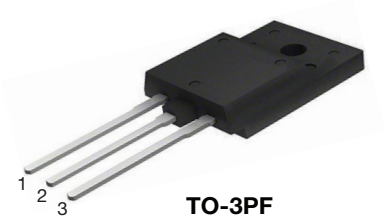
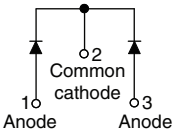
Hyperfast Rectifier, 2 x 15 A FRED Pt® G5



TO-3PF



FEATURES

- Best in class forward voltage drop and switching losses trade off
- Optimized for high speed operation
- 175 °C maximum operating junction temperature
- Polyimide passivation chip for high reliability standard
- Fully isolated package (V_{INS} = 2500 V_{RMS})
- True 2 pin package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

HALOGEN FREE

LINKS TO ADDITIONAL RESOURCES

3D Models

Application Notes

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 15 A
V_R	600 V
V_F at I_F at 125 °C	1.3 V
t_{rr} (typ.)	19 ns
T_J max.	175 °C
Package	TO-3PF
Circuit configuration	Common cathode

DESCRIPTION / APPLICATIONS

Featuring a unique combination of low conduction and switching losses, this rectifier is the right choice for soft switched and resonant converters, as well as medium frequency hard switching converters. This device is specifically designed to improve as output rectifier for DC/DC stage in resonant converters and as PFC rectifier for aircon and industrial power supplies.

MECHANICAL DATA

Case: TO-3PF
Molding compound meets UL 94 V-0 flammability rating

Terminals: matte tin plated leads, solderable per J-STD-002

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Repetitive peak reverse voltage	V_{RRM}		600	V
Average rectified forward current in DC, per leg	$I_{F(AV)}$	T_C = 110 °C, DC	15	A
Non-repetitive peak surge current, per leg	I_{FSM}	T_C = 25 °C, t_p = 10 ms, sine wave	205	
Operating junction and storage temperature	T_J, T_{Stg}		-55 to +175	°C

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	I_R = 100 µA	600	-	-	V
Forward voltage, per leg	V_F	I_F = 15 A	-	1.6	2.1	
		I_F = 15 A, T_J = 125 °C	-	1.3	-	
Reverse leakage current, per leg	I_R	V_R = V_R rated	-	-	10	µA
		T_J = 125 °C, V_R = V_R rated	-	-	500	
Junction capacitance, per leg	C_T	V_R = 600 V	-	19	-	pF

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time, per leg	t_{rr}	I_F = 1.0 A,dI_F/dt = 100 A/µs, V_R = 30 V		-	19	-	ns
		T_J = 25 °C	I_F = 10 A dI_F/dt = 1000 A/µs V_R = 400 V	-	23	-	
		T_J = 125 °C		-	36	-	
Peak recovery current, per leg	I_{RRM}	T_J = 25 °C		-	12	-	A
		T_J = 125 °C		-	20	-	
Reverse recovery charge, per leg	Q_{rr}	T_J = 25 °C		-	180	-	nC
		T_J = 125 °C		-	472	-	
Reverse recovery time, per leg	t_{rr}	T_J = 25 °C	I_F = 15 A dI_F/dt = 1000 A/µs V_R = 400 V	-	33	-	ns
		T_J = 125 °C		-	44	-	
Peak recovery current, per leg	I_{RRM}	T_J = 25 °C		-	13	-	A
		T_J = 125 °C		-	21	-	
Reverse recovery charge, per leg	Q_{rr}	T_J = 25 °C		-	220	-	nC
		T_J = 125 °C		-	578	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Thermal resistance, junction-to-case, per leg	R_{thJC}		-	-	3.1	°C/W
Weight			-	2.0	-	g
Mounting torque			4 (3.5)	-	6 (5.3)	kgf · cm (lbf · in)
Maximum junction and storage temperature range	T_J, T_{Stg}		-55	-	175	°C
Marking device		Case style TO-3PF	C5ZX3006FP			

