



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



SiC

Silicon Carbide Diode

2nd Generation thinQ!™

2nd Generation thinQ!™ SiC Schottky Diode
IDV02S60C

Data Sheet

Rev. 2.0, 2010-05-31
Final

Industrial & Multimarket

2nd Generation thinQ!™ SiC Schottky Diode

IDV02S60C

1 Description

The second generation of Infineon SiC Schottky diodes has emerged over the years as the industry standard. The IDVxxS60C family is extending the already broad portfolio with the TO220FullPAK package. In order to greatly reduce the impact of the internal isolation of the FullPAK on the thermal performance, Infineon is applying its patented diffusion soldering process for attaching the chip to the leadframe. The result is nearly identical thermal characteristics to those of the SiC diodes in the non-isolated TO220 package.



Features

- Revolutionary semiconductor material - Silicon Carbide
- Nearly no reverse / forward recovery charge
- High surge current capability
- Fully isolated package with nearly similar $R_{th,jc}$ as the standard T0220
- Suitable for high temperature operation
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC¹⁾ for target applications
- Switching behavior independent of forward current, switching speed and temperature



Benefits

- System efficiency improvement over Si diodes
- System cost / size savings due to reduced cooling requirements
- Good thermal performance without the need for additional isolation layer and washer
- Enabling higher frequency / increased power density solutions
- Higher system reliability due to lower operating temperatures and less fans
- Reduced EMI

Applications

Fully isolated TO220 package for e.g. CCM PFC; Motor Drives; Solar Applications; UPS

Table 1 Key Performance Parameters

| Parameter | Value | Unit |
|---------------------------|-------|------|
| V_{DC} | 600 | V |
| Q_C | 3.2 | nC |
| $I_F @ T_C < 120^\circ C$ | 2 | A |

Table 2 Pin Definition

| Pin 1 | Pin2 | Pin 3 |
|-------|------|-------|
| C | A | n.a. |

| Type / Ordering Code | Package | Marking | Related Links |
|----------------------|------------------|---------|--|
| IDV02S60C | PG-TO220 FullPAK | D02S60C | IFX SiC Diodes Webpage |

1) J-STD20 and JESD22

Table of Contents

| | | |
|---|---|----|
| 1 | Description | 2 |
| | Table of Contents | 3 |
| 2 | Maximum ratings | 4 |
| 3 | Thermal characteristics | 4 |
| 4 | Electrical characteristics | 5 |
| 5 | Electrical characteristics diagrams | 6 |
| 6 | Package outlines | 9 |
| 7 | Revision History | 10 |

2 Maximum ratings

Table 3 Maximum ratings

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---|----------------|--------|------|------|------------------|--|
| | | Min. | Typ. | Max. | | |
| Continuous forward current | I_F | - | - | 2 | A | $T_C = < 120^\circ\text{C}$ |
| Surge non-repetitive forward current, sine halfwave | $I_{F, SM}$ | - | - | 11.5 | | $T_C = 25^\circ\text{C}, t_p = 10 \text{ ms}$ |
| | | - | - | 9.7 | | $T_C = 150^\circ\text{C}, t_p = 10 \text{ ms}$ |
| Non-repetitive peak forward current | $I_{F, max}$ | - | - | 100 | | $T_C = 25^\circ\text{C}, t_p = 10 \mu\text{s}$ |
| $i^2 t$ value | $\int i^2 dt$ | - | - | 0.61 | A ² s | $T_C = 25^\circ\text{C}, t_p = 10 \text{ ms}$ |
| | | - | - | 0.44 | | $T_C = 150^\circ\text{C}, t_p = 10 \text{ ms}$ |
| Repetitive peak reverse voltage | V_{RRM} | - | - | 600 | V | $T_j = 25^\circ\text{C}$ |
| Diode dv/dt ruggedness | dv/dt | - | - | 50 | V/ns | $V_R = 0 \dots 480 \text{ V}$ |
| Power dissipation | P_{tot} | - | - | 18 | W | $T_C = 25^\circ\text{C}$ |
| Operating and storage temperature | T_j, T_{stg} | - 55 | - | 175 | °C | |
| Mounting torque | | - | - | 50 | Ncm | M2.5 screws |

