

# Fast Recovery Epitaxial Diode (FRED)

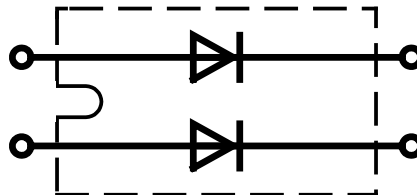
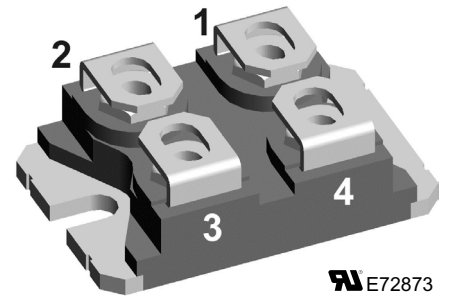
$$I_{FAVM} = 2 \times 123 \text{ A}$$

$$V_{RRM} = 200 \text{ V}$$

$$t_{rr} = 35 \text{ ns}$$

**Part number**

DSEI2x121-02A


**Features / Advantages:**

- 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 and melting
- Uninterruptible power supplies (UPS)

**Package:** miniBLOC, SOT-227 B

- Isolation voltage 2500 V~
- International standard package (ISOTOP compatible)
- 2 independent FREDs in 1 package
- RoHS compliant
- Epoxy meets UL 94V-0

**Disclaimer Notice**

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Symbol	Conditions	Maximum Ratings	
$I_{FRMS}$ $I_{FAVM}$ ① $I_{FRM}$	$T_{VJ} = T_{VJM}$	150	A
	$T_C = 70^\circ\text{C}$ ; rectangular, $d = 0.5$	123	A
	$t_p < 10$ s; rep. rating, pulse width limited by $T_{VJM}$	600	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10$ ms (50 Hz), sine	1200	A
	$t = 8.3$ ms (60 Hz), sine	1300	A
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10$ ms (50 Hz), sine	1080	A
	$t = 8.3$ ms (60 Hz), sine	1170	A
$I^2t$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10$ ms (50 Hz), sine	7200	A <sup>2</sup> s
	$t = 8.3$ ms (60 Hz), sine	7100	A <sup>2</sup> s
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10$ ms (50 Hz), sine	5800	A <sup>2</sup> s
	$t = 8.3$ ms (60 Hz), sine	5700	A <sup>2</sup> s
$P_{tot}$	$T_C = 25^\circ\text{C}$	250	W

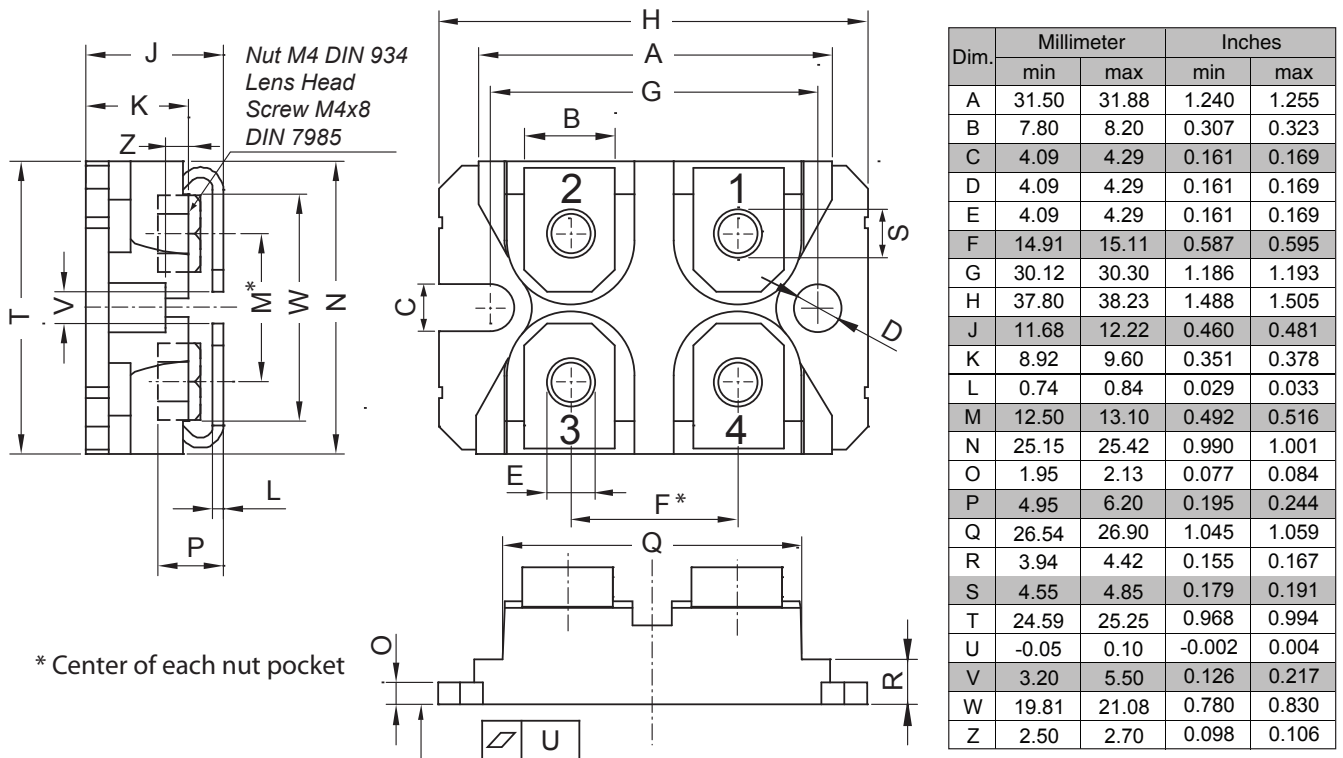
Symbol	Conditions	Characteristic Values		
		typ.	max.	
$I_R$	$V_R = V_{RRM}$ $T_{VJ} = 25^\circ\text{C}$		1	mA
	$V_R = 0.8 \cdot V_{RRM}$ $T_{VJ} = 25^\circ\text{C}$		0.5	mA
	$V_R = 0.8 \cdot V_{RRM}$ $T_{VJ} = 125^\circ\text{C}$		20	mA
$V_F$	$I_F = 120$ A $T_{VJ} = 150^\circ\text{C}$	0.89	0.95	V
	$T_{VJ} = 25^\circ\text{C}$		1.10	V
$V_T$	For power-loss calculations only		0.7	V
$r_T$	$T_{VJ} = T_{VJM}$		2.1	mΩ
$R_{thJC}$ $R_{thCK}$		0.1	0.5	K/W K/W
$t_{tr}$	$I_F = 1$ A; $-di/dt = 400$ A/μs; $V_R = 30$ V; $T_{VJ} = 25^\circ\text{C}$	35	50	ns
$I_{RM}$	$V_R = 100$ V; $I_F = 100$ A; $-di_F/dt = 200$ A/μs $L \leq 0.05$ μH; $T_{VJ} = 100^\circ\text{C}$	12	15	A

