

# Fast Recovery Epitaxial Diode (FRED)

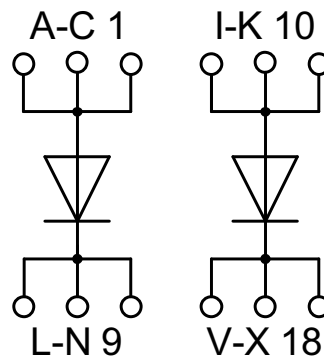
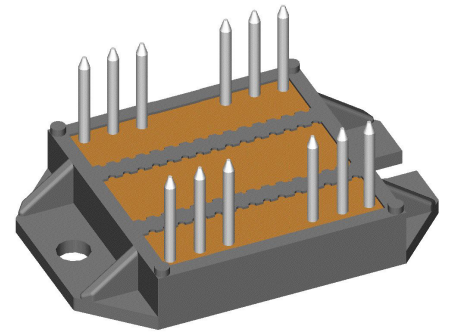
$$I_{FAVM} = 2 \times 96 \text{ A}$$

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

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

## Part number

DSEI 2x 101-06P



### Features / Advantages:

- 2 independent FRED in 1 package
- Planar passivated chips
- Very short recovery time
- Leads suitable for PC board soldering
- Very short recovery time
- Soft recovery behaviour
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling capability
- Low noise switching
- Small and light weight

### 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

### Package: ECO-PAC2

- Isolation voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 9 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

### Disclaimer Notice

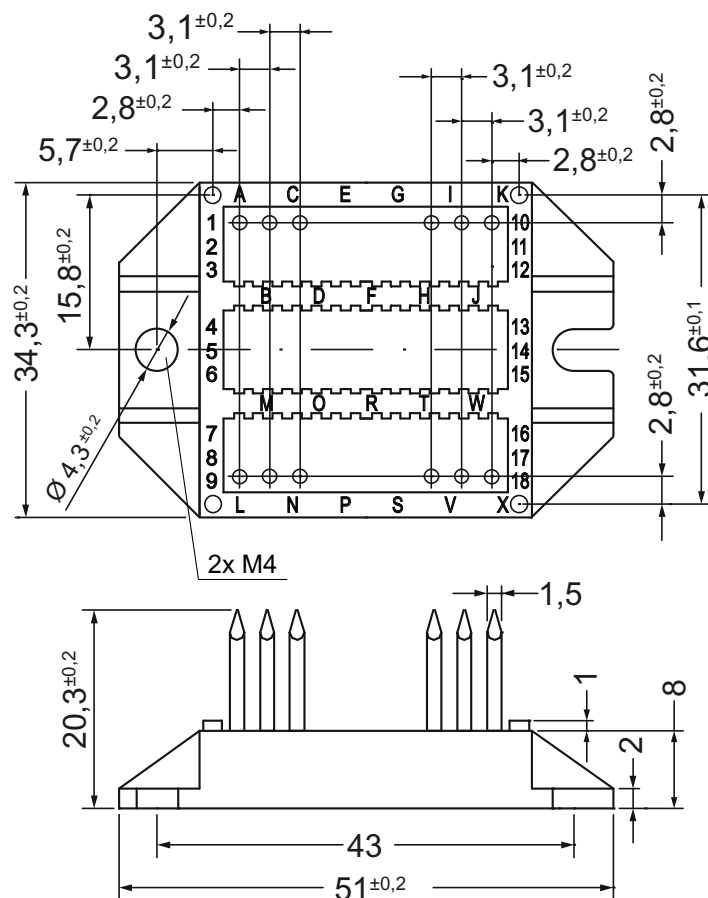
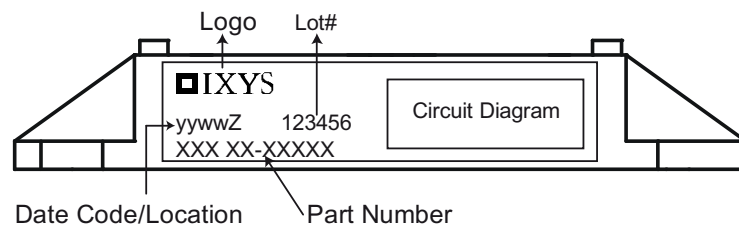
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| Diode                    |                                                                                |                                                                                                                                                                         |  | Ratings |      |              |                |
|--------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------|------|--------------|----------------|
| Symbol                   | Definitions                                                                    | Conditions                                                                                                                                                              |  | min.    | typ. | max.         |                |
| $I_{FRMS}$               | RMS forward current                                                            | $T_{VJ} = T_{VJM}$                                                                                                                                                      |  |         |      | 150          | A              |
| $I_{FAVM}$ ①             | max. average forward current                                                   | rectangular, d = 0.5<br>$T_C = 70^\circ\text{C}$                                                                                                                        |  |         |      | 96           | A              |
| $I_{FRM}$                | max. repetitive forward current                                                | $t_p < 10 \mu\text{s}$<br>rep. rating, pulse width limited by $T_{VJM}$                                                                                                 |  |         |      | tbd          | A              |
| $I_{FSM}$                | max. surge forward current                                                     | t = 10 ms (50 Hz), sine<br>$T_{VJ} = 45^\circ\text{C}$                                                                                                                  |  |         |      | 1200         | A              |
| $P_{tot}$                | total power dissipation                                                        | $T_{VJ} = 25^\circ\text{C}$                                                                                                                                             |  |         |      | 250          | W              |
| $I_R$                    | reverse current                                                                | $V_R = V_{RRM}$<br>$V_R = 0.8 \cdot V_{RRM}$<br>$V_R = 0.8 \cdot V_{RRM}$<br>$T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$ |  |         |      | 3<br>1<br>20 | mA<br>mA<br>mA |
| $V_F$                    | forward voltage                                                                | $I_F = 100 \text{ A}$<br>$T_{VJ} = 150^\circ\text{C}$<br>$T_{VJ} = 25^\circ\text{C}$                                                                                    |  |         |      | 1.17<br>1.25 | V<br>V         |
| $V_{TO}$<br>$r_T$        | threshold voltage<br>slope resistance                                          | for power-loss calculations only<br>$T_{VJ} = T_{VJM}$                                                                                                                  |  |         |      | 0.7<br>4.7   | V<br>mΩ        |
| $R_{thJC}$<br>$R_{thCH}$ | thermal resistance junction to case<br>thermal resistance junction to heatsink |                                                                                                                                                                         |  |         | 0.05 | 0.5          | K/W<br>K/W     |
| $t_{rr}$                 | reverse recovery time                                                          | $I_F = 1 \text{ A}$ ; $-di/dt = 400 \text{ A}/\mu\text{s}$ ; $V_R = 30 \text{ V}$<br>$T_{VJ} = 25^\circ\text{C}$                                                        |  |         | 40   | 60           | ns             |
| $I_{RM}$                 | max. reverse recovery current                                                  | $I_F = 80 \text{ A}$ ; $-di_F/dt = 200 \text{ A}/\mu\text{s}$<br>$V_R = 100 \text{ V}$ ; $L \leq 0.05 \mu\text{H}$<br>$T_{VJ} = 100^\circ\text{C}$                      |  |         | 19   | 24           | A              |

