

# HiPerFRED

$$V_{RRM} = 1200 \text{ V}$$

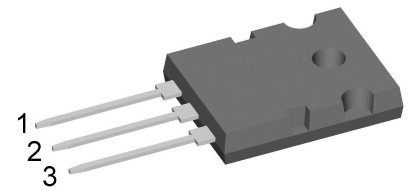
$$I_{FAV} = 2 \times 60 \text{ A}$$

$$t_{rr} = 40 \text{ ns}$$

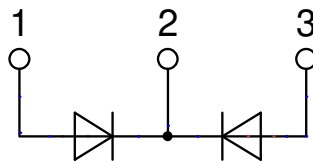
High Performance Fast Recovery Diode  
Low Loss and Soft Recovery  
Common Cathode

Part number

**DSEC120-12AK**



Backside: cathode



## 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
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

## Package: TO-264

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

## 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

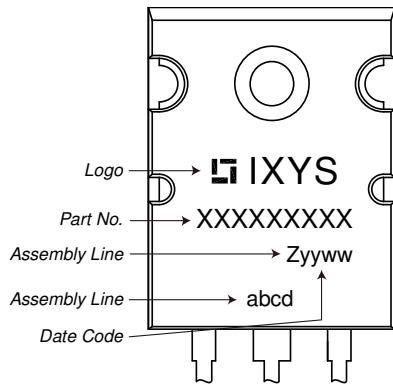
- to perform joint risk and quality assessments;

- 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       |  |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$                                    |                         |         | 1200 | V          |  |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}C$                                    |                         |         | 1200 | V          |  |
| $I_R$      | reverse current, drain current               | $V_R = 1200 V$  | $T_{VJ} = 25^{\circ}C$  |         | 650  | $\mu A$    |  |
|            |  | $V_R = 1200 V$  | $T_{VJ} = 150^{\circ}C$ |         | 2.5  | mA         |  |
| $V_F$      | forward voltage drop                         | $I_F = 60 A$  | $T_{VJ} = 25^{\circ}C$  |         | 2.66 | V          |  |
|            |  | $I_F = 120 A$   |                         |         | 3.18 | V          |  |
|            |  | $I_F = 60 A$  | $T_{VJ} = 150^{\circ}C$ |         | 1.81 | V          |  |
|            |  | $I_F = 120 A$   |                         |         | 2.40 | V          |  |
| $I_{FAV}$  | average forward current                      | $T_C = 115^{\circ}C$<br>rectangular $d = 0.5$             | $T_{VJ} = 175^{\circ}C$ |         | 60   | A          |  |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                         | $T_{VJ} = 175^{\circ}C$ |         | 1.08 | V          |  |
| $r_F$      | slope resistance                             |   |                         |         | 9.4  | m $\Omega$ |  |
| $R_{thJC}$ | thermal resistance junction to case          |   |                         |         | 0.45 | K/W        |  |
| $R_{thCH}$ | thermal resistance case to heatsink          |   |                         | 0.15    |      | K/W        |  |
| $P_{tot}$  | total power dissipation                      |   | $T_C = 25^{\circ}C$     |         | 330  | W          |  |
| $I_{FSM}$  | max. forward surge current                   | $t = 10 ms; (50 Hz), sine; V_R = 0 V$                     | $T_{VJ} = 45^{\circ}C$  |         | 500  | A          |  |
| $C_J$      | junction capacitance                         | $V_R = 600 V$ $f = 1 MHz$                                 | $T_{VJ} = 25^{\circ}C$  |         | 30   | pF         |  |
| $I_{RM}$   | max. reverse recovery current                | } $I_F = 60 A; V_R = 600 V$<br>$-di_F / dt = 200 A/\mu s$ | $T_{VJ} = 25^{\circ}C$  |         | 13   | A          |  |
|            |  |   | $T_{VJ} = 100^{\circ}C$ |         | 20   | A          |  |
| $t_{rr}$   | reverse recovery time                        |   | $T_{VJ} = 25^{\circ}C$  |         | 80   | ns         |  |
|            |  |   | $T_{VJ} = 100^{\circ}C$ |         | 220  | ns         |  |

