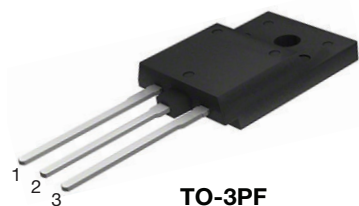
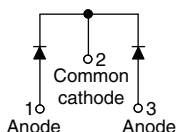


# Hyperfast Rectifier, 2 x 30 A FRED Pt®


**TO-3PF**


## FEATURES

- Hyperfast soft recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Low leakage current
- Fully isolated package ( $V_{INS} = 2500 V_{RMS}$ )
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	30 A
$V_R$	600 V
$V_F$ at $I_F$	1.40 V
$t_{rr}$ (typ.)	22 ns
$T_J$ max.	175 °C
Package	TO-3PF
Circuit configuration	Common cathode

## DESCRIPTION / APPLICATIONS

Hyperfast recovery rectifiers designed with optimized performance of forward voltage drop, hyperfast recovery time, and soft recovery.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in PFC boost stage in the AC/DC section of switch mode power supplies and inverters (air conditioning, high-frequency welding, UPS, and motor drives)

The extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

## 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
Peak repetitive reverse voltage	$V_{RRM}$		600	V
Average rectified forward current in DC, per leg	$I_{F(AV)}$		30	A
Non-repetitive peak surge current, per leg	$I_{FSM}$	$T_J = 25\text{ °C}$ , both anodes connection	280	
Operating junction and storage temperatures	$T_J, T_{Stg}$		-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, per leg	$V_F$	$I_F = 30\text{ A}$	-	1.70	2.15	
		$I_F = 30\text{ A}, T_J = 150\text{ °C}$	-	1.40	1.65	
Reverse leakage current, per leg	$I_R$	$V_R = V_R$ rated	-	0.02	10	$\mu\text{A}$
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	36	300	
Junction capacitance, per leg	$C_T$	$V_R = 600\text{ V}$	-	19	-	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	$t_{rr}$	$I_F = 1\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	22	-	ns
		$T_J = 25\text{ }^{\circ}\text{C}$	-	90	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	110	-	
Peak recovery current, per leg	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	4.1	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	9.4	-	
Reverse recovery charge, per leg	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	230	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	730	-	

**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	$T_J$ , $T_{Stg}$		-55	-	175	$^{\circ}\text{C}$
Thermal resistance, junction-to-case, per leg	$R_{thJC}$		-	2.30	2.90	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction-to-ambient, per leg	$R_{thJA}$	Typical socket mount	-	30	-	
Typical thermal resistance, case-to-heatsink	$R_{thCS}$	Mounting surface, flat, smooth, and greased	-	0.5	-	
Weight			-	6.2	-	g
			-	0.21	-	oz.
Mounting torque			4 (3.5)	-	6 (5.3)	kgf · cm (lbf · in)
Marking device		Case style TO-3PF	CZH6106FP			

