

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

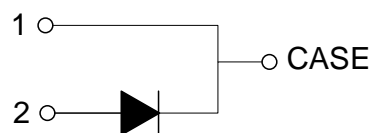


Description

Pin definition:

Pin 1 – Cathode

Pin 2 – Anode



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

Table of contents

	Description	1
	Features	1
	Potential applications	1
	Product validation	1
	Table of contents	2
1	Package	3
2	SiC Diode	3
3	Characteristics diagrams	5
4	Package outlines	8
	Revision history	9
	Disclaimer	10

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^2s
			$T_c = 150\text{ °C}$	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	$V_R = 1500\text{ V}, T_{vj} = 25\text{ °C} \& 150\text{ °C},$ $Q_C = \int_0^{V_R} C(V)dV$			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	$^{\circ}\text{C}$

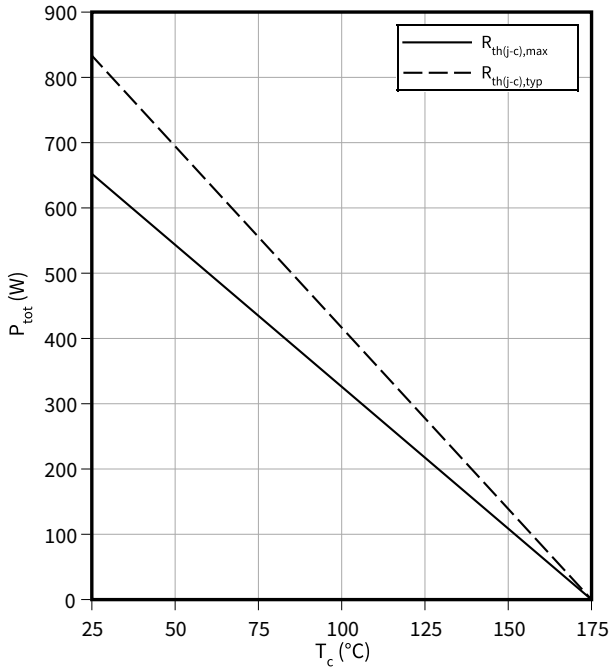
Note: For optimum lifetime and reliability, Infineon recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet.

Electrical Characteristic at $T_{vj} = 25\text{ °C}$, unless otherwise specified.

3 Characteristics diagrams

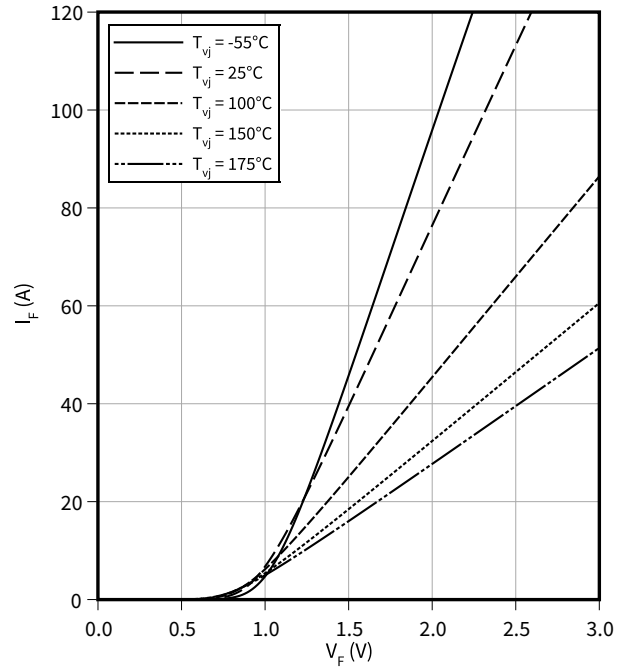
Power dissipation as function of case temperature