| Package TO-264 |                              |                | Ratings |      |      |      |
|----------------|------------------------------|----------------|---------|------|------|------|
| Symbol         | Definition                   | Conditions     | min.    | typ. | max. | Unit |
| $I_{RMS}$      | RMS current                  | per terminal " |         |      | 70   | A    |
| $T_{VJ}$       | virtual junction temperature |                | -55     |      | 175  | °C   |
| $T_{op}$       | operation temperature        |                | -55     |      | 150  | °C   |
| $T_{stg}$      | storage temperature          |                | -55     |      | 150  | °C   |
| <b>Weight</b>  |                              |                |         | 10   |      | g    |
| $M_D$          | mounting torque              |                | 0.8     |      | 1.2  | Nm   |
| $F_C$          | mounting force with clip     |                | 20      |      | 120  | N    |

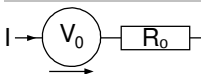


| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DSEC120-12AK    | DSEC120-12AK       | Tube          | 25       | 498653   |

### Equivalent Circuits for Simulation

\* on die level

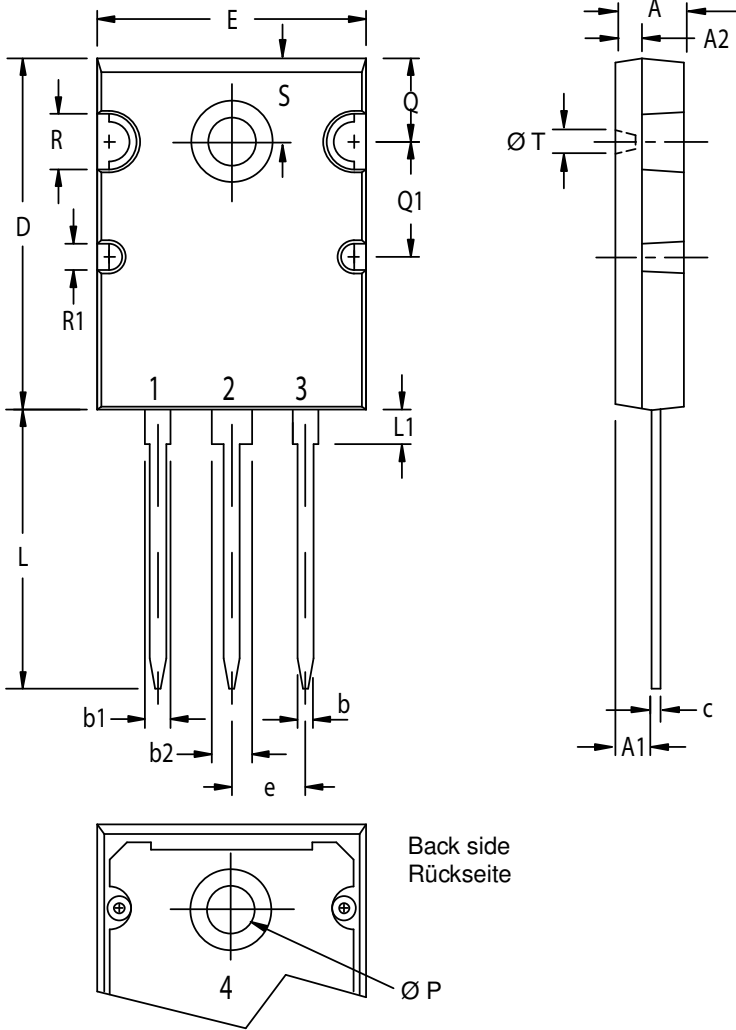
$T_{VJ} = 175\text{ °C}$



**Fast Diode**

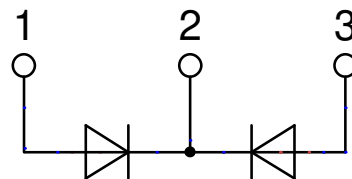
|              |                    |      |    |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage  | 1.08 | V  |
| $R_{0\ max}$ | slope resistance * | 6.8  | mΩ |

