

# Diode

Silicon Carbide Schottky Diode

## IDH08G120C5

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

### Final Datasheet

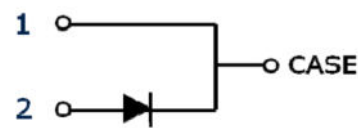
Rev. 2.2 2021-03-01

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<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      |
|-------------|-----------------|----------------|----------------|--------------------|---------|--------------|
| IDH08G120C5 | 1200V           | 8A             | 28nC           | 175°C              | D0812C5 | PG-TO220-2-1 |

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 ..... | 6  |
| Package Drawings .....                   | 9  |
| Revision History .....                   | 10 |
| Disclaimer .....                         | 11 |

### Maximum ratings

| Parameter                                                                                                                                      | Symbol        | Value               | Unit             |
|------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------|------------------|
| Repetitive peak reverse voltage                                                                                                                | $V_{RRM}$     | 1200                | V                |
| Continues forward current for $R_{th(j-c,max)}$<br>$T_C = 151^{\circ}C$ , $D=1$<br>$T_C = 135^{\circ}C$ , $D=1$<br>$T_C = 25^{\circ}C$ , $D=1$ | $I_F$         | 8.0<br>11.0<br>22.8 | A                |
| Surge non-repetitive forward current,<br>sine halfwave<br>$T_C=25^{\circ}C$ , $t_p=10ms$<br>$T_C=150^{\circ}C$ , $t_p=10ms$                    | $I_{F,SM}$    | 70<br>60            | A                |
| Non-repetitive peak forward current<br>$T_C = 25^{\circ}C$ , $t_p=10 \mu s$                                                                    | $I_{F,max}$   | 530                 | A                |
| $i^2t$ value<br>$T_C = 25^{\circ}C$ , $t_p=10 ms$<br>$T_C = 150^{\circ}C$ , $t_p=10 ms$                                                        | $\int i^2 dt$ | 25<br>18            | A <sup>2</sup> s |
| Diode $dv/dt$ ruggedness<br>$V_R=0...960V$                                                                                                     | $dv/dt$       | 150                 | V/ns             |
| Power dissipation<br>$T_C = 25^{\circ}C$                                                                                                       | $P_{tot}$     | 126                 | W                |
| Operating temperature                                                                                                                          | $T_j$         | -55...175           | $^{\circ}C$      |
| Storage temperature                                                                                                                            | $T_{stg}$     | -55...150           | $^{\circ}C$      |
| Soldering temperature,<br>wavesoldering only allowed at leads,<br>1.6mm (0.063 in.) from case for 10 s                                         | $T_{sold}$    | 260                 | $^{\circ}C$      |
| Mounting torque<br>M3 and M4 screws                                                                                                            | $M$           | 0.7                 | Nm               |

### Thermal Resistances

| Thermal Resistances                       |                      |            |       |      |      |      |
|-------------------------------------------|----------------------|------------|-------|------|------|------|
| Parameter                                 | Symbol               | Conditions | Value |      |      | Unit |
|                                           |                      |            | min.  | typ. | max. |      |
| Characteristic                            |                      |            |       |      |      |      |
| Diode thermal resistance, junction – case | R <sub>th(j-c)</sub> |            | -     | 0.92 | 1.19 | K/W  |
| Thermal resistance, junction – ambient    | R <sub>th(j-a)</sub> | leaded     | -     | -    | 62   | K/W  |

## Electrical Characteristics

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

| Parameter             | Symbol          | Conditions                                   | Value |      |      | Unit |
|-----------------------|-----------------|----------------------------------------------|-------|------|------|------|
|                       |                 |                                              | min.  | typ. | max. |      |
| Static Characteristic |                 |                                              |       |      |      |      |
| 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> = 8A, T <sub>j</sub> =25°C    | -     | 1.65 | 1.95 | V    |
|                       |                 | I <sub>F</sub> = 8A, T <sub>j</sub> =150°C   | -     | 2.25 | 2.85 |      |
| Reverse current       | I <sub>R</sub>  | V <sub>R</sub> =1200V, T <sub>j</sub> =25°C  |       | 3    | 40   | μA   |
|                       |                 | V <sub>R</sub> =1200V, T <sub>j</sub> =150°C |       | 14   | 210  |      |

