

# FRED Module

$$V_{RRM} = 1200 \text{ V}$$

$$I_{FAV} = 75 \text{ A}$$

$$t_{rr} = 230 \text{ ns}$$

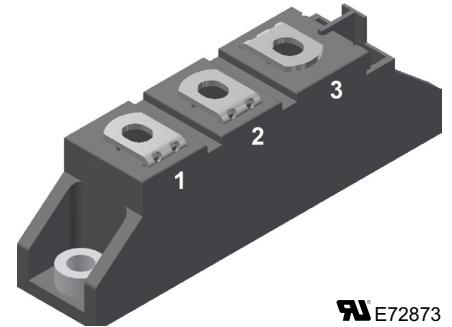
## Fast Recovery Epitaxial Diode

### Part number

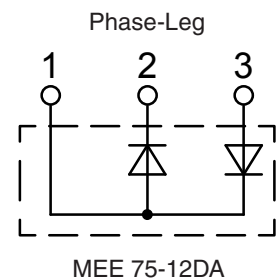
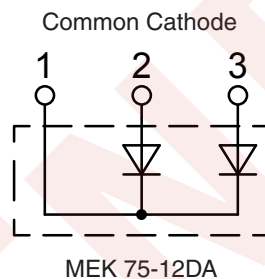
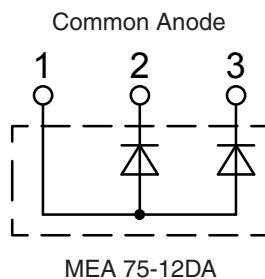
MEA 75-12DA

MEK 75-12DA

MEE 75-12DA



 E72873  
 Backside: isolated



### Features / Advantages:

- Planar passivated chips
- Low switching losses
- Soft recovery behaviour
- High reliability circuit operation
- Low voltage peaks for reduced protection circuits
- Low noise switching
- Low losses

### 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

### Package: TO-240AA

- Isolation voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Height: 30 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

### Disclaimer Notice

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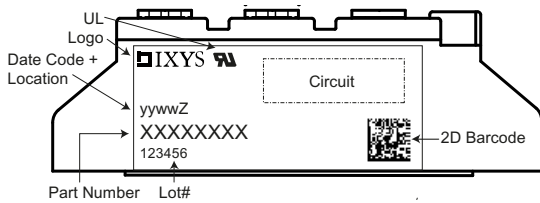


