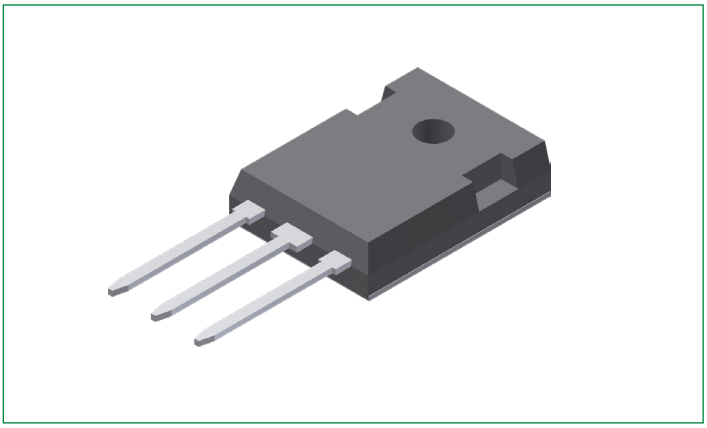
DPF120C600HB

600 V, 2 x 60 A High Performance Fast Recovery Diode

RoHS



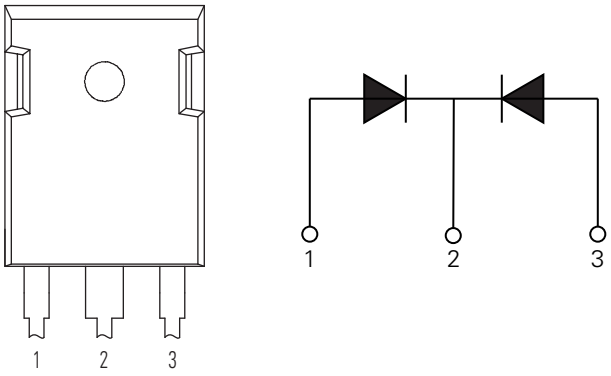
Description:

This 600 V, 2 x 60 A general purpose, power switching diode utilizes a diode array with common cathode configuration assembled in a TO-247 package.

This device belongs to the HiPerFRED (High-Performance Fast Recovery Diode) series that features planar passivated chips, very low leakage current, and very short recovery time. These features make the HiPerFRED series suitable for high-frequency applications such as battery chargers, PFC, and high-frequency output rectifiers.

Littelfuse power switching diodes can be integrated with other power semiconductors to provide complete power solutions for a wide range of applications.

Pinout Diagram



1: Anode; **2:** Cathode; **3** Anode

Features:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behavior
- Very low I_{RM} values
- Very soft recovery behavior
- Avalance voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Epoxy meets UL 94V-0
- Low I_{RM} reduces:
  - Power dissipation within the diode
  - Turn-on loss in the commutating switch

Applications:

- Antiparallel diode for high frequency switching devices
- Anti-saturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in Switch Mode Power Supplies (SMPS)
- Uninterruptable Power Supplies (UPS)

Product Summary

Characteristic	Value	Unit
V_{RRM}	600	V
I_{FAV}	2 x 60	A
t_{rr}	40	ns

Maximum Ratings

Symbol	Characteristics	Conditions	Value	Units
V_{RRM}	Repetitive Reverse Blocking Voltage	T_{VJ} = 25°C	600	V
I_{RMS}	RMS Current	per terminal	70	A
I_{FAV}	Average Forward Current	T_C = 95°C, T_{VJ} = 175°C; rectangular d = 0.5	60	A
I_{FSM}	Forward Surge Current	t = 10 ms; (50 Hz), sine; V_R = 0 V, T_{VJ} = 45°C	500	A
T_{stg}	Storage Temperature	–	–55 to +150	°C
T_{OP}	Operation Temperature	–	–55 to +150	°C
T_{VJ}	Virtual Junction Temperature	–	–55 to +175	°C
P_{tot}	Total Power Dissipation	T_C = 25°C	214	W

