

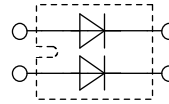
# HiPerFRED

High Performance Fast Recovery Diode  
 Low Loss and Soft Recovery  
 Parallel legs

$V_{RRM} = 1200\text{ V}$   
 $I_{FAV} = 2 \times 30\text{ A}$   
 $t_{rr} = 40\text{ ns}$

Part number

**DSEP2x31-12A**



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:**

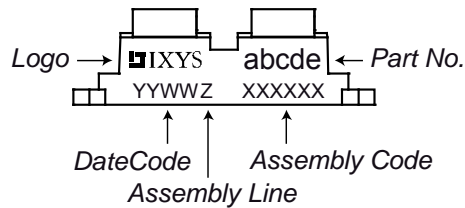
- Housing: SOT-227B (minibloc)
- Industry standard outline
- Cu base plate internal DCB isolated
- Isolation Voltage 3000 V
- Epoxy meets UL 94V-0
- RoHS compliant

**Ratings**

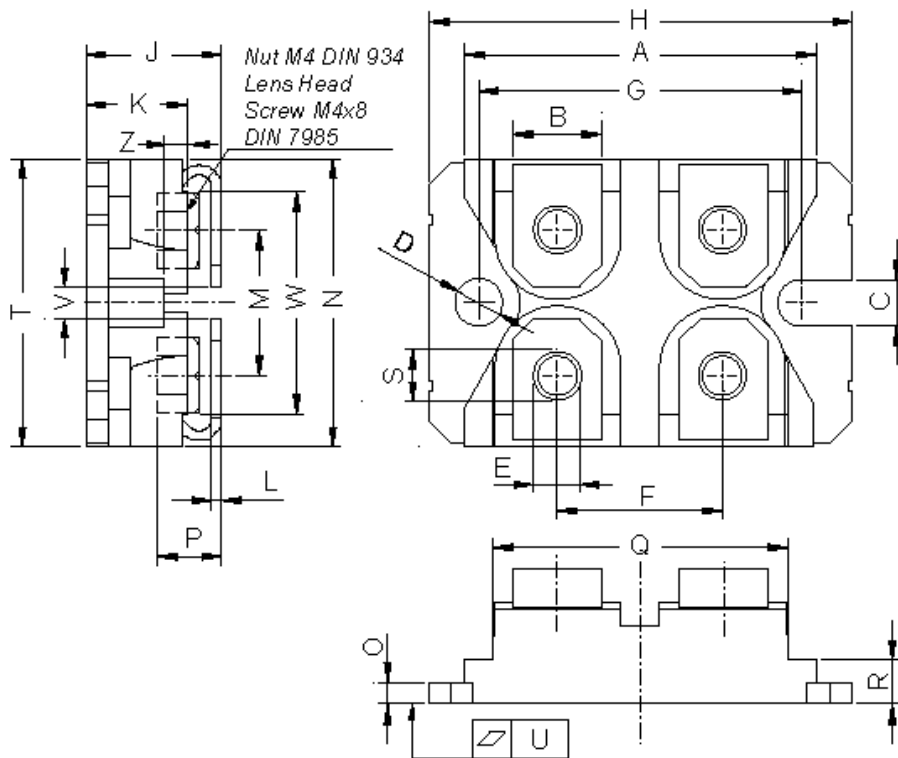
Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$V_{RRM}$	max. repetitive reverse voltage				1200	V
$I_R$	reverse current	$V_R = 1200\text{ V}$			250	$\mu\text{A}$
		$V_R = 1200\text{ V}$			1	mA
$V_F$	forward voltage	$I_F = 30\text{ A}$			2.72	V
		$I_F = 60\text{ A}$			3.24	V
		$I_F = 30\text{ A}$			1.77	V
		$I_F = 60\text{ A}$			2.26	V
$I_{FAV}$	average forward current	rectangular d = 0.5			30	A
$V_{F0}$	threshold voltage	} for power loss calculation only			1.31	V
$r_F$	slope resistance				15.4	m $\Omega$
$R_{thJC}$	thermal resistance junction to case				1.15	K/W
$T_{VJ}$	virtual junction temperature		-40		150	$^{\circ}\text{C}$
$P_{tot}$	total power dissipation				100	W
$I_{FSM}$	max. forward surge current	t = 10 ms (50 Hz), sine			200	A
$I_{RM}$	max. reverse recovery current				13	A
		$I_F = 30\text{ A}; V_R = 800\text{ V}$			24	A
$t_{rr}$	reverse recovery time	-di <sub>F</sub> /dt = 400 A/ $\mu\text{s}$			40	ns
					150	ns
$C_J$	junction capacitance	$V_R = 600\text{ V}; f = 1\text{ MHz}$			12	pF

