

**HiPerFRED<sup>2</sup>**

$$V_{RRM} = 400V$$

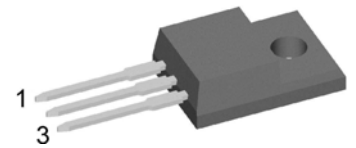
$$I_{FAV} = 2x \ 10A$$

$$t_{rr} = 45ns$$


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

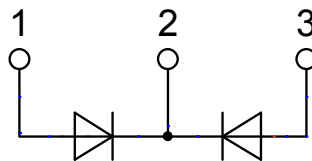
Part number

**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:**

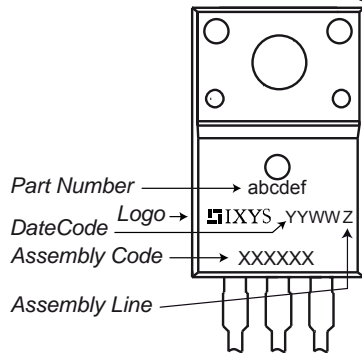
- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

**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	$T_{VJ} = 25^{\circ}C$			400	V
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			400	V
$I_R$	reverse current, drain current	$V_R = 400 V$	$T_{VJ} = 25^{\circ}C$		1	$\mu A$
		$V_R = 400 V$	$T_{VJ} = 150^{\circ}C$		0.15	mA
$V_F$	forward voltage drop	$I_F = 10 A$	$T_{VJ} = 25^{\circ}C$		1.32	V
					1.51	V
		$I_F = 10 A$	$T_{VJ} = 150^{\circ}C$		1.03	V
					1.24	V
$I_{FAV}$	average forward current	$T_C = 125^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}C$		10	A
$V_{FO}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		0.77	V
$r_F$	slope resistance				19.8	m $\Omega$
$R_{thJC}$	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	$T_C = 25^{\circ}C$			35	W
$I_{FSM}$	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		150	A
$C_J$	junction capacitance	$V_R = 200 V \quad f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}C$		12	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 10 A; V_R = 270 V$	$T_{VJ} = 25^{\circ}C$		4	A
			$T_{VJ} = 125^{\circ}C$		6	A
$t_{rr}$	reverse recovery time	} $-di_F/dt = 200 A/\mu s$	$T_{VJ} = 25^{\circ}C$		45	ns
			$T_{VJ} = 125^{\circ}C$		65	ns

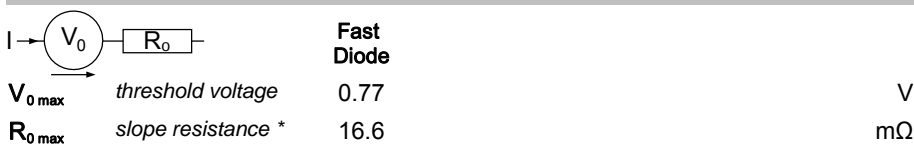
Package TO-220FP				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$I_{RMS}$	RMS current	per terminal			35	A	
$T_{VJ}$	virtual junction temperature		-55		175	°C	
$T_{op}$	operation temperature		-55		150	°C	
$T_{stg}$	storage temperature		-55		150	°C	
<b>Weight</b>				2		g	
$M_D$	mounting 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	
$d_{Spb/Abp}$		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**