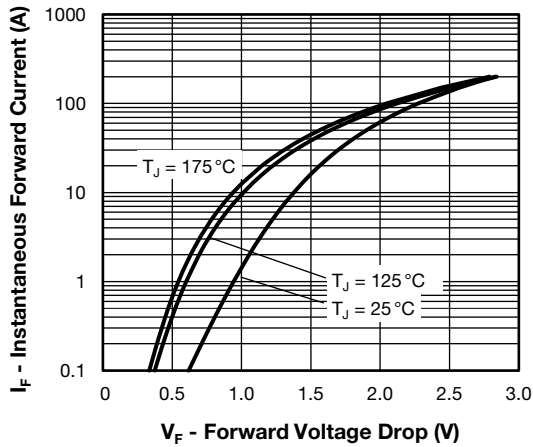


Fig. 1 - Forward Voltage Drop Characteristics, Per Leg

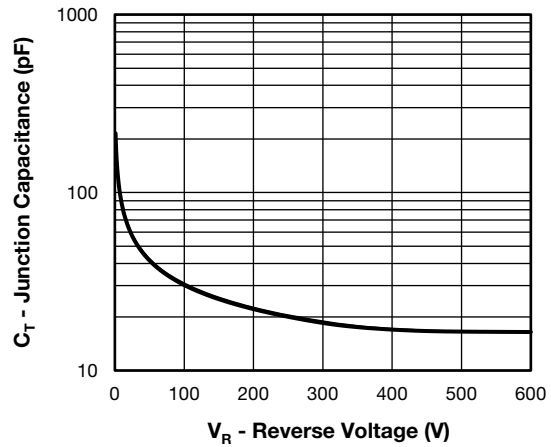


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, Per Leg

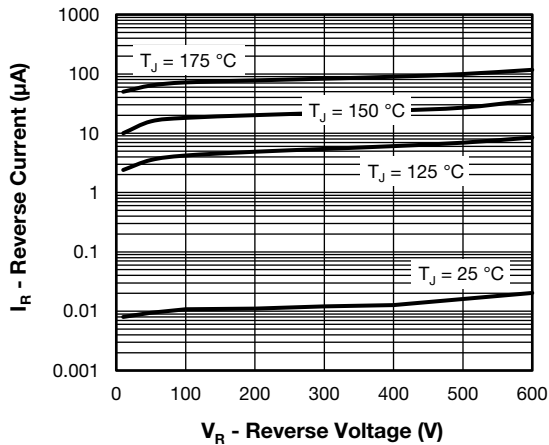


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage, Per Leg

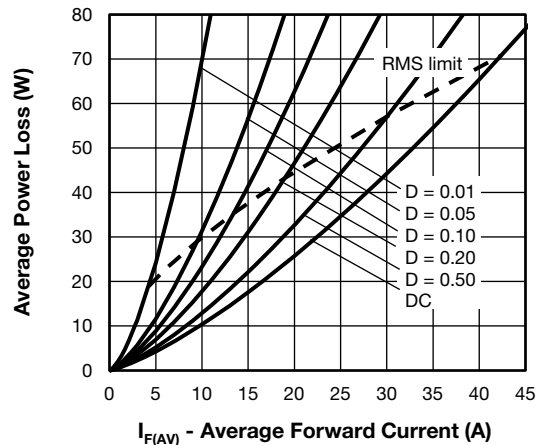


Fig. 4 - Forward Power Loss Characteristics, Per Leg

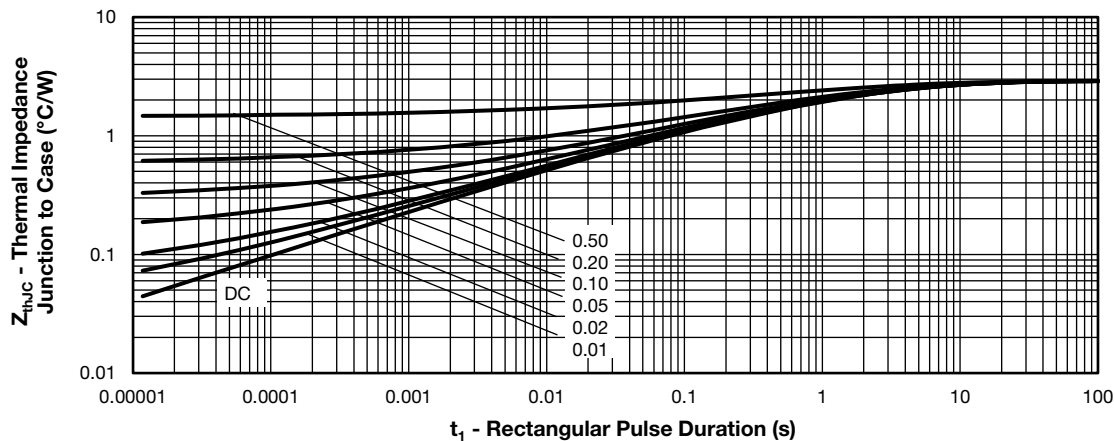
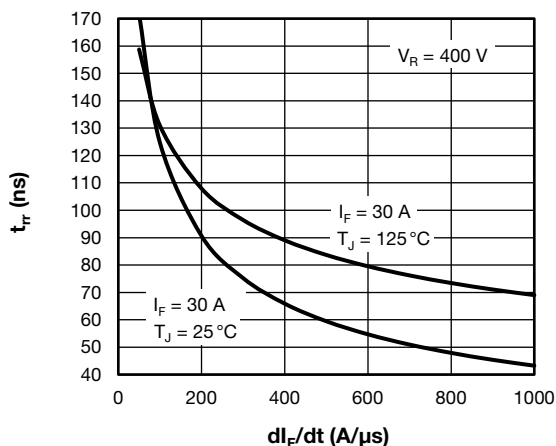
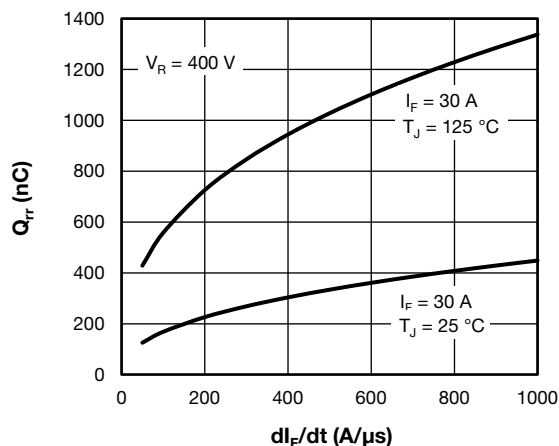
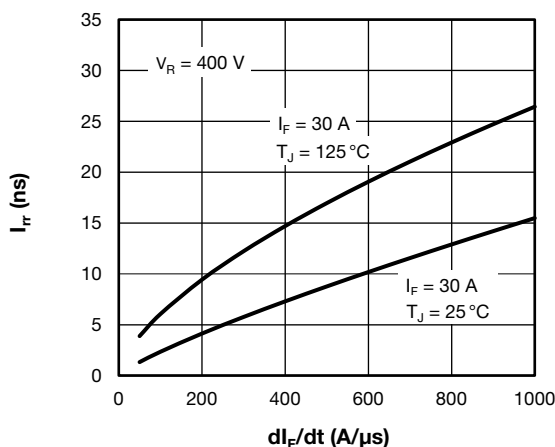


