

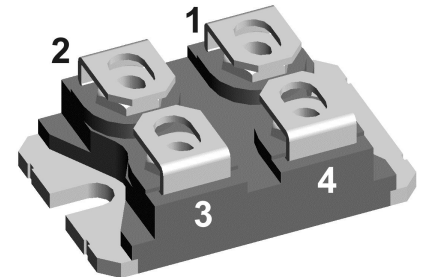
HiPerFRED

$$\begin{aligned} V_{RRM} &= 400 \text{ V} \\ I_{FAV} &= 2 \times 120 \text{ A} \\ t_{rr} &= 30 \text{ ns} \end{aligned}$$

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

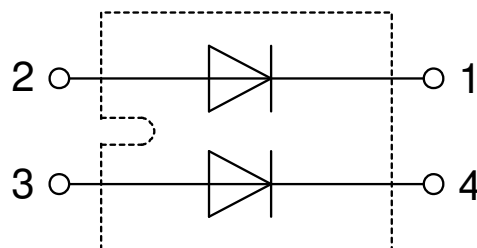
Part number

DPF240X400NA



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

Terms .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 the sales office, which is responsible for you.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

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;

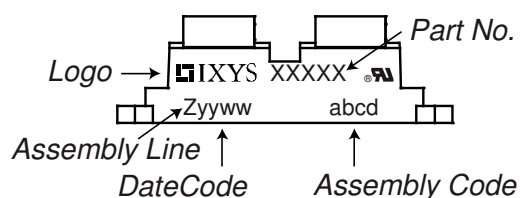
- the conclusion of quality agreements;

- 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	$T_{VJ} = 25^{\circ}\text{C}$				400	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				400	V
I_R	reverse current, drain current	$V_R = 400\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			10	μA
		$V_R = 400\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			0.5	mA
V_F	forward voltage drop	$I_F = 120\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.25	V
		$I_F = 240\text{ A}$				1.54	V
		$I_F = 120\text{ A}$	$T_{VJ} = 150^{\circ}\text{C}$			1.06	V
		$I_F = 240\text{ A}$				1.42	V
I_{FAV}	average forward current	$T_C = 70^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}\text{C}$			120	A
V_{F0}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		0.71	V
r_F	slope resistance					2.9	m Ω
R_{thJC}	thermal resistance junction to case					0.5	K/W
R_{thCH}	thermal resistance case to heatsink				0.10		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				250	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	$V_R = 200\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		187		pF
I_{RM}	max. reverse recovery current	} $I_F = 120\text{ A}; V = 240\text{ V}$ $-d_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^{\circ}\text{C}$		7	A
				$T_{VJ} = 125^{\circ}\text{C}$		18	A
t_{rr}	reverse recovery time			$T_{VJ} = 25^{\circ}\text{C}$		30	ns
				$T_{VJ} = 125^{\circ}\text{C}$		140	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

Product Marking



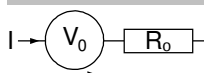
Part description

D = Diode
 P = HiPerFRED
 F = ultra fast
 240 = Current Rating [A]
 X = Parallel legs
 400 = Reverse Voltage [V]
 NA = SOT-227B (minibloc)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPF240X400NA	DPF240X400NA	Tube	10	499554

