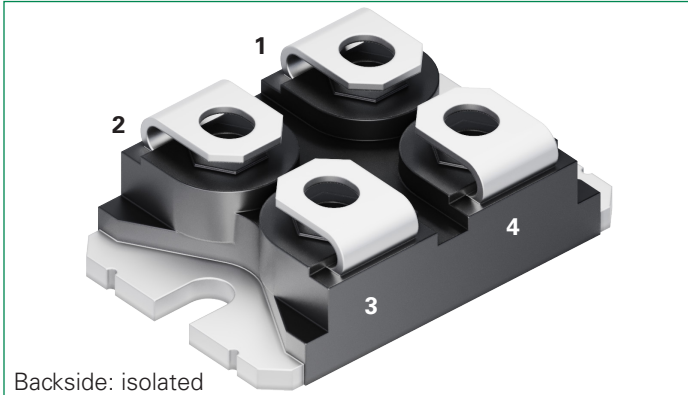


DSEP2x31-12A

1200 V, 2x30 A High Performance Fast Recovery Diode
Low Loss and Soft Recovery, Parallel legs

RoHS E72873



Description

The DSEP2x31-12A is a 1200 V, dual 30 A HiPerFRED fast recovery epitaxial diode designed for high-frequency power conversion systems. The device combines very short recovery time, soft recovery behaviour, and low reverse recovery current to reduce switching losses and EMI. Its isolated SOT-227B package with DCB technology supports effective thermal management and reliable operation in demanding industrial power electronics environments.

Features

- Short reverse recovery time
- Soft recovery behaviour
- Low reverse recovery current
- Avalanche voltage rated
- DCB-isolated SOT-227B package

Benefits

- Minimises switching losses and improves converter efficiency.
- Reduces EMI/RFI
- Enhanced robustness against transient operating conditions.
- Improved thermal behaviour

Applications

- Antiparallel diode for high frequency switching devices
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

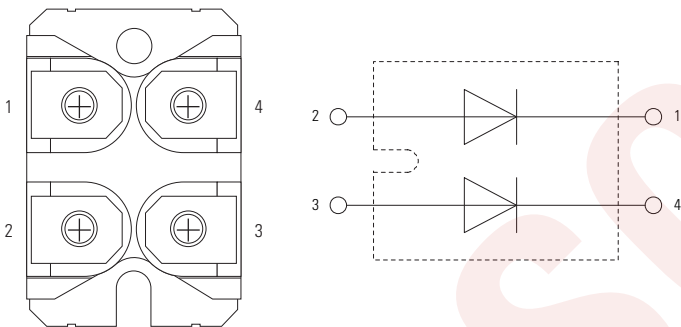
Package SOT-227 (minibloc)

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

Product Summary

Characteristic	Value	Unit
V_{RRM}	1200	V
$I_{F(AV)}$	2 x 30	A
t_{rr}	40	ns

Pinout Diagram SOT-227 (minibloc)



Maximum Ratings ($T_{vj} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Symbol	Characteristics	Condition	Value	Units
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$	1200	V
V_{RSM}	Non-Repetitive Peak Reverse Voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_c = 75\text{ }^{\circ}\text{C}$, $T_{vj} = 150\text{ }^{\circ}\text{C}$, rectangular d = 0.5	30	A
I_{FSM}	Non-repetitive Surge Forward Current	$t_p = 10\text{ ms}$, $f = 50\text{ Hz}$, sine wave, $V_R = 0\text{ V}$, $T_{vj} = 45\text{ }^{\circ}\text{C}$	200	A
P_{tot}	Total Power Dissipation	$T_c = 25\text{ }^{\circ}\text{C}$	100	W
T_{stg}	Storage Temperature Range	–	–40 to +150	$^{\circ}\text{C}$
T_{vj}	Virtual Junction Temperature Range	–	–40 to +150	$^{\circ}\text{C}$
I_{tRMS}	Terminal RMS Current	–	100	A
V_{isol}	Isolation Withstand Voltage	$f = 50/60\text{ Hz}$, $I_{isol} \leq 1\text{ mA}$, $t = 1\text{ s}$	3000	V
		$f = 50/60\text{ Hz}$, $I_{isol} \leq 1\text{ mA}$, $t = 1\text{ m}$	2500	V

