

# HiPerFRED™ Epitaxial Diode with soft recovery

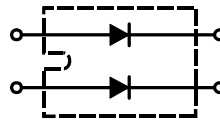
$$I_{FAV} = 2 \times 30 \text{ A}$$

$$V_{RRM} = 400 \text{ V}$$

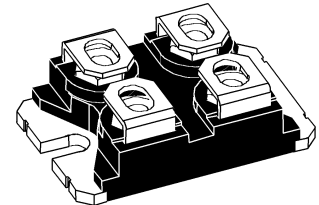
$$t_{rr} = 30 \text{ ns}$$

## Preliminary Data

$V_{RSM}$ V	$V_{RRM}$ V	Type
400	400	DSEP 2x 31-04A



miniBLOC, SOT-227 B



Symbol	Conditions	Maximum Ratings	
$I_{FRMS}$		100	A
$I_{FAVM}$	$T_C = 105^\circ\text{C}$ ; rectangular, $d = 0.5$	30	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}$ ; $t_p = 10 \text{ ms}$ (50 Hz), sine	tbd	A
$E_{AS}$	$T_{VJ} = 25^\circ\text{C}$ ; non-repetitive $I_{AS} = \text{tbd A}$ ; $L = \text{tbd } \mu\text{H}$	tbd	mJ
$I_{AR}$	$V_A = 1.5 \cdot V_R$ typ.; $f = 10 \text{ kHz}$ ; repetitive	tbd	A
$T_{VJ}$		-40...+150	$^\circ\text{C}$
$T_{VJM}$		150	$^\circ\text{C}$
$T_{stg}$		-40...+150	$^\circ\text{C}$
$P_{tot}$	$T_C = 25^\circ\text{C}$	100	W
$V_{ISOL}$	50/60 Hz, RMS $I_{ISOL} \leq 1 \text{ mA}$	2500	V~
$M_d$	mounting torque (M4)	1.1-1.5/9-13	Nm/lb.in.
	terminal connection torque (M4)	1.1-1.5/9-13	Nm/lb.in.
Weight	typical	30	g

## Features

- International standard package miniBLOC
- Isolation voltage 2500 V~
- UL registered E 72873
- 2 independent FRED in 1 package
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low  $I_{RM}$ -values
- Soft recovery behaviour

## Applications

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

## Advantages

- 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

Symbol	Conditions	Characteristic Values	
		typ.	max.
$I_R$ ①	$T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$ $T_{VJ} = 150^\circ\text{C}$ $V_R = V_{RRM}$	0.25	1.0
$V_F$ ②	$I_F = 30 \text{ A}$ ; $T_{VJ} = 125^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$	1.15	1.45
$R_{thJC}$ $R_{thCH}$		0.1	1.15
$t_{rr}$	$I_F = 1 \text{ A}$ ; $-di/dt = 200 \text{ A}/\mu\text{s}$ ; $V_R = 30 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$	30	ns
$I_{RM}$	$V_R = 100 \text{ V}$ ; $I_F = 50 \text{ A}$ ; $-di_F/dt = 100 \text{ A}/\mu\text{s}$ $T_{VJ} = 100^\circ\text{C}$		6.8

Pulse test: ① Pulse Width = 5 ms, Duty Cycle < 2.0 %  
② Pulse Width = 300  $\mu\text{s}$ , Duty Cycle < 2.0 %

