

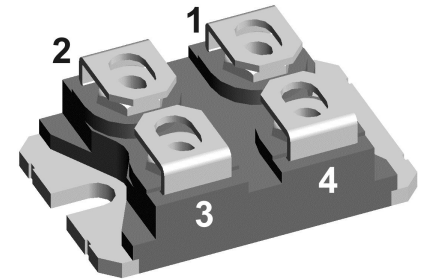
HiPerFRED

$$\begin{aligned} V_{RRM} &= 1200 \text{ V} \\ I_{DAV} &= 60 \text{ A} \\ t_{rr} &= 60 \text{ ns} \end{aligned}$$

High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 1~ Rectifier Bridge

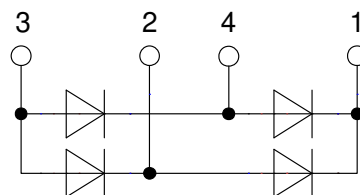
Part number

VBE60-12A



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: 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°C				1200	V	
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V	
I _R	reverse current, drain current	V _R = 1200 V	T _{VJ} = 25°C			250	μA	
		V _R = 1200 V	T _{VJ} = 125°C			1	mA	
V _F	forward voltage drop	I _F = 30 A	T _{VJ} = 25°C			2.68	V	
		I _F = 60 A				3.15	V	
		I _F = 30 A	T _{VJ} = 150°C			1.73	V	
		I _F = 60 A				2.22	V	
I _{DAV}	bridge output current	T _C = 70°C rectangular d = 0.5	T _{VJ} = 150°C			60	A	
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 150°C		1.31	V	
r _F	slope resistance					14	mΩ	
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°C				110	W	
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V		T _{VJ} = 45°C		200	A	
C _J	junction capacitance	V _R = 600 V f = 1 MHz		T _{VJ} = 25°C	12		pF	
I _{RM}	max. reverse recovery current	} I _F = 30 A; V _R = 600 V -di _F /dt = 200 A/μs		T _{VJ} = 25 °C	8.5		A	
				T _{VJ} = 100 °C	13		A	
t _{rr}	reverse recovery time			T _{VJ} = 25 °C	60		ns	
				T _{VJ} = 100 °C	170		ns	

Package SOT-227B (minibloc)				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I _{RMS}	RMS current	per terminal				150	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	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA	3000			V
		t = 1 minute		2500			V



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VBE60-12A	VBE60-12A	Tube	10	514294

Equivalent Circuits for Simulation

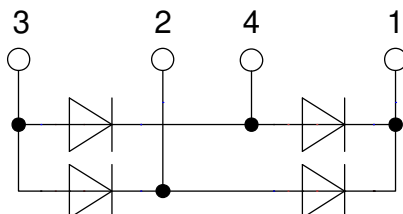
* on die level

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

		Fast Diode	
$V_{0\max}$	threshold voltage	1.31	V
$R_{0\max}$	slope resistance *	12	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



