

# FRED Module


## Fast Recovery Epitaxial Diode

$V_{RRM} = 1200\text{ V}$   
 $I_{FAVM} = 260\text{ A}$   
 $t_{rr} = 400\text{ ns}$

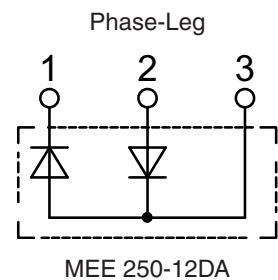
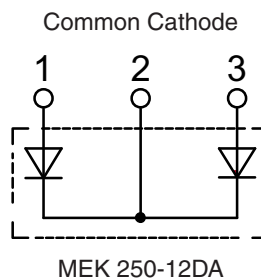
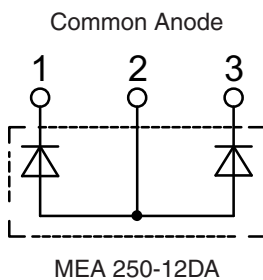
### Part number

MEA 250-12DA  
 MEK 250-12DA  
 MEE 250-12DA



 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

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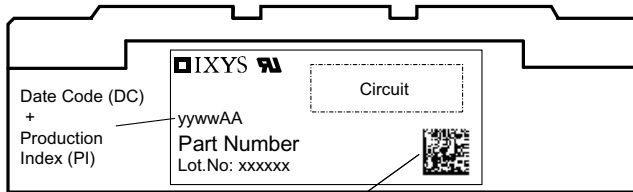


Diode				Ratings		
Symbol	Definitions	Conditions	min.	typ.	max.	
$V_{RSM}$	max. non-repetitive reverse		$T_{VJ} = 25^{\circ}C$		1200	V
$V_{RRM}$	max. repetitive reverse		$T_{VJ} = 25^{\circ}C$		1200	V
$I_R$	reverse current	$V_R = V_{RRM}$ $V_R = 0.8 \cdot V_{RRM}$ $V_R = 0.8 \cdot V_{RRM}$	$T_{VJ} = 25^{\circ}C$		12	mA
			$T_{VJ} = 25^{\circ}C$		3	mA
			$T_{VJ} = 125^{\circ}C$		60	mA
$V_F$	forward voltage	$I_F = 150 A$	$T_{VJ} = 25^{\circ}C$		1.69	V
			$T_{VJ} = 125^{\circ}C$		1.38	V
		$I_F = 260 A$	$T_{VJ} = 25^{\circ}C$		1.80	V
			$T_{VJ} = 125^{\circ}C$		1.54	V
$I_{FRMS}$	RMS forward current		$T_C = 75^{\circ}C$		367	A
$I_{FAV}$ ①	average forward current	$T_C = 75^{\circ}C$ rectangular, d = 0.5	$T_{VJ} = 150^{\circ}C$		260	A
$V_{TO}$	threshold voltage	for power-loss calculations only	$T_{VJ} = T_{VJM}$		1.16	V
$r_T$	slope resistance				1.46	mΩ
$R_{thJC}$	thermal resistance junction to case			0.085	0.143	K/W
$R_{thCH}$	thermal resistance junction to heatsink					K/W
$P_{tot}$	total power dissipation		$T_{VJ} = 25^{\circ}C$		875	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	$T_{VJ} = 45^{\circ}C$		2.40	kA
					2.64	kA
			$T_{VJ} = 150^{\circ}C$		2.16	kA
					2.38	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	$T_{VJ} = 45^{\circ}C$		28.8	kA <sup>2</sup> s
					29.3	kA <sup>2</sup> s
			$T_{VJ} = 150^{\circ}C$		23.3	kA <sup>2</sup> s
					23.8	kA <sup>2</sup> s
$t_{rr}$	max. reverse recovery current	$I_F = 250 A$ ; $-di_F/dt = 400 A/\mu s$	$T_{VJ} = 25^{\circ}C$	200	250	ns
			$T_{VJ} = 100^{\circ}C$	400	500	ns
$I_{RM}$	reverse recovery time	$V_R = 600 V$ ; $L \leq 0.05 \mu H$	$T_{VJ} = 25^{\circ}C$	44	52	A
			$T_{VJ} = 100^{\circ}C$	68	80	A

