

# HiPerFRED

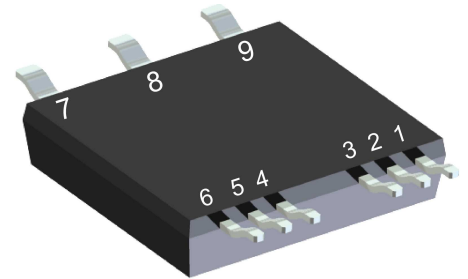
$V_{RRM}$	=	600 V
$I_{DAV}$	=	60 A
$t_{rr}$	=	40 ns

High Performance Fast Recovery Diode  
 Low Loss and Soft Recovery  
 1~ Rectifier Bridge


Part number

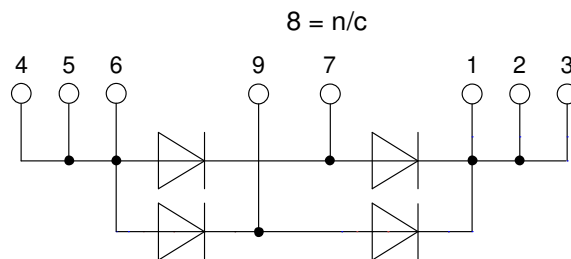
**DPG60B600LB**

Marking on Product: DPG60B600LB



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:

- Rectifiers in switch mode power supplies (SMPS)

### Package: SMPD

- Isolation Voltage: 3000 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

### Disclaimer Notice

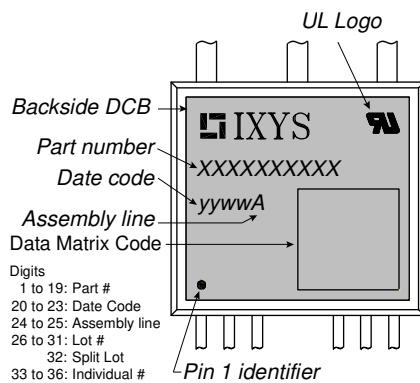
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Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			600	V	
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			600	V	
$I_R$	reverse current, drain current	$V_R = 600 V$	$T_{VJ} = 25^{\circ}C$		250	$\mu A$	
		$V_R = 600 V$	$T_{VJ} = 150^{\circ}C$		2	mA	
$V_F$	forward voltage drop	$I_F = 30 A$	$T_{VJ} = 25^{\circ}C$		2.51	V	
		$I_F = 60 A$			3.19	V	
		$I_F = 30 A$	$T_{VJ} = 150^{\circ}C$		1.59	V	
		$I_F = 60 A$			2.21	V	
$I_{DAV}$	bridge output current	$T_C = 125^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}C$		60	A	
$V_{FO}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		0.85	V	
$r_F$	slope resistance				17	m $\Omega$	
$R_{thJC}$	thermal resistance junction to case				1.1	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0.40		K/W	
$P_{tot}$	total power dissipation		$T_C = 25^{\circ}C$		135	W	
$I_{FSM}$	max. forward surge current	$t = 10 ms; (50 Hz), sine; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		250	A	
$C_J$	junction capacitance	$V_R = 300 V$ $f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		30	pF	
$I_{RM}$	max. reverse recovery current	} $I_F = 30 A; V_R = 300 V$ $-di_F / dt = 400 A/\mu s$	$T_{VJ} = 25^{\circ}C$		5.5	A	
			$T_{VJ} = 125^{\circ}C$		12	A	
$t_{rr}$	reverse recovery time		$T_{VJ} = 25^{\circ}C$		40	ns	
			$T_{VJ} = 125^{\circ}C$		85	ns	



Package SMPD		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			50	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>				8.5		g
$F_C$	mounting force with clip		40		130	N
$d_{Spp/ App}$	creepage distance on surface / striking distance through air	terminal to terminal	1.6			mm
$d_{Spb/ Apb}$		terminal to backside	4.0			mm
$V_{ISOL}$	isolation voltage	t = 1 second	3000			V
		t = 1 minute	2500			V



**Part description**

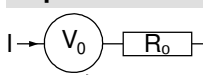
- D = Diode
- P = HiPerFRED
- G = extreme fast
- 60 = Current Rating [A]
- B = 1~ Rectifier Bridge
- 600 = Reverse Voltage [V]
- LB = SMPD-B

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG60B600LB-TUB	DPG60B600LB	Tube	20	524759
Alternative	DPG60B600LB-TRR	DPG60B600LB	Tape & Reel	200	516148

