

HiPerFRED²

$$V_{RRM} = 300V$$

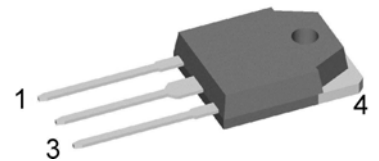
$$I_{FAV} = 2x \quad 60A$$

$$t_{rr} = 35ns$$

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)

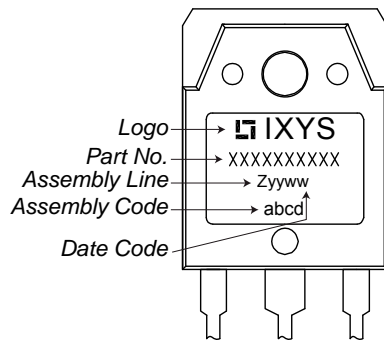
Package: TO-3P

- 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					300	V
V_{RRM}	max. repetitive reverse blocking voltage					300	V
I_R	reverse current, drain current	$V_R = 300\text{ V}$	$T_{VJ} = 25^\circ\text{C}$			1	μA
		$V_R = 300\text{ V}$	$T_{VJ} = 150^\circ\text{C}$			0.35	mA
V_F	forward voltage drop	$I_F = 60\text{ A}$	$T_{VJ} = 25^\circ\text{C}$			1.40	V
				$I_F = 120\text{ A}$	$T_{VJ} = 25^\circ\text{C}$		
		$I_F = 60\text{ A}$	$T_{VJ} = 125^\circ\text{C}$				
				$I_F = 120\text{ A}$	$T_{VJ} = 125^\circ\text{C}$		
I_{FAV}	average forward current	$T_C = 130^\circ\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^\circ\text{C}$				
V_{FO}	threshold voltage	} for power loss calculation only				0.69	V
r_F	slope resistance					5.8	m Ω
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			$T_C = 25^\circ\text{C}$		275	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		450	A
C_J	junction capacitance	$V_R = 150\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		80	pF
I_{RM}	max. reverse recovery current	} $I_F = 60\text{ A}; V_R = 200\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		3.5	A
				$T_{VJ} = 125^\circ\text{C}$		9	A
t_{rr}	reverse recovery time	} $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		35	ns
				$T_{VJ} = 125^\circ\text{C}$		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

