Final datasheet
CoolSiC™ Schottky diode 2000 V G5

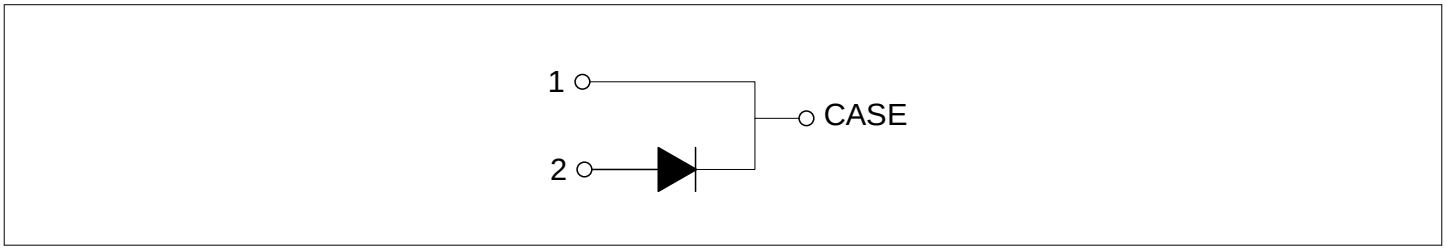
Features
- V_{RRM} = 2000 V
- I_F = 50 A
- V_F = 1.5 V
- No reverse recovery current / no forward recovery
- High surge current capability
- Temperature independent switching behavior
- Low forward voltage even at high operating temperature
- Tight forward voltage distribution
- Specified dv/dt ruggedness
- .XT interconnection technology for best-in-class thermal performance

Lead-free
Green
Halogen-free
RoHS

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
Pin 3, 4 – not connected



Type	Package	Marking
IDYH50G200C5	PG-TO247-4-PLUS-NT14	D5020C5

Table of contents

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
Thermal resistance, junction-ambient[1)]	$R_{th(j-a)}$				62	K/W
Diode thermal resistance, junction-case	$R_{th(j-c)}$			0.15	0.19	K/W

1) leaded

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		2000	V
Continuous forward current for $R_{th(j-c,max)}$	I_F	$D = 1$	$T_c = 25$ °C	140	A
			$T_c = 135$ °C	67	
			$T_c = 151$ °C	50	
Surge repetitive forward current, sine halfwave[1)]	$I_{F,RM}$	$t_p = 10$ ms	$T_c = 25$ °C	200	A
			$T_c = 100$ °C	150	
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	$t_p = 10$ ms	$T_c = 25$ °C	325	A
			$T_c = 150$ °C	287	
Non-repetitive peak forward current	$I_{F,max}$	$T_c = 25$ °C, $t_p = 10$ µs		1900	A
I^2t value	$\int I^2t$	$t_p = 10$ ms	$T_c = 25$ °C	528	A^2s
			$T_c = 150$ °C	412	
Diode dv/dt ruggedness	dv/dt	$V_R = 0...1500$ V		100	V/ns
Power dissipation for $R_{th(j-c,max)}$	P_{tot}		$T_c = 25$ °C	789	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 °C		2000			V
Diode forward voltage	V_F	I_F = 50 A	T_{vj} = 25 °C		1.5	1.75	V
			T_{vj} = 150 °C		2.3		
Reverse current	I_R	V_R = 2000 V	T_{vj} = 25 °C		25	750	µA
			T_{vj} = 150 °C		180		
Total capacitive charge	Q_C	V_R = 1500 V, T_{vj} = 25 °C & 150 °C, $Q_C = \int_0^{V_R} C(V)dV$			450		nC
Total capacitance	C	f = 100 kHz	V_R = 1 V		5700		pF
			V_R = 600 V		230		
			V_R = 1500 V		155		
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.

