

## Product brief

# Performance Boost at Low Cost

## CoolSiC™ Hybrid Discrete with SiC technology for e-Mobility

Best cost-performance is the most important aspect for auxiliary applications in electric vehicles and hybrid vehicles. Therefore, Infineon has developed a hybrid of 650V TRENCHSTOP™ 5 AUTO fast-switching IGBT and CoolSiC™ Schottky Diode to enable a cost-efficient performance boost for fast switching automotive applications such as On-Board Charger, PFC, DC-DC and DC-AC.

The combination of a best-in-class fast-switching IGBT with a very reliable SiC Diode builds a perfect cost-performance trade-off for hard-switching topologies. Due to the  $Q_{rr}$ -free unipolar CoolSiC™ Schottky Diode, the  $E_{on}$  of the IGBT will be reduced significantly by up to 40% over silicon-only solutions. This makes the hybrid the first-choice for system-cost-sensitive hard commutation applications, such as Totem Pole topology in Automotive On-Board Charger applications. This results in better margin for low-complexity design-in activities.

### Key features

- > 650V TRENCHSTOP™ 5 IGBT + CoolSiC™ Schottky Diode Gen5
- > Best-in-class switching and conduction losses
- > No reverse & forward recovery charge
- > High operating temp:  $T_{j,max} = 175^{\circ}C$
- > Robust against surge currents
- > Low gate charge  $Q_g$  Available from 15A up to 50A

### Key benefits

- > Highest reliability against environmental conditions
- > Increased system efficiency
- > Best performance/cost ratio for hard switching topologies (e.g. Totem Pole)
- > Supporting bi-directional On-Board Charger designs

### Key applications

- > On-Board Charger
- > PFC
- > DC-DC



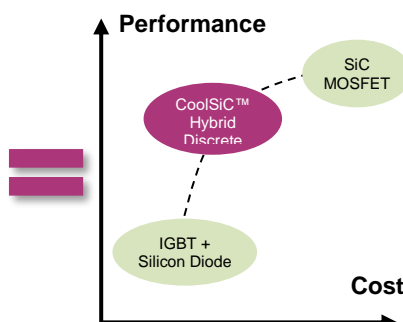
#### TRENCHSTOP™ 5 IGBT F5 Fast-Switching IGBT

- > 650V class
- > Performance-optimized IGBT for fast-switching
- > Fast IGBT in the portfolio with MOFET like switching behavior
- > Best-in-class fast-switching IGBT technology
- > Mature technology used by many customers successfully



#### CoolSiC™ Diode Gen 5 SiC Schottky Diode

- > 650V class
- > Excellent Figure of Merit ( $Q_c \times V_F$ )
- > No reverse recovery charge
- > High operating temperature ( $T_{j,max} = 175^{\circ}C$ )
- > Robust against surge currents

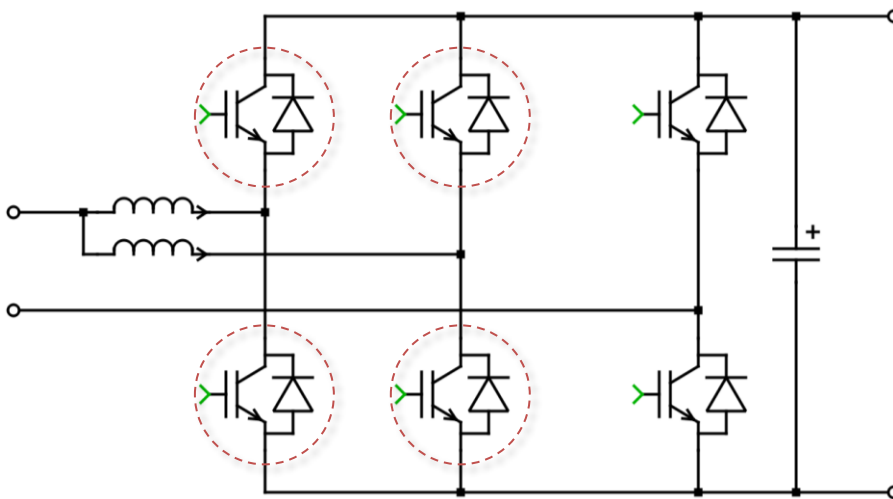


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### Application Diagram

The example shows an interleaved Totem Pole PFC topology. The CoolSiC™ Hybrid Discrete for Automotive can be used for the 4 IGBTs on the left side, whereas the remaining two IGBTs are slow switching at 50/60Hz.



### Product portfolio 650 V CoolSiC™ Hybrid Discrete for Automotive (PG-TO247-3)

Sales Product	SP Number	Switching frequency [kHz]	$V_{CE}$ [V]	$V_{CE,sat}$ [V]	$I_c$ [A]		$Q_c$ [μC]
					25 °C	100 °C	
AIKW50N65RF5	SP001724852	50-120	650	1.6	80.0	46.0	0.03

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