

Diode

Silicon Carbide Schottky Diode

IDM02G120C5

5th Generation CoolSiC™ 1200 V SiC Schottky Diode

Final Data Sheet

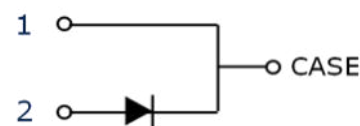
Rev. 2.1, 2021-06-09

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 JEDEC¹⁾ 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
IDM02G120C5	1200V	2A	14nC	175°C	D0212C5	PG-TO252-2

1) J-STD20 and JESD22

Table of Contents

Description.....	2
Table of Contents.....	3
Maximum ratings.....	4
Thermal Resistances	4
Electrical Characteristics.....	5
Electrical Characteristics diagram	5
Package Drawings	9
Revision History	10
Disclaimer.....	10

Maximum ratings

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	1200	V
Continuous forward current for $R_{th(j-c,max)}$ $T_C = 170^\circ\text{C}$, $D=1$ $T_C = 135^\circ\text{C}$, $D=1$ $T_C = 25^\circ\text{C}$, $D=1$	I_F	2 7 14	A
Surge non-repetitive forward current, sine halfwave $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$ $T_C=150^\circ\text{C}$, $t_p=10\text{ms}$	$I_{F,SM}$	37 31	
Non-repetitive peak forward current $T_C = 25^\circ\text{C}$, $t_p=10 \mu\text{s}$	$I_{F,max}$	344	
i^2t value $T_C = 25^\circ\text{C}$, $t_p=10 \text{ ms}$ $T_C = 150^\circ\text{C}$, $t_p=10 \text{ ms}$	$\int i^2 dt$	7.0 4.9	A^2s
Diode dv/dt ruggedness $V_R=0\ldots 960 \text{ V}$	dv/dt	150	V/ns
Power dissipation $T_C = 25^\circ\text{C}$	P_{tot}	98	W
Operating and storage temperature	$T_J; T_{stg}$	-55...175	$^\circ\text{C}$
Soldering temperature, Wave- and reflowsoldering allowed (reflow MSL1)	T_{sold}	260	

Thermal Resistances

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Characteristic						
Diode thermal resistance, junction – case	$R_{th(j-c)}$		-	1.2	1.5	K/W
Thermal resistance, junction – ambient	$R_{th(j-a)}$	SMD version, device on PCB, minimal footprint	-	-	62	
		SMD version, device on PCB, 6 cm ² cooling area ²⁾		35		

²⁾ Device on 40 mm*40mm*1.5 epoxy PCB FR4 with 6cm² (one layer, 70μm thick) copper for cathode connection. PCB is vertical without air stream cooling.

Electrical 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 = 2 A, T _j =25°C	-	1.4	1.65	V
		I _F = 2 A, T _j =150°C	-	1.7	2.30	
Reverse current	I _R	V _R =1200 V, T _j =25°C		1.2	18	μA
		V _R =1200 V, T _j =150°C		6	90	

AC 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 = 800 V, T _j =150°C $Q_C = \int_0^{V_R} C(V)dV$	-	14	-	nC
Total Capacitance	C	V _R =1 V, f=1 MHz	-	182	-	pF
		V _R =400 V, f=1 MHz	-	13	-	
		V _R =800 V, f=1 MHz	-	10	-	

