

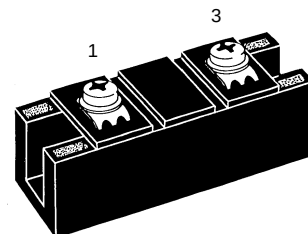
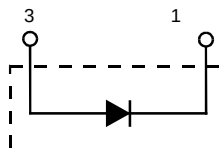
# Fast Recovery Epitaxial Diode (FRED) Module

MEO 450-12 DA

$V_{RRM} = 1200\text{ V}$   
 $I_{FAVM} = 453\text{ A}$   
 $t_{rr} = 450\text{ ns}$

Preliminary data

| $V_{RSM}$ | $V_{RRM}$ | Type         |
|-----------|-----------|--------------|
| V         | V         |              |
| 1200      | 1200      | MEO 450-12DA |



| Symbol       | Test Conditions                                                               | Maximum Ratings |                  |
|--------------|-------------------------------------------------------------------------------|-----------------|------------------|
| $I_{FRMS}$   | $T_C = 75^\circ\text{C}$                                                      | 640             | A                |
| $I_{FAVM}$ ① | $T_C = 75^\circ\text{C}$ ; rectangular, $d = 0.5$                             | 453             | A                |
| $I_{FRM}$    | $t_p < 10\text{ }\mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$ | 2460            | A                |
| $I_{FSM}$    | $T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine                | 4800            | A                |
|              | $t = 8.3\text{ ms}$ (60 Hz), sine                                             | 5280            | A                |
|              | $T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine               | 4320            | A                |
|              | $t = 8.3\text{ ms}$ (60 Hz), sine                                             | 4750            | A                |
| $I^2t$       | $T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine                | 115200          | A <sup>2</sup> s |
|              | $t = 8.3\text{ ms}$ (60 Hz), sine                                             | 117100          | A <sup>2</sup> s |
|              | $T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine               | 93300           | A <sup>2</sup> s |
|              | $t = 8.3\text{ ms}$ (60 Hz), sine                                             | 94800           | A <sup>2</sup> s |
| $T_{VJ}$     |                                                                               | -40...+150      | $^\circ\text{C}$ |
| $T_{stg}$    |                                                                               | -40...+125      | $^\circ\text{C}$ |
| $T_{Smax}$   |                                                                               | 110             | $^\circ\text{C}$ |
| $P_{tot}$    | $T_C = 25^\circ\text{C}$                                                      | 1750            | W                |
| $V_{ISOL}$   | 50/60 Hz, RMS $t = 1\text{ min}$                                              | 3000            | V~               |
|              | $I_{ISOL} \leq 1\text{ mA}$ $t = 1\text{ s}$                                  | 3600            | V~               |
| $M_d$        | Mounting torque (M6)                                                          | 2.25-2.75/20-25 | Nm/lb.in.        |
|              | Terminal connection torque (M6)                                               | 4.50-5.50/40-48 | Nm/lb.in.        |
| $d_s$        | Creeping distance on surface                                                  | 12.7            | mm               |
| $d_A$        | Strike distance through air                                                   | 9.6             | mm               |
| $a$          | Maximum allowable acceleration                                                | 50              | $\text{m/s}^2$   |
| Weight       |                                                                               | 150             | g                |

## Features

- International standard package with DCB ceramic base plate
- Planar passivated chips
- Short recovery time
- Low switching losses
- Soft recovery behaviour
- Isolation voltage 3600 V~
- UL registered E 72873

## Applications

- Antiparallel diode for high frequency switching devices
- Free wheeling diode in converters and motor control circuits
- 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

