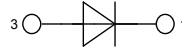


# HiPerFRED<sup>2</sup>

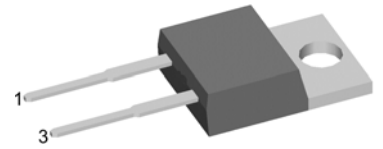
High Performance Fast Recovery Diode  
Low Loss and Soft Recovery  
Single Diode

Part number

DPG 10 I 400 PA



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



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)

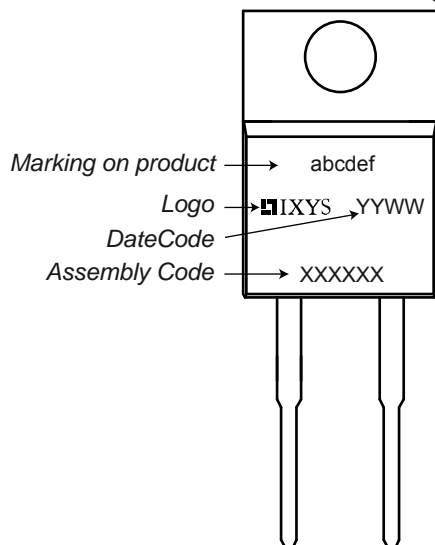
## Package:

- Housing: TO-220
- Industry standard outline
- Epoxy meets UL 94V-0
- RoHS compliant

## Ratings

Symbol	Definition	Conditions	Ratings			Unit	
			min.	typ.	max.		
$V_{RRM}$	max. repetitive reverse voltage				400	V	
$I_R$	reverse current	$V_R = 400 \text{ V}$			1	$\mu\text{A}$	
		$V_R = 400 \text{ V}$			0.15	mA	
$V_F$	forward voltage	$I_F = 10 \text{ A}$			1.32	V	
		$I_F = 20 \text{ A}$			1.51	V	
		$I_F = 10 \text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.03	V
		$I_F = 20 \text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.24	V
$I_{FAV}$	average forward current	rectangular $d = 0.5$			10	A	
$V_{F0}$	threshold voltage	} for power loss calculation only			0.77	V	
$r_F$	slope resistance				19.8	m $\Omega$	
$R_{thJC}$	thermal resistance junction to case				2.30	K/W	
$T_{VJ}$	virtual junction temperature		-55		175	$^\circ\text{C}$	
$P_{tot}$	total power dissipation				65	W	
$I_{FSM}$	max. forward surge current	$t = 10 \text{ ms}$ (50 Hz), sine			150	A	
$I_{RM}$	max. reverse recovery current				4	A	
		$I_F = 10 \text{ A}; V_R = 270 \text{ V}$			6	A	
$t_{rr}$	reverse recovery time	$-di_F/dt = 200 \text{ A}/\mu\text{s}$			45	ns	
					65	ns	
$C_J$	junction capacitance	$V_R = 200 \text{ V}; f = 1 \text{ MHz}$			12	pF	

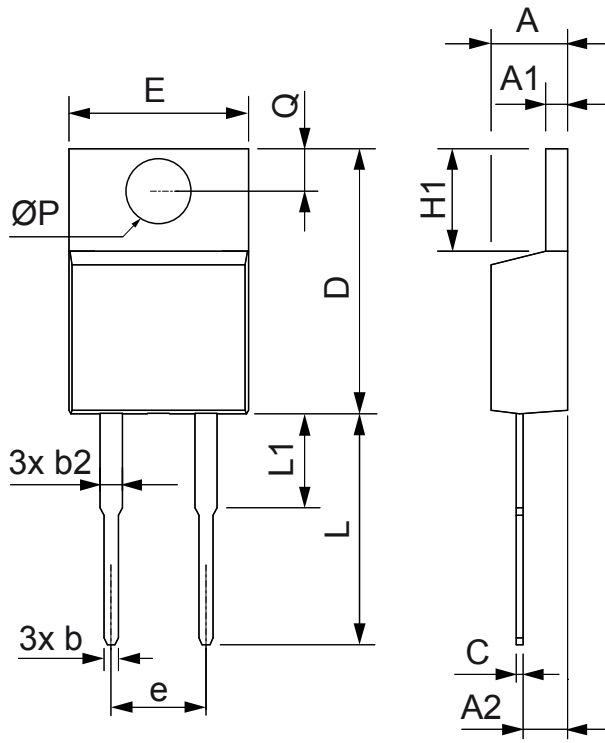
Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$I_{RMS}$	RMS current	per terminal			35	A
$R_{thCH}$	thermal resistance case to heatsink			0.50		K/W
$T_{stg}$	storage temperature		-55		150	°C
<b>Weight</b>				2		g
$M_D$	mounting torque		0.4		0.6	Nm
$F_C$	mounting force with clip		20		60	N