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$I_{RMS}$	RMS current	per terminal			100	A
$R_{thCH}$	thermal resistance case to heatsink			0.10		K/W
$T_{stg}$	storage temperature		-40		150	°C
<b>Weight</b>				30		g
$M_D$	mounting torque		1.1		1.5	Nm
$M_T$	terminal torque		1.1		1.5	Nm
$V_{ISOL}$	isolation voltage	t = 1 second	3000			V
		t = 1 minute	2500			V
$d_{Spp/App}$	creepage   striking distance on surface   through air	terminal to terminal	10.5	3.2		mm
$d_{Spb/Abp}$	creepage   striking distance on surface   through air	terminal to backside	8.6	6.8		mm

### Product Marking



Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Code Key
Standard	DSEP2x31-12A	DSEP2x31-12A	Tube	10	473286

**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

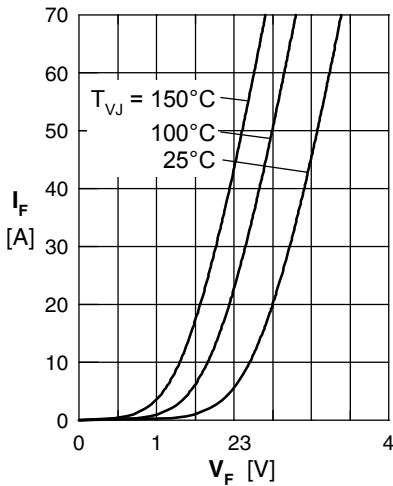


