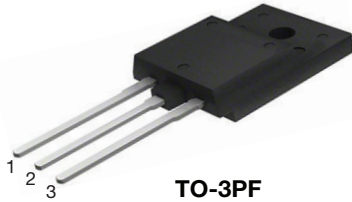
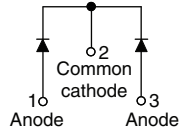


## Ultrafast Soft Recovery Diode, 2 x 15 A FRED Pt<sup>®</sup> Gen 4


**TO-3PF**

**FEATURES**

- Gen 4 FRED Pt technology
- Low  $I_{RRM}$  and reverse recovery charge
- Very low forward voltage drop
- Polyimide passivated chip for high reliability standard
- Fully isolated package ( $V_{INS} = 2500 V_{RMS}$ )
- 175 °C operating junction temperature
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$ per leg	15 A
$V_R$	600 V
$V_F$ at $I_F$	1.08 V
$t_{rr}$ typ.	37 ns
$T_J$ max.	175 °C
Package	TO-3PF
Circuit configuration	Common cathode

**DESCRIPTION**

Gen 4 Fred Pt technology, state of the art, ultralow  $V_F$ , soft switching optimized for Discontinuous (Critical) Mode (DCM) and IGBT F/W diode.

The minimized conduction loss, optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Peak repetitive reverse voltage	$V_{RRM}$		600	V
Average rectified forward current, per leg	$I_{F(AV)}$	$T_C = 120\text{ °C}$	15	A
Non-repetitive peak surge current, per leg	$I_{FSM}$	$T_C = 25\text{ °C}$ , $t_p = 8.3\text{ ms}$ half sine wave	180	
Operating junction and storage temperature	$T_J, T_{Stg}$		-55 to +175	°C

ELECTRICAL SPECIFICATIONS ( $T_J = 25\text{ °C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	$V_{BR}, V_R$	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Forward voltage	$V_F$	$I_F = 15\text{ A}$	-	1.3	1.6	
		$I_F = 30\text{ A}$	-	1.46	1.87	
		$I_F = 15\text{ A}, T_J = 150\text{ °C}$	-	1.08	1.3	
		$I_F = 30\text{ A}, T_J = 150\text{ °C}$	-	1.32	-	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	-	15	$\mu\text{A}$
		$T_J = 125\text{ °C}$ , $V_R = V_R$ rated	-	-	500	
Junction capacitance	$C_T$	$V_R = 600\text{ V}$	-	15	-	pF

<b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time, per leg	$t_{rr}$	$I_F = 1\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$		-	37	-	ns
		$T_J = 25\text{ }^\circ\text{C}$	$I_F = 15\text{ A}$ $di_F/dt = 1000\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}$	-	73	-	
		$T_J = 125\text{ }^\circ\text{C}$		-	83	-	
Peak recovery current, per leg	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 15\text{ A}$ $di_F/dt = 1000\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}$	-	13	-	A
		$T_J = 125\text{ }^\circ\text{C}$		-	21	-	
Reverse recovery charge, per leg	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 15\text{ A}$ $di_F/dt = 1000\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}$	-	500	-	nC
		$T_J = 125\text{ }^\circ\text{C}$		-	1100	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	$R_{thJC}$		-	-	3	$^\circ\text{C}/\text{W}$
Thermal resistance, case to heatsink	$R_{thCS}$		-	0.5	-	
Weight			-	6.2	-	g
			-	0.21	-	oz.
Mounting torque			4.0 (3.5)	-	6.0 (5.3)	kgf · cm (lbf · in)
Marking device		Case style TO-3PF	C4ZU3006FP			

