

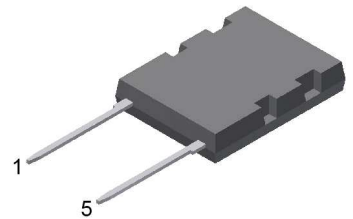
# Sonic Fast Recovery Diode

$$\begin{aligned} V_{RRM} &= 4500 \text{ V} \\ I_{F80} &= 43 \text{ A} \\ t_{rr} &= 1450 \text{ ns} \end{aligned}$$

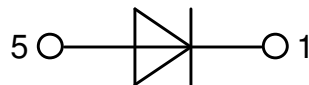
High Performance Fast Recovery Diode  
Low Loss and Soft Recovery  
Single Diode

Part number

**DHG40I4500KO**



Backside: Isolated  
see important note page 3



## Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low  $I_{rm}$ -values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low  $I_{rm}$  reduces:
  - Power dissipation within the diode
  - Turn-on loss in the commutating switch

## Applications:

- Antiparallel diode for high frequency switching devices
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

## Package: ISOPLUS264

- Isolation Voltage: 4200 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

## Terms and Conditions of Usage

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

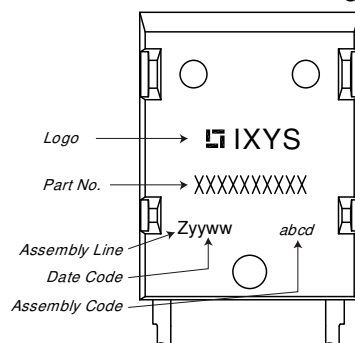
Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;
- the conclusion of quality agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

| Fast Diode        |                                              |                                                                                     |                         | Ratings                  |      |      |      |  |
|-------------------|----------------------------------------------|-------------------------------------------------------------------------------------|-------------------------|--------------------------|------|------|------|--|
| Symbol            | Definition                                   | Conditions                                                                          |                         | min.                     | typ. | max. | Unit |  |
| V <sub>RSM</sub>  | max. non-repetitive reverse blocking voltage | T <sub>VJ</sub> = 25°C                                                              |                         |                          |      | 4500 | V    |  |
| V <sub>RRM</sub>  | max. repetitive reverse blocking voltage     | T <sub>VJ</sub> = 25°C                                                              |                         |                          |      | 4500 | V    |  |
| I <sub>R</sub>    | reverse current, drain current               | V <sub>R</sub> = 4500 V                                                             | T <sub>VJ</sub> = 25°C  |                          |      | 100  | μA   |  |
|                   |                                              | V <sub>R</sub> = 4500 V                                                             | T <sub>VJ</sub> = 125°C |                          |      | 2    | mA   |  |
| V <sub>F</sub>    | forward voltage drop                         | I <sub>F</sub> = 50 A                                                               | T <sub>VJ</sub> = 25°C  |                          |      | 3.00 | V    |  |
|                   |                                              | I <sub>F</sub> = 100 A                                                              |                         |                          |      |      | V    |  |
|                   |                                              | I <sub>F</sub> = 50 A                                                               | T <sub>VJ</sub> = 125°C |                          |      | 3.50 | V    |  |
|                   |                                              | I <sub>F</sub> = 100 A                                                              |                         |                          |      |      | V    |  |
| I <sub>FAV</sub>  | average forward current                      | T <sub>C</sub> = 80°C<br>rectangular      d = 1.0                                   | T <sub>VJ</sub> = 150°C |                          |      | 43   | A    |  |
| V <sub>F0</sub>   | threshold voltage                            | } for power loss calculation only                                                   |                         | T <sub>VJ</sub> = 150°C  |      | 2.20 | V    |  |
| r <sub>F</sub>    | slope resistance                             |                                                                                     |                         |                          |      | 24   | mΩ   |  |
| R <sub>thJC</sub> | thermal resistance junction to case          |                                                                                     |                         |                          |      | 0.5  | K/W  |  |
| R <sub>thCH</sub> | thermal resistance case to heatsink          |                                                                                     |                         |                          | 0.15 |      | K/W  |  |
| P <sub>tot</sub>  | total power dissipation                      | T <sub>C</sub> = 25°C                                                               |                         |                          |      | 250  | W    |  |
| I <sub>FSM</sub>  | max. forward surge current                   | t = 10 ms; (50 Hz), sine; V <sub>R</sub> = 0 V                                      |                         | T <sub>VJ</sub> = 45°C   |      | 600  | A    |  |
| C <sub>J</sub>    | junction capacitance                         | V <sub>R</sub> = 1800 V   f = 1 MHz                                                 |                         | T <sub>VJ</sub> = 25°C   |      | 13   | pF   |  |
| I <sub>RM</sub>   | max. reverse recovery current                | } I <sub>F</sub> = 50 A; V <sub>R</sub> = 2800 V<br>-di <sub>F</sub> /dt = 800 A/μs |                         | T <sub>VJ</sub> = 25 °C  |      | 80   | A    |  |
|                   |                                              |                                                                                     |                         | T <sub>VJ</sub> = 125 °C |      | 82   | A    |  |
| t <sub>rr</sub>   | reverse recovery time                        |                                                                                     |                         | T <sub>VJ</sub> = 25 °C  |      | 1450 | ns   |  |
|                   |                                              |                                                                                     |                         | T <sub>VJ</sub> = 125 °C |      | 2200 | ns   |  |

