

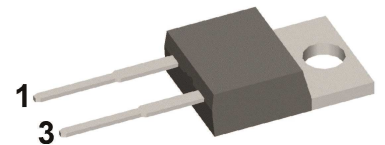
# HiPerFRED

$V_{RRM}$	=	300 V
$I_{FAV}$	=	30 A
$t_{rr}$	=	55 ns

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

Part number

**DPF30I300PA**



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

### Disclaimer Notice

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Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					300	V
$I_R$	reverse current, drain current	$V_R = 300\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		5	$\mu\text{A}$
		$V_R = 300\text{ V}$		$T_{VJ} = 150^\circ\text{C}$		0.25	mA
$V_F$	forward voltage drop	$I_F = 30\text{ A}$		$T_{VJ} = 25^\circ\text{C}$		1.17	V
		$I_F = 60\text{ A}$				1.37	V
		$I_F = 30\text{ A}$		$T_{VJ} = 150^\circ\text{C}$		0.98	V
		$I_F = 60\text{ A}$				1.21	V
$I_{FAV}$	average forward current	$T_C = 145^\circ\text{C}$	rectangular	$T_{VJ} = 175^\circ\text{C}$		30	A
$V_{FO}$	threshold voltage	} for power loss calculation only		$T_{VJ} = 175^\circ\text{C}$		0.72	V
$r_F$	slope resistance					7.4	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					0.85	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.5		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		175	W
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine; $V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		390	A
$C_J$	junction capacitance	$V_R = 150\text{ V}$ f = 1 MHz		$T_{VJ} = 25^\circ\text{C}$		42	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 30\text{ A}; V_R = 200\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		6	A
				$T_{VJ} = 125^\circ\text{C}$		10	A
$t_{rr}$	reverse recovery time	} $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		55	ns
				$T_{VJ} = 125^\circ\text{C}$		85	ns



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
<b>Weight</b>				2		g
$M_D$	mounting torque		0.4		0.6	Nm
$F_C$	mounting force with clip		20		60	N

**Product Marking**



**Part description**

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

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPF30I300PA	DPF30I300PA	Tube	50	511414

Similar Part	Package	Voltage class
DPG30I300PA	TO-220AC (2)	300
DPG30I300HA	TO-247AD (2)	300

**Equivalent Circuits for Simulation**

\* on die level

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

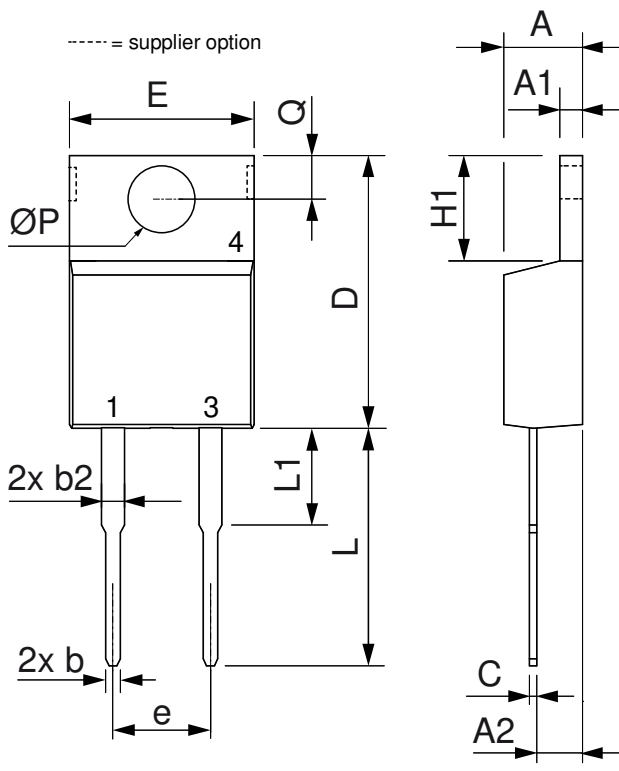


**Fast Diode**

$V_{0\ max}$	threshold voltage	0.72	V
$R_{0\ max}$	slope resistance *	4.2	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
ØP	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



