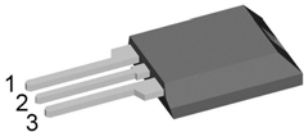
HiPerFRED²

V_{RRM} = 2x 400 V
I_{FAV} = 10 A
t_{rr} = 45 ns

High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Phase leg

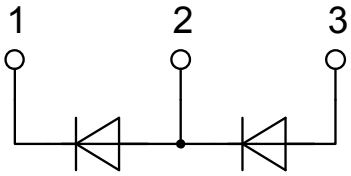
Part number

DPG10P400PJ



Backside: isolated

E72873



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low Irm-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low Irm 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: ISOPLUS220

- 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

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Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			400	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			400	V
I_R	*reverse current, drain current*	V_R = 400 V	T_{VJ} = 25°C			1	µA
		V_R = 400 V	T_{VJ} = 150°C			0.18	mA
V_F	*forward voltage drop*	I_F = 10 A	T_{VJ} = 25°C			1.28	V
		I_F = 20 A				1.48	V
		I_F = 10 A	T_{VJ} = 150°C			1.02	V
		I_F = 20 A				1.24	V
I_{FAV}	*average forward current*	T_C = 145°C	T_{VJ} = 175°C			10	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 175°C			0.78	V
r_F	*slope resistance* }					19.4	mΩ
R_{thJC}	*thermal resistance junction to case*					2.5	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.50		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			60	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			130	A
C_J	*junction capacitance*	V_R = 200 V f = 1 MHz	T_{VJ} = 25°C		16		pF
I_{RM}	*max. reverse recovery current*		T_{VJ} = 25°C		4		A
		I_F = 15 A; V_R = 270 V	T_{VJ} = 125°C		5.5		A
t_{rr}	*reverse recovery time*	$-di_F/dt$ = 200 A/µs	T_{VJ} = 25°C		45		ns
			T_{VJ} = 125°C		70		ns

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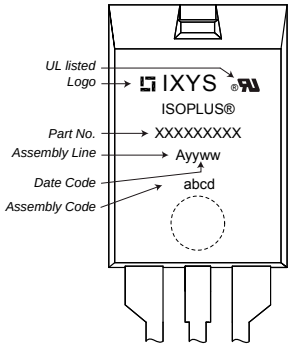
Package ISOPLUS220				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				35	A
T_{VJ}	*virtual junction temperature*			-55		175	°C
T_{op}	*operation temperature*			-55		150	°C
T_{stg}	*storage temperature*			-55		150	°C
Weight					2		g
F_C	*mounting force with clip*			20		60	N
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	1.0			mm
$d_{Spb/Apb}$			*terminal to backside*	3.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3600			V
		t = 1 minute		3000			V

Product Marking

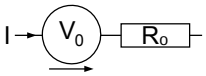


Part number

D = Diode
P = HiPerFRED
G = extreme fast
10 = Current Rating [A]
P = Phase leg
400 = Reverse Voltage [V]
PJ = ISOPLUS220AB (3)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG10P400PJ	DPG10P400PJ	Tube	50	507202

Equivalent Circuits for Simulation ** on die level* T_{VJ} = 175 °C



		Fast Diode	
$V_{0\,max}$	*threshold voltage*	0.78	V
$R_{0\,max}$	*slope resistance **	16.2	mΩ

