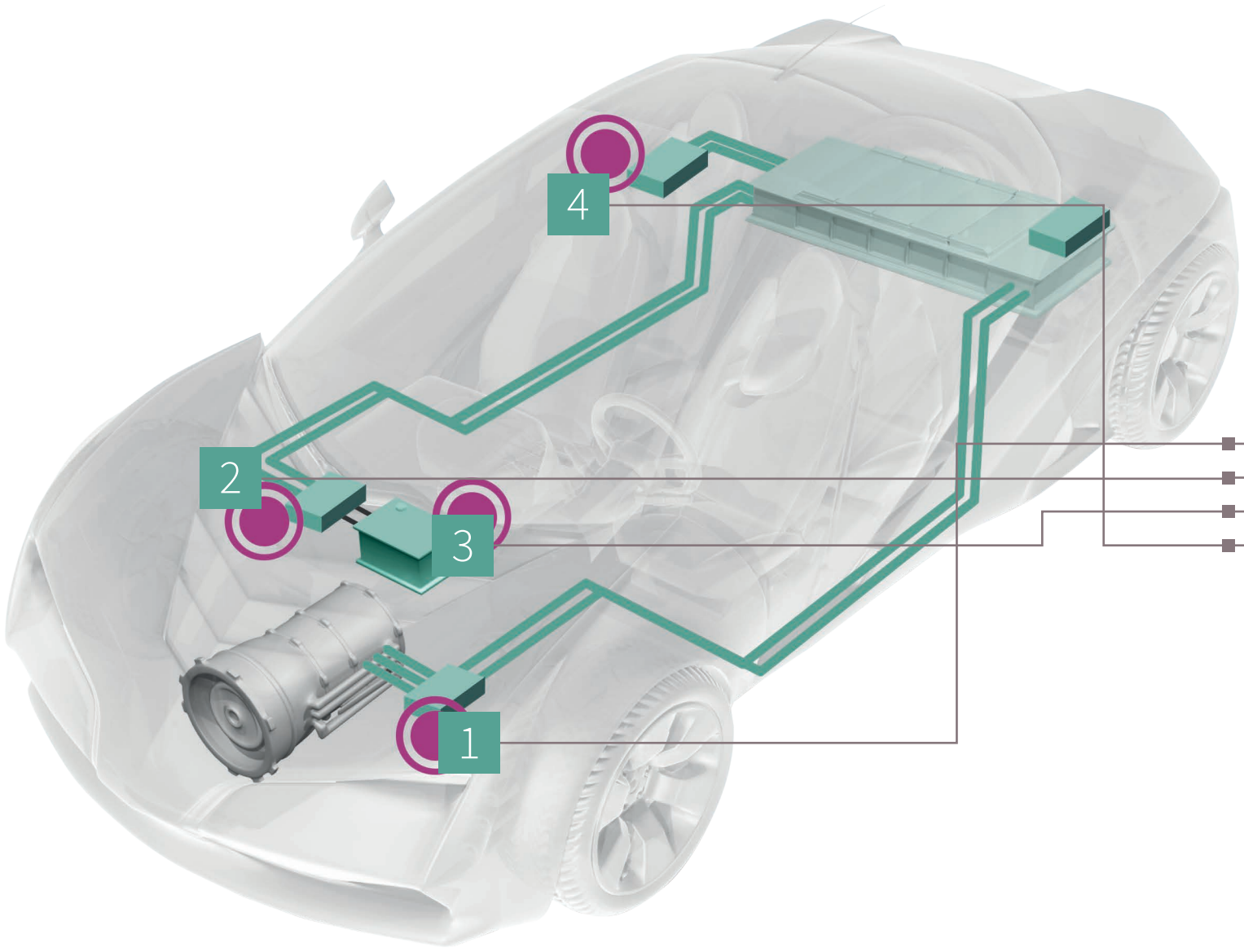
1 Main inverter
 The inverter not only drives the electric motor, but is also used for regenerative braking and feeding energy back to the battery.

2 DC-DC converter
 The DC-DC converter charges the conventional 12 V power supply net from the high-voltage battery and replaces the former belt driven alternator.

3 Auxiliary loads
 Instead of being belt-driven, auxiliaries like water pump, HVAC compressor, PTC heater, etc. also have to be driven by electric power. Smart and energy efficient auxiliary loads mainly cover inverters/converters or high-side/low-side switches.

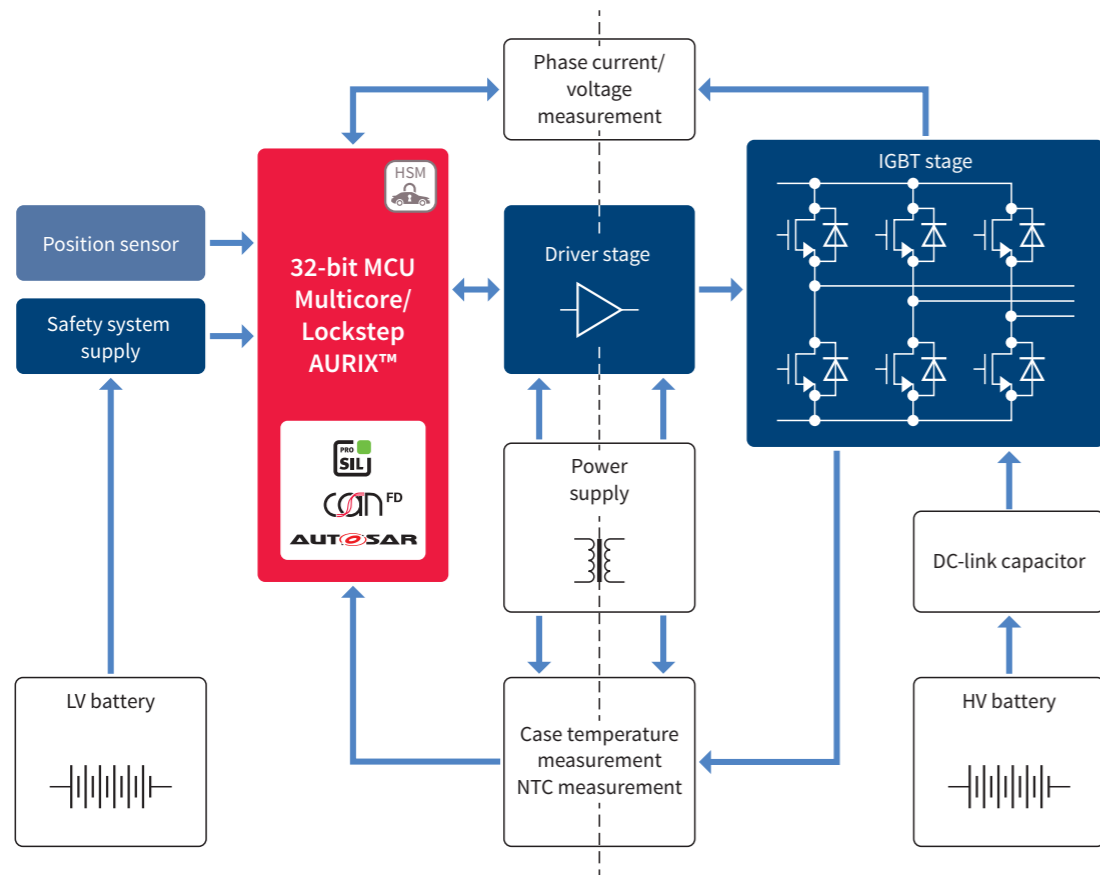
4 On-board charger
 The battery block is charged via an AC-DC converter module. In the example shown here, an on-board unit charges the battery. Off-board and inductive charging solutions are also available.





