

Final datasheet

CoolSiC™ Schottky diode 2000 V G5

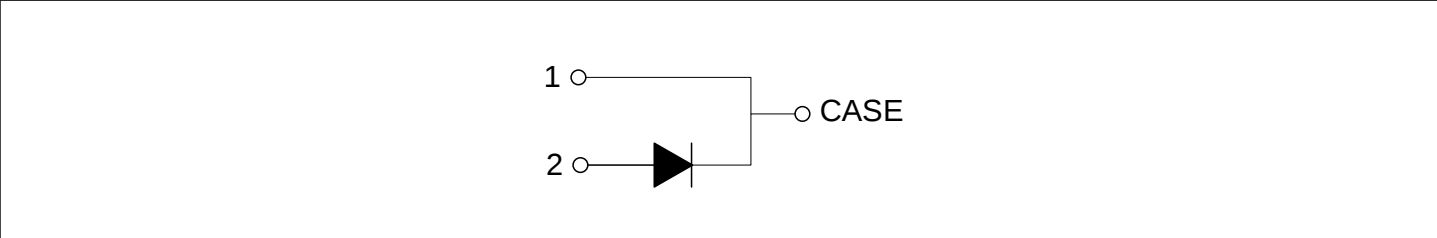
- Features
- $V_{RRM} = 2000\text{ V}$
 - $I_F = 40\text{ A}$
 - $V_F = 1.5\text{ V}$
 - No reverse recovery current / no forward recovery
 - High surge current capability
 - Temperature independent switching behavior
 - Low forward voltage even at high operating temperature
 - Tight forward voltage distribution
 - Specified dv/dt ruggedness
 - .XT interconnection technology for best-in-class thermal performance

- Potential applications
- String 3-phase inverter
 - EV Charging

- Product validation
- Qualified for industrial applications according to the relevant tests of JEDEC47/20/22

Description

Pin definition:
Pin 1 – Cathode
Pin 2 – Anode



Type	Package	Marking
IDWD40G200C5	PG-TO247-2-U01	D4020C5



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1 Package

Table 1 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Storage temperature	T_{stg}		-55		150	°C
Soldering temperature	T_{sold}	wave soldering 1.6 mm (0.063 in.) from case for 10 s			260	°C
Mounting torque	M	M3 screw, Maximum of mounting processes: 3			0.6	Nm
Thermal resistance, junction-ambient	$R_{th(j-a)}$				62	K/W
Diode thermal resistance, junction-case	$R_{th(j-c)}$			0.18	0.23	K/W

2 SiC Diode

Table 2 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} \geq 25\text{ °C}$		2000	V
Continuous forward current for $R_{th(j-c,max)}$	I_F	$D = 1$	$T_c = 25\text{ °C}$	114	A
			$T_c = 135\text{ °C}$	55	
			$T_c = 151\text{ °C}$	40	
Surge repetitive forward current, sine halfwave ¹⁾	$I_{F,RM}$	$t_p = 10\text{ ms}$	$T_c = 25\text{ °C}$	160	A
			$T_c = 100\text{ °C}$	120	
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	$t_p = 10\text{ ms}$	$T_c = 25\text{ °C}$	275	A
			$T_c = 150\text{ °C}$	246	
Non-repetitive peak forward current	$I_{F,max}$	$T_c = 25\text{ °C}, t_p = 10\text{ }\mu\text{s}$		1600	A
I^2t value	$\int I^2t$	$t_p = 10\text{ ms}$	$T_c = 25\text{ °C}$	378	A ² s
			$T_c = 150\text{ °C}$	303	
Diode dv/dt ruggedness	dv/dt	$V_R = 0...1500\text{ V}$		100	V/ns
Power dissipation for $R_{th(j-c,max)}$	P_{tot}		$T_c = 25\text{ °C}$	652	W

1) Not subject to production test. The test was performed with 20k pulses (half-wave rectified sine with 10 ms period).

