

Fast Recovery Epitaxial Diode (FRED)

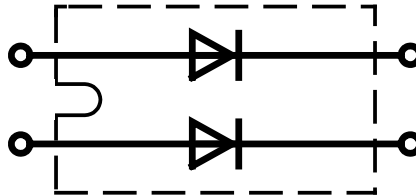
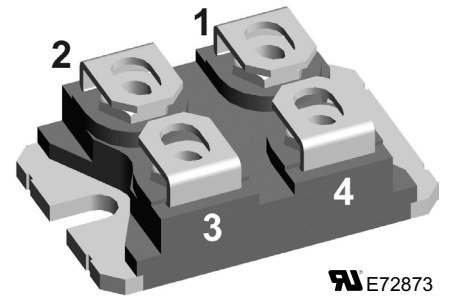
$$I_{FAVM} = 2 \times 123 \text{ A}$$

$$V_{RRM} = 200 \text{ V}$$

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

Part number

DSEI2x121-02A


Features / Advantages:

- 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 and melting
- Uninterruptible power supplies (UPS)

Package: miniBLOC, SOT-227 B

- Isolation voltage 2500 V~
- International standard package (ISOTOP compatible)
- 2 independent FREDs in 1 package
- RoHS compliant
- Epoxy meets UL 94V-0

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| Symbol | Conditions | Maximum Ratings | |
|---|---|-----------------|------------------|
| | | | |
| I_{FRMS} I_{FAVM} ① I_{FRM} | $T_{VJ} = T_{VJM}$ | 150 | A |
| | $T_C = 70^\circ\text{C}$; rectangular, $d = 0.5$ | 123 | A |
| | $t_p < 10$ s; rep. rating, pulse width limited by T_{VJM} | 600 | A |
| I_{FSM} | $T_{VJ} = 45^\circ\text{C}$; $t = 10$ ms (50 Hz), sine | 1200 | A |
| | $t = 8.3$ ms (60 Hz), sine | 1300 | A |
| | $T_{VJ} = 150^\circ\text{C}$; $t = 10$ ms (50 Hz), sine | 1080 | A |
| | $t = 8.3$ ms (60 Hz), sine | 1170 | A |
| I^2t | $T_{VJ} = 45^\circ\text{C}$; $t = 10$ ms (50 Hz), sine | 7200 | A ² s |
| | $t = 8.3$ ms (60 Hz), sine | 7100 | A ² s |
| | $T_{VJ} = 150^\circ\text{C}$; $t = 10$ ms (50 Hz), sine | 5800 | A ² s |
| | $t = 8.3$ ms (60 Hz), sine | 5700 | A ² s |
| P_{tot} | $T_C = 25^\circ\text{C}$ | 250 | W |