$P_{tot} = f(T_c)$
 $T_{vj} \leq 175\text{ °C}$



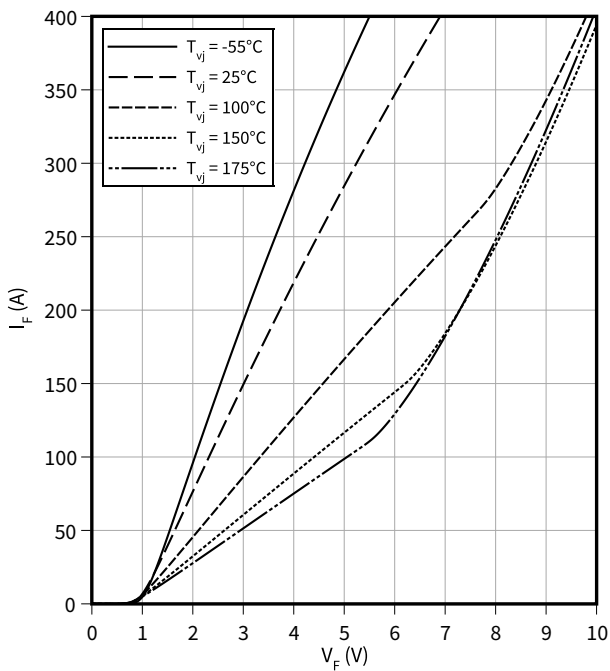
Typical forward characteristics

$I_F = f(V_F)$
 $t_p = 50\ \mu\text{s}$



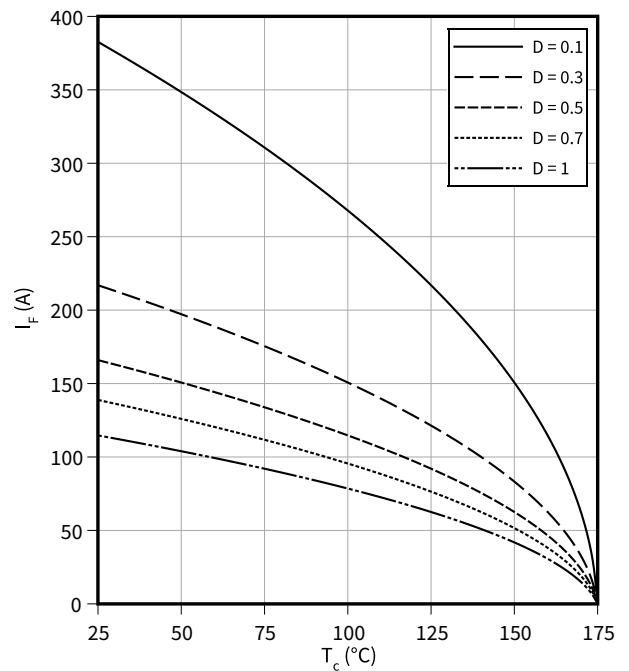
Typical forward characteristics in surge current

$I_F = f(V_F)$
 $t_p = 50\ \mu\text{s}$



Diode forward current as function of case temperature

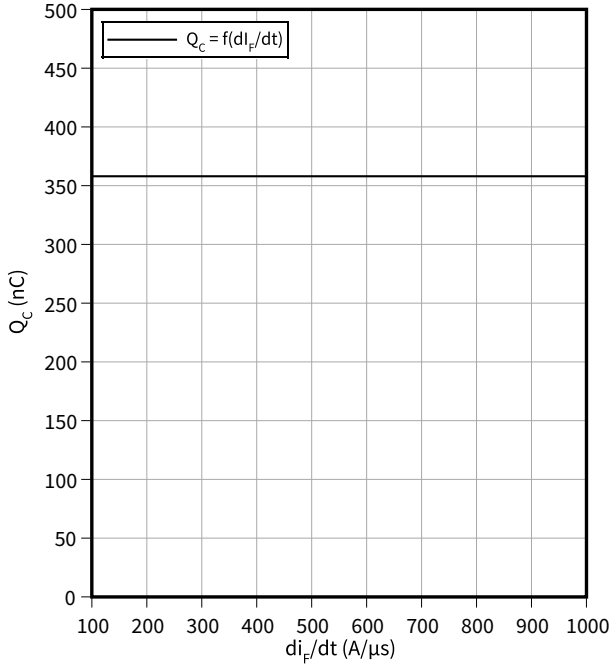
$I_F = f(T_c)$
 $D = \text{duty cycle}, T_{vj} \leq 175\text{ °C}$



