

1200V IGBT⁴

THE NEW 1200V IGBT⁴ generation combined with the improved Emitter Controlled diode from Infineon provides three optimized chip versions for low, medium and high power IGBT modules. These chips are designed to the needs of the next generation of inverter concepts for the different applications.

THESE THREE OPTIMIZED CHIP VERSIONS are the IGBT⁴-T₄ chip with fast switching behavior for low power modules with $I_{nom} = 10 - 300\text{ A}$, the IGBT⁴-E₄ chip with optimized switching and on state characteristics for medium power modules with $I_{nom} = 150 - 1000\text{ A}$ and the IGBT⁴-P₄ chip with soft switching behavior for high power modules with $I_{nom} > 900\text{ A}$.

THE IMPROVED SOFTNESS of the high power IGBT⁴-P₄ chip simplifies the use and controllability for high power applications. The low- and the medium power IGBT⁴ chips offer reduced total losses in comparison to the previous generation at same conditions.

AS A FURTHER BENEFIT the IGBT⁴ technology allows a 25K higher maximum junction operation temperature of $t_{vjop} = 150\text{ °C}$.

THIS HIGHER OPERATION TEMPERATURE results in the potential of higher output power by utilizing the full temperature swing under same cooling conditions.

THE OPTIMIZATION of the IGBT⁴ chip, the assembly and contact technology ensure a noteworthy power cycling (PC) improvement and this offers an increased PC lifetime expectation.

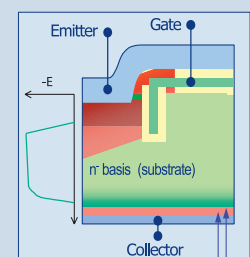
Main Features

- Operating temperature up to 150°C
- Higher RMS current in the application up to 17% possible
- Increased power cycling capability
- Optimized switching characteristic
 - softness
 - reduced switching losses
- Short circuit capability
 $t_p = 10\mu\text{s}$ @ $T_{vj} = 150\text{ °C}$
- Existing packages with higher current capability possible

Applications

- Industrial drives
- UPS/Power Supplies
- Renewable energy systems
- And further more

Trench + Field-Stop



Advantage

- Implanted backs-emitter
- Implanted fieldstop enables thinner base region

Performance

- Lower V_{CESat}
- Lower switching losses
- Robustness like NPT

Silicon Carbide Technology

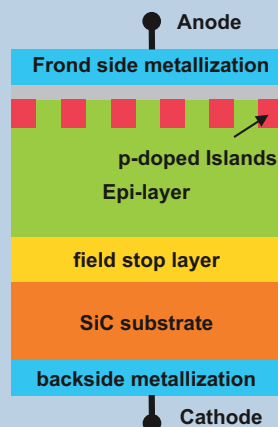
SILICON CARBIDE (SiC) MATERIAL is considered as very promising semiconductor material for next generation power semiconductor devices due to its

- High breakdown field strength
- High thermal conductivity
- Wide Bandgap

INFINEON'S SiC BASED Schottky diode is available in 300V, 600V and 1200V voltage classes. These diodes show no reverse recovery charge during turn off thus makes it the perfect freewheeling diode for IGBTs. Due to implementation of p-islands these diodes also have enhanced surge current capability. Infineon offers first high power module containing SiC Schottky diodes in PrimePACK™ 2 package.

FIRST INFINEON'S SiC BASED switch will be available as junction FET (field effect transistor). These devices have lower specific on-resistance in comparison to Si-based MOSFET with same blocking voltage. Due to the fact of having only electrons for carrying current, these devices show much lower switching losses than IGBTs. These properties make the SiC JFET the perfect switch for high efficiency, high power density and high switching frequency application.

SiC based
Schottky diode



Main Features

Advantages of SiC Schottky diode

- Same threshold voltage as Si PN diodes
- No reverse recovery charge
- Only capacitive switching losses
- Ideal free-wheeling diode for high performance IGBTs

Advantages of SiC JFET

- Very low switching losses
- Device capacitances smaller than Si MOSFETs
- Less increase of resistance with temperature than Si MOSFETs
- Very fast integrated body diode

Applications

- Solar inverter
- PFC stage
- UPS system
- High performance premium drive system
- Medical systems

How to reach us:
www.infineon.com

Published by
Infineon Technologies AG
59581 Warstein, Germany

© 2009 Infineon Technologies AG
All Rights Reserved.

Legal Disclaimer The information given in this Product Brief shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

Warnings Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office. Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.