

# FRED Module

Fast Recovery Epitaxial Diode

Single Diode

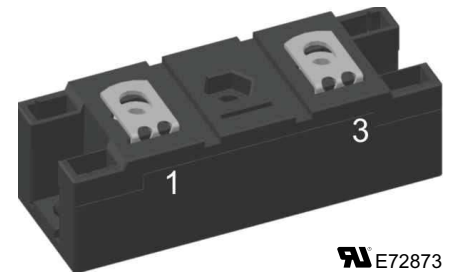
$$V_{RRM} = 600 \text{ V}$$


$$I_{FAVM} = 514 \text{ A}$$

$$t_{rr} = 250 \text{ ns}$$

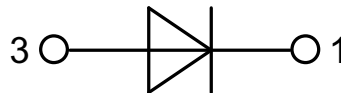
## Part number

MEO 500-06DA



 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

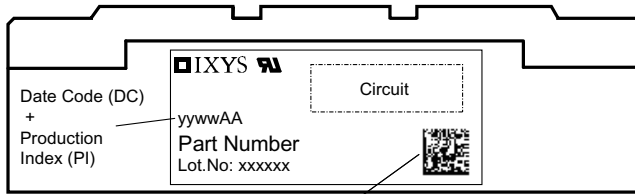
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Diode				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.		
$V_{RSM}$	max. non-repetitive reverse		$T_{VJ} = 25^{\circ}C$		600	V	
$V_{RRM}$	max. repetitive reverse		$T_{VJ} = 25^{\circ}C$		600	V	
$I_R$	reverse current	$V_R = V_{RRM}$ $V_R = 0.8 \cdot V_{RRM}$ $V_R = 0.8 \cdot V_{RRM}$	$T_{VJ} = 25^{\circ}C$		5	mA	
			$T_{VJ} = 25^{\circ}C$		4	mA	
			$T_{VJ} = 125^{\circ}C$		160	mA	
$V_F$	forward voltage	$I_F = 300 A$	$T_{VJ} = 25^{\circ}C$		1.35	V	
			$T_{VJ} = 125^{\circ}C$		1.17	V	
		$I_F = 520 A$	$T_{VJ} = 25^{\circ}C$		1.52	V	
			$T_{VJ} = 125^{\circ}C$		1.41	V	
$I_{FRMS}$	RMS forward current		$T_C = 75^{\circ}C$		726	A	
$I_{FAV}$ ①	average forward current	$T_C = 75^{\circ}C$ rectangular, d = 0.5	$T_{VJ} = 150^{\circ}C$		514	A	
$V_{TO}$	threshold voltage	for power-loss calculations only	$T_{VJ} = T_{VJM}$		0.85	V	
$r_T$	slope resistance				1.09	mΩ	
$R_{thJC}$	thermal resistance junction to case			0.043	0.071	K/W	
$R_{thCH}$	thermal resistance junction to heatsink					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 <sup>2</sup> s	
					117.1	kA <sup>2</sup> s	
			$T_{VJ} = 150^{\circ}C$		93.3	kA <sup>2</sup> s	
					94.8	kA <sup>2</sup> s	
$t_{rr}$	max. reverse recovery current	$I_F = 600 A$ ; $-di_F/dt = 800 A/\mu s$	$T_{VJ} = 25^{\circ}C$		140	200	ns
			$T_{VJ} = 100^{\circ}C$		250	300	ns
$I_{RM}$	reverse recovery time	$V_R = 300 V$ ; $L \leq 0.05 \mu H$	$T_{VJ} = 25^{\circ}C$		70	88	A
			$T_{VJ} = 100^{\circ}C$		110	132	A

