

Final datasheet

CoolSiC™ Schottky diode 2000 V G5

- Features
- $V_{RRM} = 2000\text{ V}$
 - $I_F = 50\text{ A}$
 - $V_F = 1.5\text{ V}$
 - 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

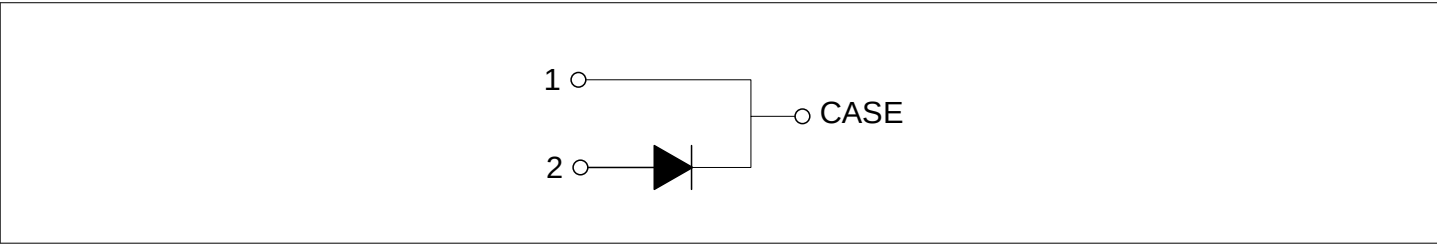
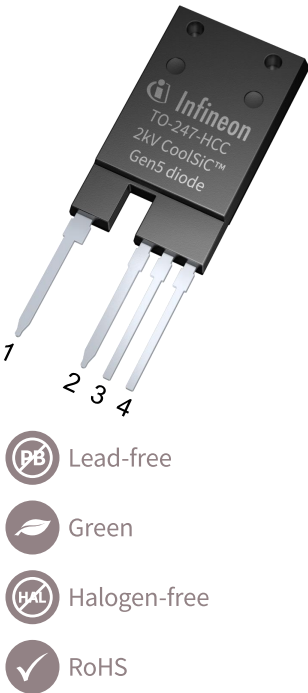
Description

Pin definition:

