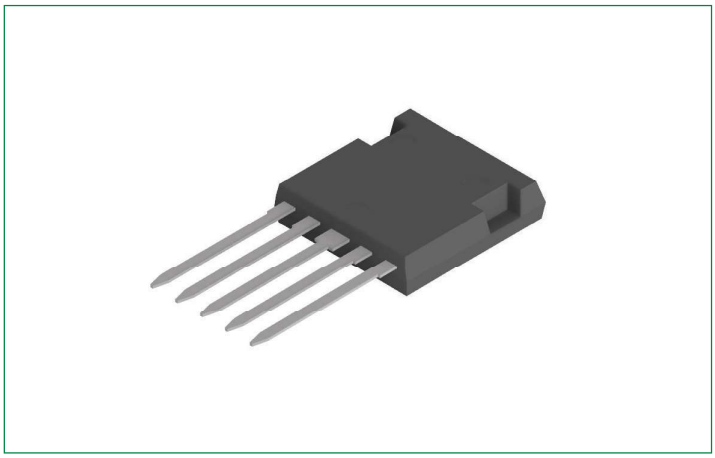
DPF30U200FC

200 V, 30 A High Performance Fast Recovery Diode



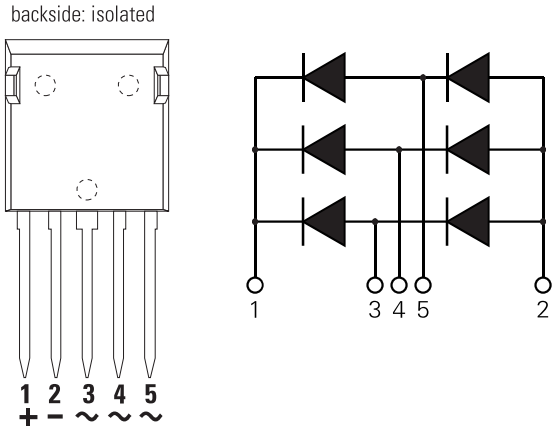
Description:

This 200 V, 30 A three-phase diode bridge rectifier integrates high-performance fast recovery diodes packaged in i4-Pac 5-Leads and is commonly used as a rectifier in Switch Mode Power Supplies (SMPS).

This device belongs to the High-Performance Fast Recovery Diode (HiPerFRED) series that features planar passivated chips, a 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 (i4-Pac-5L)



Features:

- Planar passivated chips
- Very low leakage current
- Short recovery time
- Soft recovery behavior
- Avalance voltage rated for reliable operation
- Low I_{RM} values
- Recognized as an Electrically Isolated Semiconductor Device (file number E72873)
- Soft reverse recovery for low EMI/RFI

Benefits:

- Low I_{RM} reduces power dissipation within the diode and turn-on loss in the commutating switch
- Improved thermal behavior

Applications:

- Rectifiers in Switch Mode Power Supplies (SMPS)

Product Summary

Characteristic	Value	Unit
V_{RRM}	200	V
I_{DAV}	30	A
t_{rr}	25	ns

Package:

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

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Maximum Ratings

Symbol	Characteristics	Conditions	Value	Units
V_{RRM}	Repetitive Reverse Blocking Voltage	T_{vj} = 25 °C	200	V
I_{DAV}	Bridge Output Current	T_C = 120 °C, T_{vj} = 175 °C; rectangular d = 1/3	30	A
I_{FSM}	Non-repetitive Surge Forward Current	t_p = 10 ms; (50 Hz), Half sine pulse; V_R = 0 V, T_{vj} = 45 °C	150	A
T_{stg}	Storage Temperature Range	–	–55 to +150	°C
T_{vj}	Virtual Junction Temperature Range	–	–55 to +175	°C
T_{OP}	Operating Temperature Range	–	–55 to +150	°C
P_{tot}	Total Power Dissipation	T_C = 25 °C	58	W

Thermal Specifications

Symbol	Characteristic	Value			Units
		Min.	Typ.	Max.	
R_{thJC}	Thermal Resistance, Junction to Case	–	–	2.6	K/W
R_{thCH}	Thermal Resistance, Case to Heatsink	–	1	–	K/W