3 Thermal characteristics

Table 4 Thermal characteristics TO-220 FullPAK

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|--|------------|--------|------|------|------|---------------------------------------|
| | | Min. | Typ. | Max. | | |
| Thermal resistance, junction - case | R_{thJC} | - | - | 8.5 | K/W | |
| Thermal resistance, junction - ambient | R_{thJA} | - | - | 62 | | leaded |
| Soldering temperature, wavesoldering only allowed at leads | T_{sold} | - | - | 260 | °C | 1.6 mm (0.063 in.) from case for 10 s |

4 Electrical characteristics

Table 5 Static characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|-----------------------|----------|--------|------|------|---------------|--|
| | | Min. | Typ. | Max. | | |
| DC blocking voltage | V_{DC} | 600 | - | - | V | $T_j = 25\text{ °C}$, $I_R = 0.015\text{ mA}$ |
| Diode forward voltage | V_F | - | 1.7 | 1.9 | | $I_F = 2\text{ A}$, $T_j = 25\text{ °C}$ |
| | | - | 2.1 | 2.6 | | $I_F = 2\text{ A}$, $T_j = 150\text{ °C}$ |
| Reverse current | I_R | - | 0.23 | 15 | μA | $I_R = 600\text{ V}$, $T_j = 25\text{ °C}$ |
| | | - | 1 | 150 | | $I_R = 600\text{ V}$, $T_j = 150\text{ °C}$ |

Table 6 AC characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|------------------------------|--------|--------|------|------|---|---|
| | | Min. | Typ. | Max. | | |
| Total capacitive charge | Q_c | - | 3.2 | - | nC | $V_R = 400\text{ V}$, $F \leq F_{max}$ |
| Switching time ¹⁾ | t_c | - | - | <10 | ns | $di_F/dt = 200\text{ A}/\mu\text{s}$, $T_j = 150\text{ °C}$ |
| | | C | - | 60 | | |
| | - | | 8 | - | $V_R = 300\text{ V}$, $f = 1\text{ MHz}$ | |
| | - | | 8 | - | $V_R = 600\text{ V}$, $f = 1\text{ MHz}$ | |

¹⁾ t_c is the time constant for the capacitive displacement current waveform (independent from T_j , I_{LOAD} and di/dt), different from t_{rr} which is dependent on T_j , I_{LOAD} and di/dt . No reverse recovery time constant t_{rr} due to absence of minority carrier injection.

5 Electrical characteristics diagrams

Table 7

| Power dissipation | Diode forward current |
|--------------------|--|
| | |
| $P_{tot} = f(T_C)$ | $I_F = f(T_C); T_j \leq 175\text{ °C}$ |

Table 8

| Typ. forward characteristic | Typ. forward characteristic in surge current |
|--|--|
| | |
| $I_F = f(V_F); t_p = 400\text{ }\mu\text{s}; \text{parameter: } T_j$ | $I_F = f(V_F); t_p = 400\text{ }\mu\text{s}; \text{parameter: } T_j$ |