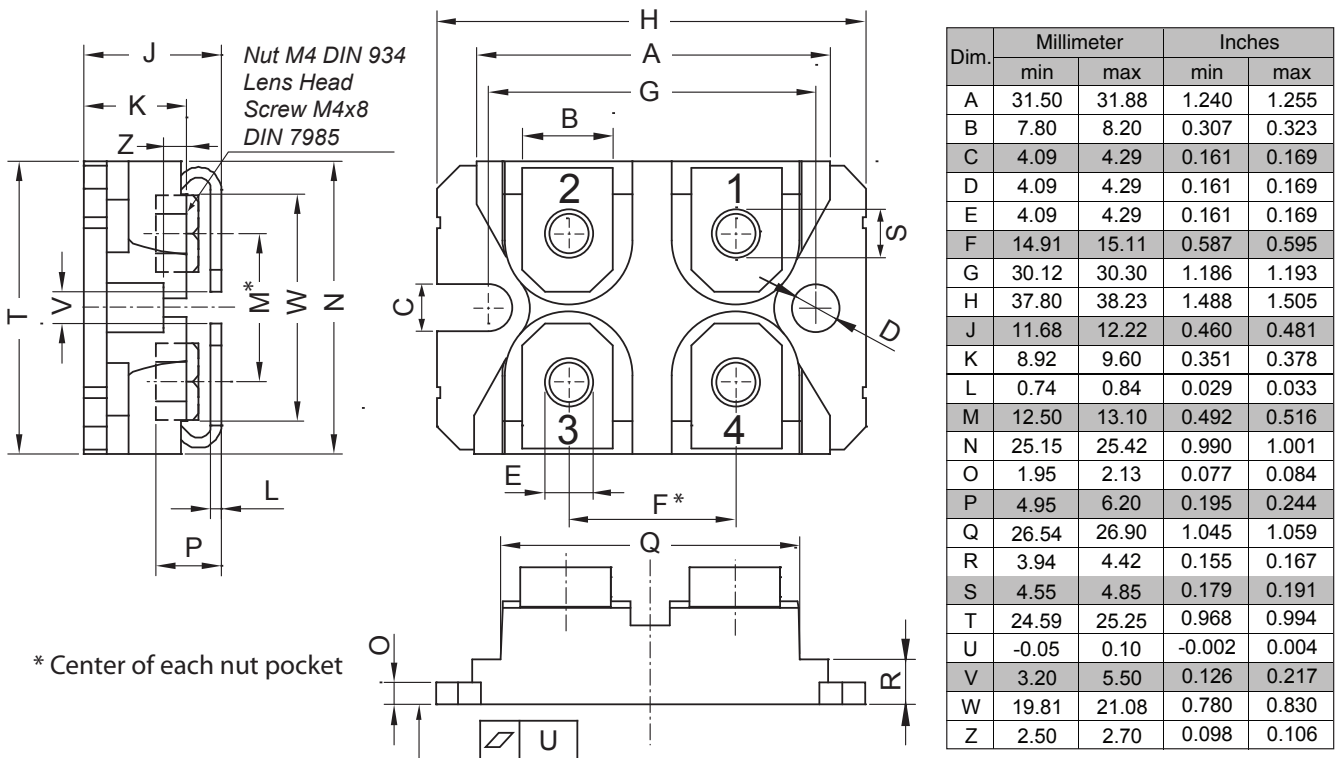
| Symbol | Conditions | Characteristic Values | | |
|--------------------------|---|-----------------------|------|------------|
| | | typ. | max. | |
| I_R | $V_R = V_{RRM}$ $T_{VJ} = 25^\circ\text{C}$ | | 1 | mA |
| | $V_R = 0.8 \cdot V_{RRM}$ $T_{VJ} = 25^\circ\text{C}$ | | 0.5 | mA |
| | $V_R = 0.8 \cdot V_{RRM}$ $T_{VJ} = 125^\circ\text{C}$ | | 20 | mA |
| V_F | $I_F = 120$ A $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$ | 0.89 | 0.95 | V |
| | | | 1.10 | V |
| V_T | For power-loss calculations only | | 0.7 | V |
| r_T | $T_{VJ} = T_{VJM}$ | | 2.1 | mΩ |
| R_{thJC} R_{thCK} | | 0.1 | 0.5 | K/W K/W |
| t_{tr} | $I_F = 1$ A; $-di/dt = 400$ A/μs; $V_R = 30$ V; $T_{VJ} = 25^\circ\text{C}$ | 35 | 50 | ns |
| I_{RM} | $V_R = 100$ V; $I_F = 100$ A; $-di_F/dt = 200$ A/μs $L \leq 0.05$ μH; $T_{VJ} = 100^\circ\text{C}$ | 12 | 15 | 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

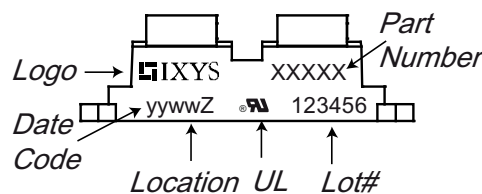
| Package miniBLOC, SOT-227 B | | | Ratings | | |
|-----------------------------|--|------------------------------|--------------|------|--------|
| Symbol | Definitions | Conditions | min. | typ. | max. |
| I_{RMS} | RMS current | per terminal ① | | | 150 |
| T_{VJ} | virtual junction temperature | | -40 | | 150 °C |
| T_{op} | operation temperature | | -40 | | 125 °C |
| T_{stg} | storage temperature | | -40 | | 150 °C |
| Weight | | | | 30 | g |
| M_D | mounting torque | | 1.1 | | 1.5 Nm |
| M_T | terminal torque (M4) | | 1.1 | | 1.5 Nm |
| $d_{SpP/APP}$ | creepage distance on surface striking distance through air | terminal to terminal | 10.5 | 3.2 | mm |
| $d_{SpB/APb}$ | | terminal to backside | 8.6 | 6.8 | mm |
| V_{ISOL} | isolation voltage | t = 1 second t = 1 minute | 3000 2500 | | V V |

① I_{RMS} is typically limited by the pin-to-chip resistance (1); or by the current capability of the chip (2). In case of (1) and a product with multiple pins for one chip-potential, the current capability can be increased by connecting the pins as one contact.