**Equivalent Circuits for Simulation**

\* on die level

$T_{VJ} = 175\text{ °C}$

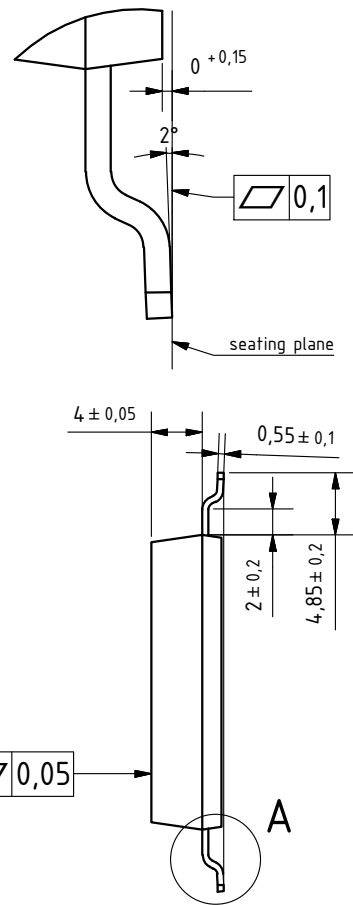
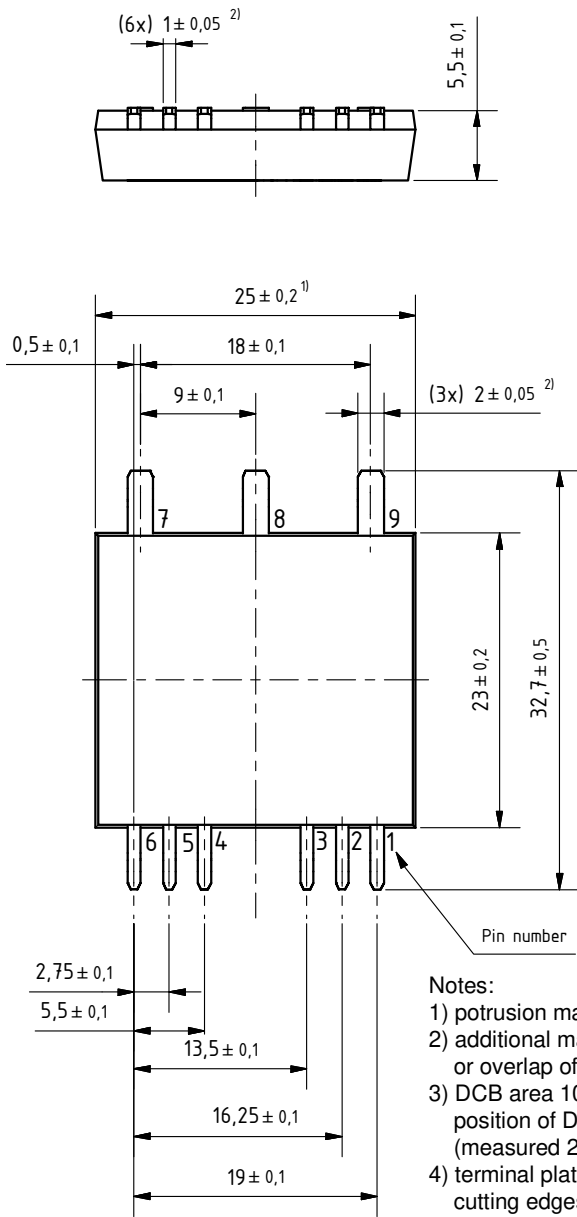


$V_{0\ max}$	threshold voltage	0.85	V
$R_{0\ max}$	slope resistance *	17	mΩ

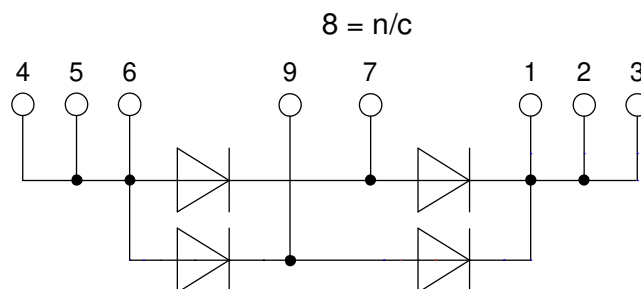


**Outlines SMPD**

**A ( 8 : 1 )**



- Notes:
- 1) potrusion may add 0.2 mm max. on each side
  - 2) additional max. 0.05 mm per side by punching misalignment or overlap of dam bar or bending compression
  - 3) DCB area 10 to 50  $\mu\text{m}$  convex; position of DCB area in relation to plastic rim:  $\pm 25 \mu\text{m}$  (measured 2 mm from Cu rim)
  - 4) terminal plating: 0.2 - 1  $\mu\text{m}$  Ni + 10 - 25  $\mu\text{m}$  Sn (gal v.) cutting edges may be partially free of plating



