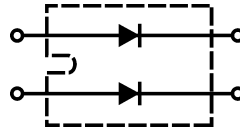


# Fast Recovery Epitaxial Diode (FRED)

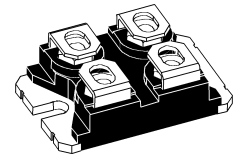
## DSEI 2x 101

$V_{RRM} = 600\text{ V}$   
 $I_{FAVM} = 2 \times 96\text{ A}$   
 $t_{rr} = 35\text{ ns}$

$V_{RSM}$	$V_{RRM}$	Type
V	V	
600	600	DSEI 2x 101-06A



miniBLOC, SOT-227 B  
 E72873

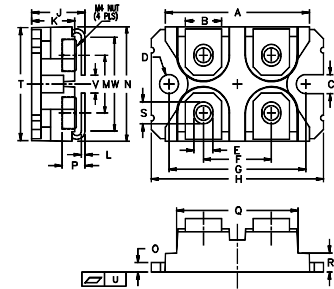


Symbol	Test Conditions	Maximum Ratings (per diode)	
$I_{F(RMS)}$	$T_{VJ} = T_{VJM}$	150	A
$I_{F(AVM)}^{\text{①}}$	$T_C = 70^\circ\text{C}$ ; rectangular, $d = 0.5$	96	A
$I_{FRM}$	$t_p < 10\ \mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$	TBD	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	1200	A
	$t = 8.3\text{ ms}$ (60 Hz), sine	1300	A
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	1080	A
	$t = 8.3\text{ ms}$ (60 Hz), sine	1170	A
$I^2t$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	7200	$\text{A}^2\text{s}$
	$t = 8.3\text{ ms}$ (60 Hz), sine	7100	$\text{A}^2\text{s}$
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	5800	$\text{A}^2\text{s}$
	$t = 8.3\text{ ms}$ (60 Hz), sine	5700	$\text{A}^2\text{s}$
$T_{VJ}$		-40...+150	$^\circ\text{C}$
$T_{VJM}$		150	$^\circ\text{C}$
$T_{stg}$		-40...+150	$^\circ\text{C}$
$P_{tot}$	$T_C = 25^\circ\text{C}$	250	W
$V_{ISOL}$	50/60 Hz, RMS $I_{ISOL} \leq 1\text{ mA}$	2500	V~
$M_d$	Mounting torque	1.5/13	Nm/lb.in.
	Terminal connection torque (M4)	1.5/13	Nm/lb.in.
Weight		30	g

### Features

- International standard package
- miniBLOC (ISOTOP compatible)
- Isolation voltage 2500 V~
- matched diodes f. parallel operation
- Planar passivated chips
- two independent diodes
- Very short recovery time
- Extremely low switching losses
- Low  $I_{RM}$ -values
- Soft recovery behaviour

### miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	0.031	0.033

Symbol	Test Conditions	Characteristic Values (per diode)	
		typ.	max.
$I_R$	$T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$	3	mA
	$T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$	1	mA
	$T_{VJ} = 125^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$	20	mA
$V_F$	$I_F = 100\text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$	1.17	V
	$T_{VJ} = 25^\circ\text{C}$	1.25	V
$V_{TO}$	For power-loss calculations only	0.70	V
$r_T$		4.7	$\text{m}\Omega$
$R_{thJC}$		0.5	K/W
$R_{thCH}$		0.05	K/W
$t_{rr}$	$I_F = 1\text{ A}$ ; $-di/dt = 400\text{ A}/\mu\text{s}$ ; $V_R = 30\text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$	35	50 ns
$I_{RM}$	$V_R = 100\text{ V}$ ; $I_F = 80\text{ A}$ ; $-di_F/dt = 200\text{ A}/\mu\text{s}$ $L \leq 0.05\text{ mH}$ ; $T_{VJ} = 100^\circ\text{C}$	19	24 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