1 Main inverter

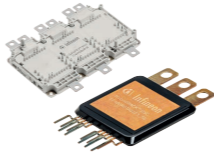
With an electric drivetrain, the inverter controls the electric motor. This is a key component in the car as, similar to the Engine Management System (EMS) of combustion vehicles, it determines driving behavior. Regardless of whether the motor is synchronous, asynchronous or brushless DC, the inverter always functions in a similar way and is controlled by an integrated PCB, which should be designed to minimize switching losses and maximize thermal efficiency. Not only does the inverter drive the electric motor, it also captures energy released through regenerative braking and feeds this back to the battery. As a result, the range of the vehicle is directly related to the efficiency of the main inverter.





Our semiconductor solutions for the main inverter

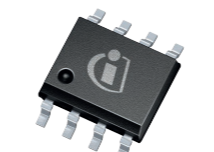
Our highly reliable semiconductor solutions support a wide range of motors, generators and power classes, enabling compact and cost-efficient system designs offering high energy efficiency thanks to the reduction of power losses.


Highlights include:

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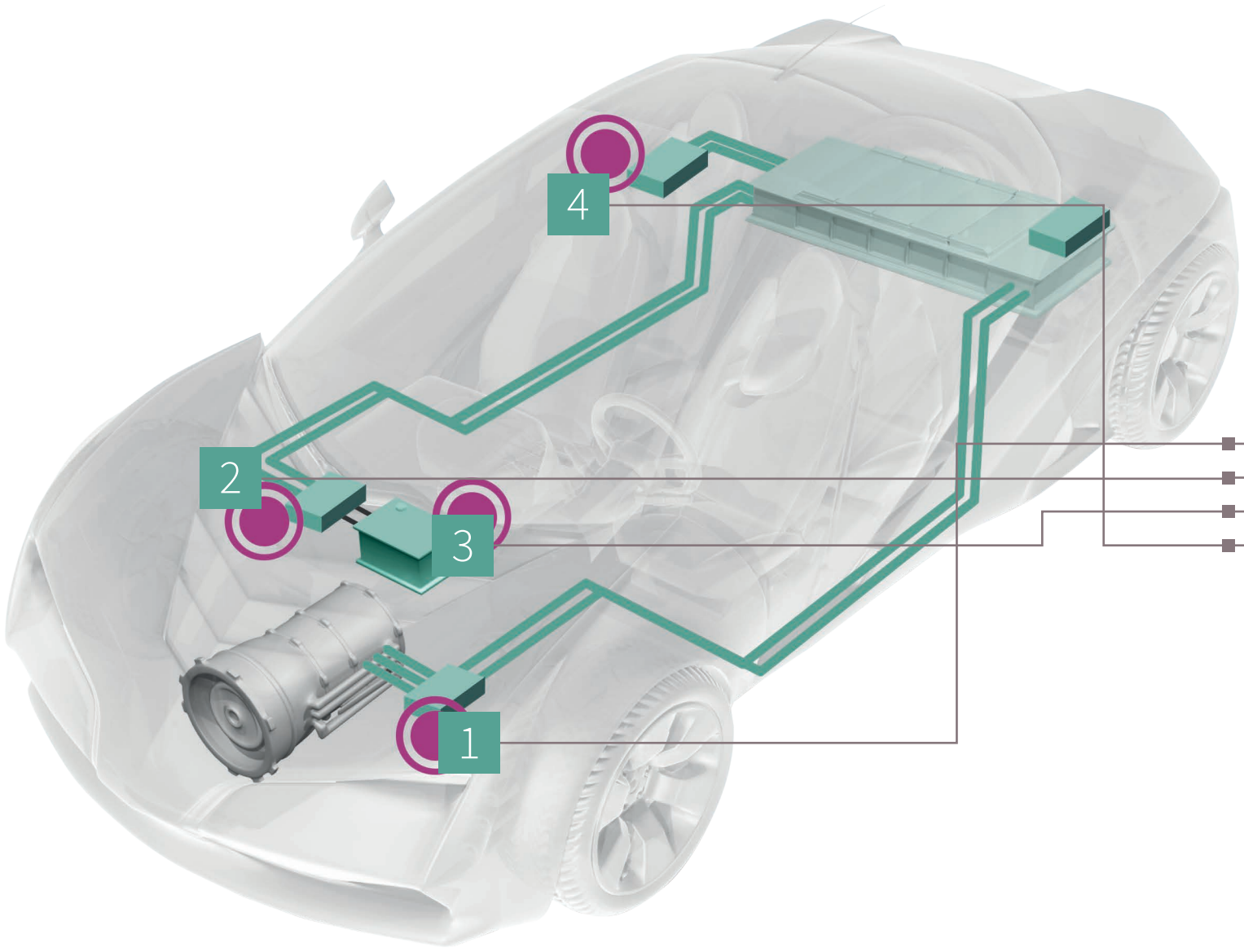
Our HybridPACK™ family enables a smooth transition across all power classes from HEV to EV (from 10 kW to 100 kW). These integrated power modules contain all power semiconductors required to drive electric motors of up to 100 kW, with the added bonus of compact inverter designs and optimum support for water cooling.
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EiceDRIVER™ is a family of gate driver ICs with the perfect feature set to drive and control the IGBTs. The EiceDRIVER™ family includes single and dual channel automotive IGBT Driver IC's providing galvanic isolation and bidirectional signal transmission.
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Our high scalable 32-bit microcontrollers AURIX™ family, with its superior performance, ASIL-D supportive functions and integrated resolver-to-digital interface, are the perfect brain for energy-efficient electric drivetrains.
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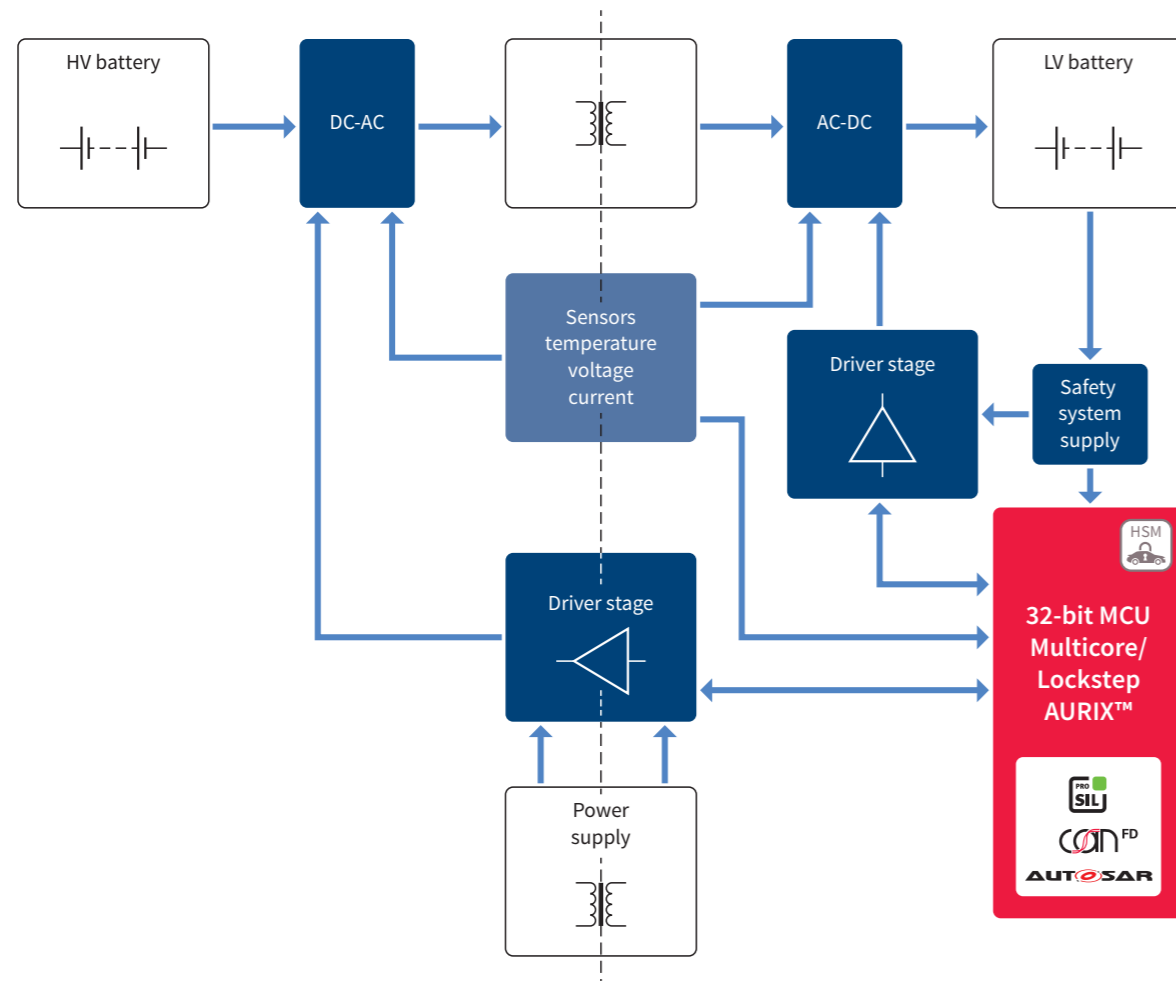
Our position sensors enable close-loop feedback of motor position for Field-Oriented Control (FOC) supporting the highest safety levels.
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High-efficiency, low-loss IGBT discret es bundle our outstanding trench and fieldstop technologies to reduce saturation voltages well below the levels offered by competing standard NPT IGBTs – without increasing switching losses. These IGBT discret es offer maximum flexibility to the application design.