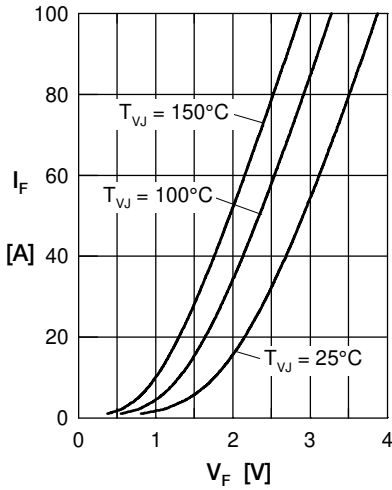
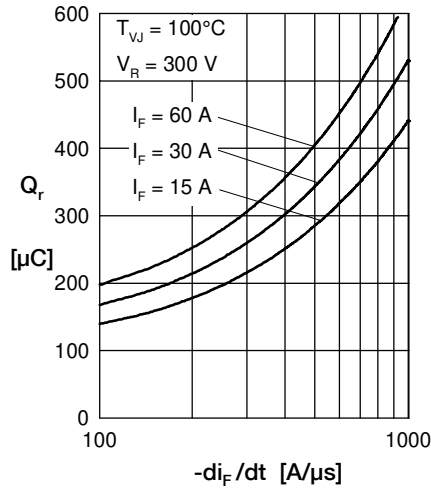
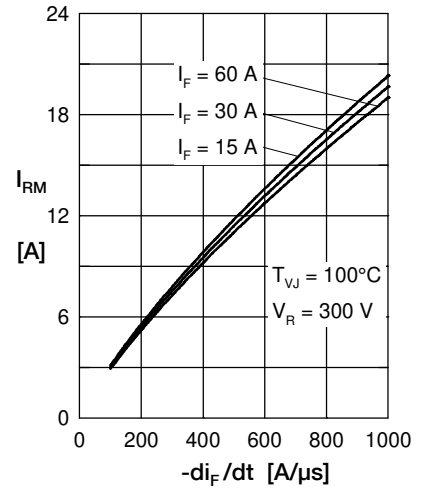
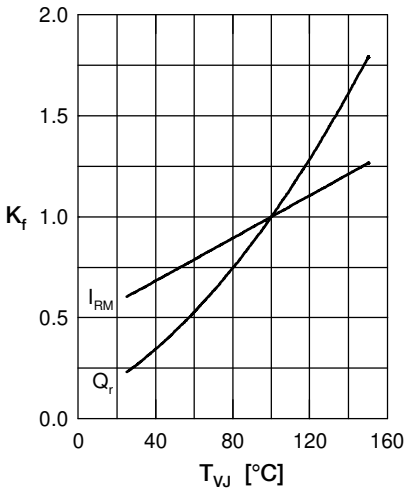
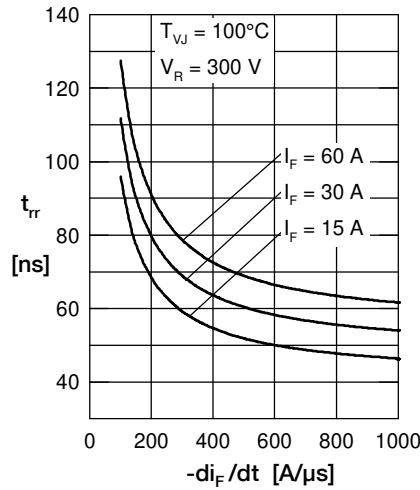
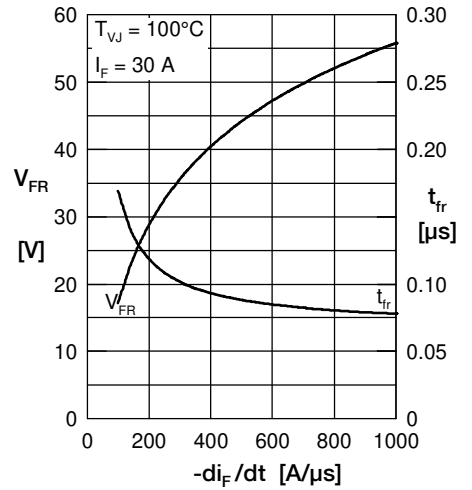
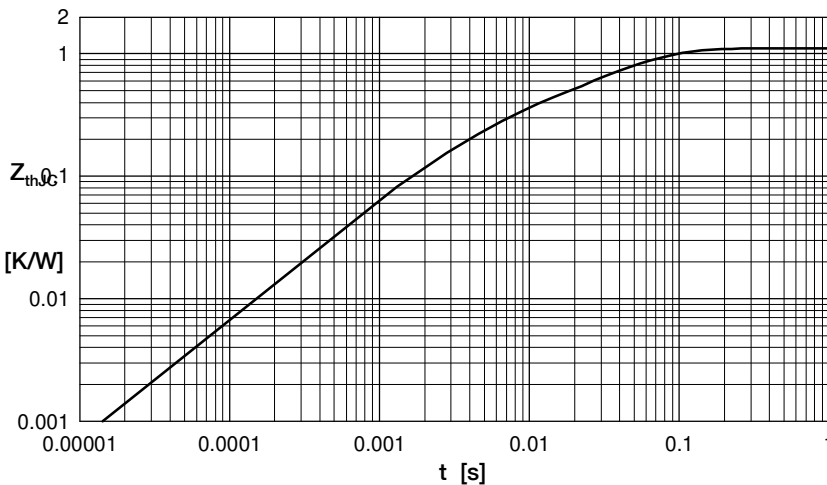
**Fast Diode**

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

 Fig. 2 Typ. reverse recov. 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  $t_{tr}$  versus  $-di_F/dt$ 

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


Fig. 7 Transient thermal impedance junction to case

 Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.465	0.0052
2	0.179	0.0003
3	0.256	0.0396