

**HiPerFRED<sup>2</sup>**

$$V_{RRM} = 400V$$

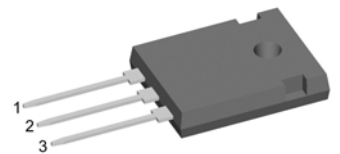
$$I_{FAV} = 2x \quad 40A$$

$$t_{rr} = 45ns$$

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

Part number

**DPG80C400HB**



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)

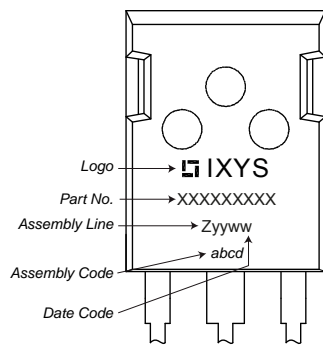
**Package: TO-247**

- Industry standard outline
- 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	$T_{VJ} = 25^{\circ}\text{C}$			400	V
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			400	V
$I_R$	reverse current, drain current	$V_R = 400\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		1	$\mu\text{A}$
		$V_R = 400\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$		0.4	mA
$V_F$	forward voltage drop	$I_F = 40\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$		1.43	V
					1.69	V
		$I_F = 80\text{ A}$	$T_{VJ} = 150^{\circ}\text{C}$		1.14	V
					1.44	V
$I_{FAV}$	average forward current	$T_C = 135^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}\text{C}$		40	A
$V_{FO}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}\text{C}$		0.79	V
$r_F$	slope resistance				7.1	m $\Omega$
$R_{thJC}$	thermal resistance junction to case				0.7	K/W
$R_{thCH}$	thermal resistance case to heatsink			0.25		K/W
$P_{tot}$	total power dissipation	$T_C = 25^{\circ}\text{C}$			215	W
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^{\circ}\text{C}$		400	A
$C_J$	junction capacitance	$V_R = 200\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		46	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 40\text{ A}; V_R = 270\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		4	A
			$T_{VJ} = \text{ }^{\circ}\text{C}$		8.5	A
$t_{rr}$	reverse recovery time	} $-di_F/dt = 200\text{ A}/\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$		45	ns
			$T_{VJ} = \text{ }^{\circ}\text{C}$		80	ns

Package TO-247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal <sup>1)</sup>			70	A
$T_{VJ}$	virtual junction temperature		-55		175	°C
$T_{op}$	operation temperature		-55		150	°C
$T_{stg}$	storage temperature		-55		150	°C
<b>Weight</b>				6		g
$M_D$	mounting torque		0.8		1.2	Nm
$F_C$	mounting force with clip		20		120	N

### Product Marking



### Part number

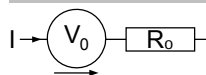
- D = Diode
- P = HiPerFRED
- G = extreme fast
- 80 = Current Rating [A]
- C = Common Cathode
- 400 = Reverse Voltage [V]
- HB = TO-247AD (3)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG80C400HB	DPG80C400HB	Tube	30	506875