Electrical Characteristics – Static ($T_{vj} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Symbol	Characteristics	Conditions	Value			Units
			Min.	Typ.	Max.	
I_R	Reverse Current	$V_R = 1200\text{ V}$, $T_{vj} = 25\text{ }^{\circ}\text{C}$	–	–	250	μA
		$V_R = 1200\text{ V}$, $T_{vj} = 150\text{ }^{\circ}\text{C}$	–	–	1	mA
V_F	Forward Voltage	$I_F = 30\text{ A}$; $T_{vj} = 25\text{ }^{\circ}\text{C}$	–	–	2.90	V
		$I_F = 60\text{ A}$; $T_{vj} = 25\text{ }^{\circ}\text{C}$	–	–	3.37	
		$I_F = 30\text{ A}$; $T_{vj} = 150\text{ }^{\circ}\text{C}$	–	–	3.05	
		$I_F = 60\text{ A}$; $T_{vj} = 150\text{ }^{\circ}\text{C}$	–	–	3.54	
			–	–		
$V_{(TO)}$	Threshold Voltage	$T_{vj} = 150\text{ }^{\circ}\text{C}$	–	–	1.31	V
r_T	Slope Resistance	$T_{vj} = 150\text{ }^{\circ}\text{C}$	–	–	15.4	$\text{m}\Omega$

Electrical Characteristics – Dynamic ($T_{vj} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
t_{rr}	Reverse Recovery Time	$I_F = 30\text{ A}$, $V_R = 600\text{ V}$, $-di_F/dt = 200\text{ A}/\mu\text{s}$	$T_{vj} = 25\text{ }^{\circ}\text{C}$	–	60	–	ns
			$T_{vj} = 100\text{ }^{\circ}\text{C}$	–	170	–	ns
I_{rrm}	Peak Reverse Recovery Current	$I_F = 30\text{ A}$, $V_R = 600\text{ V}$, $-di_F/dt = 200\text{ A}/\mu\text{s}$	$T_{vj} = 25\text{ }^{\circ}\text{C}$	–	8.5	–	A
			$T_{vj} = 100\text{ }^{\circ}\text{C}$	–	13	–	A
C_j	Junction Capacitance	$V_R = 600\text{ V}$, $f = 1\text{ MHz}$, $T_{vj} = 25\text{ }^{\circ}\text{C}$		–	12	–	pF

Thermal Characteristics

Symbol	Characteristics	Conditions	Value			Units
			Min.	Typ.	Max.	
$R_{th(j-c)}$	Thermal Resistance Junction To Case	–	–	–	1.15	K/W
$R_{th(c-h)}$	Thermal Resistance Case To Heat Sink	–	–	0.1	–	K/W

Package TO-247 2L

Symbol	Characteristics	Conditions	Value			Units
			Min.	Typ.	Max.	
M_s	Mounting Torque for Screws To Heatsink	–	1.1	–	1.5	Nm
M_t	Mounting Torque for Terminal Screws	–	1.1	–	1.5	Nm
G	Weight	–	–	30	–	g
T_{op}	Operating Temperature	–	-40	–	125	°C
d_s	Creepage Distance Along the Surface	terminal to terminal	3.2	–	–	mm
d_a	Clearance Distance in Air	terminal to backside	6.8	–	–	mm