3 Characteristics diagrams

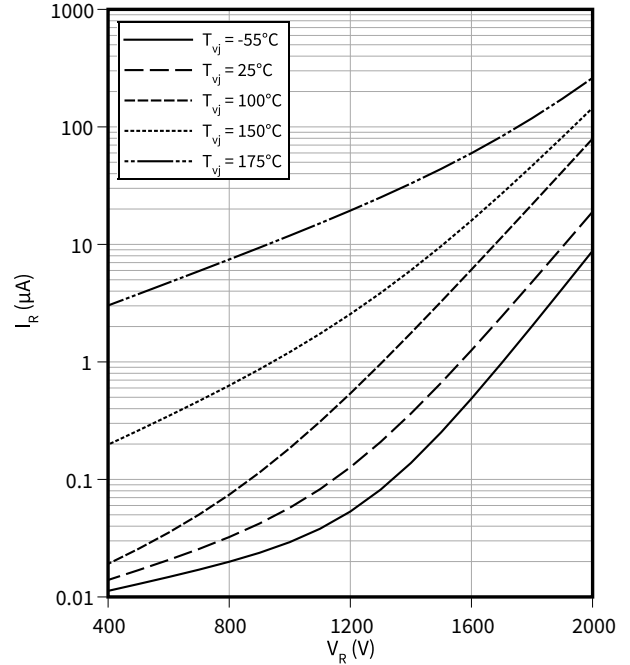
Typical capacitive charge as function of current slope

$Q_C = f(di_F/dt)$
 $T_{vj} = 25\text{ °C}, V_R = 1500\text{ V}$
 guaranteed by design



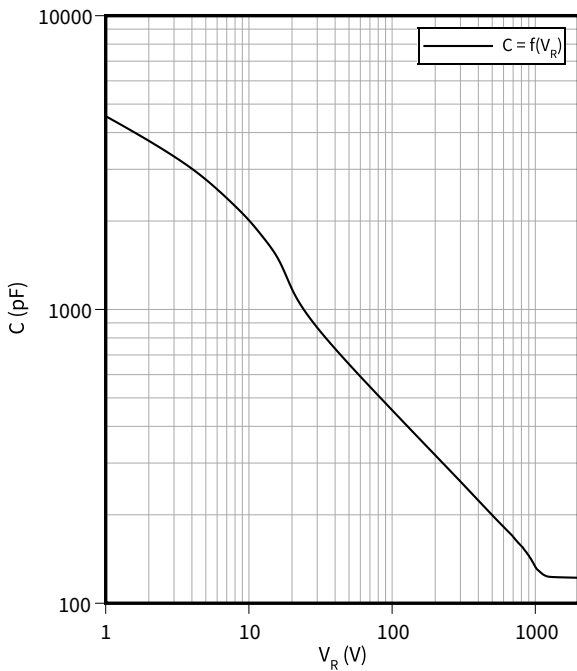
Typical reverse characteristics

$I_R = f(V_R)$



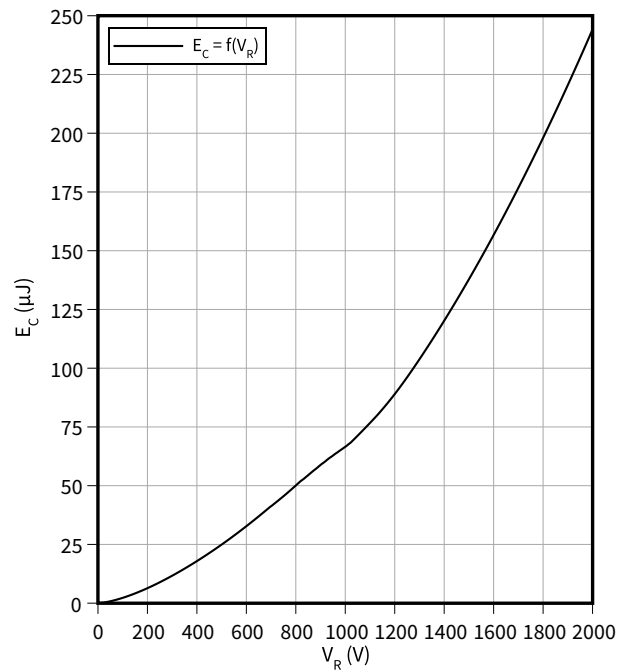
Typical capacitance as function of reverse voltage

