

HiPerFRED

V_{RRM} = 2x 600 V
 I_{FAV} = 30 A
 t_{rr} = 35 ns

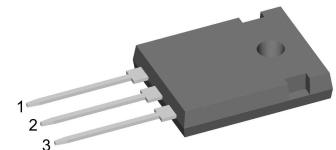
High Performance Fast Recovery Diode

Low Loss and Soft Recovery

Phase leg

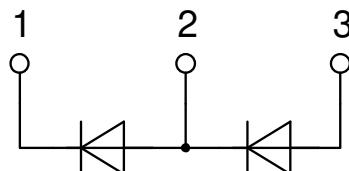
Part number

DPF30P600HR



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: ISO247

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

Disclaimer Notice

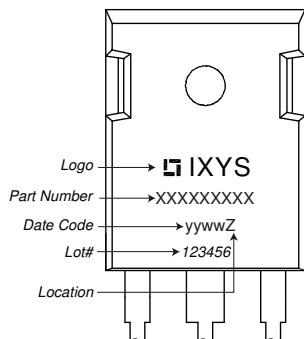
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Fast Diode

Symbol	Definition	Conditions	Ratings			
			min.	typ.	max.	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^\circ\text{C}$			600	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^\circ\text{C}$			600	V
I_R	reverse current, drain current	$V_R = 600 \text{ V}$ $V_R = 600 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 150^\circ\text{C}$		500 1	μA mA
V_F	forward voltage drop	$I_F = 30 \text{ A}$ $I_F = 60 \text{ A}$ $I_F = 30 \text{ A}$ $I_F = 60 \text{ A}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 150^\circ\text{C}$		1.62 1.95 1.27 1.58	V V
I_{FAV}	average forward current	$T_C = 130^\circ\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^\circ\text{C}$		30	A
V_{FO} r_F	threshold voltage slope resistance } for power loss calculation only		$T_{VJ} = 175^\circ\text{C}$		1.00 10	V $\text{m}\Omega$
R_{thJC}	thermal resistance junction to case				0.9	K/W
R_{thCH}	thermal resistance case to heatsink			0.3		K/W
P_{tot}	total power dissipation		$T_C = 25^\circ\text{C}$		165	W
I_{FSM}	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}; V_R = 0 \text{ V}$	$T_{VJ} = 45^\circ\text{C}$		200	A
C_J	junction capacitance	$V_R = 400 \text{ V}$ $f = 1 \text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$		26	pF
I_{RM}	max. reverse recovery current		$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 100^\circ\text{C}$		17 29	A A
t_{rr}	reverse recovery time	$I_F = 30 \text{ A}; V_R = 300 \text{ V}$ $-di_F/dt = 600 \text{ A}/\mu\text{s}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 100^\circ\text{C}$		35 90	ns ns

Package ISO247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	<i>RMS current</i>	per terminal			70	A
T_{VJ}	<i>virtual junction temperature</i>		-55		175	°C
T_{op}	<i>operation temperature</i>		-55		150	°C
T_{stg}	<i>storage temperature</i>		-55		150	°C
Weight				6		g
M_d	<i>mounting torque</i>		0.8		1.2	Nm
F_c	<i>mounting force with clip</i>		20		120	N
$d_{Spp/App}$	<i>creepage distance on surface / striking distance through air</i>		terminal to terminal	2.7		mm
$d_{Spb/Apb}$			terminal to backside	4.1		mm
V_{ISOL}	<i>isolation voltage</i>	$t = 1 \text{ second}$ $t = 1 \text{ minute}$	50/60 Hz, RMS; $I_{ISOL} \leq 1 \text{ mA}$	3600 3000		V V

Product Marking



Part description

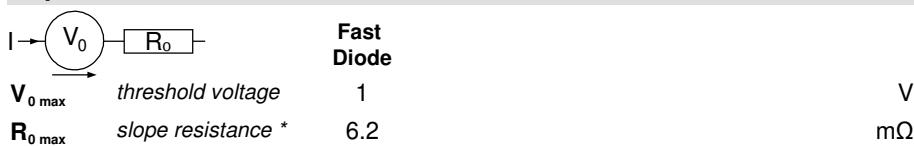
D = Diode
P = HiPerFRED
F = ultra fast
30 = Current Rating [A]
P = Phase leg
600 = Reverse Voltage [V]
HR = ISO247 (3)

