

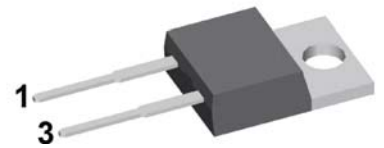
HiPerFRED²

$$\begin{aligned} V_{RRM} &= 300\text{V} \\ I_{FAV} &= 10\text{A} \\ t_{rr} &= 35\text{ns} \end{aligned}$$

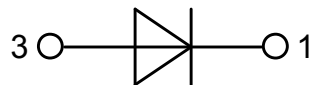
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Single Diode

Part number

DPG10I300PA



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)

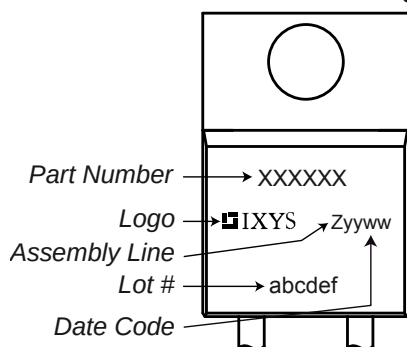
Package: TO-220

- 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	$T_{VJ} = 25^{\circ}\text{C}$				300	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				300	V
I_R	reverse current, drain current	$V_R = 300\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			1	μA
		$V_R = 300\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			0.06	mA
V_F	forward voltage drop	$I_F = 10\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.27	V
		$I_F = 20\text{ A}$				1.45	V
		$I_F = 10\text{ A}$	$T_{VJ} = 150^{\circ}\text{C}$			0.98	V
		$I_F = 20\text{ A}$				1.17	V
I_{FAV}	average forward current	$T_C = 150^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}\text{C}$			10	A
V_{FO}	threshold voltage	} for power loss calculation only		$T_{VJ} = 175^{\circ}\text{C}$		0.74	V
r_F	slope resistance					17.7	m Ω
R_{thJC}	thermal resistance junction to case					2.3	K/W
R_{thCH}	thermal resistance case to heatsink				0.50		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				65	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^{\circ}\text{C}$			140	A
C_J	junction capacitance	$V_R = 150\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		15		pF
I_{RM}	max. reverse recovery current	$I_F = 10\text{ A}; V_R = 200\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$		3		A
			$T_{VJ} = 125^{\circ}\text{C}$		5.5		A
			$T_{VJ} = 25^{\circ}\text{C}$		35		ns
			$T_{VJ} = 125^{\circ}\text{C}$		45		ns
t_{rr}	reverse recovery time						

Package TO-220			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

Product Marking



Part number

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

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG10I300PA	DPG10I300PA	Tube	50	506640

