

# **FRED Pt® Ultrafast Soft Recovery Diode, 150 A**



## **FEATURES**

- Ultrafast recovery time
- 175 °C max. operating junction temperature
- Screw mounting only
- Designed and qualified according to JEDEC®-JESD 47
- PowerTab® package
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## **BENEFITS**

- Reduced RFI and EMI
- Higher frequency operation
- Reduced snubbing
- Reduced parts count

## **DESCRIPTION/APPLICATIONS**

These diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for HF welding, power converters and other applications where switching losses are not significant portion of the total losses.

## **PRODUCT SUMMARY**

Package	PowerTab®
$I_{F(AV)}$	150 A
$V_R$	600 V
$V_F$ at $I_F$	1.08 V
$t_{rr}$ (typ.)	50 ns
$T_J$ max.	175 °C
Diode variation	Single die

## **ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		600	V
Continuous forward current	$I_{F(AV)}$	$T_C = 89\text{ °C}$	150	A
Single pulse forward current	$I_{FSM}$	$T_C = 25\text{ °C}$	1200	
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	$V_{BR}, V_R$	$I_R = 200\text{ }\mu\text{A}$	600	-	-	V
Forward voltage	$V_F$	$I_F = 150\text{ A}$	-	1.27	1.63	
		$I_F = 150\text{ A}, T_J = 125\text{ °C}$	-	1.15	1.43	
		$I_F = 150\text{ A}, T_J = 175\text{ °C}$	-	1.08	1.32	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	-	8	$\mu\text{A}$
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	-	0.5	mA
Junction capacitance	$C_T$	$V_R = 600\text{ V}$	-	70	-	pF
Series inductance	$L_S$	Measured lead to lead 5 mm from package body	-	3.5	-	nH



DYNAMIC RECOVERY CHARACTERISTICS ( $T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	$t_{rr}$	$I_F = 1.0\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	50	-	ns
		$I_F = 1.0\text{ A}$ , $dI_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	40	-	
		$T_J = 25\text{ }^{\circ}\text{C}$	-	100	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	210	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	10.5	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	22	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	550	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	2350	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	$R_{thJC}$		-	-	0.35	K/W
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, flat, smooth and greased	-	0.2	-	
Weight			-	-	5.02	g
			-	0.18	-	oz.
Mounting torque			1.2 (10)	-	2.4 (20)	kgf · cm (lbf · in)
Marking device		Case style PowerTab®	EBU15006			

