

# Diode

Silicon Carbide Schottky Diode

## IDM02G120C5

5<sup>th</sup> Generation thinQ!<sup>TM</sup> 1200 V SiC Schottky Diode

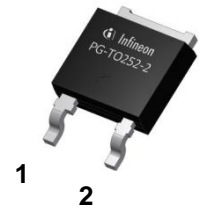
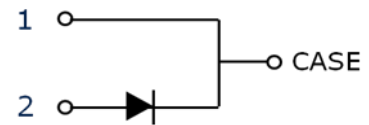
### Final Data Sheet

Rev. 2.0, 2015-06-22

## 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<sup>1)</sup> 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](http://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 <sub>DC</sub>	I <sub>F</sub>	Q <sub>C</sub>	T <sub>j,max</sub>	Marking	Package
IDM02G120C5	1200V	2A	14nC	175°C	D0212C5	PG-TO252-2

1) J-STD20 and JEDEC22

**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 <sup>2</sup> s
Diode $dv/dt$ ruggedness $V_R=0\dots960 \text{V}$	$dv/dt$	80	V/ns
Power dissipation $T_C = 25^\circ\text{C}$	$P_{tot}$	98	W
Operating and storage temperature	$T_j; T_{stg}$	-55...175	°C
Soldering temperature, Wave- and reflowsoldering allowed (reflow MSL1)	$T_{sold}$	260	

**Thermal Resistances**

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>Characteristic</b>						
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 <sup>2</sup> cooling area <sup>2)</sup>		35		

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

**Electrical Characteristics, at T<sub>j</sub>=25°C, unless otherwise specified**

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>Static Characteristic</b>						
DC blocking voltage	V <sub>DC</sub>	T <sub>j</sub> = 25°C	1200	-	-	V
Diode forward voltage	V <sub>F</sub>	I <sub>F</sub> = 2 A, T <sub>j</sub> =25°C	-	1.4	1.65	V
		I <sub>F</sub> = 2 A, T <sub>j</sub> =150°C	-	1.7	2.30	
Reverse current	I <sub>R</sub>	V <sub>R</sub> =1200 V, T <sub>j</sub> =25°C		1.2	18	μA
		V <sub>R</sub> =1200 V, T <sub>j</sub> =150°C		6	90	

**AC Characteristics, at T<sub>j</sub>=25°C, unless otherwise specified**

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>Dynamic Characteristics</b>						
Total capacitive charge	Q <sub>C</sub>	V <sub>R</sub> = 800 V, T <sub>j</sub> =150°C	-	14	-	nC
		$Q_C = \int_0^{V_R} C(V) dV$				
Total Capacitance	C	V <sub>R</sub> =1 V, f=1 MHz	-	182	-	pF
		V <sub>R</sub> =400 V, f=1 MHz	-	13	-	
		V <sub>R</sub> =800 V, f=1 MHz	-	10	-	

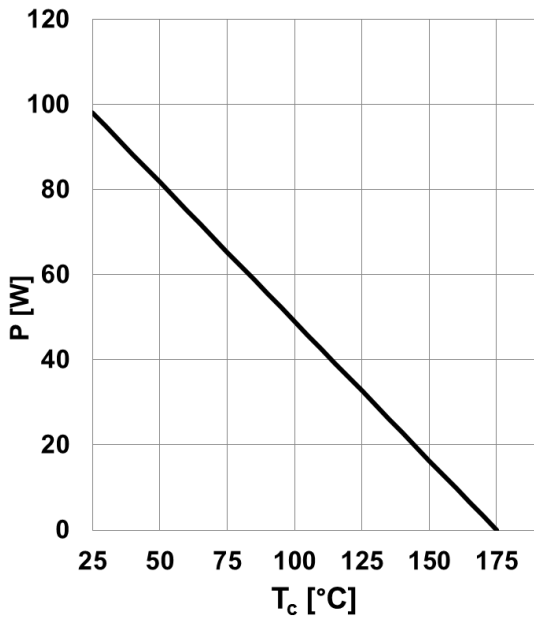


Figure 1. Power dissipation as a function of case temperature,  $P_{tot}=f(T_c)$ ,  $R_{th(j-c),max}$