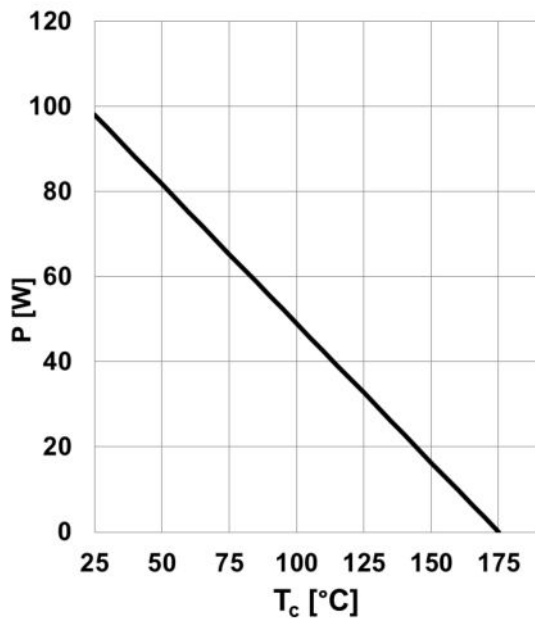


Figure 1. **Power dissipation as a function of case temperature**, $P_{tot}=f(T_c)$, $R_{th(j-c),max}$

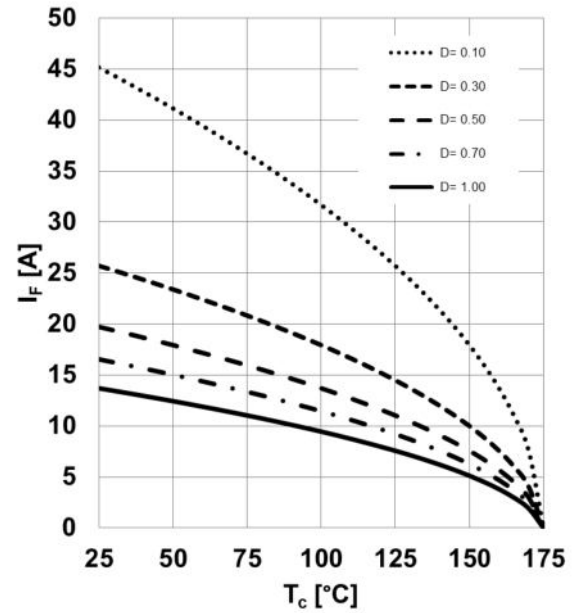


Figure 2. **Diode forward current as function of temperature**, $T_j \leq 175^\circ\text{C}$, $R_{th(j-c),max}$, parameter D =duty cycle, V_{th} , R_{diff} @ $T_j=175^\circ\text{C}$

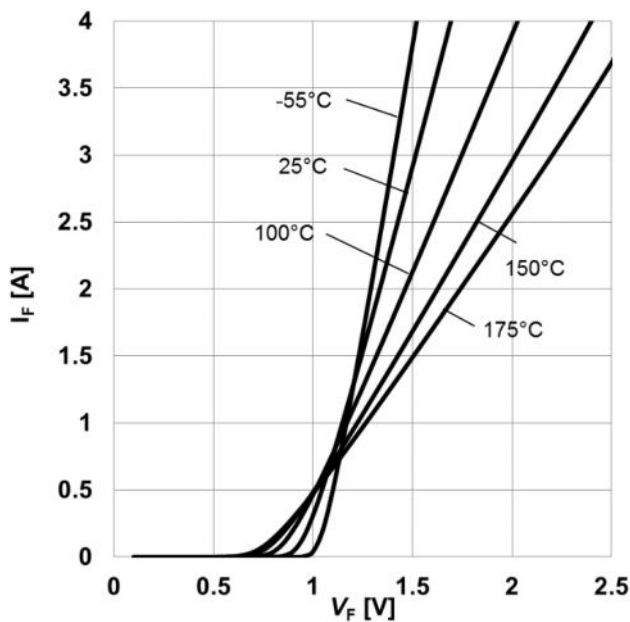


Figure 3. **Typical forward characteristics**, $I_F=f(V_F)$, $t_p=10\text{ }\mu\text{s}$, parameter: T_j