| Package ISOPLUS264 |                                                              |                      | Ratings |      |      |      |
|--------------------|--------------------------------------------------------------|----------------------|---------|------|------|------|
| Symbol             | Definition                                                   | Conditions           | min.    | typ. | max. | Unit |
| $I_{RMS}$          | RMS current                                                  | per terminal         |         |      | 70   | A    |
| $T_{VJ}$           | virtual junction temperature                                 |                      | -40     |      | 150  | °C   |
| $T_{op}$           | operation temperature                                        |                      | -40     |      | 125  | °C   |
| $T_{stg}$          | storage temperature                                          |                      | -40     |      | 150  | °C   |
| Weight             |                                                              |                      |         | 10   |      | g    |
| $F_c$              | mounting force with clip                                     |                      | 20      |      | 120  | N    |
| $d_{Spp/App}$      | creepage distance on surface / striking distance through air | terminal to terminal | 13.8    |      |      | mm   |
| $d_{Spb/Apb}$      |                                                              | terminal to backside | 5.0     |      |      | mm   |
| $V_{ISOL}$         | isolation voltage                                            | t = 1 second         | 4200    |      |      | V    |
|                    |                                                              | t = 1 minute         | 3000    |      |      | V    |

## Product Marking



## Part description

D = Diode  
 H = Sonic Fast Recovery Diode  
 G = extreme fast  
 40 = Current Rating [A]  
 I = Single Diode  
 4500 = Reverse Voltage [V]  
 KO = ISOPLUS264 (2HV)

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DHG40I4500KO    | DHG40I4500KO       |               |          |          |