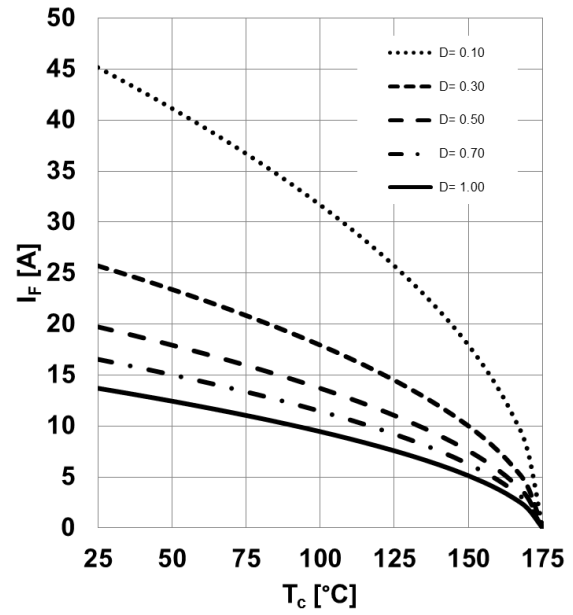


Figure 2. Diode forward current as function of temperature,  $T_j \leq 175^\circ\text{C}$ ,  $R_{th(j-c),max}$ , parameter  $D$ =duty cycle,  $V_{th}$ ,  $R_{diff}$  @  $T_j=175^\circ\text{C}$

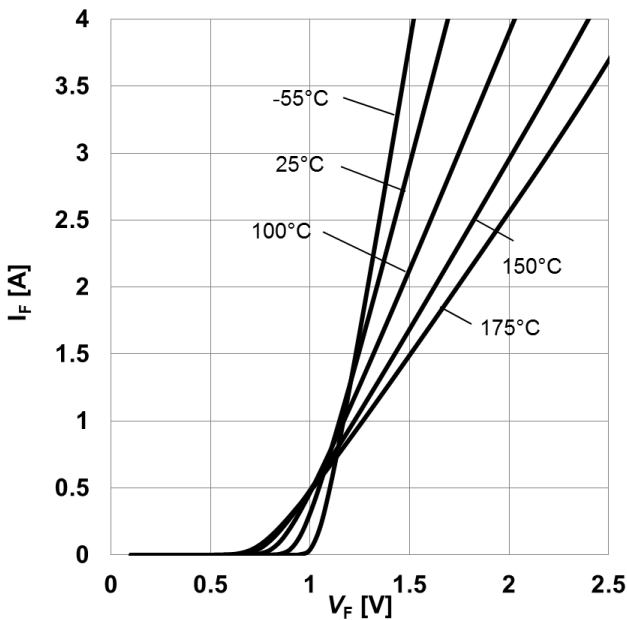


Figure 3. Typical forward characteristics,  $I_F=f(V_F)$ ,  $t_p=10\ \mu\text{s}$ , parameter:  $T_j$

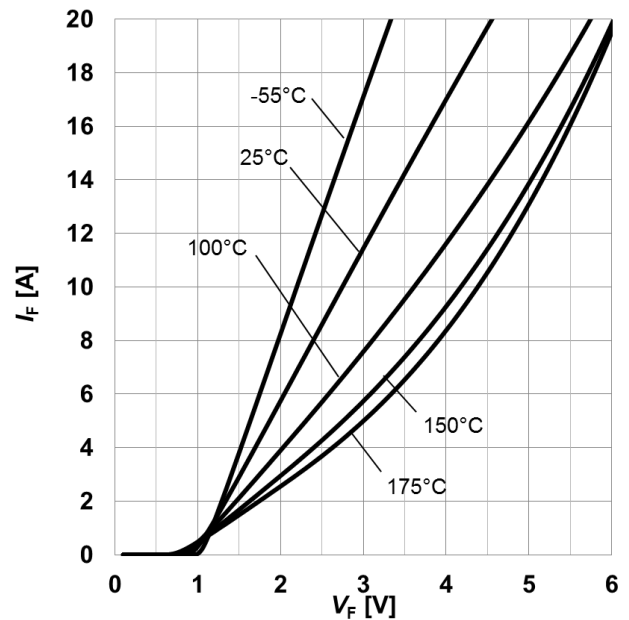


Figure 4. Typical forward characteristics in surge current,  $I_F=f(V_F)$ ,  $t_p=10\ \mu\text{s}$ , parameter:  $T_j$