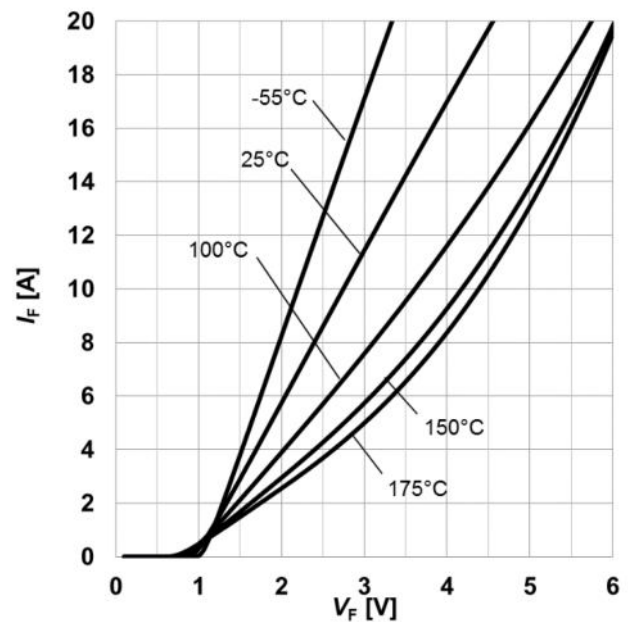


Figure 4. **Typical forward characteristics in surge current**, $I_F=f(V_F)$, $t_p=10\text{ }\mu\text{s}$, parameter: T_j

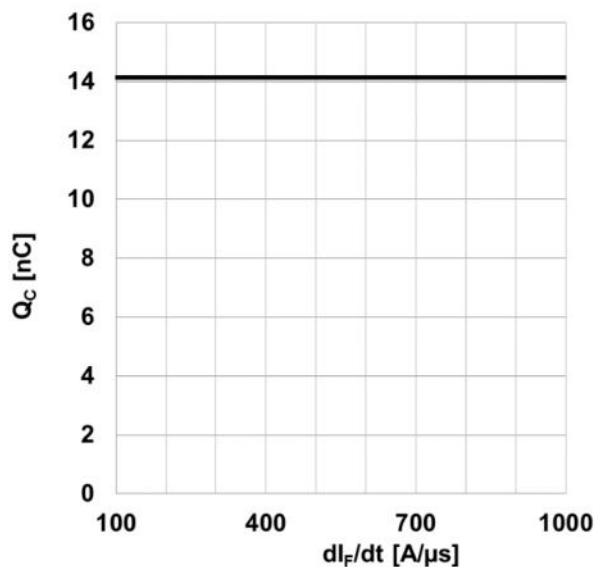


Figure 5. **Typical capacitance charge as function of current slope¹**, $Q_C=f(dI_F/dt)$, $T_J=150^{\circ}\text{C}$

1) Only capacitive charge, guaranteed by design.

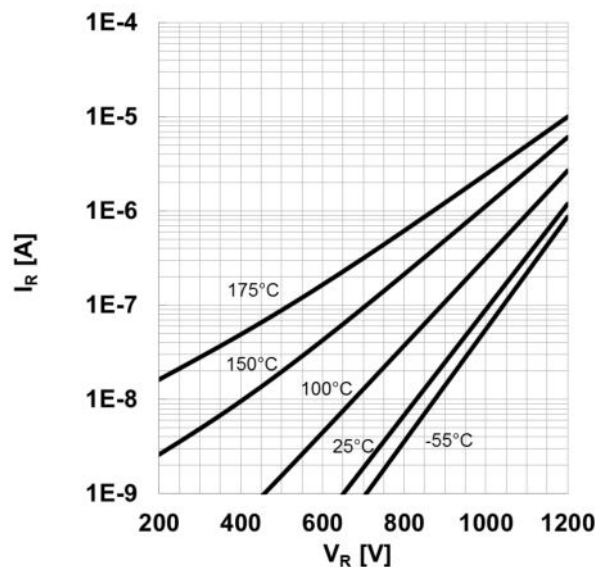


Figure 6. **Typical reverse current as function of reverse voltage**, $I_R=f(V_R)$, parameter: T_J