**Product Marking**

**Part number**

D = Diode  
 P = HiPerFRED  
 G = extreme fast  
 10 = Current Rating [A]  
 I = Single Diode  
 400 = Reverse Voltage [V]  
 PA = TO-220AC (2)

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Code Key
Standard	DPG 10 I 400 PA	DPG10I400PA	Tube	50	506654

Similar Part	Package	Voltage Class
DPG10I400PM	TO-220ACFP (2)	400

**Outlines TO-220**


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.82	0.170	0.190
A1	1.14	1.39	0.045	0.055
A2	2.29	2.79	0.090	0.110
b	0.64	1.01	0.025	0.040
b2	1.15	1.65	0.045	0.065
C	0.35	0.56	0.014	0.022
D	14.73	16.00	0.580	0.630
E	9.91	10.66	0.390	0.420
e	5.08	BSC	0.200	BSC
H1	5.85	6.85	0.230	0.270
L	12.70	13.97	0.500	0.550
L1	2.79	5.84	0.110	0.230
$\varnothing P$	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125

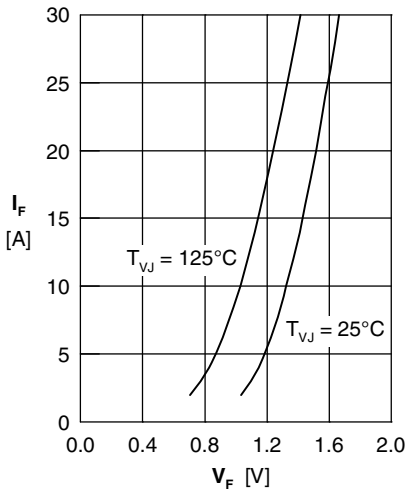