Pin 1 – Cathode

Pin 2 – Anode

Pin 3, 4 – not connected



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



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

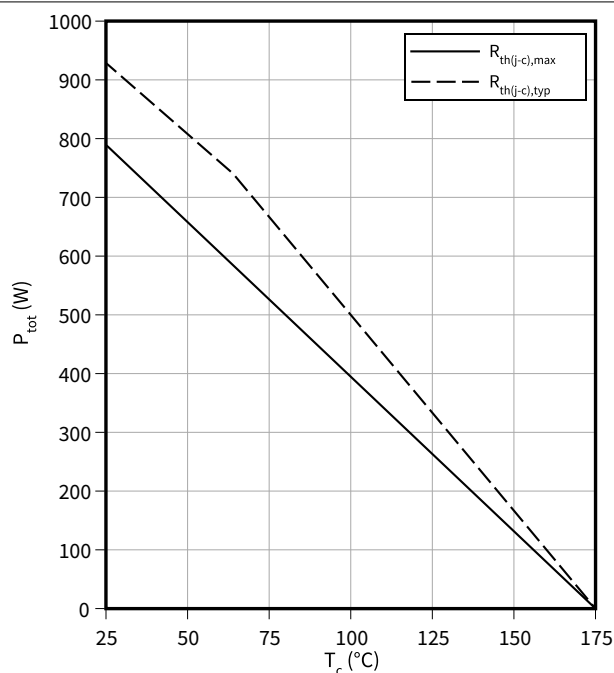
3 Characteristics diagrams

Power dissipation as function of case temperature

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

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

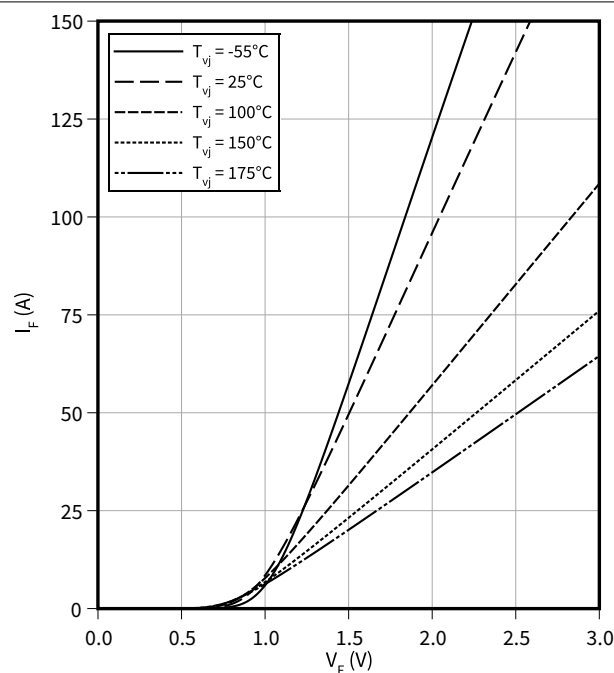
limited by bondwire



Typical forward characteristics

$$I_F = f(V_F)$$

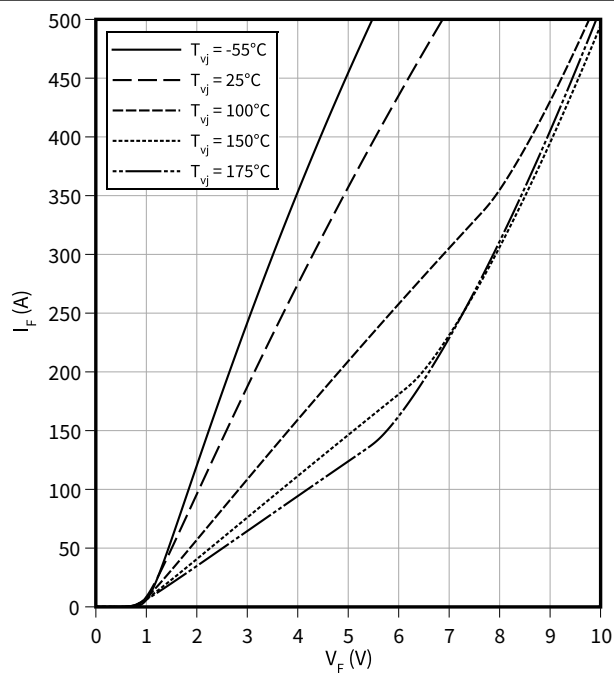