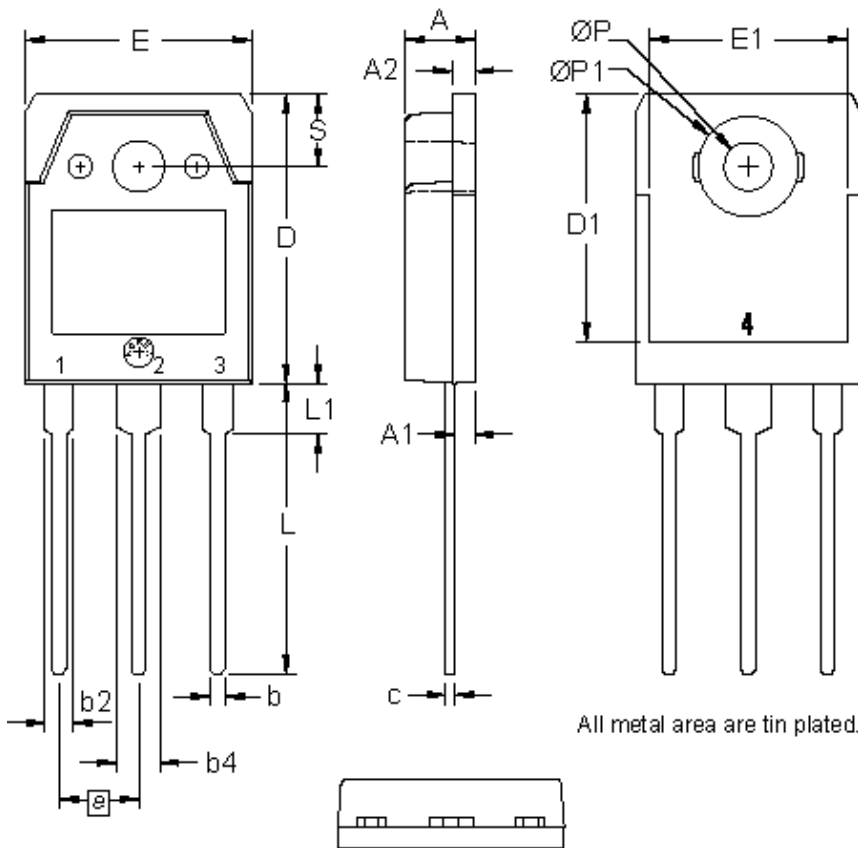
$T_{VJ} = 175\text{ °C}$



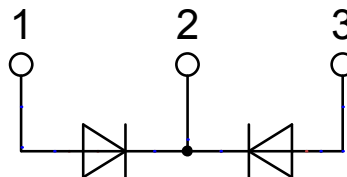
Fast Diode

$V_{0\ max}$	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

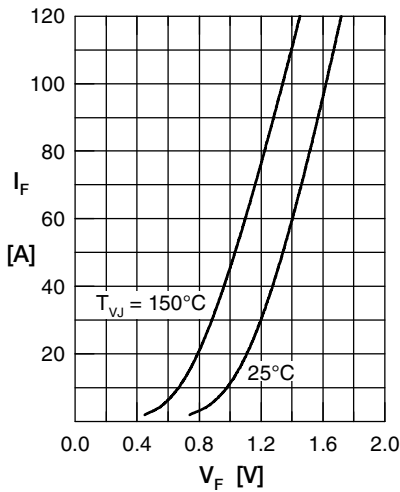


Fig. 1 Forward current I_F versus V_F

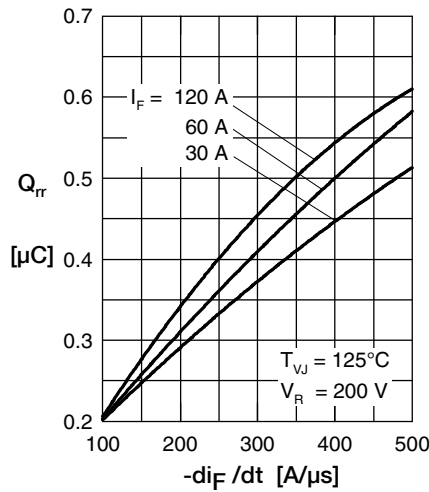


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

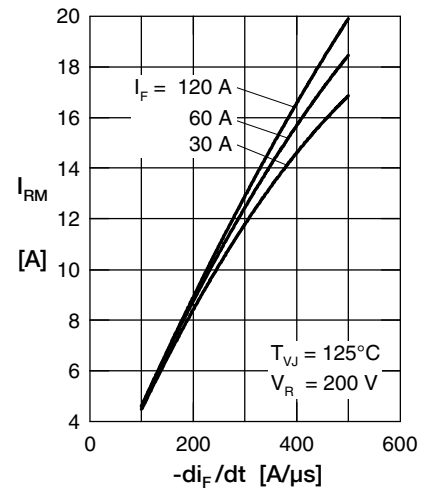


Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

