

HiPerFRED Module

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

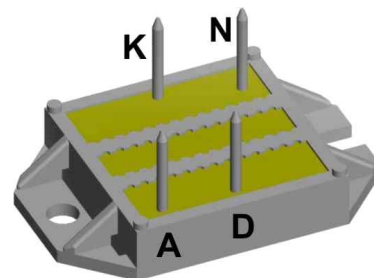
$$I_{DAV} = 19 \text{ A}$$

$$t_{rr} = 40 \text{ ns}$$

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

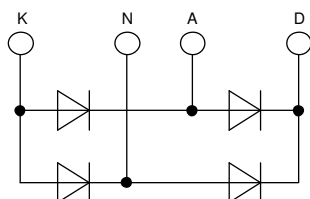
Part number

VBE17-12NO7



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-PAC1

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

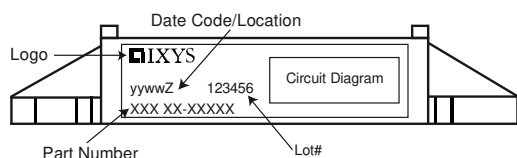
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Fast Diode				Ratings				
Symbol	Definition	Conditions		min.	typ.	max.	Unit	
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V	
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V	
I _R	reverse current, drain current	V _R = 1200 V	T _{VJ} = 25°C			60	μA	
		V _R = 1200 V	T _{VJ} = 125°C			0.25	mA	
V _F	forward voltage drop	I _F = 10 A	T _{VJ} = 25°C			2.92	V	
		I _F = 20 A				3.52	V	
		I _F = 10 A	T _{VJ} = 150°C			1.95	V	
		I _F = 20 A				2.52	V	
I _{DAV}	bridge output current	T _C = 85°C rectangular d = 1.5	T _{VJ} = 150°C			19	A	
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 150°C		1.39	V	
r _F	slope resistance					55	mΩ	
R _{thJC}	thermal resistance junction to case					2.5	K/W	
R _{thCH}	thermal resistance case to heatsink				0.30		K/W	
P _{tot}	total power dissipation	T _C = 25°C				50	W	
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V		T _{VJ} = 45°C		40	A	
C _J	junction capacitance	V _R = 600 V f = 1 MHz		T _{VJ} = 25°C	3		pF	
I _{RM}	max. reverse recovery current	} I _F = 10 A; V _R = 600 V -di _F /dt = 200 A/μs		T _{VJ} = 25 °C	5		A	
				T _{VJ} = 100 °C	8		A	
t _{rr}	reverse recovery time			T _{VJ} = 25 °C	40		ns	
				T _{VJ} = 100 °C	115		ns	



Package ECO-PAC1			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				19		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	VBE17-12NO7	VBE17-12NO7	Box	25	482773