Table 3 **Characteristic values**

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$T_{vj} = 25\text{ °C}$		2000			V
Diode forward voltage	V_F	$I_F = 40\text{ A}$	$T_{vj} = 25\text{ °C}$		1.5	1.75	V
			$T_{vj} = 150\text{ °C}$		2.3		
Reverse current	I_R	$V_R = 2000\text{ V}$	$T_{vj} = 25\text{ °C}$		20	600	μA
			$T_{vj} = 150\text{ °C}$		145		
Total capacitive charge	Q_C	$V_R = 1500\text{ V}$, $T_{vj} = 25\text{ °C}$ & 150 °C , $Q_C = \int_0^{V_R} C(V)dV$			358		nC
Total capacitance	C	$f = 100\text{ kHz}$	$V_R = 1\text{ V}$		4550		pF
			$V_R = 600\text{ V}$		182		
			$V_R = 1500\text{ V}$		122		
Operating junction temperature	T_{vj}			-55		175	$^{\circ}\text{C}$

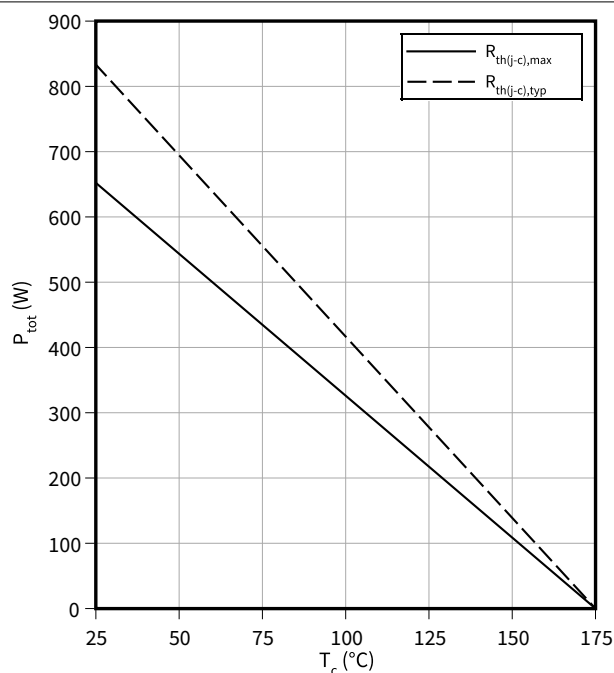
Note: For optimum lifetime and reliability, Infineon recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet.
Electrical Characteristic at $T_{vj} = 25^{\circ}\text{C}$, unless otherwise specified.