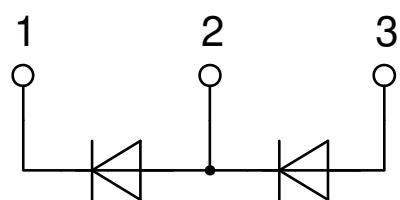
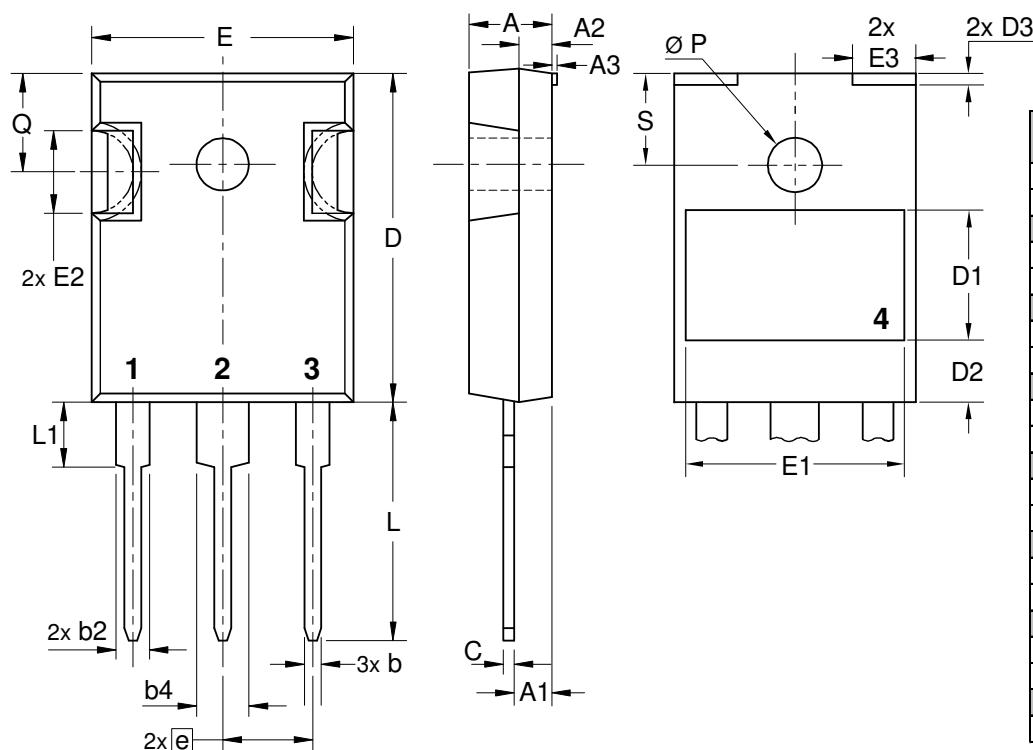
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPF30P600HR	DPF30P600HR	Tube	30	517860