$$t_p = 50 \mu\text{s}$$



Typical forward characteristics in surge current

$$I_F = f(V_F)$$

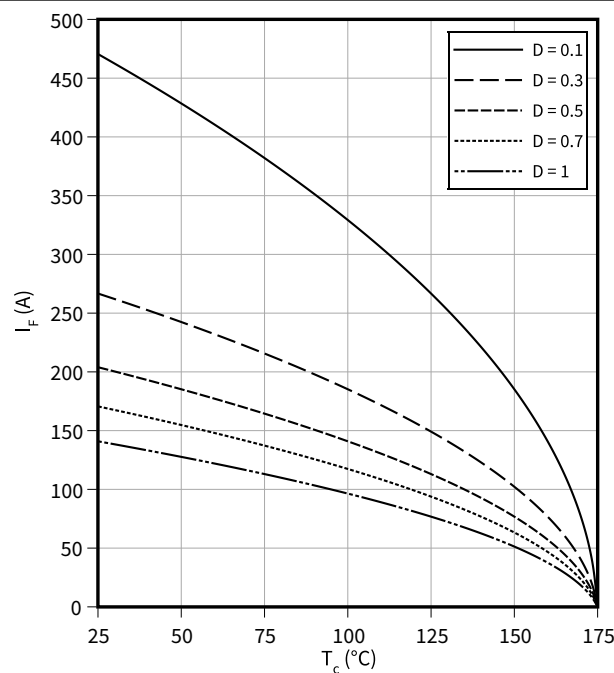
$$t_p = 50 \mu\text{s}$$



Diode forward current as function of temperature

$$I_F = f(T_c)$$

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



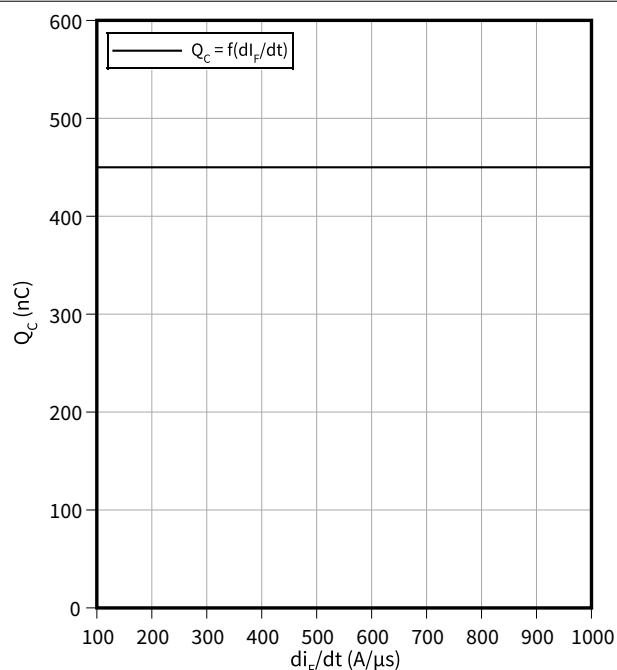
3 Characteristics diagrams

Typical capacitive charge as function of current slope

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

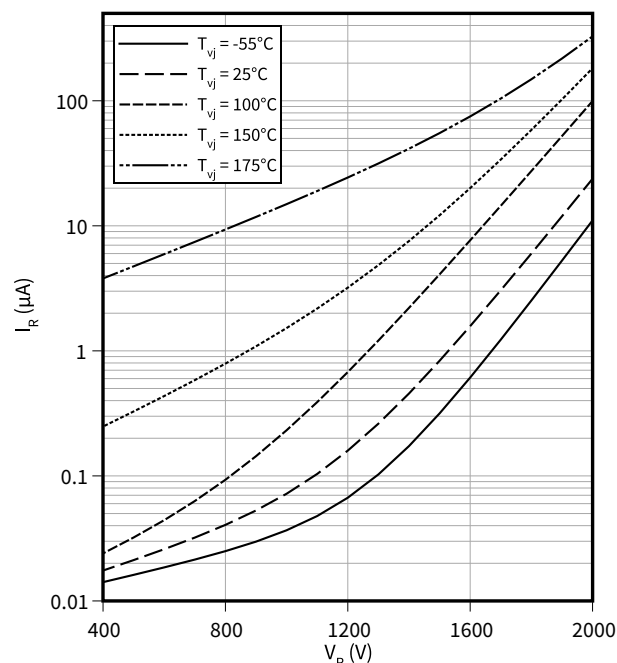
$T_{vj} = 25\text{ °C}$, $V_R = 1500\text{ V}$