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



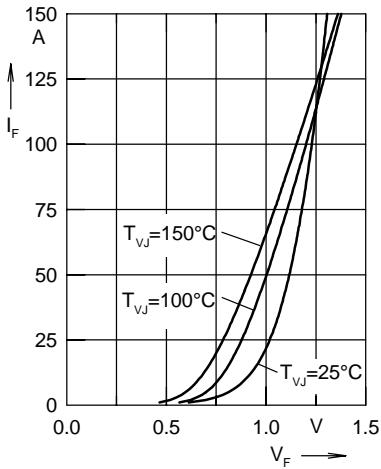


Fig. 1 Forward current  $I_F$  versus  $V_F$

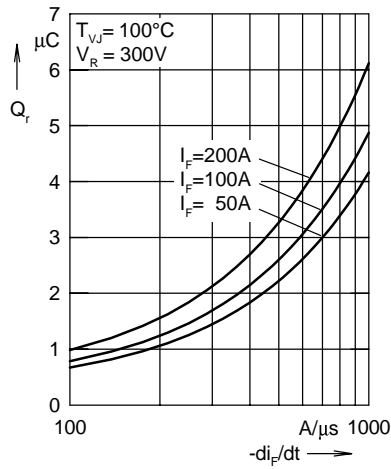


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

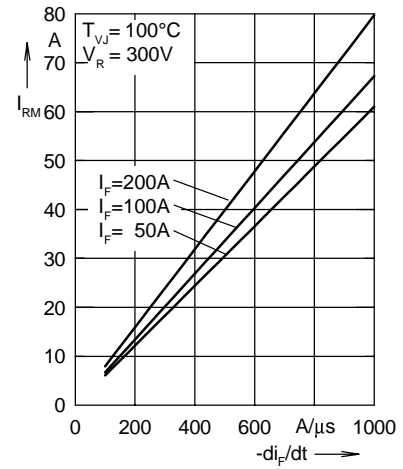


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

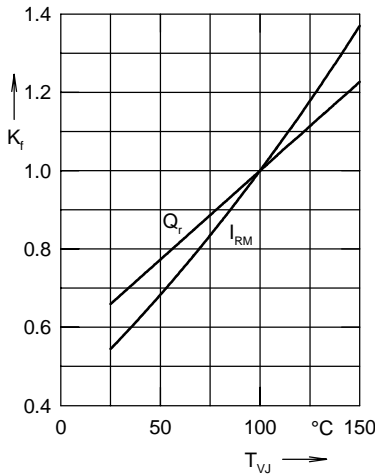


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

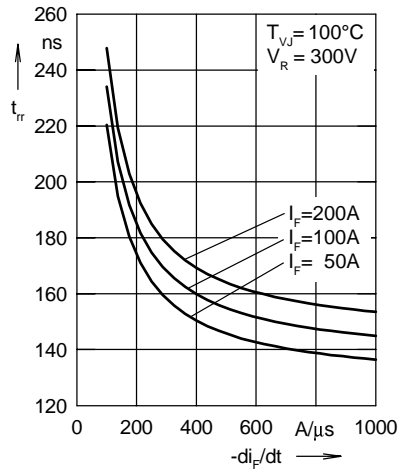


Fig. 5 Recovery time  $t_{tr}$  versus  $-di_F/dt$

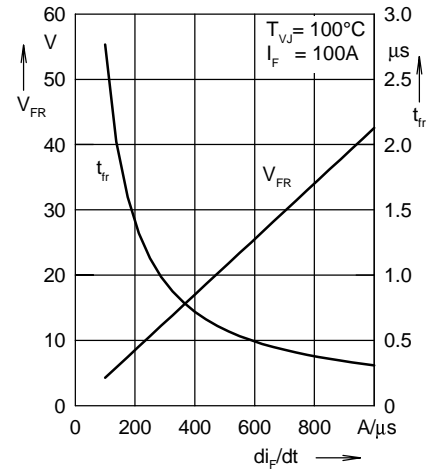


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{tr}$  versus  $di_F/dt$

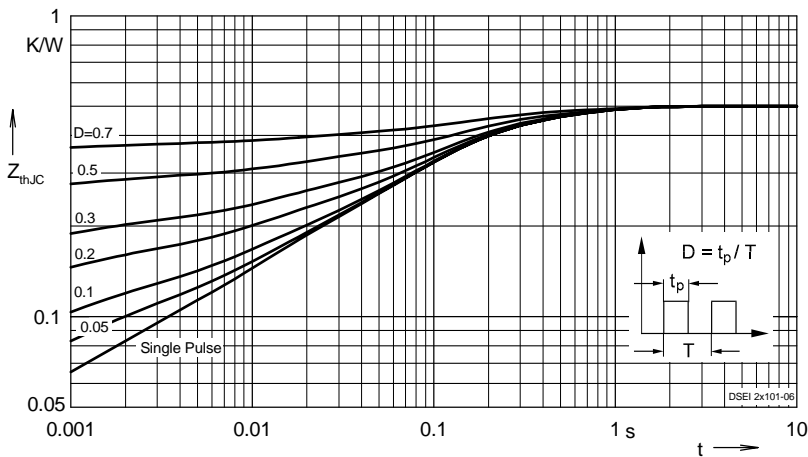


Fig. 7 Transient thermal impedance junction to case at various duty cycles

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.02	0.00002
2	0.05	0.00081
3	0.076	0.01
4	0.24	0.94
5	0.114	0.45

