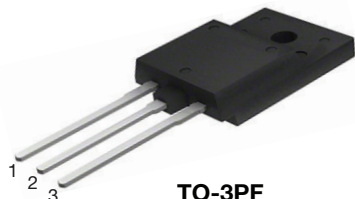
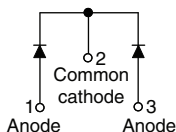


# Ultrafast Soft Recovery Diode, 2 x 15 A FRED Pt® Gen 4


**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

**DYNAMIC RECOVERY CHARACTERISTICS** ( $T_J = 25\text{ }^{\circ}\text{C}$  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
		$T_J = 25\text{ }^{\circ}\text{C}$	-	73	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	83	-	
Peak recovery current, per leg	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	13	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	21	-	
Reverse recovery charge, per leg	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	500	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	1100	-	

**THERMAL - MECHANICAL SPECIFICATIONS**

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			

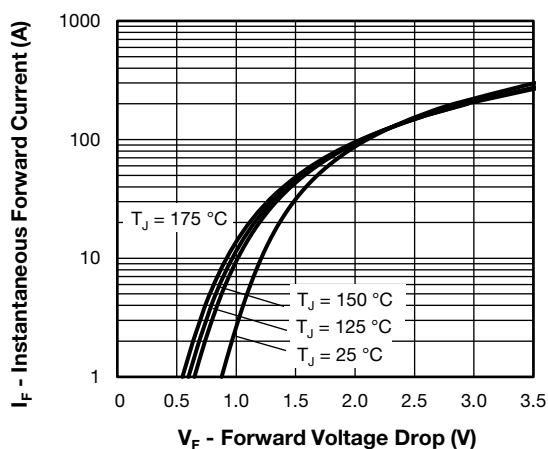


Fig. 1 - Typical Forward Voltage Drop Characteristics

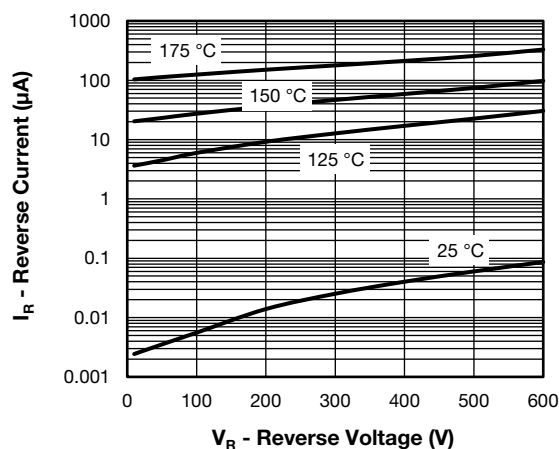


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

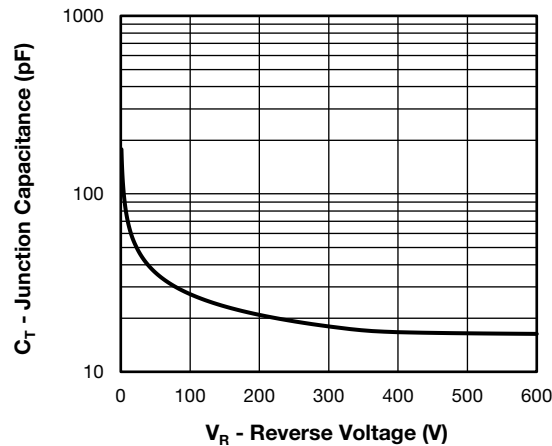


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

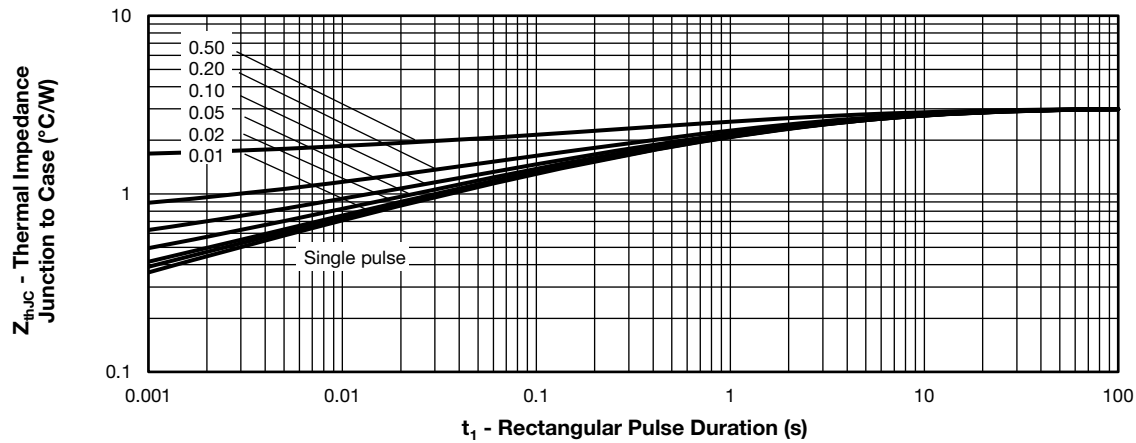
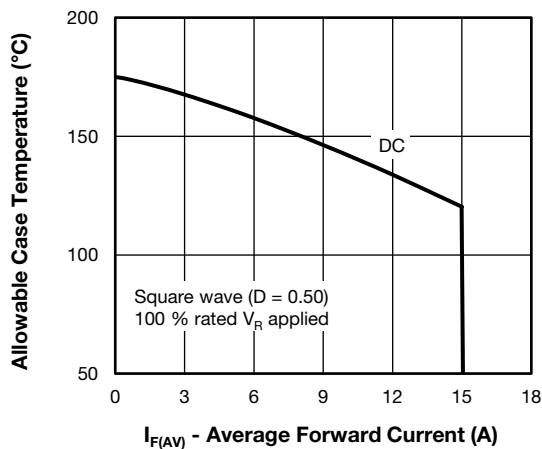

Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics


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

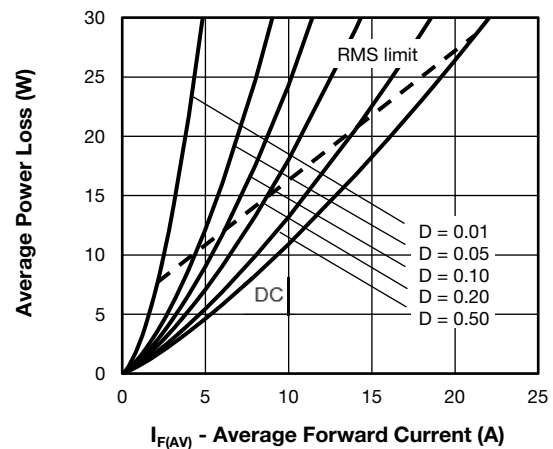
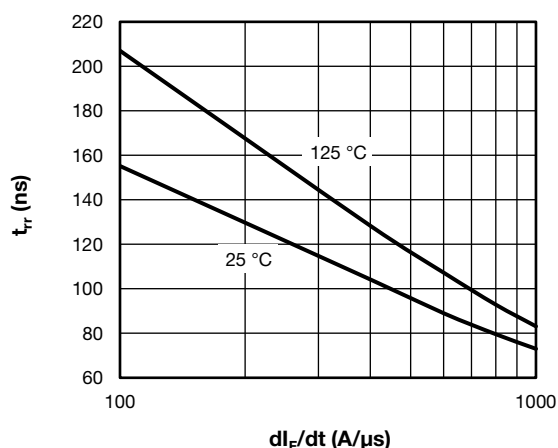
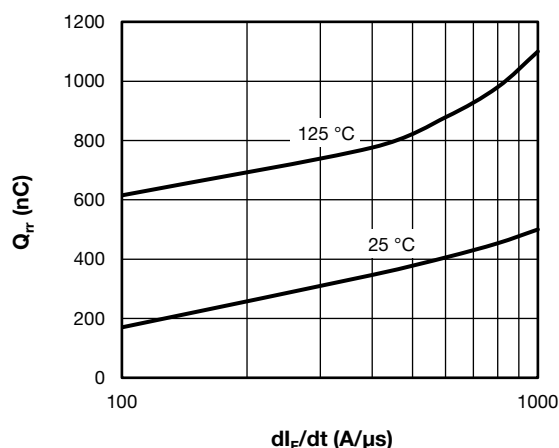


Fig. 6 - Forward Power Loss Characteristics


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$ 

Fig. 8 - Typical Stored Charge vs.  $dI_F/dt$ 

## ORDERING INFORMATION TABLE

Device code

VS-	C	4	Z	U	30	06	FP	-M3
1	2	3	4	5	6	7	8	9

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

## ORDERING INFORMATION (Example)

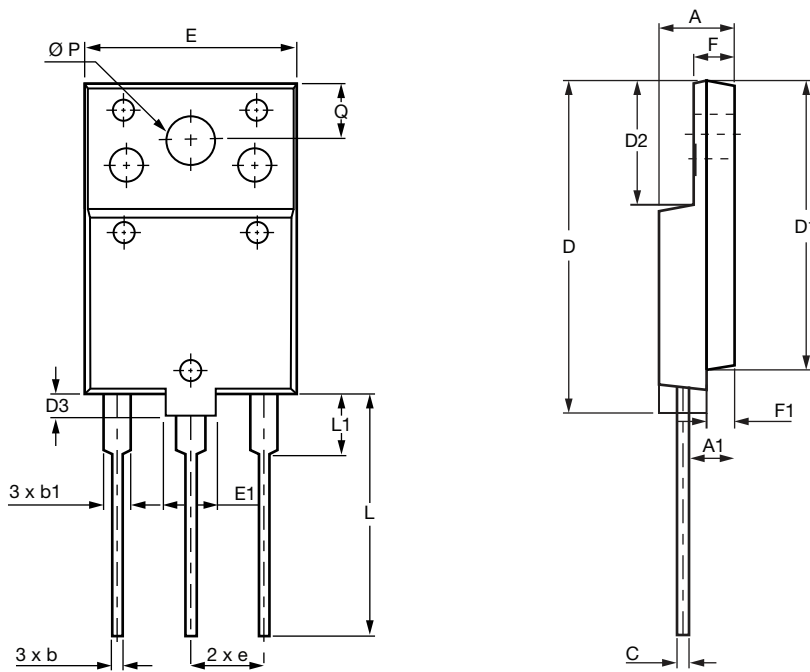
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-C4ZU3006FP-M3	25	300	Antistatic plastic tube

## LINKS TO RELATED DOCUMENTS

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
Ø P	3.40	3.60	3.80



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