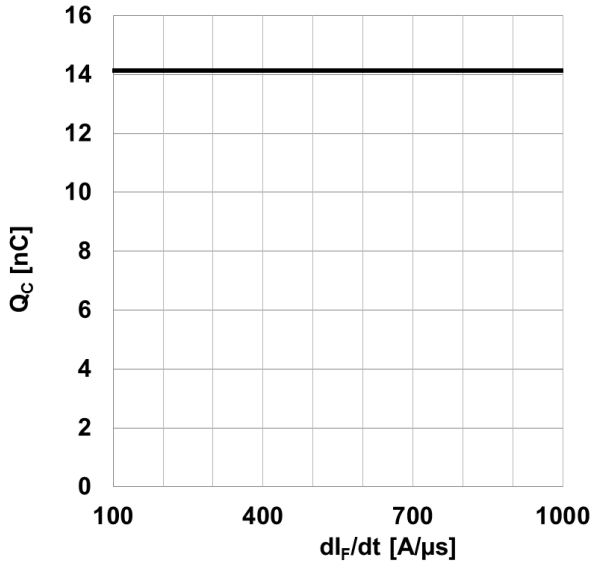


Figure 5. Typical capacitance charge as function of current slope<sup>1</sup>,  $Q_C=f(dl_F/dt)$ ,  $T_j=150^\circ\text{C}$   
 1) Only capacitive charge, guaranteed by design.

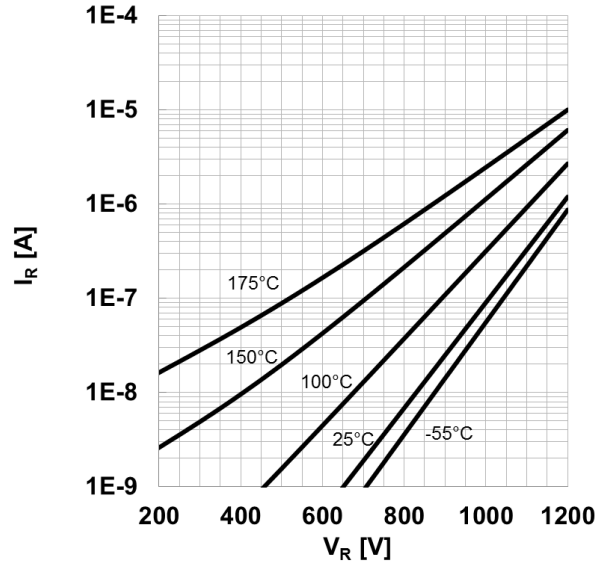


Figure 6. Typical reverse current as function of reverse voltage,  $I_R=f(V_R)$ , parameter:  $T_j$

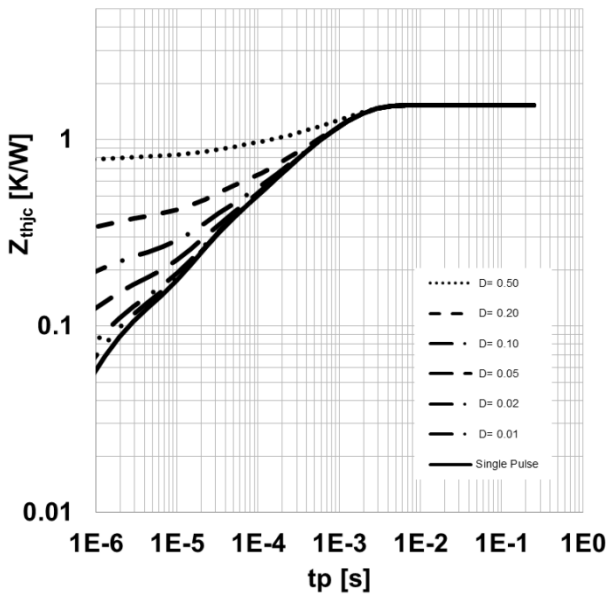


Figure 7. Max. transient thermal impedance,  $Z_{th,jc}=f(t_p)$ , parameter:  $D=t_p/T$