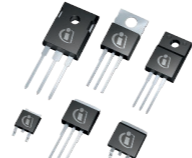
2 Auxiliary HV/LV DC-DC converter

Different voltage levels are required by the various electronic components in an EV. High-voltage batteries with different voltage levels are currently available on the market. In addition, the power classes scale from 1 kW to 5 kW depending on the number of low-voltage applications. In the past, the alternator was used to supply the 12 V power supply system. In EVs and HEVs, the DC-DC converter supplies the 12 V power system from the high-voltage battery. Designers are called on to increase conversion efficiency as a way of extending the range of the vehicle. In addition, different components may be required depending on whether the design is suited for uni- or bidirectional energy transfer.




Our semiconductor solutions for the DC-DC converter

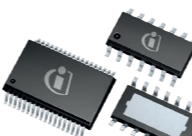
Our chip solutions enable designers to build small DC-DC converters with high power density supporting all voltage and power classes. Highlights include:




CoolMOS™ transistors for high-voltage side – this MOSFET is based on our super junction technology, ensuring low $R_{DS(on)}$ at high switching frequencies.




Our Easy automotive power modules with high speed IGBT3 and rapid diode enable a compact design and the highest energy efficiency ratings for converters from about 2–10 kW.




EiceDRIVER™ is a family of gate driver ICs with the perfect feature set to drive and control IGBTs. These isolation-integrated gate driver ICs significantly reduce space requirements on the control board.



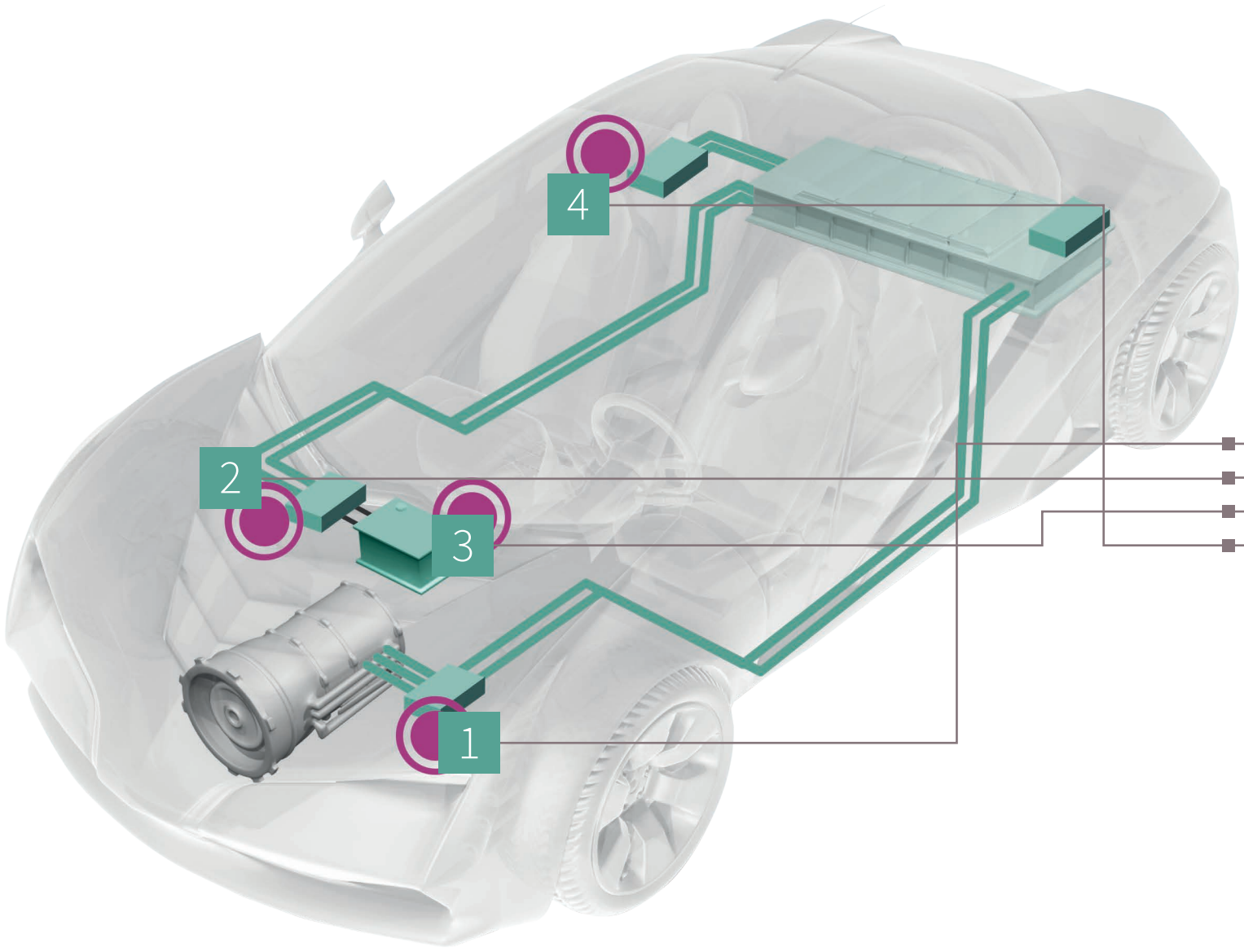
Our highly scalable and 32-bit microcontrollers AURIX™ family, with its superior performance and ASIL-D supportive functions, are the perfect brain for energy-efficient electric drivetrains.



The linear Hall IC family is optimized for measuring high currents with different digital output.

