

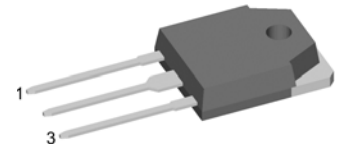
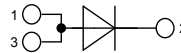
# HiPerFRED<sup>2</sup>

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

$V_{RRM} = 400\text{ V}$   
 $I_{FAV} = 60\text{ A}$   
 $t_{rr} = 45\text{ ns}$

Part number

**DPG 60 IM 400 QB**



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:

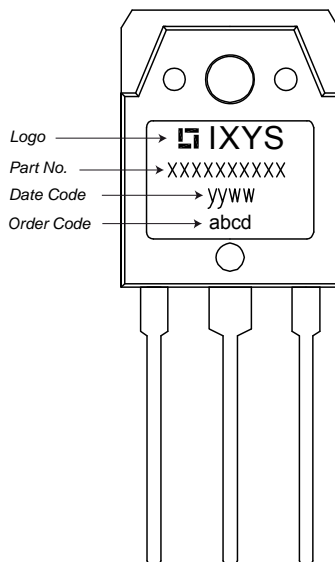
- Housing: TO-3P
- Industry standard outline compatible with TO-247
- Epoxy meets UL 94V-0
- RoHS compliant

### Ratings

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$V_{RRM}$	max. repetitive reverse voltage				400	V
$I_R$	reverse current	$V_R = 400\text{ V}$			1	$\mu\text{A}$
		$V_R = 400\text{ V}$			0.3	mA
$V_F$	forward voltage	$I_F = 60\text{ A}$			1.47	V
		$I_F = 120\text{ A}$			1.80	V
		$I_F = 60\text{ A}$			1.22	V
		$I_F = 120\text{ A}$			1.59	V
$I_{FAV}$	average forward current	rectangular d = 0.5			60	A
$V_{F0}$	threshold voltage	} for power loss calculation only			0.81	V
$r_F$	slope resistance				6.1	m $\Omega$
$R_{thJC}$	thermal resistance junction to case				0.55	K/W
$T_{VJ}$	virtual junction temperature		-55		175	$^{\circ}\text{C}$
$P_{tot}$	total power dissipation				275	W
$I_{FSM}$	max. forward surge current	t = 10 ms (50 Hz), sine			450	A
$I_{RM}$	max. reverse recovery current				4	A
		$I_F = 60\text{ A}; V_R = 240\text{ V}$			9.5	A
$t_{rr}$	reverse recovery time	$-di_F/dt = 200\text{ A}/\mu\text{s}$			45	ns
					85	ns
$C_J$	junction capacitance	$V_R = 200\text{ V}; f = 1\text{ MHz}$			61	pF

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$I_{RMS}$	RMS current	per pin <sup>1)</sup>			70	A
$R_{thCH}$	thermal resistance case to heatsink			0.25		K/W
$T_{stg}$	storage temperature		-55		150	°C
<b>Weight</b>				5		g
$M_D$	mounting torque		0.8		1.2	Nm
$F_C$	mounting force with clip		20		120	N

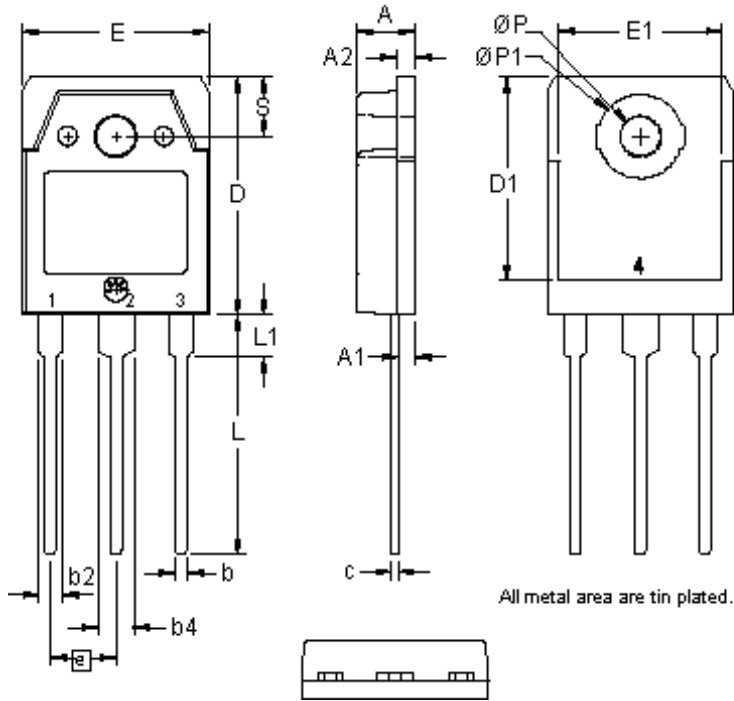
<sup>1)</sup>  $I_{RMS}$  is typically limited by: 1. pin-to-chip resistance; or by 2. current capability of the chip.  
 In case of 1, a common cathode/anode configuration and a non-isolated backside, the whole current capability can be used by connecting the backside.