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

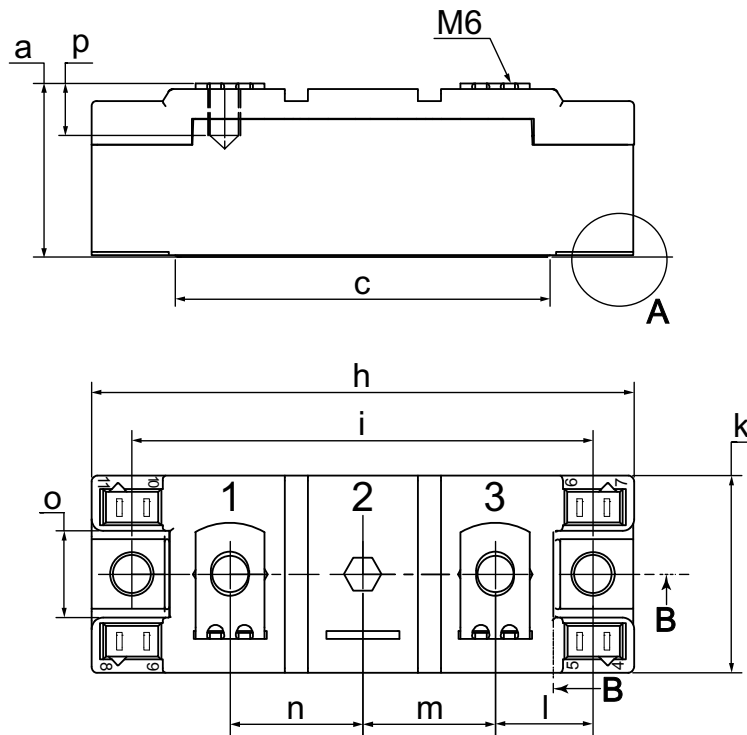


Package Y4-M6				Ratings		
Symbol	Definitions	Conditions	min.	typ.	max.	
$I_{RMS}$	RMS current	per terminal			300	A
$T_{VJ}$	virtual junction temperature		-40		150	°C
$T_{op}$	operation temperature		-40		125	°C
$T_{stg}$	storage temperature		-40		125	°C
<b>Weight</b>					150	g
$M_D$	mounting torque		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
$d_{Spb/Appb}$		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

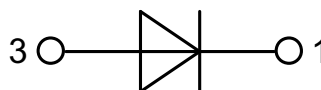
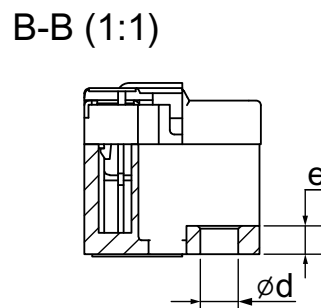
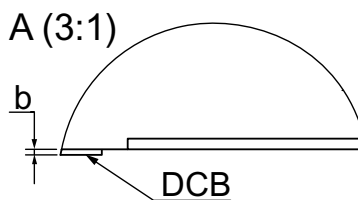


Data Matrix: part no. (1-19), DC + PI (20-25), lot.no.# (26-31), blank (32), serial no.# (33-36)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MEO 500-06DA	MEO 500-06DA	Box	6	464643

