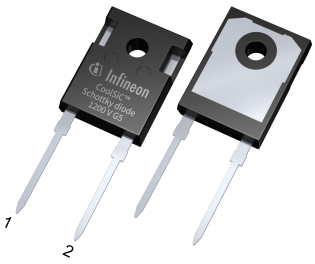
Final datasheet
CoolSiC™ 1200 V Schottky diode G5 with .XT interconnection technology

Features



- V_{RRM} = 1200 V at T_{vj} = 25°C
- I_F = 40 A
- No reverse recovery current / no forward recovery
- High surge current capability
- Temperature independent switching behavior
- Low forward voltage
- dv/dt ruggedness
- Pb-free lead plating; RoHS compliant
- .XT interconnection technology for best-in-class thermal performance

Lead-free
Green
Halogen-free
RoHS

Potential applications

- String inverter
- Online UPS / Industrial UPS
- EV Charging
- Welding

Product validation

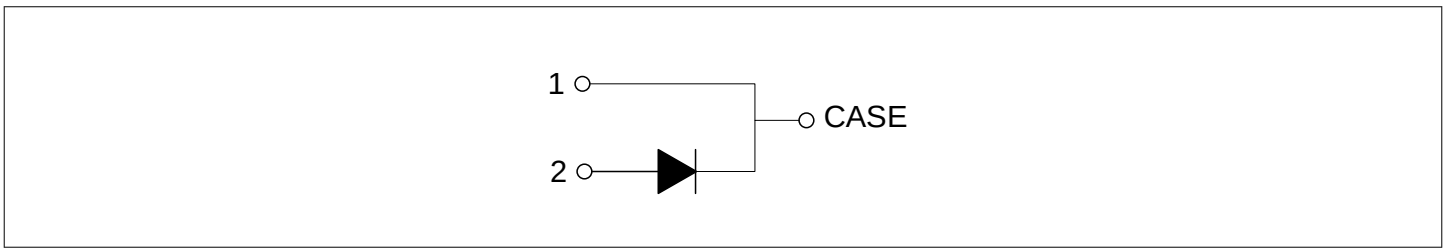
- Qualified for industrial applications according to the relevant tests of JEDEC47/20/22

Description

Pin definition:

Pin 1 & backside – Cathode

Pin 2 – Anode



Type	Package	Marking
IDWD40G120C5	PG-TO247-2-U01	D4012C5

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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	$R_{th(j-c)}$			0.27	0.35	K/W

2 SiC Diode

Table 2 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} \geq 25$ °C		1200	V
Continuous forward current for $R_{th(j-c,max)}$	I_F		$T_c = 25$ °C	109	A
			$T_c = 135$ °C	50	
			$T_c = 147$ °C	40	
Surge repetitive forward current, sine halfwave[1]	$I_{F,RM}$	$t_p = 10$ ms	$T_c = 25$ °C	160	A
			$T_c = 100$ °C	120	
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	$t_p = 10$ ms	$T_c = 25$ °C	290	A
			$T_c = 150$ °C	280	
Non-repetitive peak forward current	$I_{F,max}$	$T_c = 25$ °C, $t_p = 10$ µs		1588	A
I^2t value	$\int I^2t$	$t_p = 10$ ms[2]	$T_c = 25$ °C	420	A^2s
			$T_c = 150$ °C	392	
Diode dv/dt ruggedness	dv/dt	$V_R = 0...960$ V		150	V/ns
Avalanche energy, single pulse	E_{AS}	$I_D = 35$ A, $V_{DD} = 50$ V, $L = 0.5$ mH		299	mJ
Power dissipation for $R_{th(j-c,max)}$	P_{tot}		$T_c = 25$ °C	428	W
			$T_c = 100$ °C	214	

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

Table 3 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	I_R = 500 µA, T_{vj} = 25 °C		1200			V
Diode forward voltage	V_F	I_F = 40 A	T_{vj} = 25 °C		1.45	1.8	V
			T_{vj} = 125 °C		1.69		
			T_{vj} = 150 °C		1.8		
Reverse current	I_R	V_R = 1200 V	T_{vj} = 25 °C		20	320	µA
			T_{vj} = 150 °C		105		
Total capacitive charge	Q_C	V_R = 800 V, T_{vj} = 25 °C & 150 °C, $Q_C = \int_0^{V_R} C(V)dV$			182		nC
Total capacitance	C	f = 100 kHz	V_R = 1 V		2350		pF
			V_R = 400 V		166		
			V_R = 800 V		130		
Operating junction temperature	T_{vj}			-55		175	°C