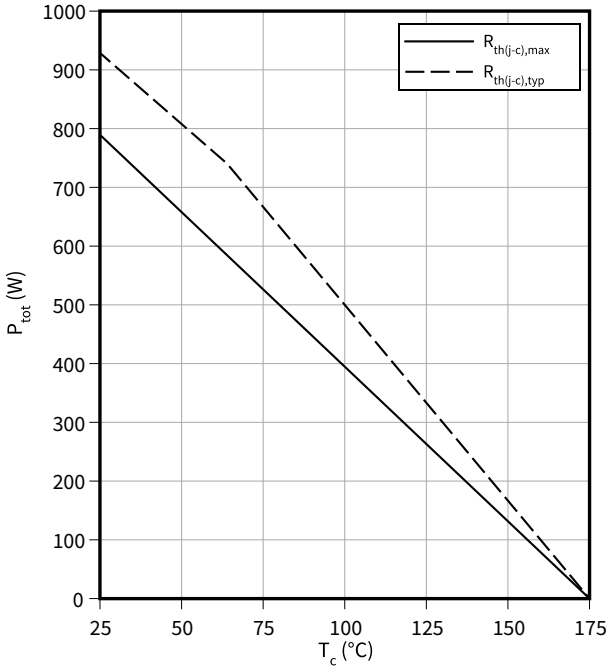
3 Characteristics diagrams

Power dissipation as function of case temperature

$P_{tot} = f(T_c)$

$T_{vj} \leq 175$ °C

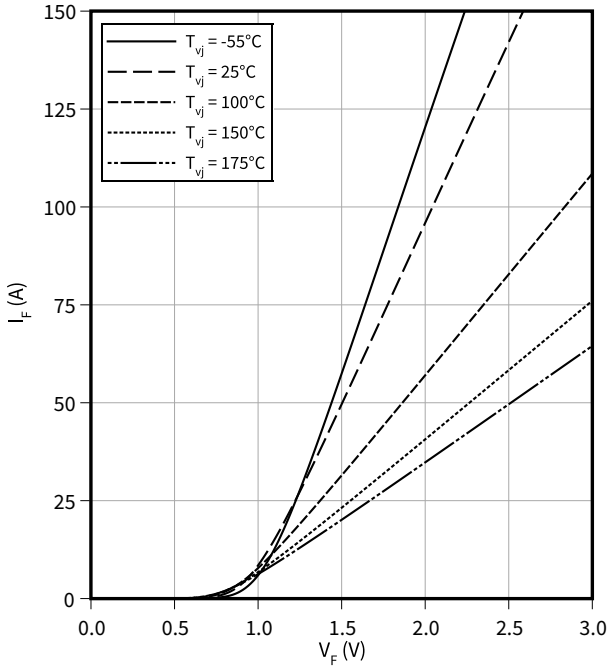
limited by bondwire



Typical forward characteristics

$I_F = f(V_F)$

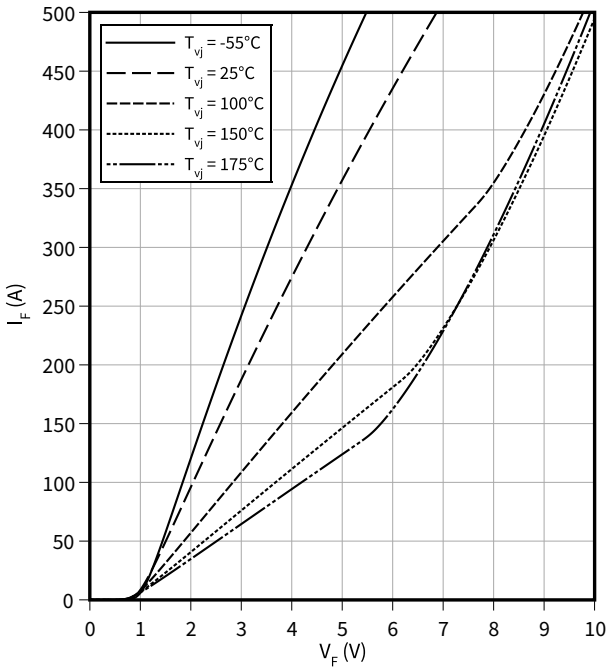
$t_p = 50$ µs



Typical forward characteristics in surge current

