



# HybridPACK™ 1

## Power Module for Hybrid- and Electric Vehicles

Infineon®'s HybridPACK™ 1 is an automotive qualified power module designed for Hybrid Electric Vehicle (HEV) applications for a power range up to 20–30kW. Designed for a 150°C junction operation temperature, the module accommodates a 3-phase Six-Pack configuration of Trench-Field-Stop IGBT3 and matching emitter controlled diodes. Maximum ratings are 400A/650V. The HybridPACK™ 1 power module is based on Infineon's leading IGBT Trench-Field-Stop Technology, which offers lowest conduction and switching losses.

The HybridPACK™ 1 power module is built on Infineon's long time experience in the development of IGBT power modules, intense research efforts of new material combinations and assembly technologies. Based on the usage of modern power semiconductor chips, Infineon has developed - dedicated for HEV - this HybridPACK™ 1 power module as a part of the HybridPACK™ family. HybridPACK™ 1 is suitable for air or liquid cooling. The copper base plate combined with high-performance ceramic substrate and Infineon's enhanced wire-bonding process provides unparalleled thermal and power cycling capability and highest reliability for mild hybrid inverter or generator applications. For a compact design the driver stage PCB can easily be soldered on top of the module. All power connections are realized with screw terminals.

The HybridKIT 1 Evaluation Kit offers a complete inverter reference system with driver- and control-board, heatsink, DC-Link capacitor and software enabling a fast application design.

All modules from the HybridPACK™ family are dedicated for automotive applications with highest power density and efficiency. Built in accordance with Infineon's automotive excellence program, this fully automotive qualified HybridPACK™ 1 sets the quality and reliability standards for power modules in hybrid and electric vehicles.

### Applications

- Main and/or generator inverter for Hybrid Electric Vehicles (Mild HEV up to 20kW)
- Generator inverter for range extenders

### Key Features

- Complete 3-phase Six-Pack with NTC in one compact module
- 650V Trench-Field-Stop IGBT3 with matching emitter controlled 650V EmCON3 diode
- Extended temperature range
  - $T_{jop} = 150^\circ\text{C}$
  - $T_{jmax} = 175^\circ\text{C}$
- Scalable power rating
- Current rating up to 400A DC
- Enhanced wire bonding
- TC rugged  $\text{Al}_2\text{O}_3$  ceramic for automotive applications
- Copper base plate
- Fully automotive qualified

### Benefits

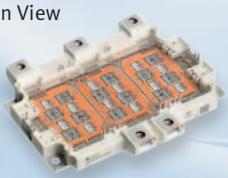
- Cost efficient system approach
- High efficiency due to low power losses
- High reliability
- Compact design
- HybridKIT 1 reference design available

### Product Portfolio for HybridPACK™ 1

Sales Name	$I_c$ [A]	$V_{CES}$ [V]	Package	Product Status
FS400R07A1E3	400	650	HybridPACK™ 1	In production
FS200R07A1E3	200	650	HybridPACK™ 1	In production
FS300R07A1E3	300	650	HybridPACK™ 1	On request

HybridPACK™ 1 with 1200V IGBTs/Diodes available upon request

Open View



Bottom View



HybridKIT



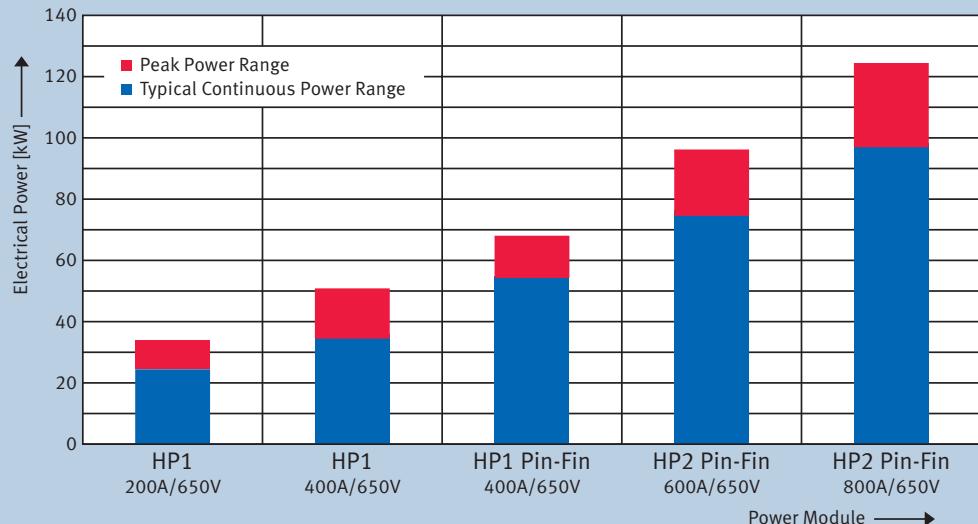
- Six-Pack configuration
- TC rugged  $\text{Al}_2\text{O}_3$  ceramic

- Copper base plate
- Screw terminals

- Evaluation Kit with reference design
- Software available with graphical user interface

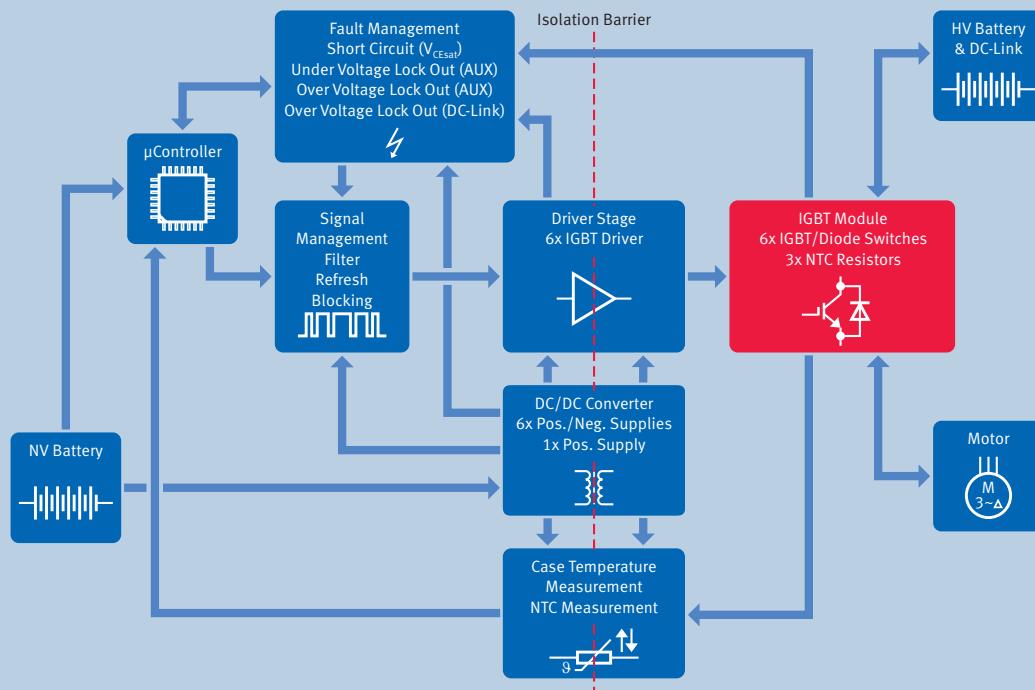
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HybridPACK™ Family Power Range Comparison<sup>1)</sup>

1) Rotating electrical motor as a load

Application Block Diagram



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