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

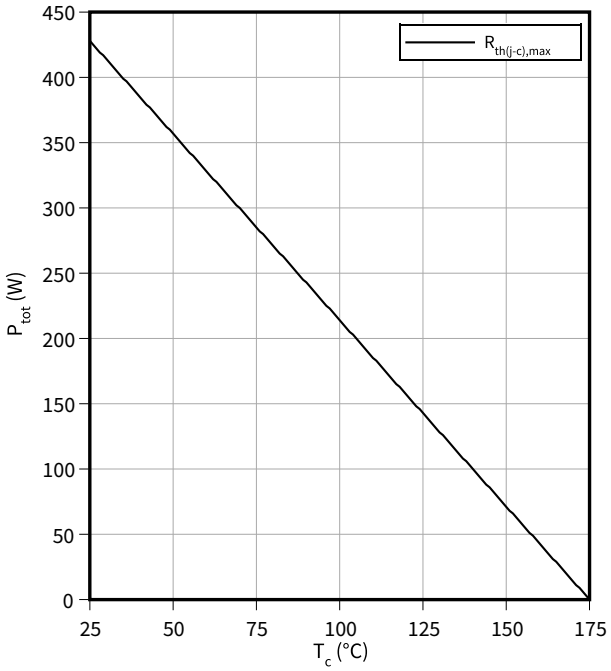
Electrical Characteristic, at T_{vj} = 25°C, unless otherwise specified.