Electrical characteristics diagrams

Table 9

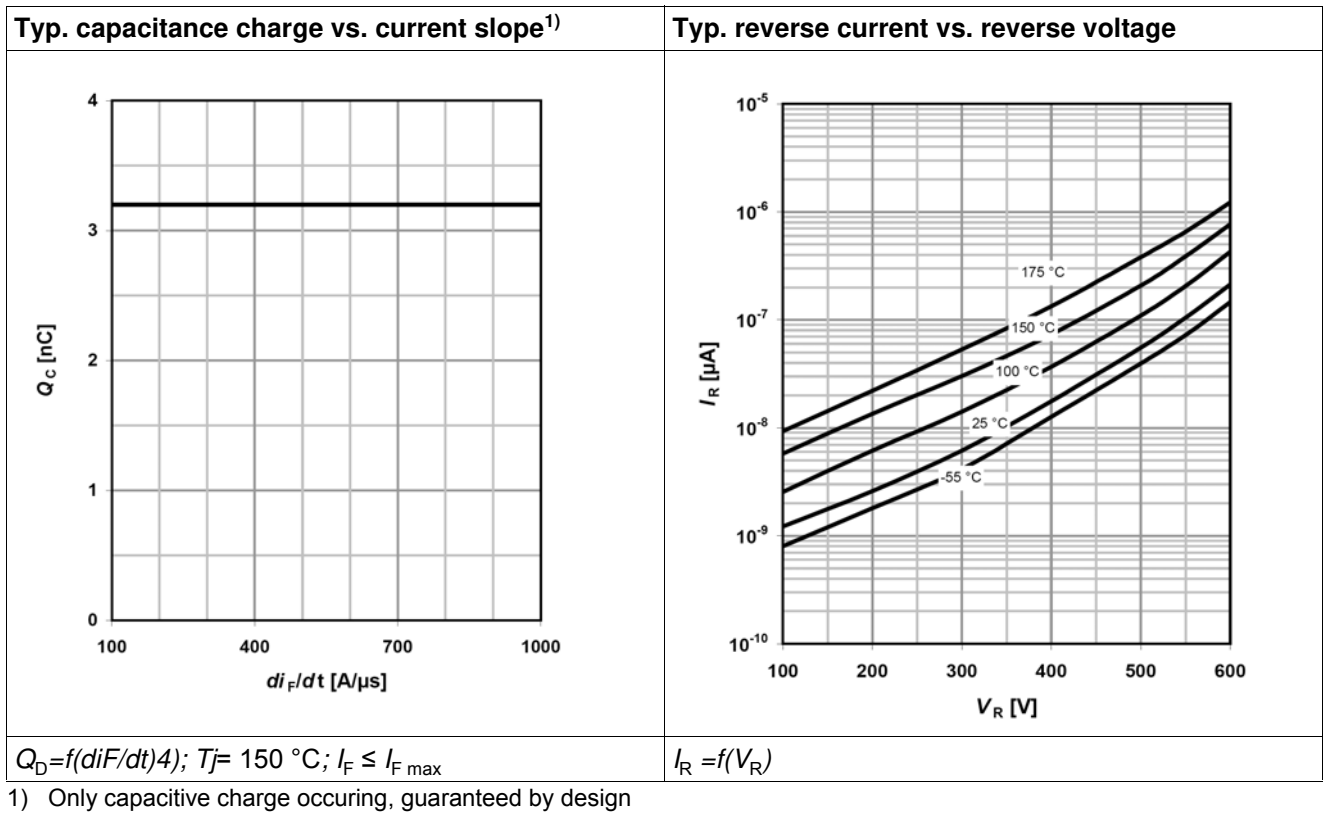


