

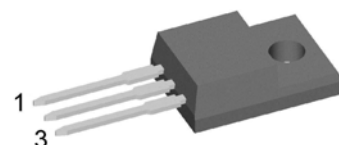
HiPerFRED²

$$\begin{aligned} V_{RRM} &= 400\text{ V} \\ I_{FAV} &= 2 \times 10\text{ A} \\ t_{rr} &= 45\text{ ns} \end{aligned}$$

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

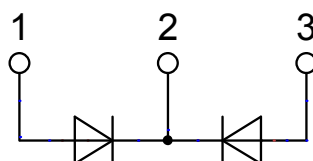
Part number

DPG20C400PN



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)

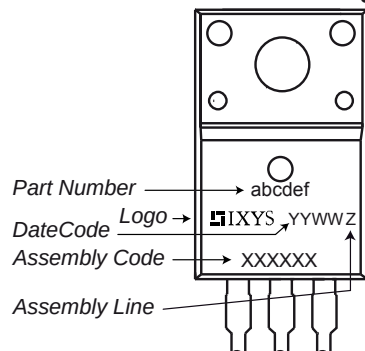
Package: TO-220FP

- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Base plate: Plastic overmolded tab
- Reduced weight

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			0.15	mA	
V _F	forward voltage drop	I _F = 10 A	T _{VJ} = 25°C			1.32	V	
		I _F = 20 A				1.51	V	
		I _F = 10 A	T _{VJ} = 150°C			1.03	V	
		I _F = 20 A				1.24	V	
I _{FAV}	average forward current	T _C = 125°C rectangular d = 0.5	T _{VJ} = 175°C			10	A	
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 175°C		0.77	V	
r _F	slope resistance					19.8	mΩ	
R _{thJC}	thermal resistance junction to case					4.4	K/W	
R _{thCH}	thermal resistance case to heatsink				0.50		K/W	
P _{tot}	total power dissipation	T _C = 25°C				35	W	
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V		T _{VJ} = 45°C		150	A	
C _J	junction capacitance	V _R = 200 V f = 1 MHz		T _{VJ} = 25°C		12	pF	
I _{RM}	max. reverse recovery current	} I _F = 10 A; V _R = 270 V -di _F /dt = 200 A/μs		T _{VJ} = 25°C		4	A	
				T _{VJ} = 125°C		6	A	
t _{rr}	reverse recovery time			T _{VJ} = 25°C		45	ns	
				T _{VJ} = 125°C		65	ns	

Package TO-220FP				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal				35	A
T_{VJ}	virtual junction temperature			-55		175	°C
T_{op}	operation temperature			-55		150	°C
T_{stg}	storage temperature			-55		150	°C
Weight					2		g
M_D	mounting torque			0.4		0.6	Nm
F_C	mounting force with clip			20		60	N
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	1.6	1.0			mm
$d_{Spb/Apb}$		terminal to backside	2.5	2.5			mm
V_{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	2500			V
		t = 1 minute		2100			V

Product Marking



Part number

D = Diode
P = HiPerFRED
G = extreme fast
20 = Current Rating [A]
C = Common Cathode
400 = Reverse Voltage [V]
PN = TO-220ABFP (3)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG20C400PN	DPG20C400PN	Tube	50	504338

Similar Part	Package	Voltage class
DPG20C400PB	TO-220AB (3)	400
DPG20C400PC	TO-263AB (D2Pak) (2)	400