Equivalent Circuits for Simulation

* on die level

 $T_{VJ} = 150\text{ °C}$ 

Fast Diode

 $V_{0\max}$ threshold voltage

0.71

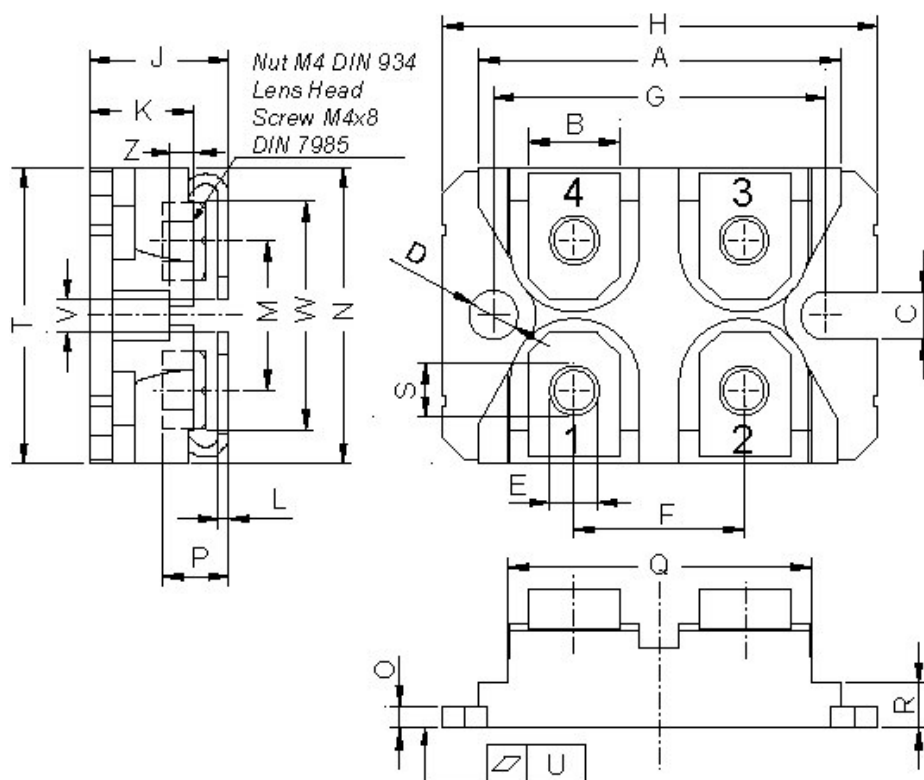
V

 $R_{0\max}$ slope resistance *

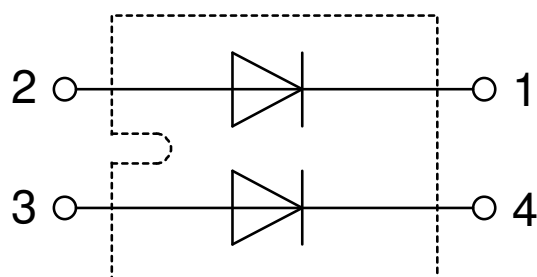
1.01

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

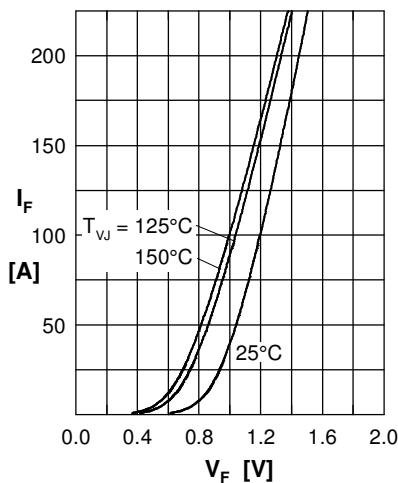


Fig. 1 Forward current I_F vs. V_F

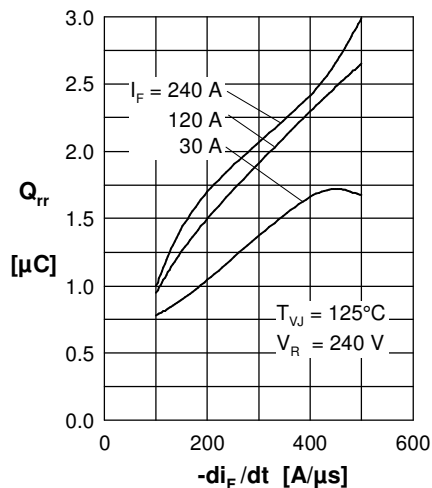


Fig. 2 Typ. reverse recovery charge Q_{rr} vs. $-di_F/dt$

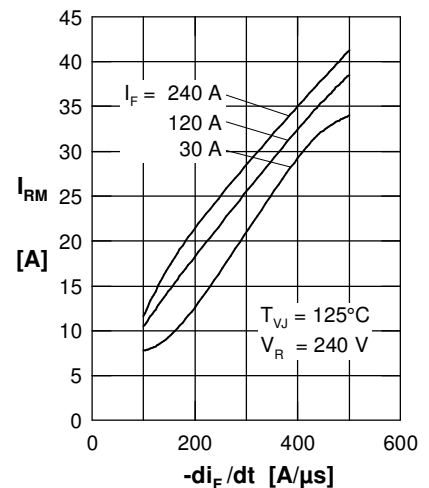


Fig. 3 Typ. reverse recovery current I_{RM} vs. $-di_F/dt$