**Product Marking**

**Part number**

- D = Diode
- P = HiPerFRED
- G = extreme fast
- 60 = Current Rating [A]
- IM = Single Diode
- 400 = Reverse Voltage [V]
- QB = TO-3P (3)

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Code Key
Standard	DPG 60 IM 400 QB	DPG60IM400QB	Tube	30	501915

Similar Part	Package	Voltage Class
DPF60IM400HB	TO-247AD (3)	400
DPG60I400HA	TO-247AD (2)	400

**Outlines TO-3P**


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	.090	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	.055	.080
D	.780	.791	19.80	20.10
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		.545 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
ØP	.126	.134	3.20	3.40
ØP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

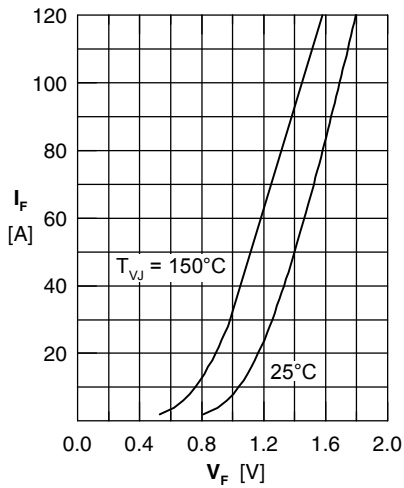