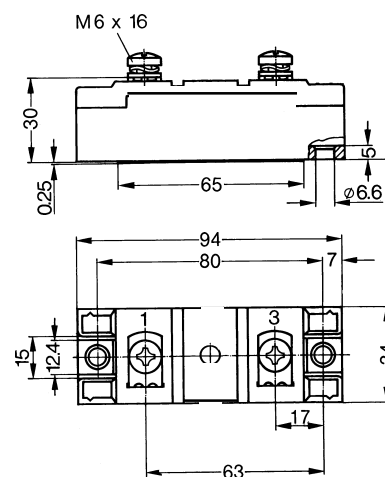
| Symbol            | Test Conditions                                                       |                                                                              | Characteristic Values (per diode) |      |    |
|-------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------|------|----|
|                   |                                                                       |                                                                              | typ.                              | max. |    |
| I <sub>R</sub>    | T <sub>VJ</sub> = 25°C                                                | V <sub>R</sub> = V <sub>RRM</sub>                                            | 24                                | mA   |    |
|                   | T <sub>VJ</sub> = 25°C                                                | V <sub>R</sub> = 0.8 • V <sub>RRM</sub>                                      | 6                                 | mA   |    |
|                   | T <sub>VJ</sub> = 125°C                                               | V <sub>R</sub> = 0.8 • V <sub>RRM</sub>                                      | 120                               | mA   |    |
| V <sub>F</sub>    | I <sub>F</sub> = 300 A;                                               | T <sub>VJ</sub> = 125°C                                                      | 1.51                              | V    |    |
|                   |                                                                       | T <sub>VJ</sub> = 25°C                                                       | 1.78                              | V    |    |
|                   | I <sub>F</sub> = 520 A;                                               | T <sub>VJ</sub> = 125°C                                                      | 1.76                              | V    |    |
|                   |                                                                       | T <sub>VJ</sub> = 25°C                                                       | 1.96                              | V    |    |
| V <sub>T0</sub>   | For power-loss calculations only                                      |                                                                              | 1.16                              | V    |    |
| r <sub>T</sub>    |                                                                       |                                                                              | 1.15                              | mΩ   |    |
| R <sub>thJH</sub> | DC current                                                            |                                                                              | 0.114                             | K/W  |    |
| R <sub>thJC</sub> | DC current                                                            |                                                                              | 0.071                             | K/W  |    |
| t <sub>rr</sub>   | I <sub>F</sub> = 600 A<br>V <sub>R</sub> = 600 V<br>-di/dt = 800 A/μs | T <sub>VJ</sub> = 100°C<br>T <sub>VJ</sub> = 25°C<br>T <sub>VJ</sub> = 100°C | 450                               | 500  | ns |
| I <sub>RM</sub>   |                                                                       |                                                                              |                                   | 110  | A  |
|                   |                                                                       |                                                                              |                                   | 165  | A  |
|                   |                                                                       |                                                                              |                                   |      |    |

①  $I_{FAVM}$  rating includes reverse blocking losses at  $T_{VJM}$ ,  $V_R = 0.6 V_{RRM}$ , duty cycle  $d = 0.5$