Electrical Characteristics – Static

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
I_R	Reverse Current	T_{vj} = 25 °C	$V_R = V_{RRM}$	–	–	20	µA
		T_{vj} = 125 °C		–	10	100	
V_F	Forward Voltage	T_{vj} = 25 °C	I_F = 15 A	–	1	1.15	V
			I_F = 30 A	–	1.14	1.38	
		T_{vj} = 125 °C	I_F = 15 A	–	0.9	1.05	
			I_F = 30 A	–	1.06	1.32	
V_{FO}	Threshold Voltage	T_{vj} = 175 °C		–	–	0.71	V
r_F	Slope Resistance	T_{vj} = 175 °C		–	–	18.5	mΩ
C_J	Junction Capacitance	V_R = 200 V		–	55	–	pF

Electrical Characteristics – Dynamic

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
Q_{rr}	Reverse Recovery Charge	T_{vj} = 25 °C	I_F = 15 A; V_R = 100 V di/dt = 200 A/µs	–	60	–	nC
		T_{vj} = 125 °C		–	200	–	
I_{RM}	Reverse Recovery Current	T_{vj} = 25 °C		–	4	–	A
		T_{vj} = 125 °C		–	6.7	–	
t_{rr}	Reverse Recovery Time	T_{vj} = 25 °C		–	25	–	ns
		T_{vj} = 125 °C		–	51	–	

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Package

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
I_{RMS}	RMS Current	per terminal		–	–	50	A
F_C	Mounting Force with Clip	–		20	–	120	N
G	Weight	–		–	6	–	g
$d_{Spp/App}$	Creepage Distance on Surface/ Striking Distance through Air	terminal to terminal		1.7	–	–	mm
$d_{Spb/Apb}$		terminal to backside		5.1	–	–	
V_{isol}	Isolation Voltage	1 second	50 Hz, RMS; $I_{isol} \leq 1$ mA	3000	–	–	V
		1 minute		2500	–	–	

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Characteristic Curves (per Diode)