Equivalent Circuits for Simulation

* on die level

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



Outlines ISO247


Fast Diode

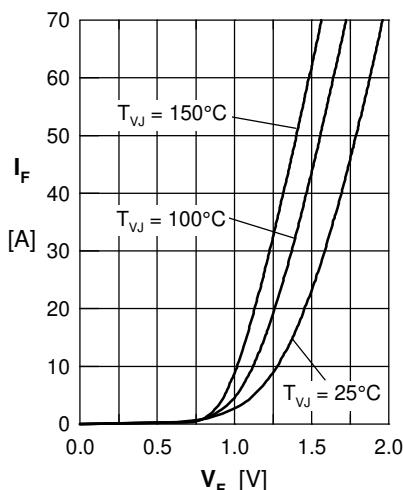


Fig. 1 Forward current I_F vs. V_F

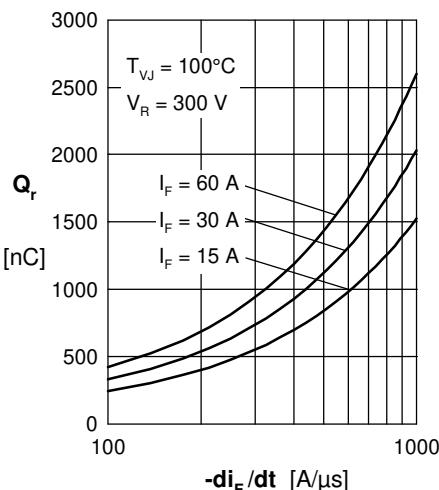


Fig. 2 Typ. reverse recovery charge Q_r versus $-di_F/dt$

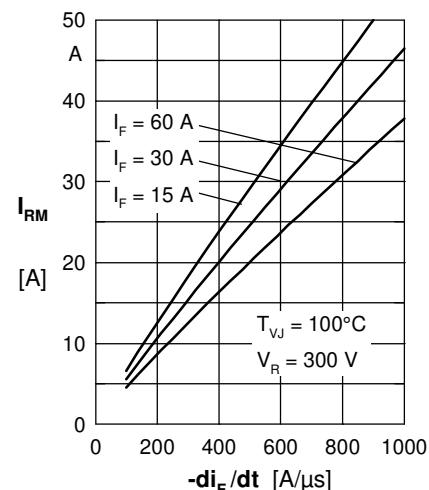


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

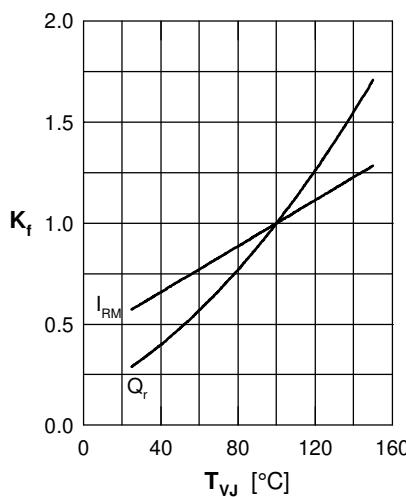


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

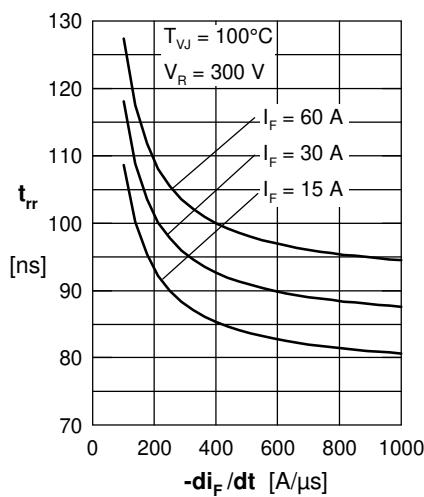


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

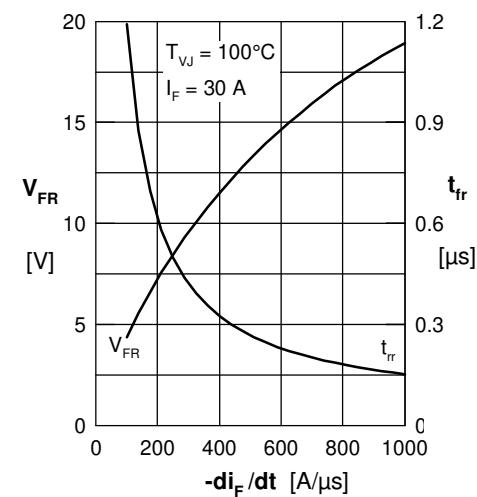


Fig. 6 Typ. peak forward voltage V_{FR} and typ. forward recovery time t_{fr} versus di_F/dt

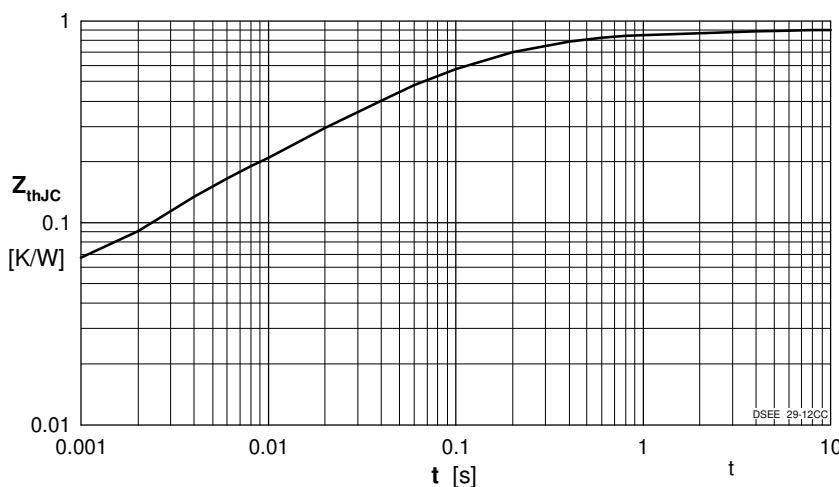


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.038	0.00024
2	0.07	0.0036
3	0.245	0.0235
4	0.198	0.1421
5	0.35	0.25