3 Characteristics diagrams

Power dissipation as function of case temperature

$P_{tot} = f(T_c)$

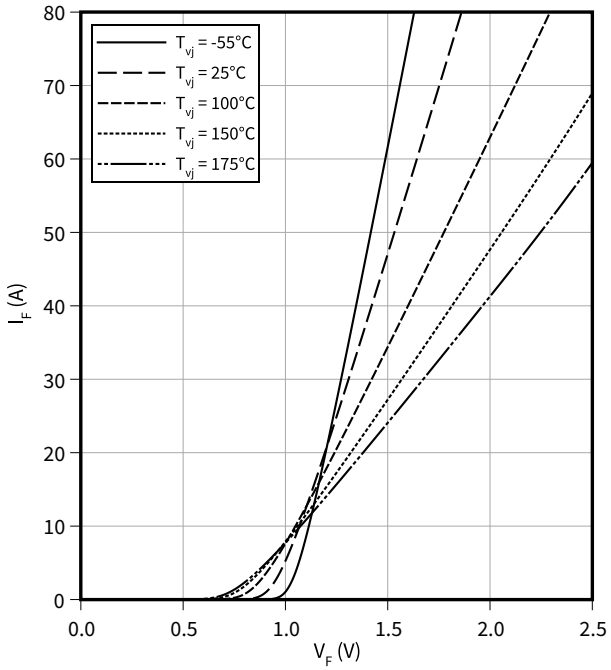
$T_{vj} \leq 175\ °C$



Typical forward characteristics

$I_F = f(V_F)$

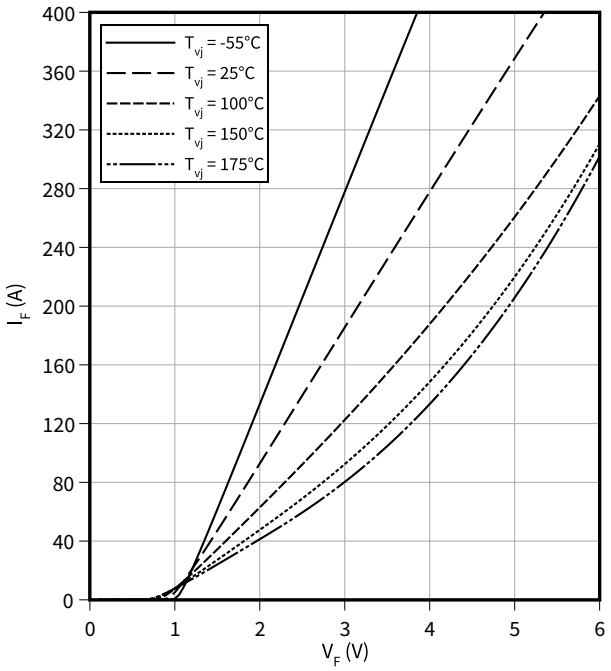
$t_p = 10\ \mu s$



Typical forward characteristics in surge current

$I_F = f(V_F)$

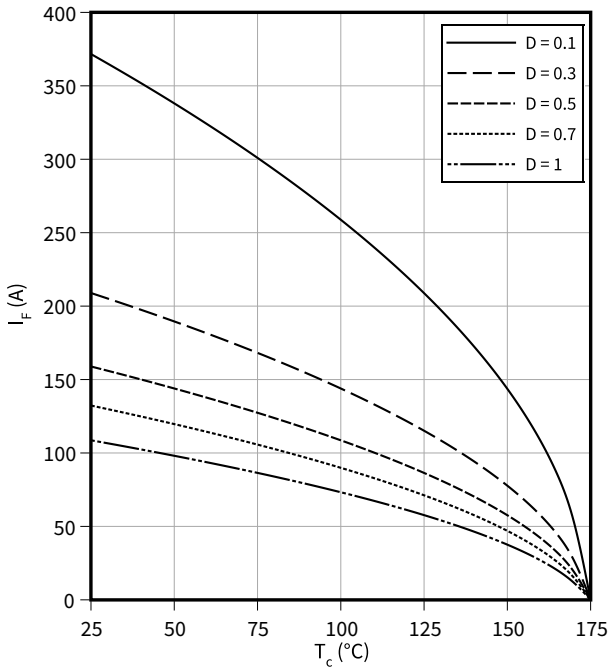
$t_p = 10\ \mu s$



Diode forward current as function of temperature

$I_F = f(T_c)$

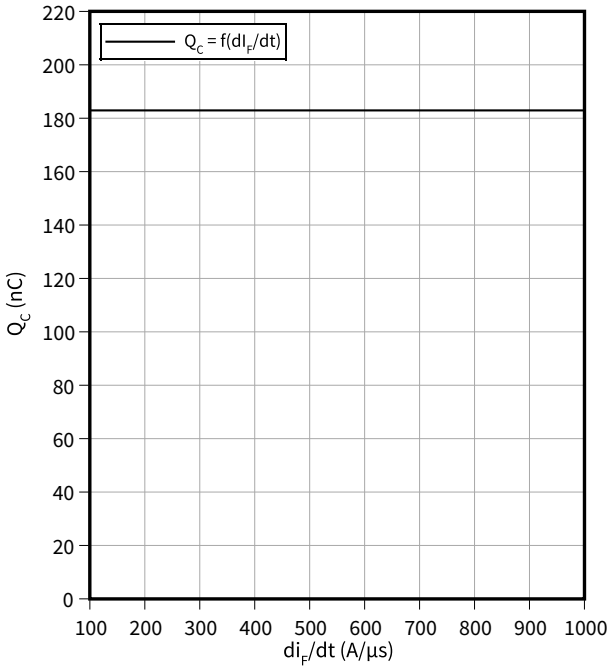