Figure 1. Forward Characteristics

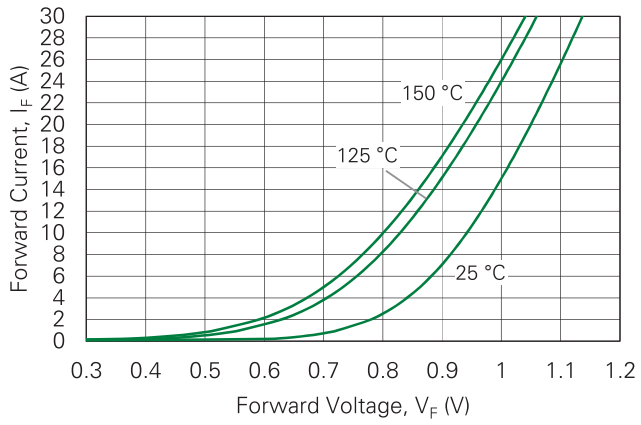


Figure 2. Junction Capacitance vs. Reverse Voltage

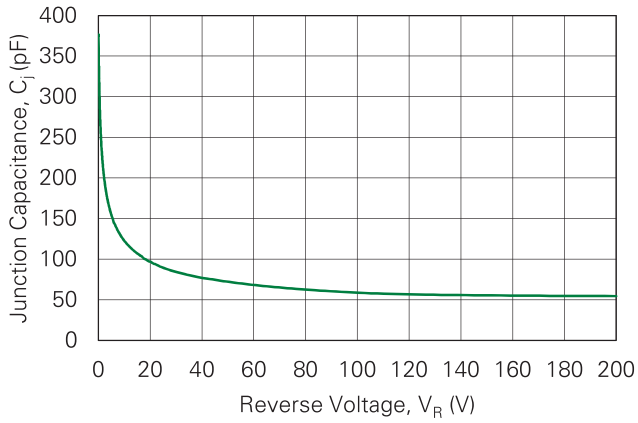


Figure 3. Power Dissipation vs. Temperature

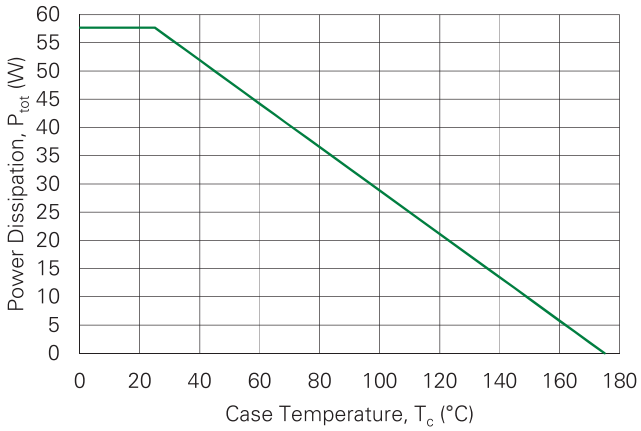


Figure 4. Current Derating Curve

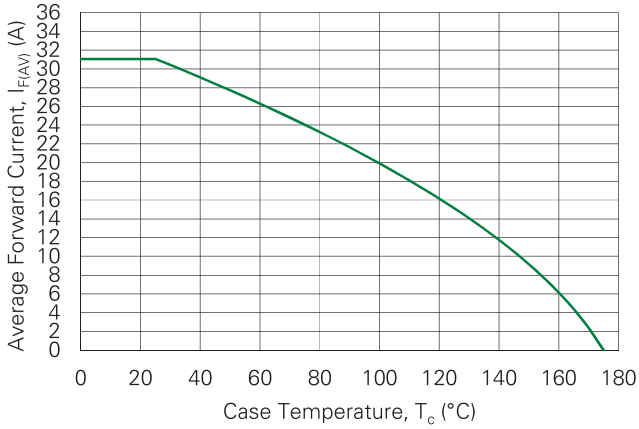
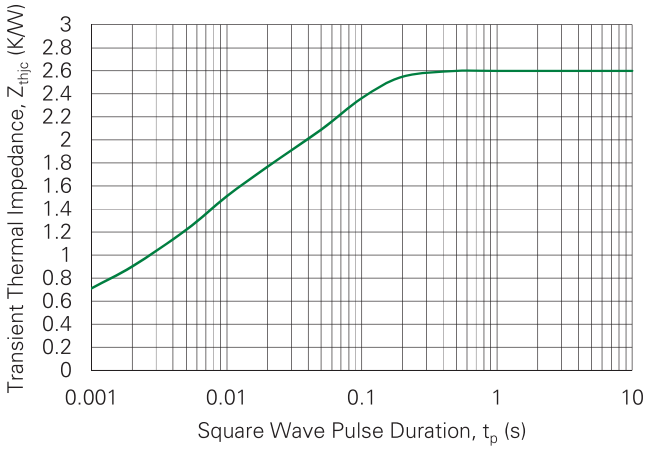
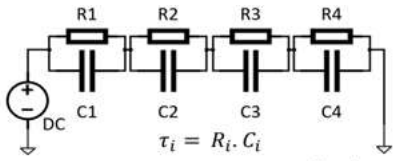


Figure 5. Transient Thermal Impedance





$$\tau_i = R_i . C_i$$

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

i	1	2	3	4
R_j	0.01	0.05	0.09	1.1
T_j	0.00001	0.00045	0.0055	0.065

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Figure 6. Reverse Recovery Charge vs. di/dt