Thermal Specifications

Symbol	Characteristic	Value			Unit
		Min.	Typ.	Max.	
R_{thJC}	Maximum Thermal Resistance, Junction to Case	–	–	0.70	°C/W
R_{thCH}	Maximum Thermal Resistance, Case to Heatsink	–	0.25	–	°C/W

Electrical Characteristics

Static Characteristics

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
I_R	Reverse Leakage Current	T_{VJ} = 25°C	$V_R = V_{RRM}$	–	–	20	µA
		T_{VJ} = 125°C		–	150	600	
V_F	Forward Voltage	T_{VJ} = 25°C	I_F = 50 A	–	1.6	1.9	V
			I_F = 100 A	–	1.89	–	
		T_{VJ} = 125°C	I_F = 50 A	–	1.3	1.44	
			I_F = 100 A	–	1.66	–	
V_{FO}	Threshold Voltage	T_{VJ} = 175°C		–	–	0.78	V
r_F	Slope Resistance			–	–	8.7	mΩ
C_J	Junction Capacitance	V_R =200 V		–	82	–	pF

Dynamic Characteristics

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
Q_{rr}	Reverse Recovery Charge	T_{VJ} = 25°C		–	0.5	–	µC
		T_{VJ} = 125°C		–	1.9	–	
I_{RM}	Reverse Recovery Current	T_{VJ} = 25°C	I_F = 50 A; V_R = 300 V di/dt = 800 A/µs	–	20	–	A
		T_{VJ} = 125°C		–	37	–	
t_{rr}	Reverse Recovery Time	T_{VJ} = 25°C		–	40	–	ns
		T_{VJ} = 125°C		–	90	–	

