

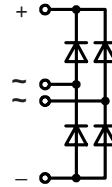
## Single Phase Rectifier Bridge with Fast Recovery Epitaxial Diodes (FRED)

$$I_{dAV} = 60 \text{ A}$$

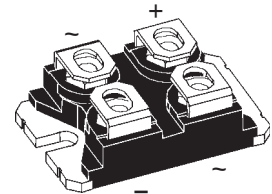
$$V_{RRM} = 600 \text{ V}$$

$$t_{rr} = 35 \text{ ns}$$

| $V_{RSM}$<br>V | $V_{RRM}$<br>V | Type       |
|----------------|----------------|------------|
| 600            | 600            | VBE 60-06A |



miniBLOC, SOT-227 B



| Symbol      | Conditions                                                                                       | Maximum Ratings |                  |
|-------------|--------------------------------------------------------------------------------------------------|-----------------|------------------|
| $I_{FRMS}$  |                                                                                                  | 70              | A                |
| $I_{dAV}$ ① | rect., d = 0.5; $T_C = 90^\circ\text{C}$                                                         | 60              | A                |
| $I_{FSM}$   | $T_{VJ} = 45^\circ\text{C}$ ; $V_R = 0$ ;                                                        | 250             | A                |
| $I^2t$      | $t_p = 10 \text{ ms}$ (50 Hz), sine                                                              | 315             | A <sup>2</sup> s |
| $E_{AS}$    | $T_{VJ} = 25^\circ\text{C}$ ; non-repetitive<br>$I_{AS} = 1.3 \text{ A}$ ; $L = 180 \mu\text{H}$ | 0.2             | mJ               |
| $I_{AR}$    | $V_A = 1.5 \cdot V_R$ typ.; $f = 10 \text{ kHz}$ ; repetitive                                    | 0.1             | A                |
| $T_{VJ}$    |                                                                                                  | -40...+150      | $^\circ\text{C}$ |
| $T_{VJM}$   |                                                                                                  | 150             | $^\circ\text{C}$ |
| $T_{stg}$   |                                                                                                  | -40...+150      | $^\circ\text{C}$ |
| $P_{tot}$   | $T_C = 25^\circ\text{C}$                                                                         | 140             | W                |
| $V_{ISOL}$  | 50/60 Hz, RMS<br>$I_{ISOL} \leq 1 \text{ mA}$                                                    | 2500            | V~               |
| $M_d$       | mounting torque (M4)                                                                             | 1.1-1.5/9-13    | Nm/lb.in.        |
|             | terminal connection torque (M4)                                                                  | 1.1-1.5/9-13    | Nm/lb.in.        |
| Weight      | typical                                                                                          | 30              | g                |

### Features

- International standard package miniBLOC
- Isolation voltage 2500 V~
- single Phase Rectifier Bridge with FREDs
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low  $I_{RM}$ -values
- Soft recovery behaviour

### Applications

- Supplies for DC power equipment
- Input and output rectifiers for high frequency
- Battery DC power supplies
- Field supply for DC motors

### 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

| Symbol     | Conditions                                                                                                            | Characteristic max. Values |          |
|------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| $I_R$ ②    | $V_R = V_{RRM}$ ; $T_{VJ} = 25^\circ\text{C}$<br>$V_R = V_{RRM}$ ; $T_{VJ} = 125^\circ\text{C}$                       | 0.15<br>1                  | mA<br>mA |
| $V_F$ ③    | $I_F = 30 \text{ A}$ ; $T_{VJ} = 125^\circ\text{C}$<br>$T_{VJ} = 25^\circ\text{C}$                                    | 1.26<br>1.54               | V<br>V   |
| $R_{thJC}$ |                                                                                                                       | 1.15                       | K/W      |
| $R_{thCH}$ |                                                                                                                       | typ. 0.1                   | K/W      |
| $t_{rr}$   | $I_F = 1 \text{ A}$ ; $-di/dt = 200 \text{ A}/\mu\text{s}$ ;<br>$V_R = 30 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$    | typ. 35                    | ns       |
| $I_{RM}$   | $V_R = 100 \text{ V}$ ; $I_F = 50 \text{ A}$ ; $-di_F/dt = 100 \text{ A}/\mu\text{s}$<br>$T_{VJ} = 100^\circ\text{C}$ | typ. 5.5                   | A        |

Pulse test: ① for resistive load at bridge output.

② Pulse Width = 5 ms, Duty Cycle < 2.0 %

③ 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, Conditions and dimensions.