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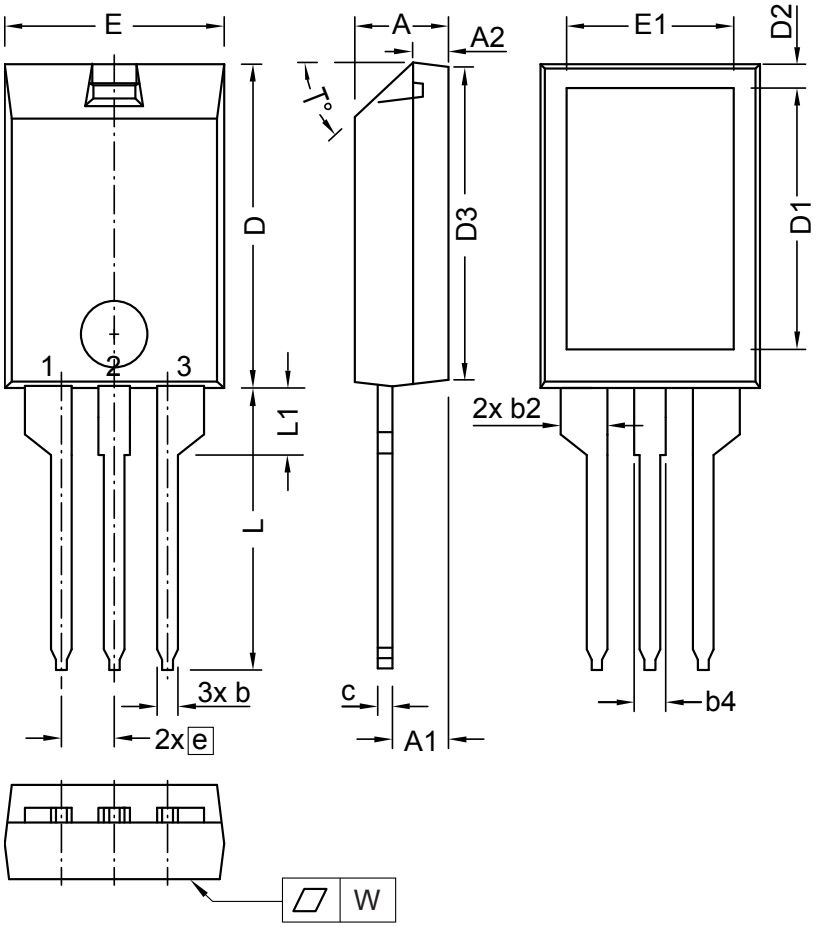
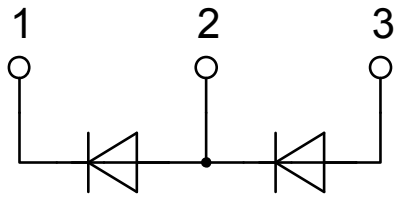
Outlines ISOPLUS220



Dim.	Millimeters		Inches	
	min	max	min	max
A	4.00	5.00	0.157	0.197
A1	2.50	3.00	0.098	0.118
A2	1.60	1.80	0.063	0.071
b	0.90	1.30	0.035	0.051
b2	2.35	2.55	0.093	0.100
b4	1.25	1.65	0.049	0.065
c	0.70	1.00	0.028	0.039
D	15.00	16.00	0.591	0.630
D1	12.00	13.00	0.472	0.512
D2	1.10	1.50	0.043	0.059
D3	14.90	15.50	0.587	0.610
E	10.00	11.00	0.394	0.433
E1	7.50	8.50	0.295	0.335
e	2.54 BSC		0.100 BSC	
L	13.00	14.50	0.512	0.571
L1	3.00	3.50	0.118	0.138
T°	42.5	47.5		
W	-	0.1	-	0.004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-273 gemäß JEDEC außer D und D1.
This drawing will meet all dimensions requiarement of JEDEC outline TO-273 except D and D1.