$I_F = f(V_F)$

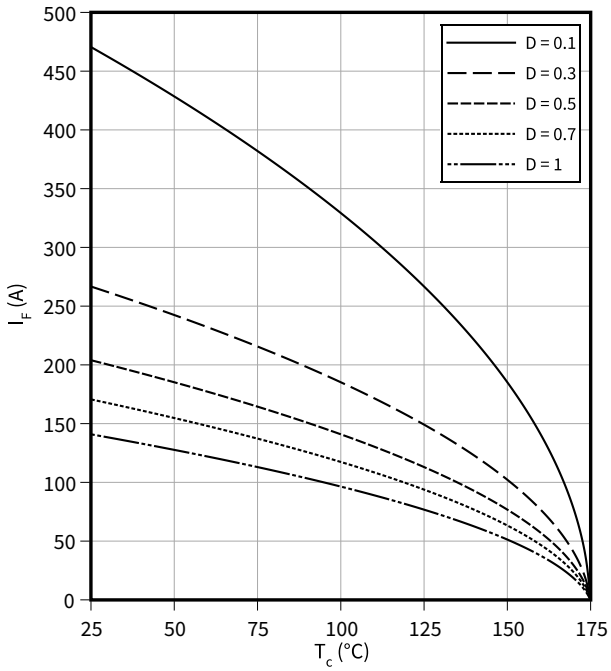
$t_p = 50$ µs



Diode forward current as function of temperature

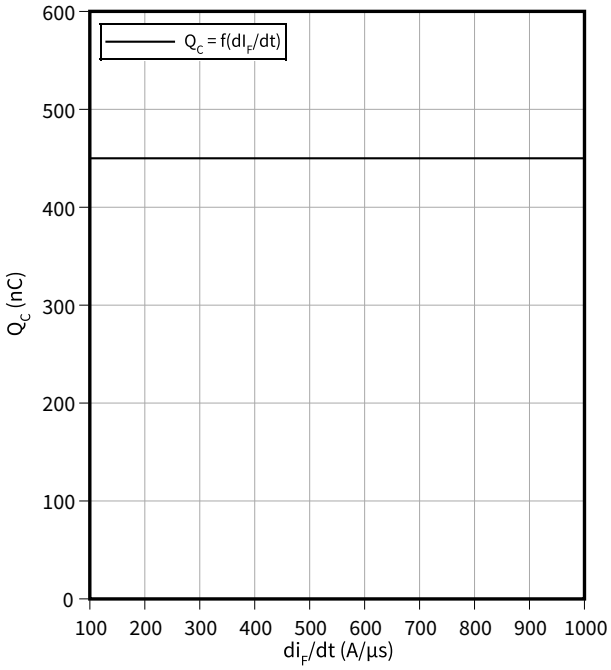
$I_F = f(T_c)$

D = duty cycle , $T_{vj} \leq 175$ °C, V_{th}, R_{diff} @ $T_{vj} = 175$ °C



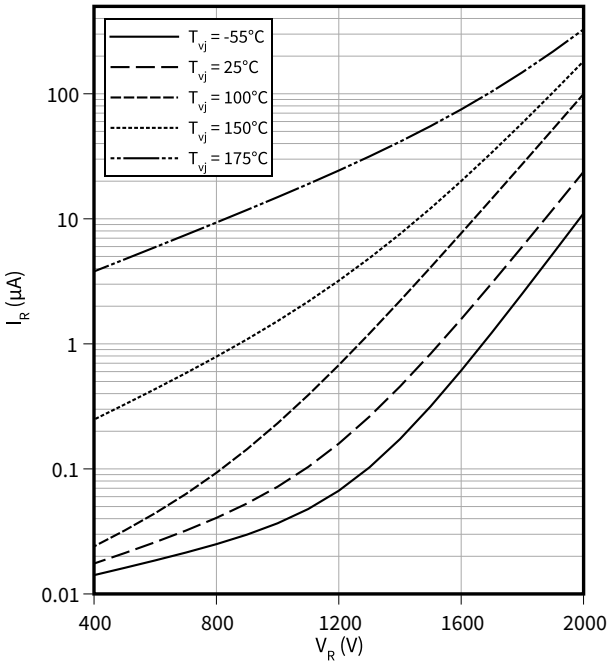
Typical capacitive charge as function of current slope