Characteristic Curves

Fig. 1. Typical Forward Characteristics

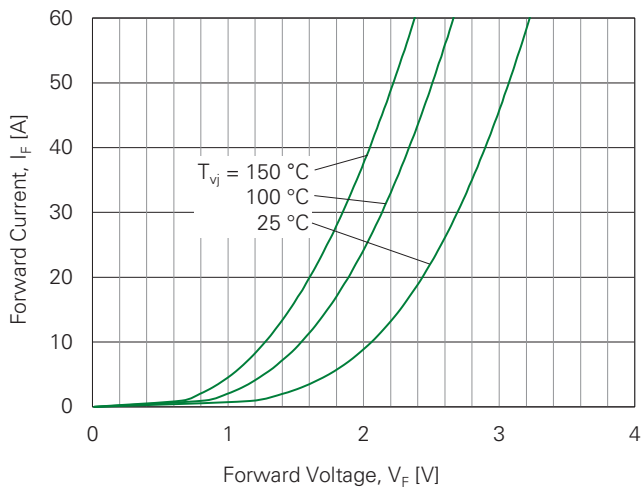


Fig. 2. Typical Reverse Recovery Charge vs. Diode Current Slope

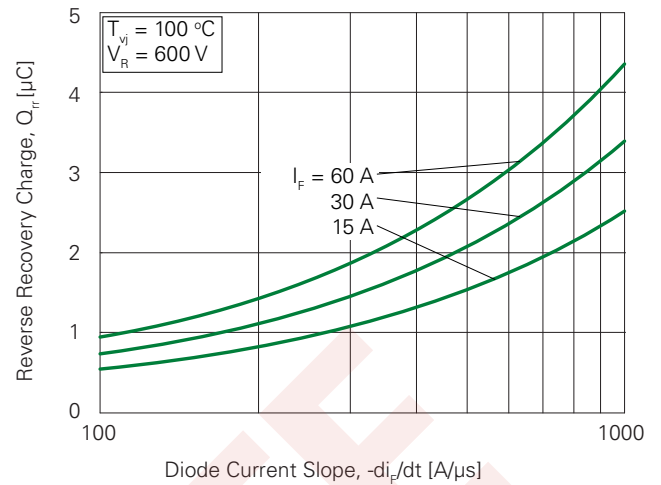


Fig. 3. Typical Peak Reverse Recovery Current vs. Diode Current Slope

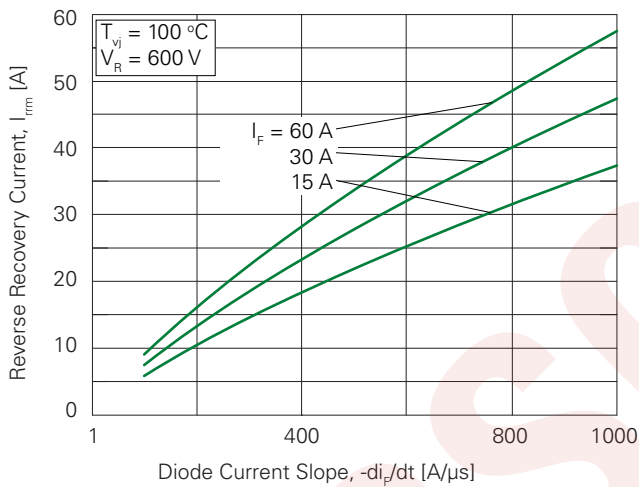


Fig. 4. Typical Dynamic Parameters vs. Virtual Junction Temperature

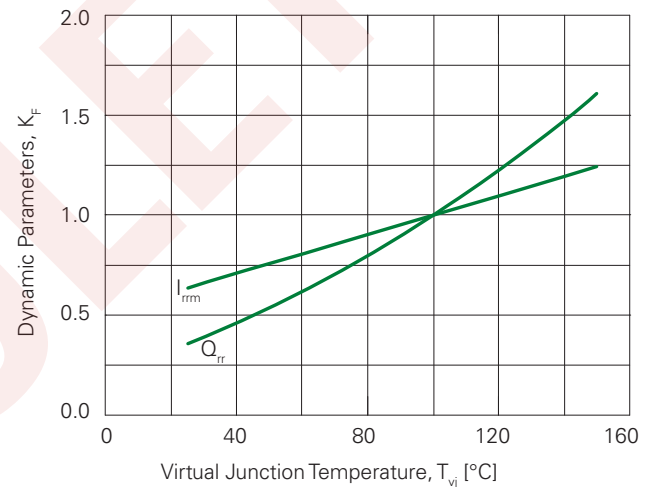
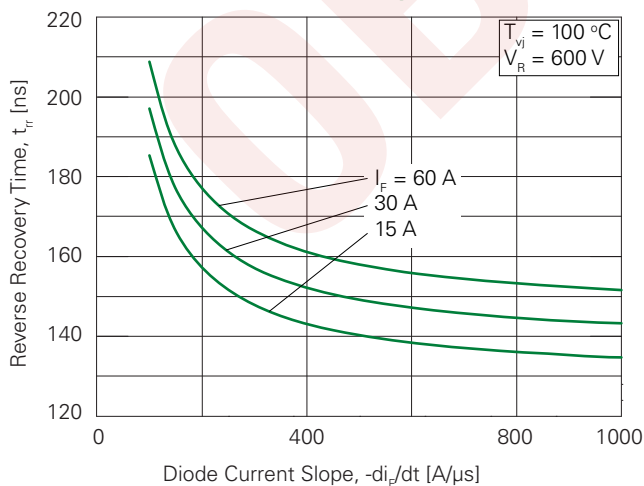
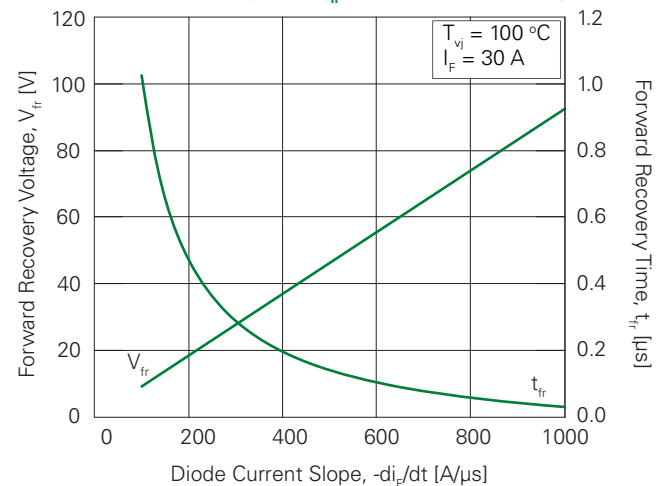
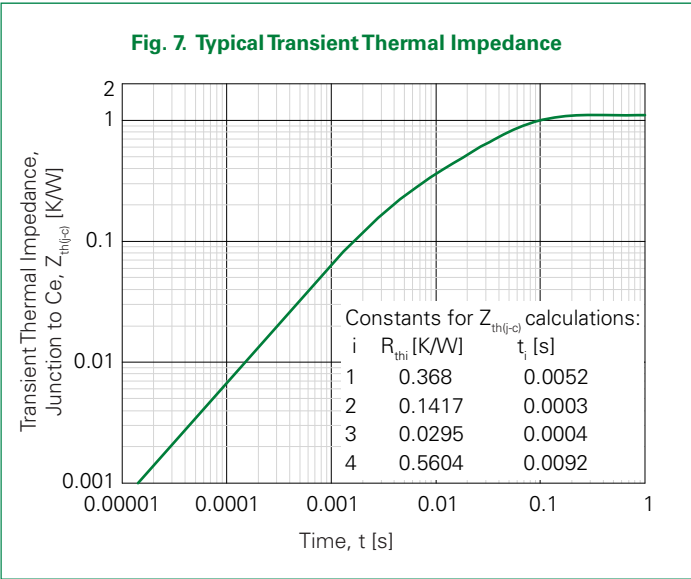


