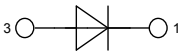
HiPerFRED²

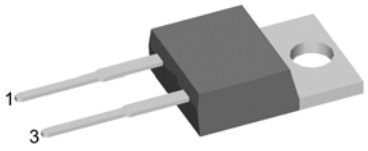
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Single Diode

V_{RRM} = 200 V
I_{FAV} = 10 A
t_{rr} = 35 ns

Part number

DPG 10 I 200 PA





Backside: cathode

Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low Irm-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low Irm 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

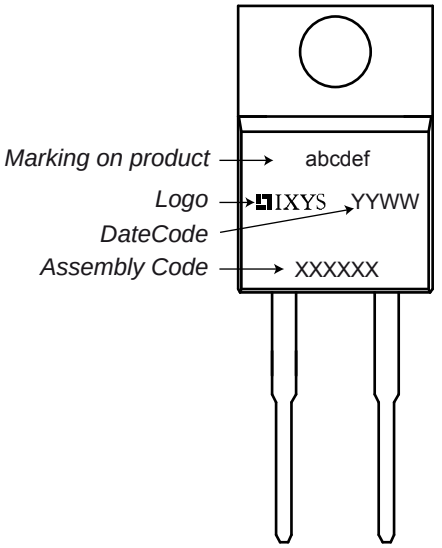
Ratings

Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			200	V
I_R	*reverse current*	V_R = 200 V	T_{VJ} = 25°C			1	µA
		V_R = 200 V	T_{VJ} = 150°C			0.06	mA
V_F	*forward voltage*	I_F = 10 A	T_{VJ} = 25°C			1.27	V
		I_F = 20 A				1.45	V
		I_F = 10 A	T_{VJ} = 150°C			0.98	V
		I_F = 20 A				1.17	V
I_{FAV}	*average forward current*	rectangular d = 0.5	T_C = 145°C			10	A
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 175°C			0.74	V
r_F	*slope resistance* }					17.7	mΩ
R_{thJC}	*thermal resistance junction to case*					2.30	K/W
T_{VJ}	*virtual junction temperature*			-55		175	°C
P_{tot}	*total power dissipation*		T_C = 25°C			65	W
I_{FSM}	*max. forward surge current*	t = 10 ms (50 Hz), sine	T_{VJ} = 45°C			140	A
I_{RM}	*max. reverse recovery current*		T_{VJ} = 25°C		3		A
		I_F = 10 A; V_R = 130 V	T_{VJ} = 125°C		5.5		A
t_{rr}	*reverse recovery time*	$-di_F/dt$ = 200 A/µs	T_{VJ} = 25°C		35		ns
			T_{VJ} = 125°C		45		ns
C_J	*junction capacitance*	V_R = 150 V; f = 1 MHz	T_{VJ} = 25°C		15		pF

Symbol	Definition	Conditions	Ratings min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per pin [1]			35	A
R_{thCH}	*thermal resistance case to heatsink*			0.50		K/W
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

[1] I_{RMS} is typically limited by: 1. pin-to-chip resistance; or by 2. current capability of the chip.
In case of 1, a common cathode/anode configuration and a non-isolated backside, the whole current capability can be used by connecting the backside.