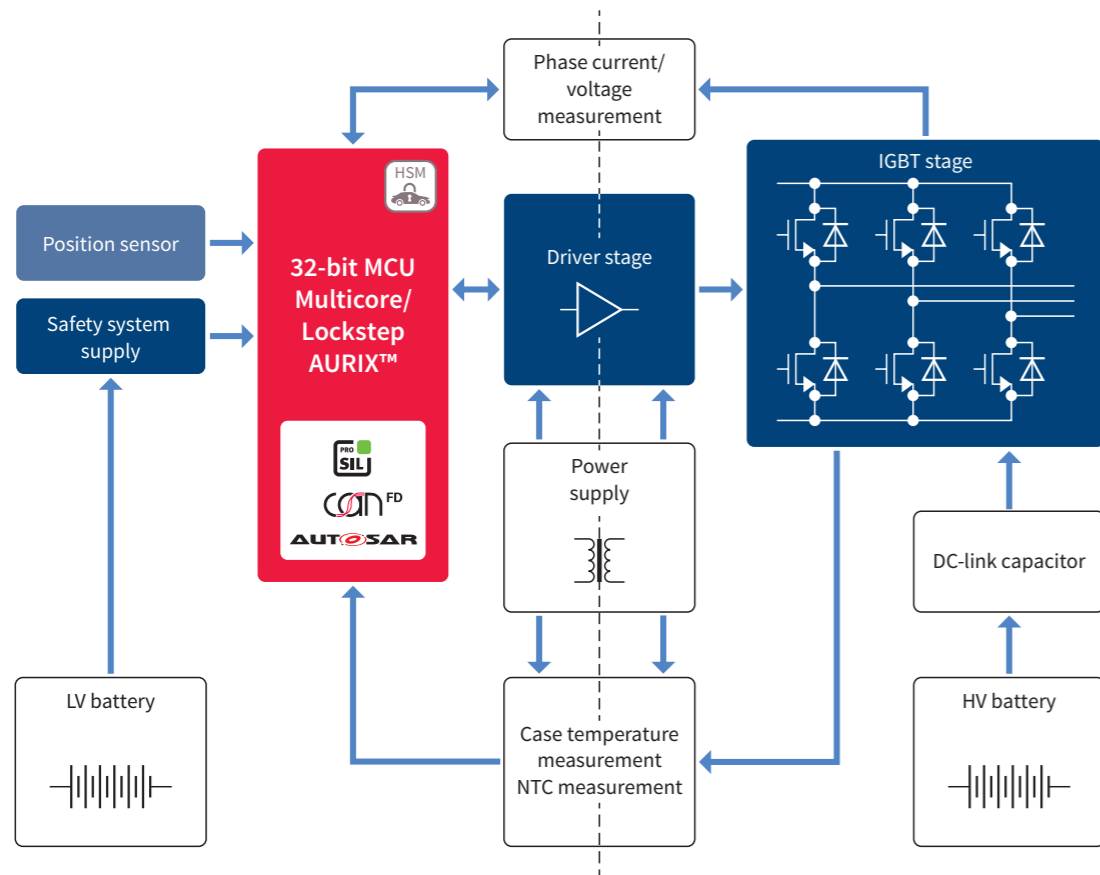


High-efficiency, low-loss IGBT discretes bundle our outstanding trench and fieldstop technologies to reduce saturation voltages well below the levels offered by competing standard NPT IGBTs – without increasing switching losses. These IGBT discretes offer maximum flexibility to the application design.




3 Auxiliary loads


Power on demand increases the efficiency of electric vehicles. With HEVs and EVs, former belt-driven devices classified as auxiliary drives have been electrified and integrated into the power system to deliver power on demand. Typical auxiliary systems supplied from the high-voltage battery include air conditioning, electronic power steering, PTC Heater, oil pumps and cooling pumps. As power from the battery is expensive, the challenge is to use the electric power as efficiently as possible. Designers are thus looking to optimize the power efficiency of all auxiliary systems.

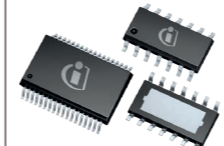



Our semiconductor solutions for the auxiliary inverter

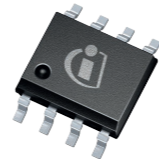
Our fully automotive-qualified product portfolio supports a wide range of motors, generators and power classes and enables compact designs offering high power density. Highlights include:

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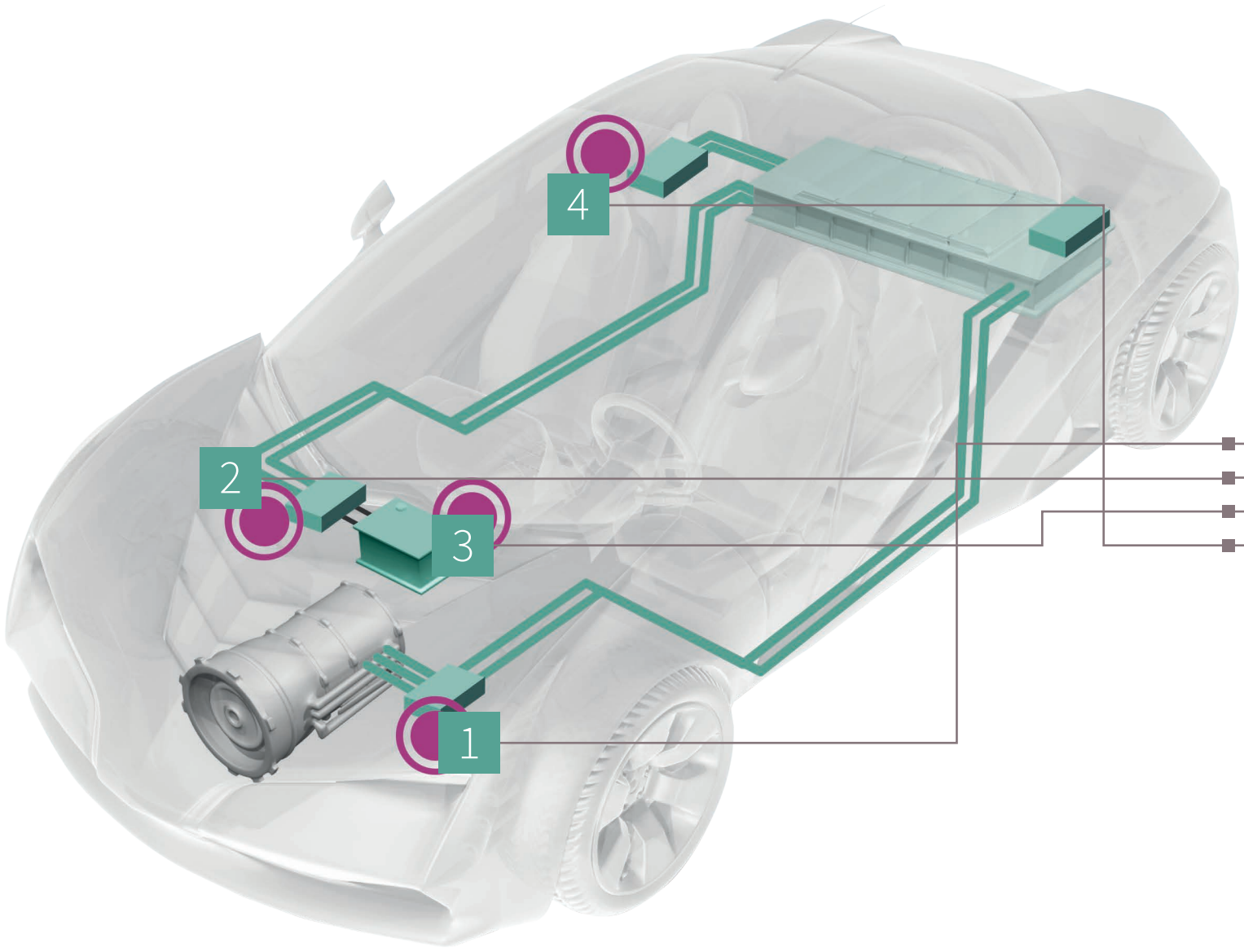
Our Easy automotive power modules enable compact designs and the highest energy efficiency ratings for auxiliary drives and converters.
- 

