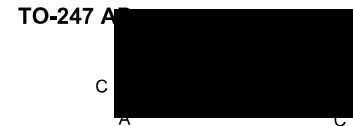


# Fast Recovery Epitaxial Diode (FRED)

**DSEI 30**

**$I_{FAVM} = 37\text{ A}$**   
 **$V_{RRM} = 600\text{ V}$**   
 **$t_{rr} = 35\text{ ns}$**

| $V_{RSM}$ | $V_{RRM}$ | Type        |
|-----------|-----------|-------------|
| V         | V         |             |
| 640       | 600       | DSEI 30-06A |



A = Anode, C = Cathode

| Symbol                                  | Test Conditions   | Maximum Ratings |                  |
|---|---|-----------------|------------------|
| $I_{FRMS}$<br>$I_{FAVM}$ ①<br>$I_{FRM}$ | $T_{VJ} = T_{VJM}$  | 70              | A                |
|   | $T_C = 85^\circ\text{C}$ ; rectangular, $d = 0.5$                       | 37              | A                |
|   | $t_p < 10\ \mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$ | 375             | A                |
| $I_{FSM}$                               | $T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine          | 300             | A                |
|   | $t = 8.3\text{ ms}$ (60 Hz), sine                                       | 320             | A                |
|   | $T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine         | 260             | A                |
|   | $t = 8.3\text{ ms}$ (60 Hz), sine                                       | 280             | A                |
| $I^2t$                                  | $T_{VJ} = 45^\circ\text{C}$ $t = 10\text{ ms}$ (50 Hz), sine            | 450             | A <sup>2</sup> s |
|   | $t = 8.3\text{ ms}$ (60 Hz), sine                                       | 420             | A <sup>2</sup> s |
|   | $T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine         | 340             | A <sup>2</sup> s |
|   | $t = 8.3\text{ ms}$ (60 Hz), sine                                       | 320             | A <sup>2</sup> s |
| $T_{VJ}$                                |   | -40...+150      | °C               |
| $T_{VJM}$                               |   | 150             | °C               |
| $T_{stg}$                               |   | -40...+150      | °C               |
| $P_{tot}$                               | $T_C = 25^\circ\text{C}$  | 125             | W                |
| $M_d$                                   | Mounting torque   | 0.8...1.2       | Nm               |
| Weight                                  |   | 6               | g                |

## Features

- International standard package JEDEC TO-247 AD
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low  $I_{RM}$ -values
- Soft recovery behaviour
- Epoxy meets UL 94V-0

## 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 |               |
|------------|---|-----------------------|---------------|
|            |   | typ.                  | max.          |
| $I_R$      | $T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$   | 100                   | $\mu\text{A}$ |
|            | $T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$   | 50                    | $\mu\text{A}$ |
|            | $T_{VJ} = 125^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$  | 7                     | mA            |
| $V_F$      | $I_F = 37\text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$  | 1.4                   | V             |
|            | $T_{VJ} = 25^\circ\text{C}$   | 1.6                   | V             |
| $V_{T0}$   | For power-loss calculations only  | 1.01                  | V             |
| $r_T$      | $T_{VJ} = T_{VJM}$  | 7.1                   | m $\Omega$    |
| $R_{thJC}$ | 0.25  | 1                     | K/W           |
| $R_{thCK}$ |   | 35                    | K/W           |
| $R_{thJA}$ |   | 35                    | K/W           |
| $t_{rr}$   | $I_F = 1\text{ A}$ ; $-di/dt = 100\text{ A}/\mu\text{s}$ ; $V_R = 30\text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$                                    | 35                    | 50 ns         |
| $I_{RM}$   | $V_R = 350\text{ V}$ ; $I_F = 30\text{ A}$ ; $-di_F/dt = 240\text{ A}/\mu\text{s}$<br>$L \leq 0.05\ \mu\text{H}$ ; $T_{VJ} = 100^\circ\text{C}$ | 10                    | 11 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

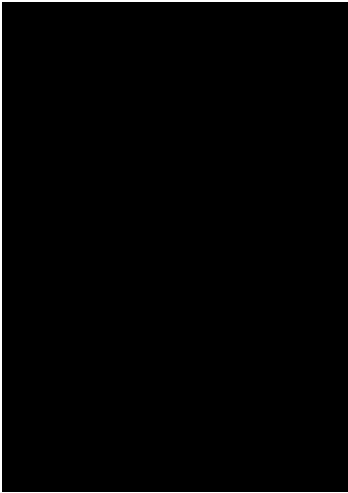


Fig. 1 Forward current versus voltage drop.

