



CoolSiC™ Silicon Carbide Schottky diodes

Selection guide

www.infineon.com/sic



Silicon Carbide

Improve efficiency and solution costs

Silicon Carbide (SiC) devices belong to the so-called wide band gap semiconductor group, which offers a number of attractive characteristics for high voltage power semiconductors when compared to commonly used Silicon (Si). In particular, the much higher breakdown field strength and thermal conductivity of Silicon Carbide allow creating devices, which by far outperform the corresponding Si ones, and enable efficiency levels unattainable otherwise. The Infineon portfolio of SiC devices covers 600 V, 650 V and 1200 V Schottky diodes. In 2016 the revolutionary CoolSiC™ MOSFET was announced.

Advantages of Silicon Carbide over Silicon Devices

The differences in material properties between Silicon Carbide and Silicon limit the fabrication of practical Silicon unipolar diodes (Schottky diodes) to a range up to 100 V-150 V, with relatively high on-state resistance and leakage current. In SiC material Schottky diodes can reach a much higher breakdown voltage. Infineon offers products up to 1200 V in discrete packages and up to 1700 V in modules.

Features

- > No reverse recovery charge
- > Purely capacitive switching
- > High operating temperature
($T_{j, \max} = 175^{\circ}\text{C}$)

Benefits

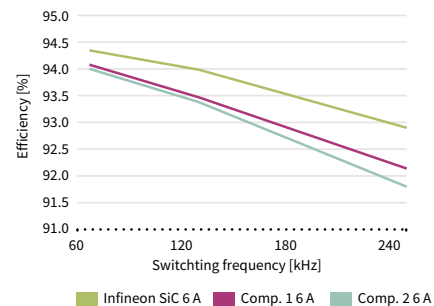
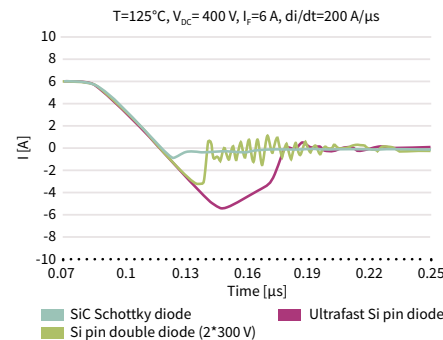
- > System efficiency improvement compared to Si diodes
- > Reduced cooling requirements
- > Enabling higher frequency/increased power density
- > Higher system reliability due to lower operating temperature
- > Reduced EMI

Advantages

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

Applications

- > Server
- > Telecom
- > Solar
- > UPS
- > Energy storage, chargers
- > PC power
- > Motor drives
- > Lighting



Reverse recovery charge of SiC Schottky diodes versus Si pin diodes

The majority carrier characteristics of the device imply no reverse recovery charge and the only contribution to the switching losses comes from the tiny displacement charge of capacitive nature. In the same voltage range, Silicon devices show a bipolar component resulting in much higher switching losses. The graph shows the comparison between various 600 V devices.

Improved system efficiency (PFC in CCM mode operation, full load, low line)

The fast switching characteristics of the SiC diodes provide clear efficiency improvements at system level. The performance gap between SiC and highend Silicon devices increases with the operating frequency.

Silicon Carbide portfolio

CoolSiC™ Schottky diodes 650 V G6

ACTIVE & PREFERRED



I_F [A]	TO-220 R2L	TO-247 Dual Die	TO-247	DPAK DML	D ² PAK R2L	ThinPAK 8x8
4	IDH04G65C6					
6	IDH06G65C6					
8	IDH08G65C6					
10	IDH10G65C6					
12	IDH12G65C6					
16	IDH16G65C6					
20	IDH20G65C6					

CoolSiC™ Schottky diodes 650 V G3

ACTIVE



I_F [A]	TO-220 R2L	TO-247 Dual Die	TO-247	DPAK DML	D ² PAK	ThinPAK 8x8
3	IDH03SG60C				IDD03SG60C	
4	IDH04SG60C				IDD04SG60C	
5	IDH05SG60C				IDD05SG60C	
6	IDH06SG60C				IDD06SG60C	
8	IDH08SG60C				IDD08SG60C	
9	IDH09SG60C				IDD09SG60C	
10	IDH10SG60C				IDD10SG60C	
12	IDH12SG60C				IDD12SG60C	

CoolSiC™ Schottky diodes 650 V G5

ACTIVE



I_F [A]	TO-220 R2L	TO-247 Dual Die	TO-247	DPAK DML	D ² PAK R2L	ThinPAK 8x8
2	IDH02G65C5				IDK02G65C5	IDL02G65C5
3	IDH03G65C5				IDK03G65C5	
4	IDH04G65C5				IDK04G65C5	IDL04G65C5
5	IDH05G65C5				IDK05G65C5	
6	IDH06G65C5				IDK06G65C5	IDL06G65C5
8	IDH08G65C5				IDK08G65C5	IDL08G65C5
9	IDH09G65C5				IDK09G65C5	
10	IDH10G65C5		IDW10G65C5		IDK10G65C5	IDL10G65C5
12	IDH12G65C5		IDW12G65C5		IDK12G65C5	IDL12G65C5
16	IDH16G65C5		IDW16G65C5			
20	IDH20G65C5	IDW20G65C5B	IDW20G65C5			
24		IDW24G65C5B				
30/32		IDW32G65C5B	IDW30G65C5			
40		IDW40G65C5B	IDW40G65C5			

