

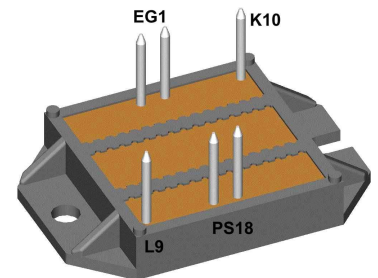
HiPerFRED Module

$$\begin{aligned} V_{RRM} &= 1200 \text{ V} \\ I_{DAV} &= 100 \text{ A} \\ t_{rr} &= 80 \text{ ns} \end{aligned}$$

High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 1~ Rectifier Bridge

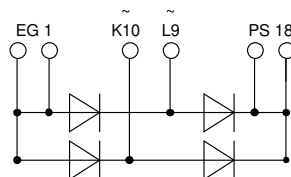
Part number

VBE100-12NO7



Backside: isolated

 E72873



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low I_{rm} -values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I_{rm} reduces:
 - Power dissipation within the diode
 - Turn-on loss in the commutating switch

Applications:

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package: ECO-PAC2

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate: Copper internally DCB isolated
- Advanced power cycling

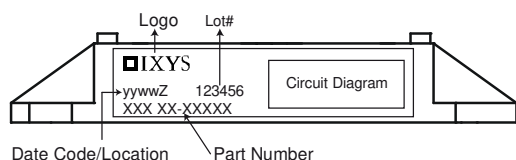
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Fast Diode				Ratings				
Symbol	Definition	Conditions		min.	typ.	max.	Unit	
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V	
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V	
I _R	reverse current, drain current	V _R = 1200 V	T _{VJ} = 25°C			100	μA	
		V _R = 1200 V	T _{VJ} = 150°C			2.5	mA	
V _F	forward voltage drop	I _F = 60 A	T _{VJ} = 25°C			2.70	V	
		I _F = 120 A				3.25	V	
		I _F = 60 A	T _{VJ} = 150°C			1.70	V	
		I _F = 120 A				2.30	V	
I _{DAV}	bridge output current	T _C = 70°C rectangular d = 0.5	T _{VJ} = 150°C			100	A	
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 150°C		1.28	V	
r _F	slope resistance					8.2	mΩ	
R _{thJC}	thermal resistance junction to case					0.8	K/W	
R _{thCH}	thermal resistance case to heatsink				0.20		K/W	
P _{tot}	total power dissipation	T _C = 25°C				155	W	
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V		T _{VJ} = 45°C		500	A	
C _J	junction capacitance	V _R = 600 V f = 1 MHz		T _{VJ} = 25°C	30		pF	
I _{RM}	max. reverse recovery current	} I _F = 60 A; V _R = 600 V -di _F /dt = 200 A/μs		T _{VJ} = 25 °C	13		A	
				T _{VJ} = 100 °C	20		A	
t _{rr}	reverse recovery time			T _{VJ} = 25 °C	80		ns	
				T _{VJ} = 100 °C	220		ns	



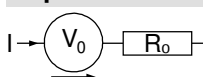
Package ECO-PAC2			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			100	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		125	°C
Weight				24		g
M_D	mounting torque		1.4		2	Nm
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	6.0			mm
$d_{Spb/Apb}$		terminal to backside	10.0			mm
V_{ISOL}	isolation voltage	t = 1 second	3600			V
		t = 1 minute	3000			V



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VBE100-12NO7	VBE100-12NO7	Box	25	494283

