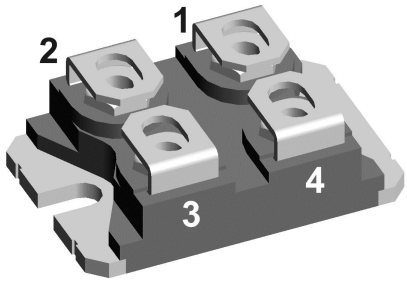
HiPerFRED

V_{RRM} = 400 V
I_{FAV} = 2x 120 A
t_{rr} = 30 ns

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

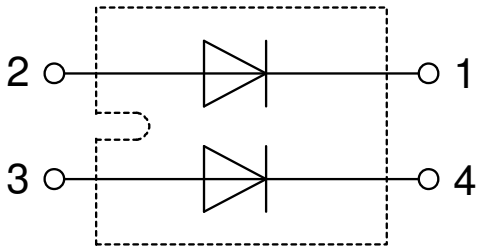
Part number

DPF240X400NA



Backside: isolated

E72873



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low Irm-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low Irm 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)

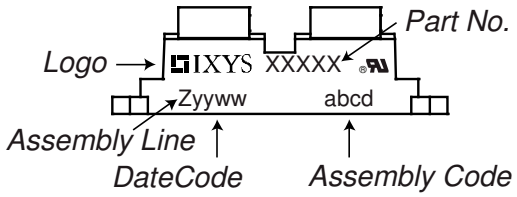
Package: SOT-227B (minibloc)

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

Fast Diode				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			400	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			400	V
I_R	*reverse current, drain current*	V_R = 400 V	T_{VJ} = 25°C			10	µA
		V_R = 400 V	T_{VJ} = 150°C			0.5	mA
V_F	*forward voltage drop*	I_F = 120 A	T_{VJ} = 25°C			1.25	V
		I_F = 240 A				1.54	V
		I_F = 120 A	T_{VJ} = 150°C			1.06	V
		I_F = 240 A				1.42	V
I_{FAV}	*average forward current*	T_C = 70°C	T_{VJ} = 150°C			120	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0.71	V
r_F	*slope resistance* }					2.9	mΩ
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°C			250	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			1.20	kA
C_J	*junction capacitance*	V_R = 200 V f = 1 MHz	T_{VJ} = 25°C		187		pF
I_{RM}	*max. reverse recovery current*		T_{VJ} = 25 °C		7		A
		I_F = 120 A; V = 240 V	T_{VJ} = 125 °C		18		A
t_{rr}	*reverse recovery time*	$-d_F/dt$ = 200 A/µs	T_{VJ} = 25 °C		30		ns
			T_{VJ} = 125 °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



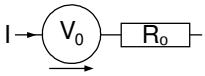
Part description

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

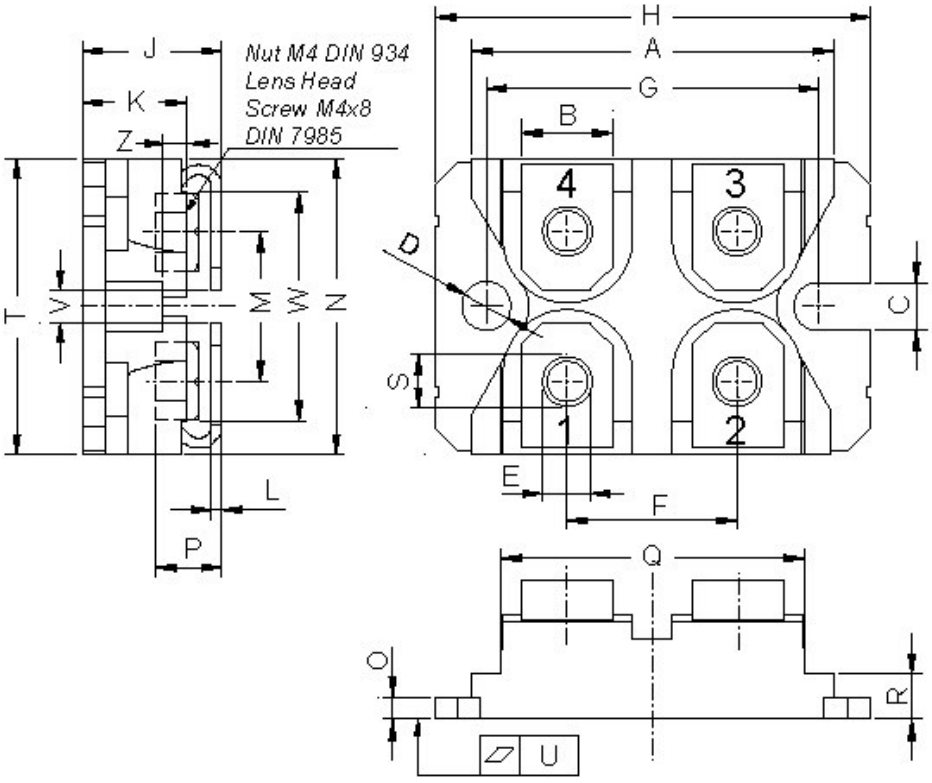
Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150 °C

