

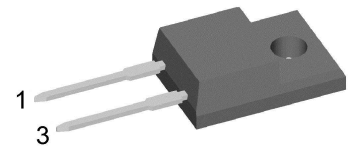
# HiPerFRED<sup>2</sup>

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

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

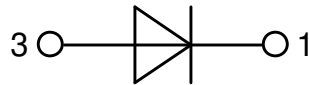
Part number

**DPG10I400PM**



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

### Disclaimer Notice

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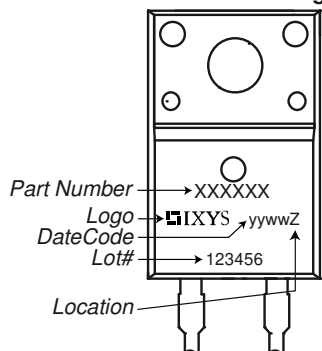


Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					400	V
$V_{RRM}$	max. repetitive reverse blocking voltage					400	V
$I_R$	reverse current, drain current	$V_R = 400\text{ V}$	$T_{VJ} = 25^\circ\text{C}$			1	$\mu\text{A}$
		$V_R = 400\text{ V}$	$T_{VJ} = 150^\circ\text{C}$			0.15	mA
$V_F$	forward voltage drop	$I_F = 10\text{ A}$	$T_{VJ} = 25^\circ\text{C}$			1.32	V
		$I_F = 20\text{ A}$				1.51	V
		$I_F = 10\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.03	V
		$I_F = 20\text{ A}$				1.24	V
$I_{FAV}$	average forward current	$T_C = 125^\circ\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^\circ\text{C}$			10	A
$V_{FO}$	threshold voltage	} for power loss calculation only				0.77	V
$r_F$	slope resistance					19.8	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					4.4	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.5		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		35	W
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		150	A
$C_J$	junction capacitance	$V_R = 150\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		12	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 10\text{ A}; V_R = 270\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		4	A
				$T_{VJ} = 125^\circ\text{C}$		6	A
$t_{rr}$	reverse recovery time			$T_{VJ} = 25^\circ\text{C}$		45	ns
				$T_{VJ} = 125^\circ\text{C}$		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
<b>Weight</b>				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	2500			V
		t = 1 minute	2100			V
		50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA				

**Product Marking**



**Part description**

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

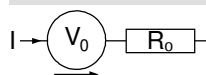
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG10I400PM	DPG10I400PM	Tube	50	503778

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

**Equivalent Circuits for Simulation**

\* on die level

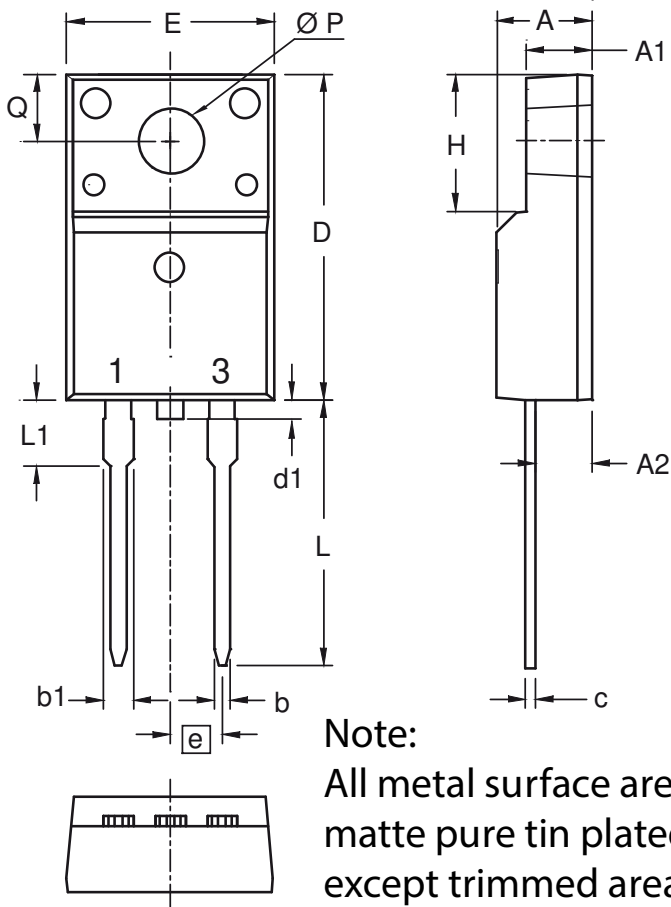
$T_{VJ} = 175^{\circ}C$



Symbol	Definition	Fast Diode	Unit
$V_{0\ max}$	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
ØP	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134