## Outlines TO-264



| SYM | INCHES   |       | MILLIMETERS |       |
|-----|----------|-------|-------------|-------|
|     | MIN      | MAX   | MIN         | MAX   |
| A   | 0.190    | 0.202 | 4.82        | 5.13  |
| A1  | 0.100    | 0.114 | 2.54        | 2.89  |
| A2  | 0.079    | 0.083 | 2.00        | 2.10  |
| b   | 0.044    | 0.056 | 1.12        | 1.42  |
| b1  | 0.094    | 0.106 | 2.39        | 2.69  |
| b2  | 0.114    | 0.122 | 2.90        | 3.09  |
| c   | 0.021    | 0.033 | 0.53        | 0.83  |
| D   | 1.020    | 1.030 | 25.91       | 26.16 |
| E   | 0.780    | 0.786 | 19.81       | 19.96 |
| e   | 5.46 BSC |       | .215 BSC    |       |
| J   | 0.000    | 0.010 | 0.00        | 0.25  |
| K   | 0.000    | 0.010 | 0.00        | 0.25  |
| L   | 0.800    | 0.820 | 20.32       | 20.83 |
| L1  | 0.090    | 0.102 | 2.29        | 2.59  |
| P   | 0.125    | 0.144 | 3.17        | 3.66  |
| Q   | 0.239    | 0.247 | 6.07        | 6.27  |
| Q1  | 0.330    | 0.342 | 8.38        | 8.69  |
| R   | 0.150    | 0.170 | 3.81        | 4.32  |
| R1  | 0.070    | 0.090 | 1.78        | 2.29  |
| S   | 0.238    | 0.248 | 6.04        | 6.30  |
| T   | 0.062    | 0.072 | 1.57        | 1.83  |