3 Characteristics diagrams

Power dissipation as function of case temperature

$$P_{\text{tot}} = f(T_c)$$

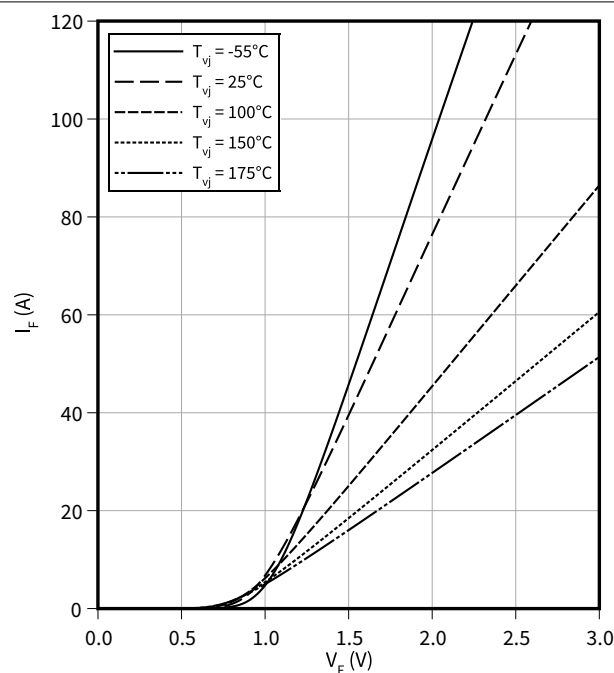
$$T_{vj} \leq 175^\circ\text{C}$$



Typical forward characteristics

$$I_F = f(V_F)$$

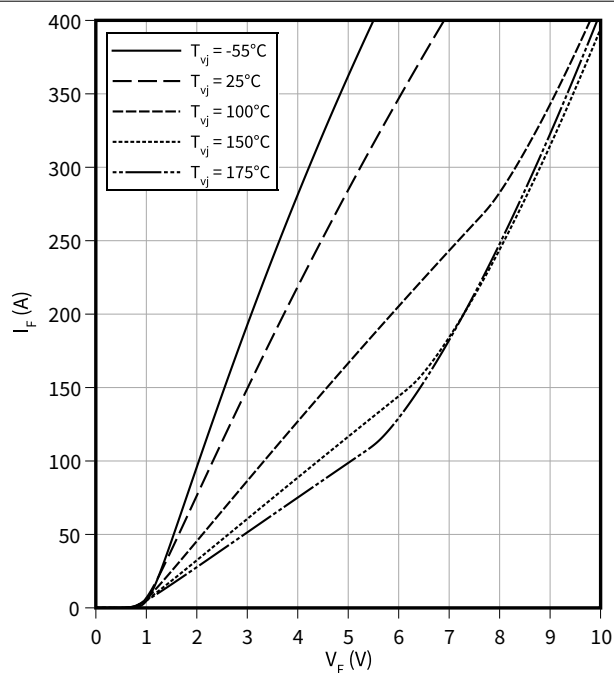
$$t_p = 50 \mu\text{s}$$



Typical forward characteristics in surge current

$$I_F = f(V_F)$$

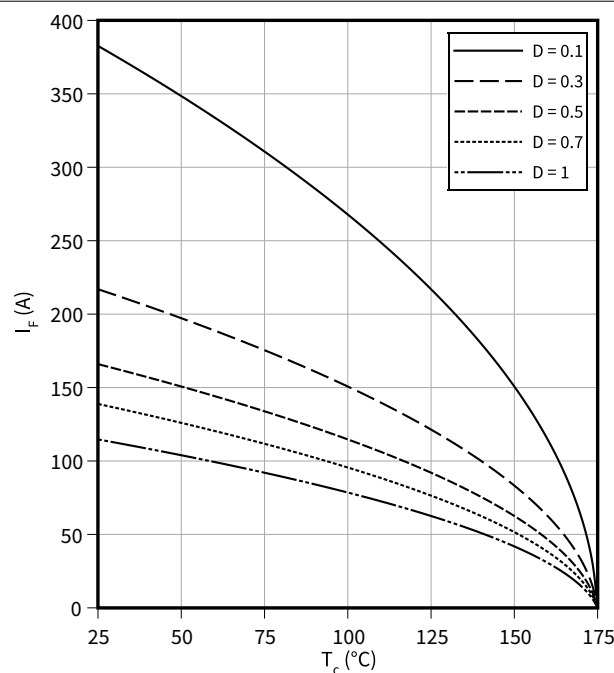