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150^{\circ}\text{C}$



Fast Diode

$V_{0\max}$ threshold voltage

1.39

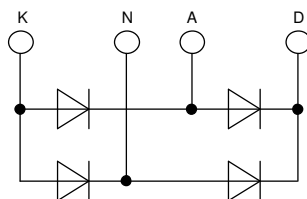
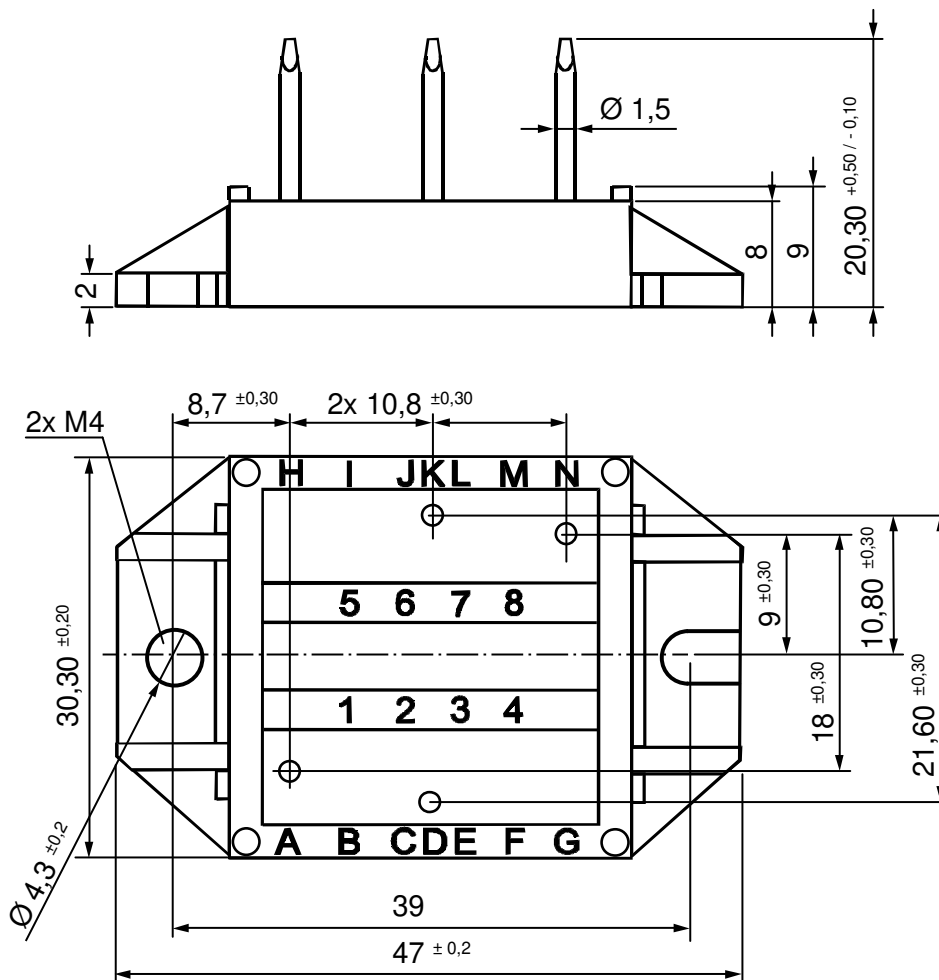
V

