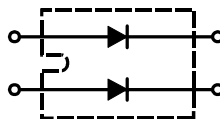


# HiPerFRED™ Epitaxial Diode with soft recovery

Preliminary Data

| $V_{RSM}$<br>V | $V_{RRM}$<br>V | Type           |
|----------------|----------------|----------------|
| 400            | 400            | DSEP 2x 31-04A |

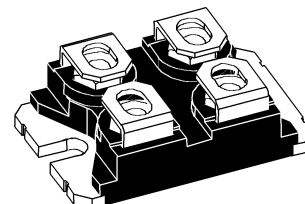


$$I_{FAV} = 2 \times 30 \text{ A}$$

$$V_{RRM} = 400 \text{ V}$$

$$t_{rr} = 30 \text{ ns}$$

miniBLOC, SOT-227 B



| Symbol                             | Conditions                                                                                              | Maximum Ratings                 |                                                          |
|------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------|
| $I_{FRMS}$<br>$I_{FAVM}$           | $T_C = 105^\circ\text{C}$ ; rectangular, $d = 0.5$                                                      | 100<br>30                       | A<br>A                                                   |
| $I_{FSM}$                          | $T_{VJ} = 45^\circ\text{C}$ ; $t_p = 10 \text{ ms}$ (50 Hz), sine                                       | tbd                             | A                                                        |
| $E_{AS}$                           | $T_{VJ} = 25^\circ\text{C}$ ; non-repetitive<br>$I_{AS} = \text{tbd A}$ ; $L = \text{tbd } \mu\text{H}$ | tbd                             | mJ                                                       |
| $I_{AR}$                           | $V_A = 1.5 \cdot V_R$ typ.; $f = 10 \text{ kHz}$ ; repetitive                                           | tbd                             | A                                                        |
| $T_{VJ}$<br>$T_{VJM}$<br>$T_{stg}$ |                                                                                                         | -40...+150<br>150<br>-40...+150 | $^\circ\text{C}$<br>$^\circ\text{C}$<br>$^\circ\text{C}$ |
| $P_{tot}$                          | $T_C = 25^\circ\text{C}$                                                                                | 100                             | W                                                        |
| $V_{ISOL}$                         | 50/60 Hz, RMS<br>$I_{ISOL} \leq 1 \text{ mA}$                                                           | 2500                            | V~                                                       |
| $M_d$                              | mounting torque (M4)<br>terminal connection torque (M4)                                                 | 1.1-1.5/9-13<br>1.1-1.5/9-13    | Nm/lb.in.<br>Nm/lb.in.                                   |
| Weight                             | typical                                                                                                 | 30                              | g                                                        |

| Symbol                   | Conditions                                                                                                            | Characteristic Values |                   |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|
|                          |                                                                                                                       | typ.                  | max.              |
| $I_R$ ①                  | $T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$<br>$T_{VJ} = 150^\circ\text{C}$ $V_R = V_{RRM}$                           |                       | 0.25 mA<br>1.0 mA |
| $V_F$ ②                  | $I_F = 30 \text{ A}$ ; $T_{VJ} = 125^\circ\text{C}$<br>$T_{VJ} = 25^\circ\text{C}$                                    |                       | 1.15 V<br>1.45 V  |
| $R_{thJC}$<br>$R_{thCH}$ |                                                                                                                       | 0.1                   | 1.15 K/W<br>K/W   |
| $t_{rr}$                 | $I_F = 1 \text{ A}$ ; $-di/dt = 200 \text{ A}/\mu\text{s}$ ;<br>$V_R = 30 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$    | 30                    | ns                |
| $I_{RM}$                 | $V_R = 100 \text{ V}$ ; $I_F = 50 \text{ A}$ ; $-di_F/dt = 100 \text{ A}/\mu\text{s}$<br>$T_{VJ} = 100^\circ\text{C}$ |                       | 6.8 A             |

Pulse test: ① Pulse Width = 5 ms, Duty Cycle < 2.0 %  
② Pulse Width = 300  $\mu\text{s}$ , Duty Cycle < 2.0 %

Data according to IEC 60747 and per diode unless otherwise specified

IXYS reserves the right to change limits, test conditions and dimensions.

## Features

- International standard package miniBLOC
- Isolation voltage 2500 V~
- UL registered E 72873
- 2 independent FRED in 1 package
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low  $I_{RM}$ -values
- Soft recovery behaviour