$$t_p = 50 \mu\text{s}$$



Diode forward current as function of case temperature

$$I_F = f(T_c)$$

$$D = \text{duty cycle}, T_{vj} \leq 175^\circ\text{C}$$



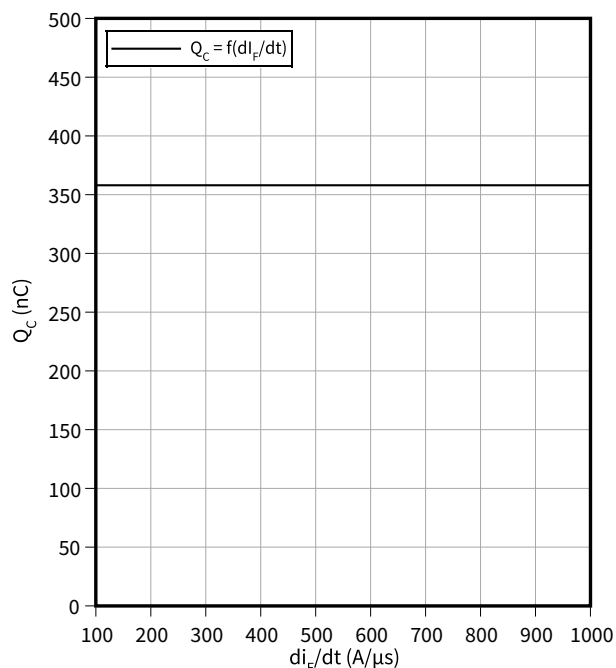
3 Characteristics diagrams

Typical capacitive charge as function of current slope

$$Q_C = f(di_F/dt)$$

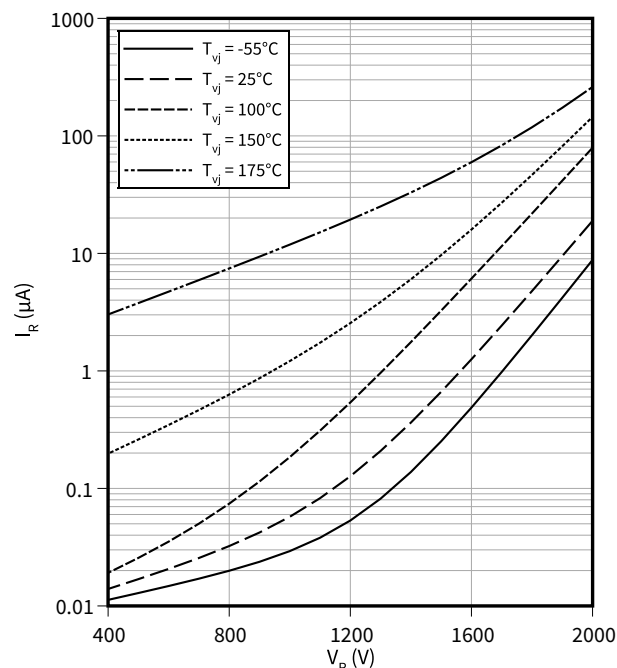
$T_{vj} = 25\text{ °C}$, $V_R = 1500\text{ V}$