Fig. 1 Forward current  $I_F$  versus forward voltage drop  $V_F$

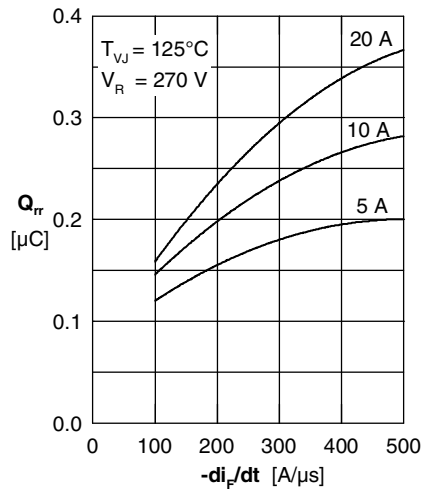


Fig. 2 Typ. reverse recovery charge  $Q_{rr}$  versus  $-di_F/dt$

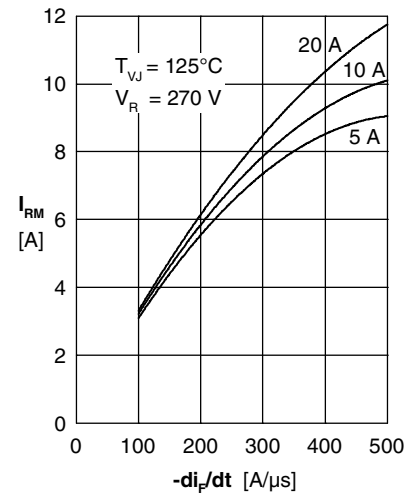


Fig. 3 Typ. reverse recovery current  $I_{RM}$  versus  $-di_F/dt$

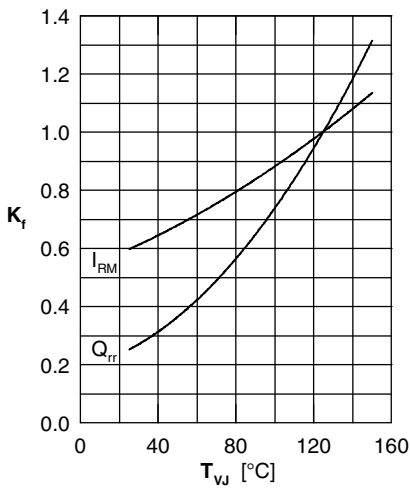


Fig. 4 Dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

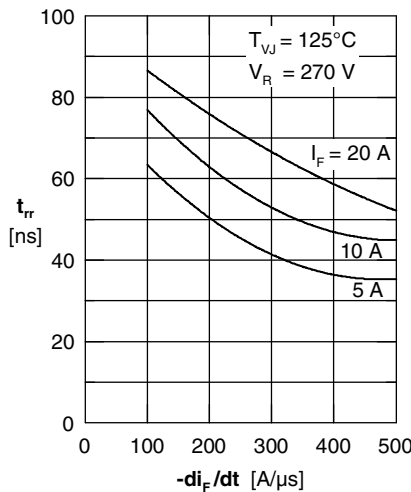


Fig. 5 Typ. reverse recovery time  $t_{rr}$  versus  $-di_F/dt$

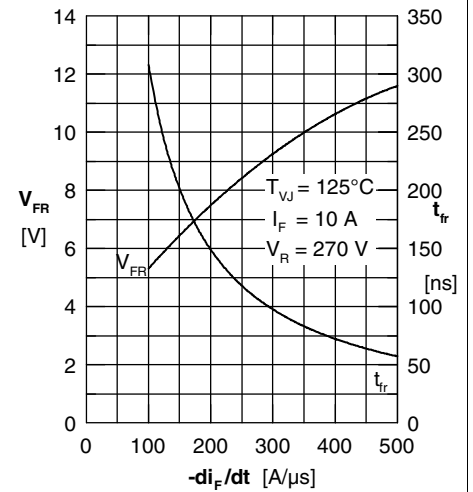


Fig. 6 Typ. forward recovery voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

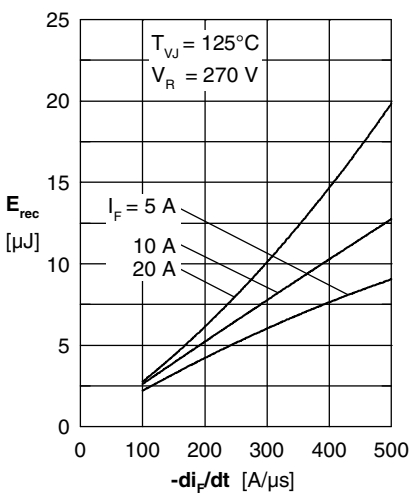


Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$

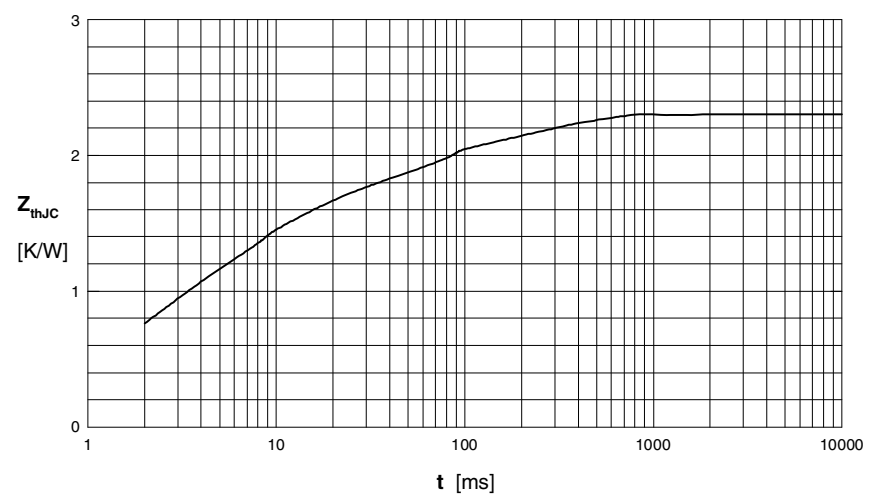


Fig. 8 Transient thermal resistance junction to case