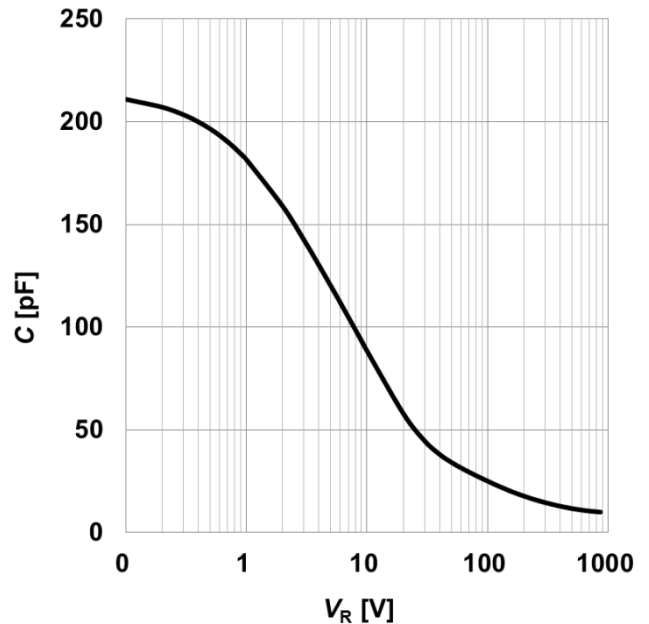


Figure 8. Typical capacitance as function of reverse voltage,  $C=f(V_R)$ ;  $T_j=25^\circ\text{C}$ ;  $f=1\text{ MHz}$

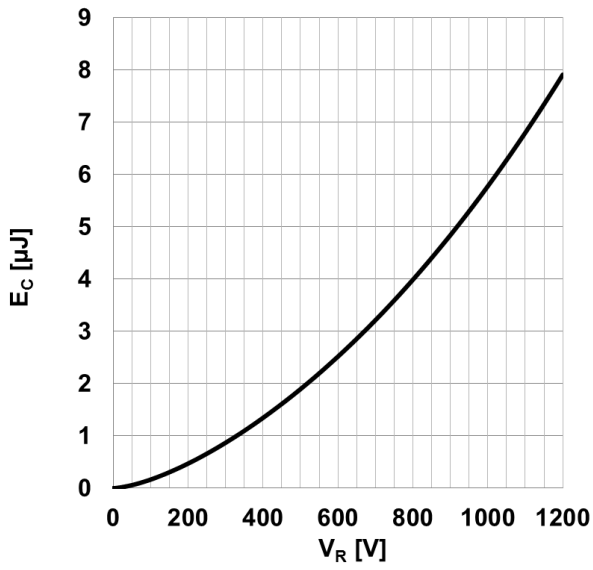
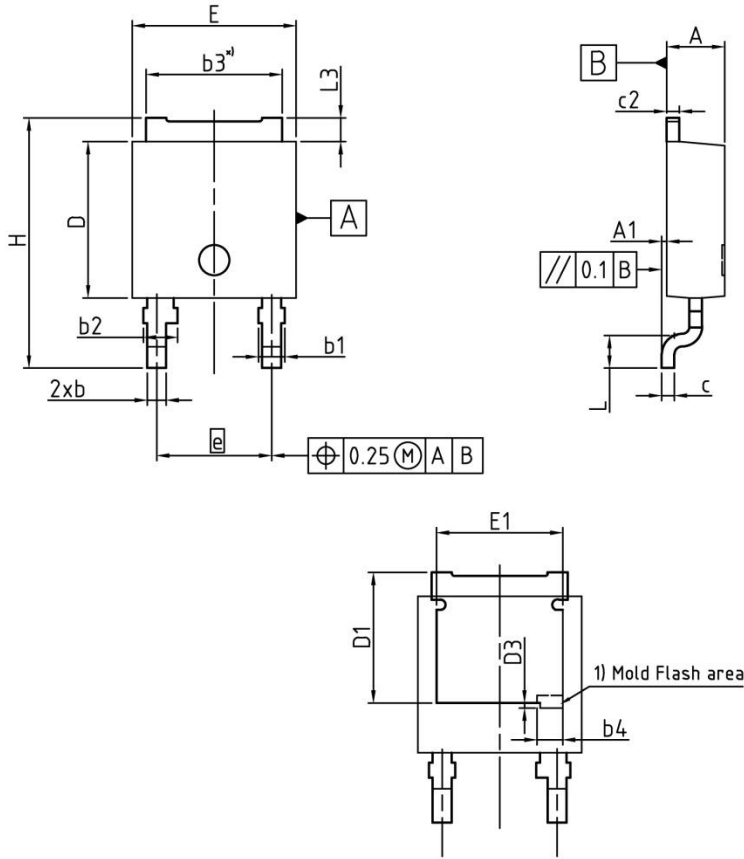