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



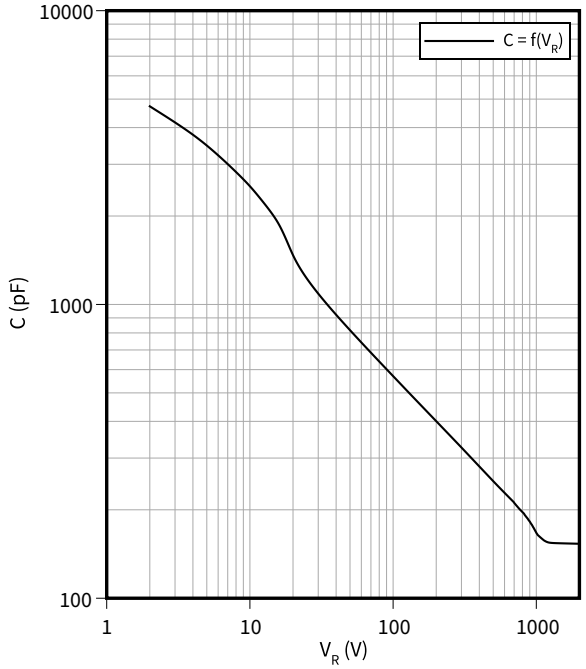
Typical reverse characteristics

$I_R = f(V_R)$



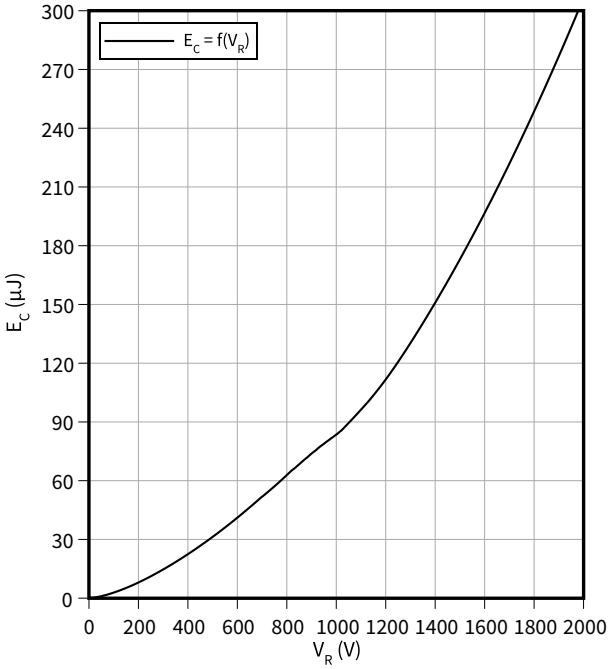
Typical capacitance as function of reverse voltage

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



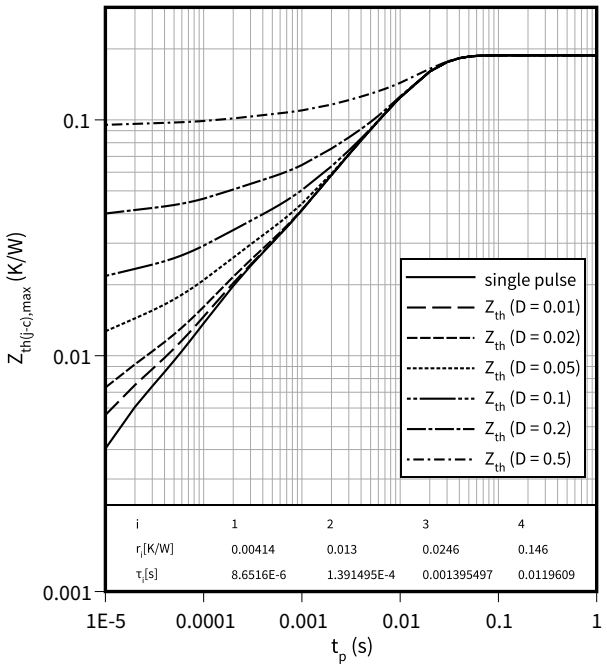
Typical capacitively stored energy as function of reverse voltage