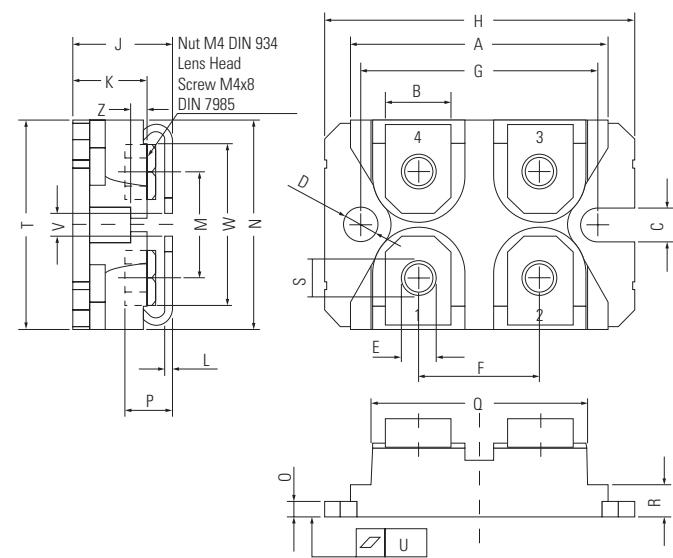
Fig. 5. Typical Reverse Recovery Time vs. Diode Current Slope

Fig. 6. Typical Peak Forward Recovery Voltage, V_{fr} and Forward Recovery Time, t_{fr} vs. Diode Current Slope

Characteristic Curves

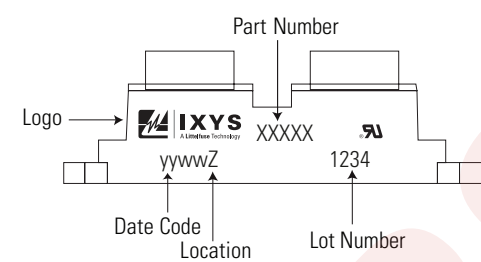


Part Outline Drawing SOT-227B (miniBLOC)



Symbol	Millimeters		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

Part Number and Marking



Ordering Information

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity
Standard	DSEP2x31-12A	DSEP2x31-12A	Tube	10

Equivalent Circuits for Simulation (*on die level, T_{vj} = 150 °C)

Symbol	Definition	Fast Diode	Units
V _{0max}	Threshold voltage	1.31	V
R _{0max}	Slope resistance*	13.5	mΩ

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 <http://www.littelfuse.com/disclaimer-electronics>.



Part of:

