

FRED

$V_{RRM} = 600\text{ V}$
 $I_{FAV} = 2 \times 120\text{ A}$
 $t_{rr} = 35\text{ ns}$

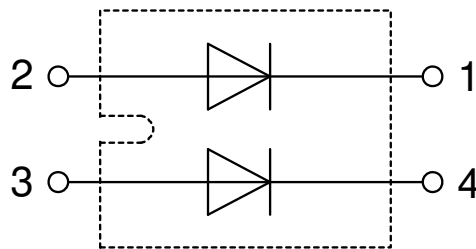
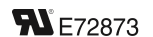
Parallel legs

Part number

DFE240X600NA



Backside: Isolated



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 and 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

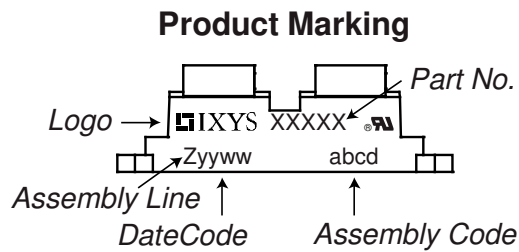
- to perform joint risk and quality assessments;

- 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				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage					600	V
V_{RRM}	max. repetitive reverse blocking voltage					600	V
I_R	reverse current, drain current	$V_R = 600\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		3	mA
		$V_R = 480\text{ V}$		$T_{VJ} = 125^\circ\text{C}$		20	mA
V_F	forward voltage drop	$I_F = 120\text{ A}$		$T_{VJ} = 25^\circ\text{C}$		1.30	V
		$I_F = 240\text{ A}$				1.55	V
		$I_F = 120\text{ A}$		$T_{VJ} = 150^\circ\text{C}$		1.20	V
		$I_F = 240\text{ A}$				1.61	V
I_{FAV}	average forward current	$T_C = 80^\circ\text{C}$	rectangular	$T_{VJ} = 150^\circ\text{C}$		120	A
V_{FO}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^\circ\text{C}$		0.80	V
r_F	slope resistance					1.9	mΩ
R_{thJC}	thermal resistance junction to case					0.4	K/W
R_{thCH}	thermal resistance case to heatsink				0.10		K/W
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$		312	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		1.20	kA
C_J	junction capacitance	$V_R = 400\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		107	pF
I_{RM}	max. reverse recovery current	} $I_F = 100\text{ A}; V_R = 300\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		27	A
				$T_{VJ} = 125^\circ\text{C}$		40	A
t_{rr}	reverse recovery time	} $-di_F/dt = 600\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		80	ns
				$T_{VJ} = 125^\circ\text{C}$		150	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		3000		V
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	2500		V



Part description

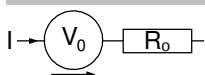
- D = Diode
- F = FRED
- E = fast, low VF
- 240 = Current Rating [A]
- X = Parallel legs
- 600 = Reverse Voltage [V]
- NA = SOT-227B (minibloc)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DFE240X600NA	DFE240X600NA	Tube	10	522315