$R_{0\max}$ slope resistance *

53

mΩ

Outlines ECO-PAC1



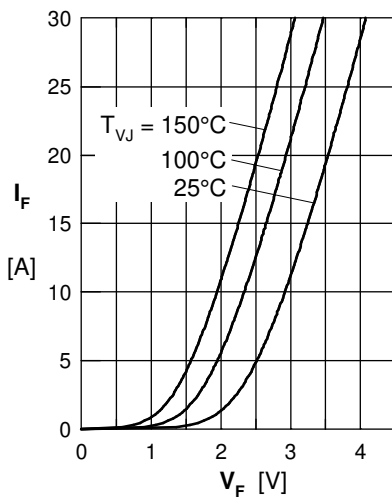
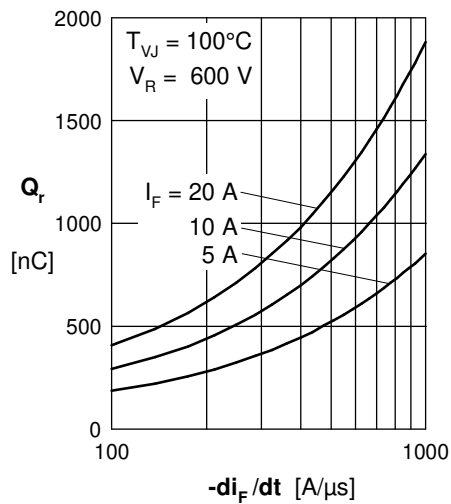
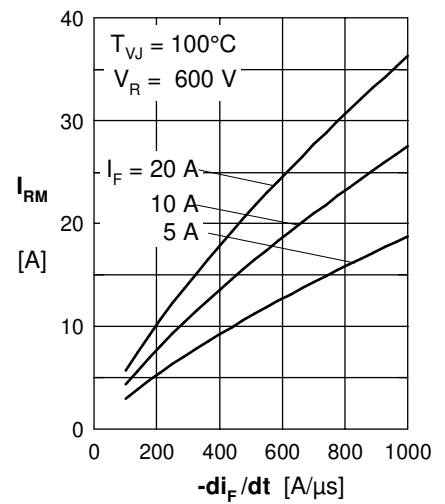
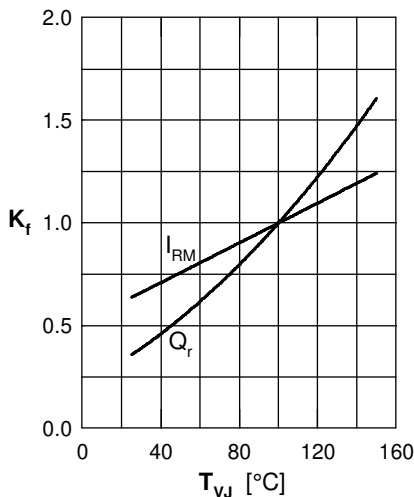
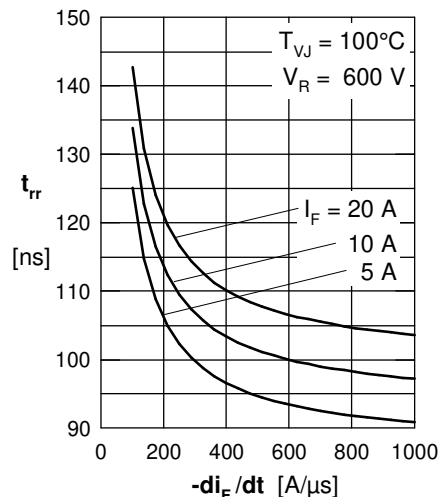
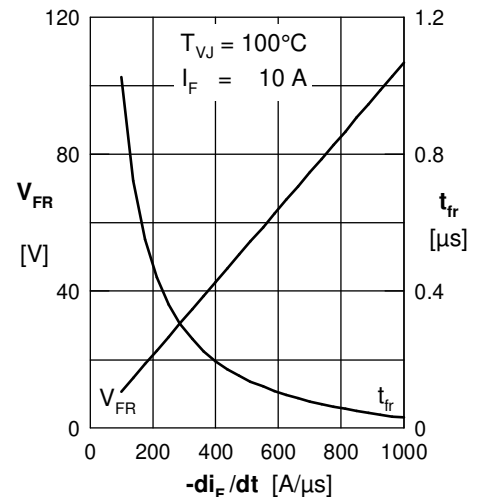
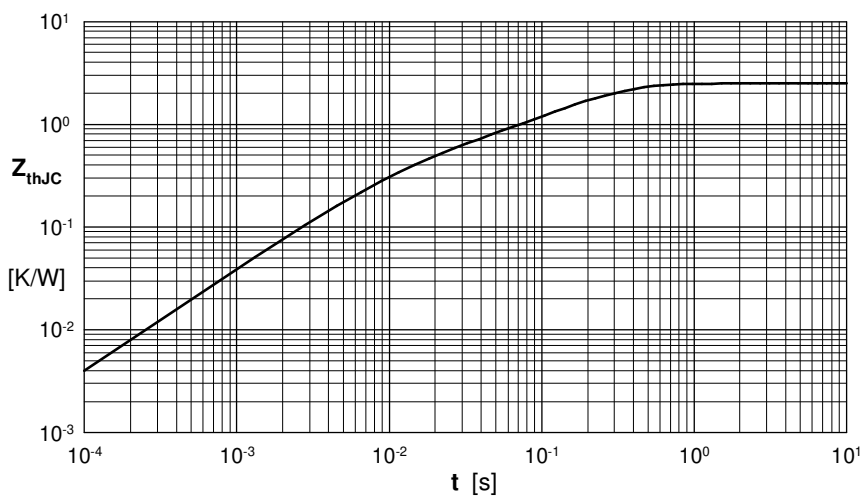
Fast Diode

 Fig. 1 Forward current I_F vs. 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} vs. $-di_F/dt$

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


Fig. 7 Transient thermal resistance junction to case

i	R_{thi} (K/W)	t_i (s)
1	0.8776	0.0052
2	0.3378	0.0003
3	0.0678	0.0004
4	1.2168	0.0092