Figure 9. Typical capacitance stored energy as function of reverse voltage,

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



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 
EUROPEAN PROJECTION 
ISSUE DATE 29-05-2014
REVISION 01

## Revision History

IDM02G120C5

### Revision: 2015-06-22, Rev. 2.0

Previous Revision:

Revision	Date	Subjects (major changes since last version)
2.0	2015-06-22	Final data sheet

### 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](mailto:erratum@infineon.com)

### Published by

**Infineon Technologies AG**

**81726 Munich, Germany**

**© 2015 Infineon Technologies AG**

**All Rights Reserved.**

### Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, 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.

### Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

### Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

The Infineon Technologies component described in this Data Sheet may be used in life-support devices or systems and/or automotive, aviation and aerospace applications or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support, automotive, aviation and aerospace device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [infineon](#) manufacturer:*

Other Similar products are found below :

[TLE6209R](#) [EVALM113023645ATOBO1](#) [EVALM11302TOBO1](#) [FD1000R33HE3-K](#) [FD300R06KE3](#) [FF1200R17KE3\\_B2](#)  
[FF300R06KE3HOSA1](#) [FF600R12ME4P](#) [FF600R17ME4\\_B11](#) [FP25R12KT4\\_B11](#) [FS600R07A2E3\\_B31](#) [FZ1600R17HP4\\_B2](#)  
[FZ1800R17KF4](#) [FZ2400R17HE4\\_B9](#) [FZ600R65KE3](#) [DD261N22K](#) [DF1000R17IE4](#) [AUIRL1404ZS](#) [BAS 40-04 E6327](#)  
[BAS4007WH6327XTSA1](#) [BAS 70-04 E6327](#) [BAS 70-06 E6327](#) [BAT15099E6327HTSA1](#) [BAT 165 E6327](#) [BAT 60A E6327](#) [BAT 60B](#)  
[E6327](#) [BC 817SU E6327](#) [BC 817U E6327](#) [BC 817UPN E6327](#) [BC 846PN H6327](#) [BC 846UPN E6327](#) [BC 847PN H6327](#) [BCM 856S H6327](#)  
[BCP5416H6327XTSA1](#) [BCP55H6327XTSA1](#) [BCP5616H6327XTSA1](#) [BCR 108 E6327](#) [BCR 10PN H6327](#) [BCR 133W H6327](#) [BCR 141](#)  
[E6327](#) [BCR 141S H6327](#) [BCR 141W H6327](#) [BCR 162 E6327](#) [BCR 183W H6327](#) [BCR 185S H6327](#) [BCR 192 E6327](#) [BCR 198 E6327](#) [BCR](#)  
[35PN H6327](#) [BCR 523U E6327](#) [BCR 533 E6327](#)