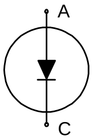
# IDC04S60CE

## $2^{nd}$ generation thinQ!$^{TM}$ SiC Schottky Diode



**Features:**

- Revolutionary Semiconductor Material - Silicon Carbide
- Switching Behaviour Benchmark
- No Reverse Recovery / No Forward Recovery
- Temperature Independent Switching Behaviour
- Qualified According to JEDEC[1)] Based on Target Applications

**Applications:**

- SMPS, PFC, snubber

| Chip Type | $V_R$ | $I_{Fn}$ | Die Size | Package |
|---|---|---|---|---|
| IDC04S60CE | 600V | 4A | 1.146 x 0.968 mm$^2$ | sawn on foil |

**Mechanical Parameters**

| | | | |
|---|---|---|---|
| Die size | | 1.146x 0.968 | mm$^2$ |
| Area total | | 1.11 | |
| Anode pad size | | 0.909 x 0.731 | |
| Thickness | | 355 | µm |
| Wafer size | | 100 | mm |
| Max. possible chips per wafer | | 6190 | |
| Passivation frontside | | Photoimide | |
| Pad metal | | 3200 nm AlSiCu | |
| Backside metal | | Ni Ag –system | |
| Die bond | | Electrically conductive epoxy glue and soft solder | |
| Wire bond | | Al, ≤500µm | |
| Reject ink dot size | | ∅ 0.65mm; max 1.2mm | |
| Storage environment[1)] | for original and sealed MBB bags | Ambient atmosphere air, Temperature 17°C – 25°C, < 6 month | |
| | for open MBB bags | Acc. to IEC60721-3-3: Atmosphere >99% Nitrogen or inert gas, Humidity <25%RH, Temperature 17°C – 25°C, < 6 month | |

[1)] Designed for storage conditions according to Infineon TR14 (Application Note “Storage of Products Supplied by Infineon Technologies)

Designed for climate condition under operation according to IEC60721-3-3, class 3K3

Edited by INFINEON Technologies, IFAG IPC TD VLS, L4704E, Edition 1.2, 05.09.2012

## Maximum Ratings

| **Parameter** | **Symbol** | **Condition** | **Value** | **Unit** |
|---|---|---|---|---|
| Repetitive peak reverse voltage | $V_{RRM}$ | $T_{vj}$ =25 °C | 600 | V |
| DC blocking voltage | $V_{DC}$ | | 600 | |
| Continuous forward current, limited by $T_{vjmax}$ | $I_F$ | $T_{vj} < 150$°C | 4 | A |
| Surge non repetitive forward current, sine halfwave | $I_{F,SM}$ | $T_C$ =25°C, $t_P$ =10 ms | 32 | |
| | | $T_C$ =150°C, $t_P$ =10 ms | | |
| Repetitive peak forward current, limited by thermal resistance $R_{th}$ | $I_{F,RM}$ | $T_C$ = 100°C, $T_{vj}$ =150°C, $D$=0.1 | 18 | |
| Non-repetitive peak forward current | $I_{F,max}$ | $T_C$ =25°C, $t_P$=10µs | 132 | |
| $i^2t$ value | $\int i^2\, dt$ | $T_C$ =25°C, $t_P$ =10 ms | 5.1 | $A^2s$ |
| | | $T_C$ =150°C, $t_P$ =10 ms | | |
| Operating junction and storage temperature range | $T_{vj}$ , $T_{stg}$ | | -55...+175 | °C |

**Static Characteristics** (tested on wafer), $T_{vj}$ = 25 °C

| **Parameter** | **Symbol** | **Conditions** | **Value** | | | **Unit** |
|---|---|---|---|---|---|---|
| | | | min. | Typ. | max. | |
| Reverse current | $I_R$ | $V_R$=600V | | 0.5 | 50 | µA |
| Diode forward voltage | $V_F$ | $I_F$=4A | | 1.7 | 1.9 | V |

**Static Characteristics** (not subject to production test - verified by design / characterization)

| **Parameter** | **Symbol** | **Conditions** | **Value** | | | **Unit** |
|---|---|---|---|---|---|---|
| | | | min. | Typ. | max. | |
| Reverse current | $I_R$ | $V_R$=600V, $T_{vj}$ =150°C | | 2 | 500 | µA |
| Diode forward voltage | $V_F$ | $I_F$=4A, $T_{vj}$ =150°C | | 2 | 2.4 | V |

**Dynamic Characteristics** (not subject to production test - verified by design / characterization)

| **Parameter** | **Symbol** | **Conditions** | | **Value** | | | **Unit** |
|---|---|---|---|---|---|---|---|
| | | | | min. | Typ. | max. | |
| Total capacitive charge[3] | $Q_C$ | $I_F <= I_{F,max}$<br>$di/dt=200A/\mu s$<br>$V_R=400V$ | $T_{vj}=150°C$ | | 8 | | nC |
| Switching time[2] | $t_c$ | | $T_{vj}=150°C$ | | | <10 | ns |
| Total capacitance | $C$ | $f=1MHz$ | $V_R=1V$ | | 130 | | pF |
| | | | $V_R=300V$ | | 20 | | |
| | | | $V_R=600V$ | | 20 | | |

[1] J-STD20 and JESD22

[2] $t_c$ is the time constant for the capacitive displacement current waveform (independent from $T_{vj}=150°C$, $I_{LOAD}$ and $di/dt$), different from $t_{rr}$, which is dependent on $T_{vj}=150°C$, $I_{LOAD}$, $di/dt$. No reverse recovery time constant $t_{rr}$ due to absence of minority carrier inject.