| Diode                                  |                                                                                |                                                                                                                     |                                                                                                        | Ratings |            |                                  |                                                                                  |
|----------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------|------------|----------------------------------|----------------------------------------------------------------------------------|
| Symbol                                 | Definitions                                                                    | Conditions                                                                                                          |                                                                                                        | min.    | typ.       | max.                             |                                                                                  |
| V <sub>RSM</sub>                       | max. non-repetitive reverse blocking voltage                                   | T <sub>VJ</sub> = 25°C                                                                                              |                                                                                                        |         |            | 1200                             | V                                                                                |
| V <sub>RRM</sub>                       | max. repetitive reverse blocking voltage                                       | T <sub>VJ</sub> = 25°C                                                                                              |                                                                                                        |         |            | 1200                             | V                                                                                |
| I <sub>R</sub>                         | reverse current                                                                | V <sub>R</sub> = V <sub>RRM</sub><br>V <sub>R</sub> = 0.8·V <sub>RRM</sub><br>V <sub>R</sub> = 0.8·V <sub>RRM</sub> | T <sub>VJ</sub> = 25°C<br>T <sub>VJ</sub> = 25°C<br>T <sub>VJ</sub> = 125°C                            |         |            | 2<br>0.5<br>34                   | mA<br>mA<br>mA                                                                   |
| V <sub>F</sub>                         | forward voltage                                                                | I <sub>F</sub> = 100 A<br><br>I <sub>F</sub> = 300 A                                                                | T <sub>VJ</sub> = 25°C<br>T <sub>VJ</sub> = 125°C<br>T <sub>VJ</sub> = 25°C<br>T <sub>VJ</sub> = 125°C |         |            | 2.17<br>1.85<br>2.64<br>2.58     | V<br>V<br>V<br>V                                                                 |
| I <sub>FRMS</sub>                      | RMS forward current                                                            | T <sub>C</sub> = 75°C                                                                                               |                                                                                                        |         |            | 107                              | A                                                                                |
| I <sub>FAV</sub> ①                     | average forward current                                                        | T <sub>C</sub> = 75°C<br>rectangular, d = 0.5                                                                       | T <sub>VJ</sub> = 150°C                                                                                |         |            | 75                               | A                                                                                |
| V <sub>TO</sub><br>r <sub>T</sub>      | threshold voltage<br>slope resistance                                          | for power-loss calculations only                                                                                    | T <sub>VJ</sub> = T <sub>VJM</sub>                                                                     |         |            | 1.48<br>3.65                     | V<br>mΩ                                                                          |
| R <sub>thJC</sub><br>R <sub>thCH</sub> | thermal resistance junction to case<br>thermal resistance junction to heatsink |                                                                                                                     |                                                                                                        |         | 0.10       | 0.45                             | K/W<br>K/W                                                                       |
| P <sub>tot</sub>                       |                                                                                | T <sub>C</sub> = 25°C                                                                                               |                                                                                                        |         |            | 280                              | W                                                                                |
| I <sub>FSM</sub>                       | max. surge forward current                                                     | t = 10 ms (50 Hz), sine<br>t = 8.3 ms (60 Hz), sine<br><br>t = 10 ms (50 Hz), sine<br>t = 8.3 ms (60 Hz), sine      | T <sub>VJ</sub> = 45°C<br><br><br>T <sub>VJ</sub> = 150°C                                              |         |            | 1200<br>1300<br><br>1080<br>1170 | A<br>A<br><br>A<br>A                                                             |
| I <sup>2</sup> t                       | I <sup>2</sup> t value for fusing                                              | t = 10 ms (50 Hz), sine<br>t = 8.3 ms (60 Hz), sine<br><br>t = 10 ms (50 Hz), sine<br>t = 8.3 ms (60 Hz), sine      | T <sub>VJ</sub> = 45°C<br><br><br>T <sub>VJ</sub> = 150°C                                              |         |            | 7200<br>7100<br><br>5800<br>5700 | A <sup>2</sup> s<br>A <sup>2</sup> s<br><br>A <sup>2</sup> s<br>A <sup>2</sup> s |
| t <sub>rr</sub>                        | max. reverse recovery current                                                  | I <sub>F</sub> = 70 A; V <sub>R</sub> = 600 V                                                                       | T <sub>VJ</sub> = 25°C<br>T <sub>VJ</sub> = 100°C                                                      |         | 140<br>230 | 200<br>300                       | ns<br>ns                                                                         |
| I <sub>RM</sub>                        | reverse recovery time                                                          | -di/dt = 400 A/μs; L ≤ 0.05 μH                                                                                      | T <sub>VJ</sub> = 25°C<br>T <sub>VJ</sub> = 100°C                                                      |         | 25<br>33   | 30<br>40                         | A<br>A                                                                           |

