

HiPerFRED

V_{RRM} = 600 V
 I_{FAV} = 2x 30 A
 t_{rr} = 30 ns

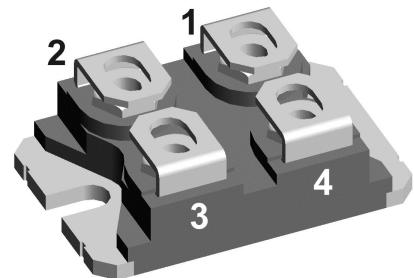
High Performance Fast Recovery Diode

Low Loss and Soft Recovery

Parallel legs

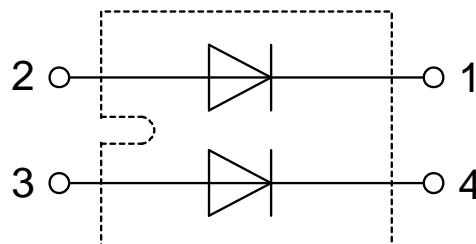
Part number

DSEP2x31-06B



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: SOT-227B (minibloc)

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate: Copper internally DCB isolated
- Advanced power cycling

Terms .Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office. Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

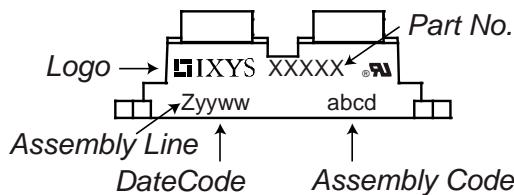
- to perform joint risk and quality assessments;
- the conclusion of quality agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Fast Diode

Symbol	Definition	Conditions	Ratings			
			min.	typ.	max.	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^\circ\text{C}$			600	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^\circ\text{C}$			600	V
I_R	reverse current, drain current	$V_R = 600\text{ V}$ $V_R = 600\text{ V}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 150^\circ\text{C}$		250 2	μA mA
V_F	forward voltage drop	$I_F = 30\text{ A}$ $I_F = 60\text{ A}$ $I_F = 30\text{ A}$ $I_F = 60\text{ A}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 150^\circ\text{C}$		2.49 3.16 1.59 2.20	V V V V
I_{FAV}	average forward current	$T_C = 75^\circ\text{C}$ rectangular	$T_{VJ} = 150^\circ\text{C}$		30	A
V_{F0} r_F	threshold voltage slope resistance } for power loss calculation only		$T_{VJ} = 150^\circ\text{C}$		1.01 19.2	V $\text{m}\Omega$
R_{thJC}	thermal resistance junction to case				1.15	K/W
R_{thCH}	thermal resistance case to heatsink			0.10		K/W
P_{tot}	total power dissipation		$T_C = 25^\circ\text{C}$		100	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^\circ\text{C}$		250	A
C_J	junction capacitance	$V_R = 400\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$		26	pF
I_{RM}	max. reverse recovery current		$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 100^\circ\text{C}$		7.5 12.5	A A
t_{rr}	reverse recovery time	$I_F = 30\text{ A}; V_R = 300\text{ V}$ $-di_F/dt = 400\text{ A}/\mu\text{s}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 100^\circ\text{C}$		20 70	ns ns

Package SOT-227B (minibloc)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	<i>RMS current</i>	per terminal			100	A
T_{VJ}	<i>virtual junction temperature</i>		-40		150	°C
T_{op}	<i>operation temperature</i>		-40		125	°C
T_{stg}	<i>storage temperature</i>		-40		150	°C
Weight				30		g
M_D	<i>mounting torque</i>		1.1		1.5	Nm
M_T	<i>terminal torque</i>		1.1		1.5	Nm
$d_{Spp/App}$	<i>creepage distance on surface striking distance through air</i>		<i>terminal to terminal</i>	10.5	3.2	mm
$d_{Spb/Apb}$			<i>terminal to backside</i>	8.6	6.8	mm
V_{ISOL}	<i>isolation voltage</i>	$t = 1$ second $t = 1$ minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA		3000 2500	V V

Product Marking



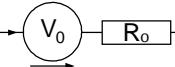
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP2x31-06B	DSEP2x31-06B	Tube	10	476285