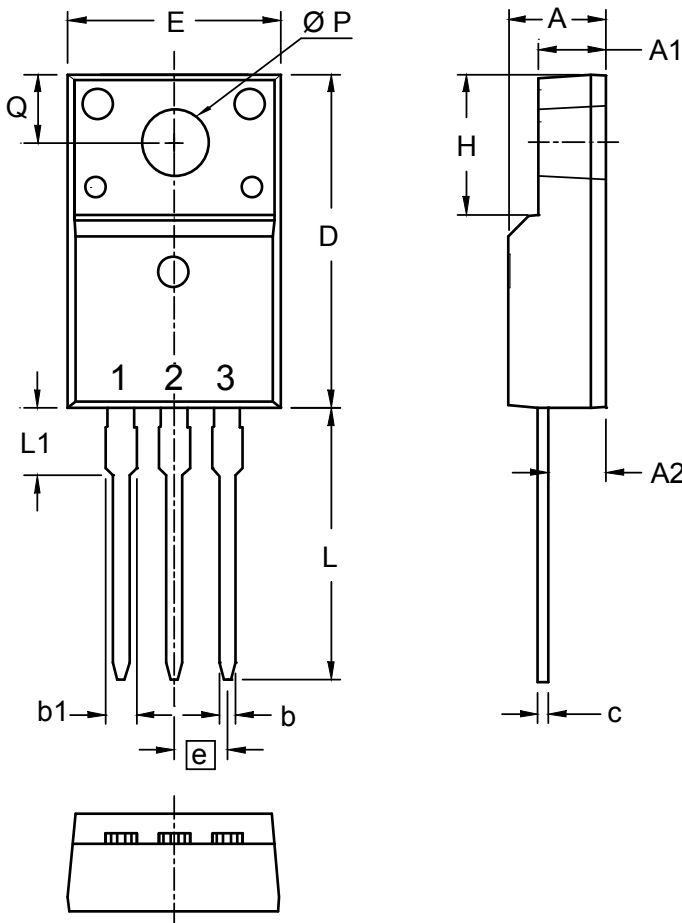
- D = Diode
- P = HiPerFRED
- G = extreme fast
- 20 = Current Rating [A]
- C = Common Cathode
- 400 = Reverse Voltage [V]
- PN = TO-220ABFP (3)

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

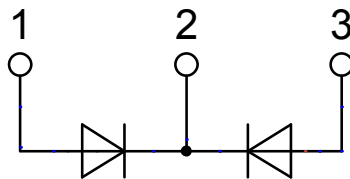
Similar Part	Package	Voltage class
DPG20C400PB	TO-220AB (3)	400
DPG20C400PC	TO-263AB (D2Pak) (2)	400