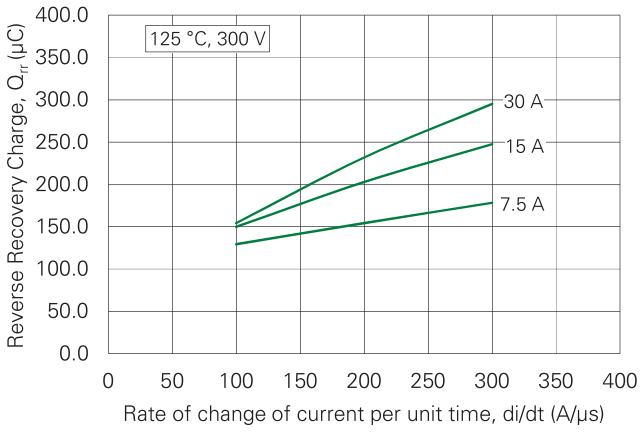


Figure 7. Reverse Recovery Current vs. di/dt

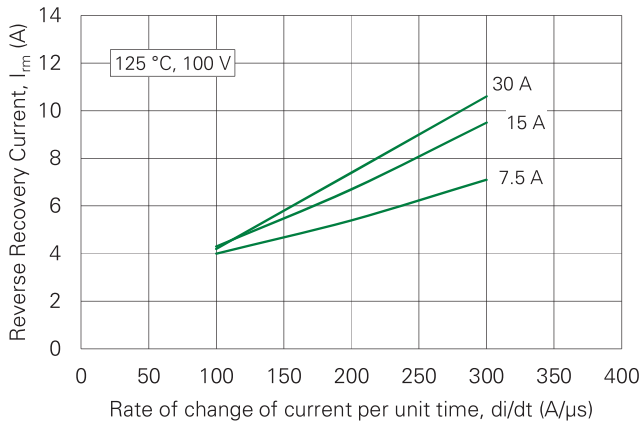


Figure 8. Reverse Recovery Time vs. di/dt

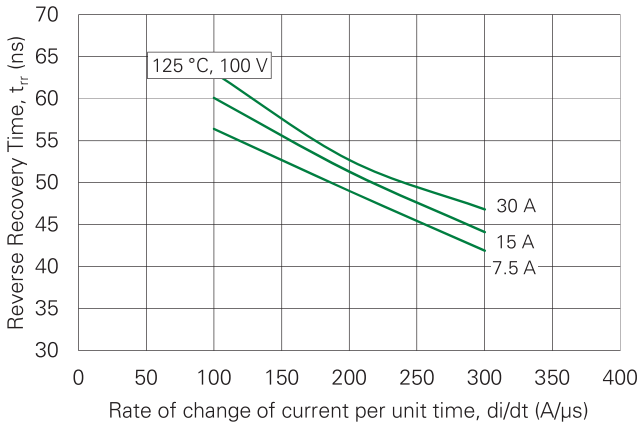
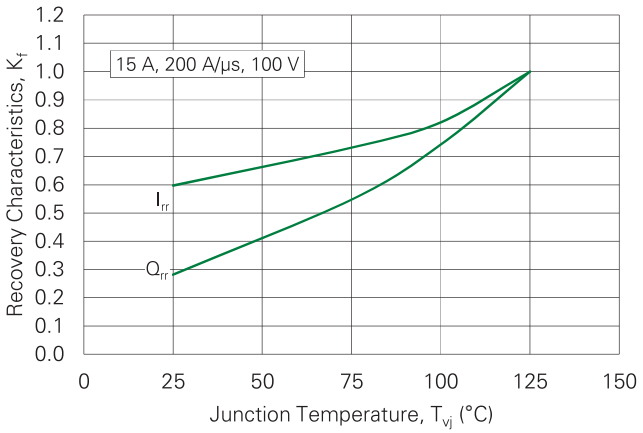
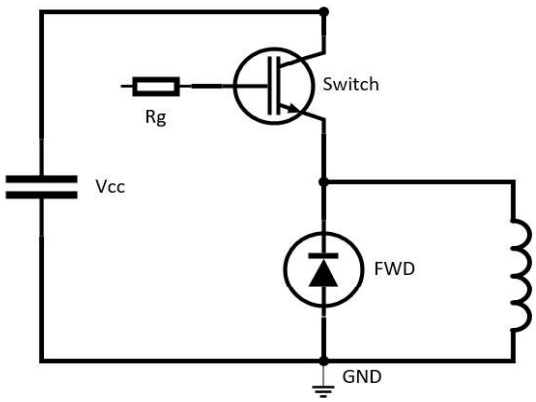
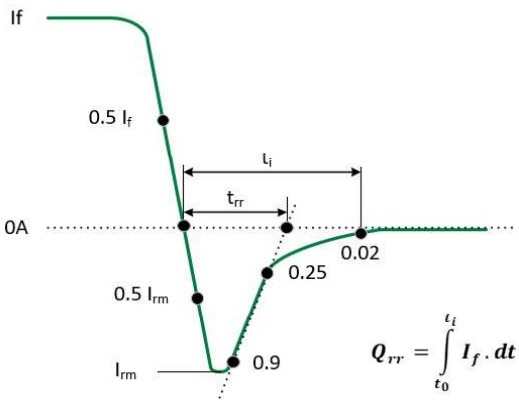