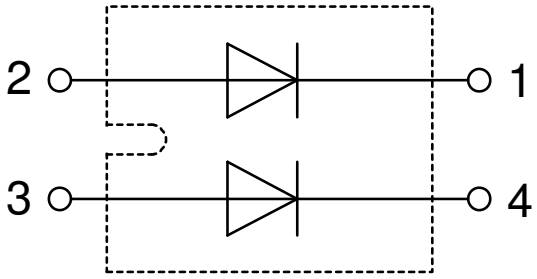


		Fast Diode	
$V_{0\,max}$	*threshold voltage*	0.71	V
$R_{0\,max}$	*slope resistance **	1.01	mΩ

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

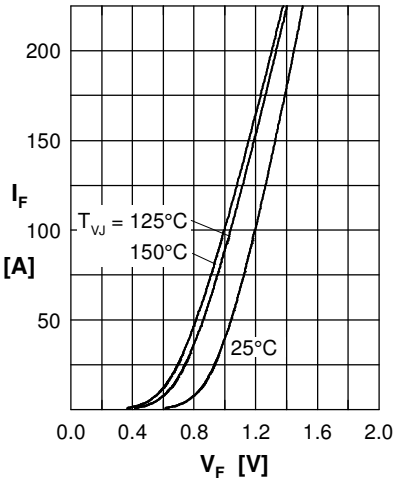


Fig. 1 Forward current I_F vs. V_F

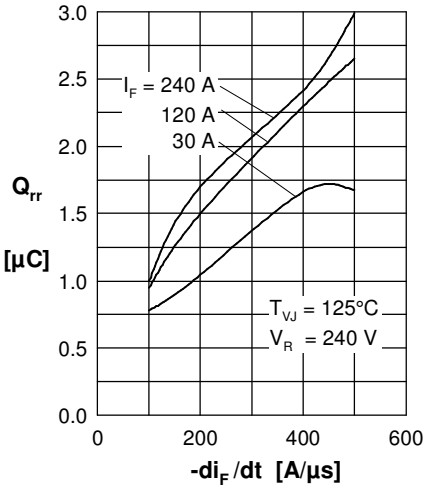


Fig. 2 Typ. reverse recovery charge Q_{rr} vs. $-di_F/dt$

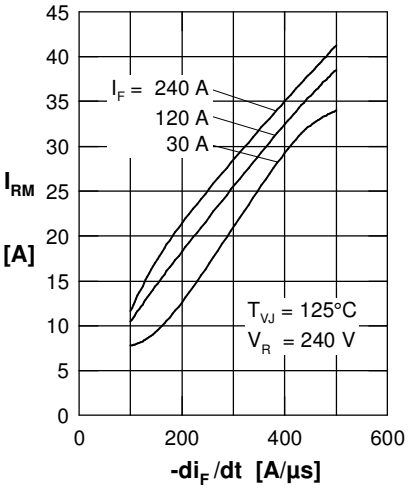


Fig. 3 Typ. reverse recovery current I_{RM} vs. $-di_F/dt$