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

| Package        | ECO-PAC2                             |                              |                                            | Ratings      |      |      |        |
|----------------|--------------------------------------|------------------------------|--------------------------------------------|--------------|------|------|--------|
| Symbol         | Definitions                          | Conditions                   |                                            | min.         | typ. | max. |        |
| $I_{RMS}$      | <i>RMS current</i>                   | per terminal                 |                                            |              |      | 100  | A      |
| $T_{VJ}$       | <i>virtual junction temperature</i>  |                              |                                            | -40          |      | 150  | °C     |
| $T_{op}$       | <i>operation temperature</i>         |                              |                                            | -40          |      | 125  | °C     |
| $T_{stg}$      | <i>storage temperature</i>           |                              |                                            | -40          |      | 125  | °C     |
| Weight         |                                      |                              |                                            |              | 24   |      | g      |
| $M_D$          | <i>mounting torque</i>               |                              |                                            | 1.4          |      | 2.0  | Nm     |
| $d_{Spp/App}$  | <i>creepage distance on surface</i>  | terminal to terminal         |                                            | 6.0          |      |      | mm     |
| $d_{Spb/Appb}$ | <i>striking distance through air</i> | terminal to backside         |                                            | 10.0         |      |      | mm     |
| $V_{ISOL}$     | <i>isolation voltage</i>             | t = 1 second<br>t = 1 minute | 50/60 Hz, RMS; $I_{ISOL} \leq 1\text{ mA}$ | 3000<br>2500 |      |      | V<br>V |