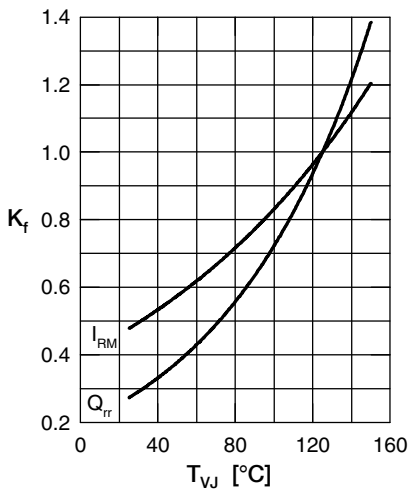


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

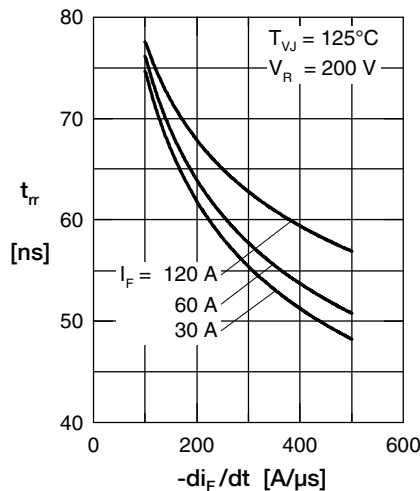


Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

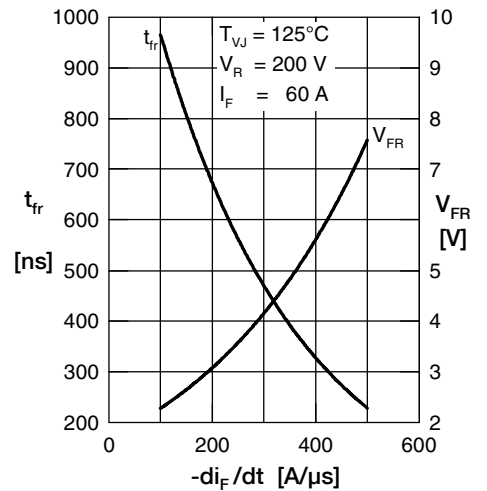


Fig. 6 Typ. forward recov. voltage V_{FR} & time t_{fr} versus di_F/dt

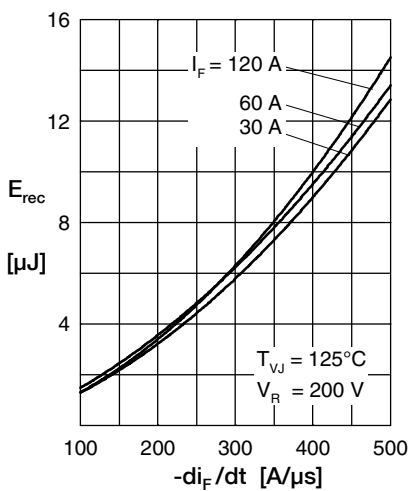


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

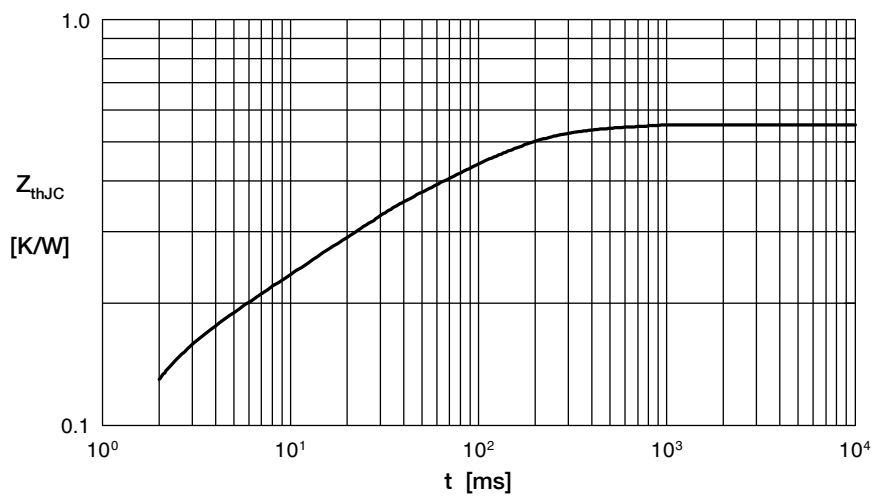


Fig. 8 Transient thermal impedance junction to case