

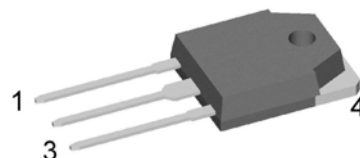
HiPerFRED²

$$\begin{aligned} V_{RRM} &= 300\text{ V} \\ I_{FAV} &= 2 \times 60\text{ A} \\ t_{rr} &= 35\text{ ns} \end{aligned}$$

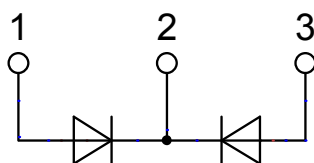
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Common Cathode

Part number

DPG120C300QB



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)

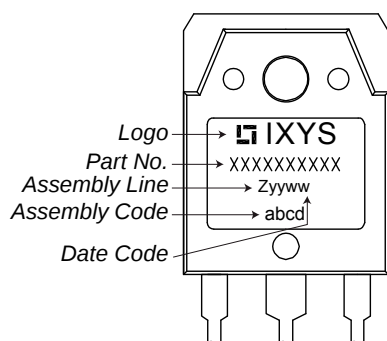
Package: TO-3P

- Industry standard outline compatible with TO-247
- RoHS compliant
- Epoxy meets UL 94V-0

Fast Diode				Ratings				
Symbol	Definition	Conditions		min.	typ.	max.	Unit	
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				300	V	
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				300	V	
I _R	reverse current, drain current	V _R = 300 V	T _{VJ} = 25°C			1	μA	
		V _R = 300 V	T _{VJ} = 150°C			0.35	mA	
V _F	forward voltage drop	I _F = 60 A	T _{VJ} = 25°C			1.40	V	
		I _F = 120 A				1.72	V	
		I _F = 60 A	T _{VJ} = 125°C			1.10	V	
		I _F = 120 A				1.45	V	
I _{FAV}	average forward current	T _C = 130°C rectangular d = 0.5	T _{VJ} = 175°C			60	A	
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 175°C		0.69	V	
r _F	slope resistance					5.8	mΩ	
R _{thJC}	thermal resistance junction to case					0.55	K/W	
R _{thCH}	thermal resistance case to heatsink				0.25		K/W	
P _{tot}	total power dissipation	T _C = 25°C				275	W	
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V		T _{VJ} = 45°C		450	A	
C _J	junction capacitance	V _R = 150 V f = 1 MHz		T _{VJ} = 25°C	80		pF	
I _{RM}	max. reverse recovery current	} I _F = 60 A; V _R = 200 V -di _F /dt = 200 A/μs		T _{VJ} = 25°C	3.5		A	
				T _{VJ} = 125°C	9		A	
t _{rr}	reverse recovery time			T _{VJ} = 25°C	35		ns	
				T _{VJ} = 125°C	65		ns	

Package TO-3P			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal ¹⁾			70	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				5		g
M_D	mounting torque		0.8		1.2	Nm
F_C	mounting force with clip		20		120	N

Product Marking



Part number

D = Diode
 P = HiPerFRED
 G = extreme fast
 120 = Current Rating [A]
 C = Common Cathode
 300 = Reverse Voltage [V]
 QB = TO-3P (3)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG120C300QB	DPG120C300QB	Tube	30	503821