* Center of each nut pocket

Product Marking



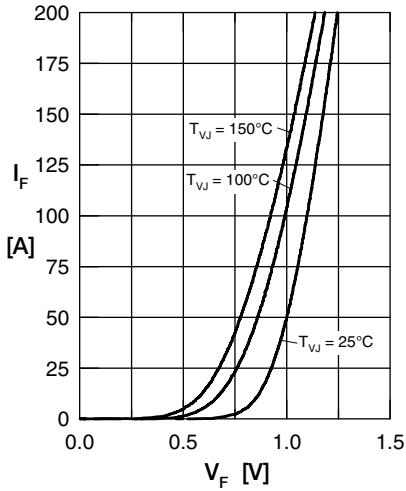


Fig. 1 Forward current I_F versus V_F

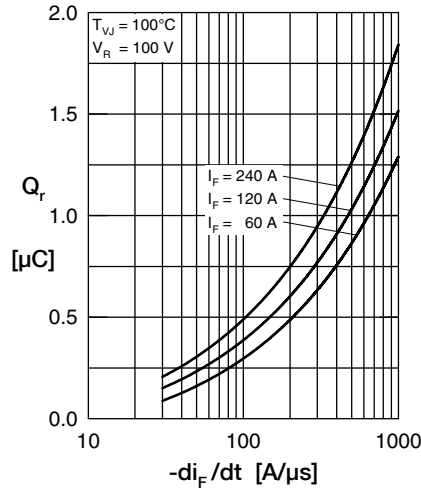


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

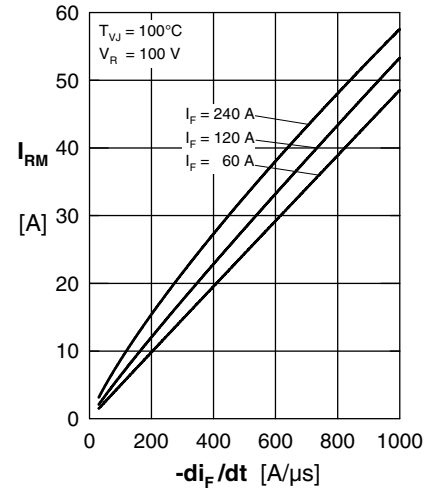


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

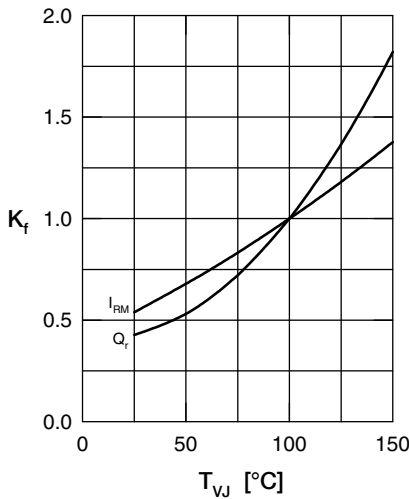


Fig. 4 Typ. dyn. parameters Q_r , I_{RM} versus T_{VJ}

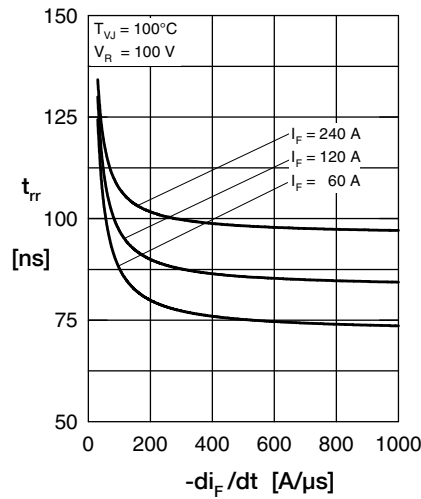


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

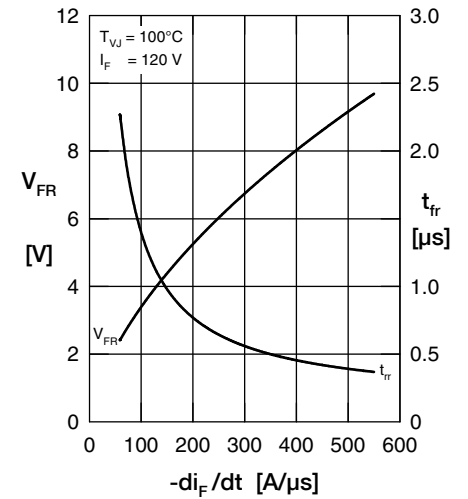


Fig. 6 Typ. peak forward voltage V_{FR} and t_{rr} versus di_F/dt

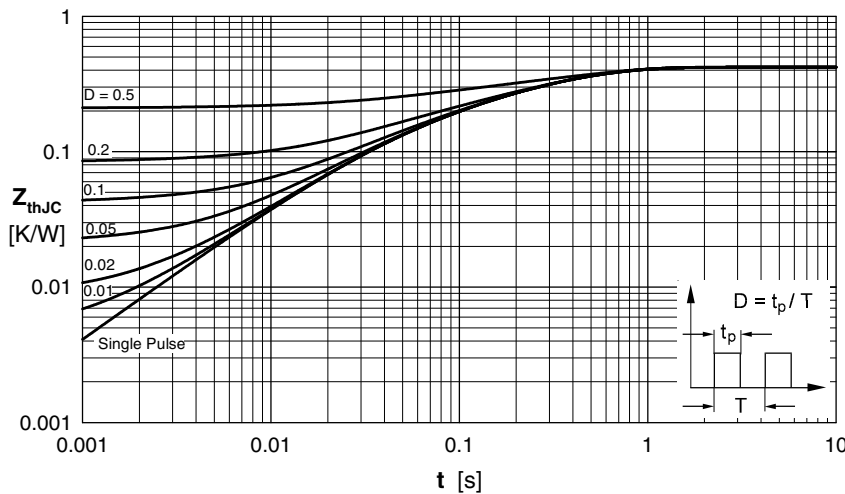


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.0725 | 0.0028 |
| 2 | 0.1423 | 0.0092 |
| 3 | 0.2852 | 0.0350 |