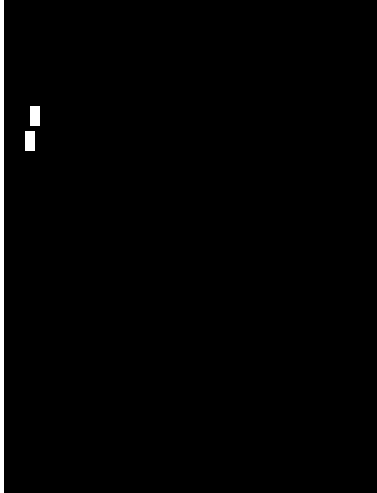


Fig. 2 Recovery charge versus  $-di_p/dt$ .

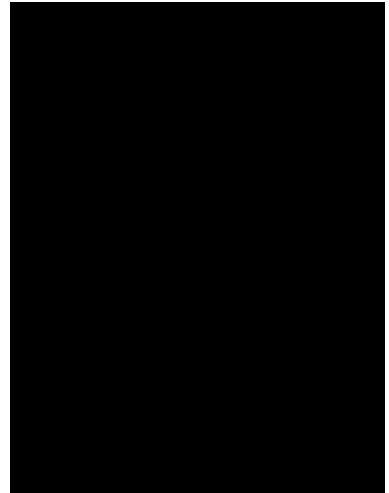


Fig. 3 Peak reverse current versus  $-di_p/dt$ .



Fig. 4 Dynamic parameters versus junction temperature.

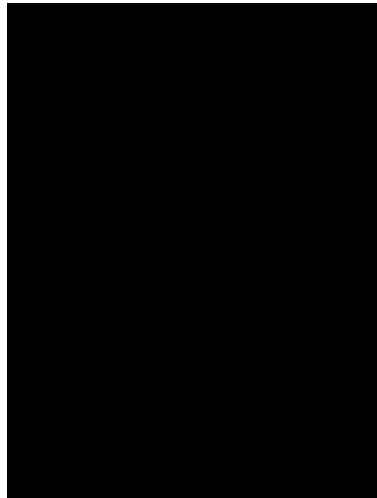


Fig. 5 Recovery time versus  $-di_p/dt$ .

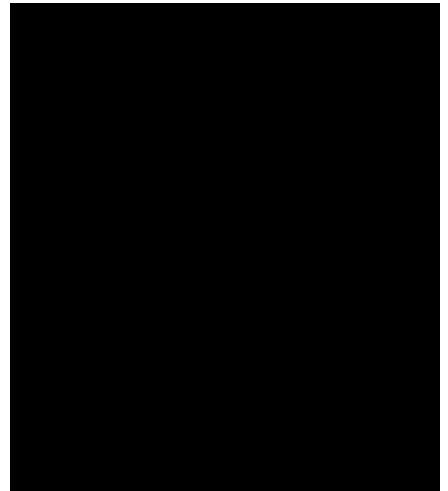


Fig. 6 Peak forward voltage versus  $di_p/dt$ .

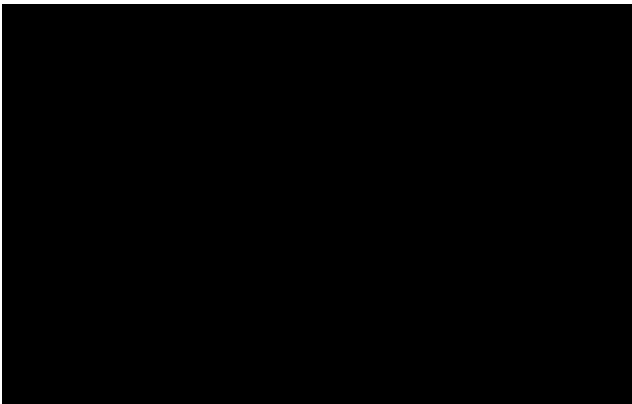
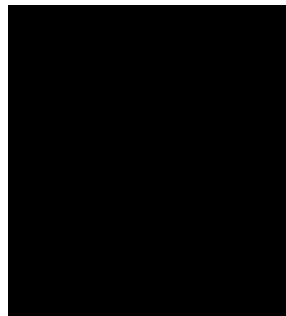


Fig. 7 Transient thermal impedance junction to case.

**Dimensions**



| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | Min.       | Max.  | Min.   | Max.  |
| A    | 19.81      | 20.32 | 0.780  | 0.800 |
| B    | 20.80      | 21.46 | 0.819  | 0.845 |
| C    | 15.75      | 16.26 | 0.610  | 0.640 |
| D    | 3.55       | 3.65  | 0.140  | 0.144 |
| E    | 4.32       | 5.49  | 0.170  | 0.216 |
| F    | 5.4        | 6.2   | 0.212  | 0.244 |
| G    | 1.65       | 2.13  | 0.065  | 0.084 |
| H    | -          | 4.5   | -      | 0.177 |
| J    | 1.0        | 1.4   | 0.040  | 0.055 |
| K    | 10.8       | 11.0  | 0.426  | 0.433 |
| L    | 4.7        | 5.3   | 0.185  | 0.209 |
| M    | 0.4        | 0.8   | 0.016  | 0.031 |
| N    | 2.2        | 2.54  | 0.087  | 0.102 |