## Applications

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

## Advantages

- 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

Dimensions see outlines.pdf

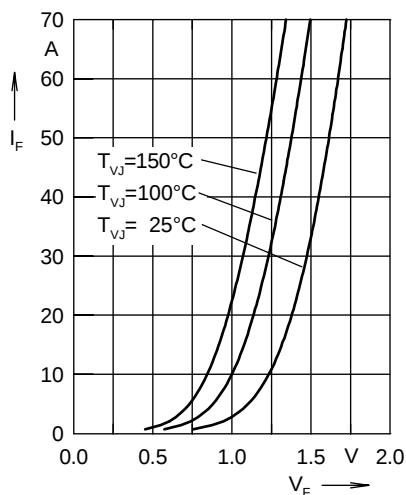


Fig. 1 Forward current  $I_F$  versus  $V_F$

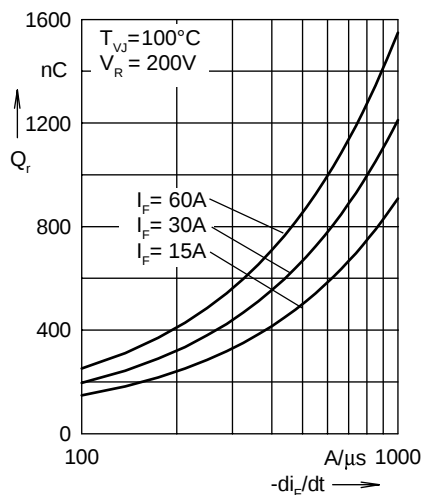


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

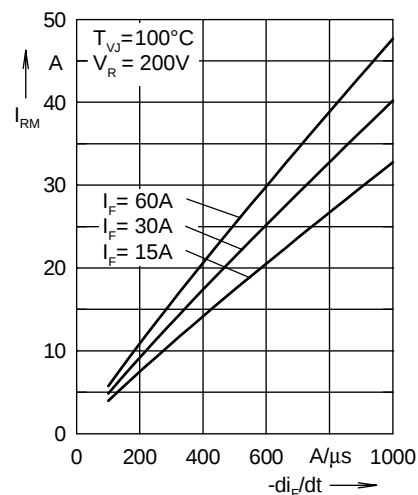


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

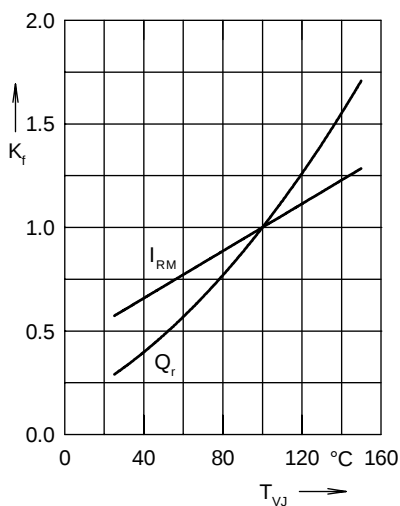


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

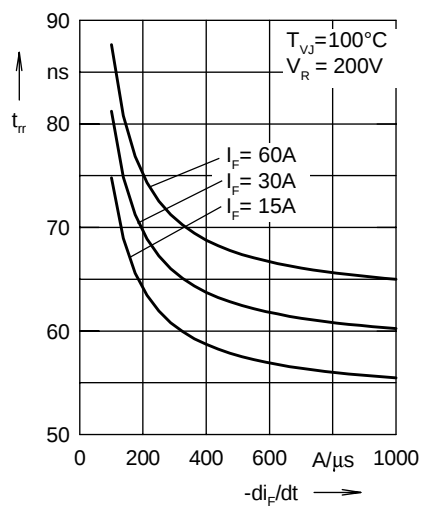


Fig. 5 Recovery time  $t_{rr}$  versus  $-di_F/dt$

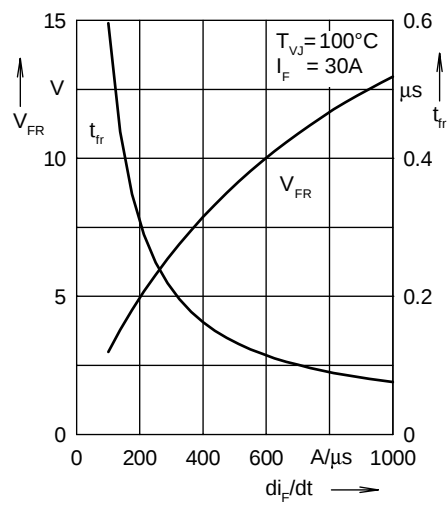


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

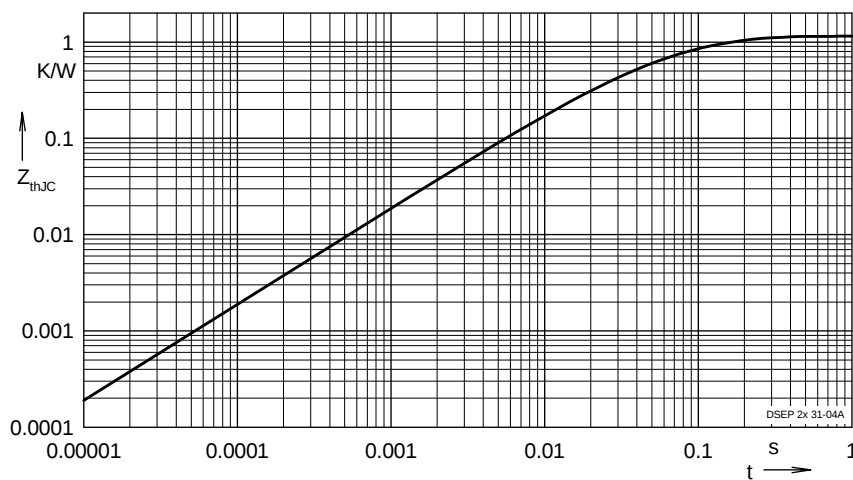


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.436           | 0.0055    |
| 2 | 0.482           | 0.0092    |
| 3 | 0.117           | 0.0007    |
| 4 | 0.115           | 0.0418    |

NOTE: Fig. 2 to Fig. 6 shows typical values

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