Similar Part	Package	Voltage class
DPG10IM300UC	TO-252AA (DPak)	300

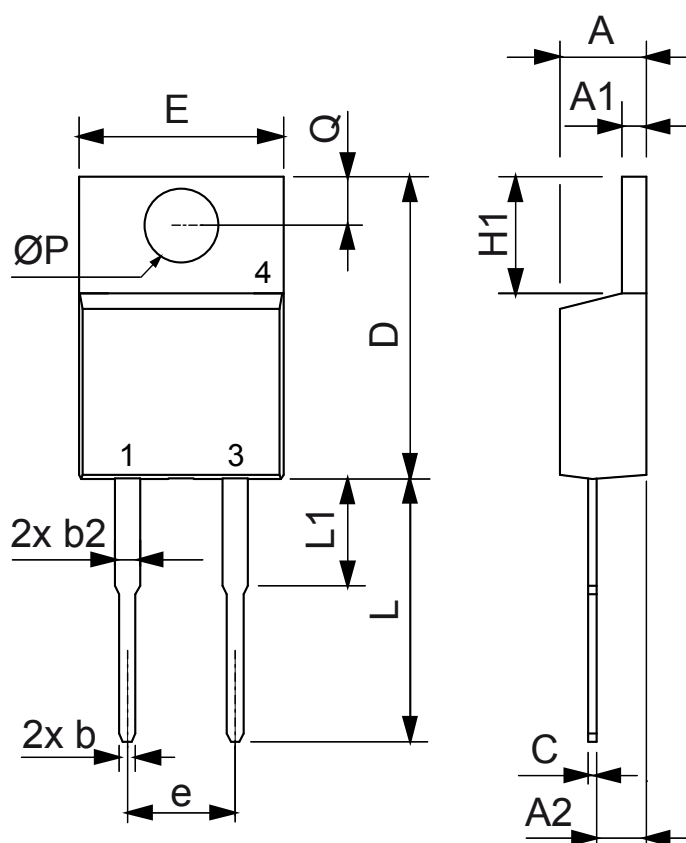
Equivalent Circuits for Simulation

* on die level

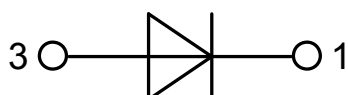
$T_{VJ} = 175^{\circ}\text{C}$

$I \rightarrow$	V_0	R_0	Fast Diode	
$V_{0\max}$	threshold voltage	0.74		V
$R_{0\max}$	slope resistance *	14.5		mΩ

Outlines TO-220



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.82	0.170	0.190
A1	1.14	1.39	0.045	0.055
A2	2.29	2.79	0.090	0.110
b	0.64	1.01	0.025	0.040
b2	1.15	1.65	0.045	0.065
C	0.35	0.56	0.014	0.022
D	14.73	16.00	0.580	0.630
E	9.91	10.66	0.390	0.420
e	5.08	BSC	0.200	BSC
H1	5.85	6.85	0.230	0.270
L	12.70	13.97	0.500	0.550
L1	2.79	5.84	0.110	0.230
$\varnothing P$	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