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



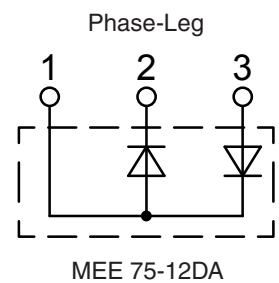
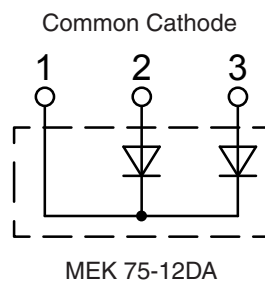
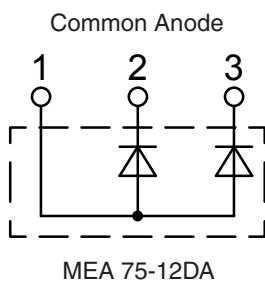
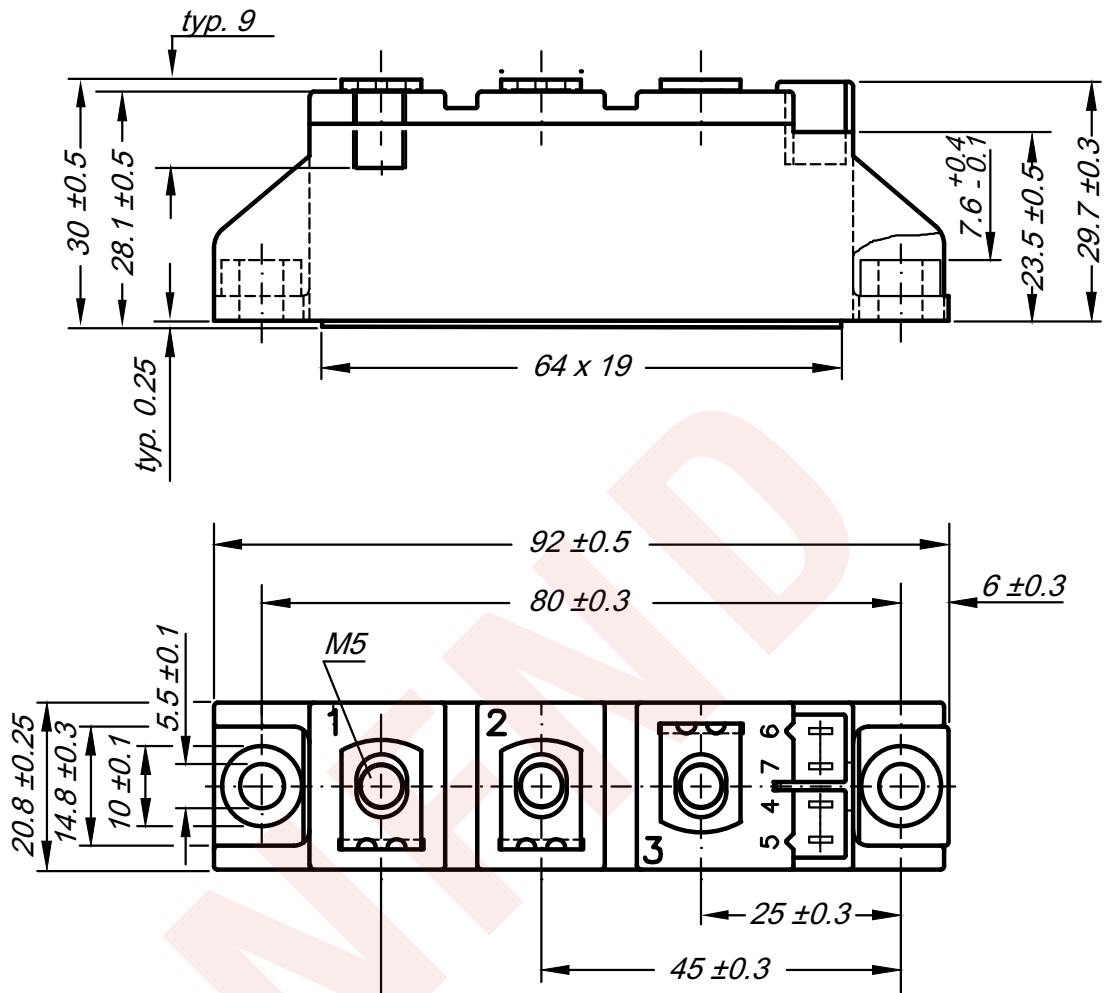
| Package TO-240AA |                                                              |                                  |                                     | Ratings      |      |        |
|------------------|--------------------------------------------------------------|----------------------------------|-------------------------------------|--------------|------|--------|
| Symbol           | Definitions                                                  | Conditions                       |                                     | min.         | typ. | max.   |
| $I_{RMS}$        | RMS current                                                  | per terminal                     |                                     |              |      | 200 A  |
| $T_{VJ}$         | virtual junction temperature                                 |                                  |                                     | -40          |      | 150 °C |
| $T_{op}$         | operation temperature                                        |                                  |                                     | -40          |      | 125 °C |
| $T_{stg}$        | storage temperature                                          |                                  |                                     | -40          |      | 125 °C |
| Weight           |                                                              |                                  |                                     |              | 76   | g      |
| $M_D$            | mounting torque                                              |                                  |                                     | 2.5          |      | 4 Nm   |
| $M_T$            | terminal torque                                              |                                  |                                     | 2.5          |      | 4 Nm   |
| $d_{Spp/App}$    | creepage distance on surface   striking distance through air | terminal to terminal             | 13.0                                | 9.7          |      | mm     |
| $d_{Spb/Apb}$    |                                                              | terminal to backside             | 16.0                                | 16.0         |      | mm     |
| $V_{ISOL}$       | isolation voltage                                            | $t = 1$ second<br>$t = 1$ minute | 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | 4800<br>4000 |      | V<br>V |