Similar Part	Package	Voltage class
DSEP2x31-06A	SOT-227B (minibloc)	600

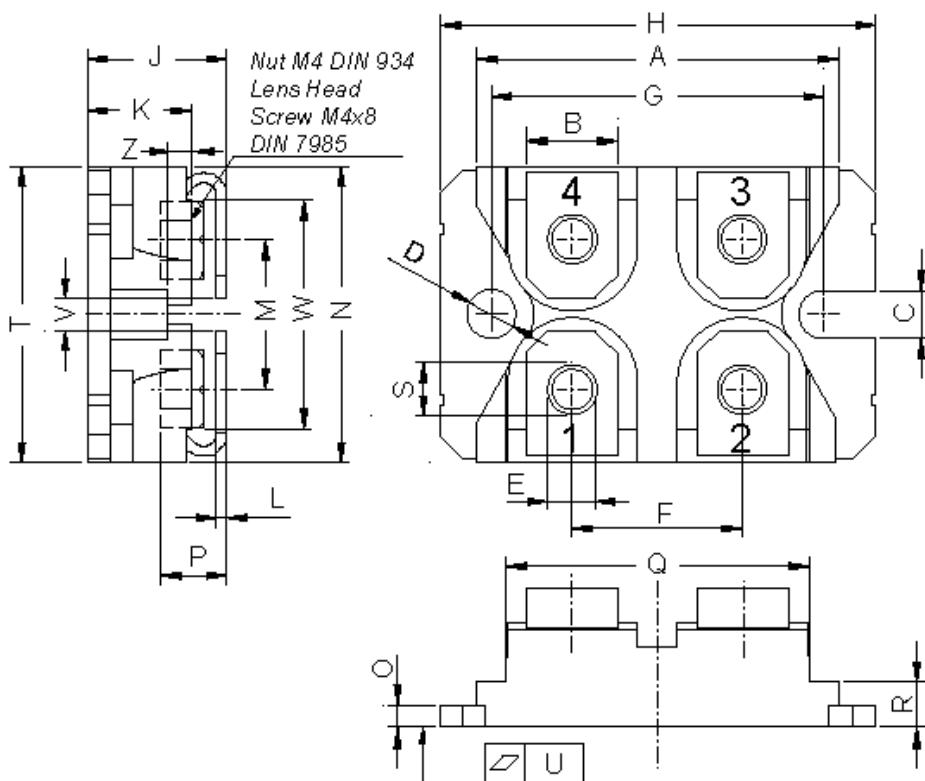
Equivalent Circuits for Simulation

* on die level

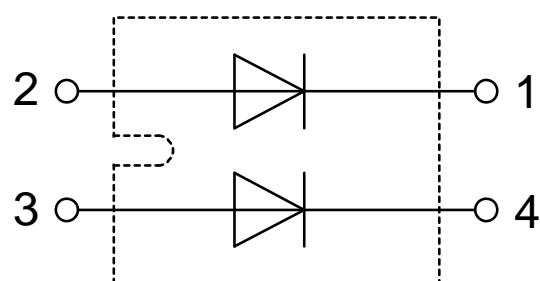
 $T_{VJ} = 150$ °C

	Fast Diode	
$V_{0\max}$	threshold voltage	1.01
$R_{0\max}$	slope resistance *	17.3

Outlines SOT-227B (minibloc)



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	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106



