

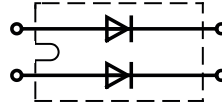
# Fast Recovery Epitaxial Diode (FRED)

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

$$V_{RRM} = 1000 \text{ V}$$

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

| $V_{RSM}$<br>V | $V_{RRM}$<br>V | Type           |
|----------------|----------------|----------------|
| 1000           | 1000           | DSEI 2x 61-10B |



miniBLOC, SOT-227 B



| Symbol       | Test Conditions                                                        | Maximum Ratings (per diode) |                  |
|--------------|------------------------------------------------------------------------|-----------------------------|------------------|
| $I_{FRMS}$   | $T_{VJ} = T_{VJM}$                                                     | 100                         | A                |
| $I_{FAVM}$ ① | $T_C = 50^\circ\text{C}$ ; rectangular, $d = 0.5$                      | 60                          | A                |
| $I_{FRM}$    | $t_p < 10 \mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$ | 800                         | A                |
| $I_{FSM}$    | $T_{VJ} = 45^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine        | 500                         | A                |
|              | $t = 8.3 \text{ ms}$ (60 Hz), sine                                     | 540                         | A                |
|              | $T_{VJ} = 150^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine       | 450                         | A                |
|              | $t = 8.3 \text{ ms}$ (60 Hz), sine                                     | 480                         | A                |
| $I^2t$       | $T_{VJ} = 45^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine        | 1150                        | A <sup>2</sup> s |
|              | $t = 8.3 \text{ ms}$ (60 Hz), sine                                     | 1200                        | A <sup>2</sup> s |
|              | $T_{VJ} = 150^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine       | 1000                        | A <sup>2</sup> s |
|              | $t = 8.3 \text{ ms}$ (60 Hz), sine                                     | 950                         | A <sup>2</sup> s |
| $T_{VJ}$     |                                                                        | -40...+150                  | °C               |
| $T_{VJM}$    |                                                                        | 150                         | °C               |
| $T_{stg}$    |                                                                        | -40...+150                  | °C               |
| $P_{tot}$    | $T_C = 25^\circ\text{C}$                                               | 180                         | W                |
| $V_{ISOL}$   | 50/60 Hz, RMS<br>$I_{ISOL} \leq 1 \text{ mA}$                          | 2500                        | V~               |
| $M_d$        | Mounting torque                                                        | 1.5/13                      | Nm/lb.in.        |
|              | Terminal connection torque (M4)                                        | 1.5/13                      | Nm/lb.in.        |
| Weight       |                                                                        | 30                          | g                |

## Features

- International standard package miniBLOC (ISOTOP compatible)
- Isolation voltage 2500 V~
- 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
- Anti saturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating and melting
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

## Advantages

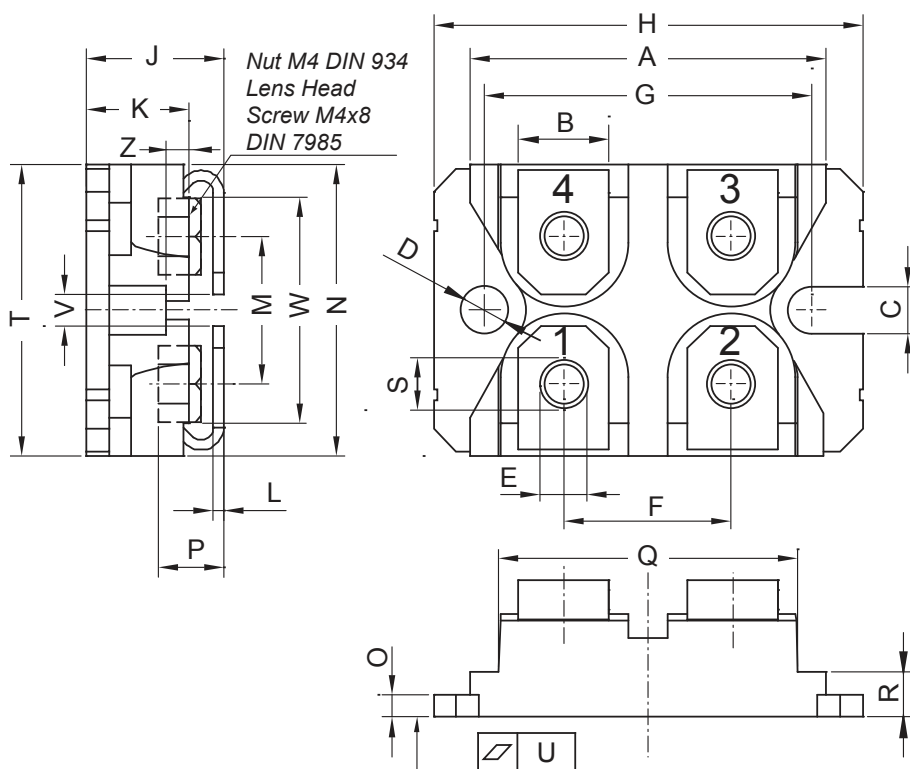
- High reliability circuit operation
- Low voltage peaks for reduced protection circuits
- Low noise switching
- Low losses
- Operating at lower temperature or space saving by reduced cooling

