

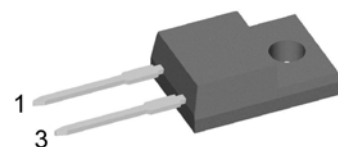
HiPerFRED²

$$\begin{aligned}
 V_{RRM} &= 400\text{ V} \\
 I_{FAV} &= 15\text{ A} \\
 t_{rr} &= 45\text{ ns}
 \end{aligned}$$

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

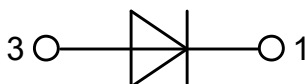
Part number

DPG15I400PM



Backside: isolated

 E72873

**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)

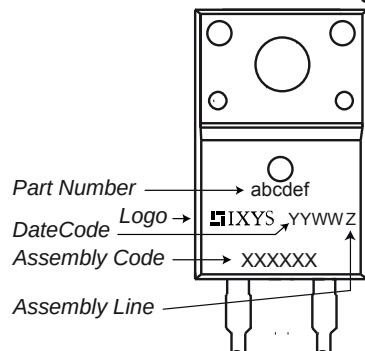
Package: TO-220FP

- 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	$T_{VJ} = 25^{\circ}\text{C}$				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	μA
		$V_R = 400\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			0.18	mA
V_F	forward voltage drop	$I_F = 15\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.39	V
		$I_F = 30\text{ A}$				1.63	V
		$I_F = 15\text{ A}$	$T_{VJ} = 150^{\circ}\text{C}$			1.14	V
		$I_F = 30\text{ A}$				1.40	V
I_{FAV}	average forward current	$T_C = 90^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}\text{C}$			15	A
V_{FO}	threshold voltage	} for power loss calculation only		$T_{VJ} = 175^{\circ}\text{C}$		0.84	V
r_F	slope resistance					16.5	m Ω
R_{thJC}	thermal resistance junction to case					4.2	K/W
R_{thCH}	thermal resistance case to heatsink				0.50		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				35	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^{\circ}\text{C}$			190	A
C_J	junction capacitance	$V_R = 200\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		16		pF
I_{RM}	max. reverse recovery current	$I_F = 15\text{ A}; V_R = 270\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^{\circ}\text{C}$		4	A
				$T_{VJ} = 125^{\circ}\text{C}$		5.5	A
				$T_{VJ} = 25^{\circ}\text{C}$		45	ns
				$T_{VJ} = 125^{\circ}\text{C}$		70	ns
t_{rr}	reverse recovery time						

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; $I_{ISOL} \leq 1$ mA	2500			V
		t = 1 minute		2080			V

Product Marking



Part number

D = Diode
P = HiPerFRED
G = extreme fast
15 = 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	DPG15I400PM	DPG15I400PM	Tube	50	503814