High-efficiency, low-loss IGBT discretes bundle our outstanding trench and fieldstop technologies to reduce saturation voltages well below the levels offered by competing standard NPT IGBTs – without increasing switching losses.
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EiceDRIVER™ is a family of gate driver ICs with the perfect feature set to drive and control IGBTs. These isolation-integrated gate driver ICs significantly reduce space requirements on the control board.
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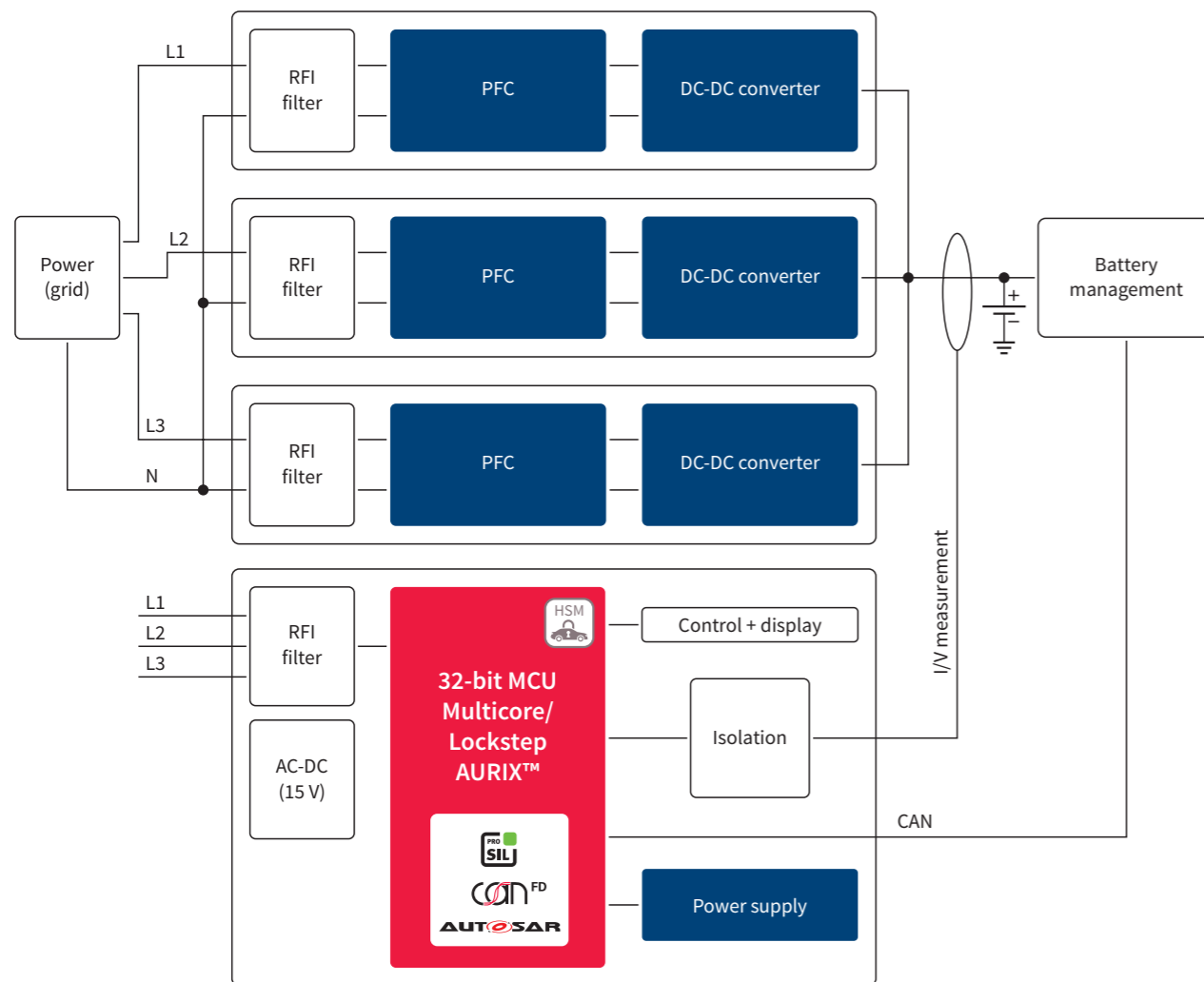
Our highly scalable and ASIL-D supportive 32-bit microcontrollers dedicated to (H)EV solutions are the perfect complement to our product portfolio for energy-efficient electric drivetrains.
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Our position sensors enable close-loop feedback of motor position for Field-Oriented Control (FOC) supporting the highest safety levels.



4 On-board charger

The battery in an electric vehicle is useless without a battery charger. And all electronic systems depend on the battery for power. With an on-board charger unit, the battery can be charged from a standard power outlet. Charging via the main grid calls for design flexibility given the different voltage and current levels in different countries. And charging time is an important factor for car drivers. System designers are challenged to support varied voltage and current levels while increasing power density. The key success factors of on-board charging are efficiency and high power density for a small form factor. The long-term trend is moving towards bi-directionality, where the charger also feeds power from the car to the smart grid.

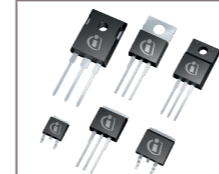


Our semiconductor solutions for the on-board chargers

Our comprehensive product portfolio provides the perfect fit for compact charger units (>> 10 kW/dm³) designed for high switching frequencies, lower weight and adjustable displacement power factors. Our isolated gate drivers ensure safe operation. Highlights include:



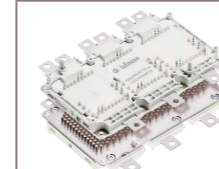
Our highly scalable 32-bit microcontrollers AURIX™ family with ASIL-D supportive functions and CAN FD, are ideal fit for (H)EV solutions.



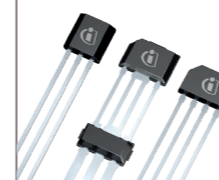
CoolMOS™ transistors – high-voltage automotive MOSFETs for low-power charging solutions (overnight).



Easy 1B/2B – flexible power module solutions for low-power charging solutions.



HybridPACK™ – power module solutions for high-power charging solutions.



The linear Hall IC family is optimized for measuring high currents with different digital output.



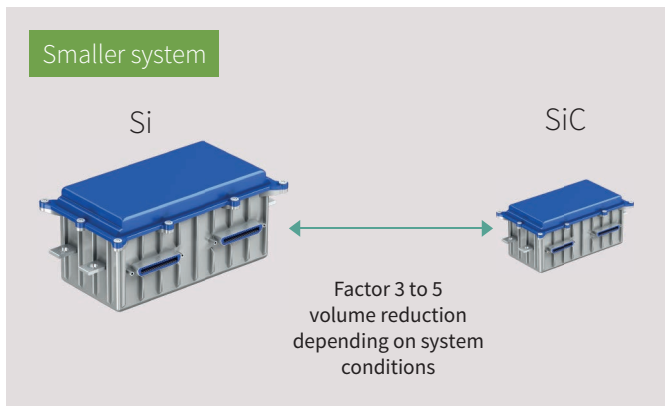
SiC for automotive applications

Gearing up for a new generation of power electronics

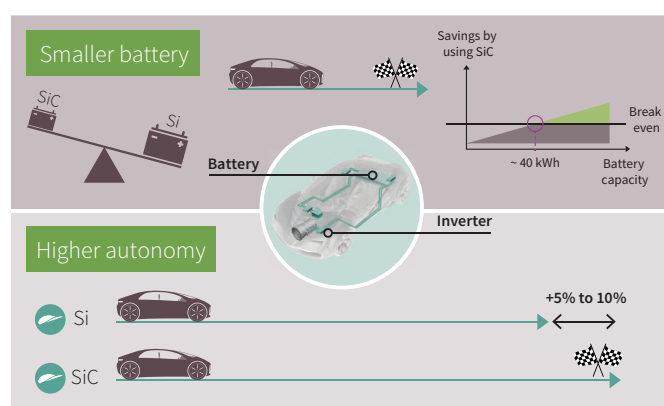
Demand for plug-in hybrid and all-electric vehicles (xEV) continues to rise. These vehicles are packed full of power electronics – most of which are currently based on silicon. However, the latest xEV designs call for advances in efficiency and power density. Silicon carbide (SiC) is emerging as the material of choice to overcome the performance pla-

teau of silicon. Highlights such as low switching losses, high temperature capability and high switching frequency, make it ideal to meet best xEV requirements. SiC based solutions are promised to be more efficient, lighter and compacter than conventional applications.