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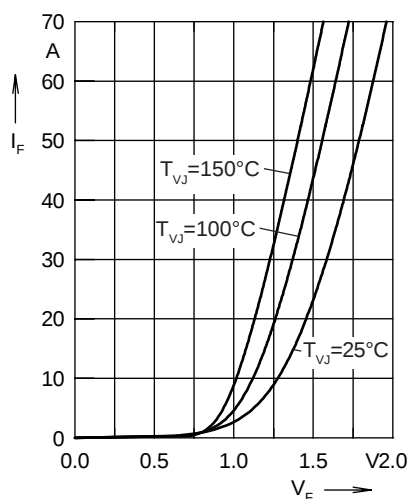


Fig. 1 Forward current  $I_F$  versus  $V_F$

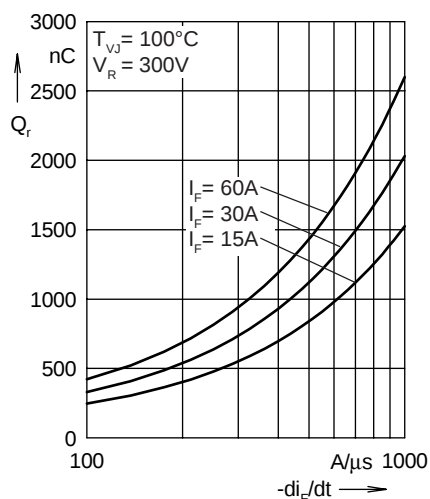


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

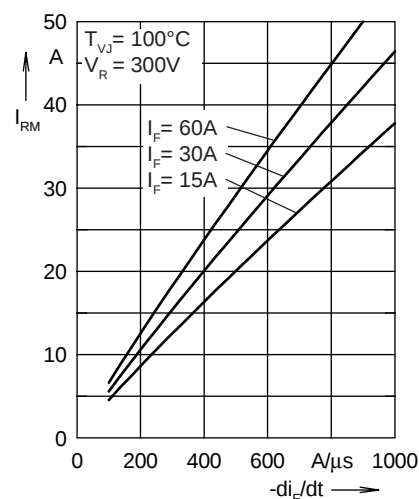


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

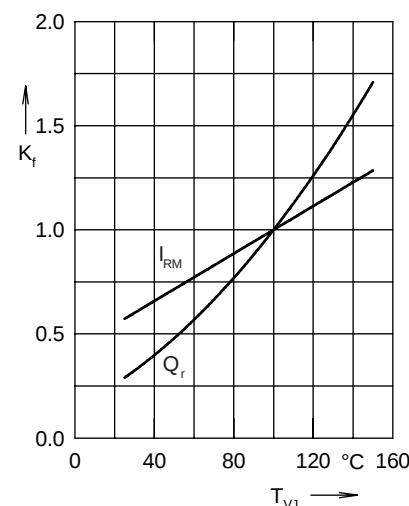


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

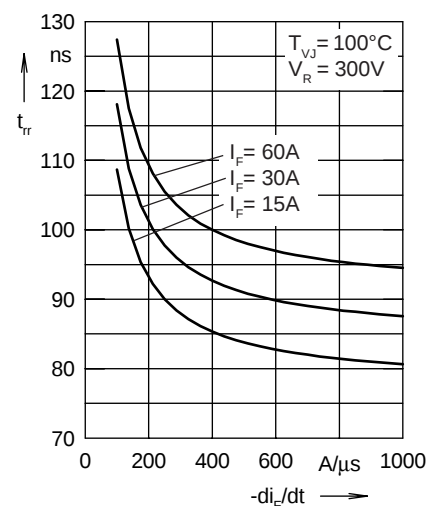


Fig. 5 Recovery time  $t_{rr}$  versus  $-di_F/dt$

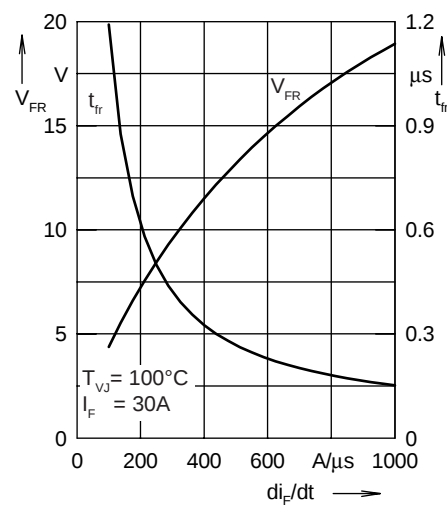


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

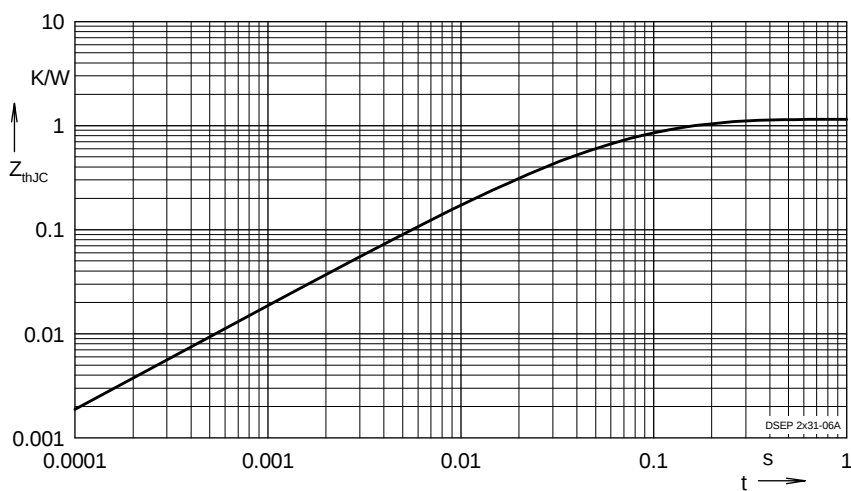


Fig. 7 Transient thermal resistance junction to case

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