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

| Parameter               | Symbol         | Conditions                                                                 | Value |      |      | Unit |
|-------------------------|----------------|----------------------------------------------------------------------------|-------|------|------|------|
|                         |                |                                                                            | min.  | typ. | max. |      |
| Dynamic Characteristics |                |                                                                            |       |      |      |      |
| Total capacitive charge | Q <sub>C</sub> | V <sub>R</sub> =800V, T <sub>J</sub> =150°C<br>$Q_C = \int_0^{V_R} C(V)dV$ | -     | 28   | -    | nC   |
| Total Capacitance       | C              | V <sub>R</sub> =1 V, f=1 MHz                                               | -     | 365  | -    | pF   |
|                         |                | V <sub>R</sub> =400 V, f=1 MHz                                             | -     | 26   | -    |      |
|                         |                | V <sub>R</sub> =800 V, f=1 MHz                                             | -     | 20   | -    |      |

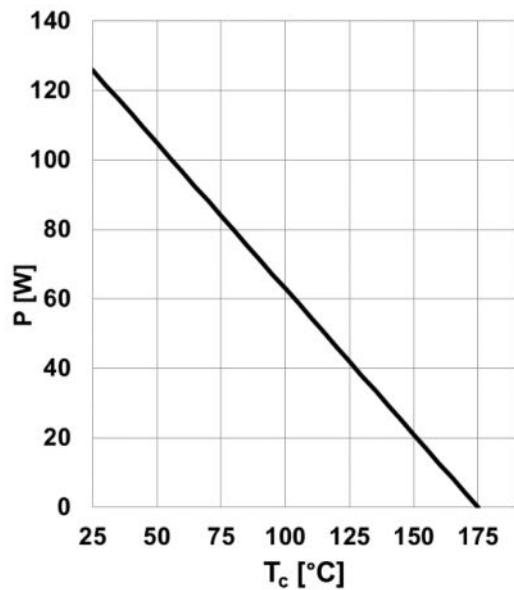


Figure 1. **Power dissipation as a function of case temperature,  $P_{tot}=f(T_c)$ ,  $R_{th(j-c),max}$**

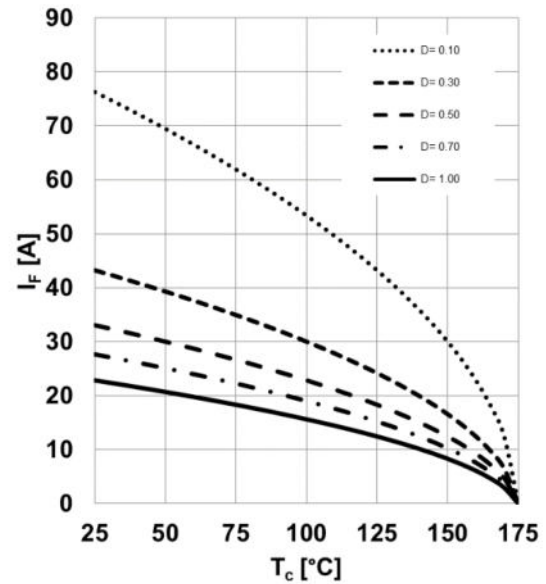


Figure 2. **Diode forward current as function of temperature,  $T_j \leq 175^\circ\text{C}$ ,  $R_{th(j-c),max}$ , parameter  $D$ =duty cycle,  $V_{th}$ ,  $R_{diff}$  @  $T_j=175^\circ\text{C}$**

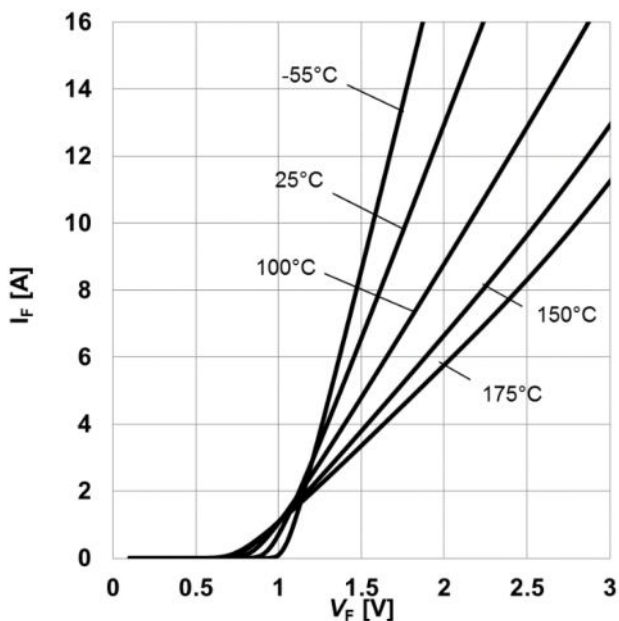


Figure 3. **Typical forward characteristics,  $I_F=f(V_F)$ ,  $t_p=10\text{ }\mu\text{s}$ , parameter:  $T_j$**