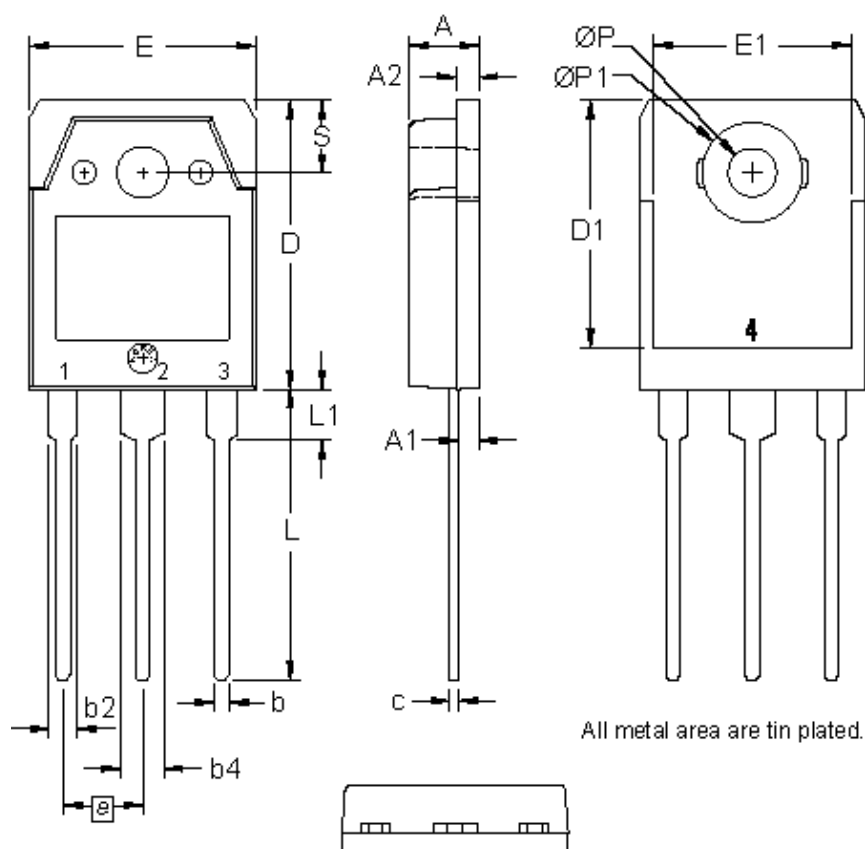
Equivalent Circuits for Simulation

* on die level

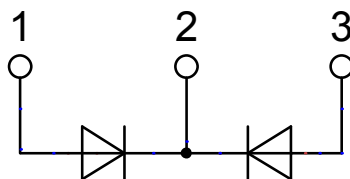
 $T_{VJ} = 175^\circ\text{C}$ 

Fast Diode

 $V_{0\max}$ threshold voltage 0.69 V $R_{0\max}$ slope resistance * 3.2 mΩ

Outlines TO-3P


Dim.	Millimeter		Inches	
	min	max	min	max
A	4.70	4.90	0.185	0.193
A1	1.30	1.50	0.051	0.059
A2	1.45	1.65	0.057	0.065
b	0.90	1.15	0.035	0.045
b2	1.90	2.20	0.075	0.087
b4	2.90	3.20	0.114	0.126
c	0.55	0.80	0.022	0.031
D	19.80	20.10	0.780	0.791
D1	16.90	17.20	0.665	0.677
E	15.50	15.80	0.610	0.622
E1	13.50	13.70	0.531	0.539
e	5.45 BSC		0.215 BSC	
L	19.80	20.20	0.780	0.795
L1	3.40	3.60	0.134	0.142
Ø P	3.20	3.40	0.126	0.134
ØP1	6.90	7.10	0.272	0.280
S	4.90	5.10	0.193	0.201