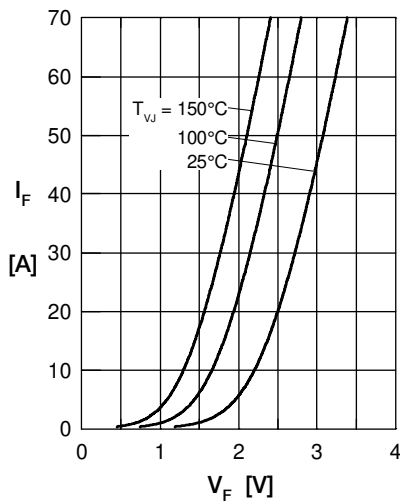
Fast Diode


Fig. 1 Forward current
 I_F versus V_F

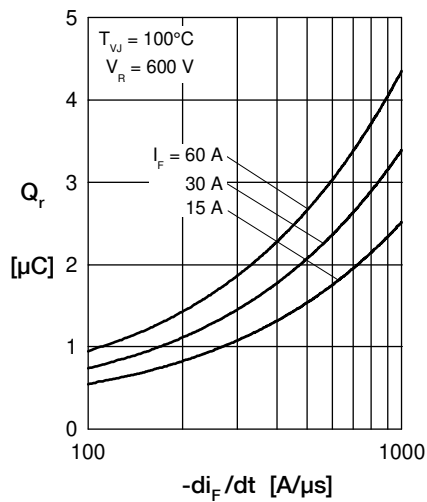


Fig. 2 Typ. reverse recov. charge
 Q_r versus $-di_F/dt$

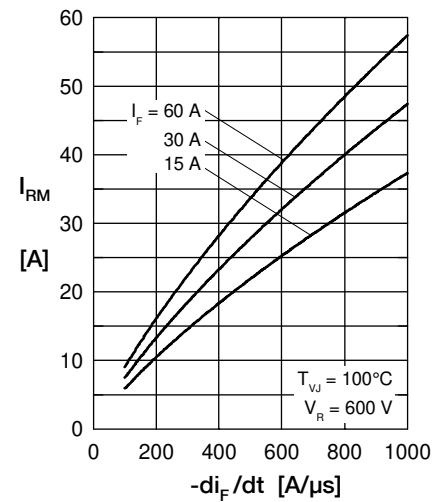


Fig. 3 Typ. peak reverse current
 I_{RM} versus $-di_F/dt$

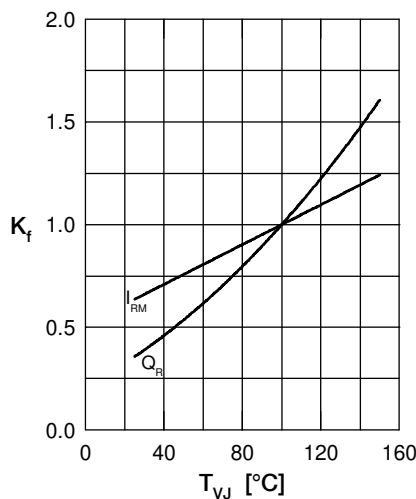


Fig. 4 Dynamic parameters
 Q_r , I_{RM} versus T_{VJ}

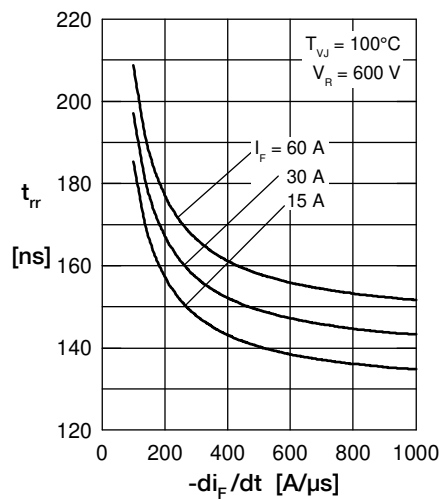


Fig. 5 Typ. recovery time
 t_{rr} versus $-di_F/dt$

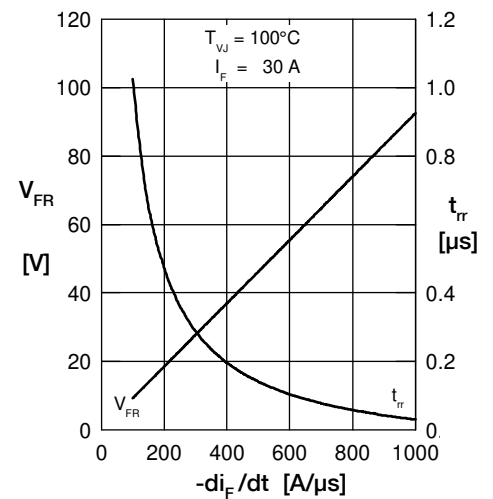


Fig. 6 Typ. peak forward voltage
 V_{FR} and t_{fr} versus di_F/dt

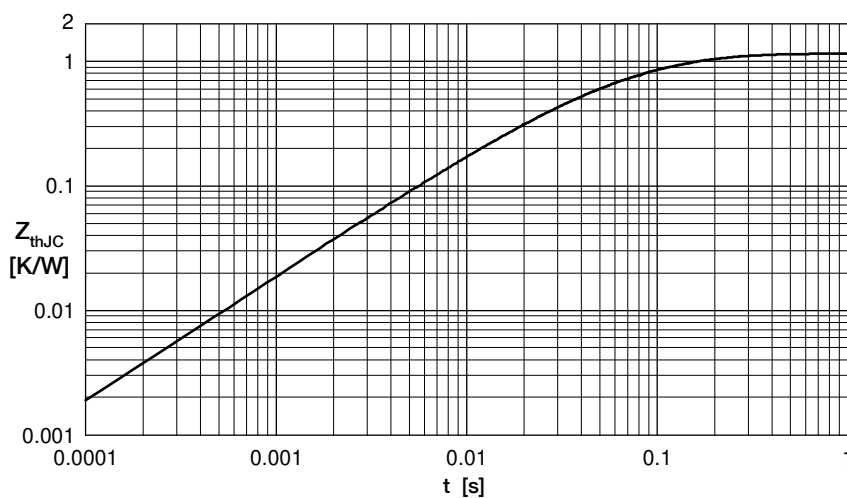


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.436	0.0055
2	0.482	0.0092
3	0.117	0.0007
4	0.115	0.0418