Fast Diode

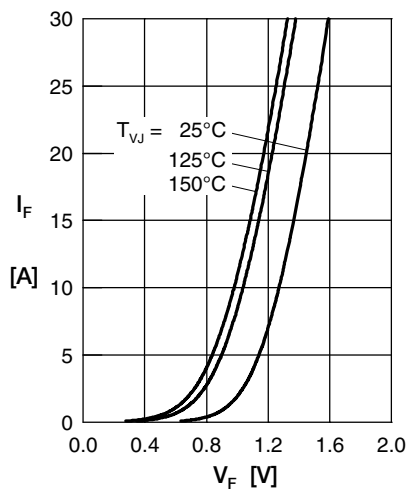


Fig. 1 Forward current I_F versus V_F

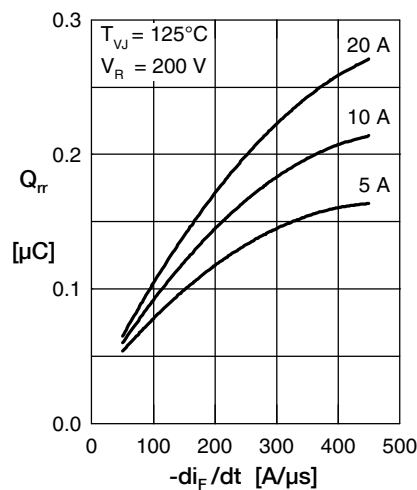


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

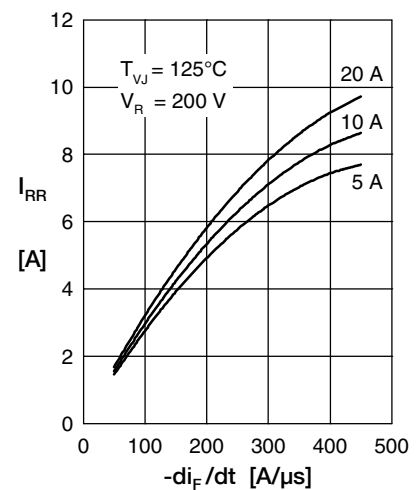


Fig. 3 Typ. reverse recov. current I_{RR} versus $-di_F/dt$

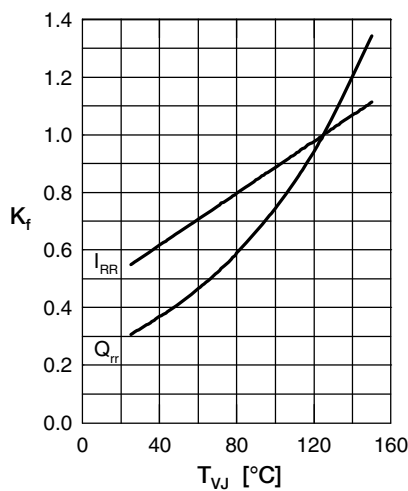


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RR} versus T_{VJ}

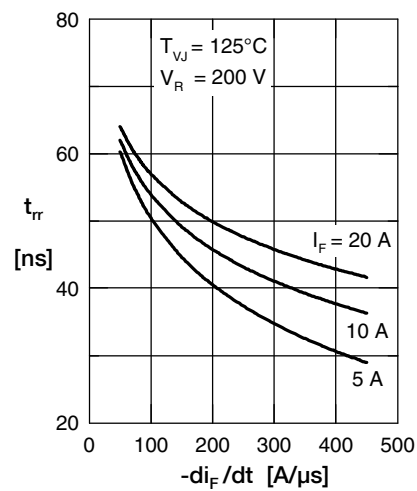


Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

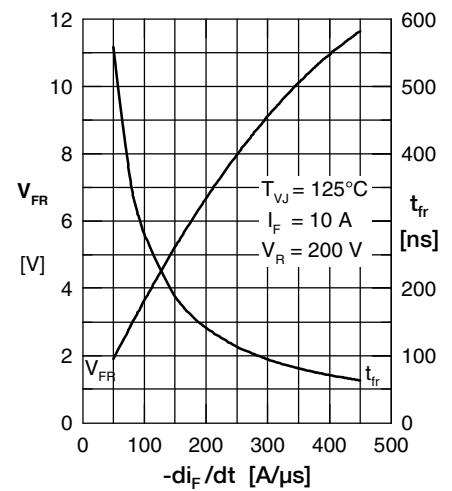


Fig. 6 Typ. forward recov. voltage V_{FR} and t_{fr} versus di_F/dt

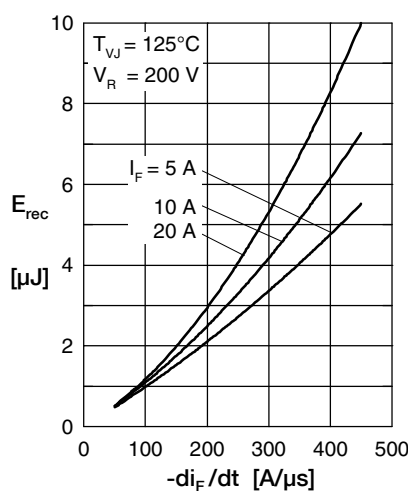


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

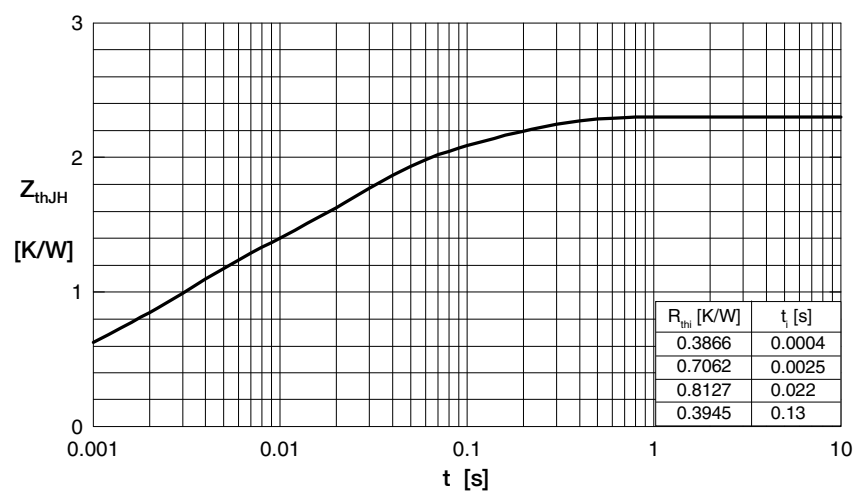


Fig. 8 Transient thermal resistance junction to case