Table 10

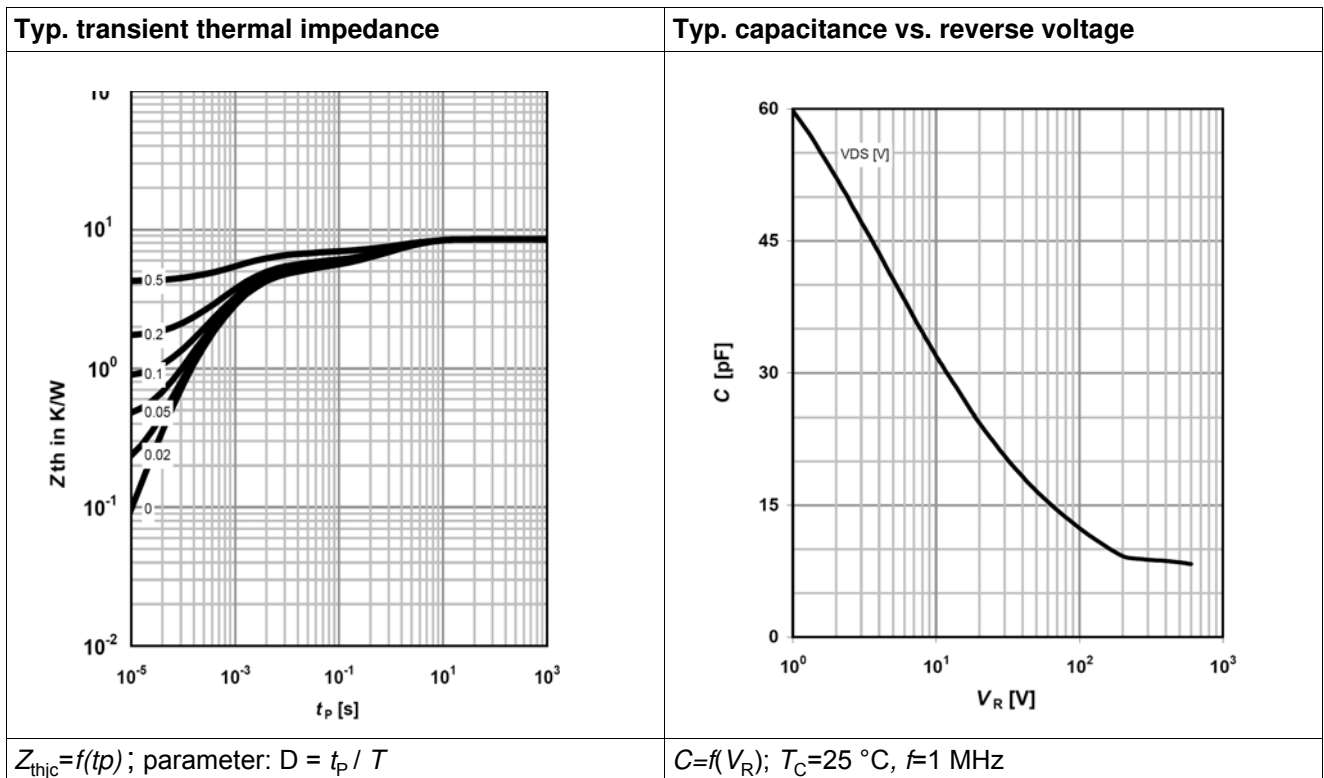
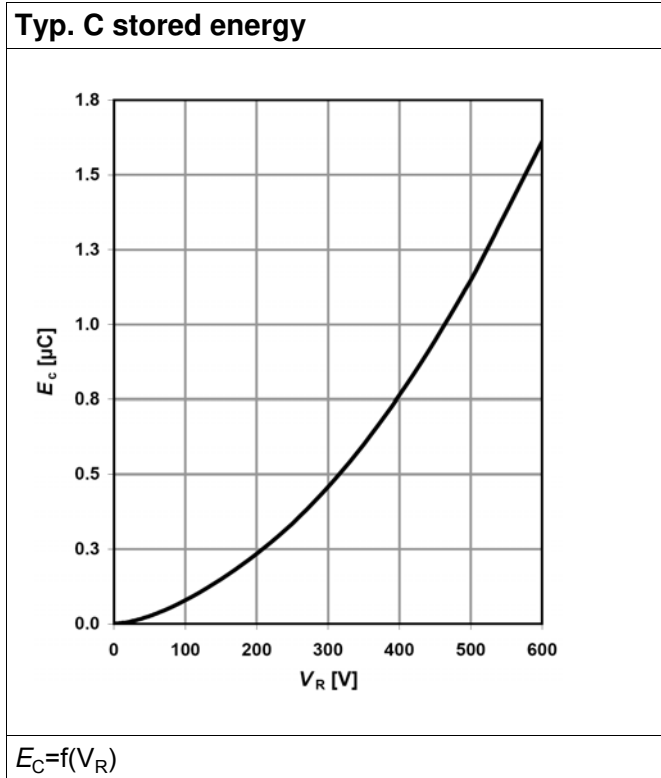


