

HiPerFRED²

$$V_{RRM} = 400 \text{ V}$$

$$I_{FAV} = 2 \times 40 \text{ A}$$

$$t_{rr} = 45 \text{ ns}$$

High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Common Cathode

Part number

DPG80C400HB



Backside: cathode



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: TO-247

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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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				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			1	μA	
		V _R = 400 V	T _{VJ} = 150°C			0.4	mA	
V _F	forward voltage drop	I _F = 40 A	T _{VJ} = 25°C			1.43	V	
		I _F = 80 A				1.69	V	
		I _F = 40 A	T _{VJ} = 150°C			1.14	V	
		I _F = 80 A				1.44	V	
I _{FAV}	average forward current	T _C = 135°C rectangular d = 0.5	T _{VJ} = 175°C			40	A	
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 175°C		0.79	V	
r _F	slope resistance					7.1	mΩ	
R _{thJC}	thermal resistance junction to case					0.7	K/W	
R _{thCH}	thermal resistance case to heatsink				0.3		K/W	
P _{tot}	total power dissipation	T _C = 25°C				215	W	
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V		T _{VJ} = 45°C		400	A	
C _J	junction capacitance	V _R = 200 V f = 1 MHz		T _{VJ} = 25°C		46	pF	
I _{RM}	max. reverse recovery current	} I _F = 40 A; V _R = 270 V -di _F /dt = 200 A/μs		T _{VJ} = 25 °C		4	A	
				T _{VJ} = °C		8.5	A	
t _{rr}	reverse recovery time			T _{VJ} = 25 °C		45	ns	
				T _{VJ} = °C		80	ns	

Package TO-247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal ¹⁾			70	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				6		g
M_D	mounting torque		0.8		1.2	Nm
F_C	mounting force with clip		20		120	N

Product Marking



Part description

D = Diode
 P = HiPerFRED
 G = extreme fast
 80 = Current Rating [A]
 C = Common Cathode
 400 = Reverse Voltage [V]
 HB = TO-247AD (3)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG80C400HB	DPG80C400HB	Tube	30	506875

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 175^{\circ}\text{C}$

			Fast Diode	
$V_{0\max}$	threshold voltage	0.79		V
$R_{0\max}$	slope resistance *	4.5		mΩ

Outlines TO-247


Sym.	Inches		Millimeter	
	min.	max.	min.	max.
A	0.185	0.209	4.70	5.30
A1	0.087	0.102	2.21	2.59
A2	0.059	0.098	1.50	2.49
D	0.819	0.845	20.79	21.45
E	0.610	0.640	15.48	16.24
E2	0.170	0.216	4.31	5.48
e	0.215	BSC	5.46	BSC
L	0.780	0.800	19.80	20.30
L1	-	0.177	-	4.49
Ø P	0.140	0.144	3.55	3.65
Q	0.212	0.244	5.38	6.19
S	0.242	BSC	6.14	BSC
b	0.039	0.055	0.99	1.40
b2	0.065	0.094	1.65	2.39
b4	0.102	0.135	2.59	3.43
c	0.015	0.035	0.38	0.89
D1	0.515	-	13.07	-
D2	0.020	0.053	0.51	1.35
E1	0.530	-	13.45	-
Ø P1	-	0.29	-	7.39