guaranteed by design



Typical reverse characteristics

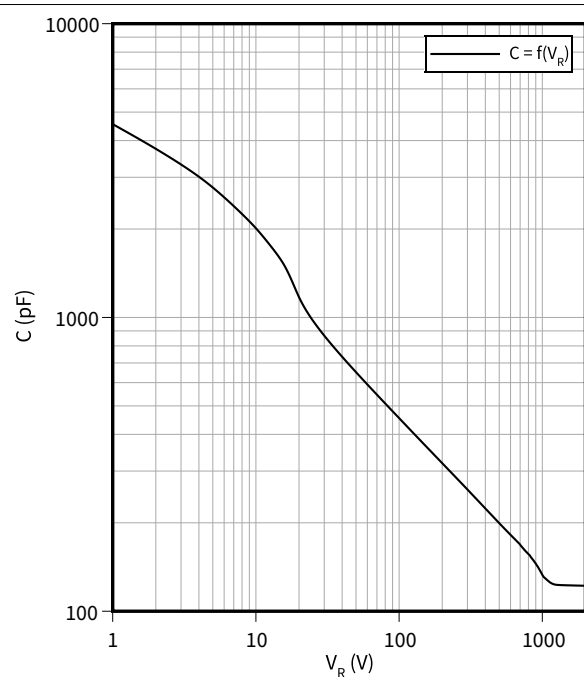
$$I_R = f(V_R)$$



Typical capacitance as function of reverse voltage

$$C = f(V_R)$$

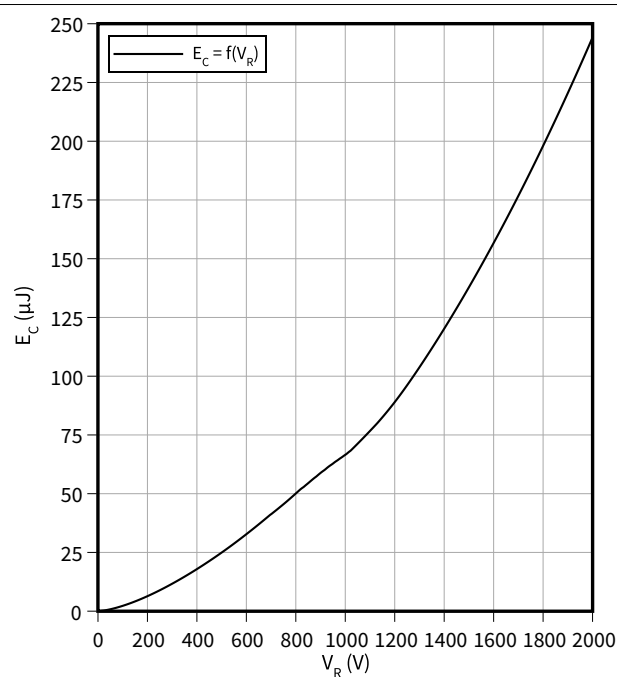
$T_{vj} = 25\text{ °C}$, $f = 100\text{ kHz}$