$E_C = f(V_R)$
f = 100 kHz



Max. transient thermal impedance

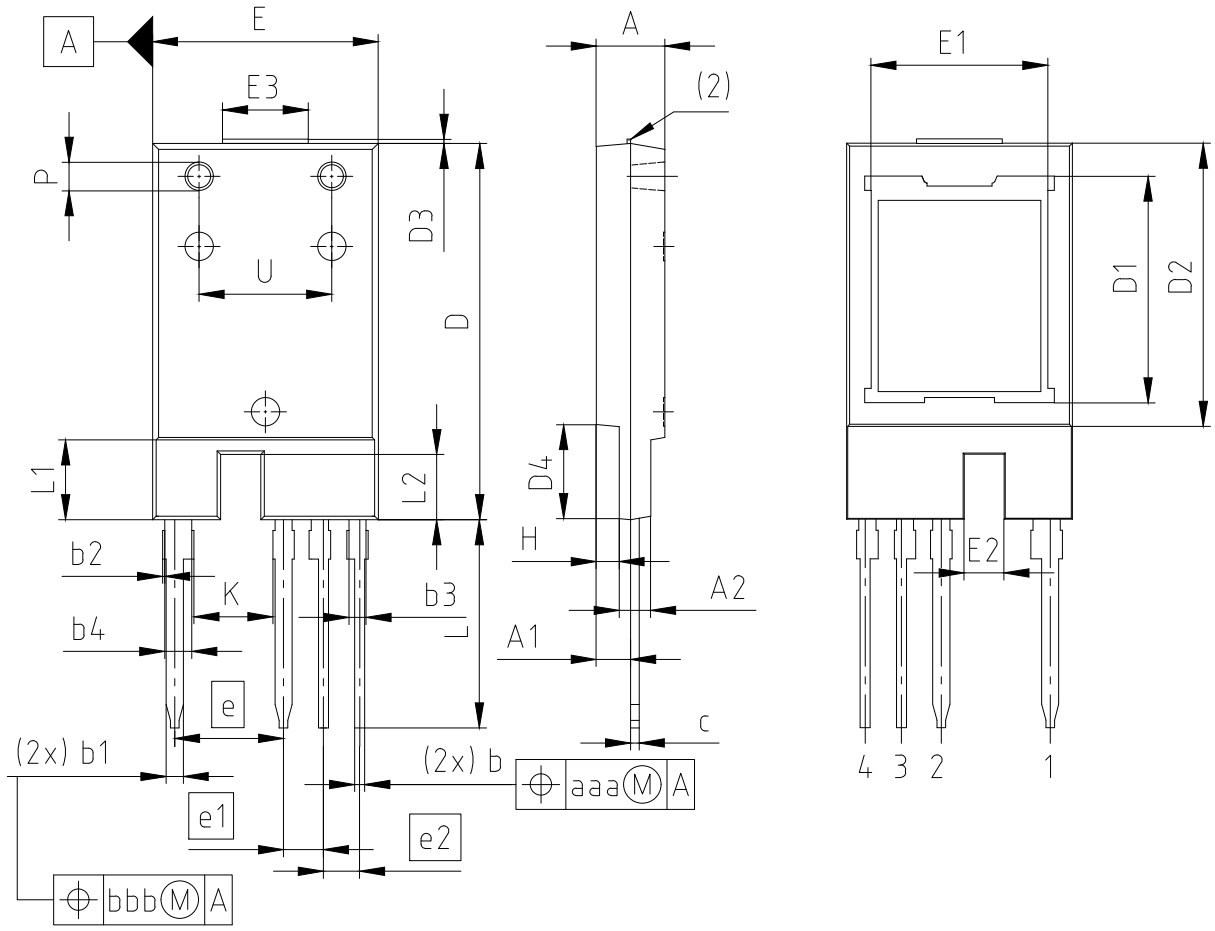
$Z_{th(j-c),max} = f(t_p)$
$D = t_p/T$



i	1	2	3	4
r_i[K/W]	0.00414	0.013	0.0246	0.146
τ_i[s]	8.6516E-6	1.391495E-4	0.001395497	0.0119609

4 Package outlines

PG-TO247-4-PLUS-NT14



NOTES:
(1) ALL METAL SURFACES TIN PLATED EXPECT AREA OF CUT
(2) MOLD GATE PROTRUSION AFTER DEGATING

PACKAGE - GROUP NUMBER:	PG-TO247-4-U04				
DIMENSIONS	MILLIMETERS		DIMENSIONS	MILLIMETERS	
	MIN.	MAX.		MIN.	MAX.
A	4.65	4.95	**E1**	12.00	12.80
A1	2.16	2.66	**E2**	2.60	3.00
A2	2.00	2.40	**E3**	5.00	7.00
b	0.60	0.80	**e**	7.62	
b1	1.10	1.30	**e1**	2.79	
b2	---	0.15	**e2**	2.54	
b3	1.10	1.30	**H**	1.51	1.71
b4	1.70	2.10	**K**	5.50	---
c	0.50	0.70	**N**	4	
D	26.00	26.70	**L**	14.30	14.90
D1	15.50	16.30	**L1**	5.40	5.70
D2	19.40	20.20	**L2**	4.56	
D3	---	0.50	**ØP**	1.75	2.25
D4	6.35	6.65	**U**	9.00	9.50
E	15.60	16.00	**aaa**	0.25	
			bbb	0.25	

Figure 1

Revision history

Document revision	Date of release	Description of changes
0.10	2024-02-14	Preliminary datasheet
1.00	2024-04-15	Final datasheet

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