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Fast Diode

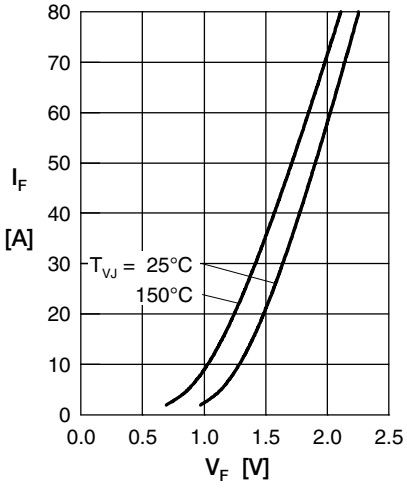

Fig. 1 Forward current I_F versus V_F

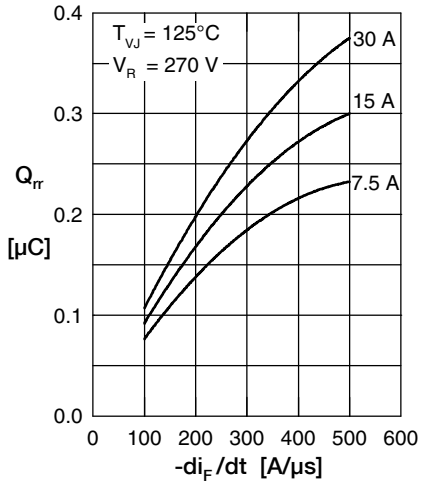

Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

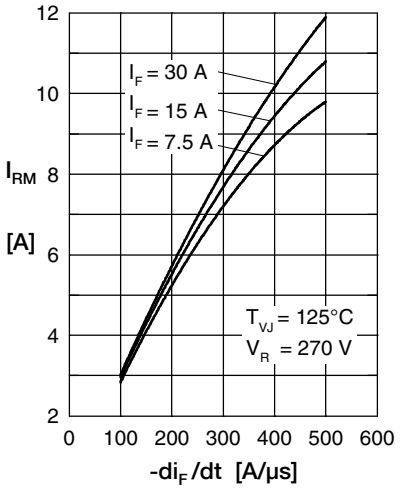

Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

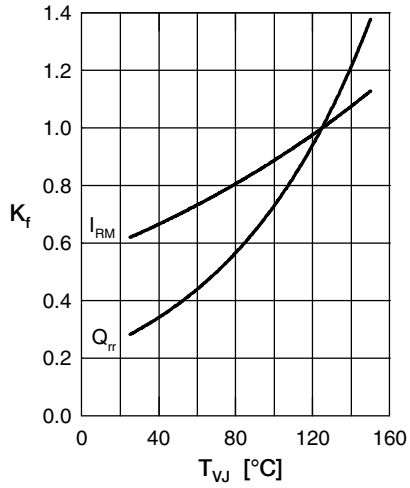

Fig. 4 Typ. dynamic parameters Q_{rr}, I_{RM} versus T_{VJ}

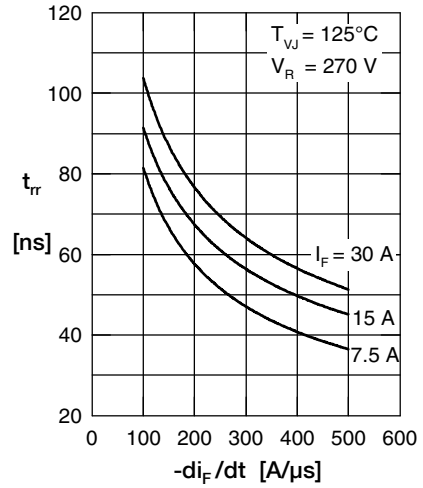

Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

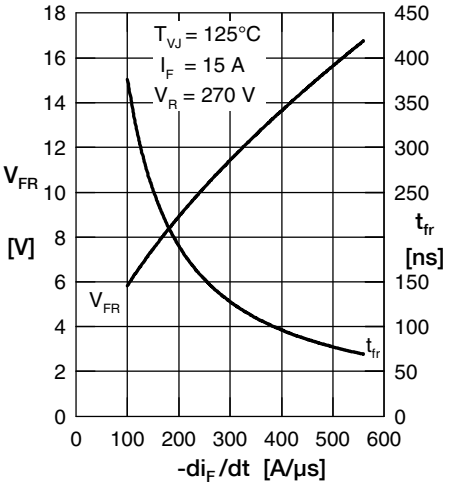

Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus di_F/dt

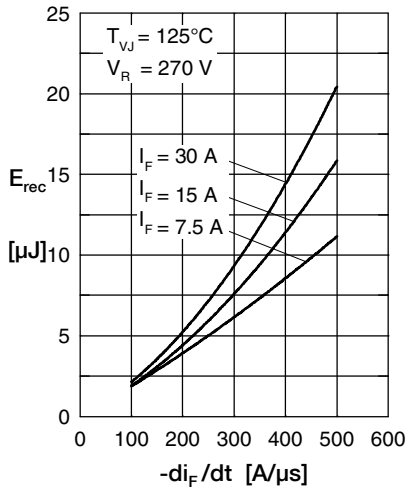

Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

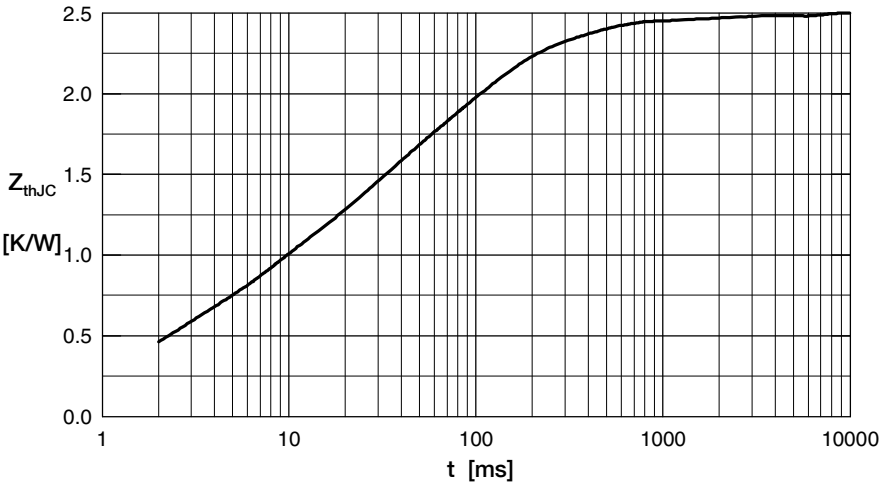

Fig. 8 Transient thermal resistance junction to case

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