| Symbol     | Test Conditions                                                                                                                                   | Characteristic Values (per diode) |        |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------|
|            |                                                                                                                                                   | typ.                              | max.   |
| $I_R$      | $T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$                                                                                                       |                                   | 3 mA   |
|            | $T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$                                                                                             |                                   | 0.5 mA |
|            | $T_{VJ} = 125^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$                                                                                            |                                   | 14 mA  |
| $V_F$      | $I_F = 60 \text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$                                                                                               |                                   | 1.8 V  |
|            | $T_{VJ} = 25^\circ\text{C}$                                                                                                                       |                                   | 2.3 V  |
| $V_{T0}$   | For power-loss calculations only                                                                                                                  |                                   | 1.43 V |
| $r_T$      | $T_{VJ} = T_{VJM}$                                                                                                                                |                                   | 6.1 mΩ |
| $R_{thJC}$ |                                                                                                                                                   | 0.7                               | K/W    |
| $R_{thCK}$ |                                                                                                                                                   | 0.05                              | K/W    |
| $t_{rr}$   | $I_F = 1 \text{ A}$ ; $-di/dt = 200 \text{ A}/\mu\text{s}$ ; $V_R = 30 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$                                   | 35                                | 50 ns  |
| $I_{RM}$   | $V_R = 540 \text{ V}$ ; $I_F = 60 \text{ A}$ ; $-di_F/dt = 480 \text{ A}/\mu\text{s}$<br>$L \leq 0.05 \mu\text{H}$ ; $T_{VJ} = 100^\circ\text{C}$ | 32                                | 36 A   |

①  $I_{FAVM}$  rating includes reverse blocking losses at  $T_{VJM}$ ,  $V_R = 0.8 V_{RRM}$ , duty cycle  $d = 0.5$   
Data according to IEC 60747

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

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**miniBLOC, SOT-227 B**


| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | min        | max   | min    | max   |
| A    | 31.50      | 31.88 | 1.240  | 1.255 |
| B    | 7.80       | 8.20  | 0.307  | 0.323 |
| C    | 4.09       | 4.29  | 0.161  | 0.169 |
| D    | 4.09       | 4.29  | 0.161  | 0.169 |
| E    | 4.09       | 4.29  | 0.161  | 0.169 |
| F    | 14.91      | 15.11 | 0.587  | 0.595 |
| G    | 30.12      | 30.30 | 1.186  | 1.193 |
| H    | 37.80      | 38.23 | 1.488  | 1.505 |
| J    | 11.68      | 12.22 | 0.460  | 0.481 |
| K    | 8.92       | 9.60  | 0.351  | 0.378 |
| L    | 0.74       | 0.84  | 0.029  | 0.033 |
| M    | 12.50      | 13.10 | 0.492  | 0.516 |
| N    | 25.15      | 25.42 | 0.990  | 1.001 |
| O    | 1.95       | 2.13  | 0.077  | 0.084 |
| P    | 4.95       | 6.20  | 0.195  | 0.244 |
| Q    | 26.54      | 26.90 | 1.045  | 1.059 |
| R    | 3.94       | 4.42  | 0.155  | 0.167 |
| S    | 4.55       | 4.85  | 0.179  | 0.191 |
| T    | 24.59      | 25.25 | 0.968  | 0.994 |
| U    | -0.05      | 0.10  | -0.002 | 0.004 |
| V    | 3.20       | 5.50  | 0.126  | 0.217 |
| W    | 19.81      | 21.08 | 0.780  | 0.830 |
| Z    | 2.50       | 2.70  | 0.098  | 0.106 |

