

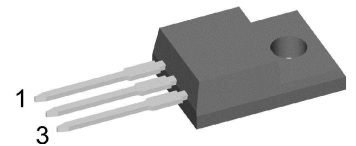
HiPerFRED²

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

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

Disclaimer Notice

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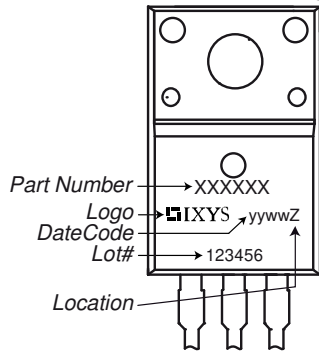


Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			400	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			400	V	
I_R	reverse current, drain current	$V_R = 400 V$	$T_{VJ} = 25^{\circ}C$		1	μA	
		$V_R = 400 V$	$T_{VJ} = 150^{\circ}C$		0.15	mA	
V_F	forward voltage drop	$I_F = 10 A$	$T_{VJ} = 25^{\circ}C$		1.32	V	
		$I_F = 20 A$			1.51	V	
		$I_F = 10 A$	$T_{VJ} = 150^{\circ}C$		1.03	V	
		$I_F = 20 A$			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 Ω	
R_{thJC}	thermal resistance junction to case				4.4	K/W	
R_{thCH}	thermal resistance case to heatsink			0.5		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	} $I_F = 10 A; V_R = 270 V$ $-di_F / dt = 200 A/\mu s$	$T_{VJ} = 25^{\circ}C$		4	A	
			$T_{VJ} = 125^{\circ}C$		6	A	
t_{rr}	reverse recovery time		$T_{VJ} = 25^{\circ}C$		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
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	2500			V
		t = 1 minute	2100			V
		50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA				

Product Marking



Part description

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

Ordering	Ordering 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

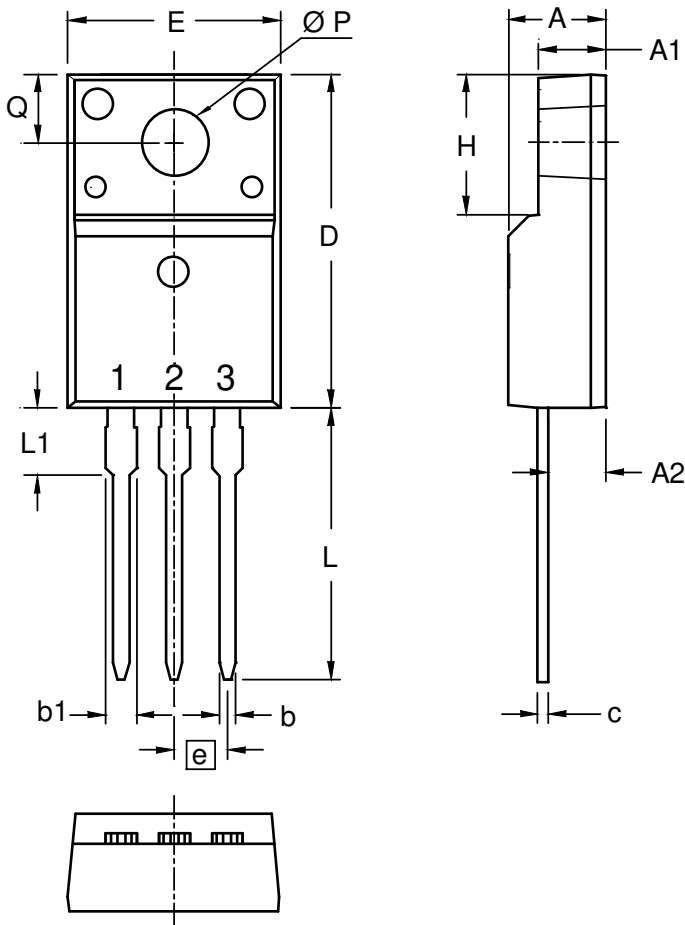
$T_{VJ} = 175^{\circ}C$



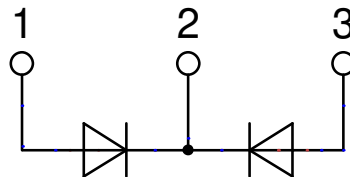
Symbol	Definition	Fast Diode	Unit
$V_{0\ max}$	threshold voltage	0.77	V
$R_{0\ max}$	slope resistance *	16.6	mΩ



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
ØP	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134