CoolSiC™ Schottky diodes 1200 V G5

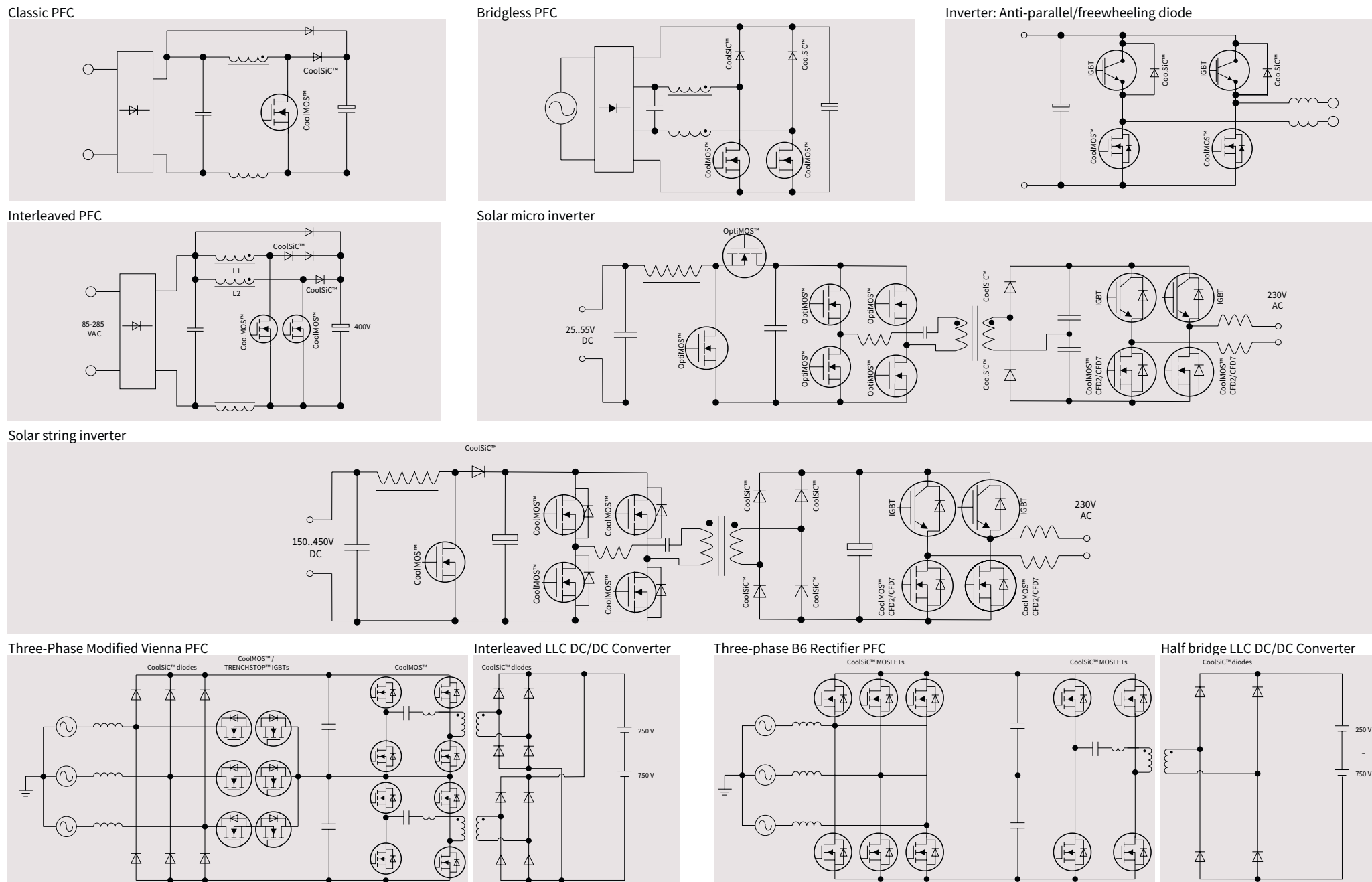
ACTIVE & PREFERRED



I_F [A]	TO-220 R2L	TO-247 Dual Die	TO-247	DPAK DML	TO220-2 R2L	DPAK R2L
2				IDM02G120C5	IDH02G120C5	
5				IDM05G120C5	IDH05G120C5	
8				IDM08G120C5	IDH08G120C5	
10		IDW10G120C5B		IDM10G120C5	IDH10G120C5	
15/16		IDW15G120C5B			IDH16G120C5	
20		IDW20G120C5B			IDH20G120C5	
30		IDW30G120C5B				
40		IDW40G120C5B				

„B“ refers to common-cathode configuration

Common SiC diodes applications and topologies



For further information please visit our website: www.infineon.com/sic