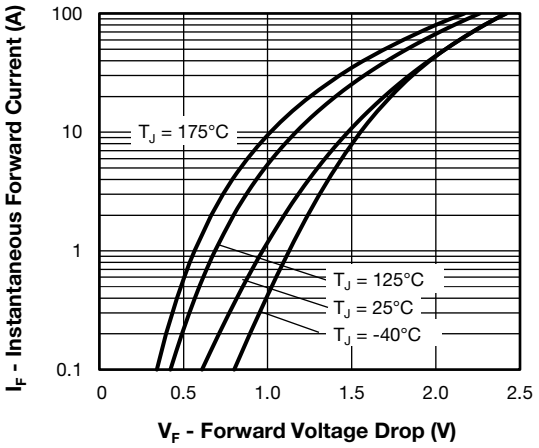


Fig. 1 - Forward Voltage Drop Characteristics, Per Leg

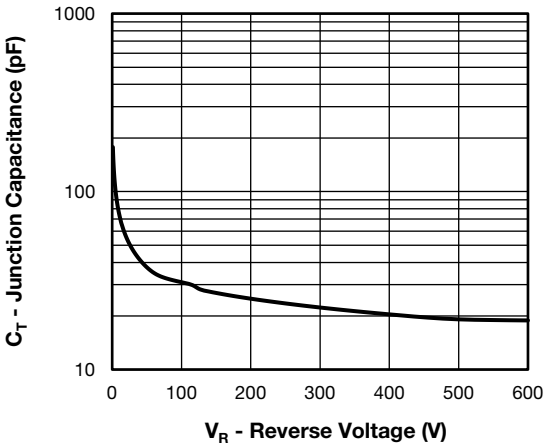


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, Per Leg

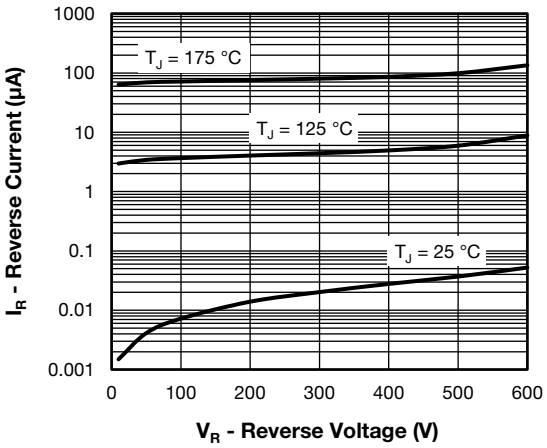


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage, Per Leg

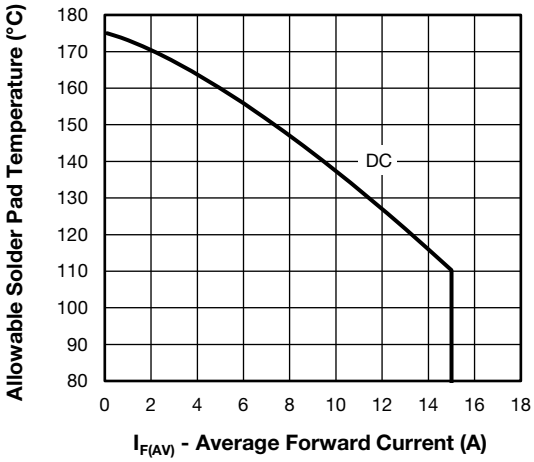


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current, Per Leg

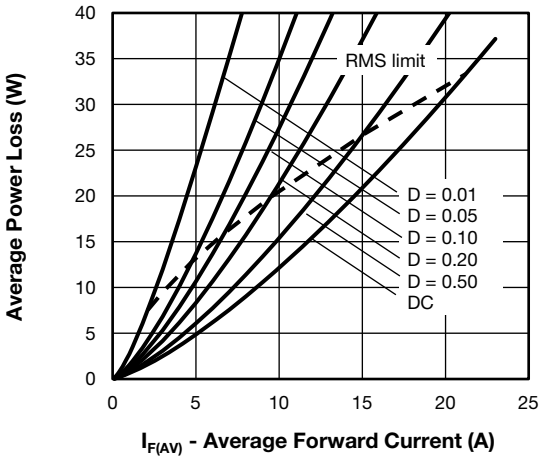


Fig. 5 - Forward Power Loss Characteristics, Per Leg