$T_{vj} \leq 175\ °C$



Typical capacitive charge as function of current slope

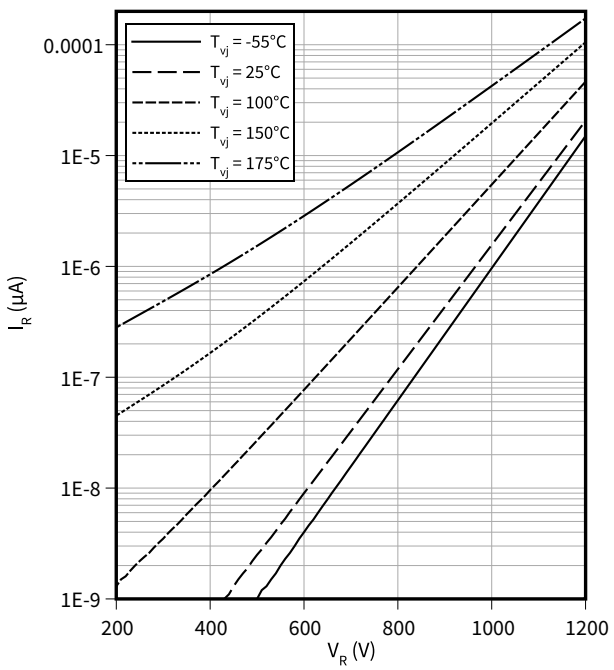
$Q_C = f(di_F/dt)$

T_{vj} = 25 °C, V_R = 800 V



Typical reverse characteristics

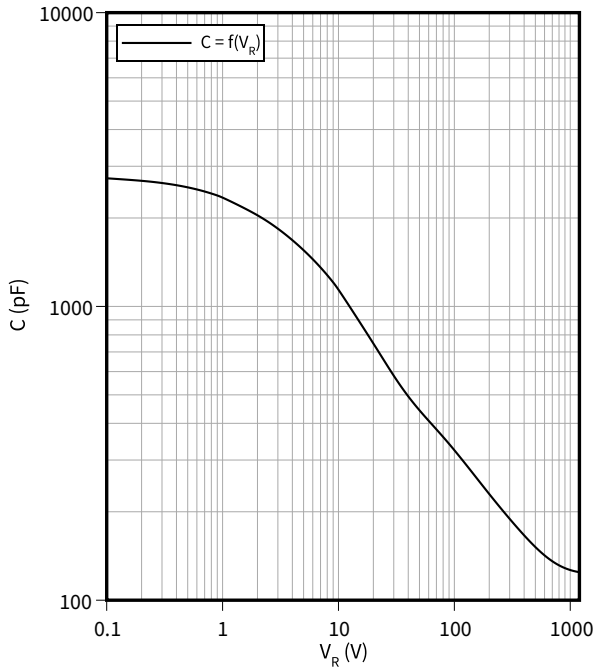
$I_R = f(V_R)$



Typical capacitance as function of reverse voltage

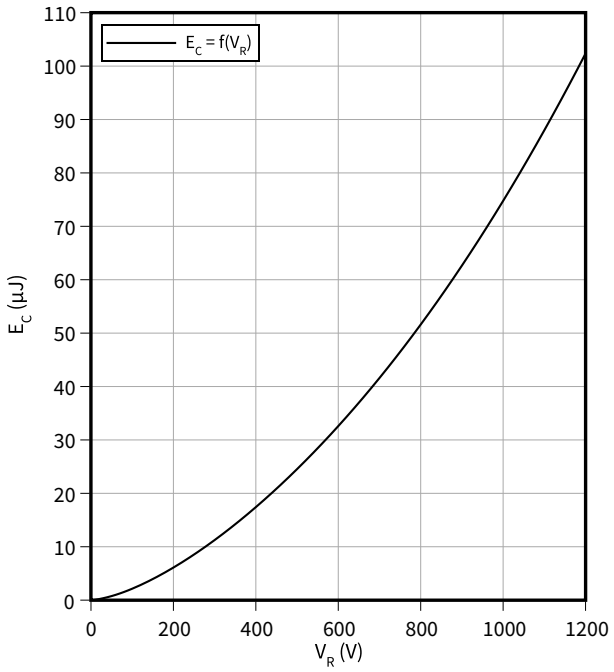
$C = f(V_R)$

T_{vj} = 25 °C, f = 100 kHz



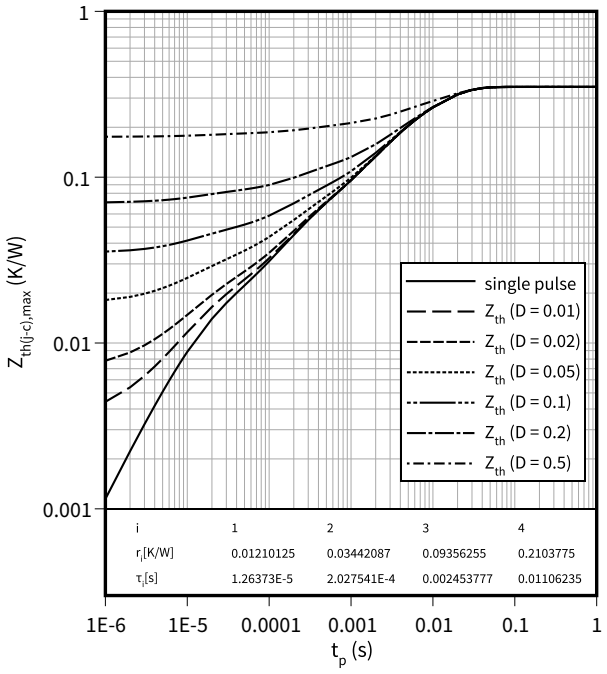
Typical capacitively stored energy as function of reverse voltage

