

FRED Module

Fast Recovery Epitaxial Diode

Single Diode

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


$$I_{FAVM} = 453 \text{ A}$$

$$t_{rr} = 500 \text{ ns}$$

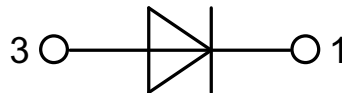
Part number

MEO 450-12DA



 E72873

Backside: isolated



Features / Advantages:

- International standard package with DCB ceramic base plate
- Planar passivated chips
- Short recovery time
- 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: Y4-M6

- Isolation voltage: 3600 V~
- Industry standard outline
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Disclaimer Notice

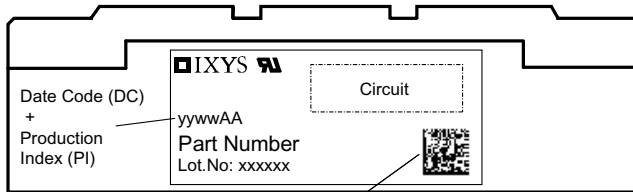
Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

| Diode | | | | Ratings | | | |
|-------------|---|--|-------------------------|---------|-------|-------|-------------------|
| Symbol | Definitions | Conditions | min. | typ. | max. | | |
| V_{RSM} | max. non-repetitive reverse | | $T_{VJ} = 25^{\circ}C$ | | | 1200 | V |
| V_{RRM} | max. repetitive reverse | | $T_{VJ} = 25^{\circ}C$ | | | 1200 | V |
| I_R | reverse current | $V_R = V_{RRM}$ $V_R = 0.8 \cdot V_{RRM}$ $V_R = 0.8 \cdot V_{RRM}$ | $T_{VJ} = 25^{\circ}C$ | | | 24 | mA |
| | | | $T_{VJ} = 25^{\circ}C$ | | | 6 | mA |
| | | | $T_{VJ} = 125^{\circ}C$ | | | 120 | mA |
| V_F | forward voltage | $I_F = 300 A$ | $T_{VJ} = 25^{\circ}C$ | | | 1.78 | V |
| | | | $T_{VJ} = 125^{\circ}C$ | | | 1.51 | V |
| | | $I_F = 520 A$ | $T_{VJ} = 25^{\circ}C$ | | | 1.96 | V |
| | | | $T_{VJ} = 125^{\circ}C$ | | | 1.76 | V |
| I_{FRMS} | RMS forward current | | $T_C = 75^{\circ}C$ | | | 640 | A |
| I_{FAV} ① | average forward current | $T_C = 75^{\circ}C$ rectangular, d = 0.5 | $T_{VJ} = 150^{\circ}C$ | | | 453 | A |
| V_{TO} | threshold voltage | for power-loss calculations only | $T_{VJ} = T_{VJM}$ | | | 1.16 | V |
| r_T | slope resistance | | | | | 1.15 | m Ω |
| R_{thJC} | thermal resistance junction to case | | | | | 0.071 | K/W |
| R_{thCH} | thermal resistance junction to heatsink | | | | 0.043 | | K/W |
| P_{tot} | total power dissipation | | $T_{VJ} = 25^{\circ}C$ | | | 1750 | W |
| I_{FSM} | max. surge forward current | t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine | $T_{VJ} = 45^{\circ}C$ | | | 4.80 | kA |
| | | | | | | 5.28 | kA |
| | | | $T_{VJ} = 150^{\circ}C$ | | | 4.32 | kA |
| | | | | | | 4.75 | kA |
| I^2t | I^2t value for fusing | t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine | $T_{VJ} = 45^{\circ}C$ | | | 115.2 | kA ² s |
| | | | | | | 117.1 | kA ² s |
| | | | $T_{VJ} = 150^{\circ}C$ | | | 93.3 | kA ² s |
| | | | | | | 94.8 | kA ² s |
| t_{rr} | max. reverse recovery current | $I_F = 450 A$; $-di_F/dt = 800 A/\mu s$ | $T_{VJ} = 25^{\circ}C$ | | 250 | 300 | ns |
| | | | $T_{VJ} = 100^{\circ}C$ | | 500 | 600 | ns |
| I_{RM} | reverse recovery time | $V_R = 600 V$; $L \leq 0.05 \mu H$ | $T_{VJ} = 25^{\circ}C$ | | 80 | 100 | A |
| | | | $T_{VJ} = 100^{\circ}C$ | | 125 | 150 | A |