Product Marking



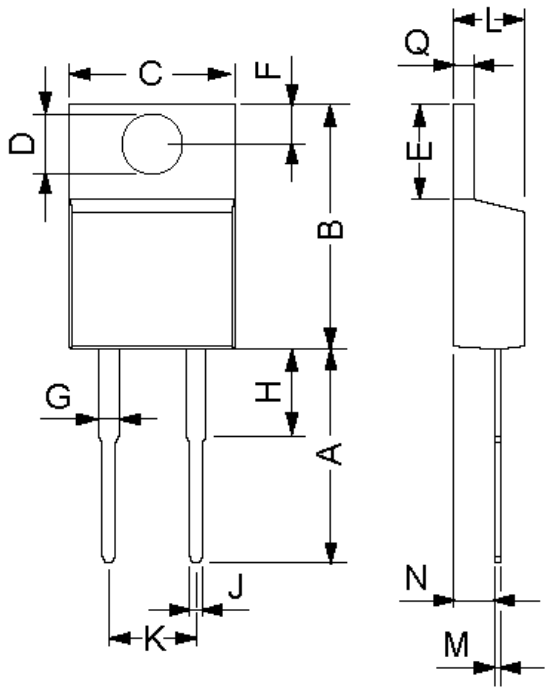
Part number

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

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Code Key
Standard	DPG 10 I 200 PA	DPG10I200PA	Tube	50	506301

Similar Part	Package	Voltage Class
DPG10I200PM	TO-220ACFP (2)	200

Outlines TO-220



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	12.7	14.73	0.5	0.58
B	14.23	16.51	0.56	0.65
C	9.66	10.66	0.38	0.42
D	3.54	4.08	0.139	0.161
E	5.85	6.85	2.3	0.42
F	2.54	3.42	0.1	0.135
G	1.15	1.77	0.045	0.07
H	-	6.35	-	0.25
J	0.64	0.89	0.025	0.035
K	4.83	5.33	0.19	0.21
L	3.56	4.82	0.14	0.19
M	0.51	0.76	0.02	0.03
N	2.04	2.49	0.08	0.115
Q	0.64	1.39	0.025	0.055