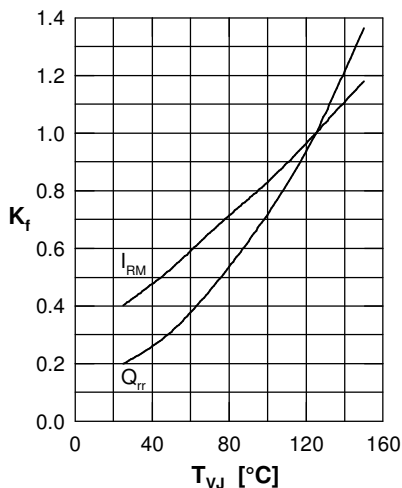


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} vs. T_{VJ}

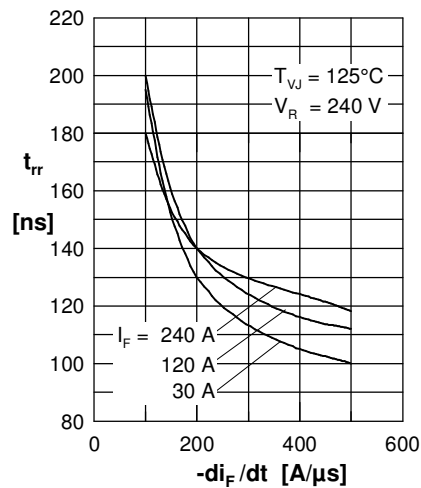


Fig. 5 Typ. reverse recovery time t_{rr} vs. $-di_F/dt$

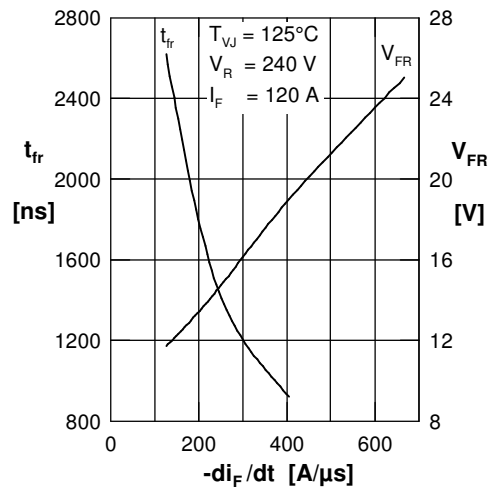


Fig. 6 Typ. forward recovery voltage V_{FR} & t_{fr} vs. di_F/dt

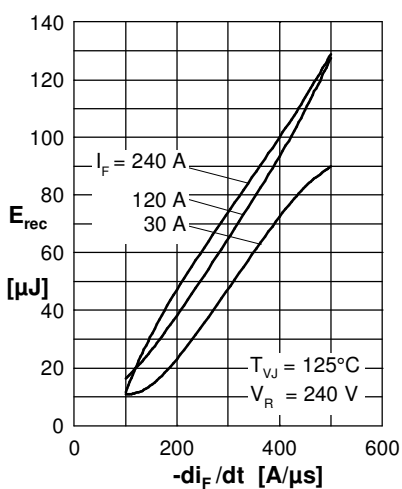


Fig. 7 Typ. recovery energy E_{rec} vs. $-di_F/dt$

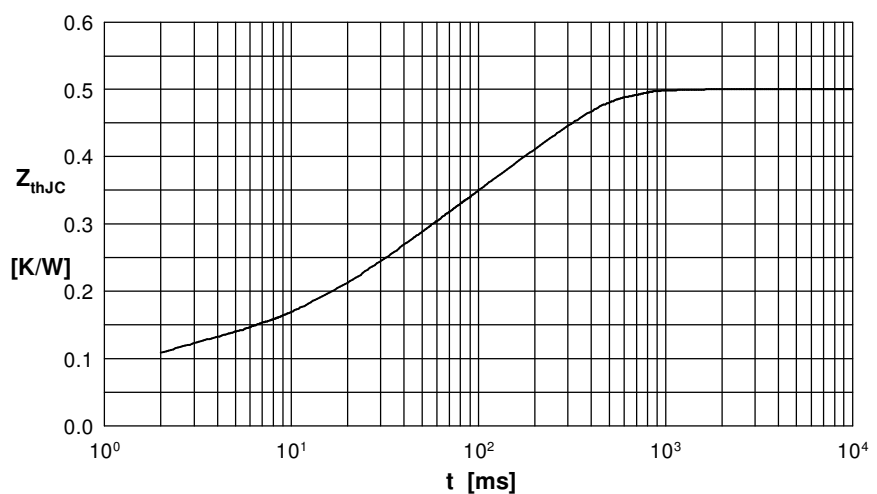


Fig. 8 Transient thermal impedance junction to case

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