$E_C = f(V_R)$



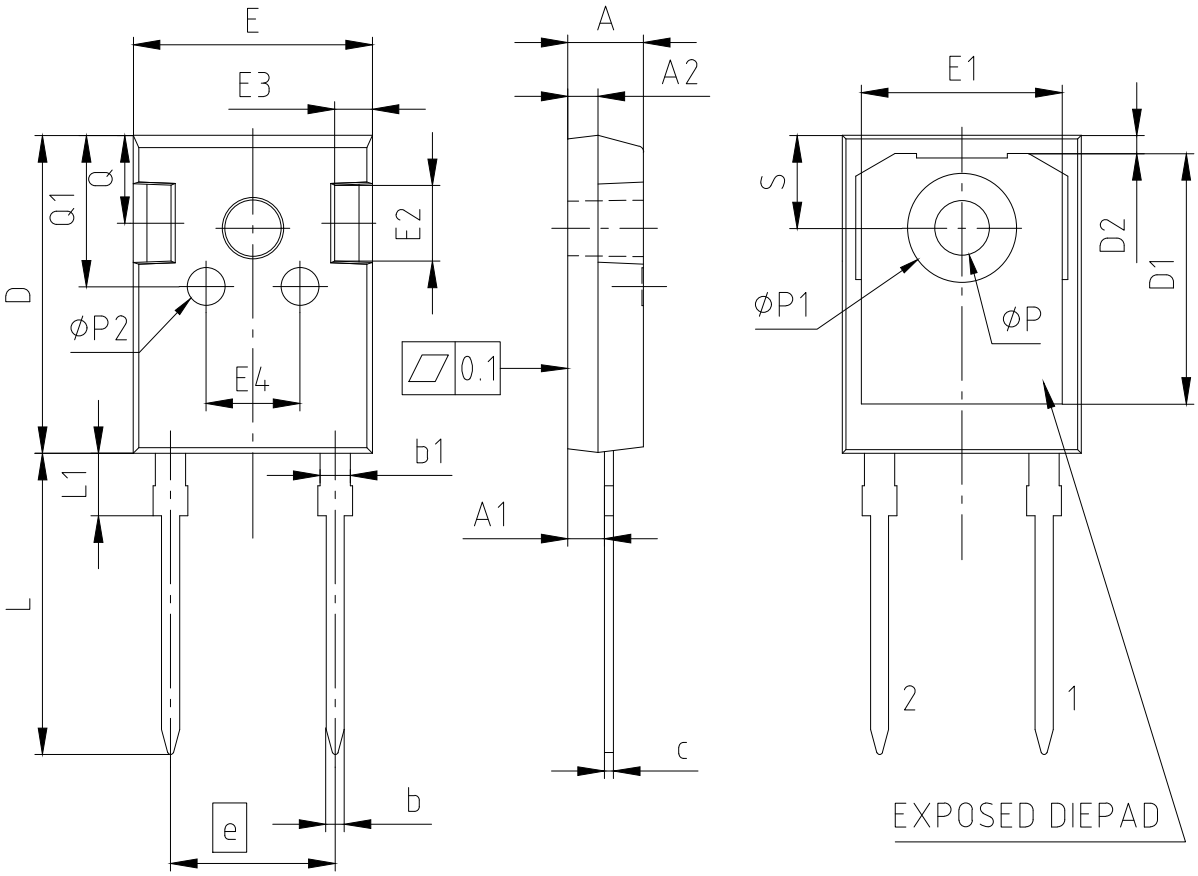
Max. transient thermal impedance

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



i	1	2	3	4
r_i[K/W]	0.01210125	0.03442087	0.09356255	0.2103775
τ_i[s]	1.26373E-5	2.027541E-4	0.002453777	0.01106235

4 Package outlines



PACKAGE - GROUP NUMBER:	PG-TO247-2-U01	
DIMENSIONS	**MILLIMETERS**	
	MIN.	MAX.
A	4.90	5.10
A1	2.31	2.51
A2	1.90	2.10
b	1.16	1.26
b1	1.96	2.06
c	0.59	0.66
D	20.90	21.10
D1	16.25	16.85
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	

L	19.80	20.10
L1	---	4.30
øP	3.50	3.70
øP1	7.00	7.40
øP2	2.40	2.60
Q	5.60	6.00
Q1	9.80	10.20
S	6.05	6.25

ALL DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

Figure 1

Revision history

Document revision	Date of release	Description of changes
0.10	2023-08-02	Target datasheet
0.20	2024-10-16	Preliminary datasheet
1.00	2025-01-14	Final datasheet

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Edition 2025-01-14

Published by

Infineon Technologies AG

81726 Munich, Germany

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Document reference
IFX-ABH611-003

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