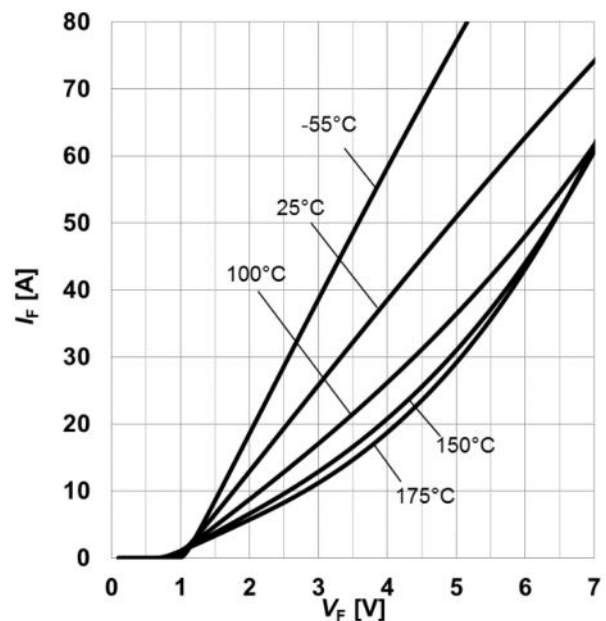


Figure 4. **Typical forward characteristics in surge current,  $I_F=f(V_F)$ ,  $t_p=10\text{ }\mu\text{s}$ , parameter:  $T_j$**

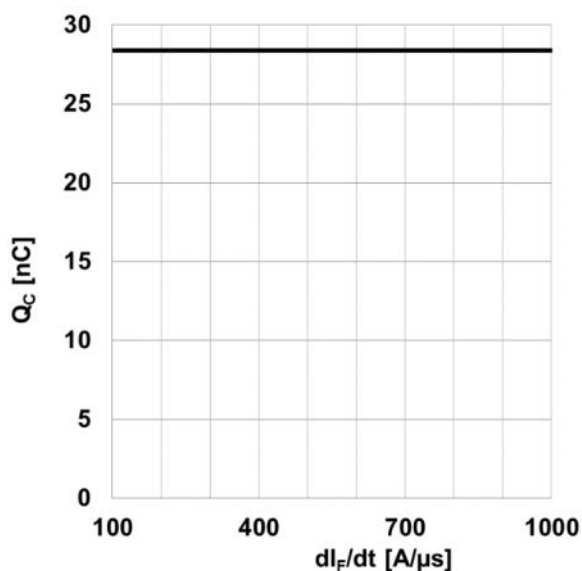


Figure 5. **Typical capacitive charge as function of current slope<sup>1</sup>**,  $Q_c=f(di_F/dt)$ ,  $T_j=150^\circ\text{C}$   
1) Only capacitive charge, guaranteed by design.

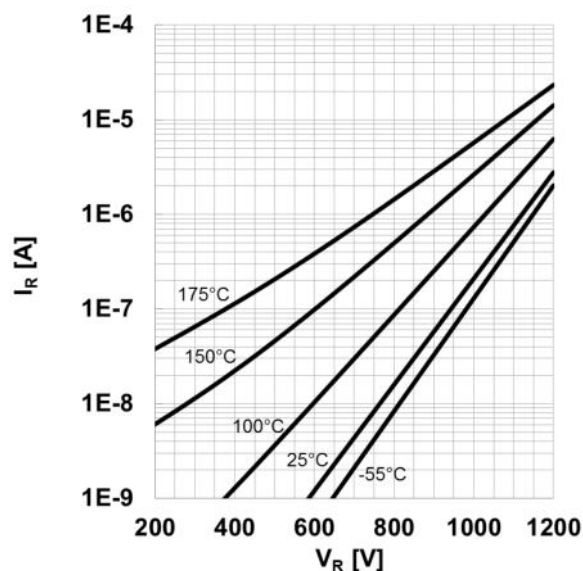


Figure 6. **Typical reverse current as function of reverse voltage**,  $I_R=f(V_R)$ , parameter:  $T_j$