Typical capacitively stored energy as function of reverse voltage

$$E_C = f(V_R)$$

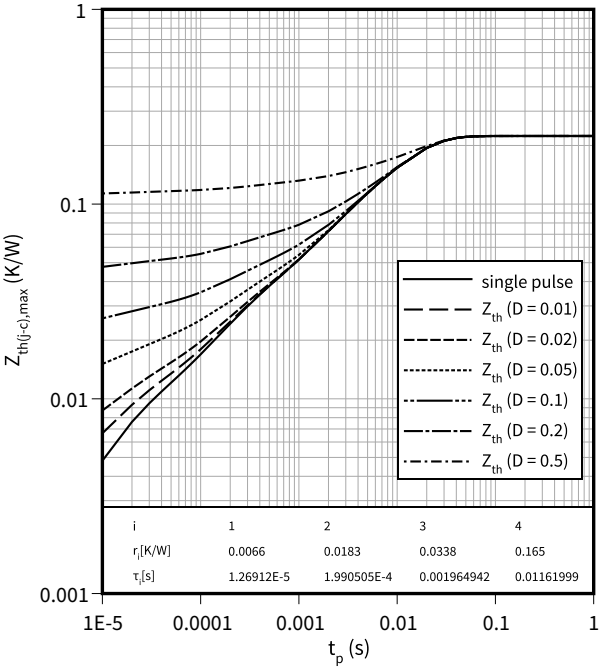
$f = 100\text{ kHz}$



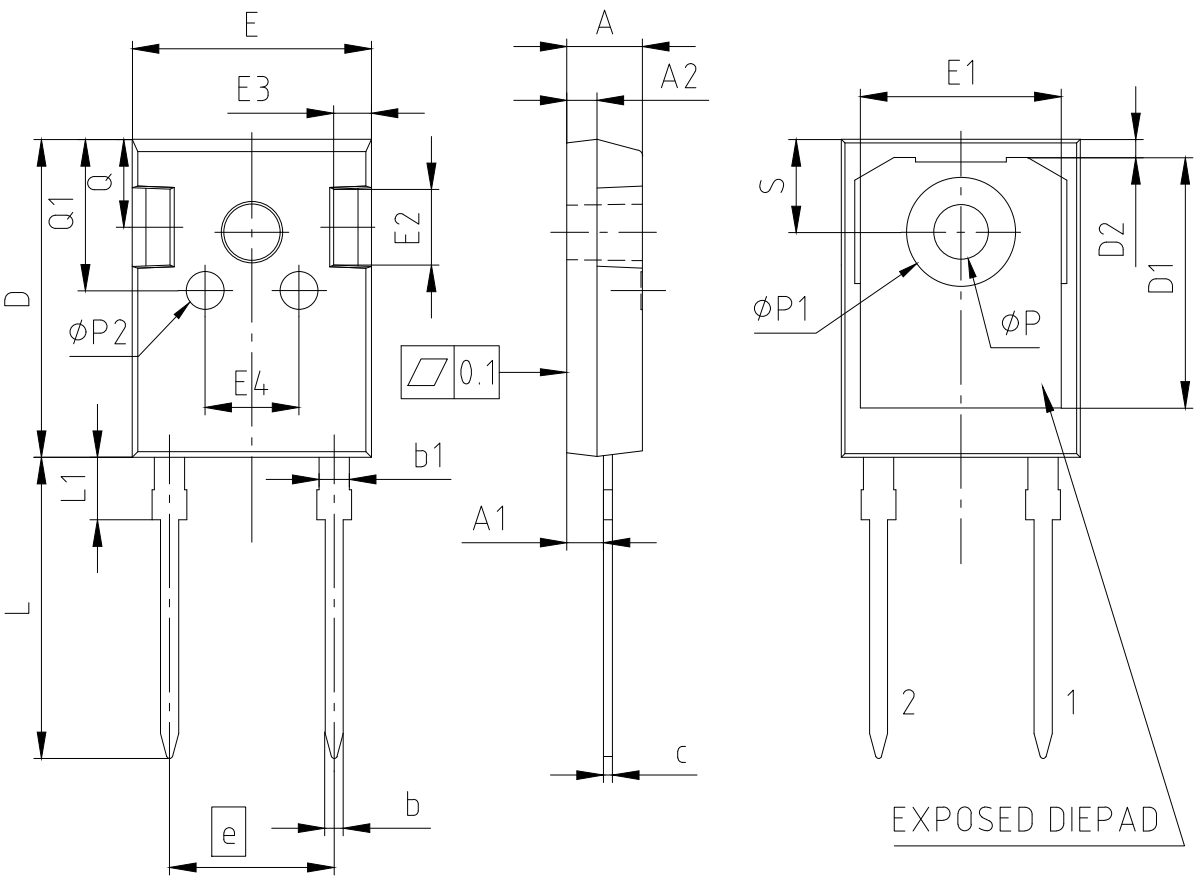
3 Characteristics diagrams

Max. transient thermal impedance

$Z_{th(j-c),max} = f(t_p)$
 $D = t_p/T$



4 Package outlines



PACKAGE - GROUP NUMBER:		PG-T0247-2-U01			
DIMENSIONS	MILLIMETERS				
	MIN.	MAX.			
A	4.90	5.10	L	19.80	20.10
A1	2.31	2.51	L1	---	4.30
A2	1.90	2.10	øP	3.50	3.70
b	1.16	1.26	øP1	7.00	7.40
b1	1.96	2.06	øP2	2.40	2.60
c	0.59	0.66	Q	5.60	6.00
D	20.90	21.10	Q1	9.80	10.20
D1	16.25	16.85	S	6.05	6.25
D2	1.05	1.35			
E	15.70	15.90			
E1	13.10	13.50			
E2	4.90	5.10			
E3	2.40	2.60			
E4	6.00	6.40			
e	10.88				
N	2				

ALL DIMENSIONS DO NOT INCLUDE
MOLD FLASH OR PROTRUSIONS.

Figure 1



Revision history

Revision history

Document revision	Date of release	Description of changes
0.10	2023-05-16	Target datasheet
0.20	2024-03-20	Preliminary datasheet
1.00	2024-09-05	Final datasheet

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Edition 2024-09-05

Published by

Infineon Technologies AG
81726 Munich, Germany

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Document reference
IFX-ABH307-003

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