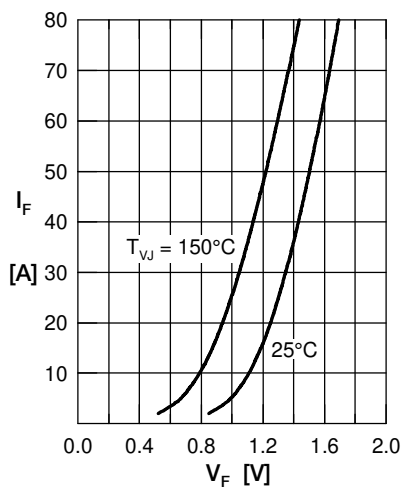
Fast Diode


Fig. 1 Forward current I_F versus V_F

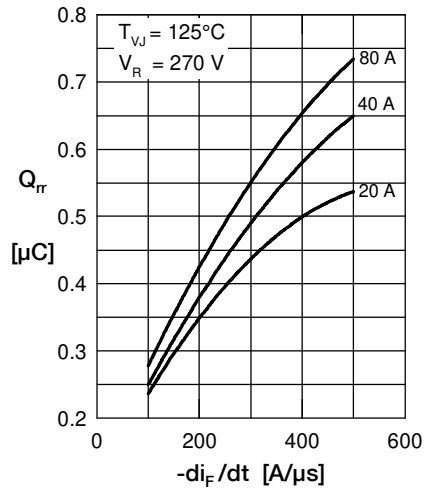


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

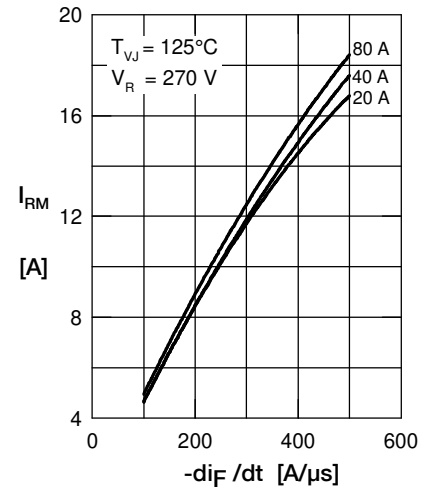


Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

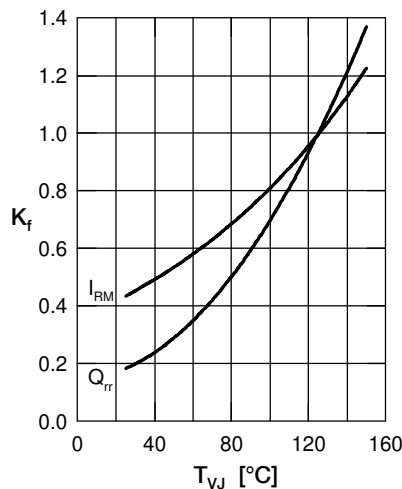


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

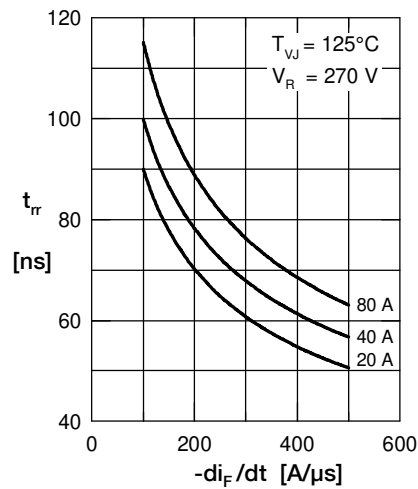


Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

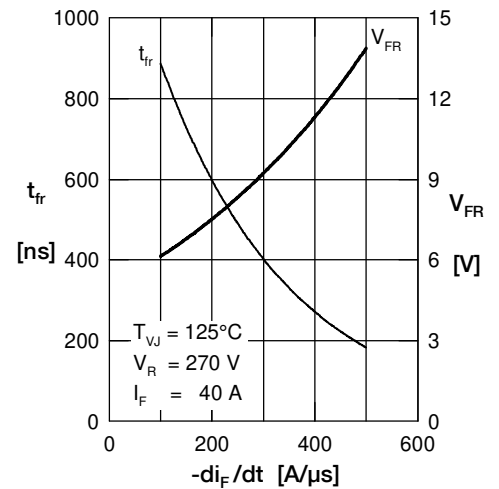


Fig. 6 Typ. forward recovery voltage V_{FR} & time t_{fr} versus di_F/dt

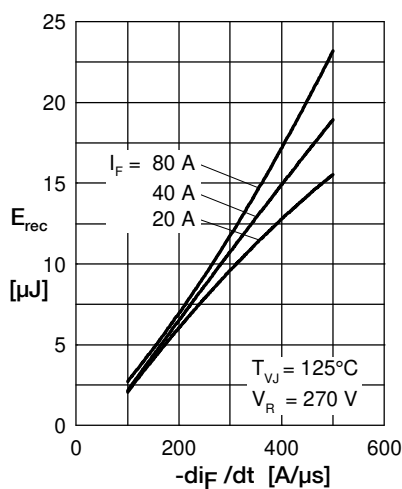


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

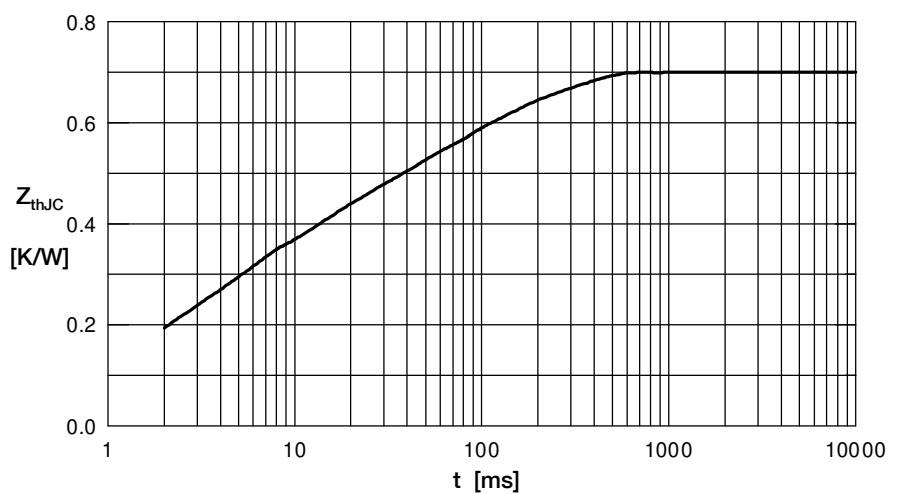


Fig. 8 Transient thermal impedance junction to case