Characteristic Curves

Figure 1. Forward Characteristics

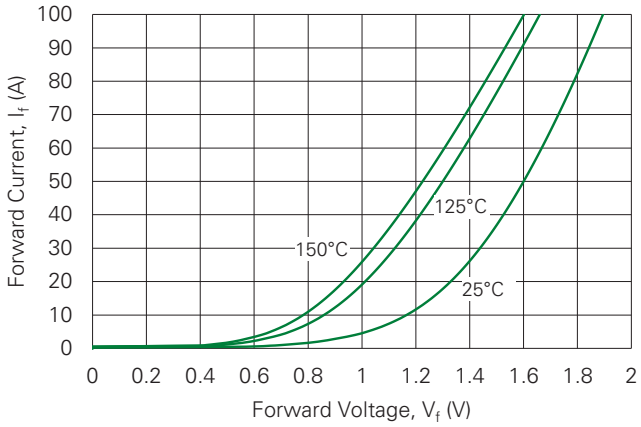


Figure 2. Junction Capacitance vs. Reverse Voltage

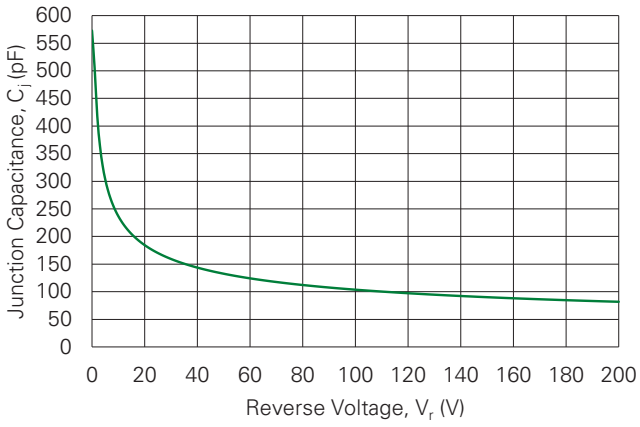


Figure 3. Power Dissipation vs. Temperature

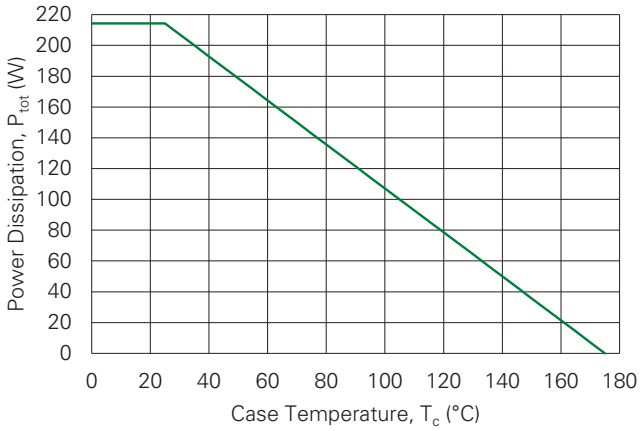


Figure 4. Current Derating Curve

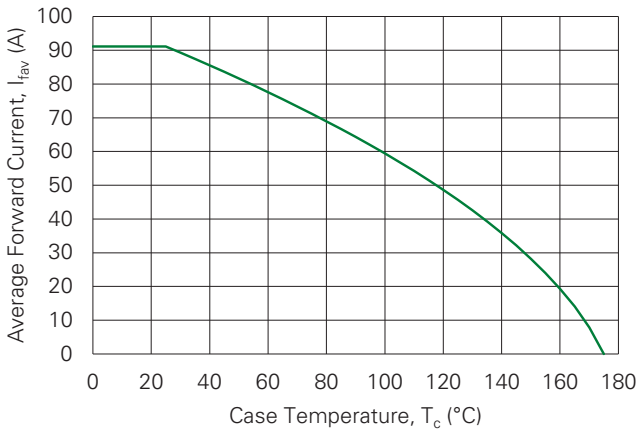
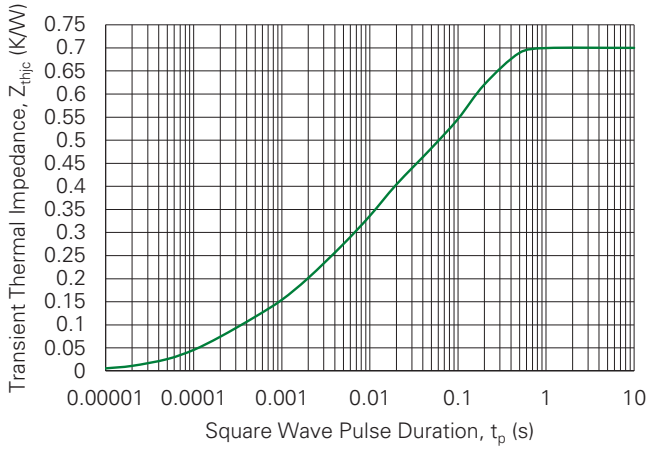
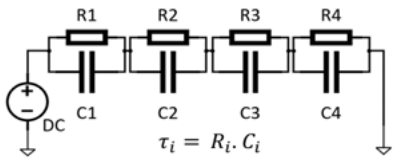