Equivalent Circuits for Simulation

* on die level

 $T_{VJ} = 150^{\circ}\text{C}$ **Fast Diode** $V_{0\max}$ threshold voltage

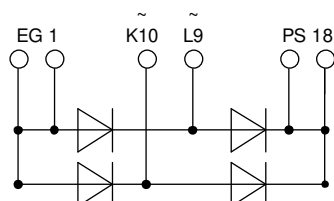
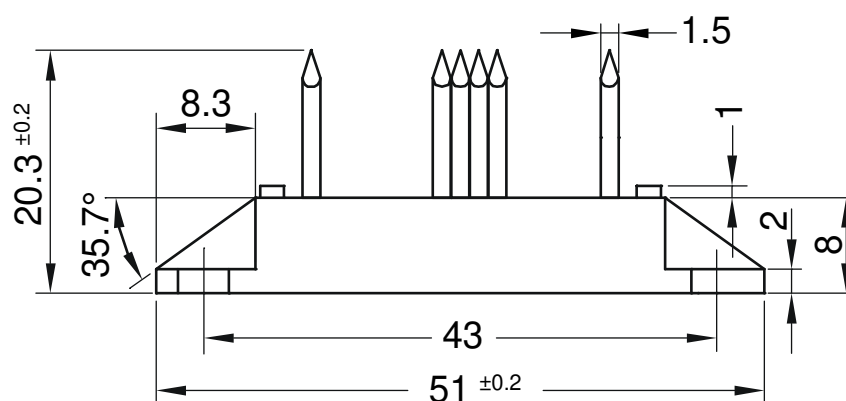
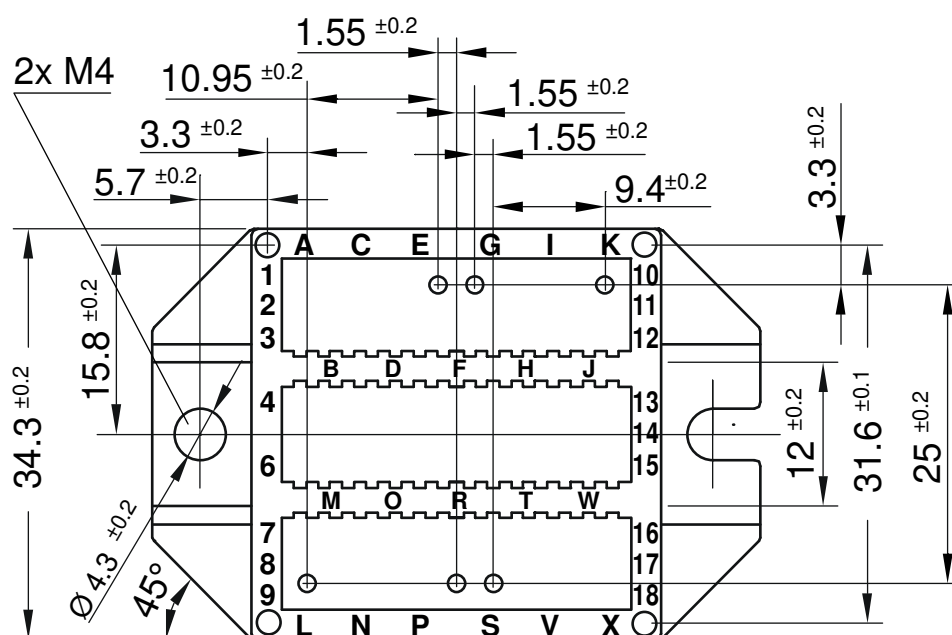
1.28