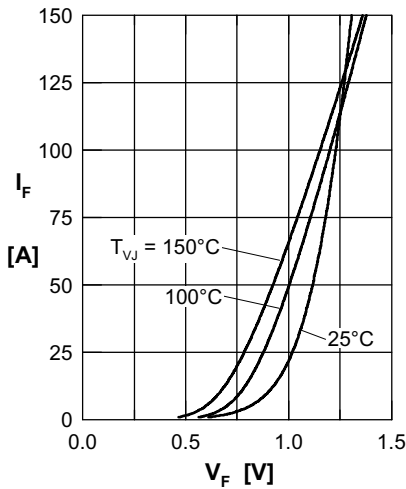
**Curves**


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

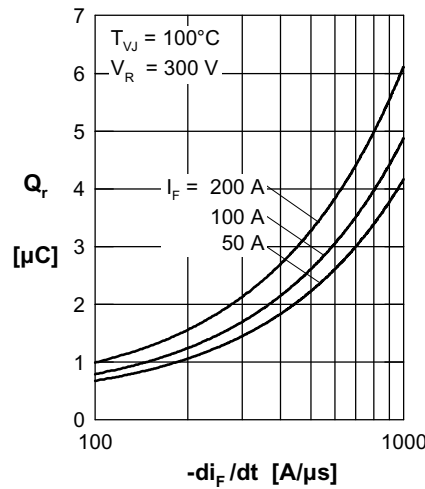


Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $-di_F/dt$

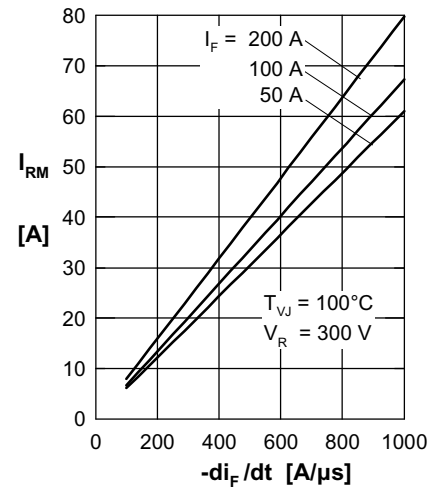


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

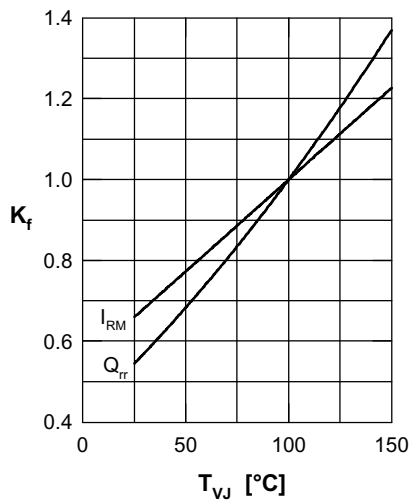


Fig. 4 Typ. dyn. parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

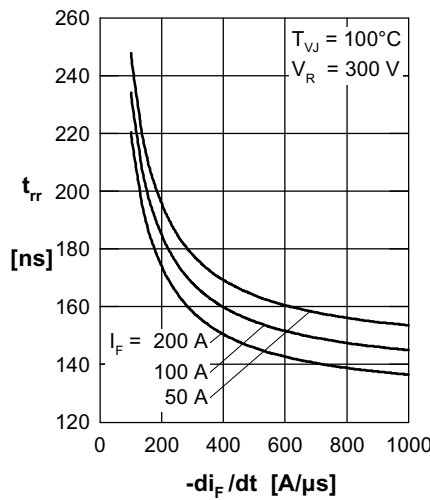


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

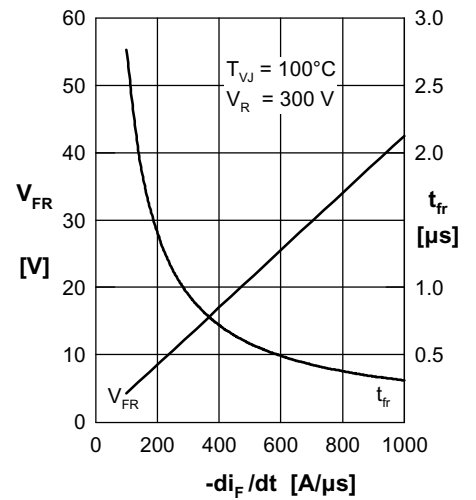


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

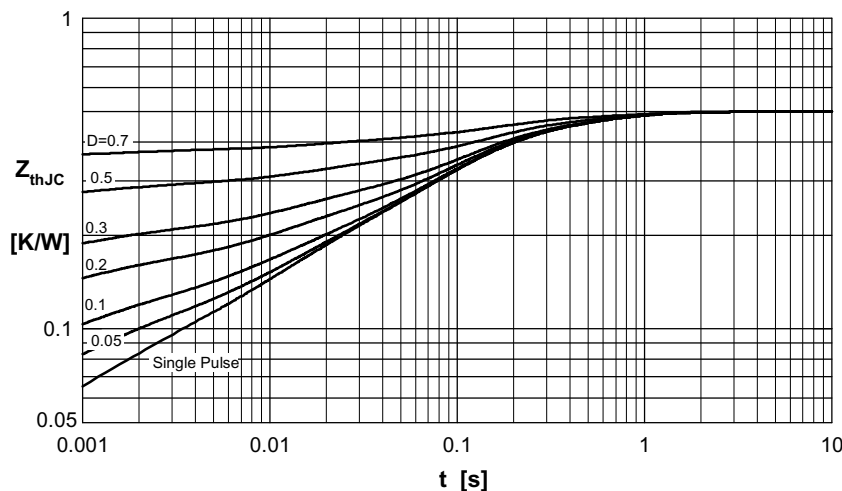


Fig. 7 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$<br>[K/W] | $t_i$<br>[s] |
|---|--------------------|--------------|
| 1 | 0.020              | 0.00002      |
| 2 | 0.050              | 0.00081      |
| 3 | 0.076              | 0.01000      |
| 4 | 0.240              | 0.09400      |
| 5 | 0.114              | 0.45000      |