

HiPerFRED

$$V_{RRM} = 600V$$

$$I_{FAV} = 2x \ 30A$$

$$t_{rr} = 30ns$$

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

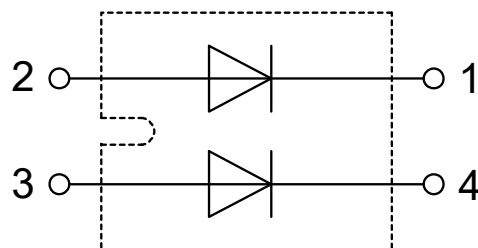
Part number

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

Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.



Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			600	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			600	V	
I_R	reverse current, drain current	$V_R = 600 V$	$T_{VJ} = 25^{\circ}C$		250	μA	
		$V_R = 600 V$	$T_{VJ} = 150^{\circ}C$		2	mA	
V_F	forward voltage drop	$I_F = 30 A$	$T_{VJ} = 25^{\circ}C$		2,49	V	
					3,16	V	
		$I_F = 60 A$	$T_{VJ} = 150^{\circ}C$		1,59	V	
					2,20	V	
I_{FAV}	average forward current	$T_C = 75^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}C$		30	A	
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		1,01	V	
r_F	slope resistance				19,2	m Ω	
R_{thJC}	thermal resistance junction to case				1,15	K/W	
R_{thCH}	thermal resistance case to heatsink			0,1		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		100	W	
I_{FSM}	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		250	A	
C_J	junction capacitance	$V_R = 400 V \quad f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}C$		26	pF	
I_{RM}	max. reverse recovery current	} $I_F = 30 A; V_R = 300 V$ $-di_F/dt = 400 A/\mu s$	$T_{VJ} = 25^{\circ}C$		7,5	A	
			$T_{VJ} = 100^{\circ}C$		12,5	A	
t_{rr}	reverse recovery time		$T_{VJ} = 25^{\circ}C$		20	ns	
			$T_{VJ} = 100^{\circ}C$		70	ns	



Package SOT-227B (minibloc)				Ratings		
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			100	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		150	°C
Weight				30		g
M_D	mounting torque		1,1		1,5	Nm
M_T	terminal torque		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			3000	V
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA		2500	V

Product Marking



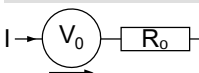
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP2x31-06B	DSEP2x31-06B	Tube	10	476285

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

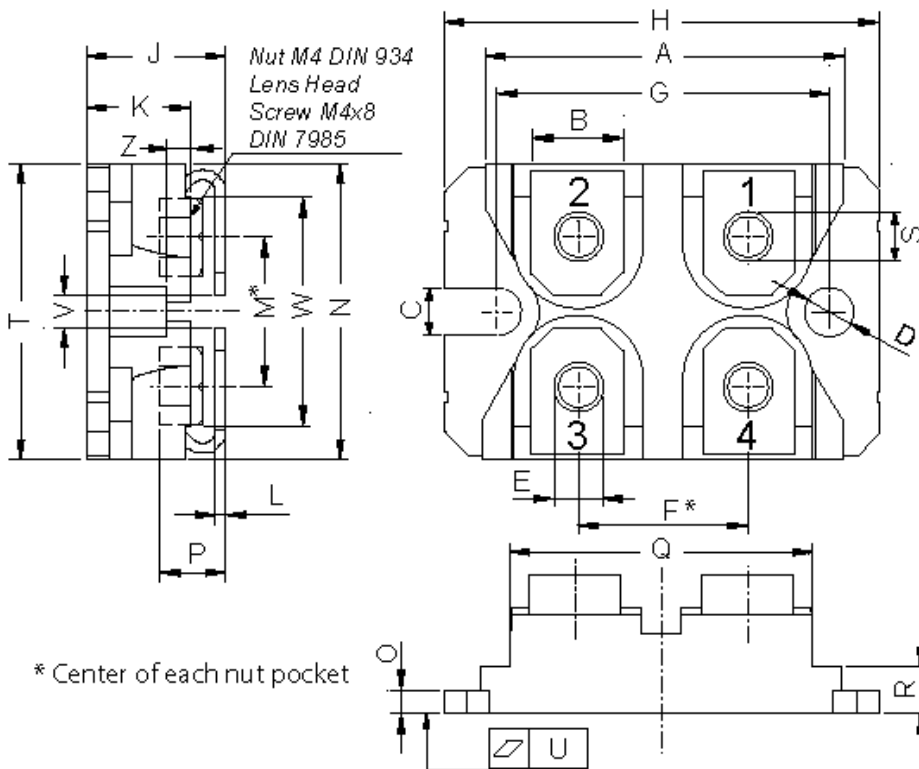
Equivalent Circuits for Simulation

* on die level

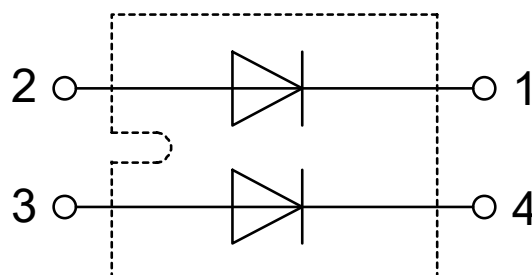
$T_{VJ} = 150^\circ\text{C}$



Symbol	Definition	Fast Diode	Unit
$V_{0\ max}$	threshold voltage	1,01	V
$R_{0\ max}$	slope resistance *	17,3	mΩ