**Equivalent Circuits for Simulation**
*\* on die level*
 $T_{VJ} = 175\text{ °C}$ 


**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
ØP	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134



## Fast Diode

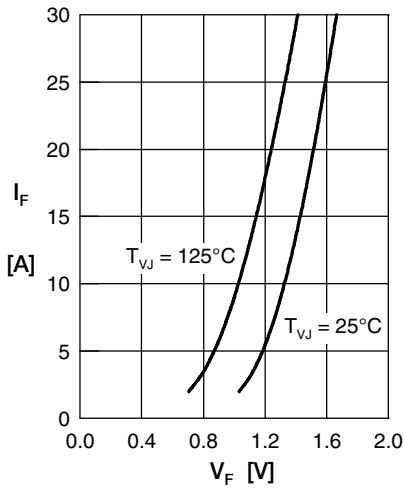


Fig. 1 Forward current  $I_F$  versus  $V_F$

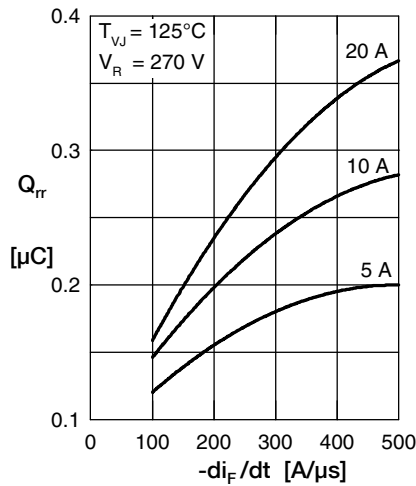


Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $-di_F/dt$

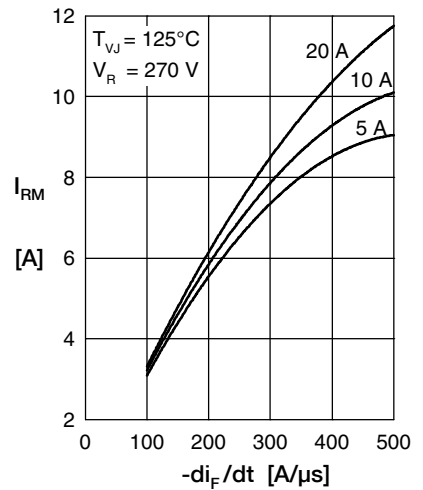


Fig. 3 Typ. reverse recov. current  $I_{RM}$  versus  $-di_F/dt$

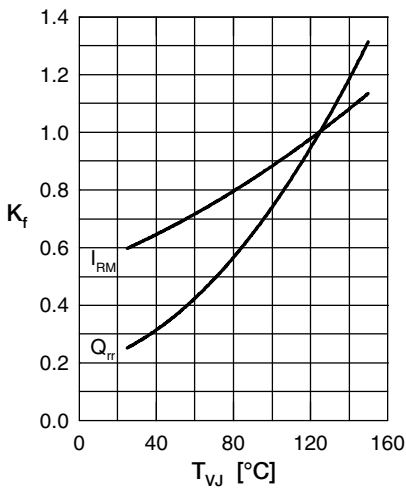


Fig. 4 Typ. dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

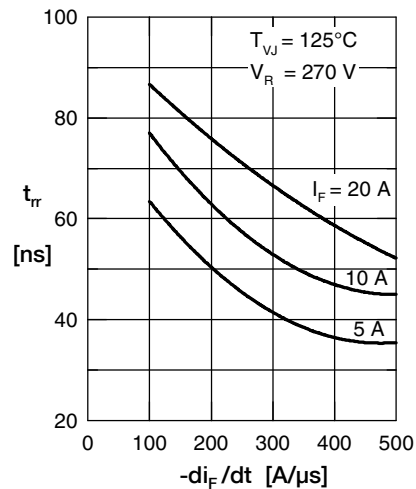


Fig. 5 Typ. reverse recov. time  $t_{rr}$  versus  $-di_F/dt$

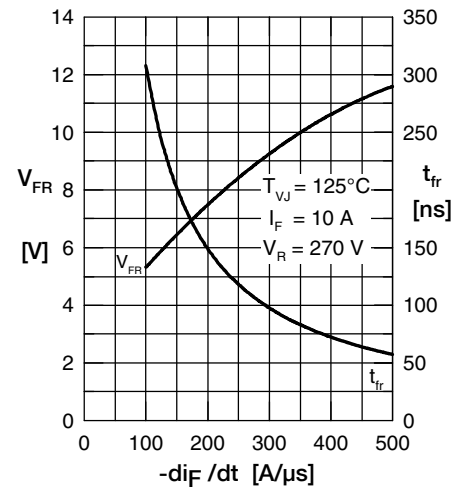


Fig. 6 Typ. forward recovery voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

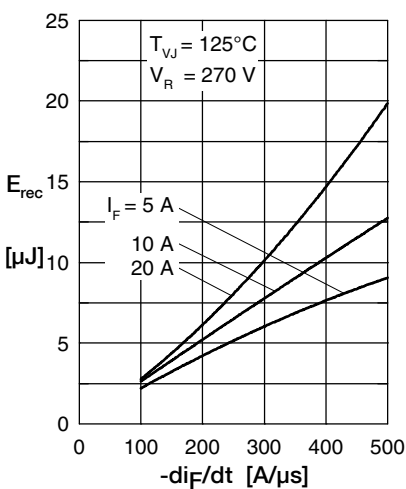


Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$

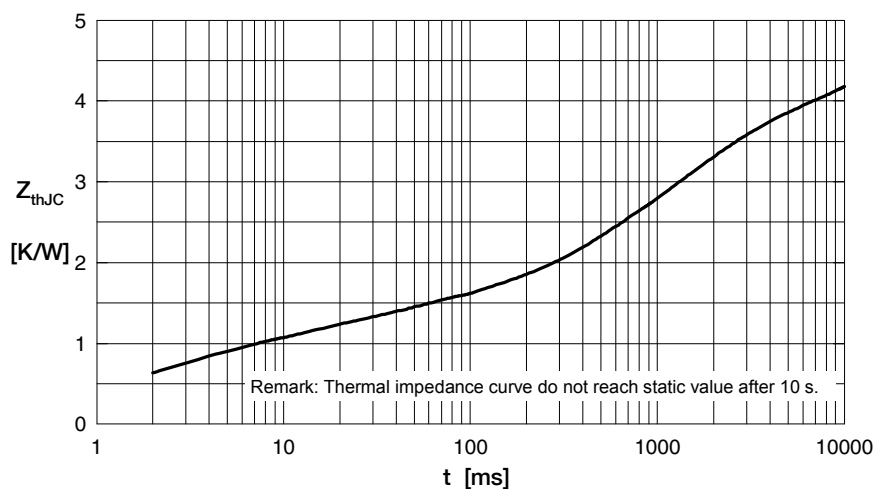


Fig. 8 Transient thermal resistance junction to case