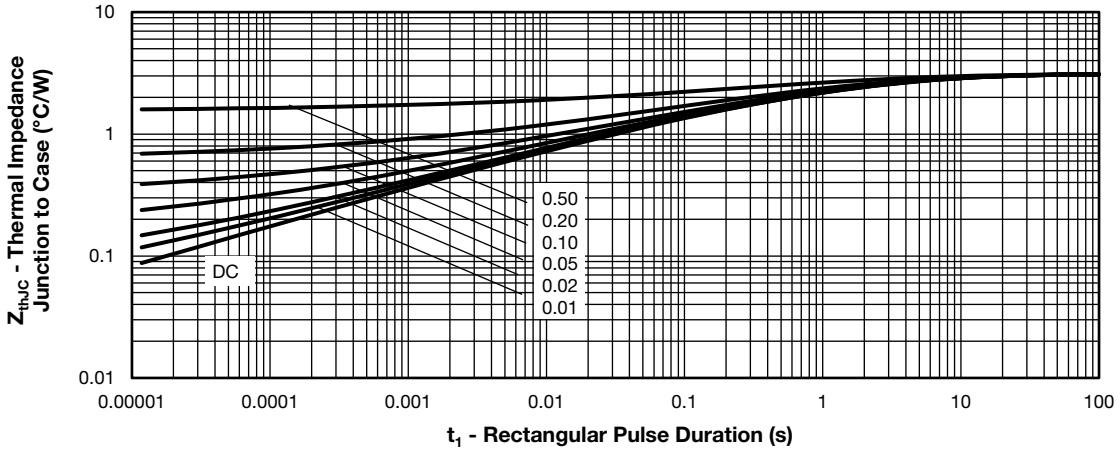


Fig. 6 - Transient Thermal Impedance, Junction to Case, Per Leg

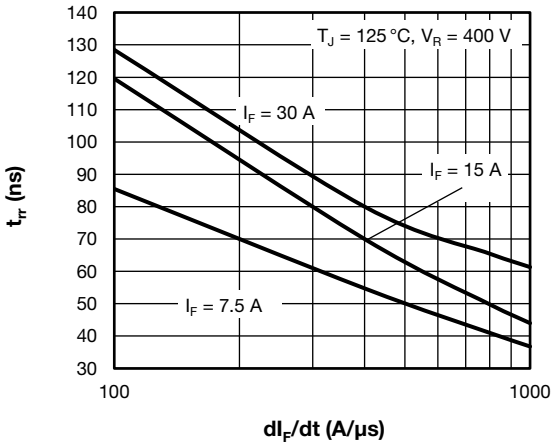


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt, Per Leg

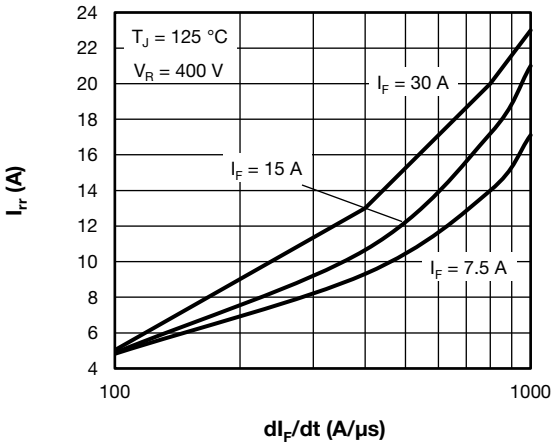


Fig. 9 - Typical Reverse Recovery Current vs. dI_F/dt, Per Leg

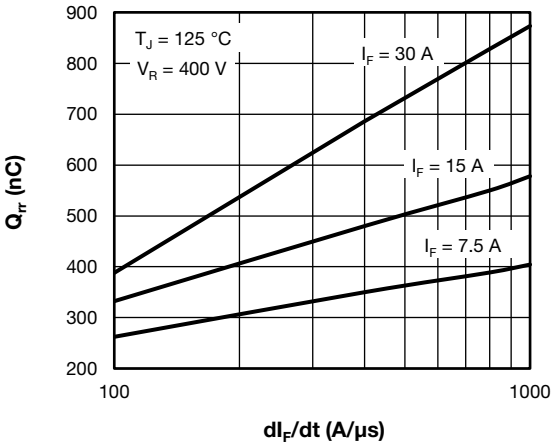


Fig. 8 - Typical Reverse Recovery Charge vs. dI_F/dt, Per Leg

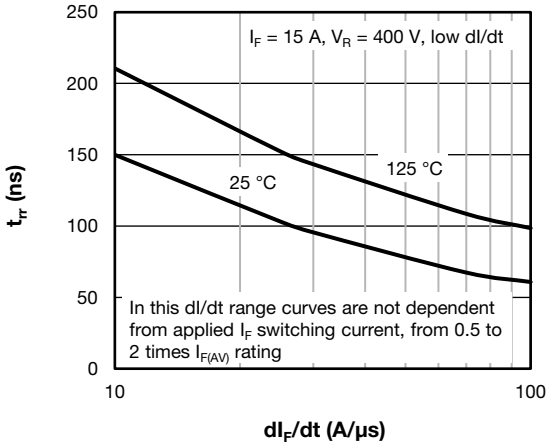


Fig. 10 - Typical Reverse Recovery Time vs. dI_F/dt, Per Leg