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

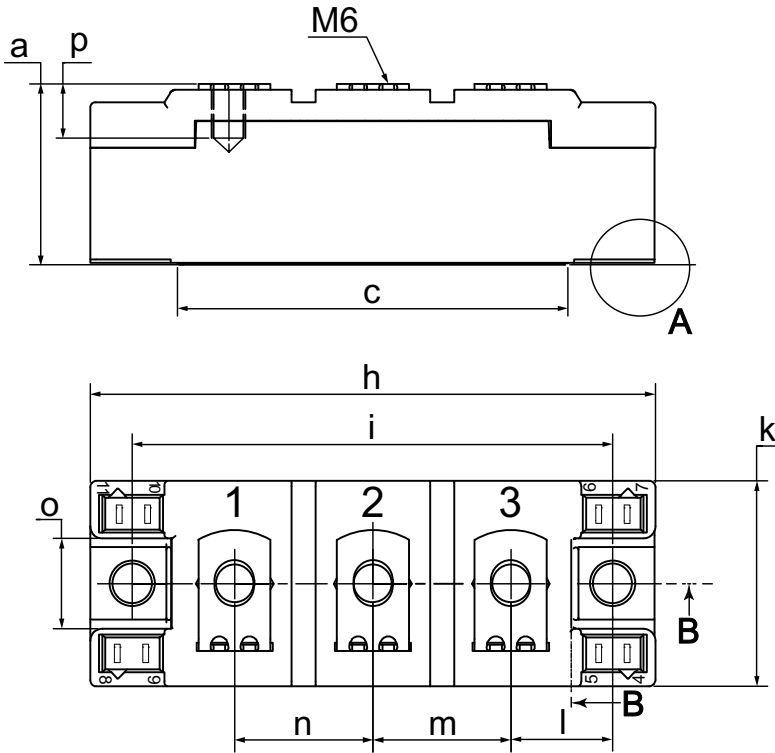


Package Y4-M6				Ratings		
Symbol	Definitions	Conditions	min.	typ.	max.	
$I_{RMS}$	RMS current	per terminal			300	A
$T_{VJ}$	virtual junction temperature		-40		150	°C
$T_{op}$	operation temperature		-40		125	°C
$T_{stg}$	storage temperature		-40		125	°C
<b>Weight</b>					126	g
$M_D$	mounting torque		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

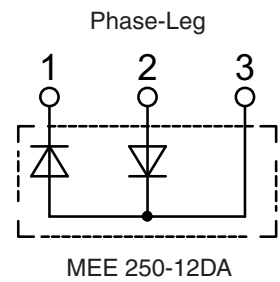
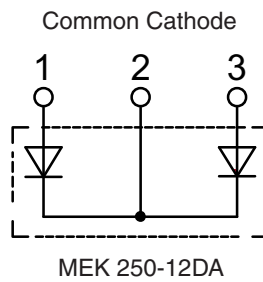
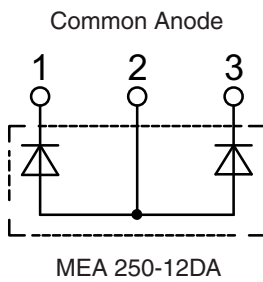
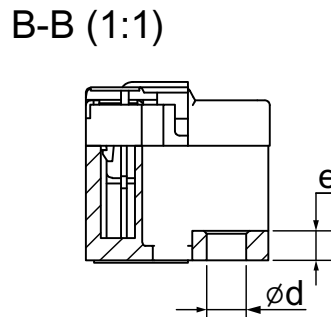
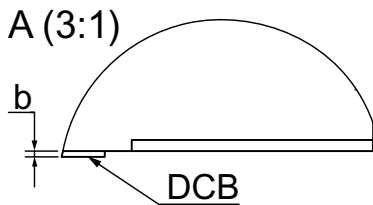


Data Matrix: part no. (1-19), DC + PI (20-25), lot.no.# (26-31), blank (32), serial no.# (33-36)

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MEA 250-12DA	MEA 250-12DA	Box	36	464678
Standard	MEK 250-12DA	MEK 250-12DA	Box	36	464627
Standard	MEE 250-12DA	MEE 250-12DA	Box	36	464694