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

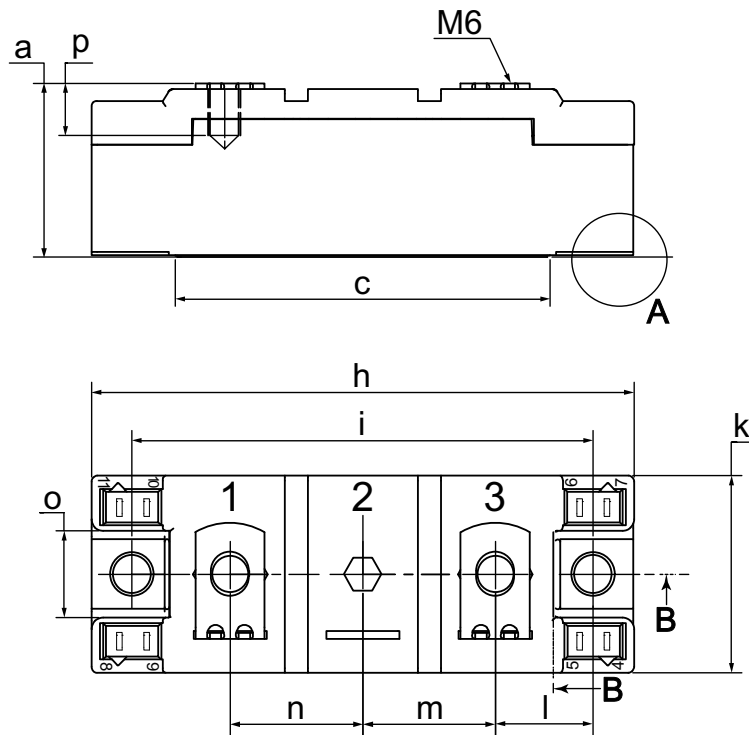


| Package Y4-M6 | | | | Ratings | | |
|---------------|--|------------------------------|-------------------------------------|---------|--------------|--------|
| Symbol | Definitions | Conditions | min. | typ. | max. | |
| I_{RMS} | RMS current | per terminal | | | 300 | A |
| T_{VJ} | virtual junction temperature | | -40 | | 150 | °C |
| T_{op} | operation temperature | | -40 | | 125 | °C |
| T_{stg} | storage temperature | | -40 | | 125 | °C |
| Weight | | | | | 108 | g |
| M_D | mounting torque | | 2.25 | | 2.75 | Nm |
| M_T | terminal torque | | 4.5 | | 5.5 | Nm |
| $d_{Spp/App}$ | creepage distance on surface striking distance through air | terminal to terminal | 14.0 | 10.0 | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 16.0 | 16.0 | | mm |
| V_{ISOL} | isolation voltage | t = 1 second t = 1 minute | 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | | 3600 3000 | V V |

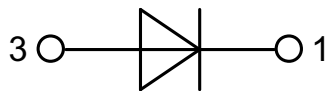
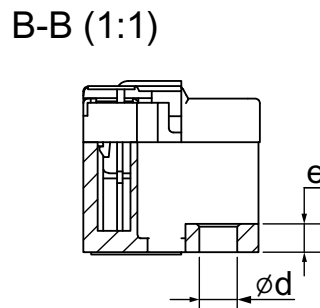
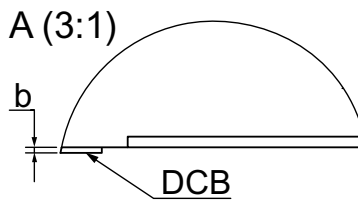


Data Matrix: part no. (1-19), DC + PI (20-25), lot.no.# (26-31), blank (32), serial no.# (33-36)

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | MEO 450-12DA | MEO 450-12DA | Box | 6 | 464635 |

Outlines Y4-M6


| Dim. | MIN [mm] | MAX [mm] | MIN [inch] | MAX [inch] |
|------|-----------|----------|------------|------------|
| a | 30.0 | 30.6 | 1.181 | 1.205 |
| b | typ. 0.25 | | typ. 0.010 | |
| c | 64.0 | 65.0 | 2.520 | 2.559 |
| d | 6.5 | 7.0 | 0.256 | 0.275 |
| e | 4.9 | 5.1 | 0.193 | 0.201 |
| h | 93.5 | 94.5 | 3.681 | 3.720 |
| i | 79.5 | 80.5 | 3.130 | 3.169 |
| k | 33.4 | 34.0 | 1.315 | 1.339 |
| l | 16.7 | 17.3 | 0.657 | 0.681 |
| m | 22.7 | 23.3 | 0.894 | 0.917 |
| n | 22.7 | 23.3 | 0.894 | 0.917 |
| o | 14.0 | 15.0 | 0.551 | 0.591 |
| p | typ. 10.5 | | typ. 0.413 | |