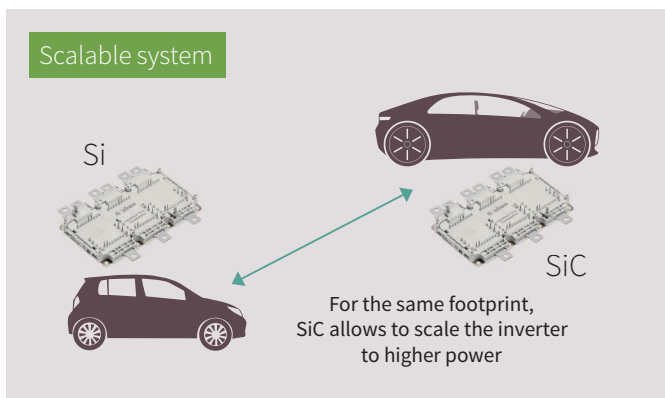
Higher power density



Lighter, smaller battery and longer range



Scalability



Benefits of SiC

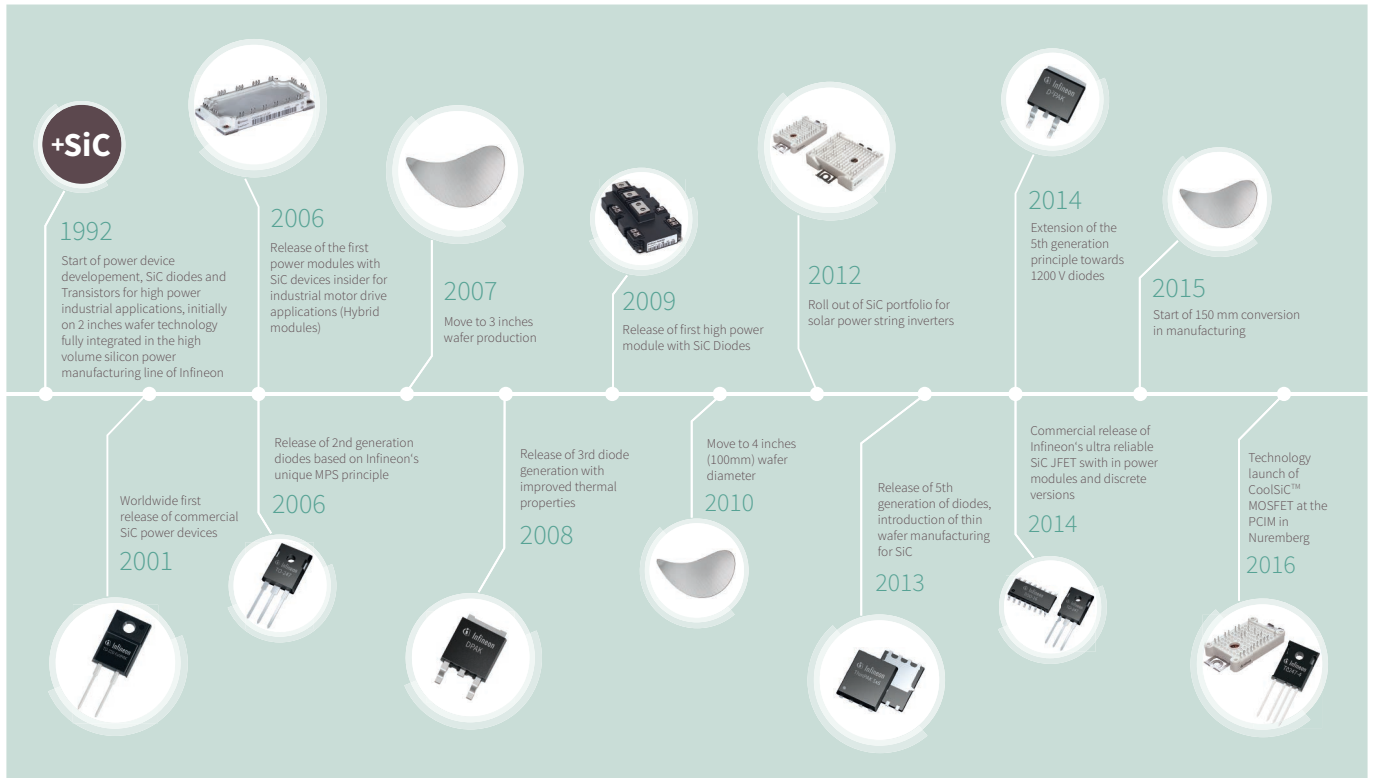


Synergized expertise

Number one in automotive power semiconductors worldwide, Infineon has developed one of the broadest technology portfolio available on the market. The company has developed expertise in silicon, SiC, gallium nitride (GaN), complemented by innovative packaging and gate driver

solutions. Infineon is now leveraging over five decades of experience in both high-voltage components and automotive semiconductors to bring the benefits of SiC technology to the automotive world.

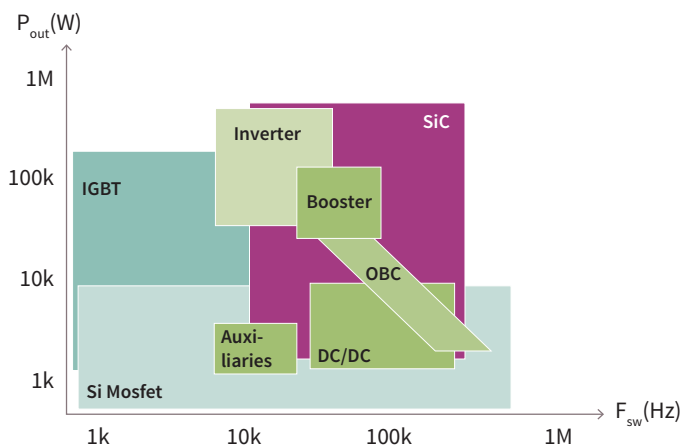
SiC – where do we come from?



Technology portfolio

As a technology leader for SiC power semiconductors, Infineon will actively drive down the cost/performance ratio of SiC and accelerate its market introduction. Building on a recognized expertise in automotive systems, Infineon will support his partners to design the next generation xEV that take full advantage of the performance capabilities of SiC, in order to create additional value for its customers.

Once Infineon is ready for an open market approach, customers can look forward to compact and highly efficient SiC devices offering performance and efficiency gains of up to 10 percent for a variety of driving scenarios.