Figure 5. Transient Thermal Impedance





$$\tau_i = R_i . C_i$$

$$Zth(t) = \sum_i R_i \left[1 - e^{\left(-\frac{t}{\tau_i}\right)}\right]$$

i	1	2	3	4
R_j	0.078	0.116	0.206	0.3
T_j	0.00016	0.0015	0.011	0.15

Revised: TK.12/27/2023

Figure 6. Reverse Recovery Charge vs. di/dt

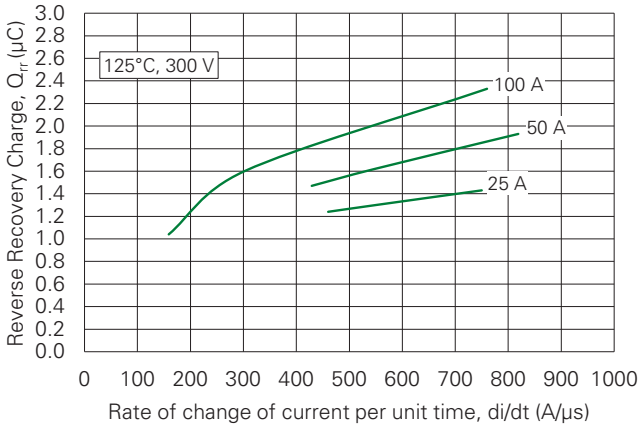


Figure 7. Reverse Recovery Current vs. di/dt

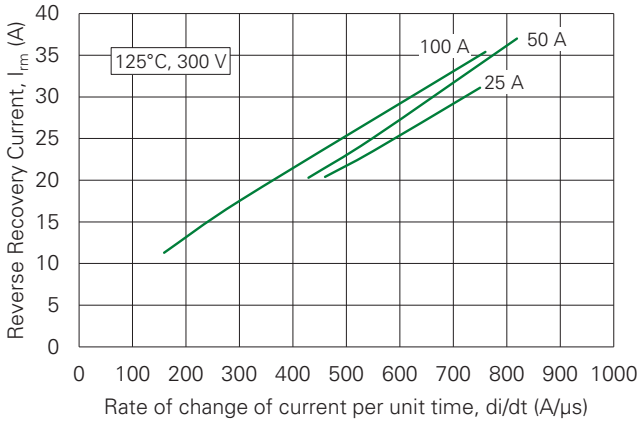


Figure 8. Reverse Recovery Time vs. di/dt

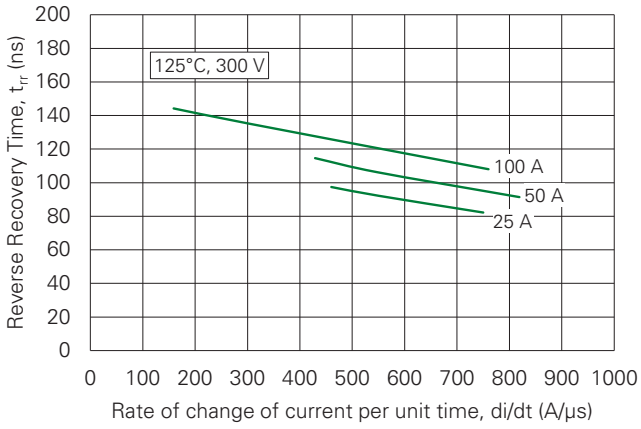


Figure 9. Recovery Characteristics vs. Temperature

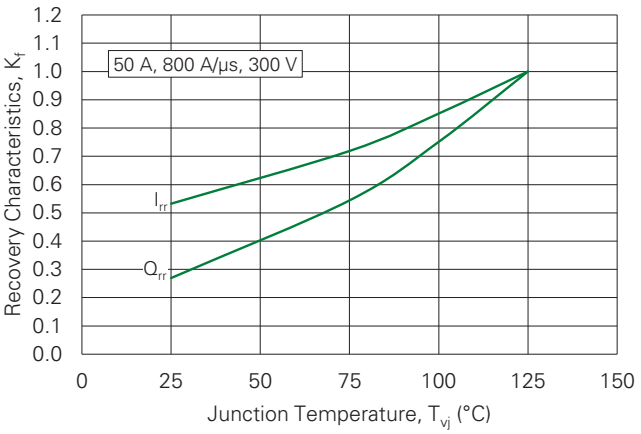
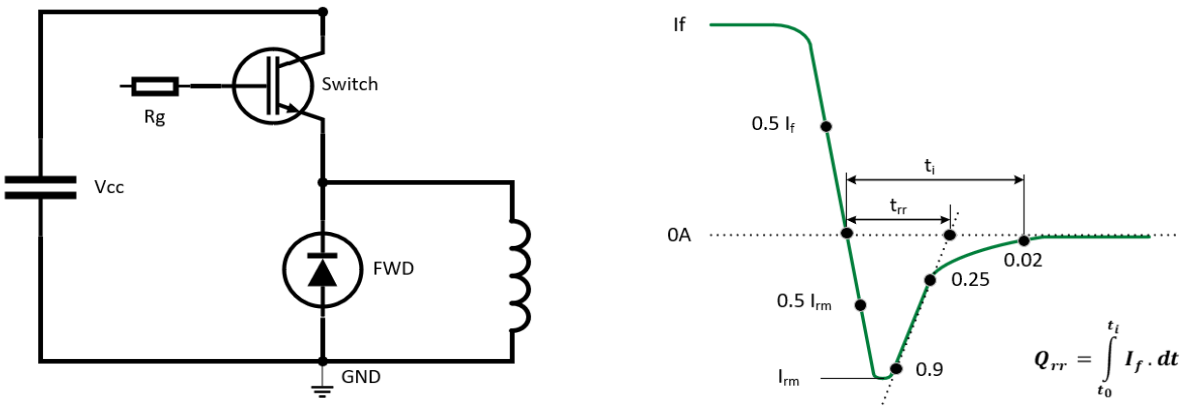
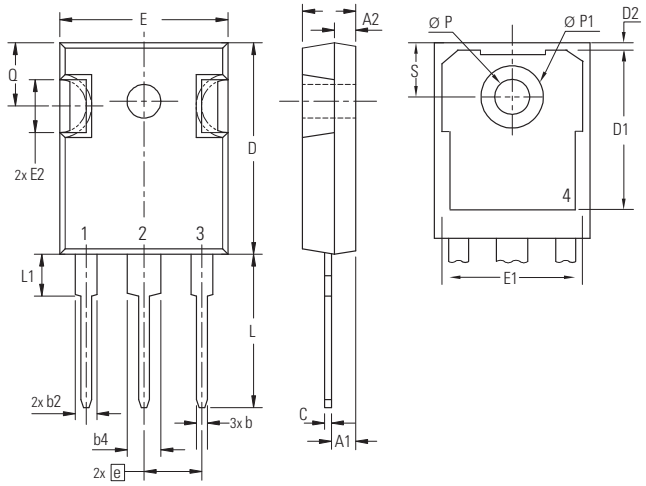


Figure 10. Test Circuit and Waveform Definition

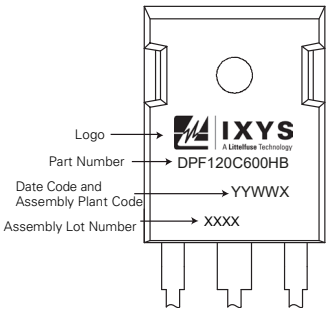


Part Outline Drawing (TO-247-3L)



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	4.70	5.30	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	20.79	21.45	0.819	0.845
D1	13.07	–	0.515	–
D2	0.51	1.35	0.020	0.053
e	5.45 BSC		0.215 BSC	
E	15.48	16.24	0.610	0.640
E1	13.45	–	0.530	–
E2	4.31	5.48	0.170	0.216
L	19.80	20.30	0.780	0.800
L1	–	4.49	–	0.177
Q	5.38	6.19	0.212	0.244
S	6.14 BSC		0.242 BSC	
ØP	3.55	3.65	0.140	0.144
ØP1	–	7.39	–	0.29

Part Numbering and Marking



D	=	Diode
P	=	HiPerFRED
F	=	Ultra Fast
120	=	Current Rating [A]
C	=	Common Cathode
600	=	Reverse Voltage [V]
HB	=	Package (TO-247-3L)

Packing Options

Part Number	Marking	Packing Mode	M.O.Q.
DPF120C600HB	DPF120C600HB	Tube (30 pcs)	300

Packing Specifications (Tube Option)