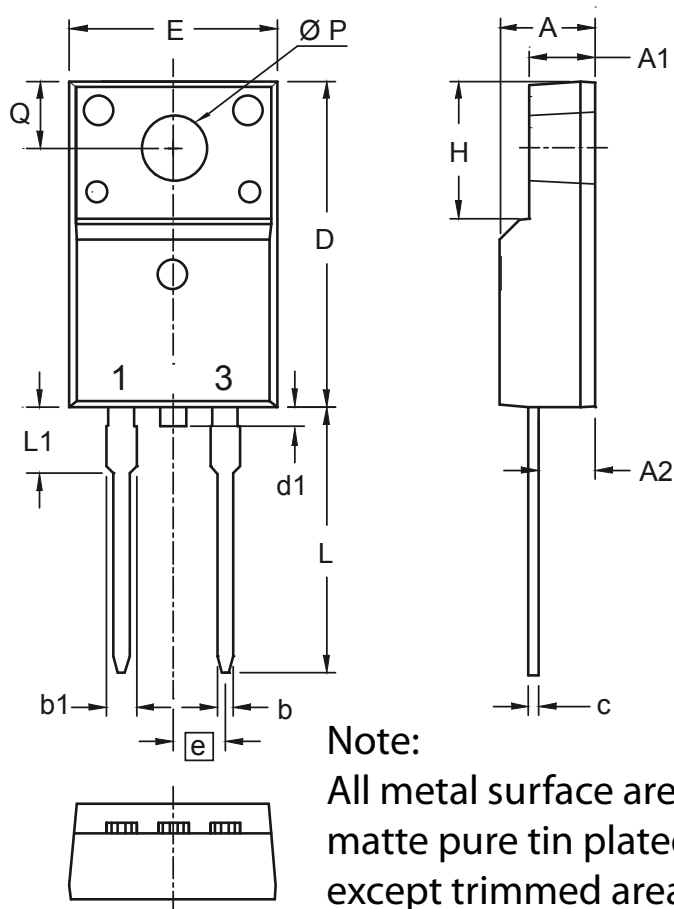
Equivalent Circuits for Simulation

* on die level

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

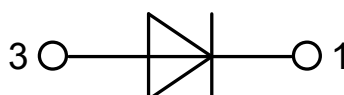
$I \rightarrow$	V_0	R_0	Fast Diode	
$V_{0\max}$	threshold voltage	0.84		V
$R_{0\max}$	slope resistance *	13.3		mΩ

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
$\varnothing P$	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134