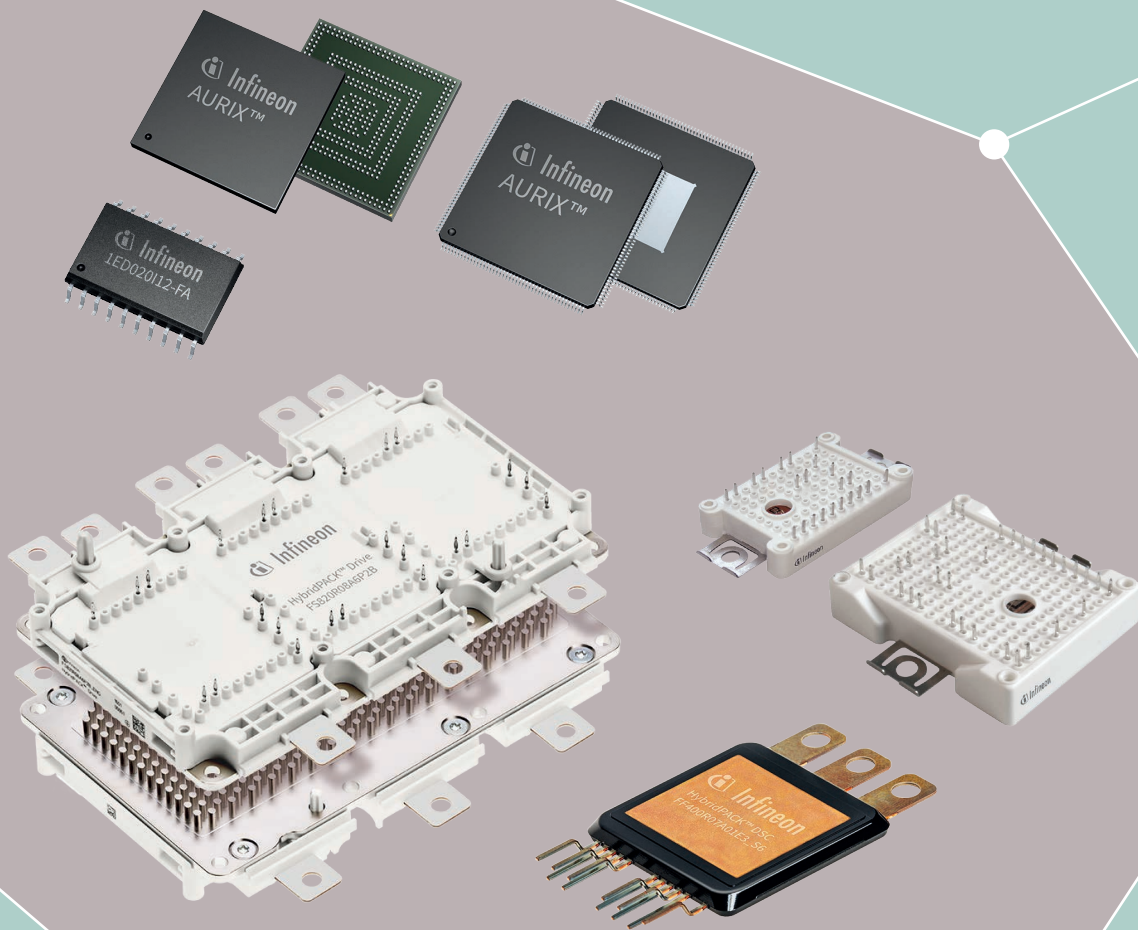


HybridPACK™ DSC

Half-bridge module with Double-Sided Cooling for superior thermal performance and higher power densities

Building on our long-standing experience in IGBT power modules and trench-field-stop IGBTs, we have developed a new half-bridge module to increase inverter power density even further – the HybridPACK™ DSC. With its extremely compact design in a dual in-line package, our FF400R07A01E3_S6 device delivers superior thermal performance thanks to Double-Sided Cooling (DSC). This makes it ideal for today's hybrid and electric vehicle designs.

Highlights include low stray inductance, integrated current and temperature sensing and higher blocking voltage. Integrated isolation means these new modules can be directly attached to a cooler without external isolation. Discover a new dimension in inverter power density, system efficiency and monitoring capabilities today!



Product portfolio overview for (H)EV applications

Hybrid power modules

HybridPACK™ 1, HybridPACK™ Light – power module for hybrid electric vehicle applications for a power range up to 100 kW

NEW!

Sales name	I_c [A]	V_{CES} [V]	Application	Product status	Packages
FS400R07A1E3_S7	400	705	Inverter	Released	HybridPACK™ 1
FS215R04A1E3D	215	400	Inverter	Released	HybridPACK™ 1
FS200R07A5E3_S6	200	705	Inverter	Released	HybridPACK™ Light
FS400R07A3E3	400	705	Inverter	Released	HybridPACK™ 1 DC6

HybridPACK™ 1 Pin-Fin – power module for hybrid electric vehicle applications for a power range up to 100 kW

Sales name	I_c [A]	V_{CES} [V]	Application	Product status	Packages
FS400R07A1E3_H5	400	650	Inverter	Released	HybridPACK™ 1 Pin-Fin
FS200R12A1E3_H5	200	1200	Inverter	Released	HybridPACK™ 1 Pin-Fin

HybridPACK™ 2 – power module for hybrid electric vehicle applications for a power range up to 180 kW

NEW!

NEW!

Sales name	I_c [A]	V_{CES} [V]	Application	Product status	Packages
FS400R12A2T4	400	1200	Inverter	Released	HybridPACK™ 2
FS600R07A2E3_B31	600	680	Inverter	Released	HybridPACK™ 2 Enhanced
FS600R07A2E3_B32	600	680	Inverter	Released	HybridPACK™ 2 Enhanced
FS800R07A2E3_B31	800	680	Inverter	Released	HybridPACK™ 2 Enhanced
FS800R07A2E3_B32	800	680	Inverter	Released	HybridPACK™ 2 Enhanced
FS900R08A2P2_B31	900	750	Inverter	Coming Q4/2016	HybridPACK™ 2 Enhanced
FS900R08A2P2_B32	900	750	Inverter	Coming Q1/2017	HybridPACK™ 2 Enhanced

www.infineon.com/hybridpack

HybridPACK™ Drive – power module for hybrid electric vehicle applications for a power range up to 160 kW

NEW!

NEW!

NEW!

Sales name	I_c [A]	V_{CES} [V]	Application	Product status	Packages
FS820R08A6P2	820	750	Inverter	Coming Q1/2017	HybridPACK™ Drive
FS820R08A6P2B	820	750	Inverter	Coming Q1/2017	HybridPACK™ Drive
FS820R08A6P2LB	820	750	Inverter	Coming Q1/2017	HybridPACK™ Drive

HybridPACK™ DSC – molded power module for hybrid electric vehicle applications for a power range up to 100 kW

NEW!

NEW!

Sales name	I_c [A]	V_{CES} [V]	Application	Product status	Packages
FS200R07A02E3_S6	200	700	Inverter	Coming Q2/2017	HybridPACK™ DSC L
FF400R07A01E3_S6	400	700	Inverter	Coming Q2/2017	HybridPACK™ DSC S

Automotive easy modules – power modules for auxiliaries and charger up to 10 kW

Sales name	I_c [A]	V_{CES} [V]	Application	Product status	Packages
FS75R07W2E3_B11A	75	650	Inverter	Released	Automotive Easy 2B
FS50R07W1E3_B11A	50	650	Inverter	Released	Automotive Easy 1B
F4-50R07W1H3_B11A	50	650	DC-DC converter	Released	Automotive Easy 1B
F4-75R07W1H3_B11A	75	650	DC-DC converter	Released	Automotive Easy 1B
FZ30R07W1E3_B31A	30	650	Inverter	Released	Automotive Easy 1B

www.infineon.com/autoeasy

Evaluation kits

Board name	SP nummer	Description
Hybrid kit 1 pin-fin	SP000889400	Evaluation kit for applications with HybridPACK™ 1 pin-fin FS400R07A1E3_H5
Hybrid kit 1+	SP000806996	Evaluation kit for applications with HybridPACK™ 1 FS400R07A1E3
Hybrid kit 2 enhanced	SP001285706	Evaluation kit for applications with HybridPACK™ 2 FS800R07A2E3
Easy kit aux drives	SP001020068	Evaluation kit for applications with Easy 1B FS50R07W1E3_B11A
Easy kit DC-DC	SP001007734	Evaluation kit for applications with Easy 1B F4-50R07W1H3_B11A