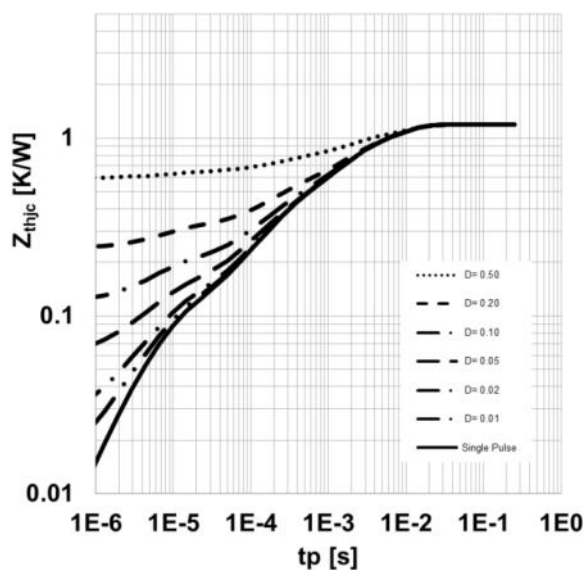


Figure 7. **Max. transient thermal impedance**,  $Z_{th,jc}=f(t_p)$ , parameter:  $D=t_p/T$

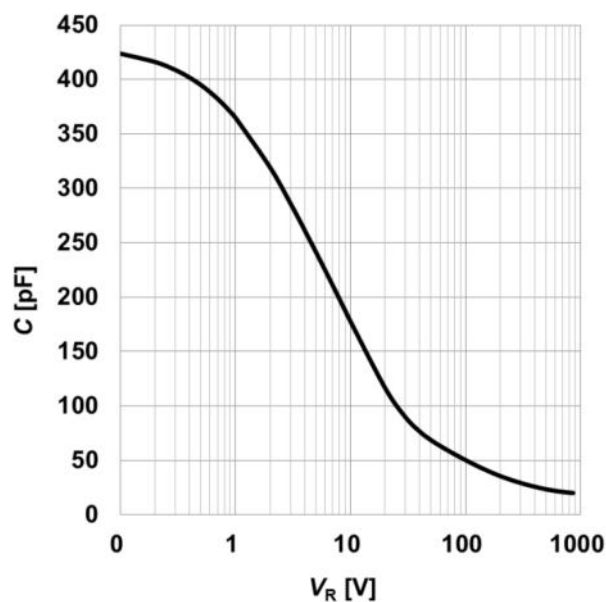


Figure 8. **Typical capacitance as function of reverse voltage**,  $C=f(V_R)$ ;  $T_j=25^\circ\text{C}$ ;  $f=1\text{ MHz}$