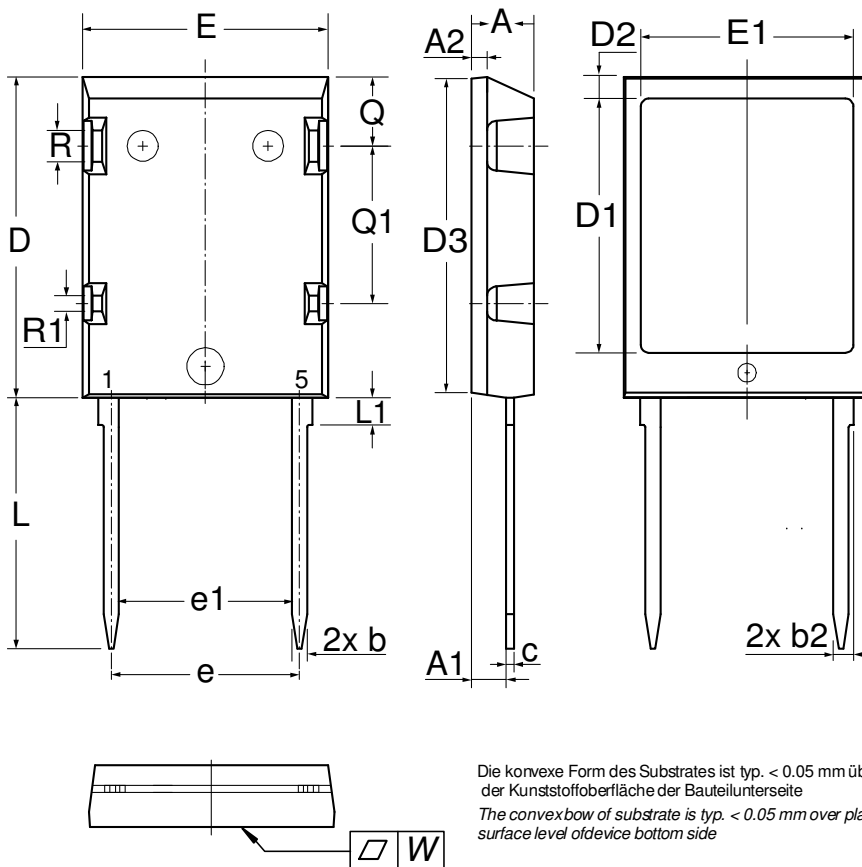
## Equivalent Circuits for Simulation

\* on die level

$T_{VJ} = 150\text{ °C}$

|                    |                    |     |                   |    |
|--------------------|--------------------|-----|-------------------|----|
|                    |                    |     | <b>Fast Diode</b> |    |
| $V_{0\text{ max}}$ | threshold voltage  | 2.2 |                   | V  |
| $R_{0\text{ max}}$ | slope resistance * | 24  |                   | mΩ |

## Outlines ISOPLUS264



| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | min        | max   | min    | max   |
| A    | 4.83       | 5.21  | 0.190  | 0.205 |
| A1   | 2.59       | 3.00  | 0.102  | 0.118 |
| A2   | 1.17       | 1.40  | 0.046  | 0.055 |
| b    | 1.14       | 1.40  | 0.045  | 0.055 |
| b2   | 1.60       | 1.83  | 0.063  | 0.072 |
| c    | 0.51       | 0.74  | 0.020  | 0.029 |
| D    | 25.91      | 26.42 | 1.020  | 1.040 |
| D1   | 20.34      | 20.85 | 0.801  | 0.821 |
| D2   | 1.65       | 2.03  | 0.065  | 0.080 |
| D3   | 25.29      | 25.78 | 1.000  | 1.020 |
| E    | 19.56      | 20.29 | 0.770  | 0.799 |
| E1   | 16.97      | 17.53 | 0.668  | 0.690 |
| e    | 15.24      | BSC   | 0.600  | BSC   |
| e1   | 14.10      | BSC   | 0.555  | BSC   |
| L    | 19.81      | 20.83 | 0.780  | 0.820 |
| L1   | 2.03       | 2.59  | 0.080  | 0.102 |
| Q    | 5.33       | 5.97  | 0.210  | 0.235 |
| Q1   | 12.45      | 13.03 | 0.490  | 0.513 |
| R    | 3.81       | 4.57  | 0.150  | 0.180 |
| R1   | 2.54       | 3.30  | 0.100  | 0.130 |
| W    | -          | 0.10  | -      | 0.004 |

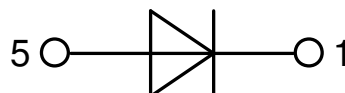
### Important note:

External clearances between pins and between pins and tab may be insufficient to prevent flash over under all conditions. It is the customer's responsibility to apply additional insulation appropriate to the application.