V

 $R_{0\max}$ slope resistance *

6.2

mΩ



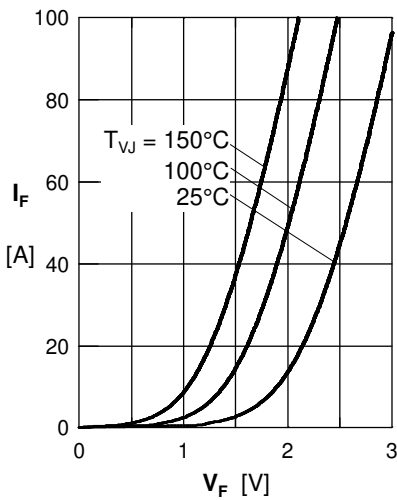
Fast Diode


Fig. 1 Forward current I_F versus V_F

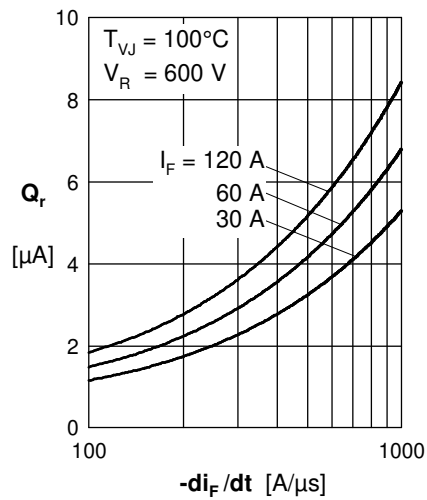


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

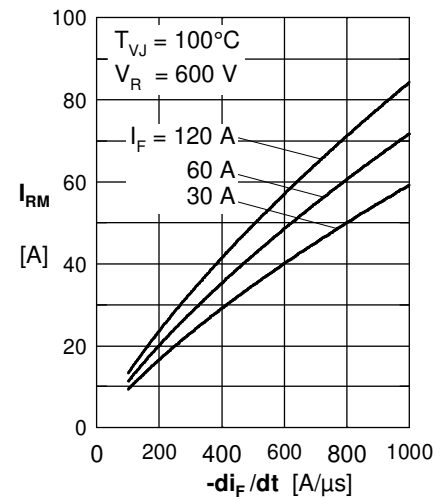


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

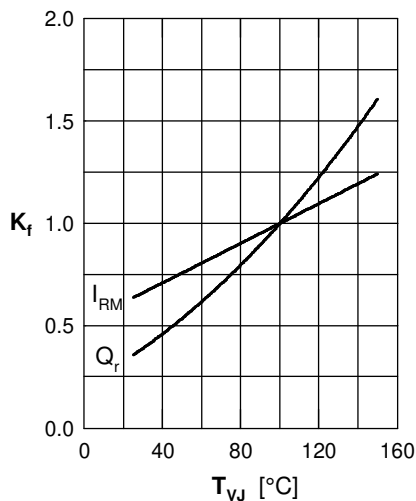


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

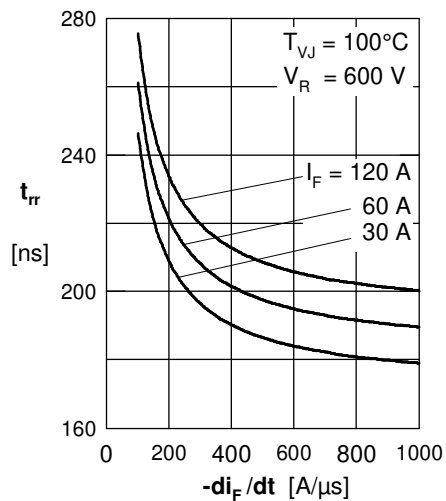


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

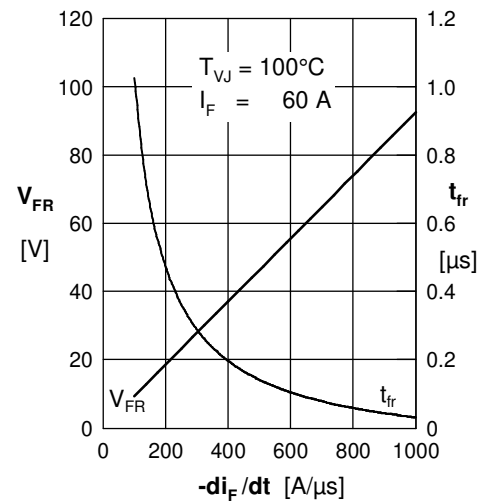


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

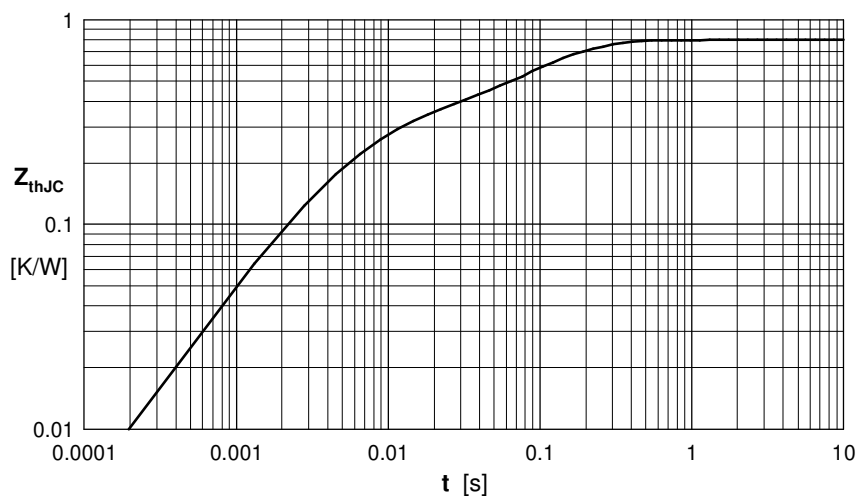


Fig. 7 Typical transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0010	0.0010
2	0.0790	0.0300
3	0.2500	0.0050
4	0.4700	0.1200