

## Product brief

# Small + Powerful: Fast IGBTs for e-Mobility

## World-class fast switching automotive IGBT in SMD package

Energy efficiency is the most important aspect for electric vehicles and hybrid vehicles. Therefore, Infineon has developed the 650 V TRENCHSTOP™ 5 AUTO technology with H5/F5 optimization to enable highest efficiency fast switching automotive applications such as On-Board Charger, PFC, DC/DC and DC/AC.

TRENCHSTOP™ 5 AUTO is an IGBT technology that enables world's lowest losses for switching in its class. The resulting high efficiency enables either an increased cruising range or a downsizing of the batteries for electric vehicles, or could simply provide better margin for low-complexity design-in activities. Overall, the great performance of TRENCHSTOP™ 5 AUTO offers a cost-optimized solution where engineers were used to use MOSFETs only. It is therefore perfectly suited for PFC stages in On-Board Chargers (OBCs).

Moreover, TRENCHSTOP™ 5 AUTO technology in an SMD housing, like the D<sup>2</sup>PAK (PG-TO263-3), even further decreases IGBT solution costs by reducing cost on system and manufacturing level. This comes with the benefit of increased quality control due to automated processes.

### H5 High Speed Variant

- › Designed for ease of use/Plug & Play
- › Soft high speed IGBT, optimized for gate resistor values down to 5 Ω
- › Implementation to easy replace existing IGBTs in designs or especially where redesign resources are not available

### H5 Highest Efficiency Variant

- › Performance optimized
- › Faster IGBT compared to H5 (faster di/dt)
- › Requires low inductance designs
- › Requires higher design in effort, e.g. higher voltage overshoots, but rewards are higher

### Key features

- › 650 V break-through voltage
- › SMD package
- › Optional: co-packed with “Rapid” diode
- › Low  $C_{OSS}/E_{OSS}$
- › 300 mm wafer production
- › Available from 15 A up to 50 A

### Key benefits

- › Best in its class and even beyond:
  - World-class switching performance
  - Best cost-down solution for fast-switching high-performance power devices
- › Lowest cost for PFC stages in OBCs vs MOSFET or SiC solutions
- › SMD package offers further reduced cost on system and manufacturing level with better quality control

### Key applications

- › On-Board Charger
- › PFC
- › DC-DC
- › e-Compressor/Motor drive

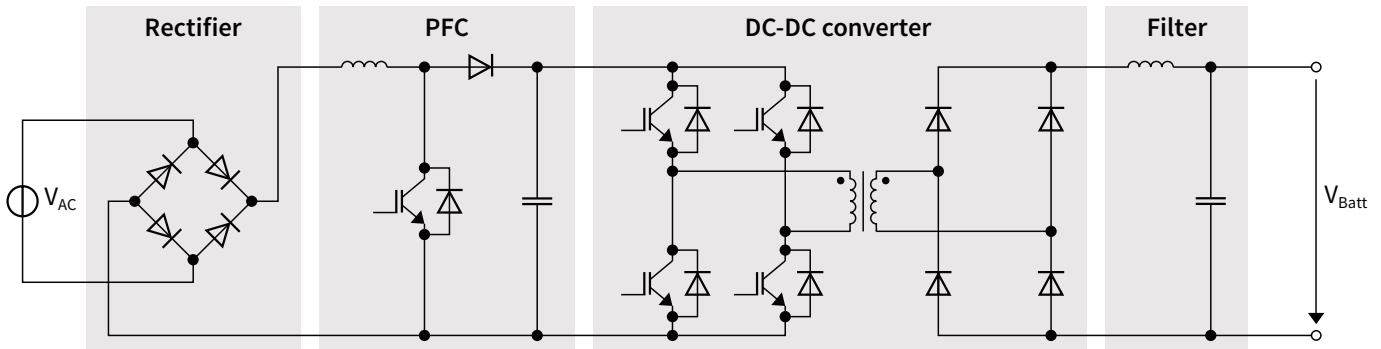


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The example shows a unidirectional On-Board Charger. TRENCHSTOP™ 5 AUTO IGBTs can be used in the PFC and the DC-DC converter block. They are offered with or without co-packed diode.

### Application diagram



### Product portfolio 650 V TRENCHSTOP™ 5 AUTO in D<sup>2</sup>PAK (PG-TO263-3)

Sales product	Switching frequency [kHz]	$V_{bv}$ [V]	$I_C$ [A]	$V_{CE(sat)}$ [V]	$E_{ON}$ [mJ]	$E_{OFF}$ [mJ]	$Q_{rr}$ [μC]
		$V_{GE} = 0\text{ V}, I_C = I_{nom}$			$V_{CC} = 400\text{ V}, I_C = I_{nom}, V_{GE} = 0/15\text{ V}, R_{G(on/off)} = \text{div. } \Omega, L_G = 30\text{ nH}, C_G = 30\text{ pF}, L_C, C_C \text{ from fig. E}$		
<b>Single IGBT</b>							
AIGB15N65F5	70 – 120	650	18	1.60	0.13	0.04	–
AIGB15N65H5	30 – 100	650	18	1.65	0.12	0.05	–
AIGB30N65F5	70 – 120	650	35	1.60	0.28	0.07	–
AIGB30N65H5	30 – 100	650	35	1.65	0.28	0.10	–
AIGB40N65F5	70 – 120	650	46	1.60	0.36	0.10	–
AIGB40N65H5	30 – 100	650	46	1.65	0.39	0.12	–
AIGB50N65F5	70 – 120	650	56	1.60	0.49	0.16	–
AIGB50N65H5	30 – 100	650	56	1.65	0.52	0.18	–
<b>DuoPack: IGBT + Diode</b>							
AIKB15N65DF5	70 – 120	650	18	1.60	0.13	0.04	–
AIKB15N65DH5	30 – 100	650	18	1.65	0.12	0.05	–
AIKB30N65DF5	70 – 120	650	35	1.60	0.28	0.07	–
AIKB30N65DH5	30 – 100	650	35	1.65	0.28	0.10	–
AIKB40N65DF5	70 – 120	650	46	1.60	0.36	0.10	–
AIKB40N65DH5	30 – 100	650	46	1.65	0.39	0.12	–
AIKB50N65DF5	70 – 120	650	56	1.60	0.49	0.16	–
AIKB50N65DH5	30 – 100	650	56	1.65	0.52	0.18	–

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