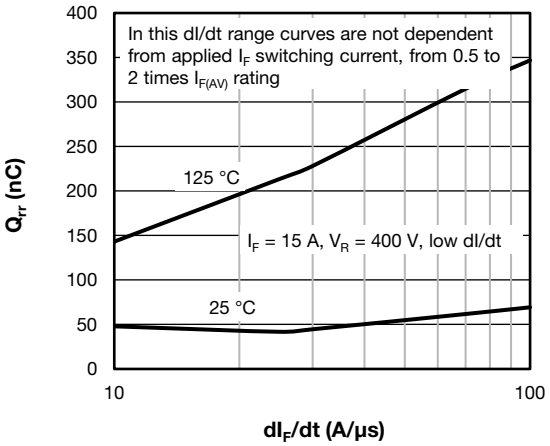


Fig. 11 - Typical Reverse Recovery Charge vs. dI_F/dt, Per Leg

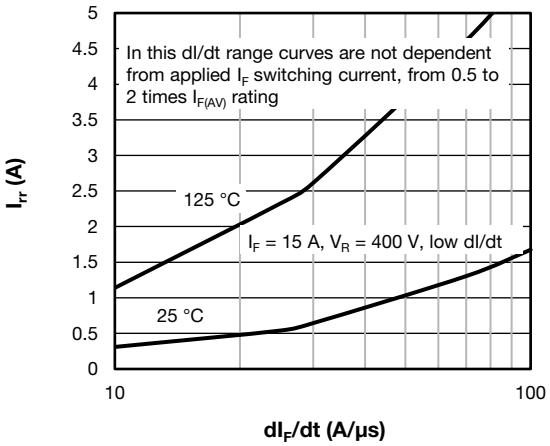


Fig. 12 - Typical Reverse Recovery Current vs. dI_F/dt, Per Leg

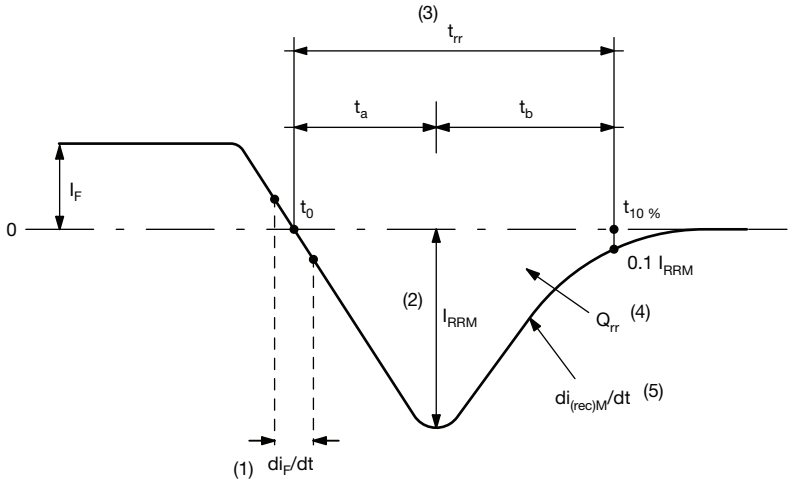


Fig. 13 - Reverse Recovery Waveform and Definitions

Notes

(1) di_F/dt - rate of change of current through zero crossing

(2) I_{RRM} - peak reverse recovery current

(3) t_{rr} - reverse recovery time measured from t_0, crossing point of negative going I_F, to point $t_{10\%}$, 0.1 I_{RRM}