guaranteed by design



Typical reverse characteristics

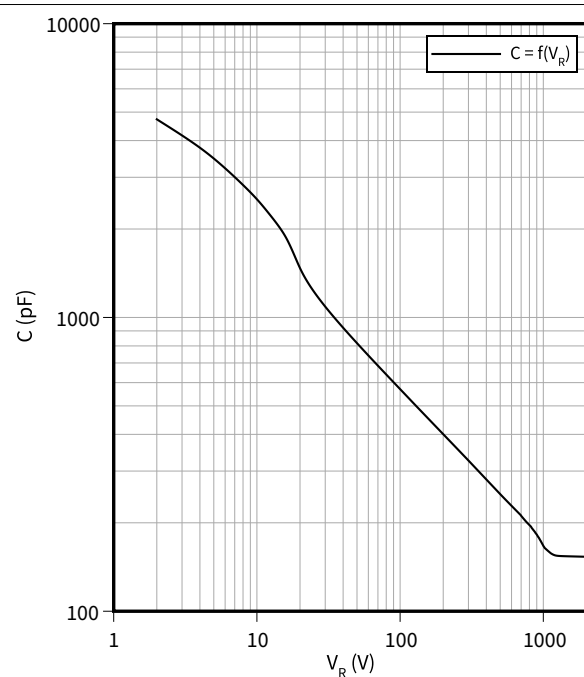
$$I_R = f(V_R)$$



Typical capacitance as function of reverse voltage

$$C = f(V_R)$$

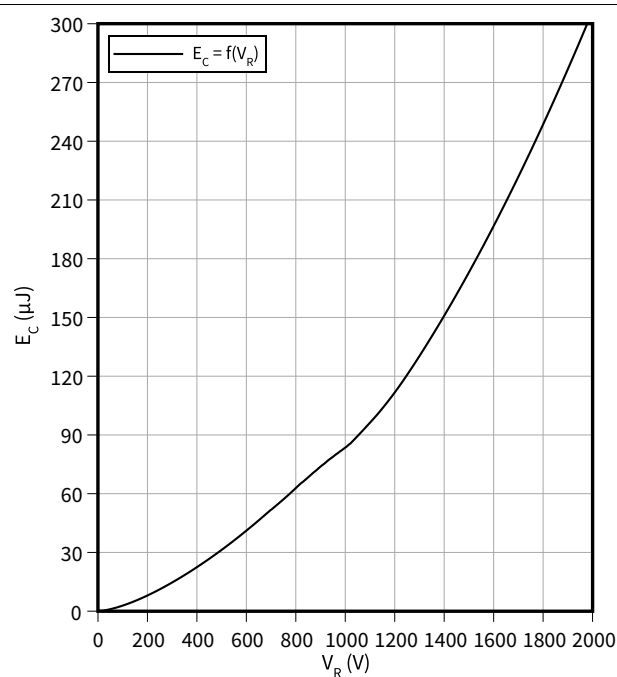
$T_{vj} = 25\text{ °C}$, $f = 100\text{ kHz}$