Equivalent Circuits for Simulation

* on die level

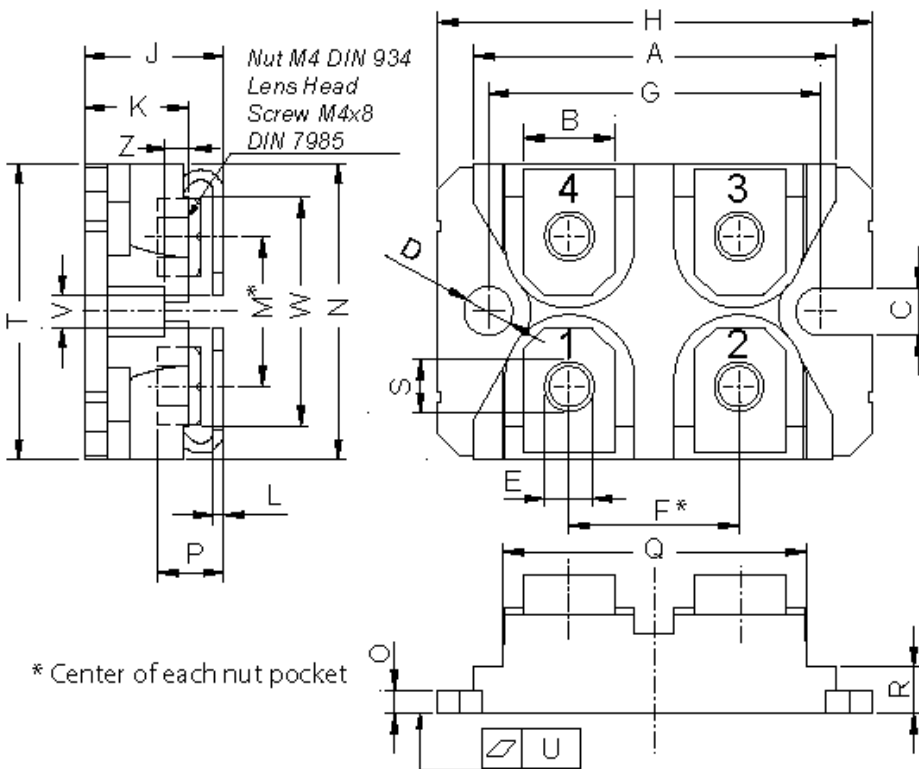
$T_{VJ} = 150^\circ\text{C}$



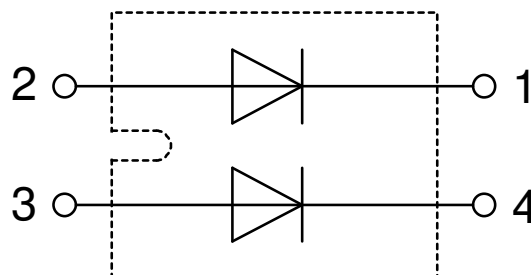
Fast Diode

$V_{0\ max}$	threshold voltage	0.8	V
$R_{0\ max}$	slope resistance *	1.4	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