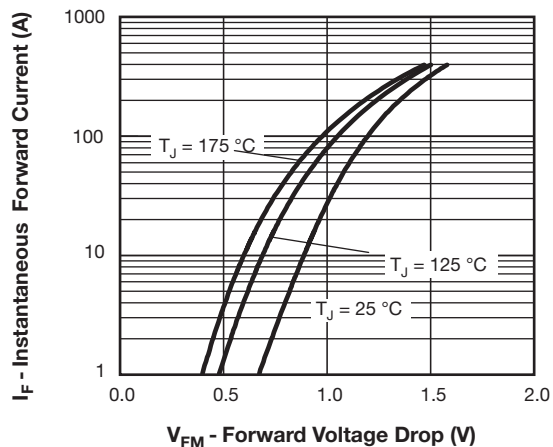


Fig. 1 - Maximum Forward Voltage Drop Characteristics

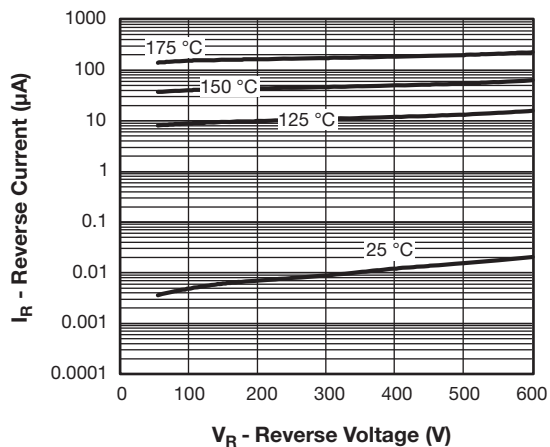


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

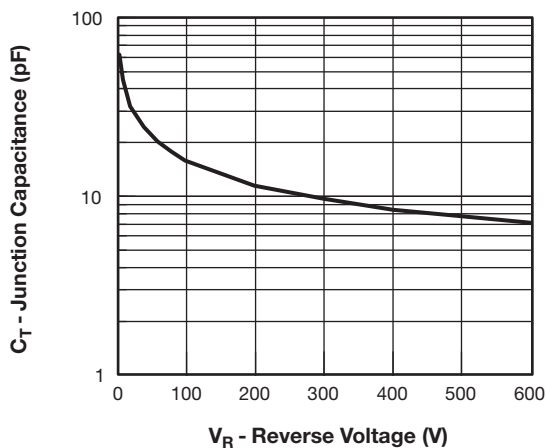


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

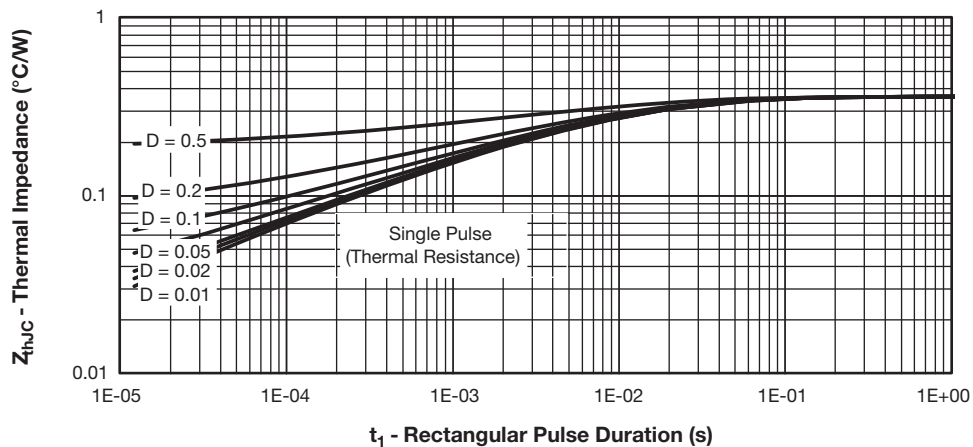


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

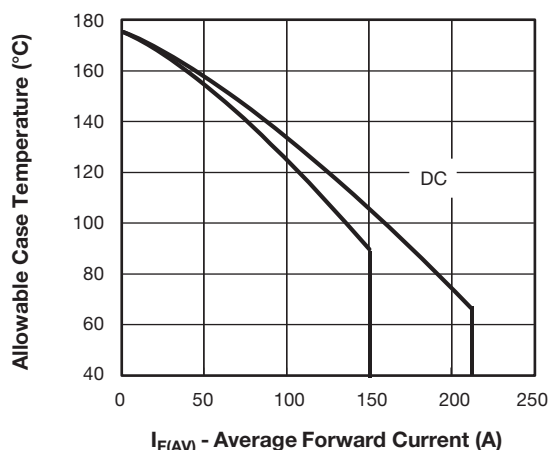


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

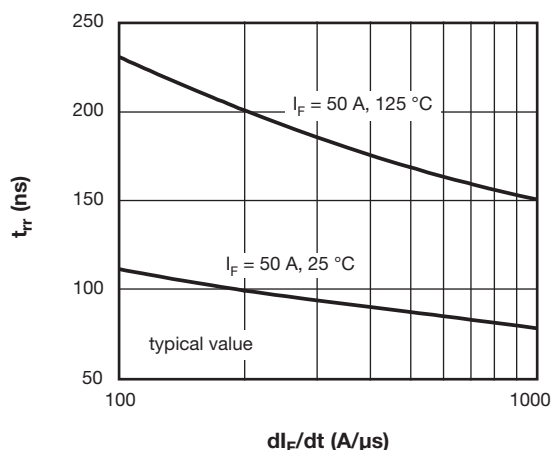


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$