### Equivalent Circuits for Simulation

\* on die level

$T_{VJ} = 175\text{ °C}$



**Fast Diode**

$V_{0\max}$  threshold voltage

0.79

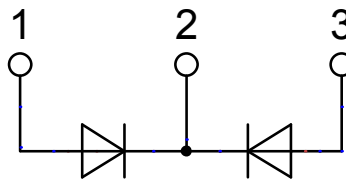
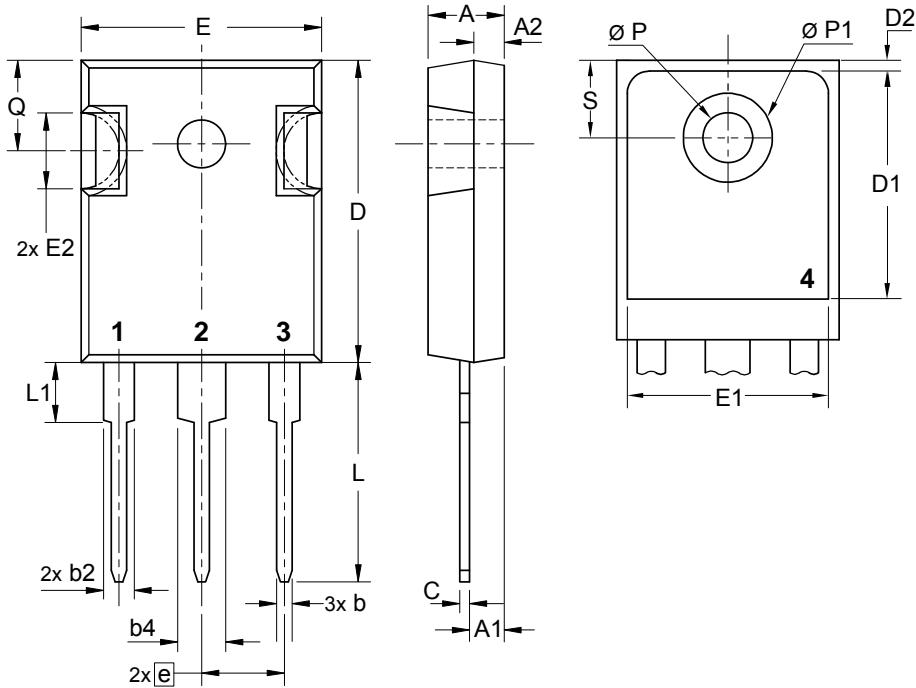
V