Back side  
Rückseite



## Fast Diode

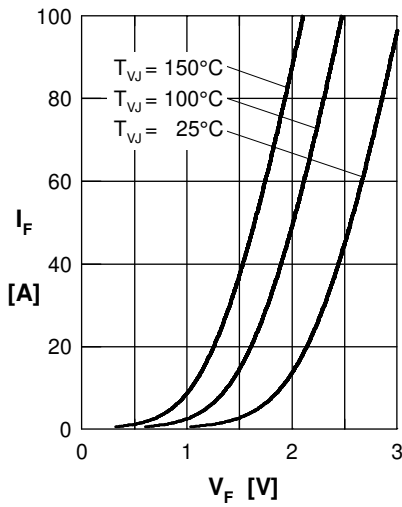


Fig. 1 Forward current  $I_F$  versus  $V_F$

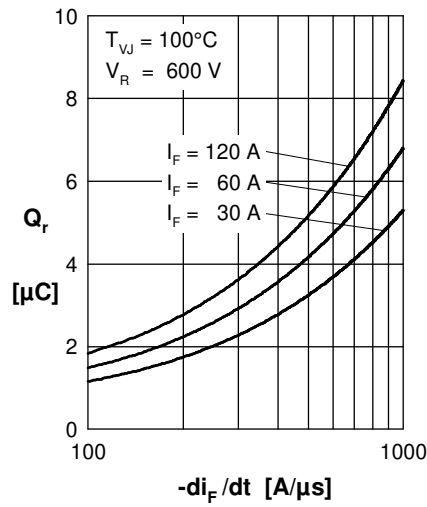


Fig. 2 Typ. reverse recov. charge  $Q_r$  versus  $-di_F/dt$

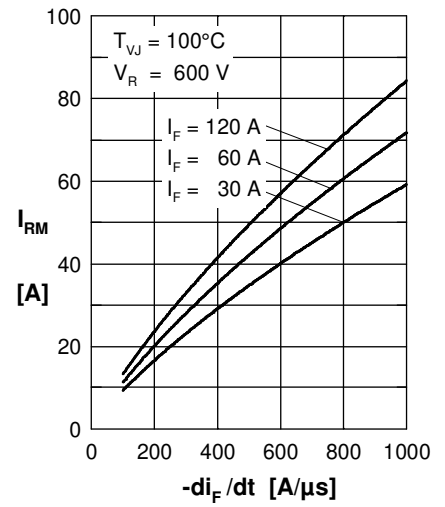


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

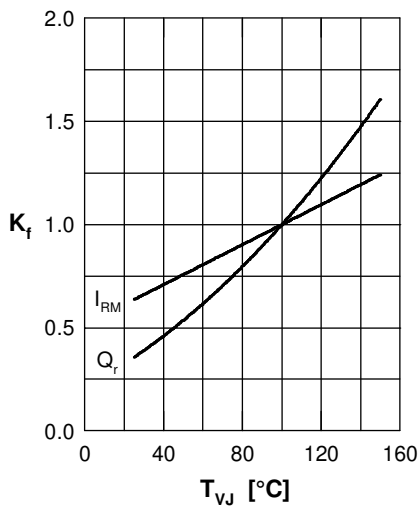


Fig. 4 Typ. dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

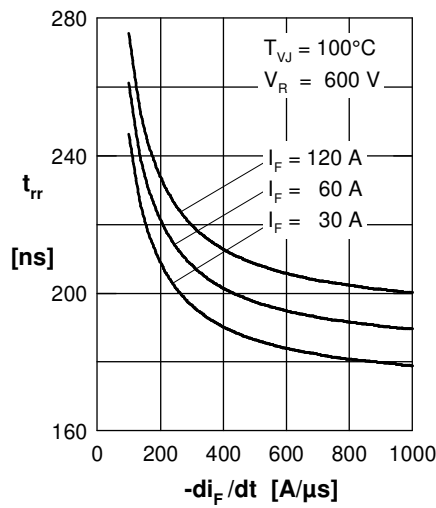


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

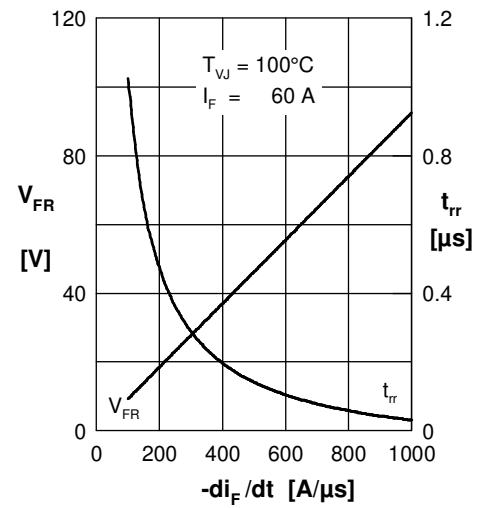


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{rr}$  versus  $di_F/dt$

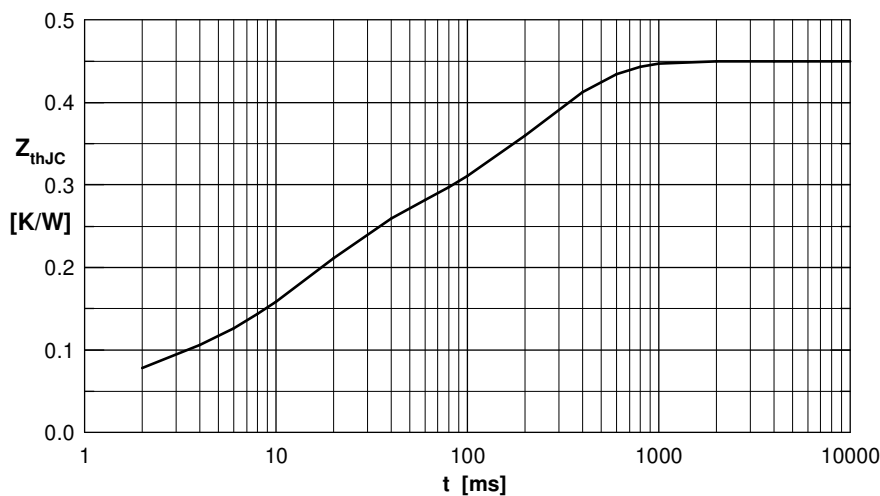


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.0050          | 0.0001    |
| 2 | 0.0550          | 0.0010    |
| 3 | 0.1750          | 0.0140    |
| 4 | 0.2150          | 0.2300    |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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