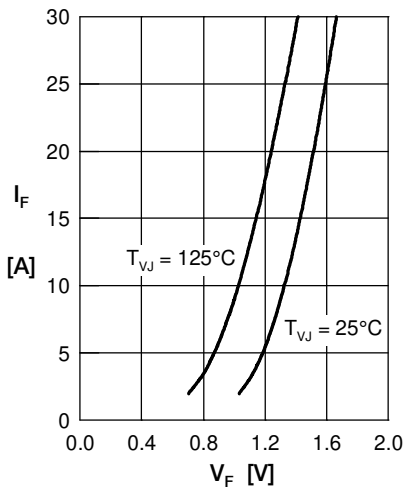
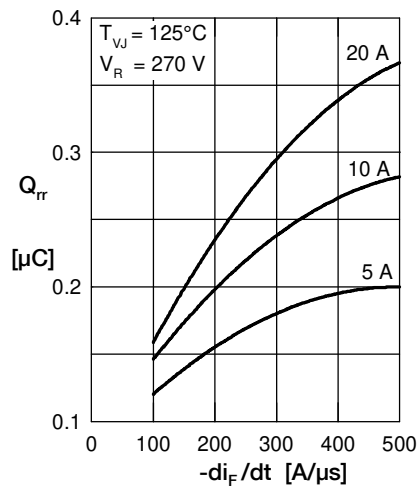
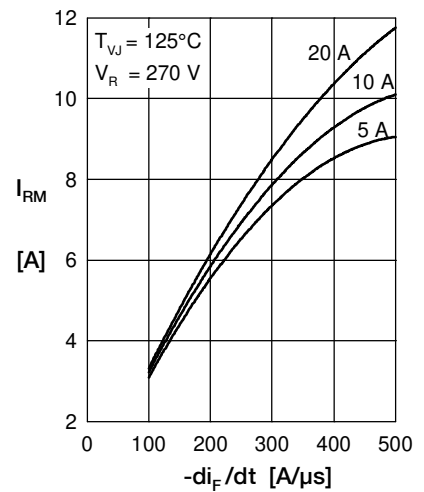
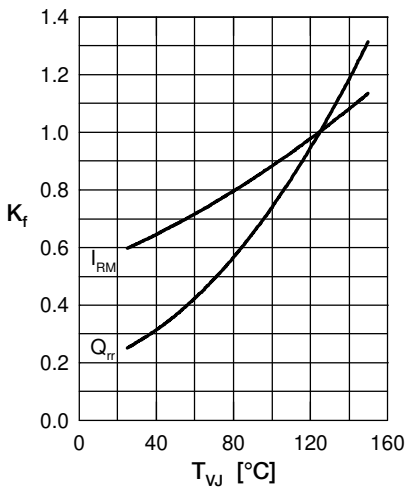
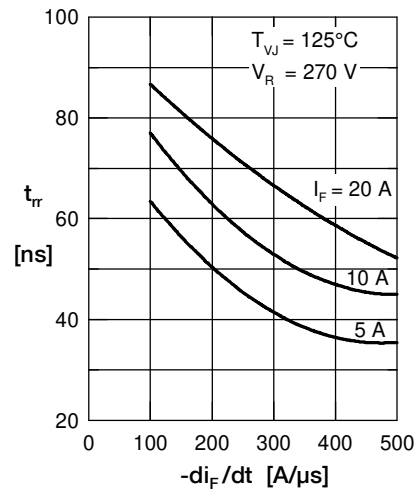
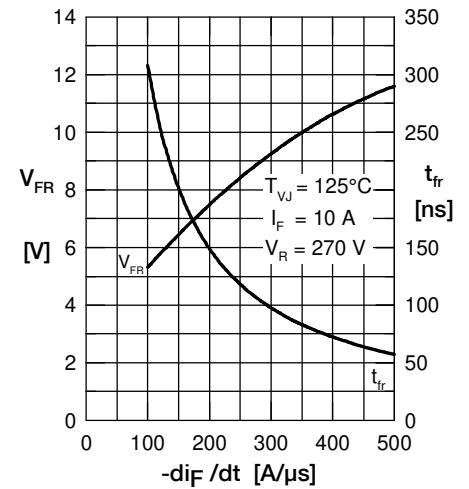
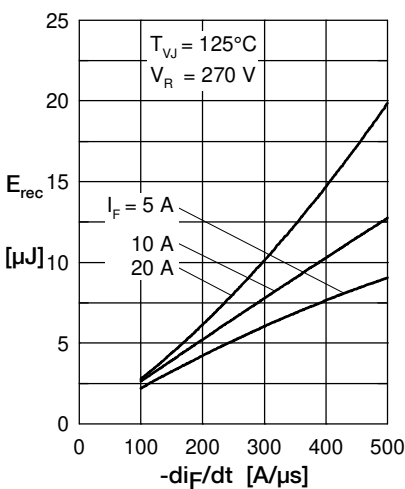
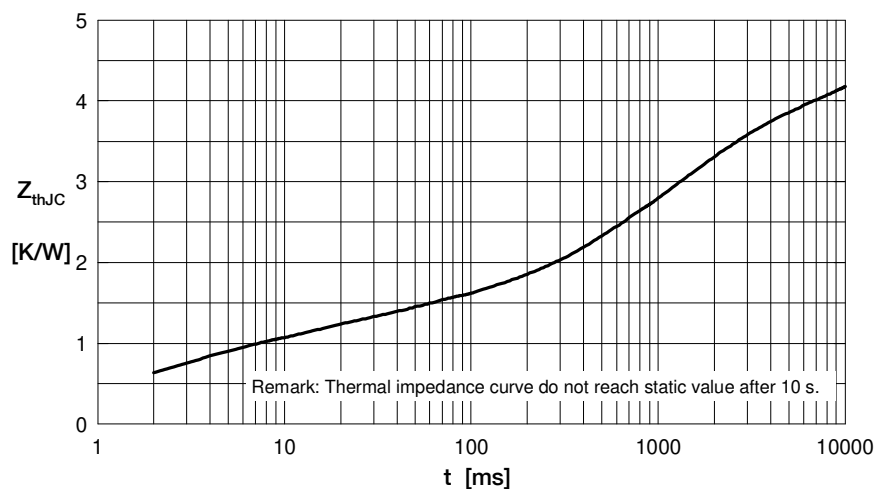
**Fast Diode**

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

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

 Fig. 3 Typ. 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