HiPerFRED²

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

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

Part number

DPG10I400PM
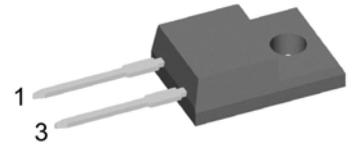
Backside: isolated

UL E72873

3 ○—▷|—○ 1
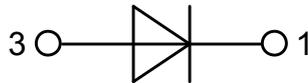
Features / Advantages:

● Planar passivated chips
● Very low leakage current
● Very short recovery time
● Improved thermal behaviour
● Very low Irm-values
● Very soft recovery behaviour
● Avalanche voltage rated for reliable operation
● Soft reverse recovery for low EMI/RFI
● Low Irm 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-220FP

● Isolation Voltage: 2500 V~
● Industry standard outline
● RoHS compliant
● Epoxy meets UL 94V-0
● Soldering pins for PCB mounting
● Base plate: Plastic overmolded tab
● Reduced weight

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 = 125°C	T_{VJ} = 175°C			10	A
		rectangular d = 0.5					
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					4.4	K/W
R_{thCH}	thermal resistance case to heatsink				0.50		K/W
P_{tot}	total power dissipation		T_C = 25°C			35	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 = 150 V f = 1 MHz	T_{VJ} = 25°C		12		pF
I_{RM}	max. reverse recovery current		T_{VJ} = 25°C		4		A
		I_F = 10 A; V_R = 270 V	T_{VJ} = 125°C		6		A
t_{rr}	reverse recovery time	-di_F/dt = 200 A/μs	T_{VJ} = 25°C		45		ns
			T_{VJ} = 125°C		65		ns

Package	TO-220FP				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
d$_{Spp/App}$	creepage distance on surface | striking distance through air	terminal to terminal		3.2	2.7			mm
d$_{Spb/Apb}$		terminal to backside		2.5	2.5			mm
V$_{ISOL}$	isolation voltage	t = 1 second	50/60 Hz, RMS; I$_{ISOL}$ ≤ 1 mA		2500			V
		t = 1 minute			2080			V

Product Marking

Part Number → abcdef
Logo → IXYS
DateCode YYWWZ
Assembly Code → XXXXXX
Assembly Line
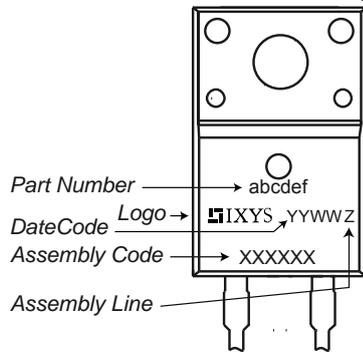
Part number

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

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG10I400PM	DPG10I400PM	Tube	50	503778

Similar Part	Package	Voltage class
DPG10I400PA	TO-220AC (2)	400

Equivalent Circuits for Simulation   *on die level*   T$_{VJ}$ = 175 °C
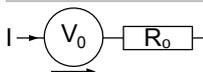
		Fast Diode	
V$_{0 max}$	threshold voltage	0.77	V
R$_{0 max}$	slope resistance *	16.6	mΩ

Outlines   TO-220FP
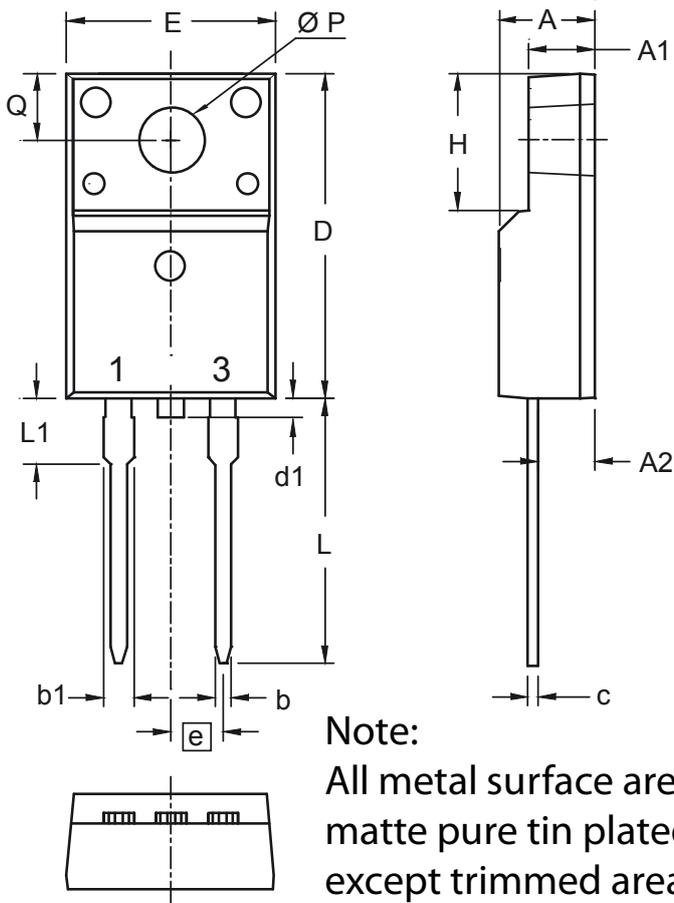
Note:
All metal surface are matte pure tin plated except trimmed area.