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

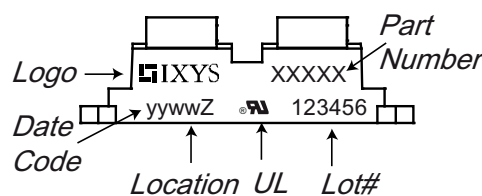
Data according to IEC 60747

Package miniBLOC, SOT-227 B			Ratings		
Symbol	Definitions	Conditions	min.	typ.	max.
$I_{RMS}$	RMS current	per terminal ①			150
$T_{VJ}$	virtual junction temperature		-40		150 °C
$T_{op}$	operation temperature		-40		125 °C
$T_{stg}$	storage temperature		-40		150 °C
<b>Weight</b>				30	g
$M_D$	mounting torque		1.1		1.5 Nm
$M_T$	terminal torque (M4)		1.1		1.5 Nm
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	10.5	3.2	mm
$d_{Spb/Apb}$		terminal to backside	8.6	6.8	mm
$V_{ISOL}$	isolation voltage	t = 1 second t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA		3000 2500 V

①  $I_{RMS}$  is typically limited by the pin-to-chip resistance (1); or by the current capability of the chip (2). In case of (1) and a product with multiple pins for one chip-potential, the current capability can be increased by connecting the pins as one contact.