Figure 9. Recovery Characteristics vs. Temperature







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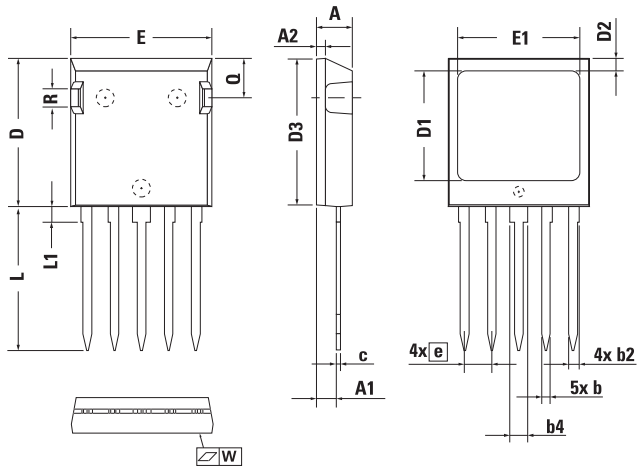
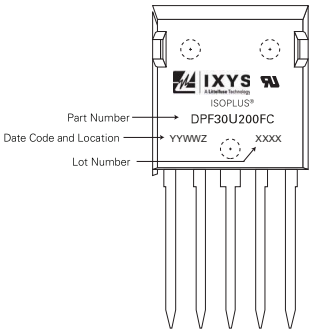
Part Outline Drawing (i4-Pac-5L)



Note: The convex bow of substrate is typically <0.05 mm over plastic surface level of the device's bottom side.

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	4.83	5.21	0.190	0.205
A1	2.59	3.00	0.102	0.118
A2	1.17	2.16	0.046	0.085
b	1.14	1.40	0.045	0.055
b2	1.47	1.73	0.058	0.068
b4	2.54	2.79	0.100	0.110
c	0.51	0.74	0.020	0.029
D	20.80	21.34	0.819	0.840
D1	14.99	15.75	0.590	0.620
D2	1.65	2.03	0.065	0.080
D3	20.30	20.70	0.799	0.815
E	19.56	20.29	0.770	0.799
E1	16.76	17.53	0.660	0.690
e	3.81 BSC		0.150 BSC	
L	19.81	21.34	0.780	0.840
L1	2.11	2.59	0.083	0.102
Q	5.33	6.20	0.210	0.244
R	2.54	4.57	0.100	0.180
W	–	0.10	–	0.004

Part Numbering and Marking

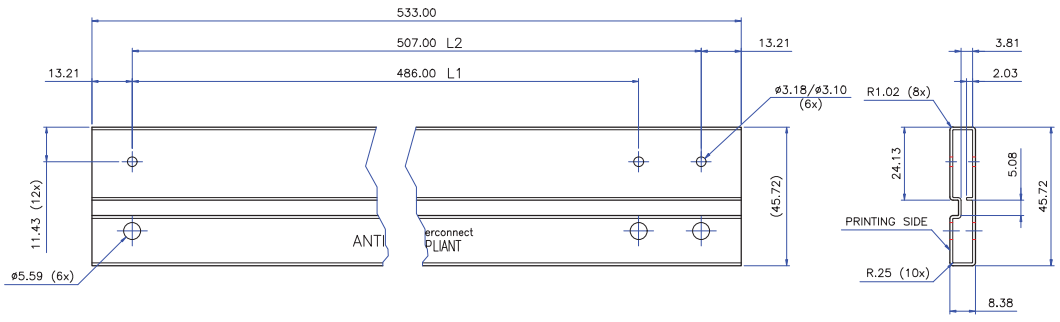


D	=	Diode
P	=	HiPerFRED
F	=	Ultra Fast
30	=	Current Rating (A)
U	=	3~ Rectifier Bridge
200	=	Reverse Voltage (V)
FC	=	Package (i4-Pac-5L)

Packing Options

Part Number	Marking	Packing Mode	M.O.Q.
DPF30U200FC	DPF30U200FC	Tube (25 pcs)	250

Packing Specifications (Tube Option)



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