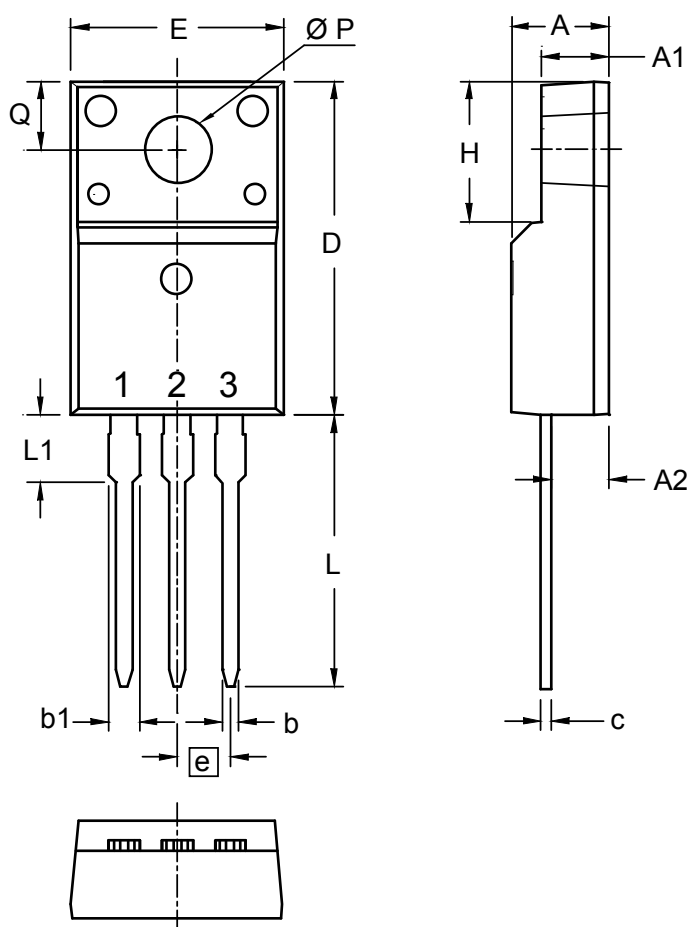
Equivalent Circuits for Simulation

* on die level

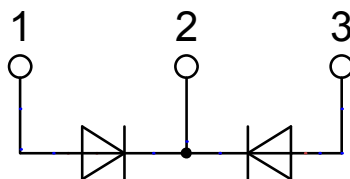
 $T_{VJ} = 175^\circ\text{C}$

$I \rightarrow$	V_0	R_0	Fast Diode	
$V_{0\max}$	threshold voltage	0.77		V
$R_{0\max}$	slope resistance *	16.6		mΩ

Outlines TO-220FP



Dim.	Millimeters		Inches	
	min	max	min	max
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.56	2.96	0.101	0.117
b	0.70	0.90	0.028	0.035
c	0.45	0.60	0.018	0.024
D	15.67	16.07	0.617	0.633
E	9.96	10.36	0.392	0.408
e	2.54 BSC		0.100 BSC	
H	6.48	6.88	0.255	0.271
L	12.68	13.28	0.499	0.523
L1	3.03	3.43	0.119	0.135
Ø P	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134