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



Typical capacitively stored energy as function of reverse voltage

$E_C = f(V_R)$
 $f = 100\text{ kHz}$

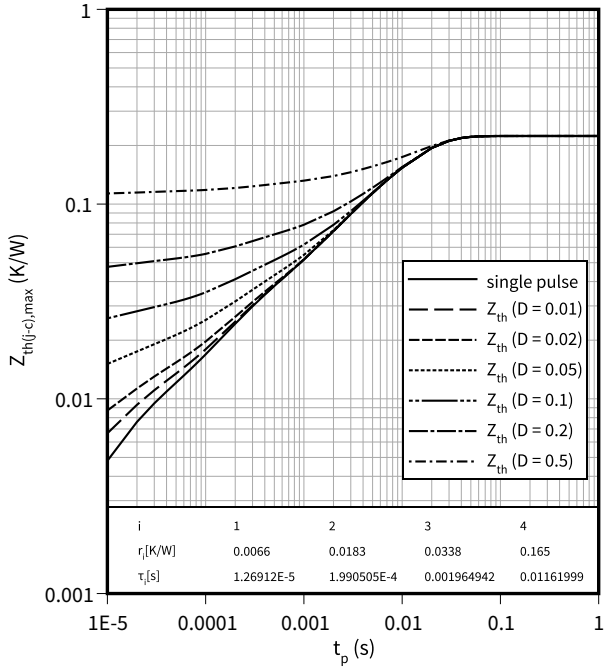


3 Characteristics diagrams

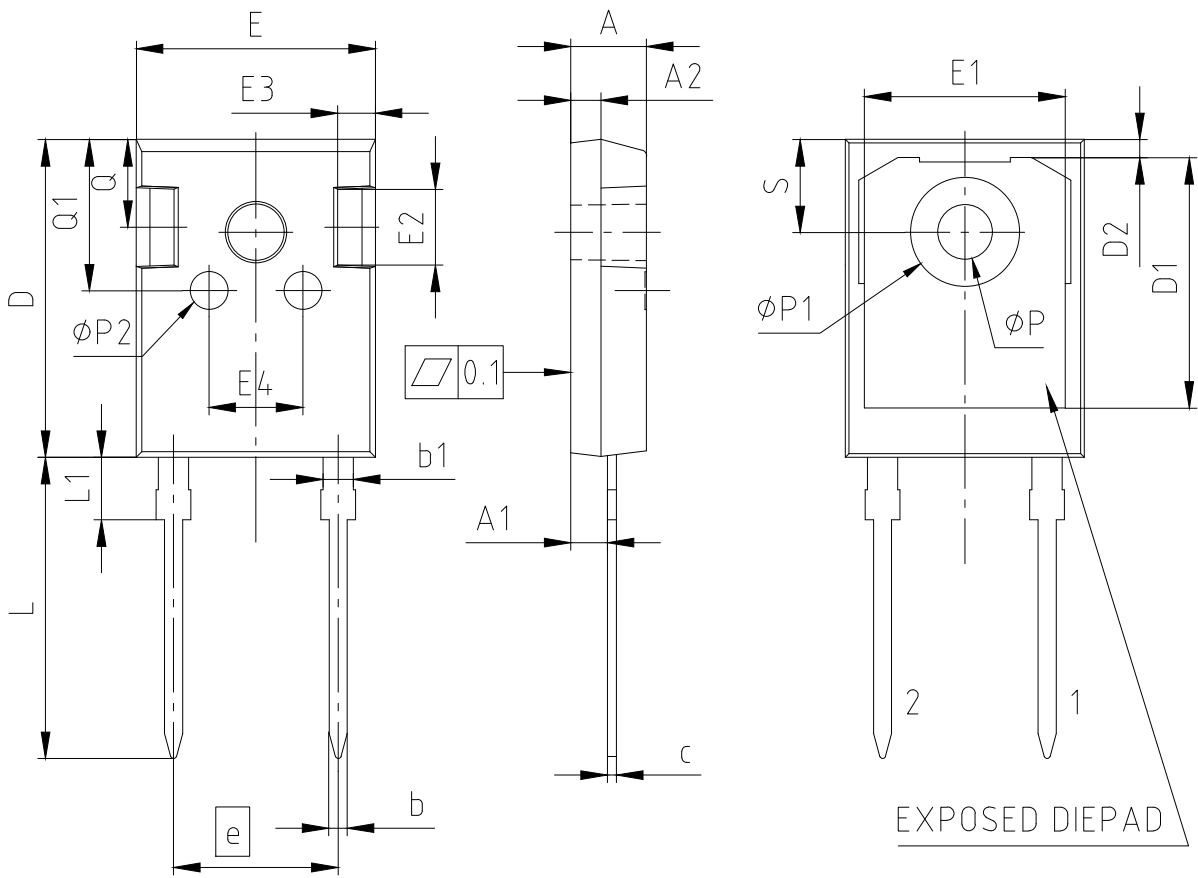
Max. transient thermal impedance

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

$$D = t_p/T$$



4 Package outlines



PACKAGE - GROUP NUMBER:		PG-TO247-2-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

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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