Dim.	Millimeters		Inches	
	min	max	min	max
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.56	2.96	0.101	0.117
b	0.70	0.90	0.028	0.035
b1	1.27	1.47	0.050	0.058
c	0.45	0.60	0.018	0.024
D	15.67	16.07	0.617	0.633
d1	0	1.10	0	0.043
E	9.96	10.36	0.392	0.408
e	2.54 BSC		0.100 BSC	
H	6.48	6.88	0.255	0.271
L	12.68	13.28	0.499	0.523
L1	3.03	3.43	0.119	0.135
Ø P	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134

IXYS reserves the right to change limits, conditions and dimensions.   Data according to IEC 60747and per semiconductor unless otherwise specified   20131101a
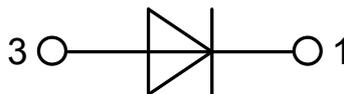
Fast Diode
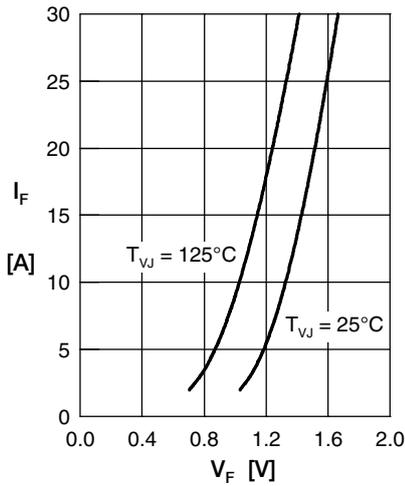
Fig. 1 Forward current
I_F versus V_F
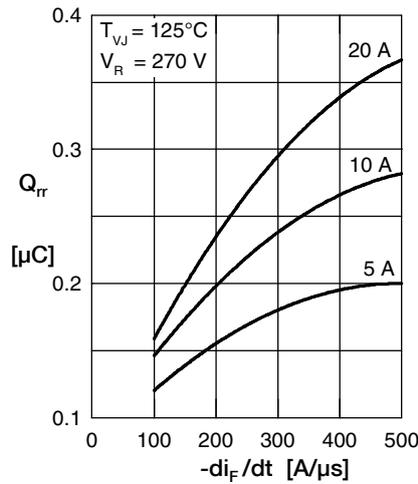
Fig. 2 Typ. reverse recov. charge
Q_{rr} versus $-di_F/dt$
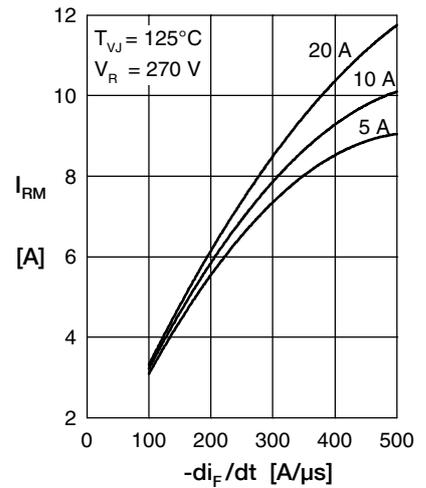
Fig. 3 Typ. reverse recov. current
I_{RM} versus $-di_F/dt$
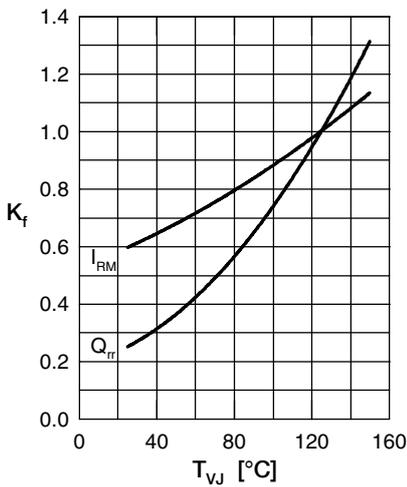
Fig. 4 Typ. dynamic parameters
Q_{rr}, I_{RM} versus T_{VJ}
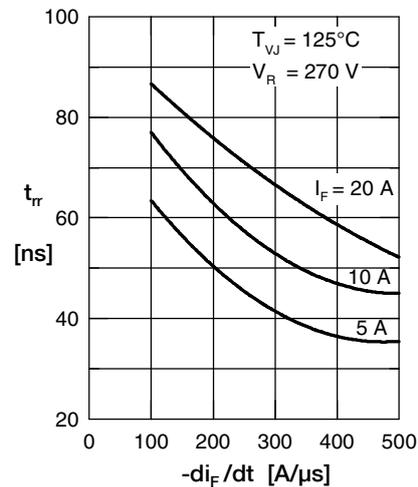
Fig. 5 Typ. reverse recov. time
t_{rr} versus $-di_F/dt$
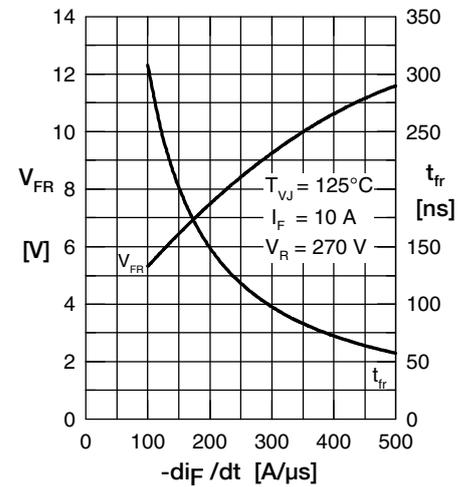
Fig. 6 Typ. forward recovery voltage
V_{FR} and t_{fr} versus di_F/dt
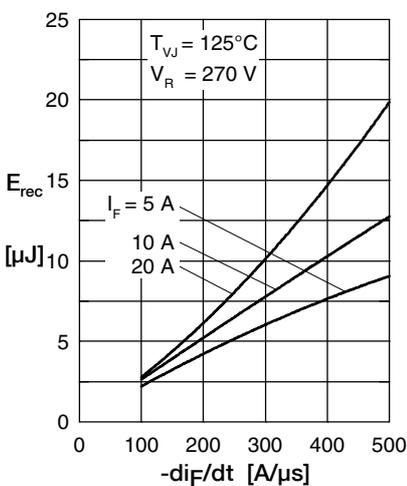