### Product Marking



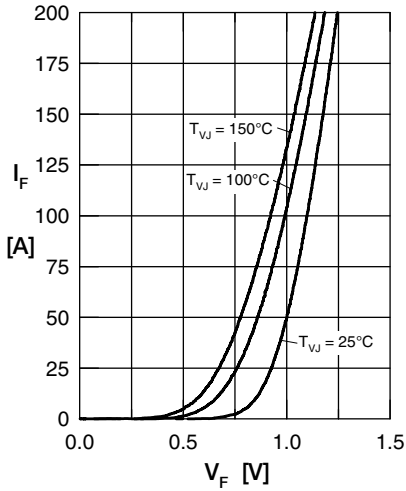
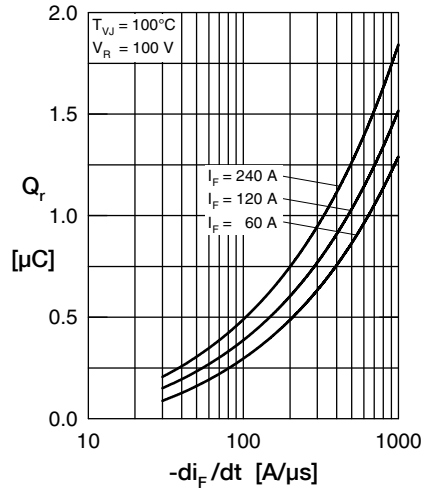
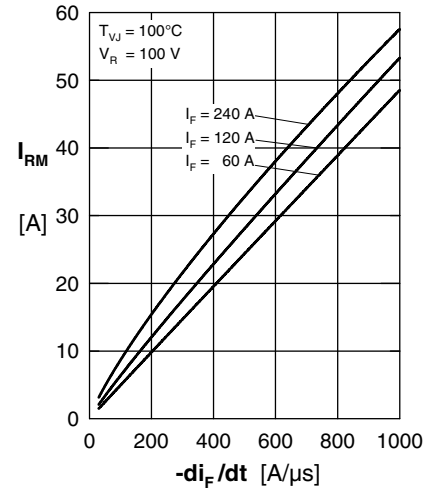
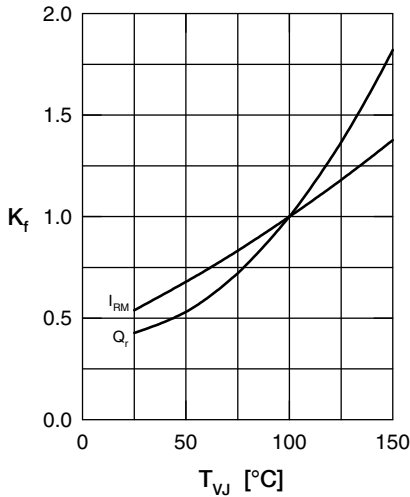
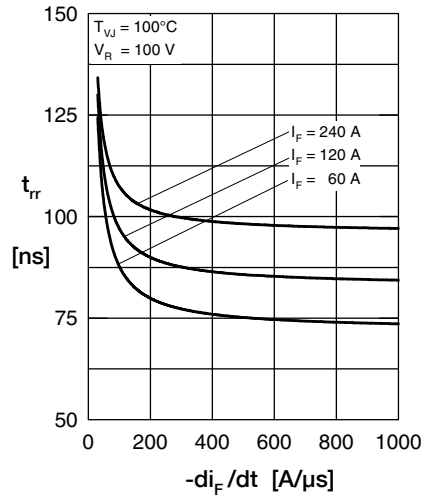
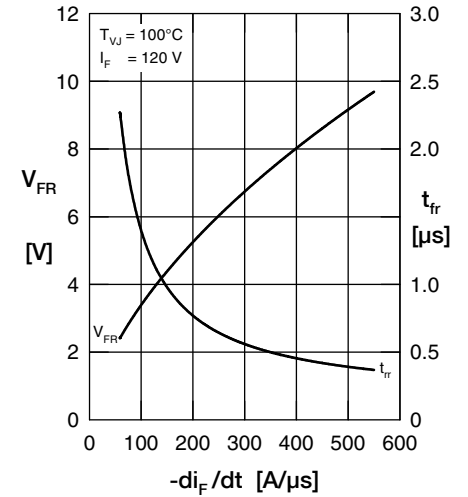
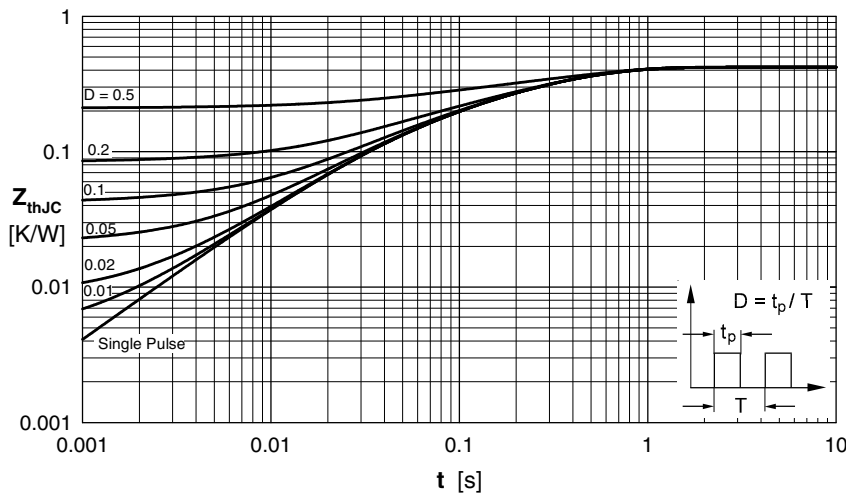

 Fig. 1 Forward current  $I_F$  versus  $V_F$ 

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

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

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

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

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


Fig. 7 Transient thermal impedance junction to case

 Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0725	0.0028
2	0.1423	0.0092
3	0.2852	0.0350