

# Infineon's technology trifecta for power designs of today and tomorrow

## CoolMOS™ 7 – CoolSiC™ – CoolGaN™

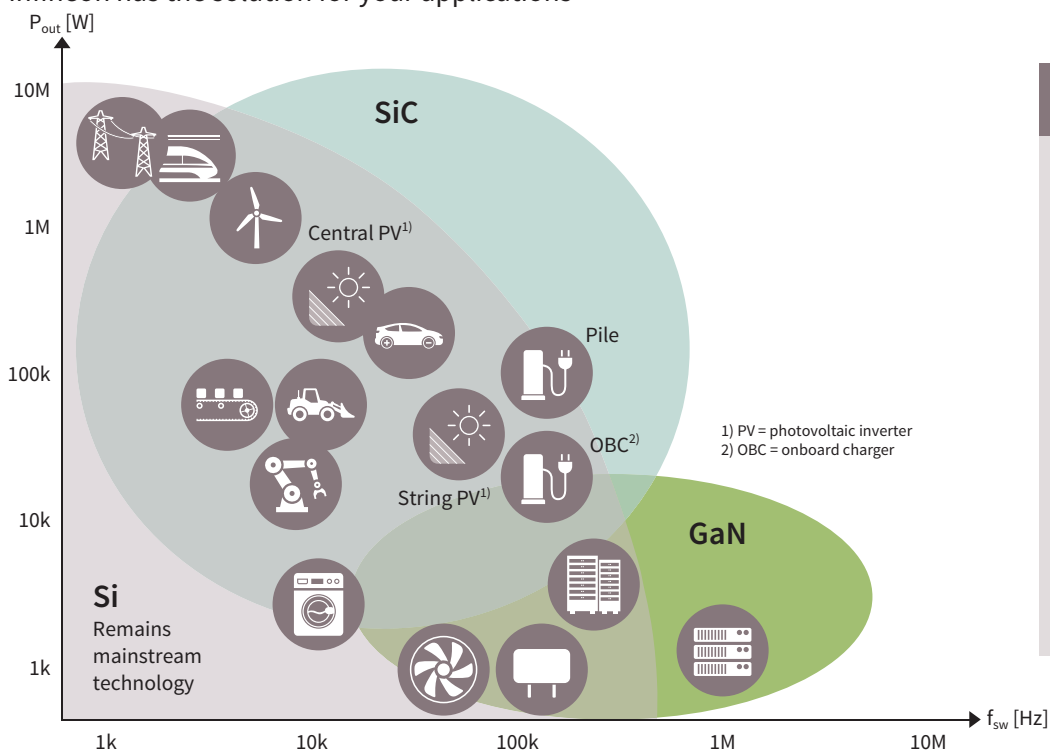
Infineon is the leader in the power semiconductor market and currently the only manufacturer mastering all power technologies while offering the broadest product and technology portfolio of silicon (such as SJ MOSFETs, IGBTs), silicon carbide (such as Schottky diodes, MOSFETs) and gallium nitride-based (e-mode HEMTs) devices, covering bare die, discretes and module solutions.

Equipped with the only 300 millimeter wafer fab for power semiconductors in the world, Infineon is best positioned to fully seize the growth opportunities in the power semiconductor industry.

CoolMOS™ SJ MOSFET products boast the outstanding figures of merit in terms of conduction, switching and driving losses. With quality and efficiency-ensuring features of its products, Infineon is setting new standards for energy efficiency, power density and ease of use. CoolSiC™ and CoolGaN™ enable extremely efficient and compact system designs that meet future demands for greener and better products. Additionally, a comprehensive portfolio of gate driver ICs for Si and WBG technologies unlock the full potential of the switches.

Infineon – part of your life, part of tomorrow.

### Infineon has the solution for your applications



#### Key features

##### Silicon (Si)

- > Mainstream technology

##### Silicon carbide (SiC)

- > Reaching tipping point
- > Targeting voltage classes ranging from 600 V to 3.3 kV
- > High power

##### Gallium nitride (GaN)

- > Lower cost than SiC
- > Targeting voltage classes ranging from 100 V to 600 V
- > Medium power

Discover Infineon's power technologies for high voltage designs, all of them complemented with dedicated gate drivers for Si, SiC and GaN devices. To learn more about the driver ICs please visit [www.infineon.com/gatedrivers](http://www.infineon.com/gatedrivers)

Si



**CoolMOS™ features**

- > Broadest SJ MOSFET portfolio on the market – wide on-state resistance ( $R_{DS(on)}$ ) granularity
- > Best in class  $R_{DS(on)}$ /package
- > Highest efficiency with an optimized price/performance ratio
- > Innovative package concepts
- > Low switching losses ( $E_{oss}$ ), Gate charge ( $Q_g$ )

**Technical benefits**

- > Low conduction and switching losses
- > Ease of use
- > High reliability
- > Product robustness
- > Excellent thermal management

**Customer benefits**

- > High power density resulting in compact and light design
- > Higher efficiency resulting in operational expenditure (OPEX) savings for end customers
- > Bill of material (BOM) savings resulting in low system cost
- > Long system lifetime

SiC



**CoolSiC™ features**

- CoolSiC™ MOSFET**
- > Low device capacitance
  - > Temperature-independent switching losses
  - > Intrinsic diode with low reverse recovery charge
  - > Threshold-free on-state characteristics

**CoolSiC™ Schottky Diode**

- > No reverse recovery charge
- > Purely capacitive switching
- > Lowest figure of merit ( $Q_c \times V_f$ )

**Technical benefits**

- CoolSiC™ MOSFET**
- > Superior gate oxide reliability
  - > Best-in-class switching and conduction losses
  - > IGBT-compatible driving (+15 V)
  - > Threshold voltage,  $V_{th} > 4$  V
  - > Short-circuit robustness

**CoolSiC™ Schottky Diode**

- > Low turn-off loss
- > Low conduction loss
- > Reduction of CoolMOS™ or IGBT turn-on loss
- > Switching loss independent of load current, switching speed and temperature

**Customer benefits**

- CoolSiC™ MOSFET**
- > Highest efficiency for reduced cooling effort
  - > Long lifetime and great reliability
  - > High frequency operation
  - > Reduction in system cost
  - > High power density
  - > Low system complexity
  - > Ease of design and implementation

**CoolSiC™ Schottky Diode**

- > System efficiency improvements
  - Reduced cooling requirements
  - Enabling higher frequency
- > High power density
- > High system reliability
- > Low electromagnetic interference (EMI)

GaN



**CoolGaN™ features**

- > 10x higher breakdown field and 2x higher mobility<sup>1)</sup>
- > 10x lower output charge<sup>1)</sup>
- > Zero reverse recovery charge
- > 10x lower gate charge and linear output capacitance ( $C_{oss}$ ) characteristic<sup>1)</sup>

**Technical benefits**

- > Very low  $R_{DS(on)}$  and large cost-down potential
- > Excellent efficiency in resonant circuits
- > New topologies and current modulation
- > Fast (and nearly lossless) switching

**Customer benefits**

- > Extreme power density resulting in compact and light design
- > Extreme efficiency resulting in operational expenditure (OPEX) savings for end customers
- > Bill of material (BOM) savings resulting in low system cost

1) Compared to Si

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