Diode

Silicon Carbide Schottky Diode

IDH05G120C5

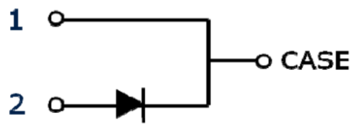
5th Generation CoolSiC™ 1200 V SiC Schottky Diode

Final Datasheet

Rev. 2.1 2017-07-21

Industrial Power Control

CoolSiC™ SiC Schottky Diode



Features:

- Revolutionary semiconductor material - Silicon Carbide
- No reverse recovery current / No forward recovery
- Temperature independent switching behavior
- Low forward voltage even at high operating temperature
- Tight forward voltage distribution
- Excellent thermal performance
- Extended surge current capability
- Specified dv/dt ruggedness
- Qualified according to JEDEC[1)] for target applications
- Pb-free lead plating; RoHS compliant

Benefits

- System efficiency improvement over Si diodes
- Enabling higher frequency / increased power density solutions
- System size / cost savings due to reduced heatsink requirements and smaller magnetics
- Reduced EMI
- Highest efficiency across the entire load range
- Robust diode operation during surge events
- High reliability
- RelatedLinks: www.infineon.com/sic

Applications

- Solar inverters
- Uninterruptable power supplies
- Motor drives
- Power Factor Correction

Package pin definitions

- Pin 1 and backside – cathode
- Pin 2 – anode

Key Performance and Package Parameters

Type	V_{DC}	I_F	Q_C	$T_{j,max}$	Marking	Package
IDH05G120C5	1200V	5A	24nC	175°C	D0512C5	PG-TO220-2-1

1) J-STD20 and JESD22

Table of Contents

Maximum ratings

Parameter	**Symbol**	**Value**	**Unit**
Repetitive peak reverse voltage	V_{RRM}	1200	V
Continues forward current for $R_{th(j-c,max)}$ T_C = 161°C, D=1 T_C = 135°C, D=1 T_C = 25°C, D=1	I_F	 5.0 9.2 19.1	A
Surge non-repetitive forward current, sine halfwave T_C=25°C, t_p=10ms T_C=150°C, t_p=10ms	$I_{F,SM}$	 59 50	A
Non-repetitive peak forward current T_C = 25°C, t_p=10 µs	$I_{F,max}$	472	A
i²t value T_C = 25°C, t_p=10 ms T_C = 150°C, t_p=10 ms	$\int i^2 dt$	 17.4 12.5	A²s
Diode d*v*/d*t* ruggedness V_R=0…960V	d*v*/d*t*	80	V/ns
Power dissipation T_C = 25°C	P_{tot}	109	W
Operating temperature	T_j	-55…175	°C
Storage temperature	T_{stg}	-55…150	°C
Soldering temperature, wavesoldering only allowed at leads, 1.6mm (0.063 in.) from case for 10 s	T_{sold}	260	°C
Mounting torque M3 and M4 screws	*M*	0.7	Nm

Thermal Resistances

Parameter	**Symbol**	**Conditions**	**Value**			**Unit**
			min.	**typ.**	**max.**	
Characteristic						
Diode thermal resistance, junction – case	$R_{th(j-c)}$		-	1.06	1.37	K/W
Thermal resistance, junction – ambient	$R_{th(j-a)}$	leaded	-	-	62	K/W

Electrical Characteristics

Static Characteristics, at T_j=25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Static Characteristic						
DC blocking voltage	V_{DC}	T_j = 25°C	1200	-	-	V
Diode forward voltage	V_F	I_F= 5A, T_j=25°C I_F= 5A, T_j=150°C	- -	1.50 1.95	1.8 2.6	V
Reverse current	I_R	V_R=1200V, T_j=25°C V_R=1200V, T_j=150°C		2.5 12	33 175	µA