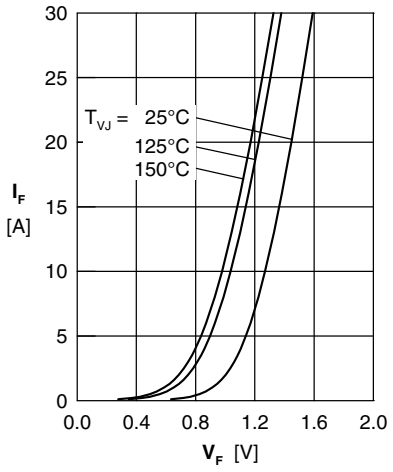


Fig. 1 Forward current I_F versus forward voltage drop V_F

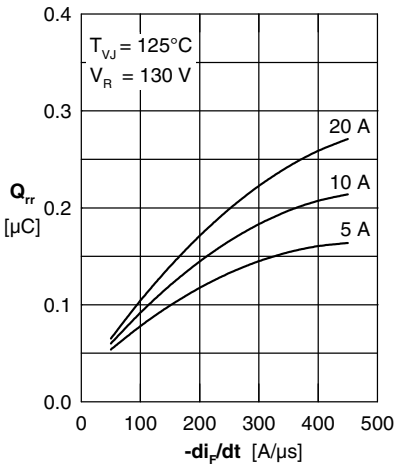


Fig. 2 Typ. reverse recovery charge Q_{rr} versus $-di_F/dt$

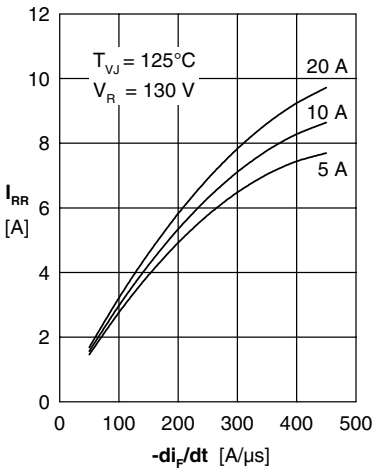


Fig. 3 Typ. reverse recovery current I_{RR} versus $-di_F/dt$

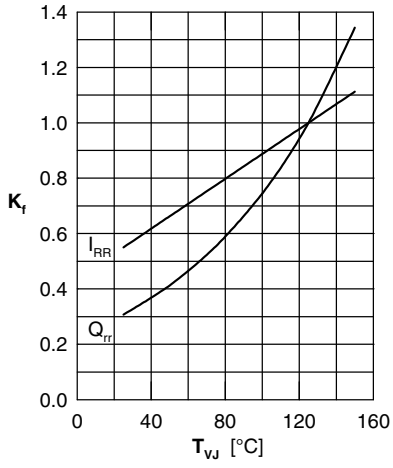


Fig. 4 Dynamic parameters Q_{rr}, I_{RR} versus T_{VJ}

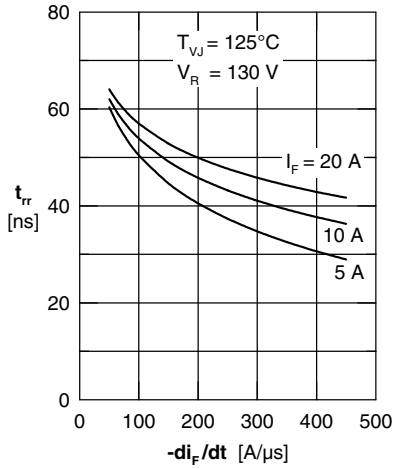


Fig. 5 Typ. reverse recovery time t_{rr} versus $-di_F/dt$

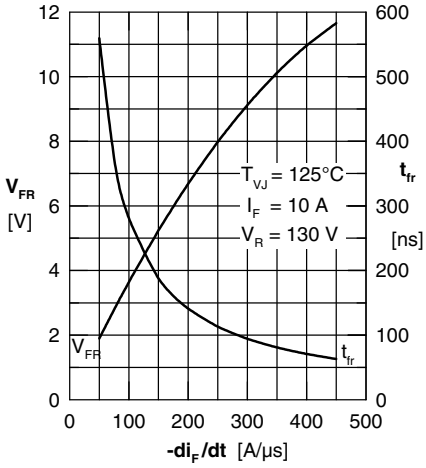


Fig. 6 Typ. forward recovery voltage V_{FR} and t_{fr} versus di_F/dt

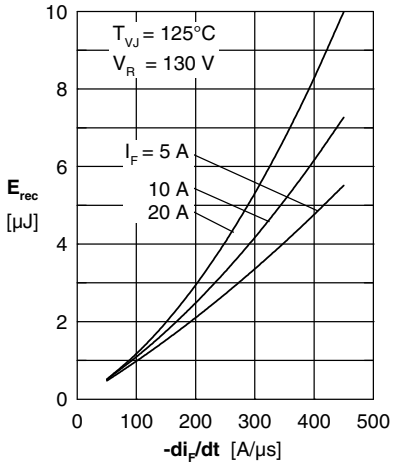
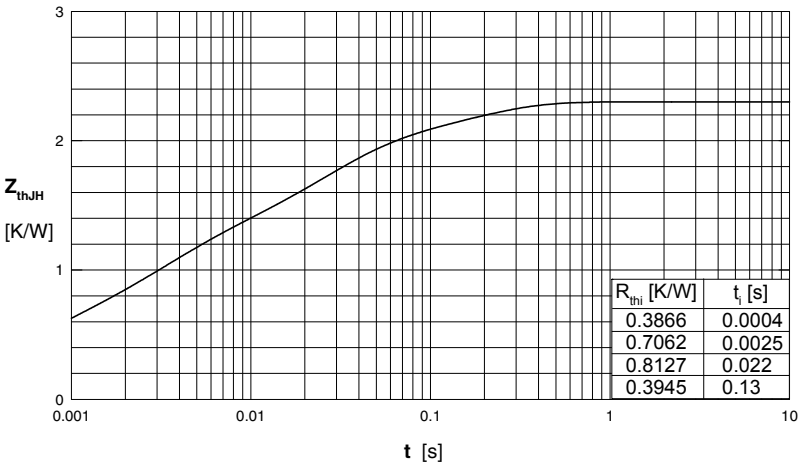


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$



R_{thi} [K/W]	t_i [s]
0.3866	0.0004
0.7062	0.0025
0.8127	0.022
0.3945	0.13

Fig. 8 Transient thermal resistance junction to case