**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	



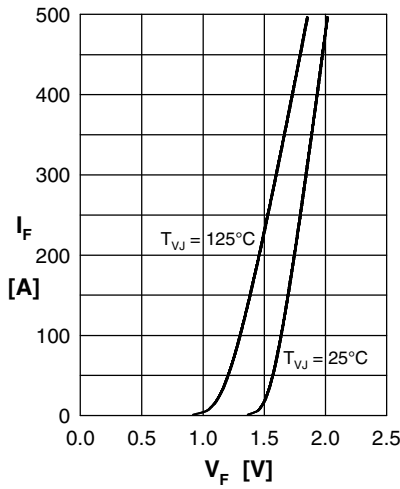
**Curves**


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

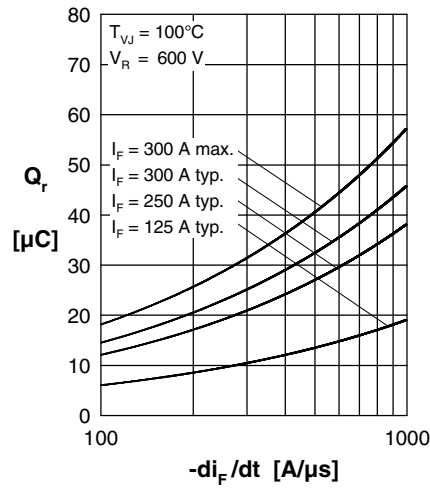


Fig. 2 Typ. reverse recovery charge  $Q_r$  versus  $-di_F/dt$

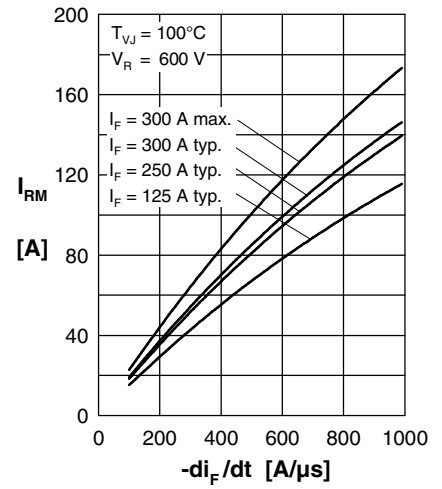


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

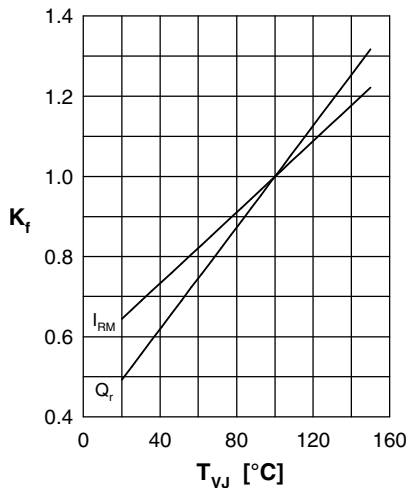


Fig. 4 Typ. dynamic parameters  $Q_r$ ,  $I_{RM}$  versus junction temperature  $T_{VJ}$

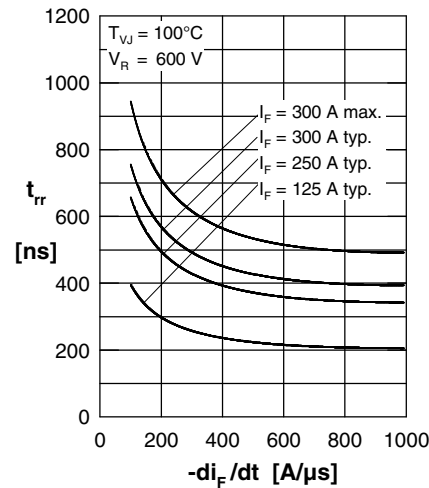


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

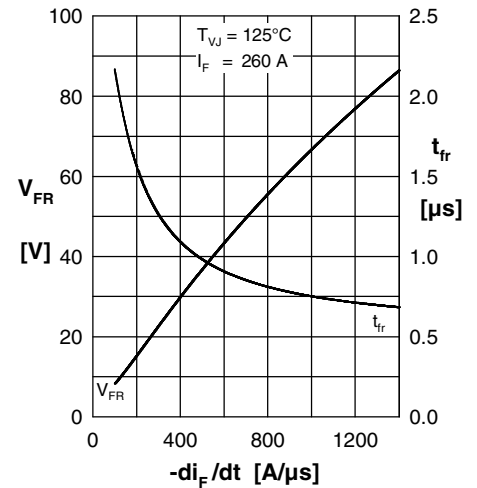


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $-di_F/dt$

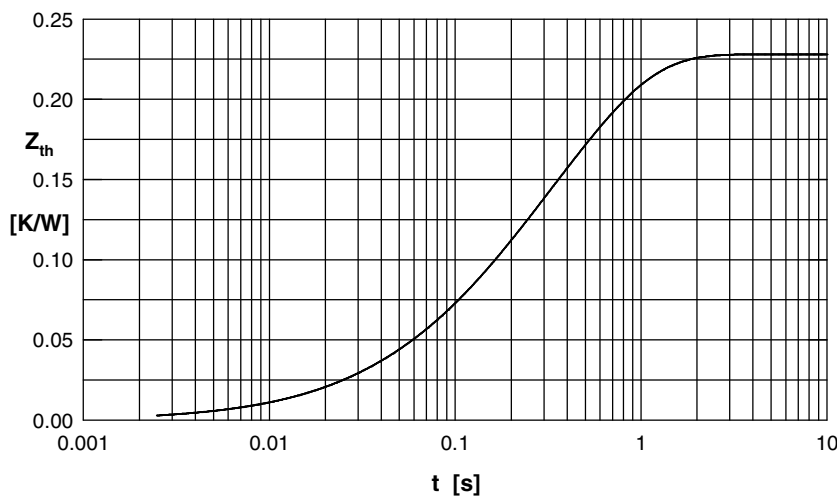


Fig. 7 Typ. transient thermal impedance junction to heatsink

Constants for  $Z_{thJS}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.002	0.08
2	0.008	0.024
3	0.054	0.112
4	0.164	0.464