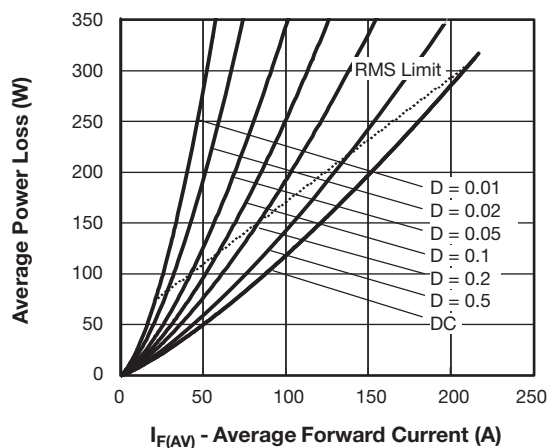


Fig. 6 - Forward Power Loss Characteristics

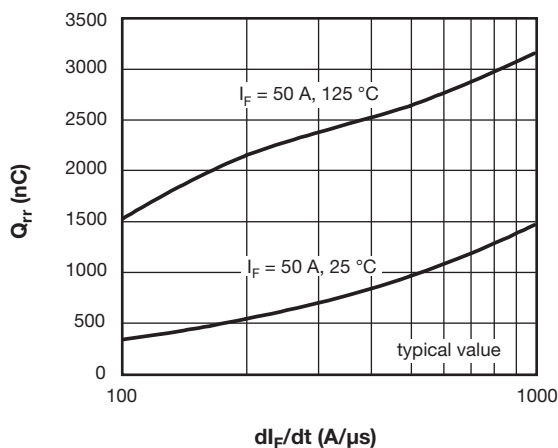


Fig. 8 - Typical Stored Charge vs.  $dI_F/dt$

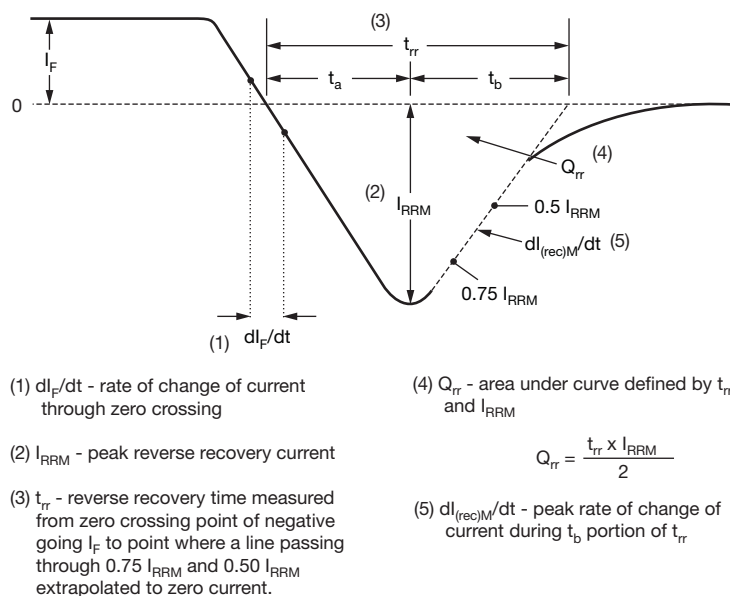


Fig. 9 - Reverse Recovery Waveform and Definitions



## ORDERING INFORMATION TABLE

Device code	VS-	E	B	U	150	06	-F4
	1	2	3	4	5	6	7
1	-	Vishay Semiconductors product					
2	-	Single diode					
3	-	PowerTab®					
4	-	Ultrafast recovery					
5	-	Current rating (150 = 150 A)					
6	-	Voltage rating (06 = 600 V)					
7	-	Environmental digit:					
		-F4 = RoHS-compliant and totally lead (Pb)-free					