Fast Diode

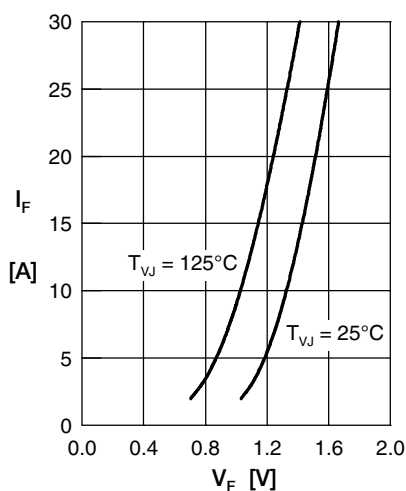


Fig. 1 Forward current I_F versus V_F

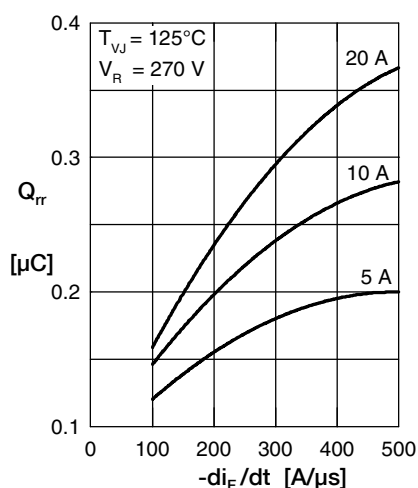


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

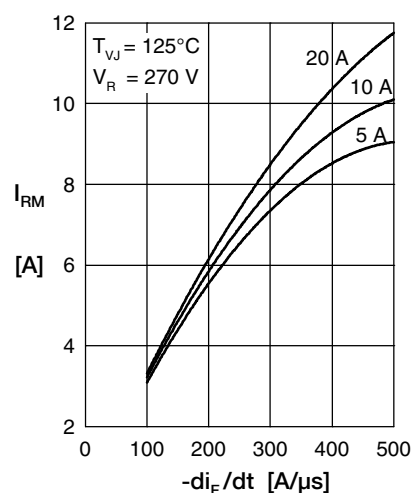


Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

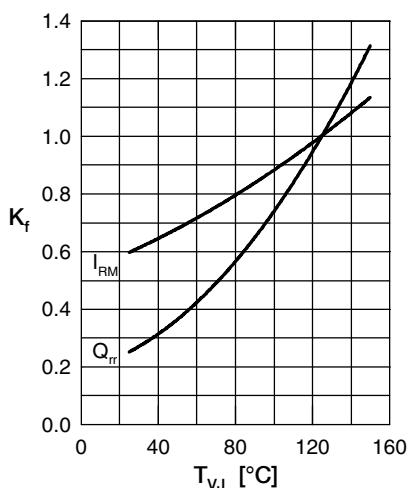


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

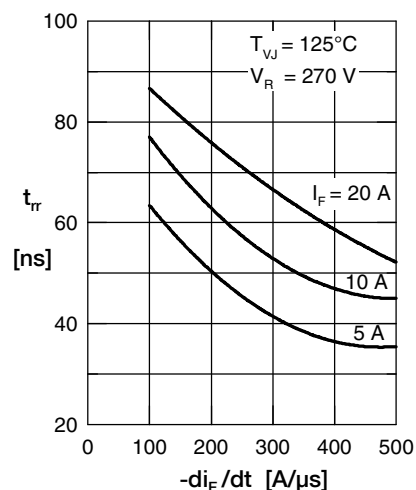


Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

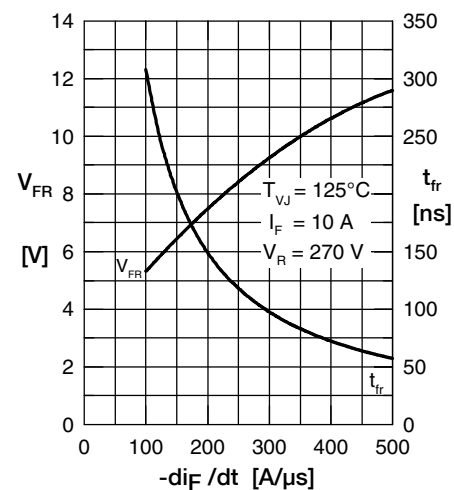


Fig. 6 Typ. forward recovery voltage V_{FR} and t_{fr} versus di_F/dt

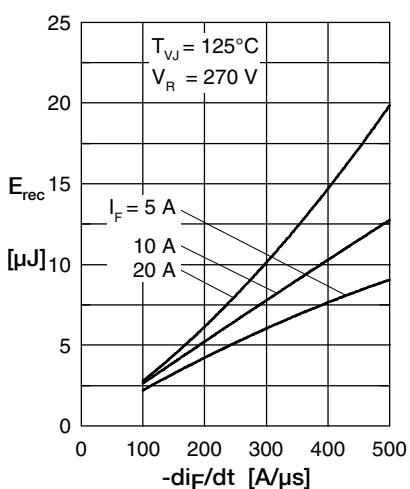


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

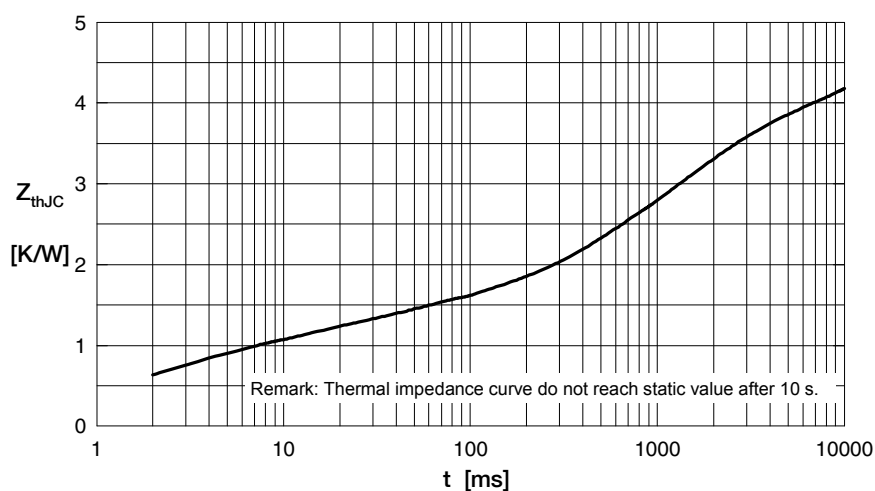


Fig. 8 Transient thermal resistance junction to case