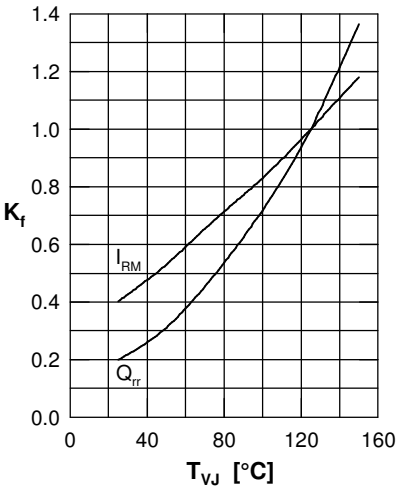


Fig. 4 Typ. dynamic parameters Q_{rr}, I_{RM} vs. T_{VJ}

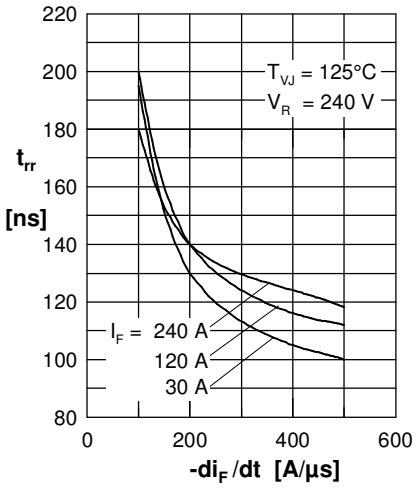


Fig. 5 Typ. reverse recovery time t_{rr} vs. $-di_F/dt$

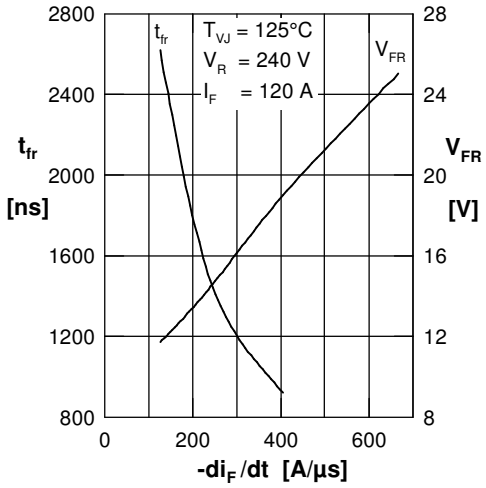


Fig. 6 Typ. forward recovery voltage V_{FR} & t_{fr} vs. di_F/dt

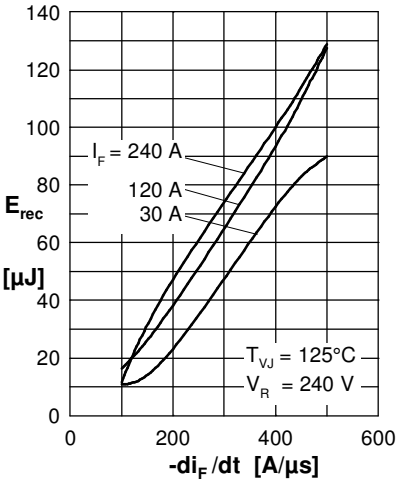


Fig. 7 Typ. recovery energy E_{rec} vs. $-di_F/dt$

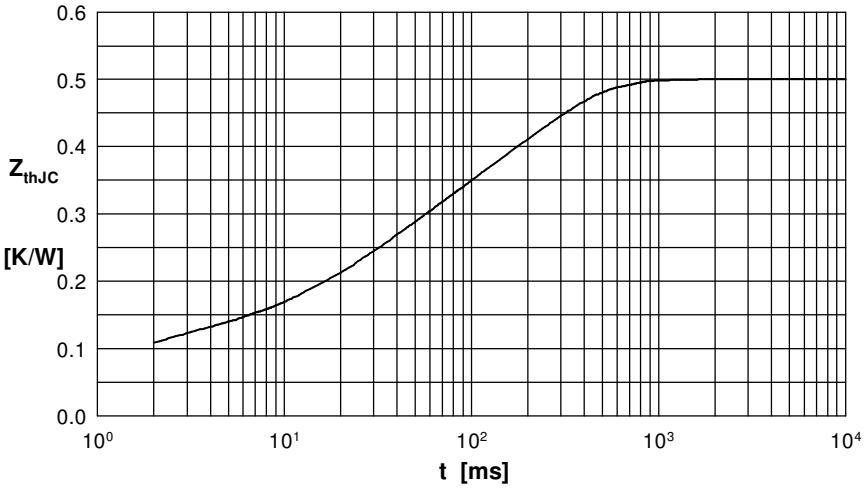


Fig. 8 Transient thermal impedance junction to case