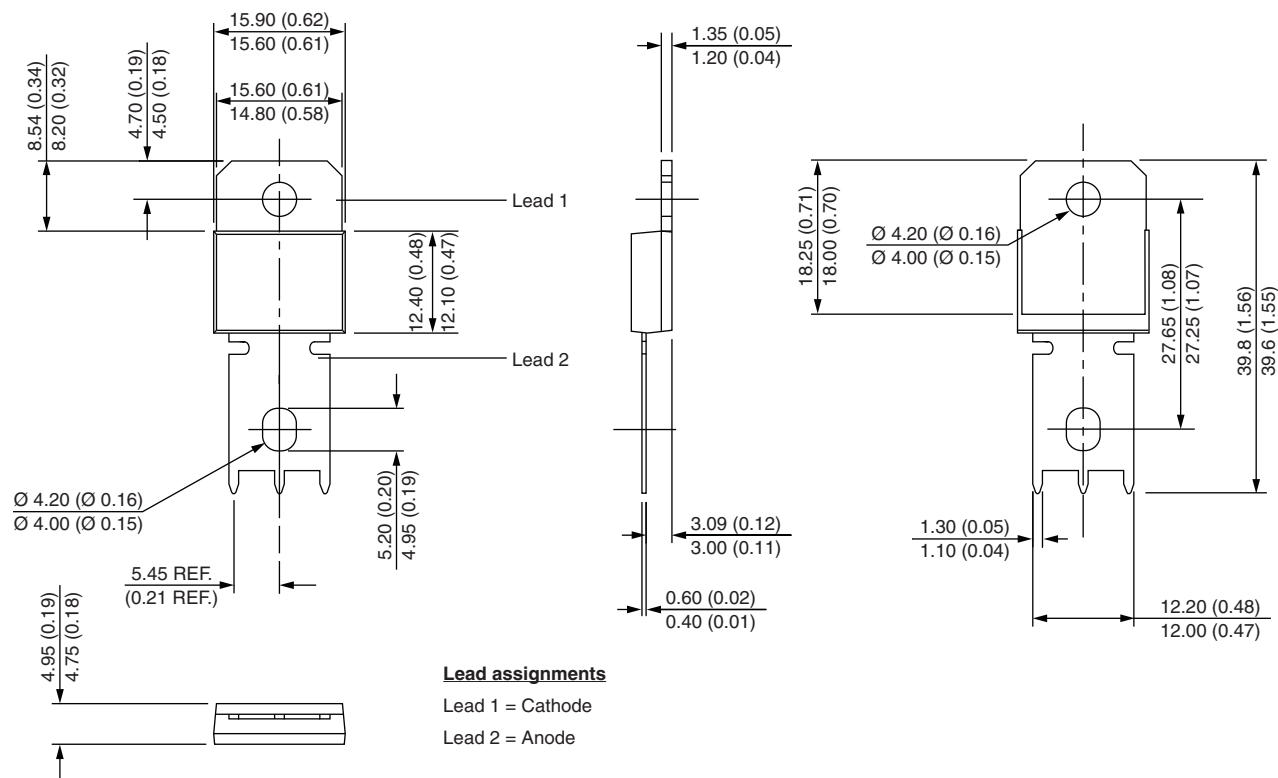
ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-EBU15006-F4	25	375	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95240">www.vishay.com/doc?95240</a>
Part marking information	<a href="http://www.vishay.com/doc?95467">www.vishay.com/doc?95467</a>
Application note	<a href="http://www.vishay.com/doc?95179">www.vishay.com/doc?95179</a>



## PowerTab®

**DIMENSIONS** in millimeters (inches)





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