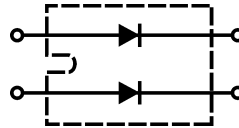


# Fast Recovery Epitaxial Diode (FRED)

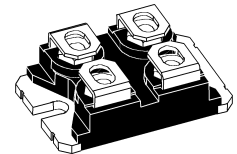
## DSEI 2x 101

$V_{RRM} = 1200\text{ V}$   
 $I_{FAVM} = 2 \times 91\text{ A}$   
 $t_{rr} = 40\text{ ns}$

$V_{RSM}$	$V_{RRM}$	Type
V	V	
1200	1200	DSEI 2x 101-12A



miniBLOC, SOT-227 B  
 E72873

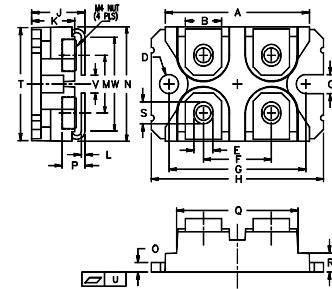


Symbol	Test Conditions	Maximum Ratings (per diode)	
$I_{F(RMS)}$	$T_{VJ} = T_{VJM}$	130	A
$I_{F(AVJM)}^{\text{①}}$	$T_C = 50^\circ\text{C}$ ; rectangular, $d = 0.5$	91	A
$I_{FRM}$	$t_p < 10\ \mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$	TBD	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	900	A
	$t = 8.3\text{ ms}$ (60 Hz), sine	970	A
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	810	A
	$t = 8.3\text{ ms}$ (60 Hz), sine	870	A
$I^2t$	$T_{VJ} = 45^\circ\text{C}$ $t = 10\text{ ms}$ (50 Hz), sine	4100	A <sup>2</sup> s
	$t = 8.3\text{ ms}$ (60 Hz), sine	4000	A <sup>2</sup> s
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	3300	A <sup>2</sup> s
	$t = 8.3\text{ ms}$ (60 Hz), sine	3200	A <sup>2</sup> s
$T_{VJ}$		-40...+150	°C
$T_{VJM}$		150	°C
$T_{stg}$		-40...+150	°C
$P_{tot}$	$T_C = 25^\circ\text{C}$	250	W
$V_{ISOL}$	50/60 Hz, RMS $I_{ISOL} \leq 1\text{ mA}$	2500	V~
$M_d$	Mounting torque	1.5/13	Nm/lb.in.
	Terminal connection torque (M4)	1.5/13	Nm/lb.in.
Weight		30	g

### Features

- International standard package
- miniBLOC (ISOTOP compatible)
- Isolation voltage 2500 V~
- matched diodes f. parallel operation
- Planar passivated chips
- two independent diodes
- Very short recovery time
- Extremely low switching losses
- Low  $I_{RM}$ -values
- Soft recovery behaviour

### miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
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D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	0.031	0.033

Symbol	Test Conditions	Characteristic Values (per diode)	
		typ.	max.
$I_R$	$T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$		3 mA
	$T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$		1.5 mA
	$T_{VJ} = 125^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$		15 mA
$V_F$	$I_F = 100\text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$		1.61 V
	$T_{VJ} = 25^\circ\text{C}$		1.87 V
$V_{T0}$	For power-loss calculations only		1.01 V
$r_T$			6.1 mΩ
$R_{thJC}$			0.5 K/W
$R_{thCH}$		0.05	K/W
$t_{rr}$	$I_F = 1\text{ A}$ ; $-di/dt = 400\text{ A}/\mu\text{s}$ ; $V_R = 30\text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$	40	60 ns
$I_{RM}$	$V_R = 100\text{ V}$ ; $I_F = 75\text{ A}$ ; $-di_F/dt = 200\text{ A}/\mu\text{s}$	24	30 A
	$L \leq 0.05\text{ mH}$ ; $T_{VJ} = 100^\circ\text{C}$		

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

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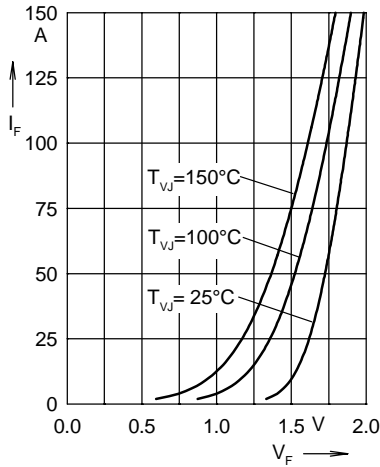