Dynamic Characteristics, at T_j=25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Dynamic Characteristics						
Total capacitive charge	Q_C	V_R=800V, T_j=150°C $Q_C = \int_0^{V_R} C(V)dV$	-	24	-	nC
Total Capacitance	C	V_R=1 V, f=1 MHz V_R=400 V, f=1 MHz V_R=800 V, f=1 MHz	- - -	301 21 17	- - -	pF

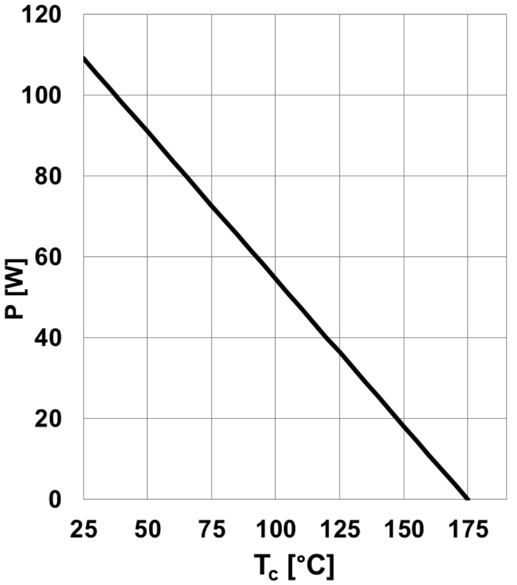


Figure 1. **Power dissipation as a function of case temperature,** P_{tot}=f(T_C), $R_{th(j-c),max}$

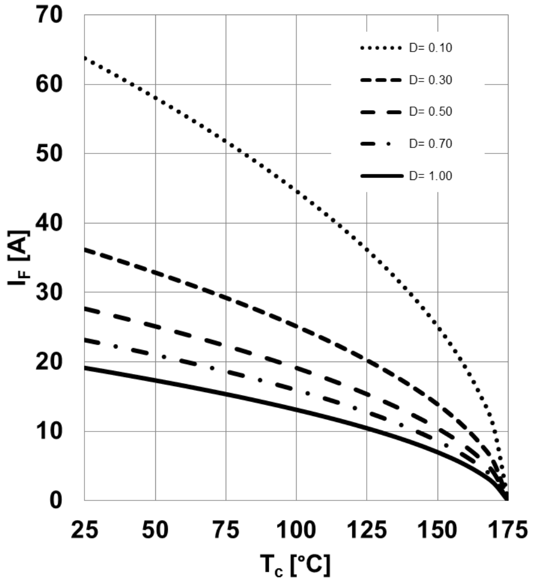


Figure 2. **Diode forward current as function of temperature,** T_j≤175°C, $R_{th(j-c),max}$, parameter D=duty cycle, V_{th}, R_{diff} @ T_j=175°C

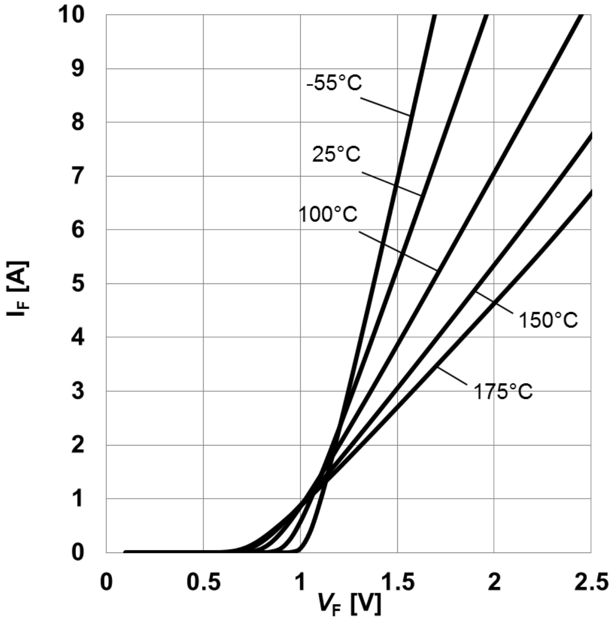


Figure 3. **Typical forward characteristics,** I_F=f(V_F), t_p= 10 µs, parameter: T_j