Data according to IEC 60747

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

## Dimensions in mm (1 mm = 0.0394")



749

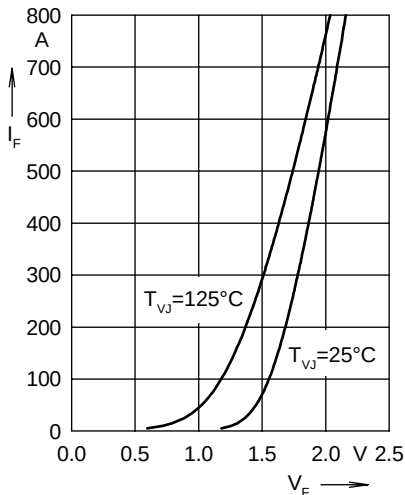


Fig. 1 Forward current  $I_F$  versus  $V_F$

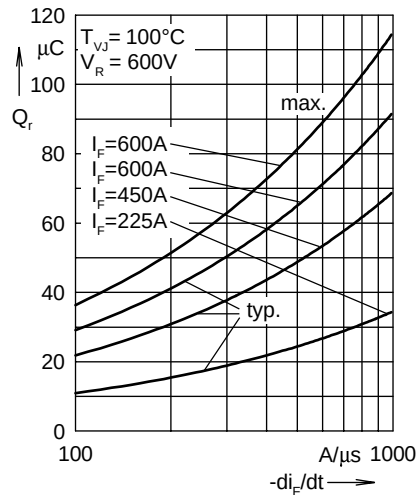


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F / dt$

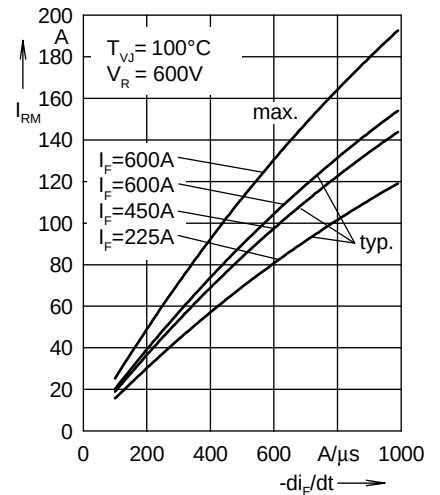


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F / dt$

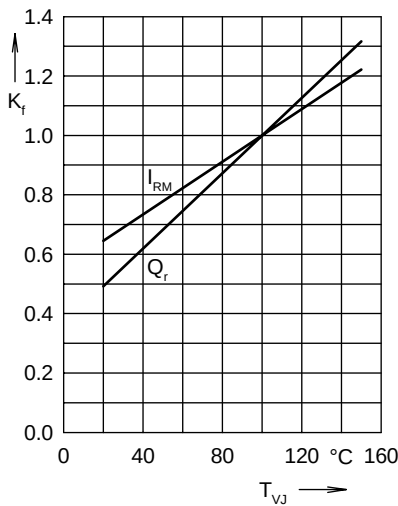


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

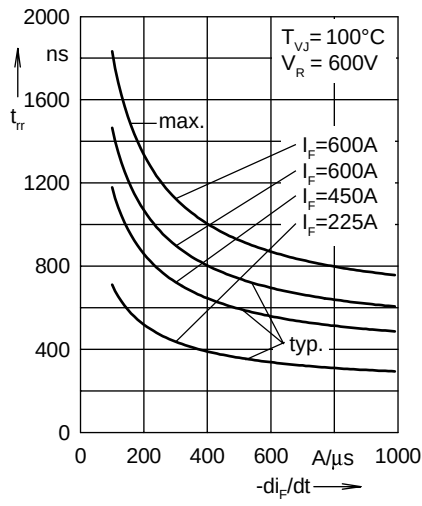


Fig. 5 Recovery time  $t_{rr}$  versus  $-di_F / dt$

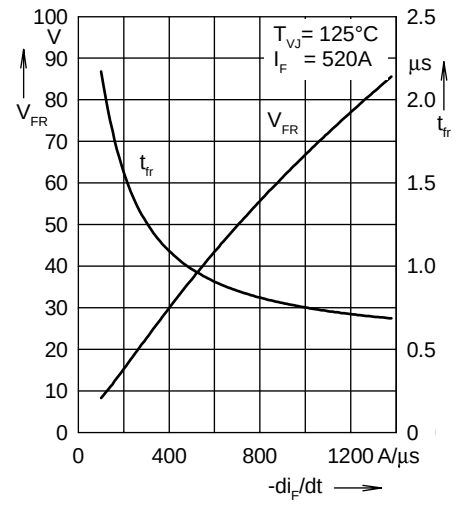


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F / dt$

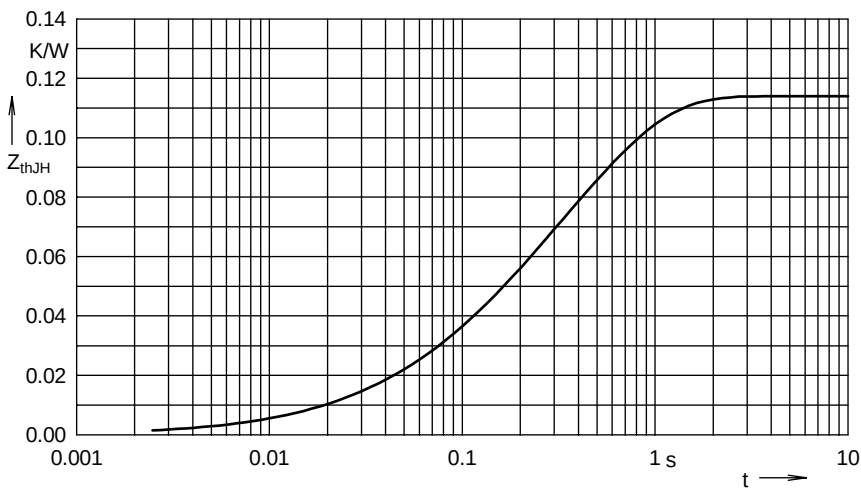


Fig. 7 Transient thermal impedance junction to case

Constants for  $Z_{thJS}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.001           | 0.08      |
| 2 | 0.004           | 0.024     |
| 3 | 0.027           | 0.112     |
| 4 | 0.082           | 0.464     |