Fast Diode

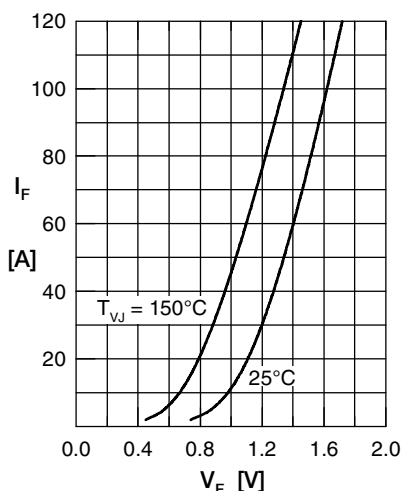


Fig. 1 Forward current I_F versus V_F

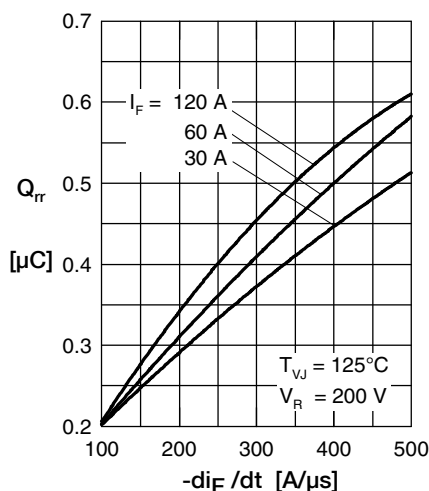


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

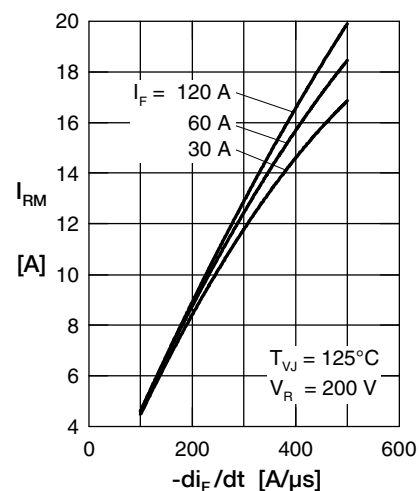


Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

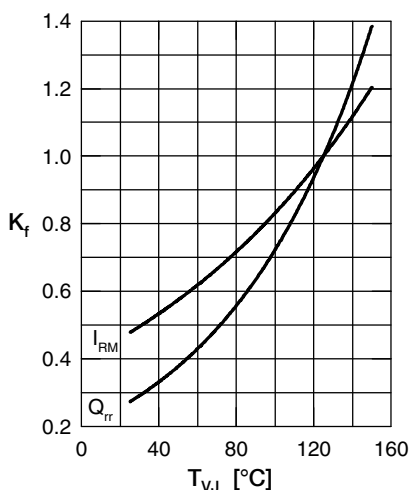


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

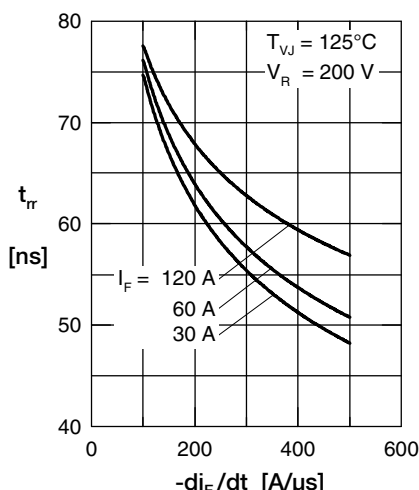


Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

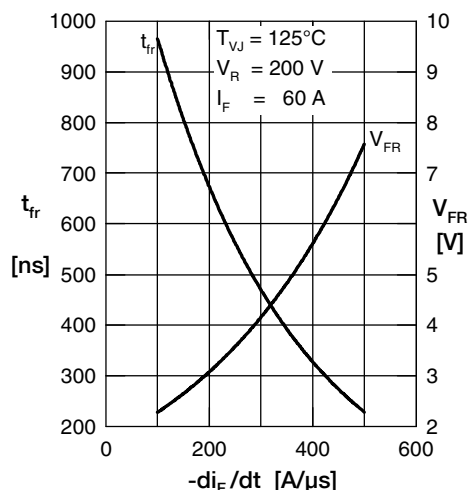


Fig. 6 Typ. forward recov. voltage V_{FR} & time t_{fr} versus di_F/dt

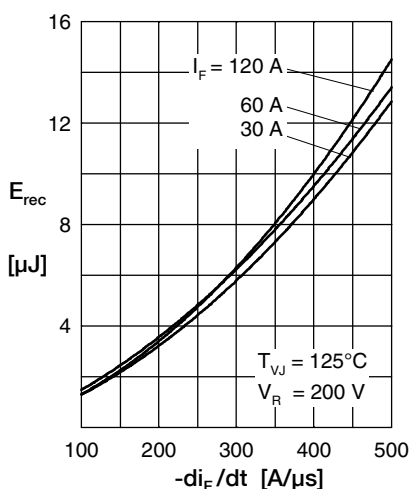


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

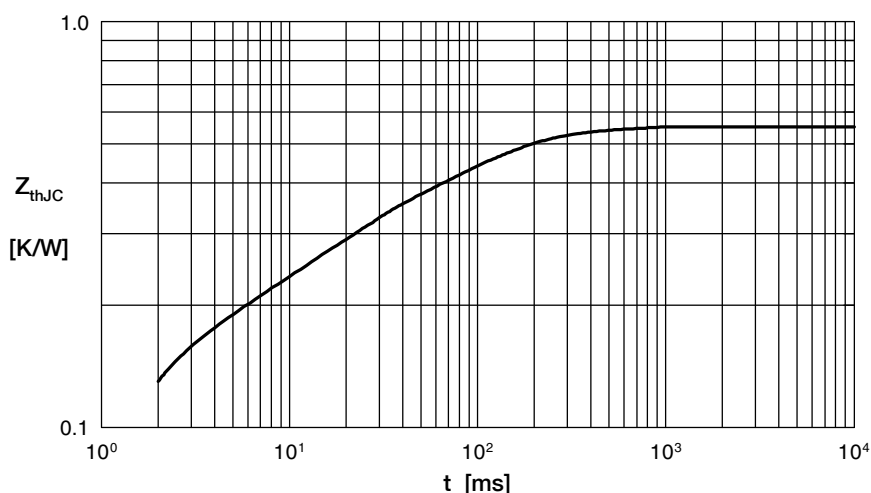


Fig. 8 Transient thermal impedance junction to case