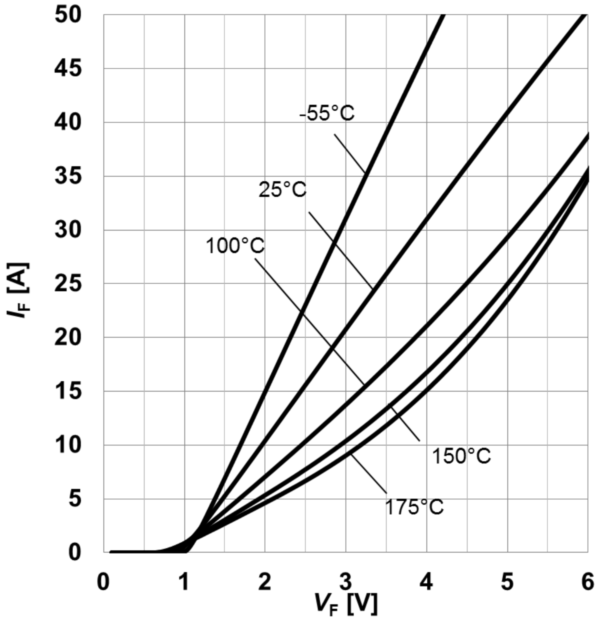


Figure 4. **Typical forward characteristics in surge current,** I_F=f(V_F), t_p= 10 µs, parameter: T_j

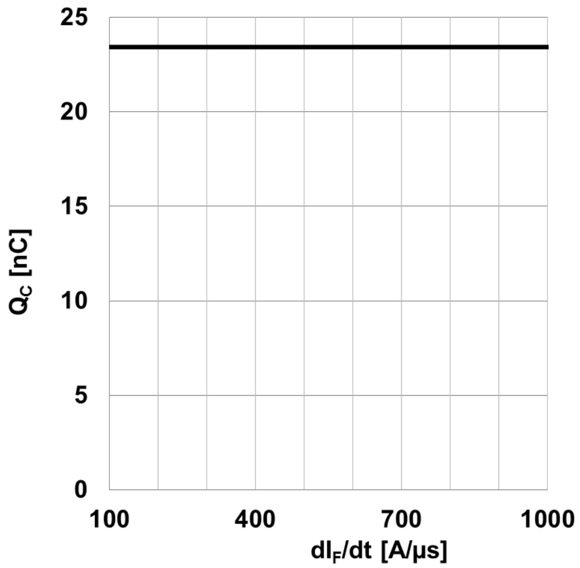


Figure 5. **Typical capacitive charge as function of current slope**[1]**,** Q_C=f(dI_F/dt), T_j=150°C

1) Only capacitive charge, guaranteed by design.

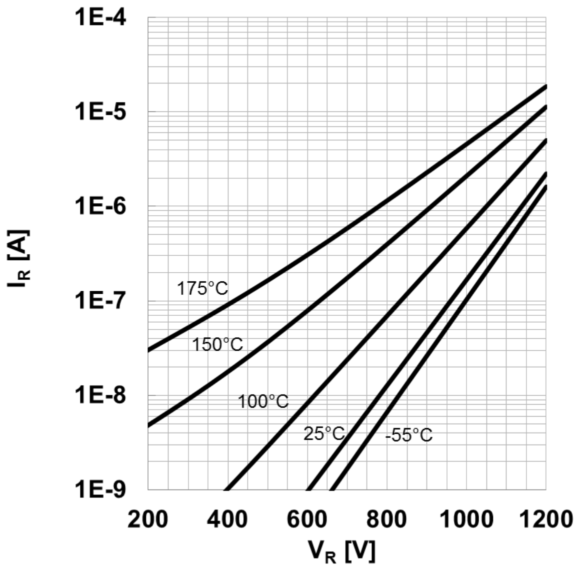


Figure 6. **Typical reverse current as function of reverse voltage,** I_R=f(V_R), parameter: T_j