Fig. 5 - Transient Thermal Impedance, Junction to Case, Per Leg


Fig. 6 - Typical Reverse Recovery Time vs.  $dI_F/dt$ , Per Leg

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

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

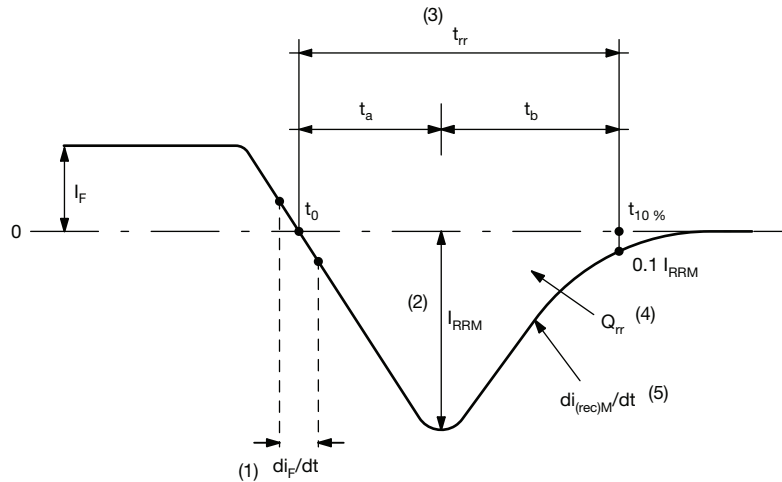


Fig. 9 - Reverse Recovery Waveform and Definitions

#### 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	VS-	C	Z	H	61	06	FP	-M3
	1	2	3	4	5	6	7	8

- 1** - Vishay Semiconductors product
- 2** - Circuit configuration:  
C = common cathode
- 3** - Z = TO-3FP package
- 4** - H = hyperfast recovery time
- 5** - Current code: 61 = 60 A (2 x 30 A)
- 6** - Voltage code: 06 = 600 V
- 7** - FP = FullPAK
- 8** - Environmental digit:  
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

#### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?96691">www.vishay.com/doc?96691</a>
Part marking information	<a href="http://www.vishay.com/doc?96690">www.vishay.com/doc?96690</a>



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