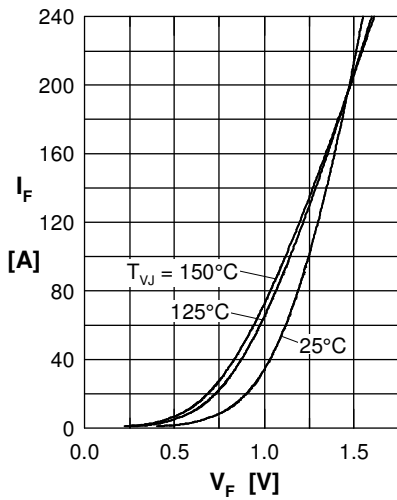


Fig. 1 Forward current I_F versus V_F

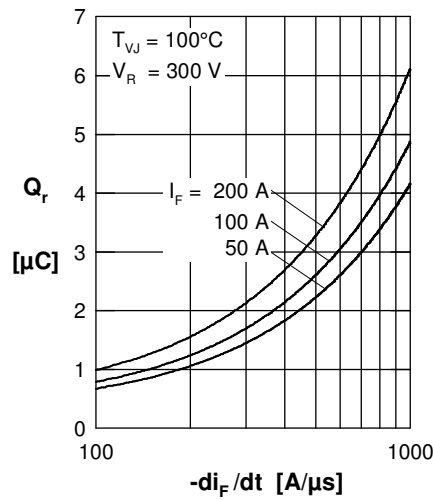


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

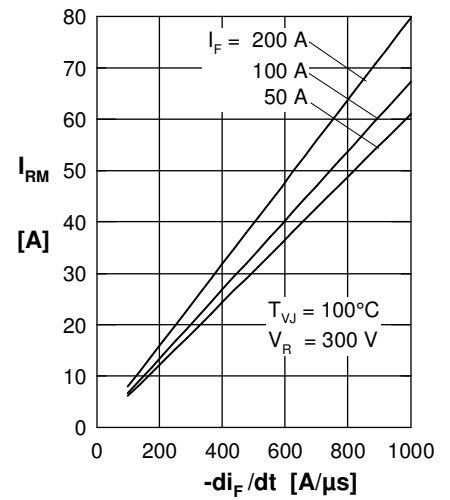


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

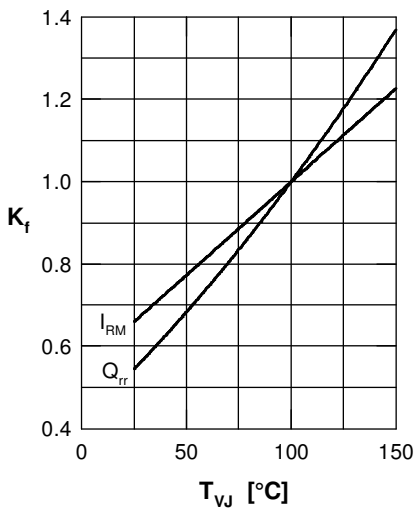


Fig. 4 Typ. dyn. parameters Q_r , I_{RM} versus T_{VJ}

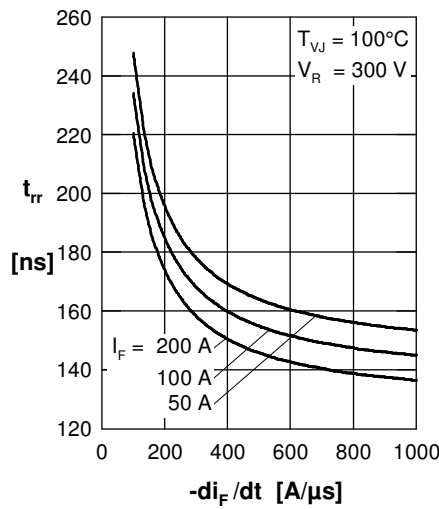


Fig. 5 Typ. recovery time t_{tr} versus $-di_F/dt$

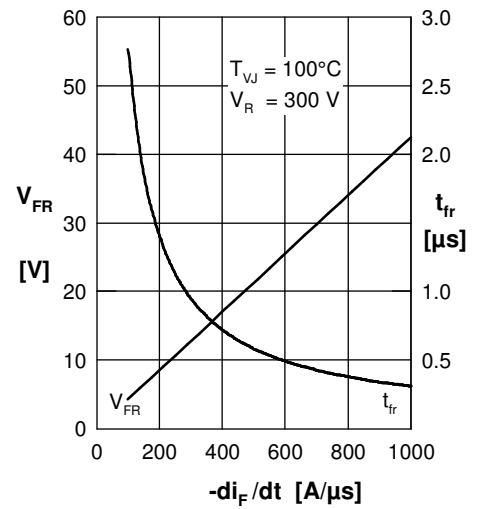


Fig. 6 Typ. peak forward voltage V_{FR} and t_{tr} versus di_F/dt

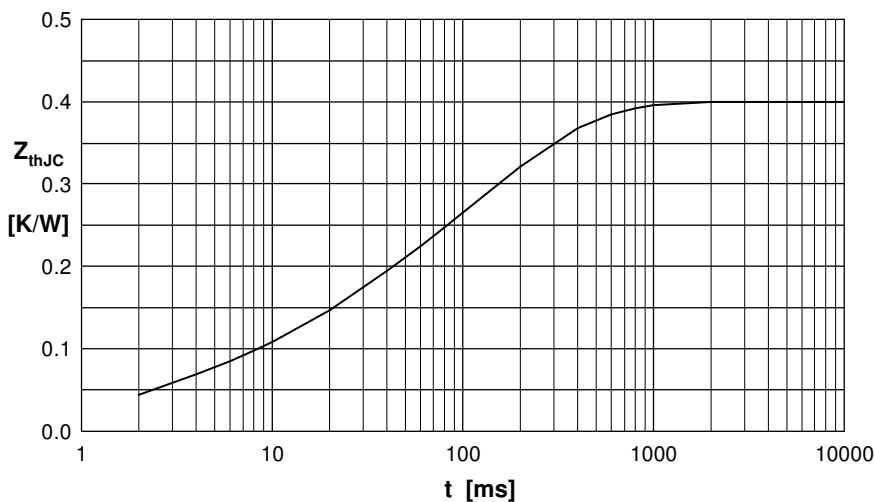


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.040	0.010
2	0.045	0.002
3	0.070	0.026
4	0.110	0.300
5	0.135	0.110