

HiPerFRED

V_{RRM}	=	400 V
I_{FAV}	=	10 A
t_{rr}	=	45 ns

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

Part number

DPG10I400PA



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: TO-220

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

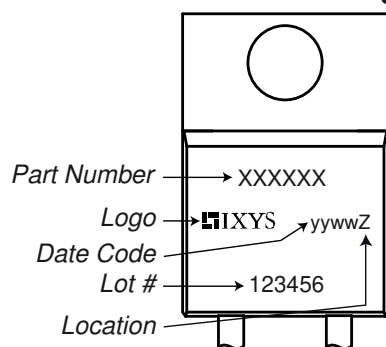
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Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				400	V
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				400	V
I _R	reverse current, 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 = 150°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					2.3	K/W
R _{thCH}	thermal resistance case to heatsink				0.5		K/W
P _{tot}	total power dissipation	T _C = 25°C				65	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 _{rr}	reverse recovery time			T _{VJ} = 125 °C	6		A
				T _{VJ} = 25 °C	45		ns
				T _{VJ} = 125 °C	65		ns

Package TO-220			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

Product Marking



Part description

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

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG10I400PA	DPG10I400PA	Tube	50	506654

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

Equivalent Circuits for Simulation

* on die level

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

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

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
ØP	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



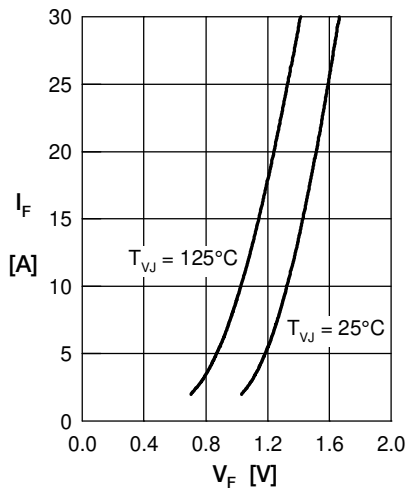
Fast Diode


Fig. 1 Forward current I_F versus V_F

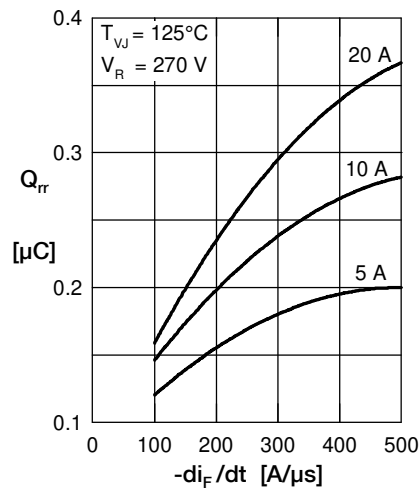


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

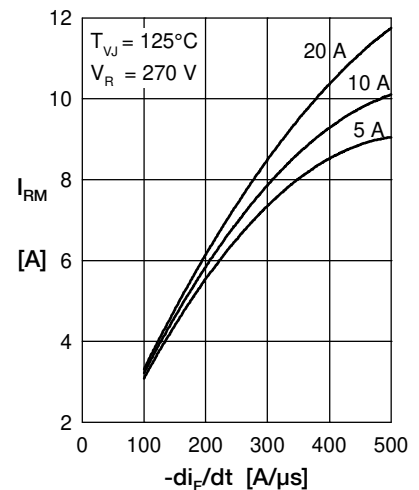


Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

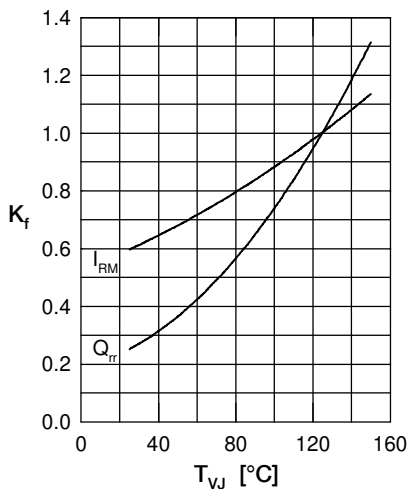


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

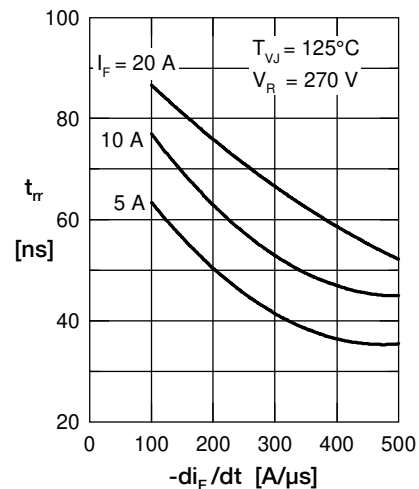


Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

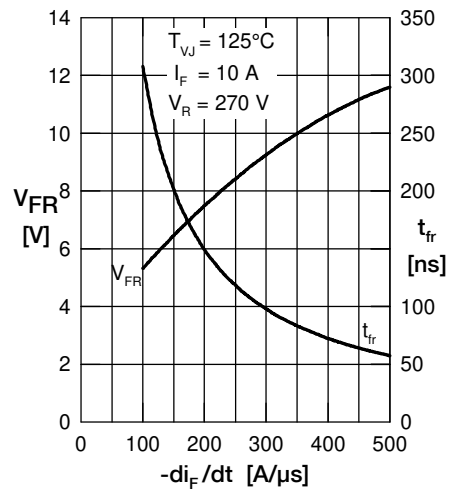


Fig. 6 Typ. forward recovery voltage V_{FR} and t_{fr} versus di_F/dt

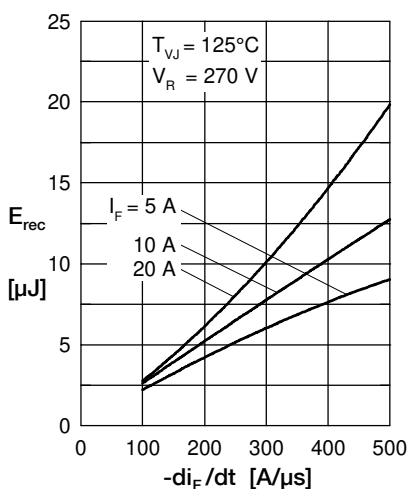


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

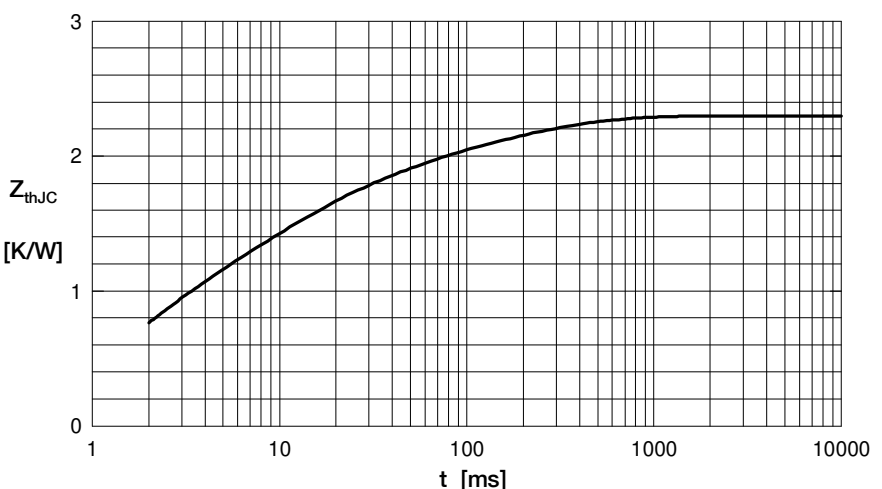


Fig. 8 Transient thermal resistance junction to case