www.infineon.com/evaluation-boards

Discrete IGBTs

Sales name	I_c [A]	V_{CES} [V]	Incl. Diode	Application	Product status	Packages
AIKB20N60CT	20	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-263-3-2
AIKP20N60CT	20	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-220-3-1
AIKQ100N60CT	100	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247-3-46
AIKQ120N60CT	120	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247-3-46
AIKW20N60CT	20	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247-3-41
AIKW30N60CT	30	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247-3-41
AIKW50N60CT	50	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247-3-41
AIKW75N60CT	75	600	Yes	Main Inverter, Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247-3-41
AIGW40N65F5	40	650	No	DC-DC converter, On-board Charger	Released	TO-247-3-41
AIGW40N65H5	40	650	No	DC-DC converter, On-board Charger	Released	TO-247-3-41
AIGW50N65F5	50	650	No	DC-DC converter, On-board Charger	Released	TO-247-3-41
AIGW50N65H5	50	650	No	DC-DC converter, On-board Charger	Released	TO-247-3-41
AIKW40N65DF5	40	650	Yes	DC-DC converter, On-board Charger	Released	TO-247-3-41
AIKW40N65DH5	40	650	Yes	DC-DC converter, On-board Charger	Released	TO-247-3-41
AIKW50N65DF5	50	650	Yes	DC-DC converter, On-board Charger	Released	TO-247-3-41
AIKW50N65DH5	50	650	Yes	DC-DC converter, On-board Charger	Released	TO-247-3-41
AUIRG4BC30U-S	12	600	No	PTC Heater	Released	TO-263-3-2
AUIRG4PC40S-E	31	600	No	PTC Heater	Released	TO-247AD
AUIRG4PH50S	33	1200	No	PTC Heater	Released	TO-247AC
AUIRGB4062D1	39	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-220AB
AUIRGDC0250	81	1200	No	PTC Heater	Released	Super-TO-220
AUIRGP35B60PD	34	600	Yes	DC-DC converter, On-board Charger	Released	TO-247AC
AUIRGP35B60PD-E	34	600	Yes	DC-DC converter, On-board Charger	Released	TO-247AD
AUIRGP4062D	24	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247AC
AUIRGP4062D-E	24	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247AD
AUIRGP4063D	48	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247AC
AUIRGP4066D1	90	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	TO-247AC
AUIRGP50B60PD1	45	600	Yes	DC-DC converter, On-board Charger	Released	TO-247AC
AUIRGP65G40D0	41	600	Yes	DC-DC converter, On-board Charger	Released	TO-247AC
AUIRGF65G40D0	41	600	Yes	DC-DC converter, On-board Charger	Released	TO-247AD
AUIRGP66524D0	40	600	Yes	DC-DC converter, On-board Charger	Released	TO-247AC
AUIRGF66524D0	40	600	Yes	DC-DC converter, On-board Charger	Released	TO-247AD
AUIRGPS4067D1	160	600	Yes	Main Inverter, Motor drives, AirCon/HVAC, PTC Heater	Released	Super-274
AUIRGPS4070D0	120	600	Yes	Main Inverter, Motor drives, AirCon/HVAC, PTC Heater	Released	Super-274
AUIRGR4045D	6	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	DPAK (TO-252)
AUIRGS30B60K	50	600	No	Motor drives, AirCon/HVAC, PTC Heater	Released	D2PAK (TO-263)
AUIRGS4062D1	39	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	D2PAK (TO-263)
AUIRGS30B60K	50	600	No	Motor drives, AirCon/HVAC, PTC Heater	Released	PG-TO262-3-901
AUIRGS4062D1	39	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	PG-TO262-3-901
AUIRGU4045D	6	600	Yes	Motor drives, AirCon/HVAC, PTC Heater	Released	IPAK (TO-251)
AUIRGF76548D0	48	680	Yes	Motor drives, AirCon/HVAC, PTC Heater	Coming soon	TO-247

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Automotive Gate Driver ICs

Suitable for our power products: EiceDRIVER™ – IGBT Driver IC providing galvanic isolation and bidirectional signal transmission with high ambient temperature capability (supported IGBT technologies)

Sales name	ID [A]	V _{BR} [V] (supported IGBT technologies)	Packages	Product status
1ED020I12FTA	2	400-1200	DSO-20	Released
2ED020I12FA	2	400-1200	DSO-36	Released
1ED020I12FA2	2	400-1200	DSO-20	Released
1EDI2001AS	1	400-1200	DSO-36	In development ¹⁾
1EDI2002AS	1	400-1200	DSO-36	In development ¹⁾
1EBN1001AS	15	400-1200	DSO-14	In development ¹⁾

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Automotive microcontrollers

32-bit microcontroller family

Sales name	CPU clock [MHz]	Flash [MB]	Packages	Product status
SAK-TC299TP-128F300S	300	8.0	LFBGA-516	Released
SAK-TC297TP-128F300S	300	8.0	LFBGA-292	Released
SAK-TC277T-64F200S	200	4.0	LFBGA-292	Released
SAK-TC275T-64F200W	200	4.0	LQFP-176	Released
SAK-TC265D-40F200W	200	2.5	LQFP-176	Released
SAK-TC264D-40F200W	200	2.5	LQFP-144	Released
SAK-TC234LP-32F200F	200	2.0	LQFP-144	Released
SAK-TC233LP-32F200F	200	2.0	TQFP-100	Released

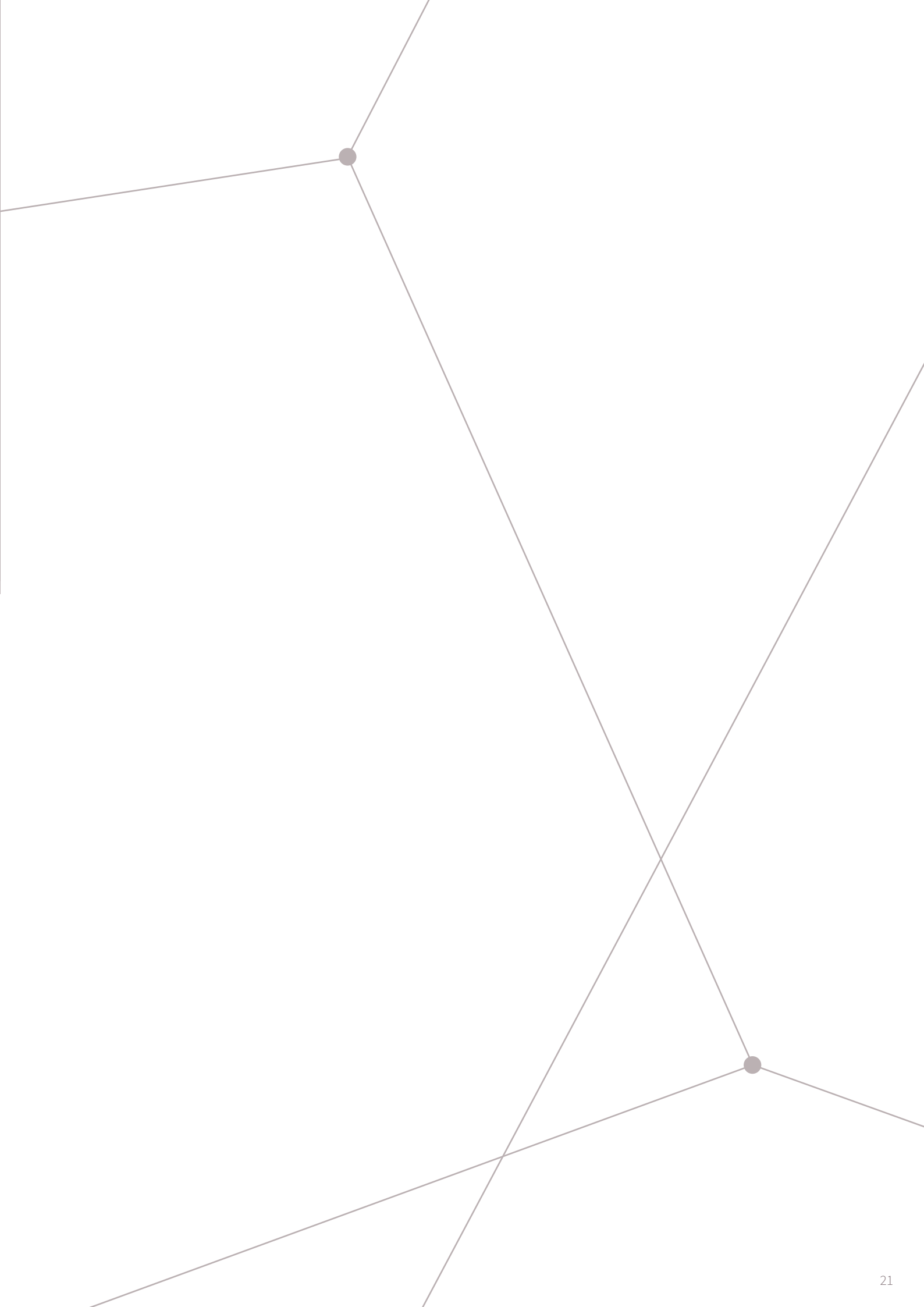
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