Typical capacitively stored energy as function of reverse voltage

$$E_C = f(V_R)$$

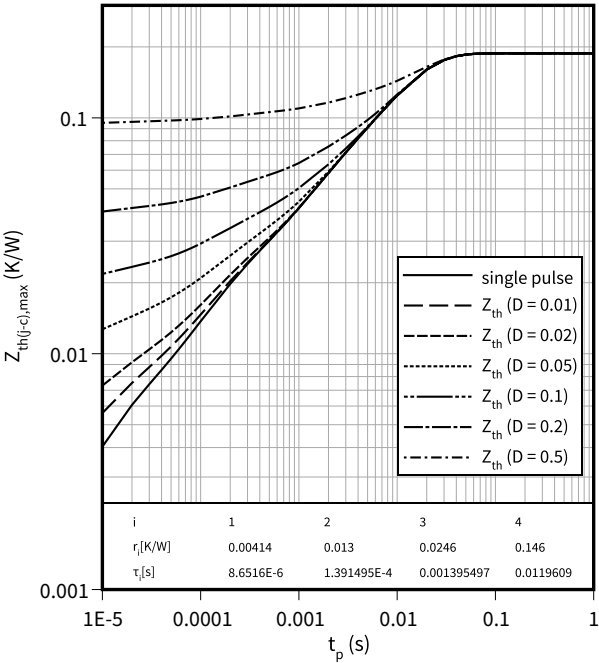
$f = 100\text{ kHz}$

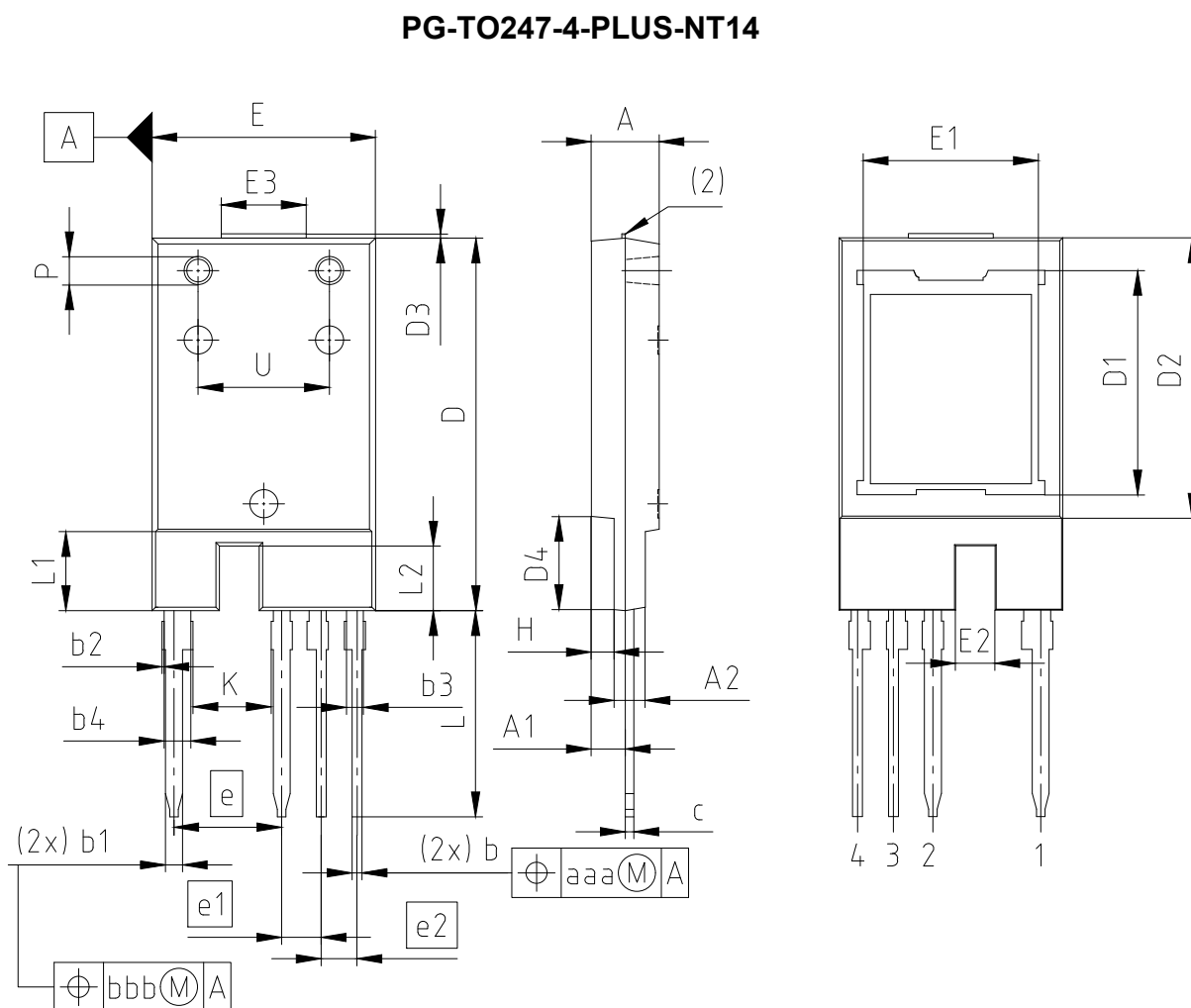


3 Characteristics diagrams

Max. transient thermal impedance

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





(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	



Revision history

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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