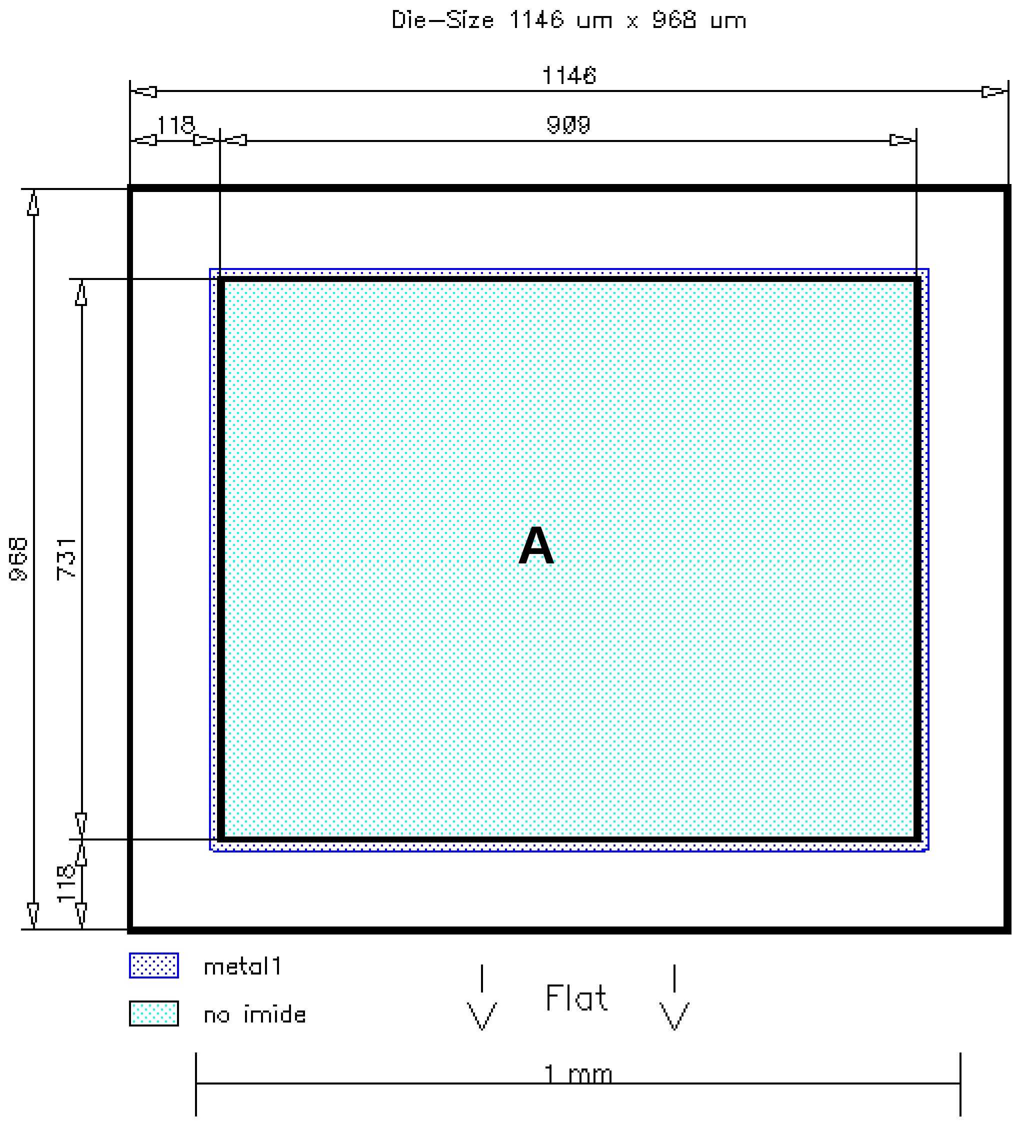
[3] Only capacitive charge occurring, guaranteed by design (independent from $T_{vj}$, $I_{LOAD}$ and $di/dt$).

**Further Electrical Characteristics**

Switching characteristics and thermal properties are depending strongly on module design and mounting technology and can therefore not be specified for a bare die.

| | | |
|---|---|---|
| This chip data sheet refers to the device data sheet | IDT04S60C | Rev. 2.1 |

## Chip Drawing



A: Anode pad

## Description

| |
|---|
| AQL 0,65 for visual inspection according to failure catalogue |
| Electrostatic Discharge Sensitive Device according to MIL-STD 883 |

## Revision History

| Version | Subjects (major changes since last revision) | Date |
|---|---|---|
| | | |
| | | |

**Published by**
**Infineon Technologies AG**
**81726 Munich, Germany**

## 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.
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.