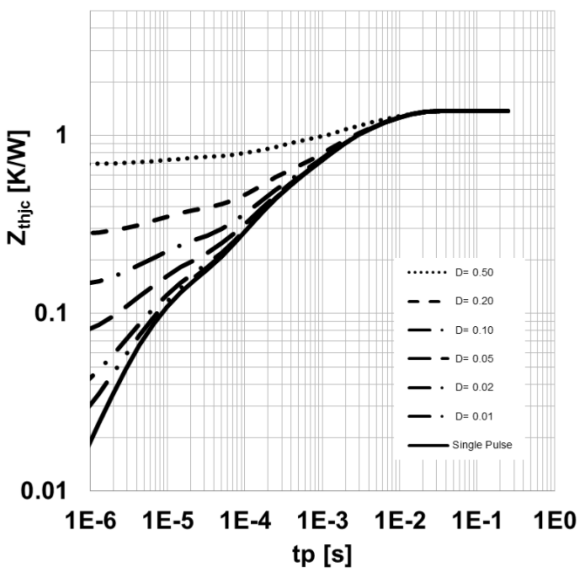


Figure 7. **Max. transient thermal impedance,** $Z_{th,jc}$=f(t_P), parameter: D=t_P/T

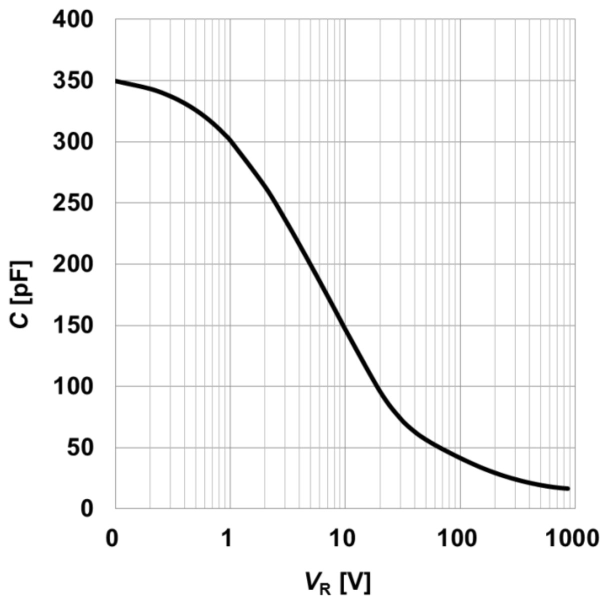


Figure 8. **Typical capacitance as function of reverse voltage**, C=f(V_R); T_j=25°C; f=1 MHz

