

FRED

$$V_{RRM} = 600 \text{ V}$$

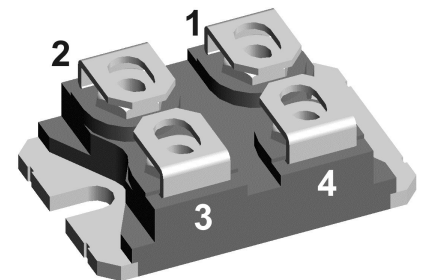
$$I_{FAV} = 2 \times 120 \text{ A}$$

$$t_{rr} = 35 \text{ ns}$$

Parallel legs

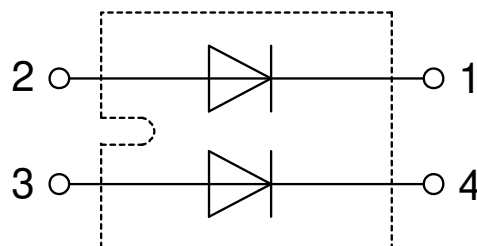
Part number

DFE240X600NA



Backside: Isolated

 E72873



Features / Advantages:

- Planar passivated chips
- 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

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Fast Diode				Ratings				
Symbol	Definition	Conditions		min.	typ.	max.	Unit	
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				600	V	
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				600	V	
I _R	reverse current, drain current	V _R = 600 V	T _{VJ} = 25°C			3	mA	
		V _R = 480 V	T _{VJ} = 125°C			20	mA	
V _F	forward voltage drop	I _F = 120 A	T _{VJ} = 25°C			1.30	V	
		I _F = 240 A				1.55	V	
		I _F = 120 A	T _{VJ} = 150°C			1.20	V	
		I _F = 240 A				1.61	V	
I _{FAV}	average forward current	T _C = 80°C rectangular d = 0.5	T _{VJ} = 150°C			120	A	
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 150°C		0.80	V	
r _F	slope resistance					3.3	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°C				312	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 = 400 V f = 1 MHz		T _{VJ} = 25°C	107		pF	
I _{RM}	max. reverse recovery current	} I _F = 100 A; V _R = 300 V -di _F /dt = 600 A/μs		T _{VJ} = 25 °C	27		A	
				T _{VJ} = 125 °C	40		A	
t _{rr}	reverse recovery time			T _{VJ} = 25 °C	80		ns	
				T _{VJ} = 125 °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	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3000			V
		t = 1 minute		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