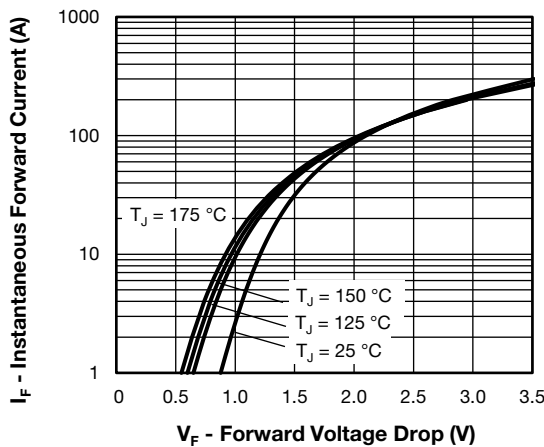


Fig. 1 - Typical Forward Voltage Drop Characteristics

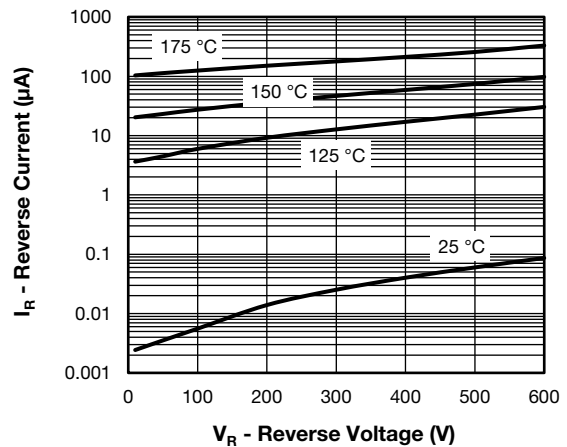


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

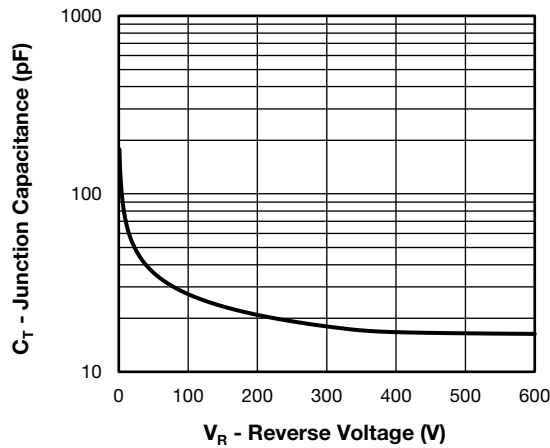


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

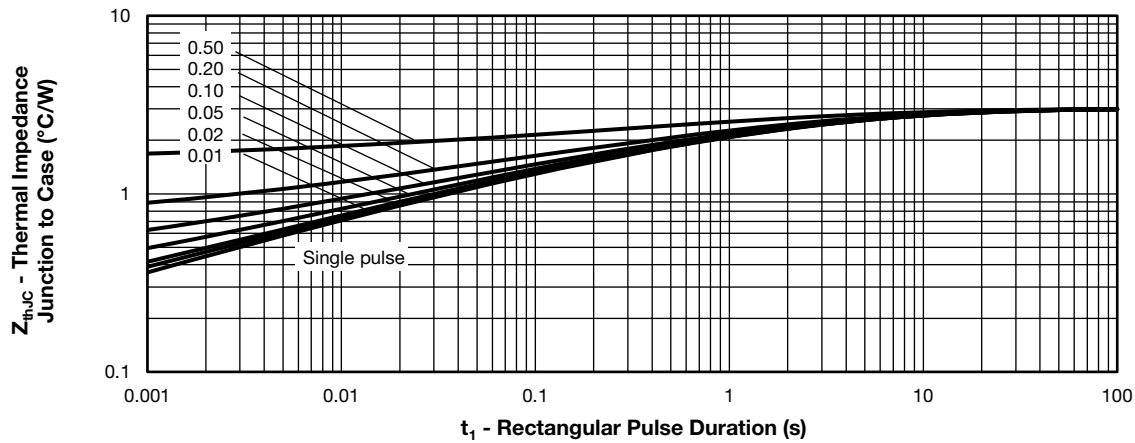


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics

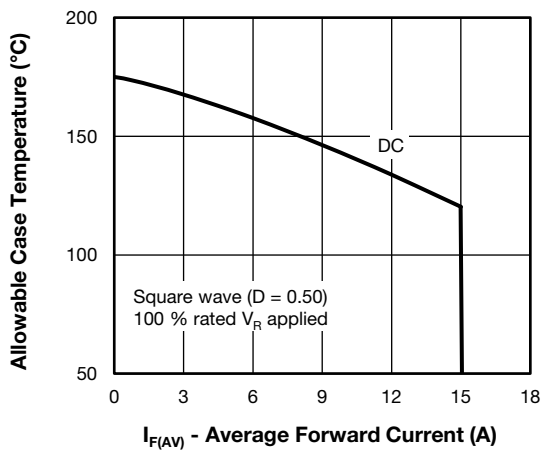


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

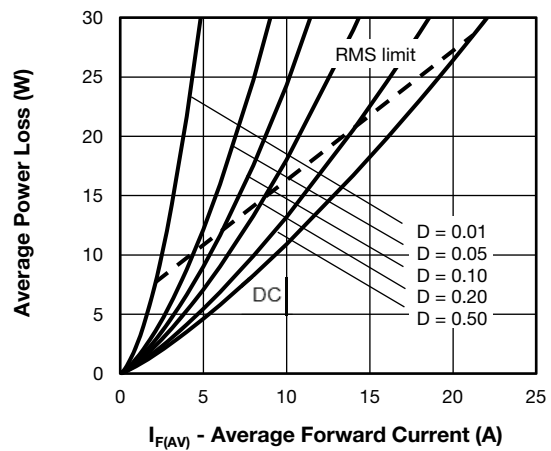


Fig. 6 - Forward Power Loss Characteristics

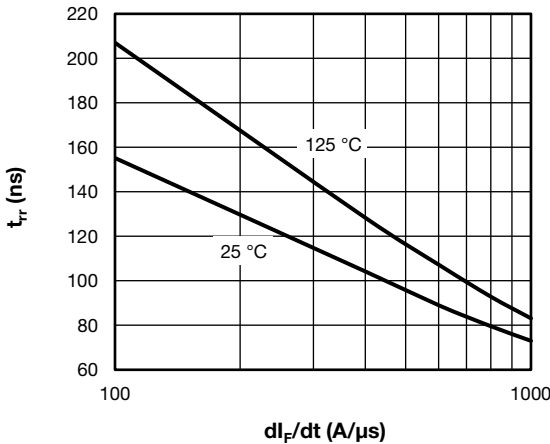


Fig. 7 - Typical Reverse Recovery Time vs. diF/dt

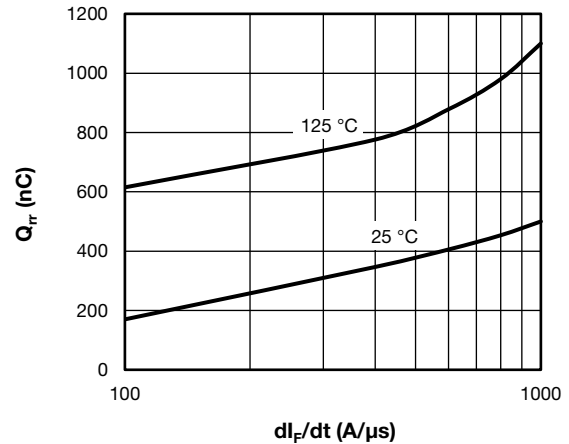


Fig. 8 - Typical Stored Charge vs. diF/dt

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>C</b>	<b>4</b>	<b>Z</b>	<b>U</b>	<b>30</b>	<b>06</b>	<b>FP</b>	<b>-M3</b>
	①	②	③	④	⑤	⑥	⑦	⑧	⑨
	<b>1</b>	-	Vishay Semiconductors product						