| Ordering | Part Name   | Marking on Product | Delivering Mode | Base Qty | Ordering Code |
|----------|-------------|--------------------|-----------------|----------|---------------|
| Standard | MEA 75-12DA | MEA 75-12DA        | Box             | 36       | 469130        |
| Standard | MEK 75-12DA | MEK 75-12DA        | Box             | 36       | 468541        |
| Standard | MEE 75-12DA | MEE 75-12DA        | Box             | 36       | 469297        |



**Outlines TO-240AA**



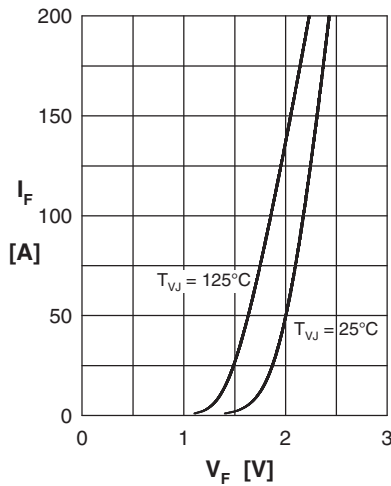
**Curves**


Fig. 1 Typ. forward current  $I_F$  vs. voltage drop  $V_F$  per leg

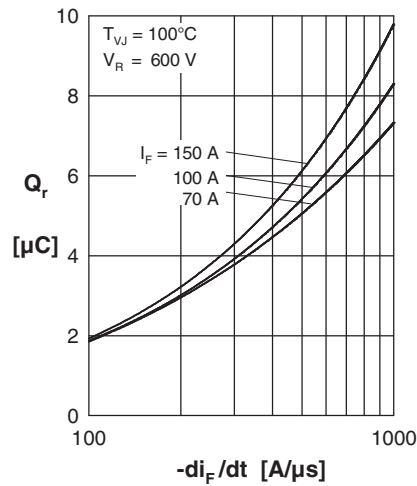


Fig. 2 Typ. reverse recovery charge  $Q_r$  versus  $-di_F/dt$