Table 11



6 Package outlines

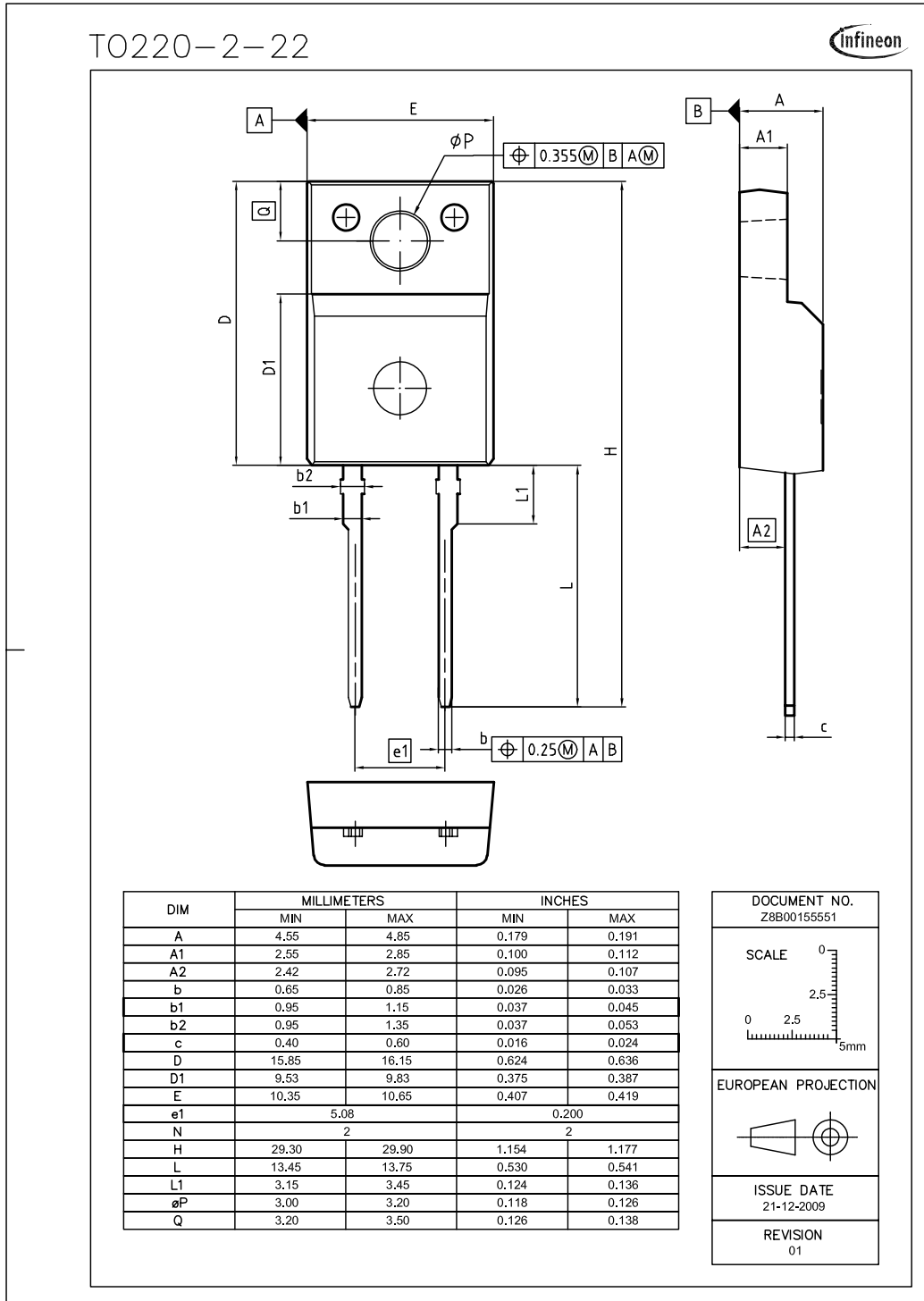


Figure 1 Outlines TO-220 FullPAK, dimensions in mm/inches

7 Revision History

2nd Generation thinQ!™ 2nd Generation thinQ!™ SiC Schottky Diode

Revision History: 2010-05-31, Rev. 2.0

Previous Revision:

| Revision | Subjects (major changes since last revision) |
|----------|--|
| 2.0 | Release of 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



Edition 2010-05-31

Published by
Infineon Technologies AG
81726 Munich, Germany

© 2010 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).

Warnings

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

Infineon Technologies components may be used in life-support devices 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 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.