**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	



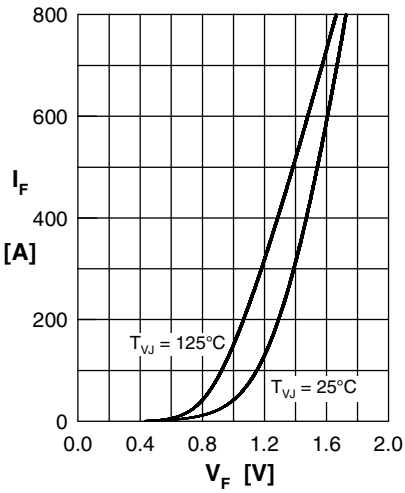
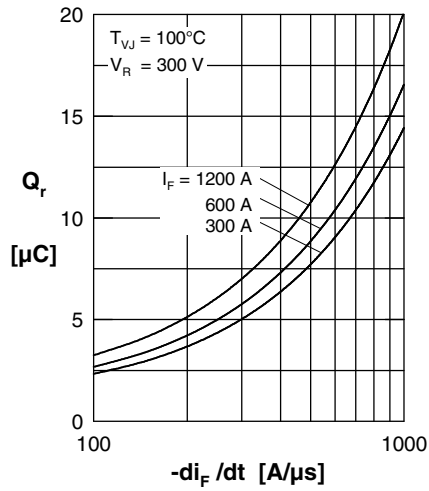
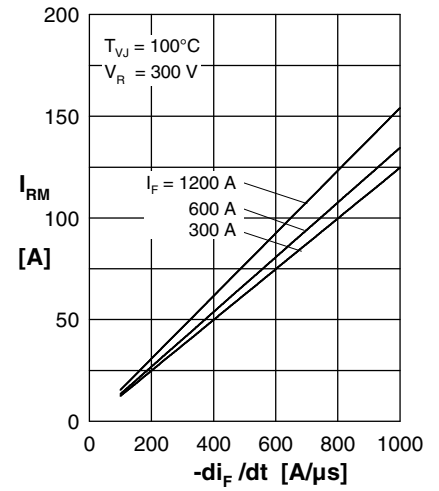
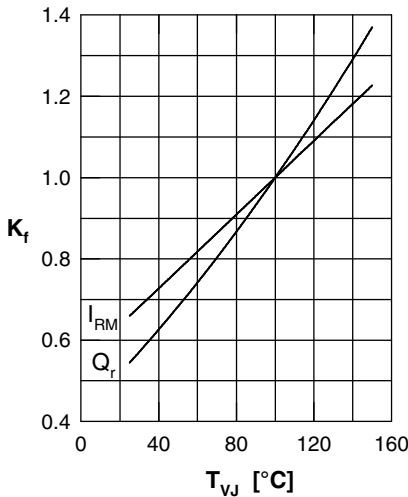
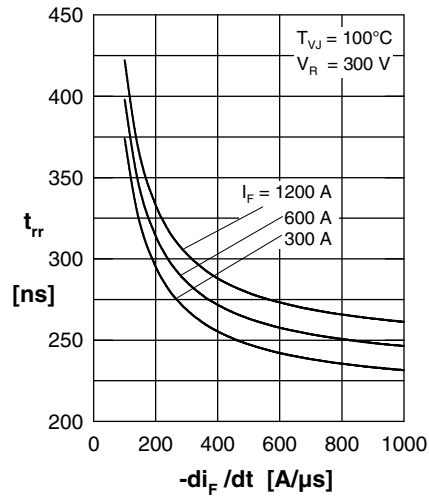
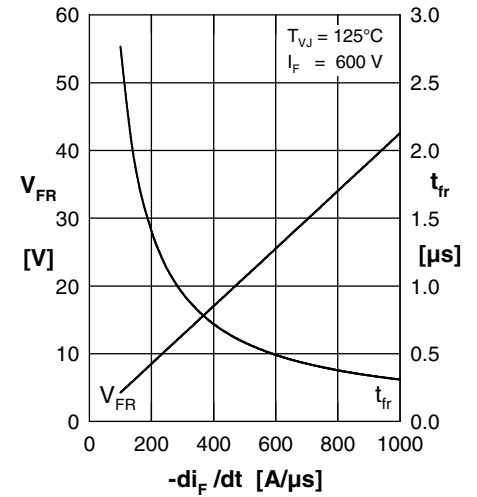
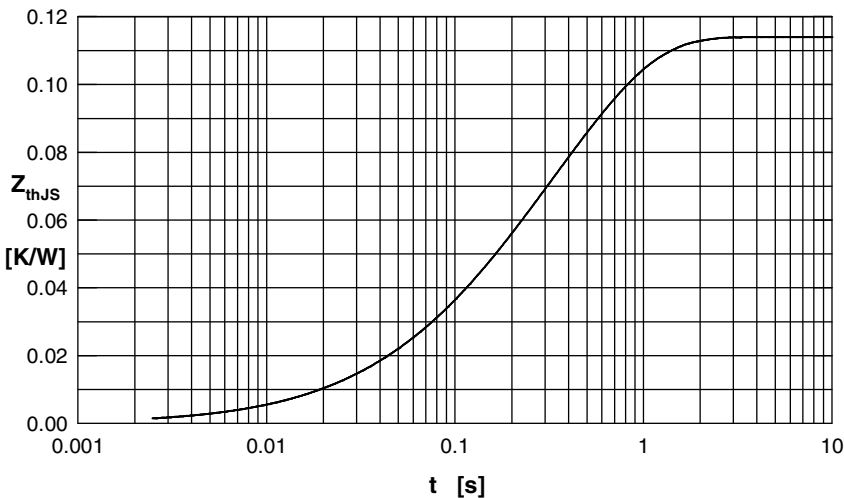
**Curves**

 Fig. 1 Typ. forward current  $I_F$  vs 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	0.001	0.080
2	0.004	0.024
3	0.027	0.112
4	0.082	0.464