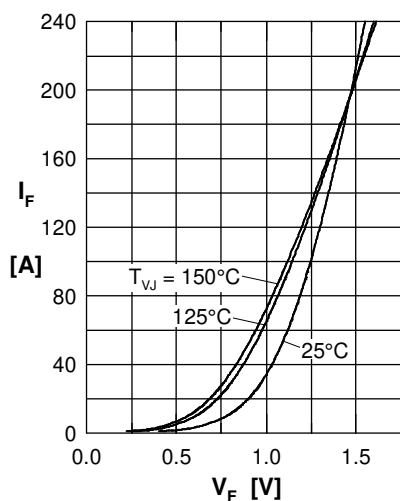
Fast Diode


Fig. 1 Forward current I_F versus V_F

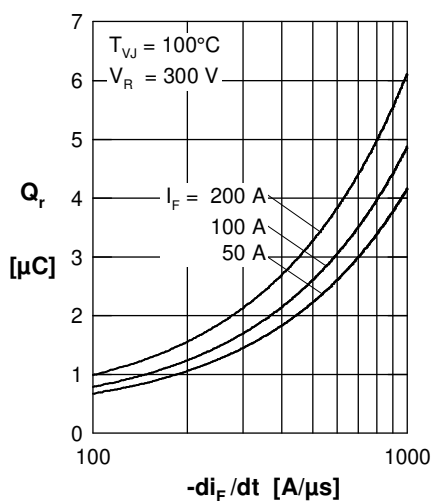


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

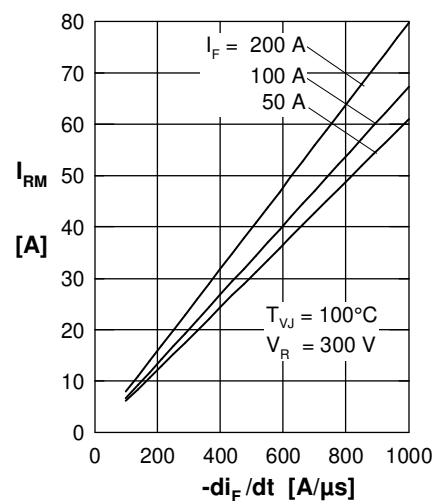


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

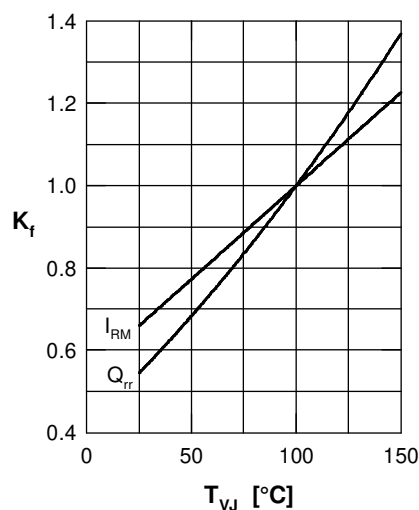


Fig. 4 Typ. dyn. parameters Q_r , I_{RM} versus T_{VJ}

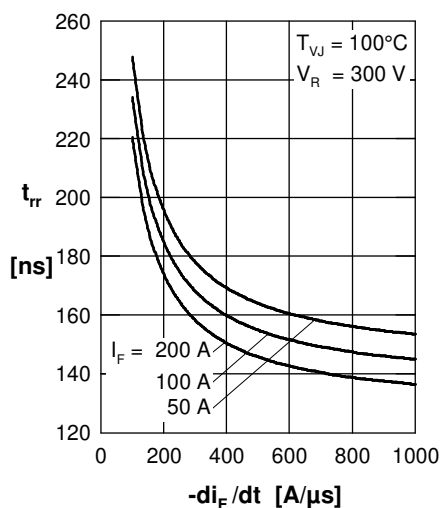


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

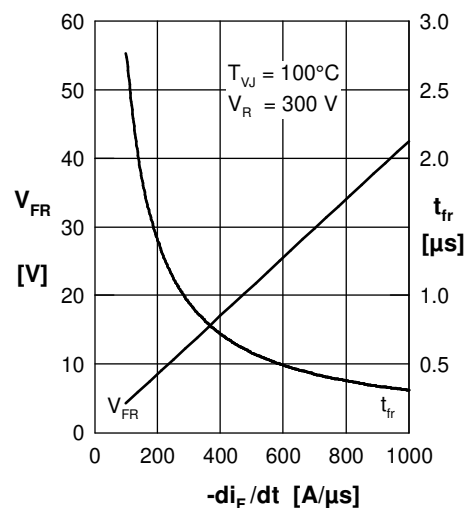


Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus di_F/dt

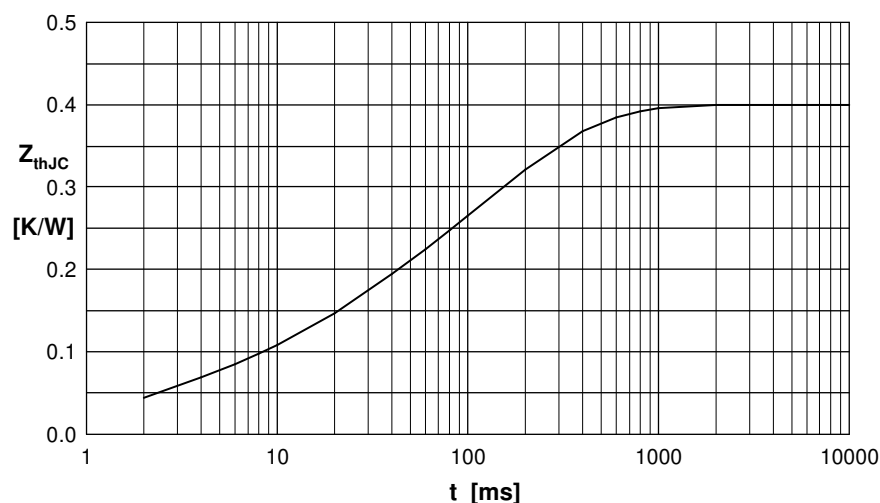


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

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