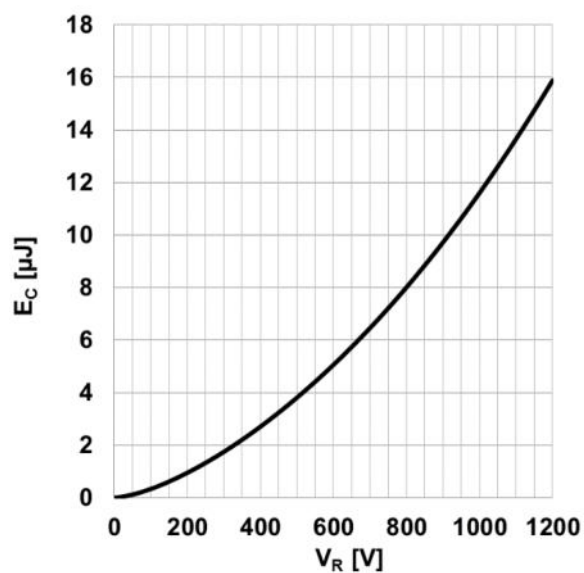
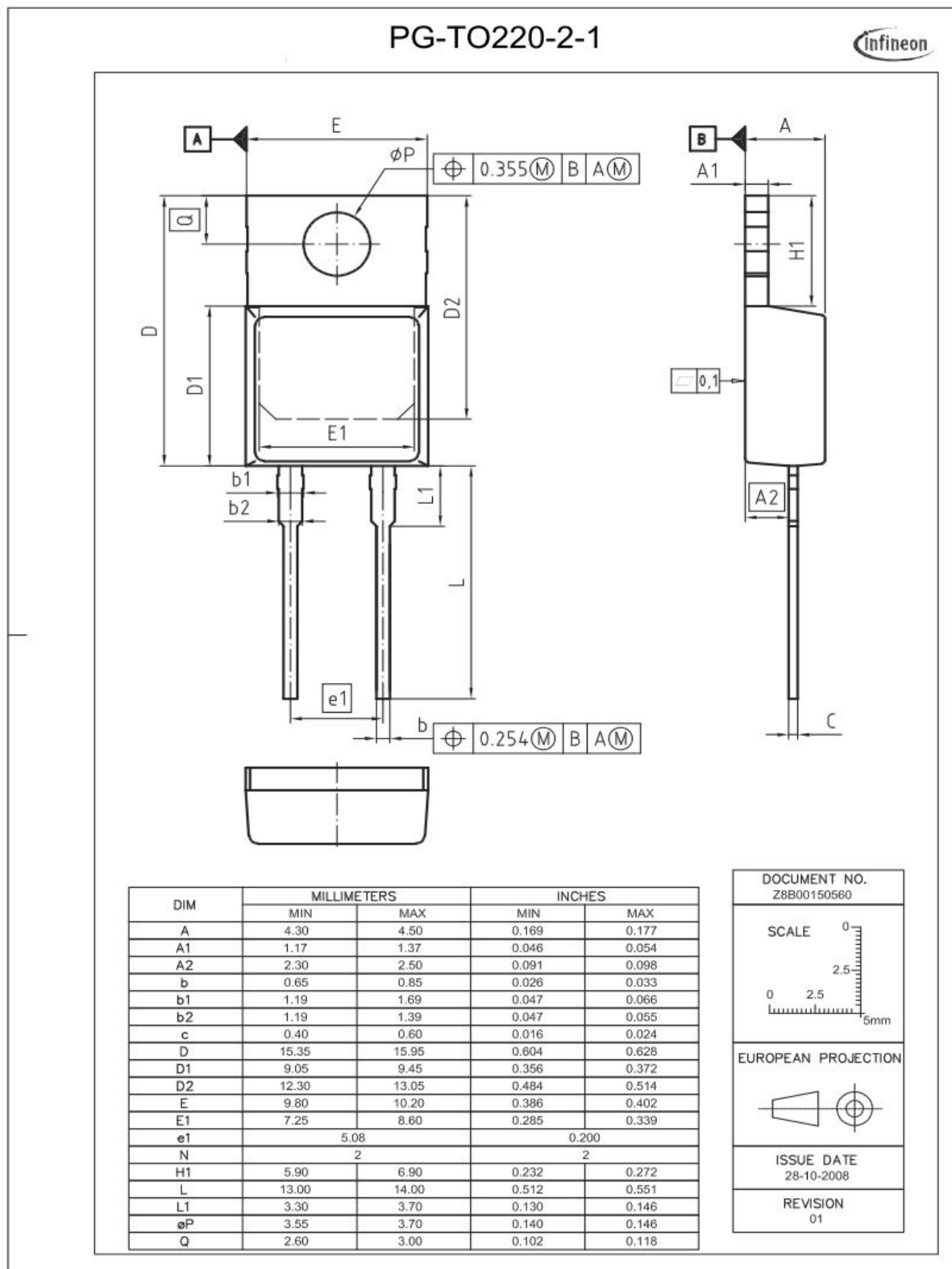


Figure 9. **Typical capacitively stored energy as function of reverse voltage,**

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



**Revision History**IDH08G120C5

---

**Revision: 2021-03-01, Rev. 2.2**

Previous Revision:

| Revision | Date       | Subjects (major changes since last version) |
|----------|------------|---------------------------------------------|
| 2.0      | 2015-07-22 | Final data sheet                            |
| 2.1      | 2017-07-21 | Editorial Changes                           |
| 2.2      | 2021-03-01 | 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](mailto: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](http://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.