Fig. 7 Typ. recovery energy
E_{rec} versus $-di_F/dt$
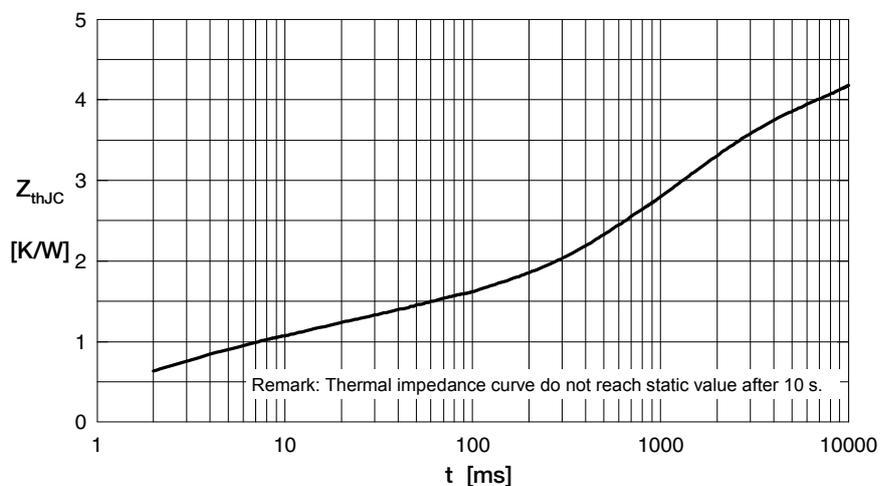
Fig. 8 Transient thermal resistance junction to case

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