ISOPLUS264 is designed to isolate a max continuous operation voltage (DC) of 1700 V. The peak test voltage of 4200 V assures safety for transient voltages only. The package is not tested for partial discharge.

If the product is used outside the package design voltage range the customer must use additional electrical insulation. Extra insulation layers should be used both between the tab and any heatsink and between any conducting clip and the top surface of the package particularly when metal parts (such as a heatsink or a clip) are in contact. Please note that the intention of this package is to provide customers with an encapsulated die for high voltage application but the responsibility rests entirely with the customer to ensure for safe operation. Bodily injury cannot be excluded if this warning is disregarded. Device implementation is the end user's responsibility.

For a low FIT rate over lifetime failures due to SEB (Single Event Burnout) and an adequate voltage derating should be considered.



## Fast Diode

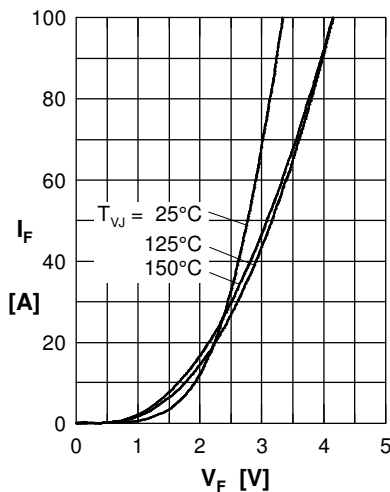


Fig. 1 Forward current  $I_F$  versus  $V_F$

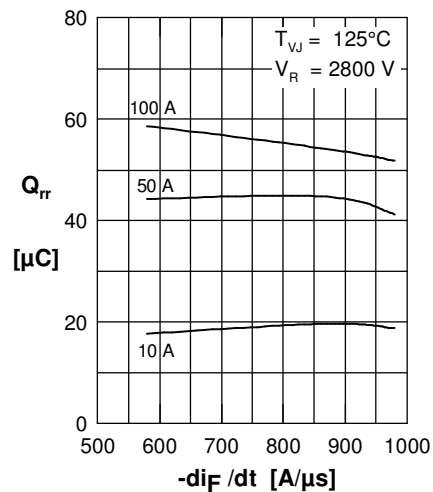


Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $-di_F/dt$

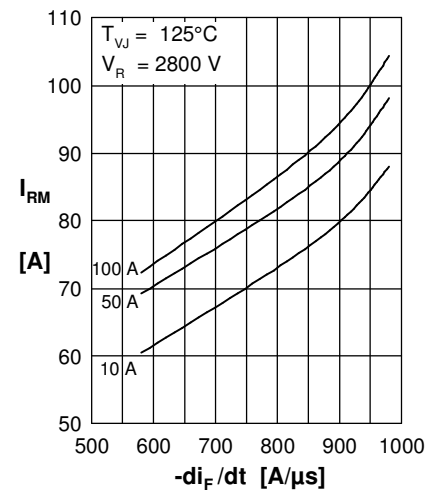


Fig. 3 Typ. reverse recov. current  $I_{RM}$  versus  $-di_F/dt$

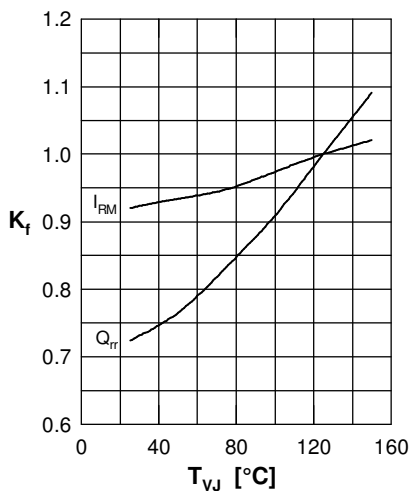


Fig. 4 Typ. dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

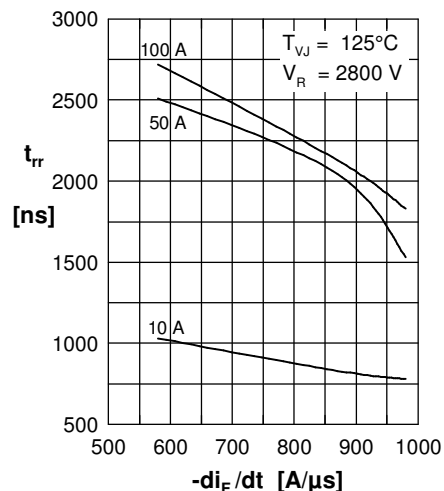


Fig. 5 Typ. reverse recov. time  $t_{rr}$  versus  $-di_F/dt$

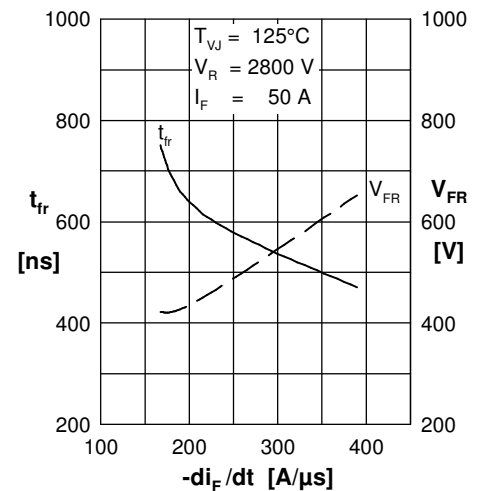


Fig. 6 Typ. forward recov. voltage  $V_{FR}$  & time  $t_{fr}$  versus  $di_F/dt$

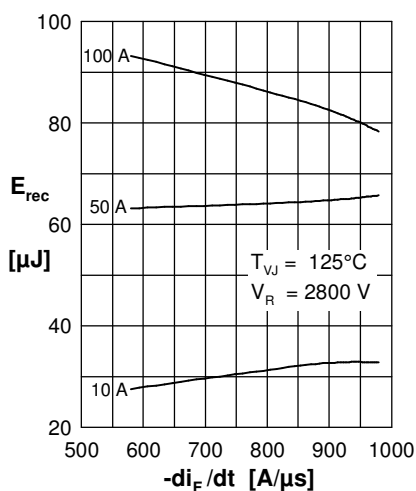


Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$

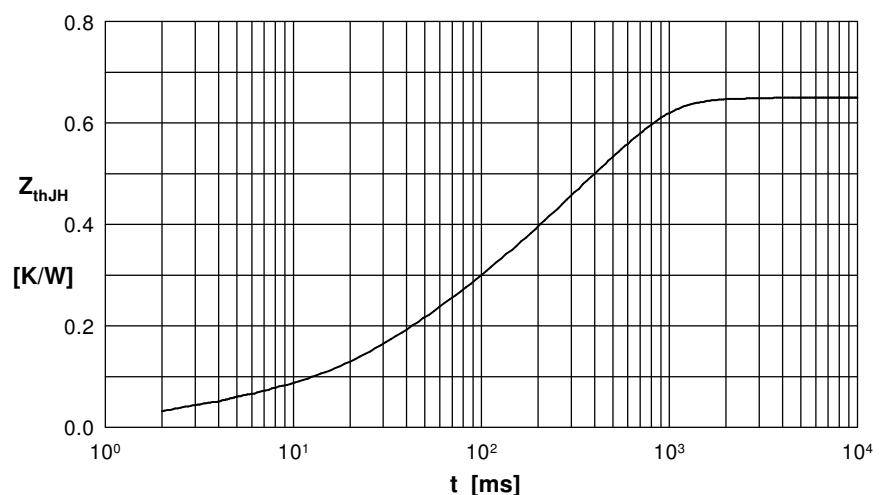


Fig. 8 Typical transient thermal impedance junction to heatsink

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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