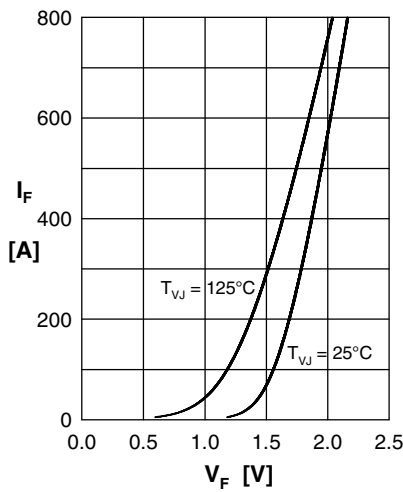
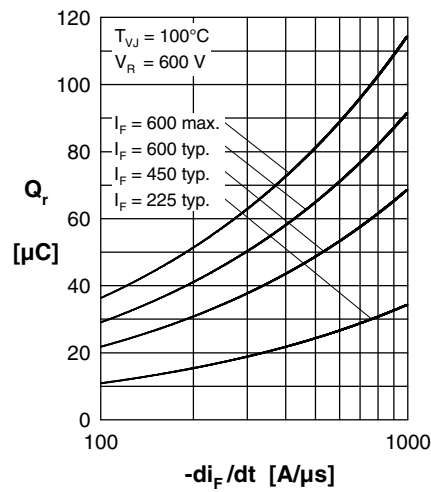
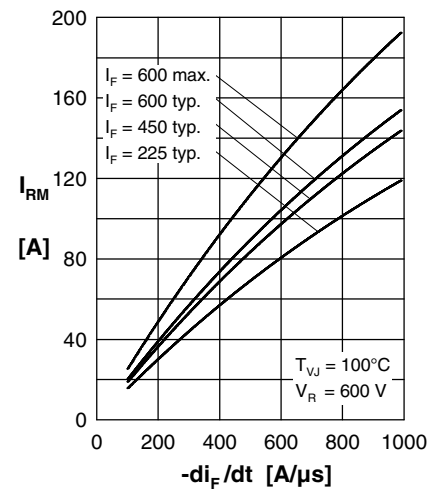
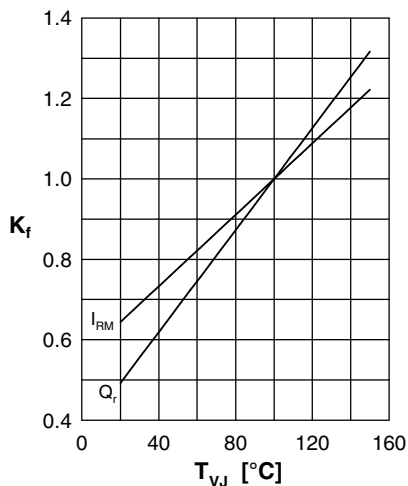
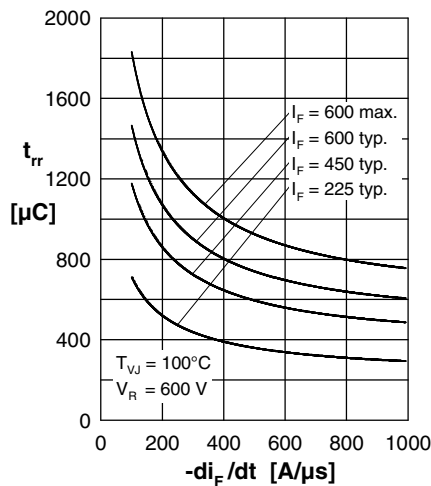
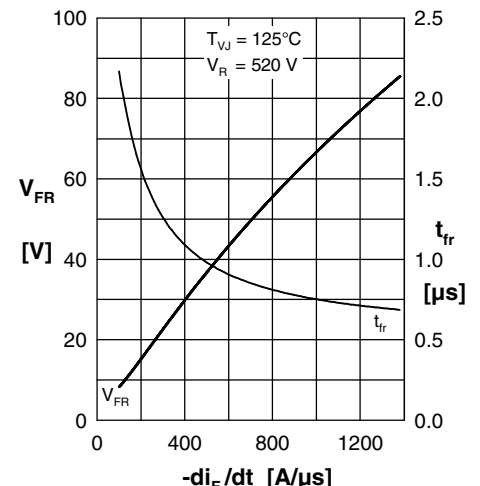
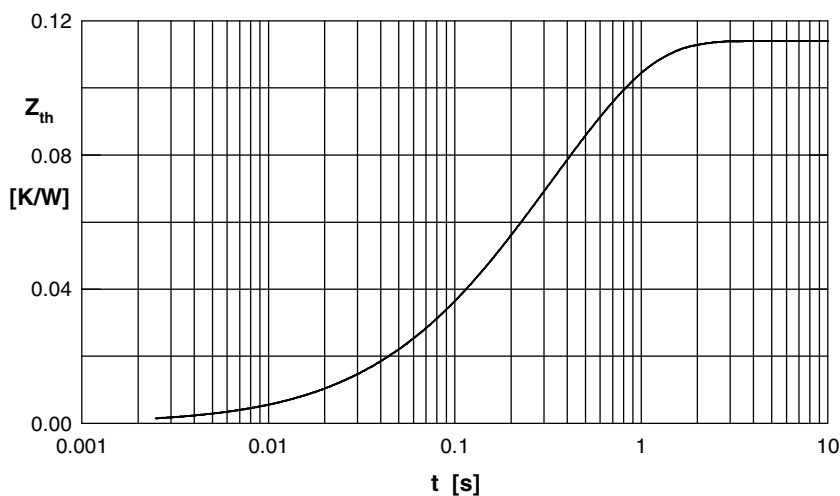
Curves

 Fig. 1 Typ. forward current I_F vs. V_F

 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} versus T_{VJ}

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

 Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus T_{VJ}


Fig. 7 Typ. transient thermal impedance junction to case

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

 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 |