Fast Diode

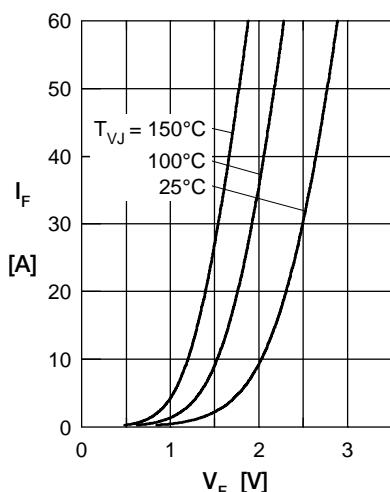
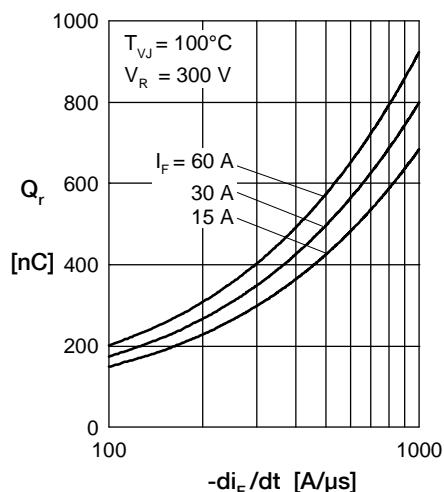
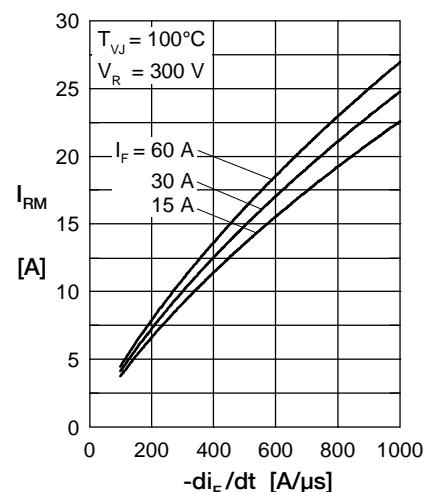
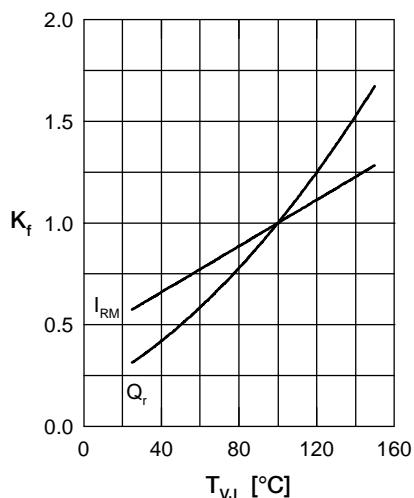
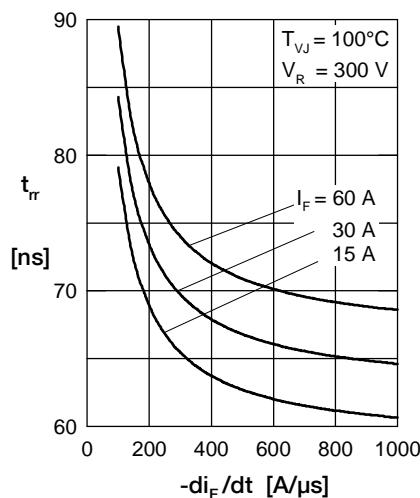
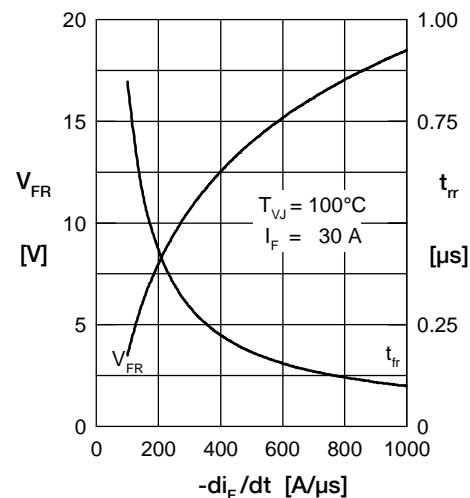
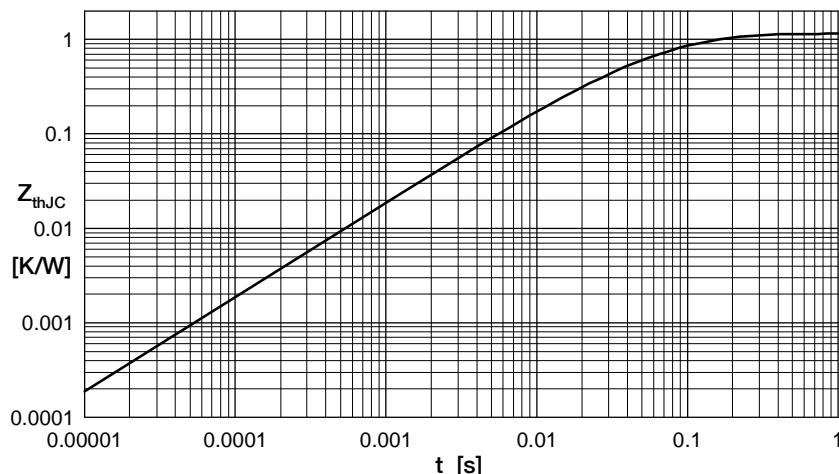
Fig. 1 Forward current I_F versus V_F Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$ Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$ Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ} Fig. 5 Recovery time t_{rr} versus $-di_F/dt$ Fig. 6 Peak forward voltage V_{FR} and t_{rr} versus $-di_F/dt$ 

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

Mouser Electronics

Authorized Distributor

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