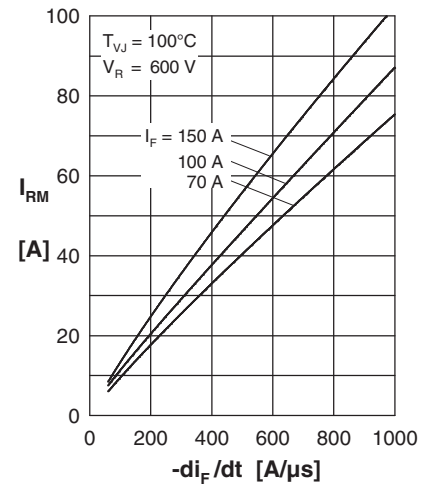


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

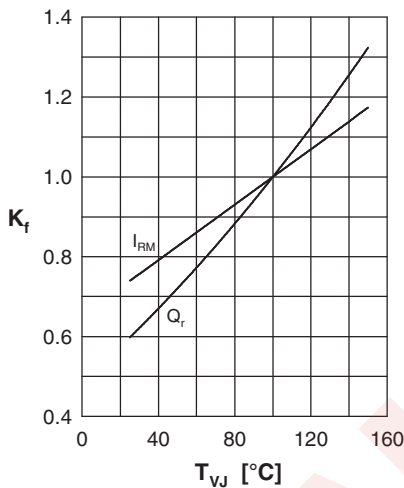


Fig. 4 Typ. dynamic parameters  $Q_r$ ,  $I_{RM}$  vs. junction temperature  $T_{VJ}$

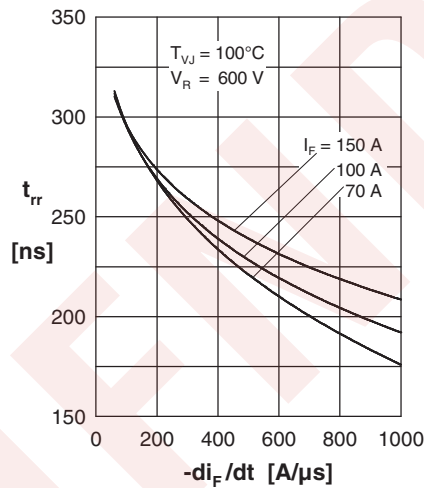


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

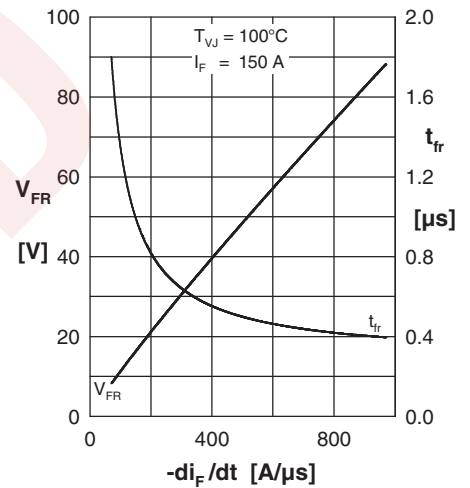


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $-di_F/dt$

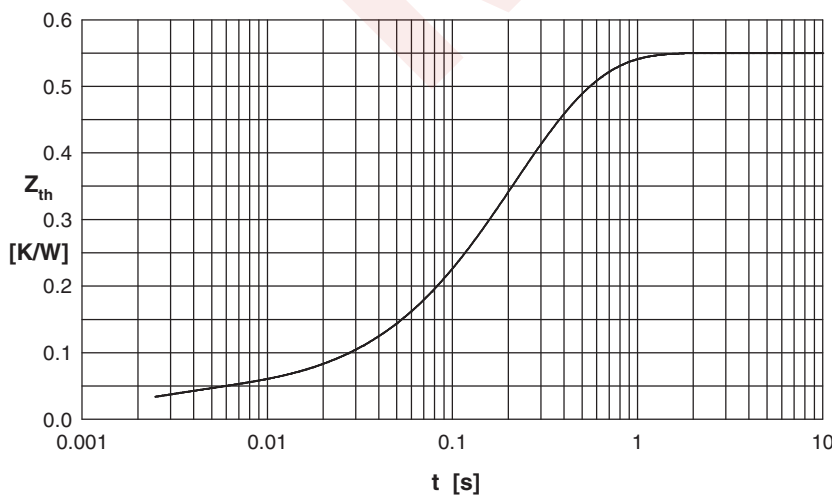


Fig. 7 Typ. transient thermal impedance junction to heatsink

Constants for  $Z_{thJS}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.037           | 0.002     |
| 2 | 0.138           | 0.134     |
| 3 | 0.093           | 0.250     |
| 4 | 0.282           | 0.274     |