Fig. 1 Forward current  $I_F$  versus forward voltage  $V_F$

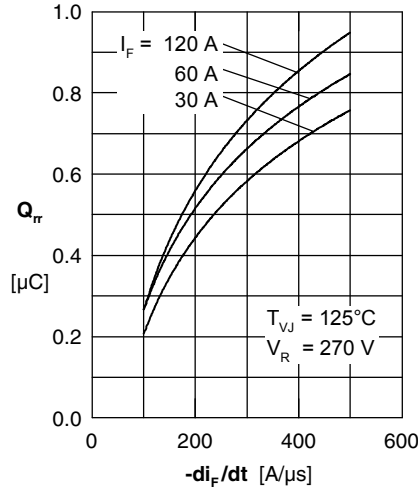


Fig. 2 Typ. reverse recovery charge  $Q_{rr}$  versus  $-di_F/dt$

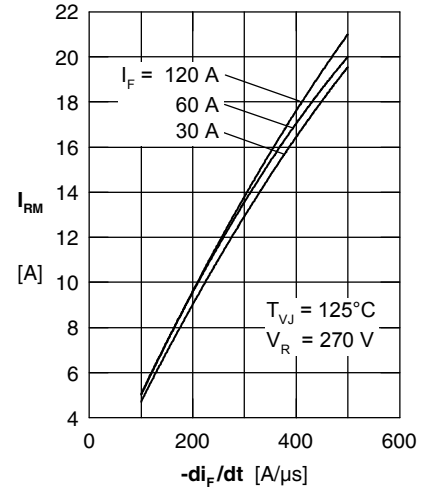


Fig. 3 Typ. reverse recovery current  $I_{RM}$  versus  $-di_F/dt$

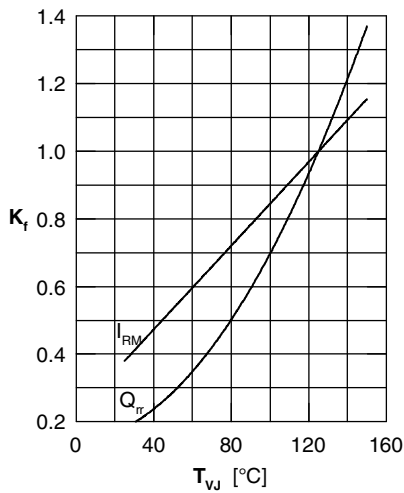


Fig. 4 Dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

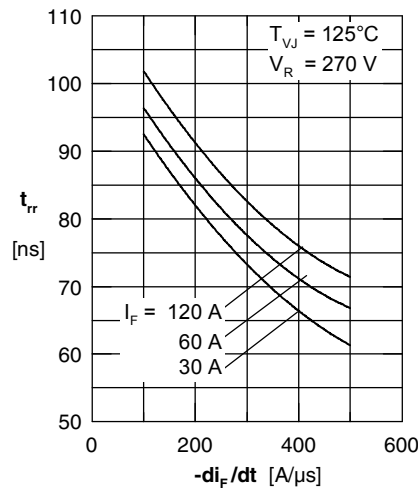


Fig. 5 Typ. reverse recovery time  $t_{rr}$  versus  $-di_F/dt$

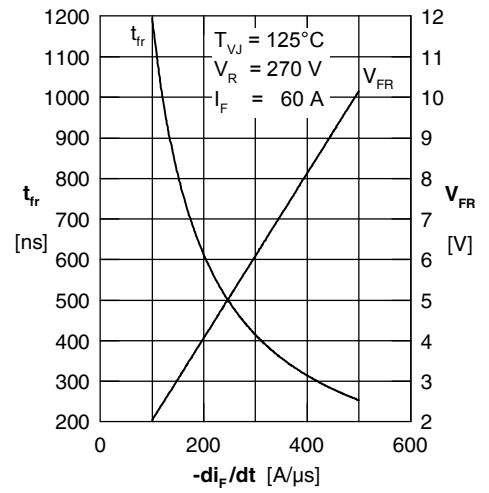


Fig. 6 Typ. forward recovery voltage  $V_{FR}$  & forward recovery time  $t_{fr}$  vs.  $di_F/dt$

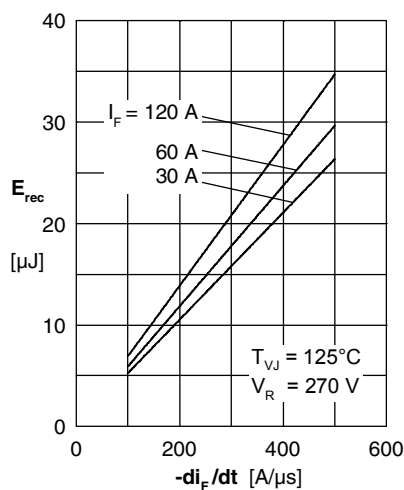


Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$

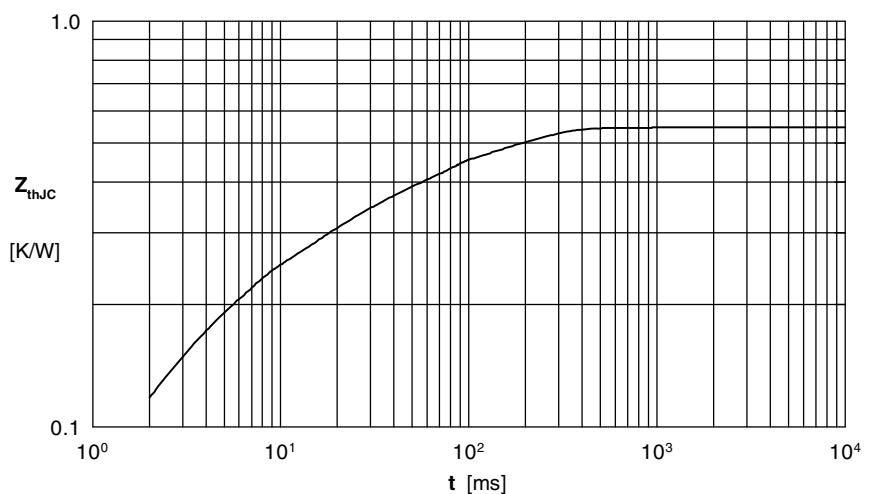


Fig. 8 Transient thermal impedance junction to case