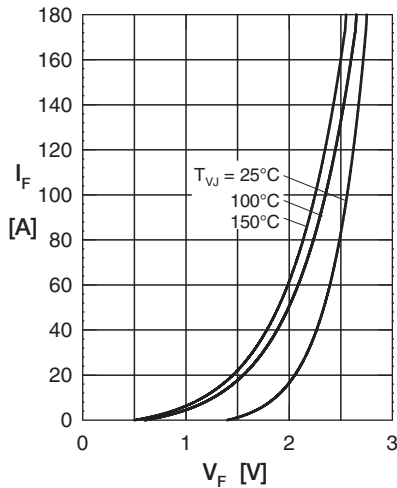


Fig. 1 Forward current  $I_F$  versus  $V_F$

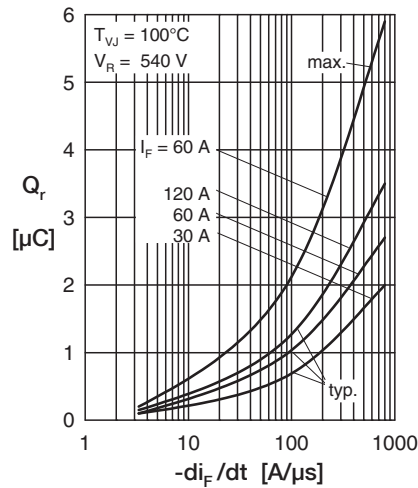


Fig. 2 Typ. recovery charge  $Q_r$  versus  $-di_F/dt$

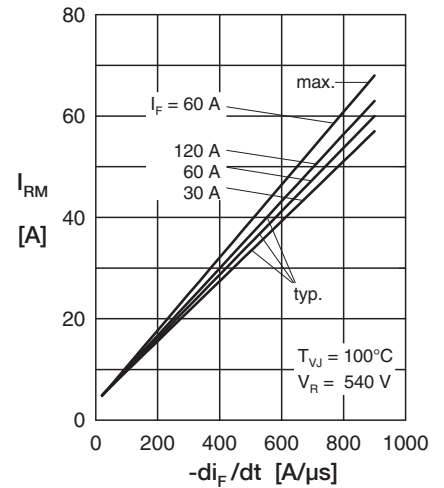


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

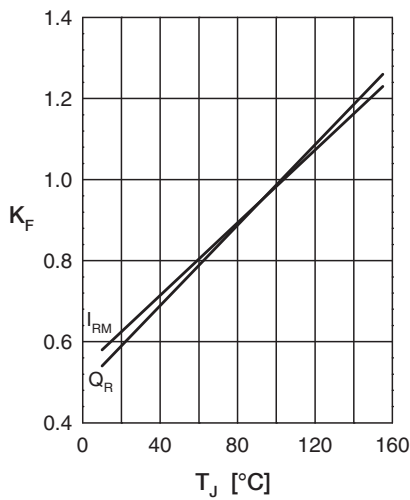


Fig. 4 Typ. dyn. parameters vs. junction temperature

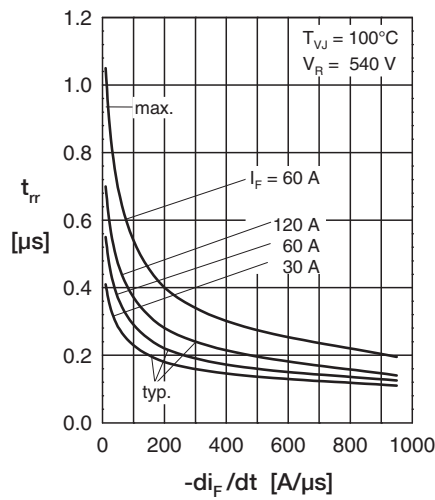


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

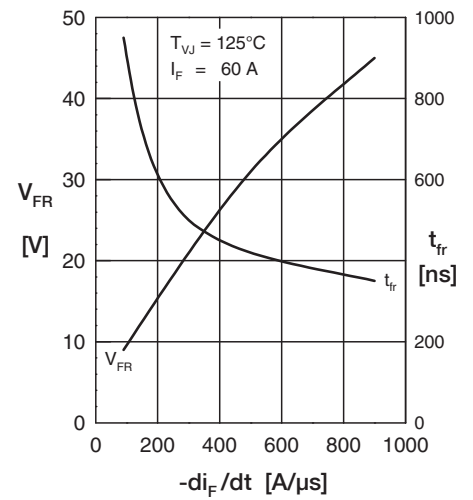


Fig. 6 Typ. peak forward voltage  $V_{FR}$  versus  $-di_F/dt$

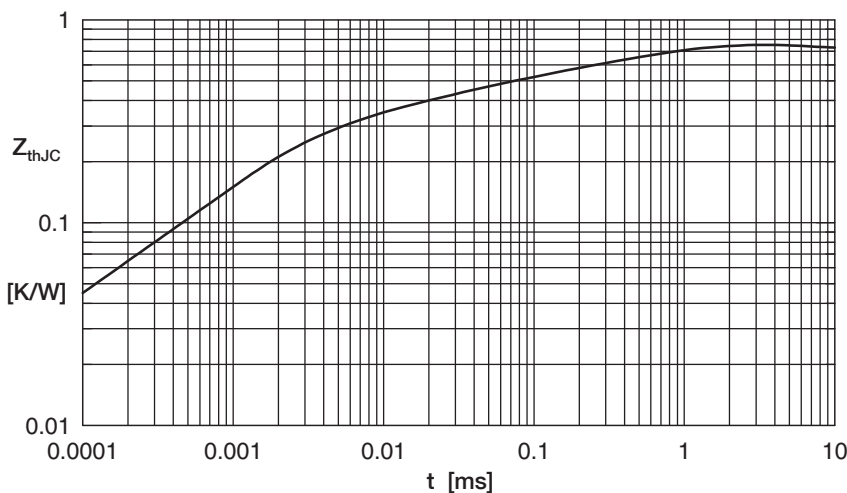


Fig. 7 Transient thermal impedance junction to case