Fast Diode

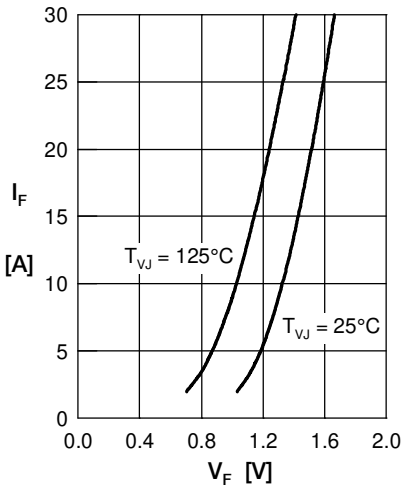


Fig. 1 Forward current I_F versus V_F

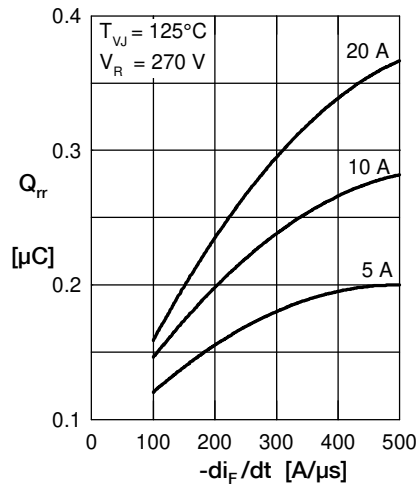


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

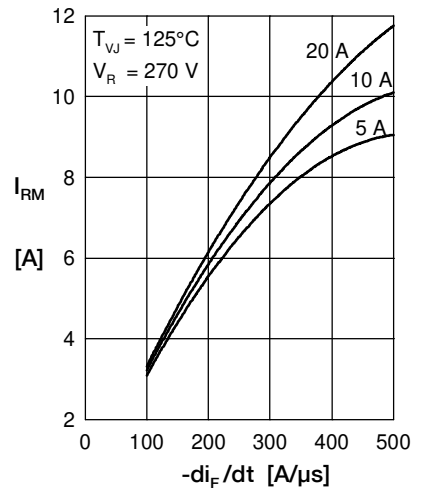


Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

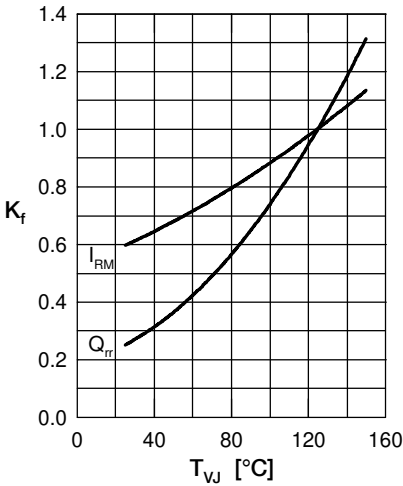


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

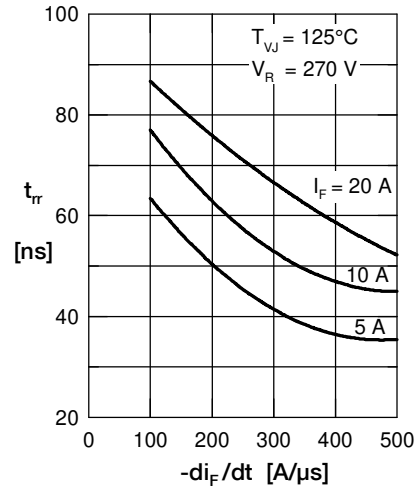


Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

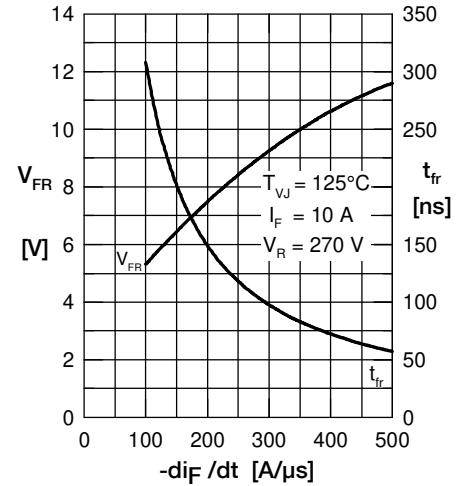


Fig. 6 Typ. forward recovery voltage V_{FR} and t_{fr} versus di_F/dt

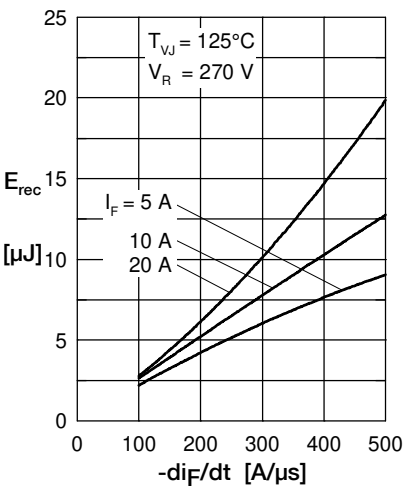


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

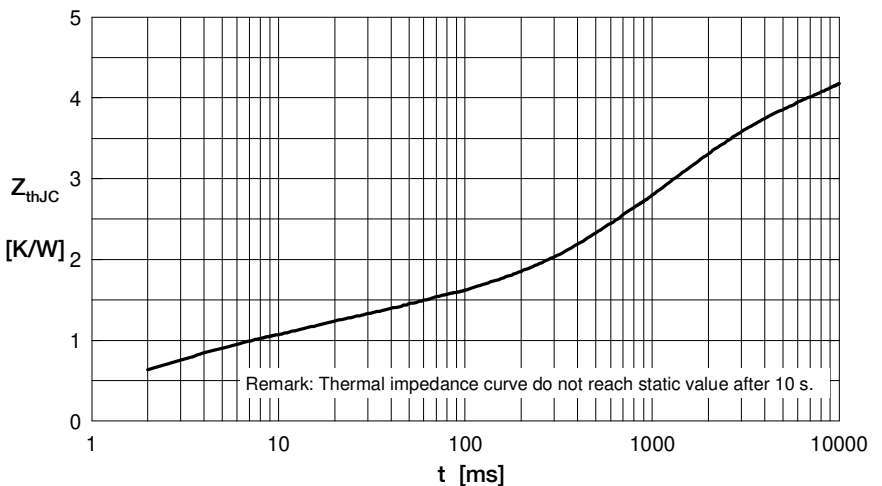


Fig. 8 Transient thermal resistance junction to case