Fig. 1 Forward current  $I_F$  vs.  $V_F$

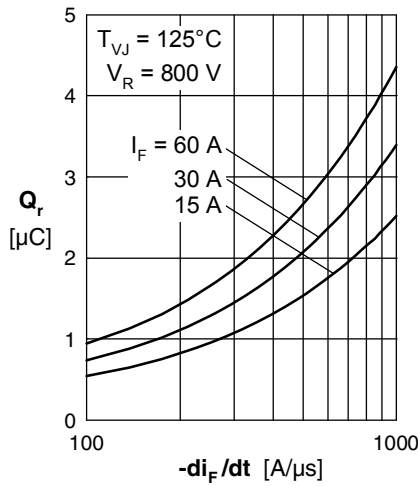


Fig. 2 Typ. reverse recovery charge  $Q_r$  versus  $-di_F/dt$

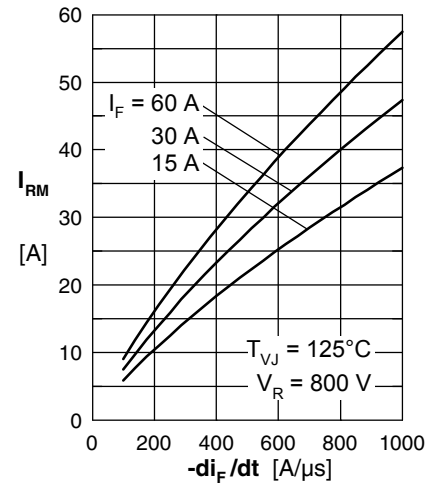


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

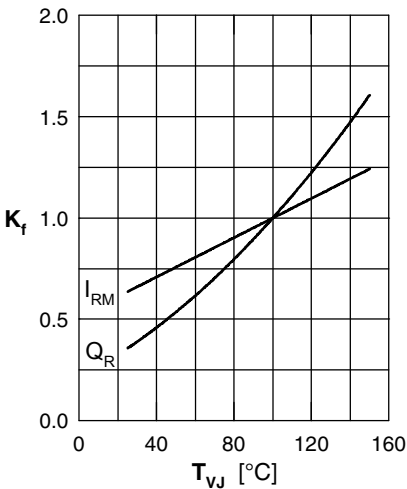


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

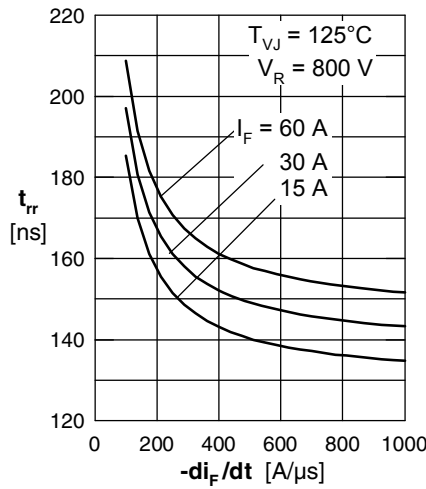


Fig. 5 Typ. recovery time  $t_{rr}$  vs.  $-di_F/dt$

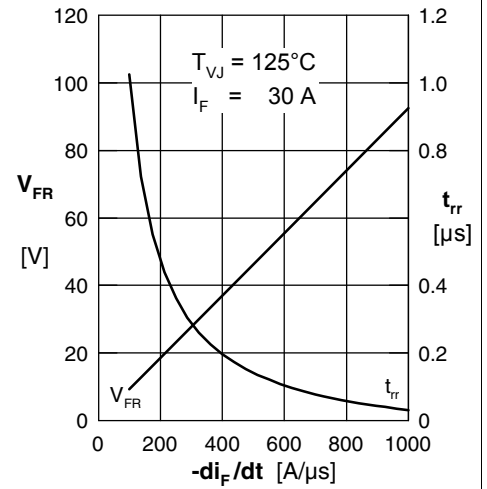


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{rr}$  versus  $di_F/dt$

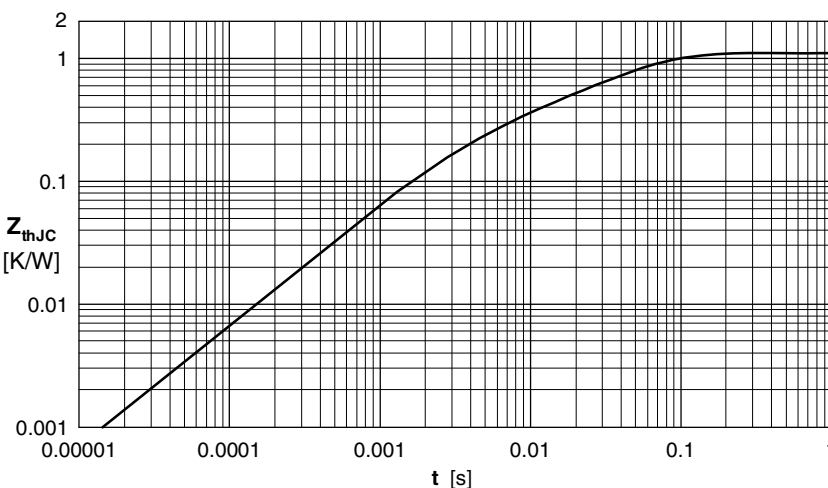


Fig. 7 Transient thermal impedance junction to case

Constants for  $Z_{thjC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.368	0.0052
2	0.1417	0.0003
3	0.0295	0.0004
4	0.5604	0.0092