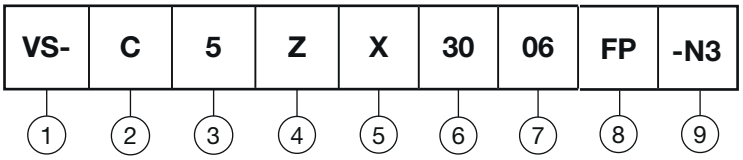
(4) Q_{rr} - area under curve defined by t_0 and $t_{10\ \%}$

$$Q_{rr} = \int_{t_0}^{t_{10\ \%}} I(t)dt$$

(5) $di_{(rec)}M/dt$ - peak rate of change of current during t_b portion of t_{rr}

ORDERING INFORMATION TABLE

Device code



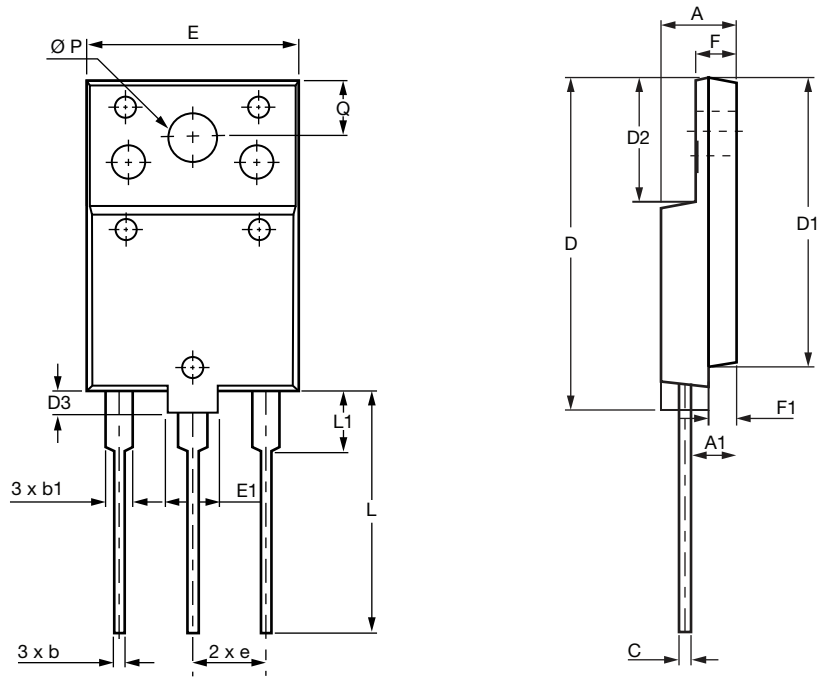
1 - Vishay Semiconductors product
2 - C = common cathode
3 - 5 = FRED generation 5
4 - Package:
Z = TO-3PF package
5 - X = hyperfast recovery
6 - Current rating (30 = 30 A)
7 - Voltage rating (06 = 600 V)
8 - FP = FullPAK
9 - Environmental digit:
N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER TUBE**	**BASE QUANTITY**	**PACKAGING DESCRIPTION**
VS-C5ZX3006FP-N3	25	300	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS		
Dimensions	TO-3PF	www.vishay.com/doc?96691
Part marking information	TO-3PF	www.vishay.com/doc?96690

TO-3PF

DIMENSIONS in millimeters



SYMBOL	MIN.	NOM.	MAX.
A	5.30	5.50	5.70
A1	3.10	3.30	3.50
b	0.65	0.85	0.95
b1	1.80	2.00	2.20
c	0.80	0.90	1.10
D	26.30	26.50	26.70
D1	22.80	23.00	23.20
D2	9.80	10.00	10.20
D3	1.80	2.00	2.20
E	15.30	15.50	15.70
E1	3.80	4.00	4.20
e		5.45 BSC	
F	2.80	3.00	3.20
F1	1.80	2.00	2.20
L	19.10	19.30	19.50
L1	4.20	4.50	5.20
Q	4.30	4.50	4.70
Ø P	3.40	3.60	3.80

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