Fig. 1 Forward current  $I_F$  versus  $V_F$

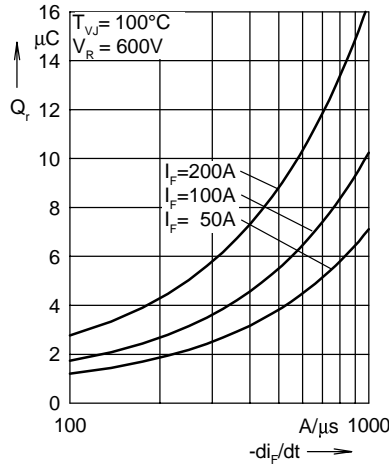


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

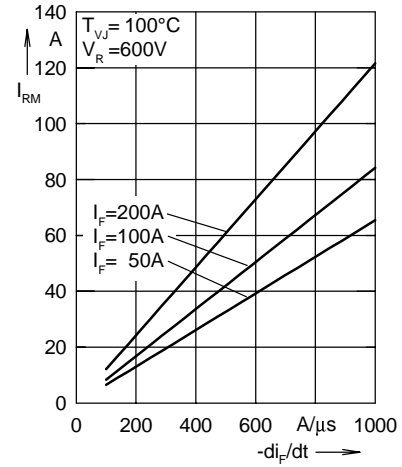


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

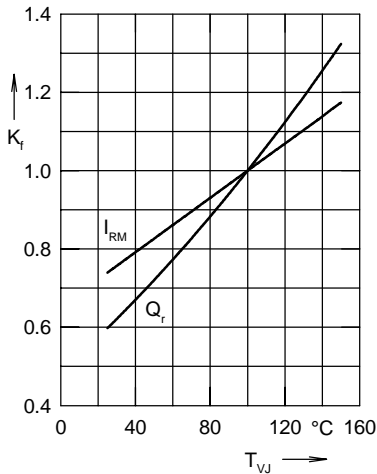


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

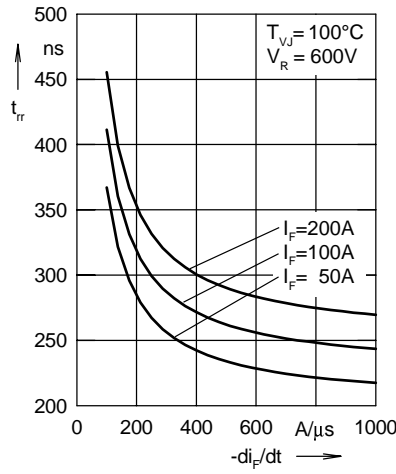


Fig. 5 Recovery time  $t_{tr}$  versus  $-di_F/dt$

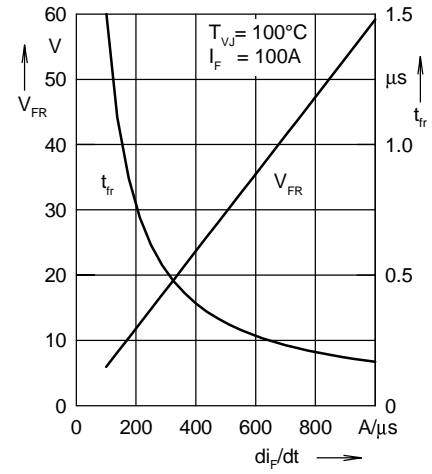


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{tr}$  versus  $di_F/dt$

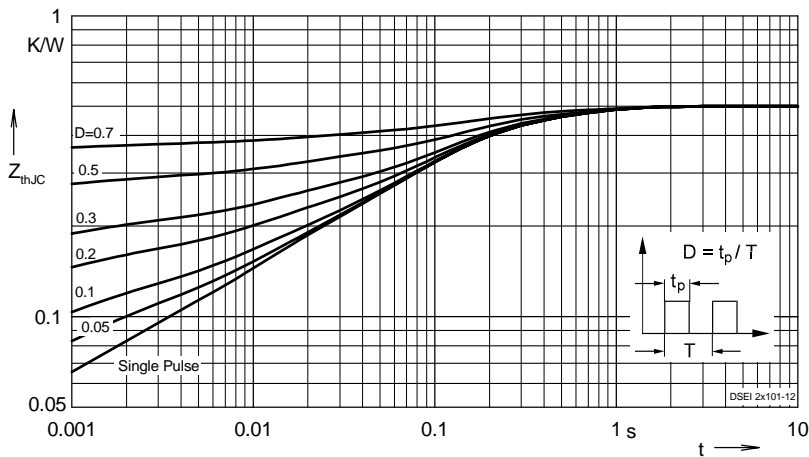


Fig. 7 Transient thermal impedance junction to case at various duty cycles

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.02	0.00002
2	0.05	0.00081
3	0.076	0.01
4	0.24	0.94
5	0.114	0.45