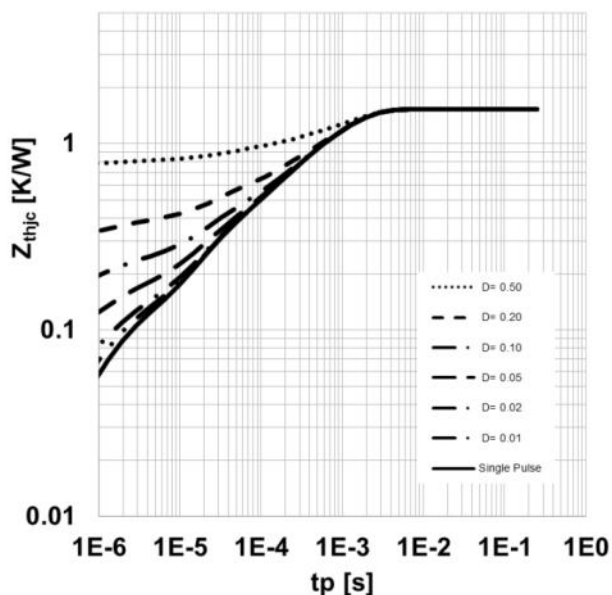


Figure 7. **Max. transient thermal impedance**, $Z_{th,jc}=f(t_p)$, parameter: $D=t_p/T$

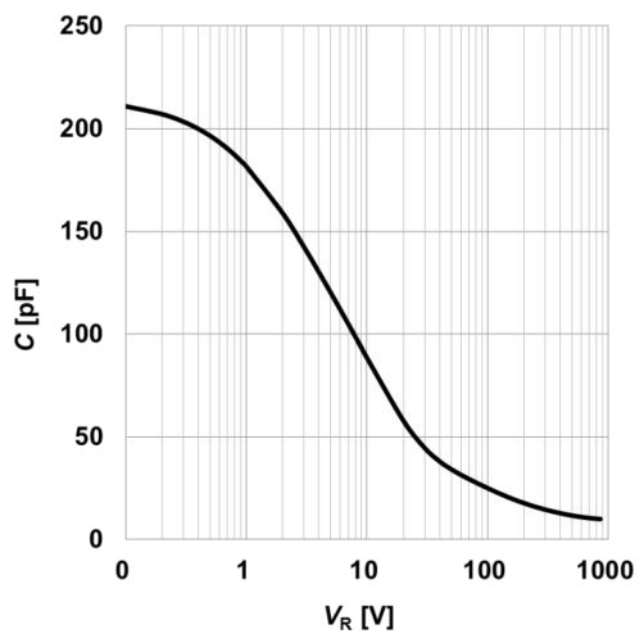


Figure 8. **Typical capacitance as function of reverse voltage**, $C=f(V_R)$; $T_J=25^{\circ}\text{C}$; $f=1\text{ MHz}$