$R_{0\max}$  slope resistance \*

4.5

mΩ

**Outlines TO-247**



**Fast Diode**

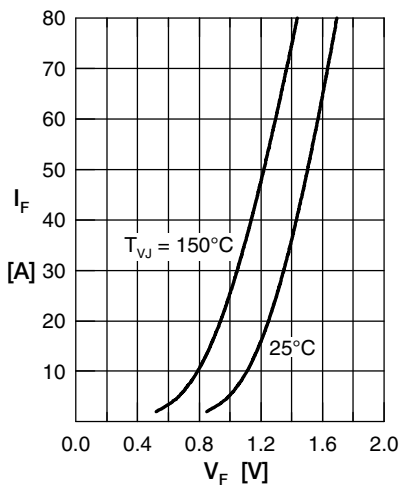


Fig. 1 Forward current  $I_F$  versus  $V_F$

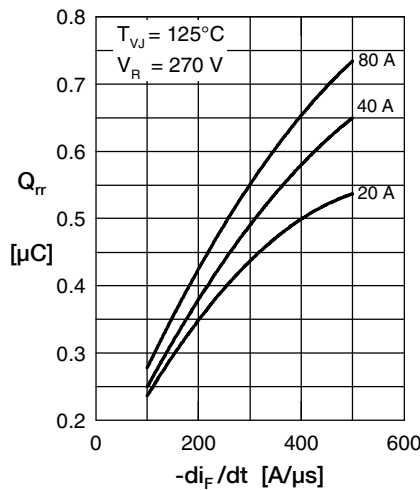


Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $-di_F/dt$

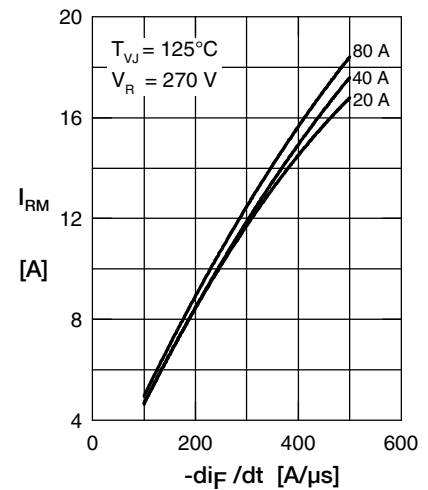


Fig. 3 Typ. reverse recov. current  $I_{RM}$  versus  $-di_F/dt$

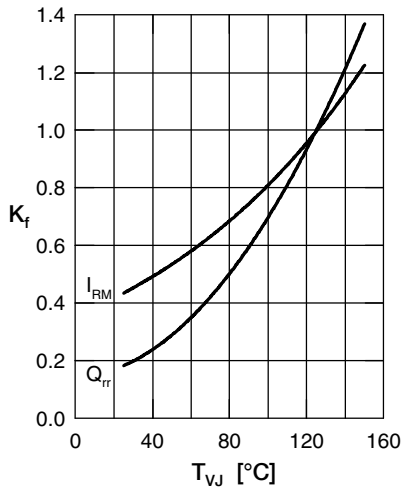


Fig. 4 Typ. dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

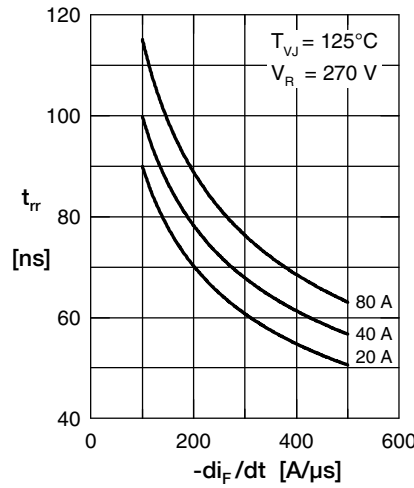


Fig. 5 Typ. reverse recov. time  $t_{rr}$  versus  $-di_F/dt$

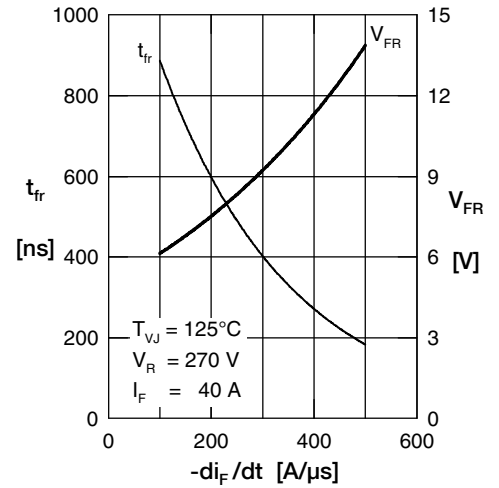


Fig. 6 Typ. forward recovery voltage  $V_{FR}$  & time  $t_{fr}$  versus  $di_F/dt$

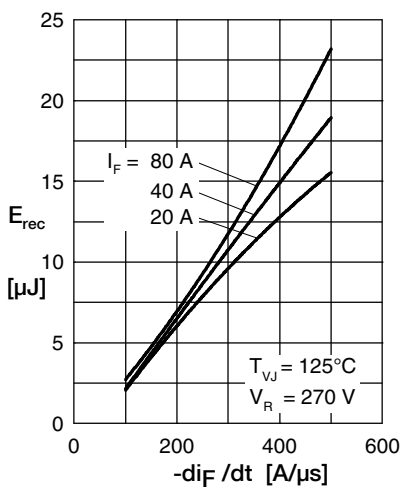


Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$

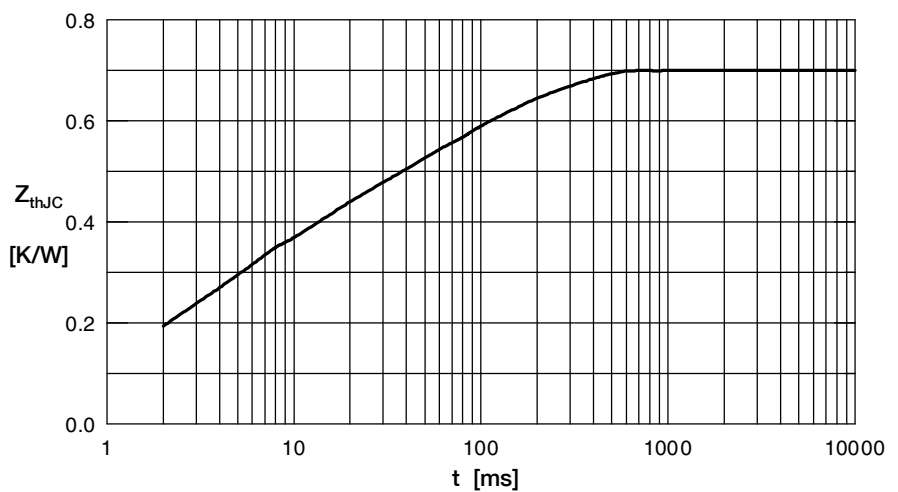


Fig. 8 Transient thermal impedance junction to case