Data according to IEC 60747 and per diode unless otherwise specified

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

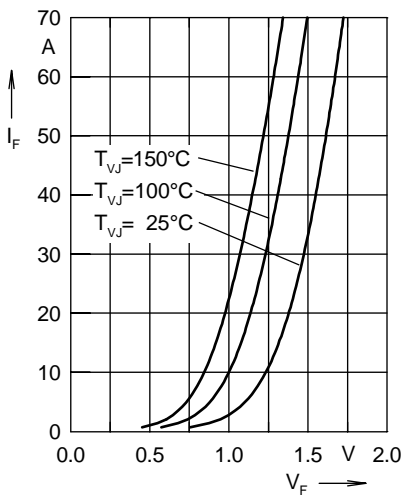


Fig. 1 Forward current  $I_F$  versus  $V_F$

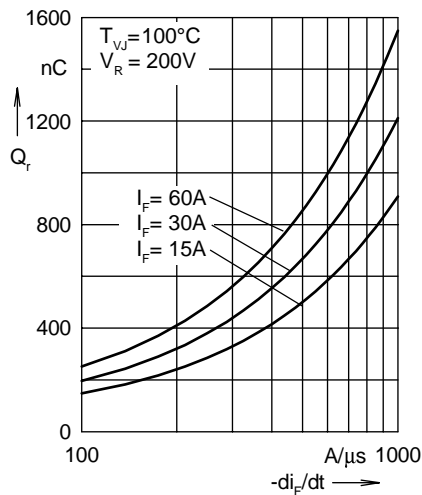


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

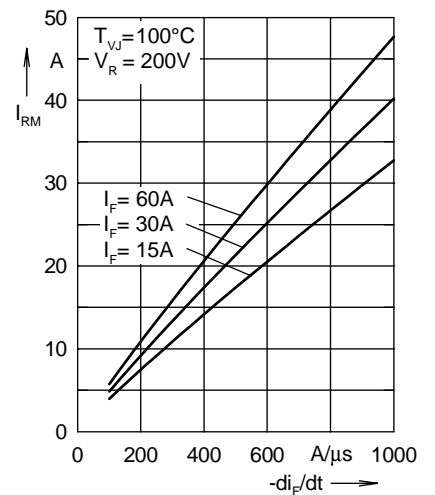


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

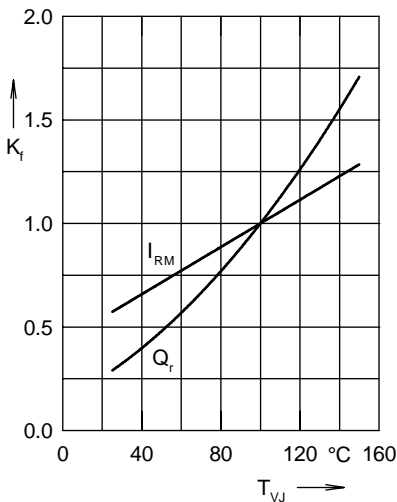


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

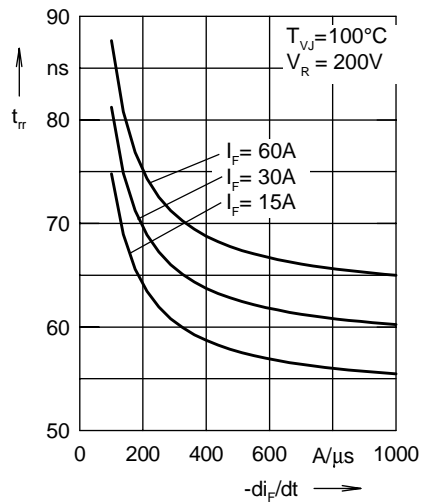


Fig. 5 Recovery time  $t_{rr}$  versus  $-di_F/dt$

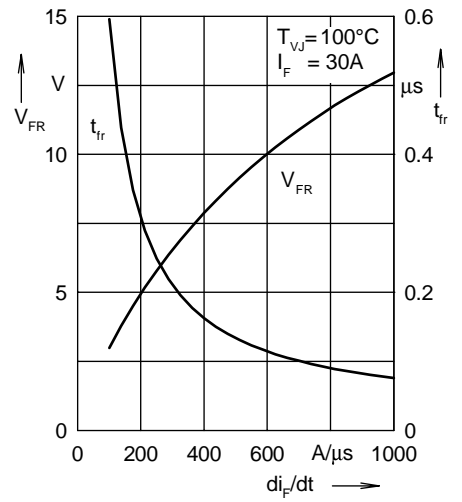


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{rr}$  versus  $di_F/dt$

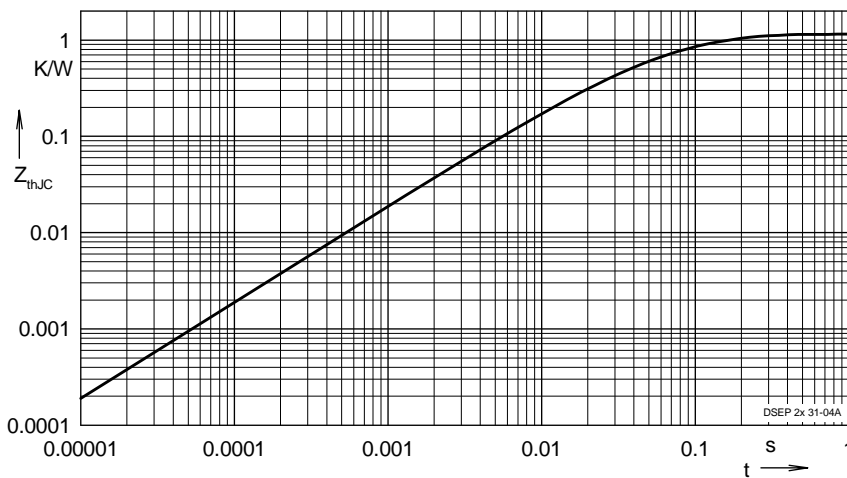


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.436	0.0055
2	0.482	0.0092
3	0.117	0.0007
4	0.115	0.0418

NOTE: Fig. 2 to Fig. 6 shows typical values