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

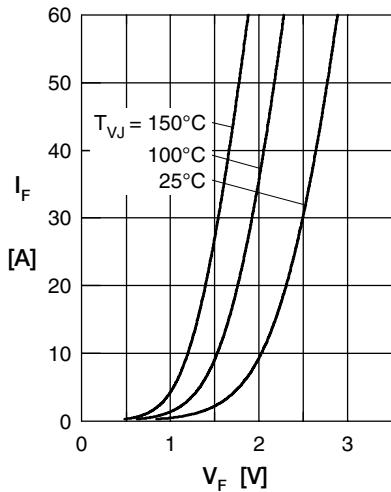


Fig. 1 Forward current I_F versus V_F

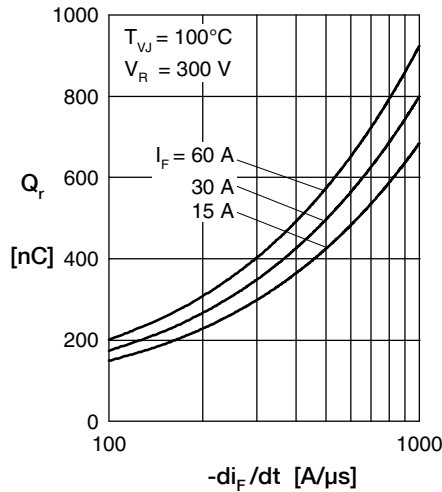


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

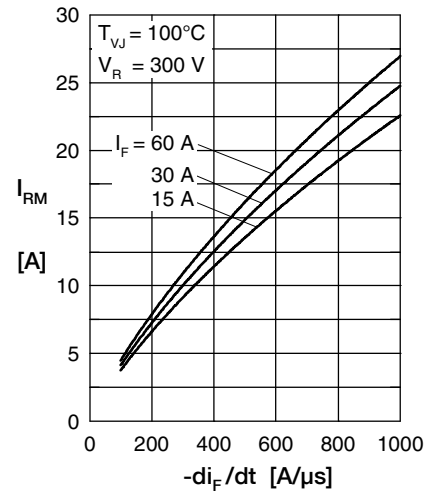


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

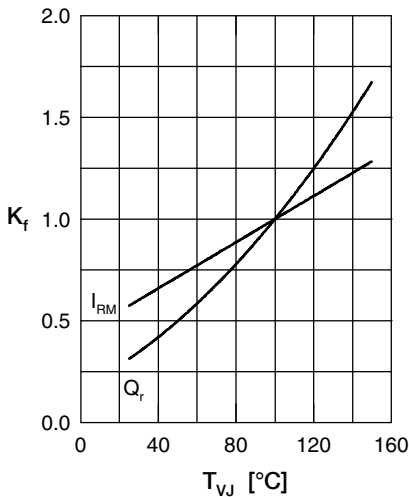


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

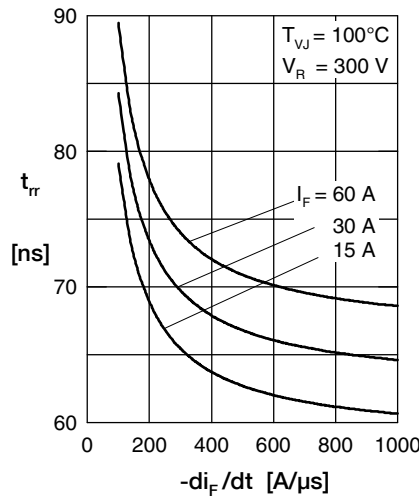


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

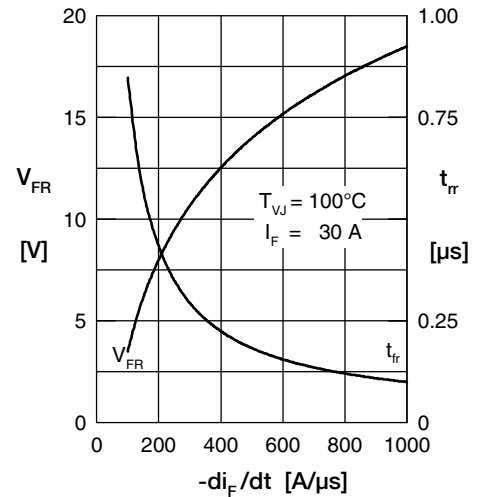


Fig. 6 Peak forward voltage V_{FR} and t_{rr} versus di_F/dt

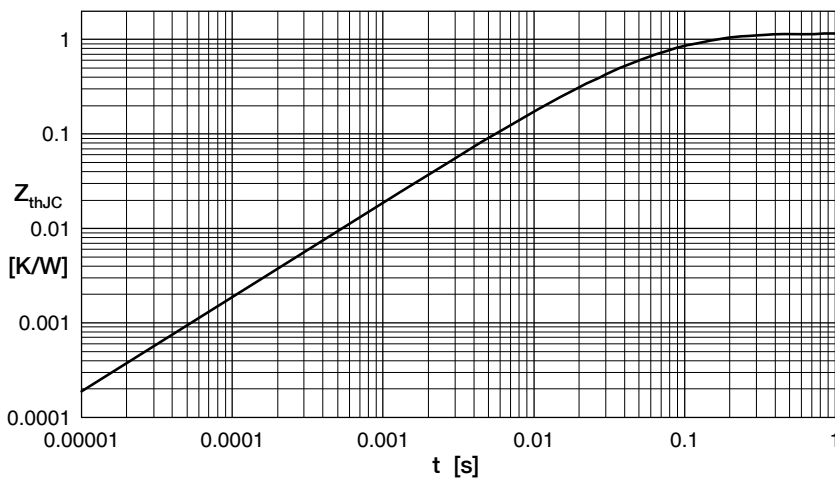


Fig. 7 Transient thermal resistance junction to case

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