	<b>2</b>	-	Circuit configuration: C = common cathode						
	<b>3</b>	-	FRED Pt Gen 4						
	<b>4</b>	-	Z = TO-3PF package						
	<b>5</b>	-	Process type: U = ultrafast recovery						
	<b>6</b>	-	Current rating (30 = 2 x 15 A)						
	<b>7</b>	-	Voltage rating (06 = 600 V)						
	<b>8</b>	-	FULL-PAK						
	<b>9</b>	-	Environmental digit: -M3 = halogen-free, RoHS-compliant, terminations lead (Pb)-free						

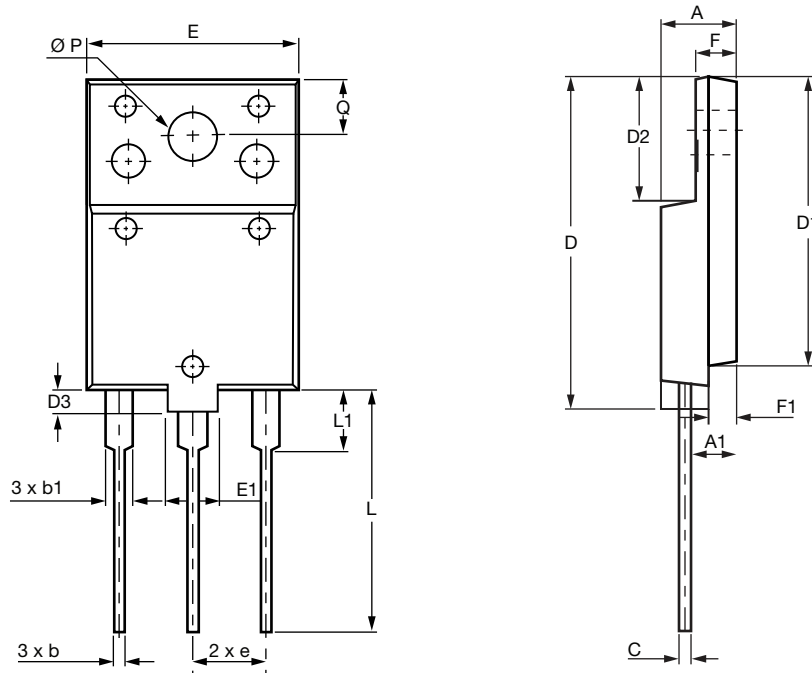
<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-C4ZU3006FP-M3	25	300	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>		
Dimensions	TO-3PF	<a href="http://www.vishay.com/doc?96691">www.vishay.com/doc?96691</a>
Part marking information	TO-3PF	<a href="http://www.vishay.com/doc?96690">www.vishay.com/doc?96690</a>



## 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
$\varnothing P$	3.40	3.60	3.80



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