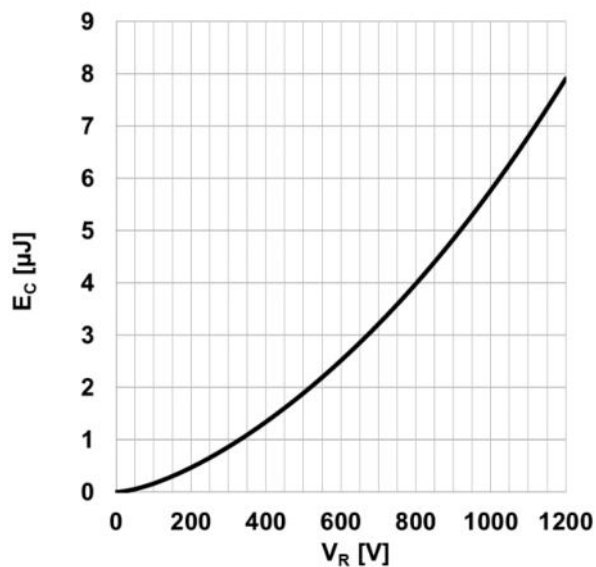
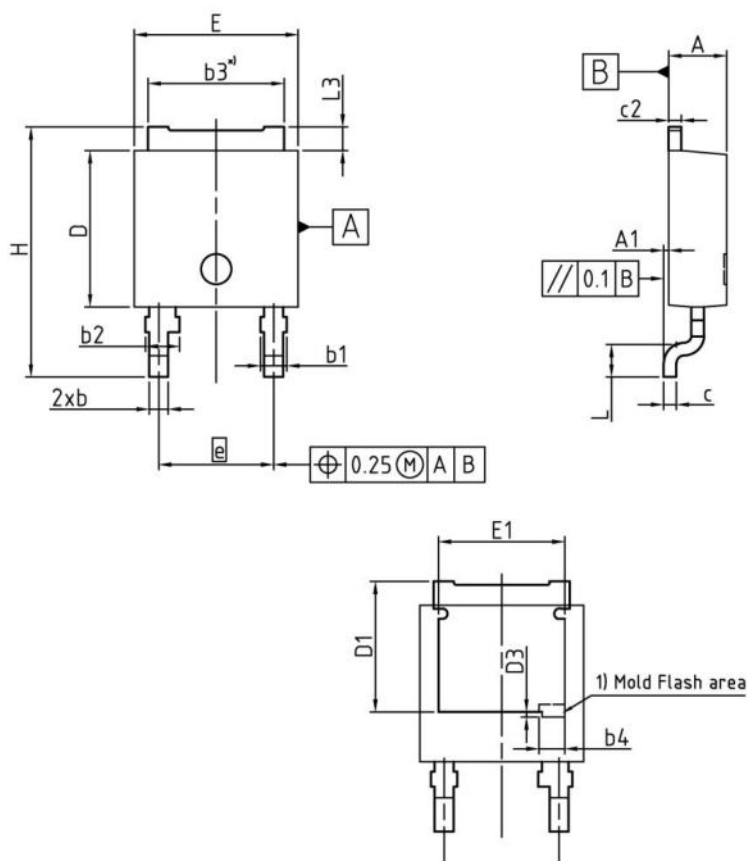


Figure 9. **Typical capacitance stored energy as function of reverse voltage,**

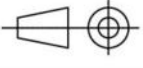
$$E_C = \int_0^{V_R} C(V) V dV$$

PG-TO252-2



*) mold flash not included

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.20	2.35	0.087	0.093
A1	0.00	0.15	0.000	0.006
b	0.65	0.85	0.026	0.033
b1	-	1.15	-	0.045
b2	1.05	1.45	0.041	0.057
b3	5.30	5.50	0.209	0.217
b4	1.02		0.040	
c	0.46	0.58	0.018	0.023
c2	0.46	0.58	0.018	0.023
D	6.02	6.22	0.237	0.245
D1	5.04	5.44	0.198	0.214
E	6.45	6.65	0.254	0.262
E1	5.00		0.197	
e	4.57 (BSC)		0.180 (BSC)	
N	2		2	
H	9.40	10.40	0.370	0.409
L	1.19	1.39	0.047	0.055
D3	0.20		0.008	
L3	0.90	1.10	0.035	0.043

DOCUMENT NO. Z8B00173481
SCALE 0 2.0 4mm
EUROPEAN PROJECTION 
ISSUE DATE 29-05-2014
REVISION 01

Revision History

IDM02G120C5**Revision: 2021-06-09, Rev. 2.1**

Previous Revision:

Revision	Date	Subjects (major changes since last version)
2.0	2015-06-22	Final data sheet
2.1	2021-06-09	Increased dv/dt ruggedness

We Listen to Your Comments

Any information within this document that you feel is wrong, unclear or missing at all?

Your feedback will help us to continuously improve the quality of this document.

Please send your proposal (including a reference to this document) to: erratum@infineon.com

Published by
Infineon Technologies AG
81726 München, Germany
© Infineon Technologies AG 2021.
All Rights Reserved.

Important Notice

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie"). With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

Please note that this product is not qualified according to the AEC Q100 or AEC Q101 documents of the Automotive Electronics Council.

Warnings

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.