Fast Diode

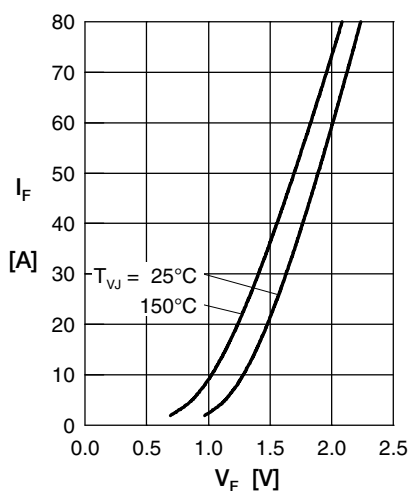


Fig. 1 Forward current I_F versus V_F

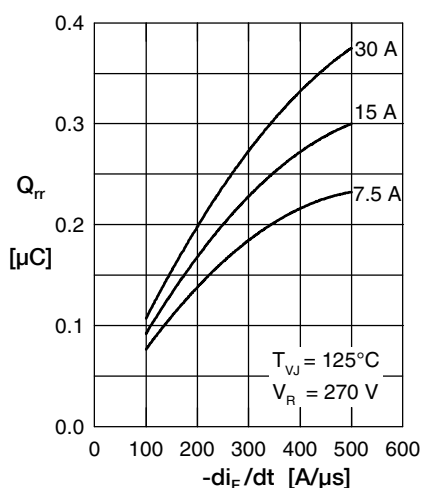


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

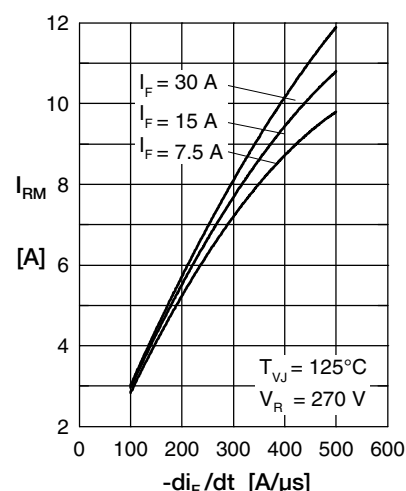


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

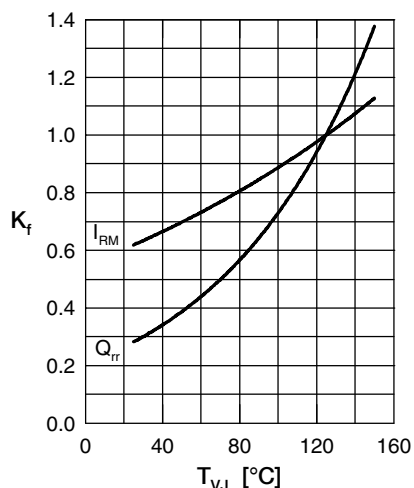


Fig. 4 Dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

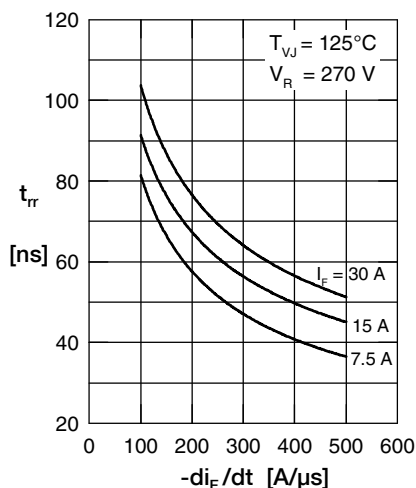


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

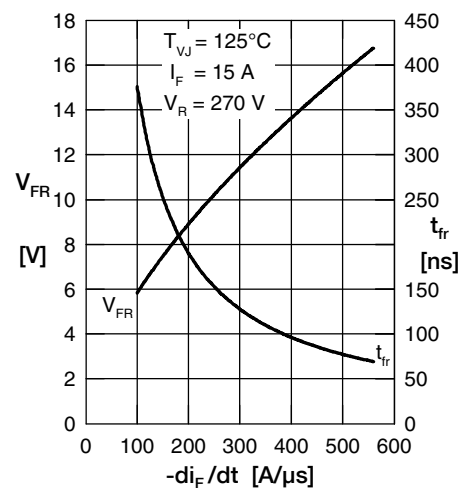


Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus di_F/dt

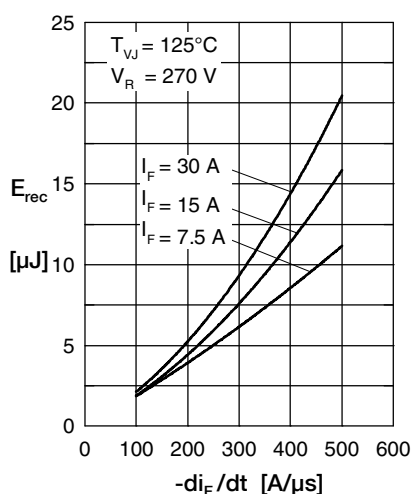


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

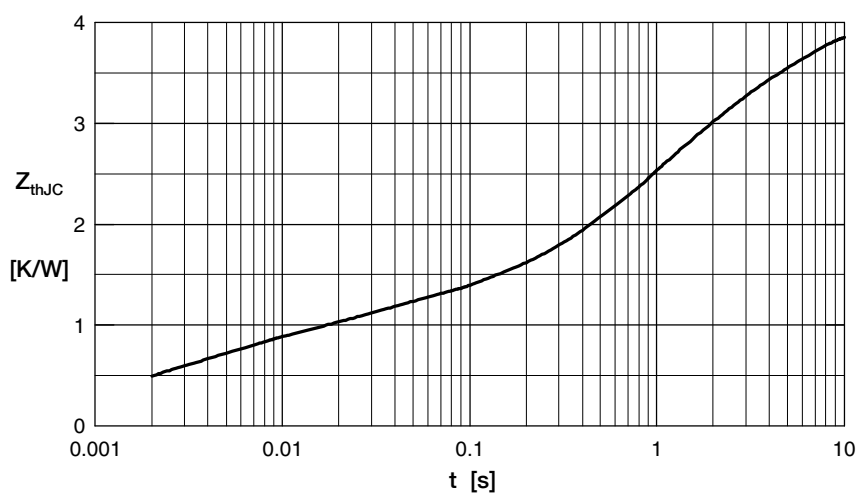


Fig. 8 Transient thermal resistance junction to case