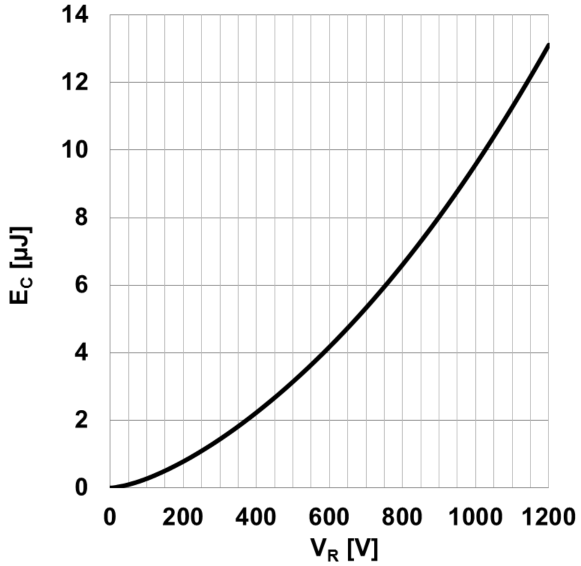


Figure 9. **Typical capacitively stored energy as function of reverse voltage,**

$$E_C = \int_0^{V_R} C(V) V dV$$

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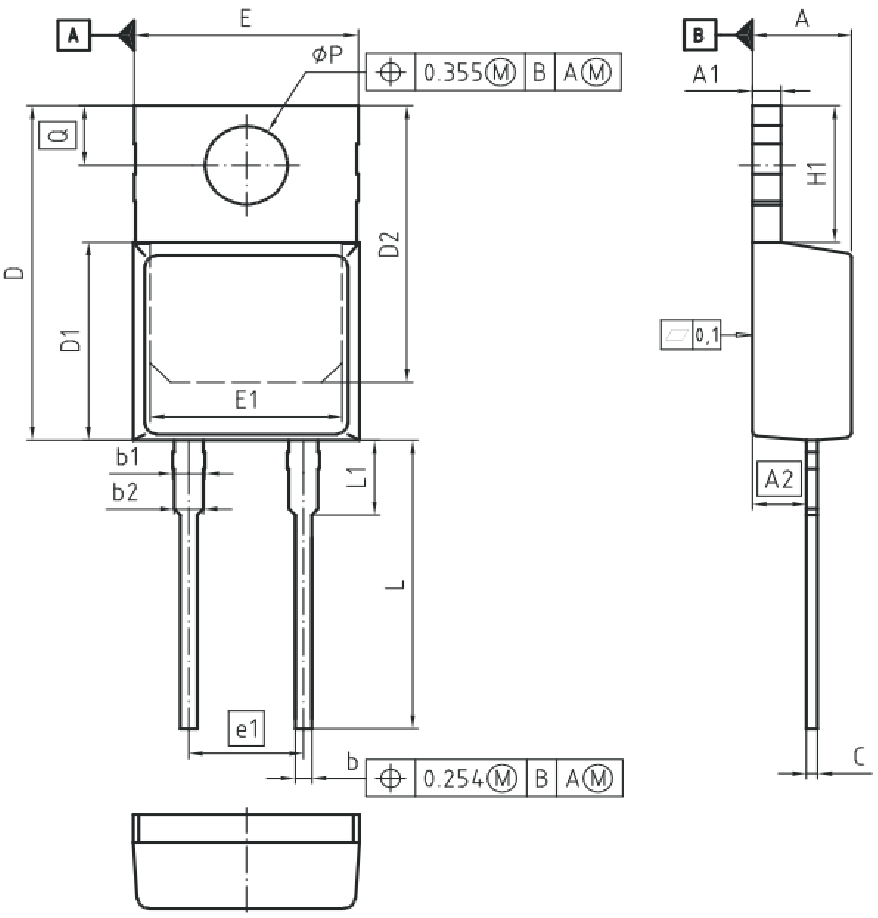

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.50	0.169	0.177
A1	1.17	1.37	0.046	0.054
A2	2.30	2.50	0.091	0.098
b	0.65	0.85	0.026	0.033
b1	1.19	1.69	0.047	0.066
b2	1.19	1.39	0.047	0.055
c	0.40	0.60	0.016	0.024
D	15.35	15.95	0.604	0.628
D1	9.05	9.45	0.356	0.372
D2	12.30	13.05	0.484	0.514
E	9.80	10.20	0.386	0.402
E1	7.25	8.60	0.285	0.339
e1	5.08		0.200	
N	2		2	
H1	5.90	6.90	0.232	0.272
L	13.00	14.00	0.512	0.551
L1	3.30	3.70	0.130	0.146
øP	3.55	3.70	0.140	0.146
Q	2.60	3.00	0.102	0.118

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REVISION
01

Revision History

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Revision: 2017-07-21, Rev. 2.1

Previous Revision:

Revision	Date	Subjects (major changes since last version)
2.0	2015-08-28	Final data sheet
2.1	-	Editorial Changes

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