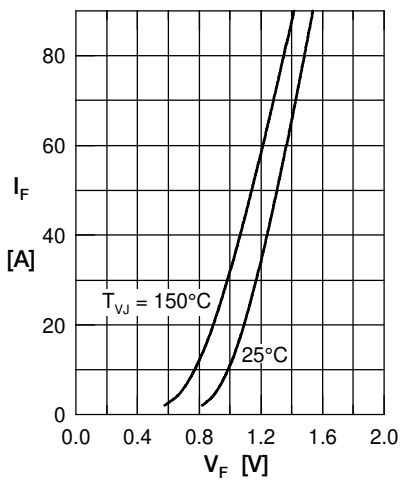
**Fast Diode**


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

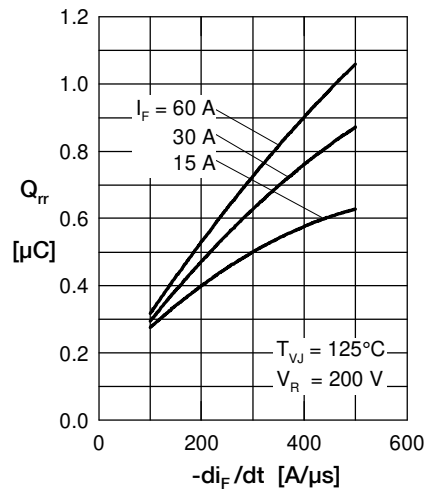


Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $-di_F/dt$

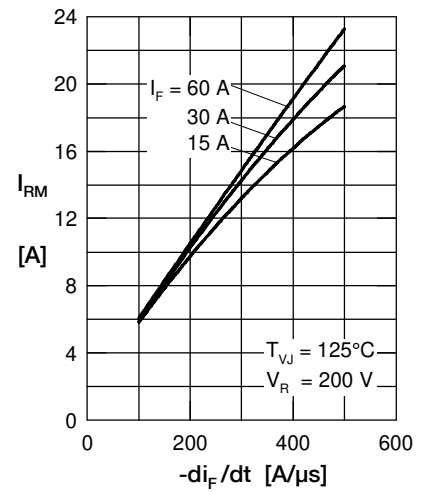


Fig. 3 Typ. reverse recovery current  $I_{RM}$  versus  $-di_F/dt$

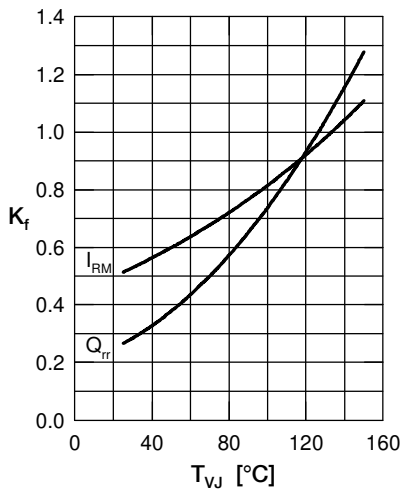


Fig. 4 Typ. dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

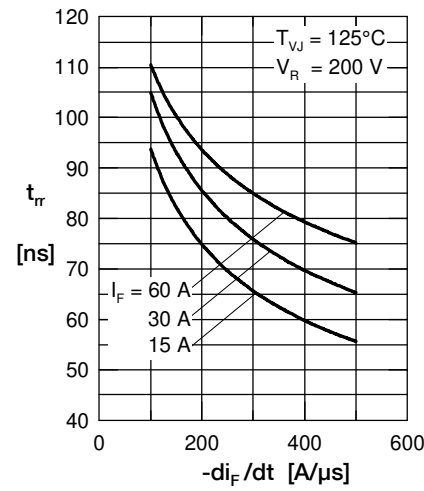


Fig. 5 Typ. reverse recovery time  $t_{rr}$  versus  $-di_F/dt$

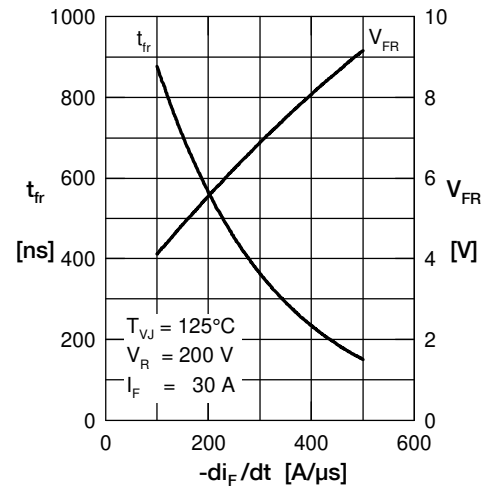


Fig. 6 Typ. forward recov. voltage  $V_{FR}$  & recovery time  $t_{fr}$  vs.  $di_F/dt$

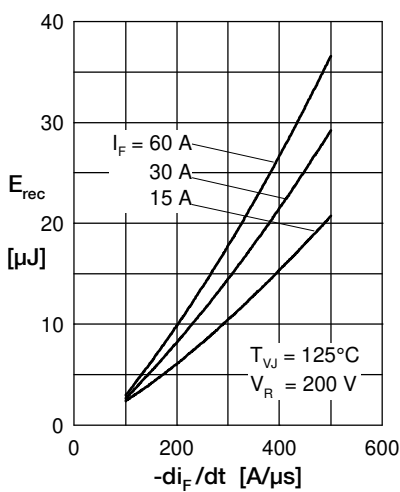


Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$

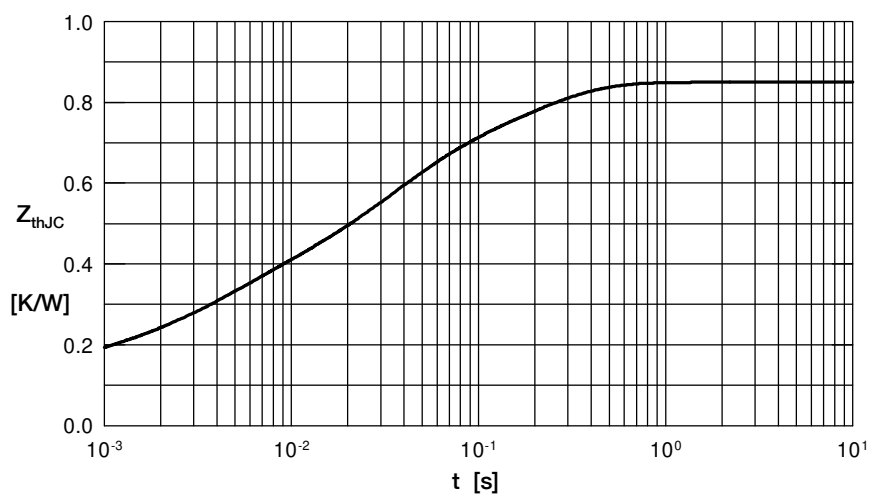


Fig. 8 Transient thermal impedance junction to case