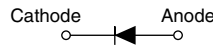


## Ultrafast Soft Recovery Diode, 150 A FRED Pt™


**PowerTab™**

**FEATURES**

- Ultrafast recovery
- 175 °C operating junction temperature
- Screw mounting only
- Lead (Pb)-free plating
- Designed and qualified for industrial level


**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**

$t_{rr}$	45 ns
$I_{F(AV)}$	150 A
$V_R$	200 V

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		200	V
Continuous forward current	$I_{F(AV)}$	$T_C = 116\text{ °C}$	150	A
Single pulse forward current	$I_{FSM}$	$T_C = 25\text{ °C}$	1600	
Maximum repetitive forward current	$I_{FRM}$	Square wave, 20 kHz	380	
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	$V_{BR}, V_R$	$I_R = 100\text{ }\mu\text{A}$	200	-	-	V
Forward voltage	$V_F$	$I_F = 150\text{ A}$ $I_F = 150\text{ A}, T_J = 175\text{ °C}$	-	0.99 0.79	1.13 0.90	
Reverse leakage current	$I_R$	$V_R = V_R\text{ rated}$	-	-	50	$\mu\text{A}$
		$T_J = 150\text{ °C}, V_R = V_R\text{ rated}$	-	-	2	mA
Junction capacitance	$C_T$	$V_R = 200\text{ V}$	-	180	-	pF
Series inductance	$L_S$	Measured lead to lead 5 mm from package body	-	3.5	-	nH

<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	$t_{rr}$	$I_F = 1.0\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	-	45	ns	
		$T_J = 25\text{ }^\circ\text{C}$	-	34	-		
		$T_J = 125\text{ }^\circ\text{C}$	-	58	-		
Peak recovery current	$I_{RRM}$	$I_F = 150\text{ A}$ $V_R = 160\text{ V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$	$T_J = 25\text{ }^\circ\text{C}$	-	4.5	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	9.0	-	
Reverse recovery charge	$Q_{rr}$	$I_F = 150\text{ A}$ $V_R = 160\text{ V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$	$T_J = 25\text{ }^\circ\text{C}$	-	87	-	nC
			$T_J = 125\text{ }^\circ\text{C}$	-	300	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	$R_{thJC}$		-	-	0.35	K/W
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)	N · m (lbf · in)
Marking device		Case style PowerTab™	150EBU02			

Ultrafast Soft Recovery Diode, Vishay High Power Products  
150 A FRED Pt™

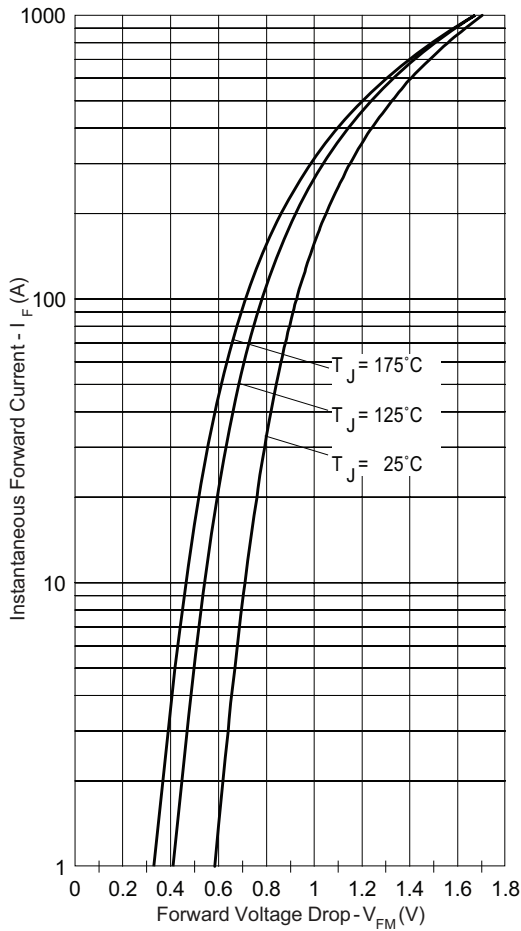


Fig. 1 - Maximum Forward Voltage Drop Characteristics

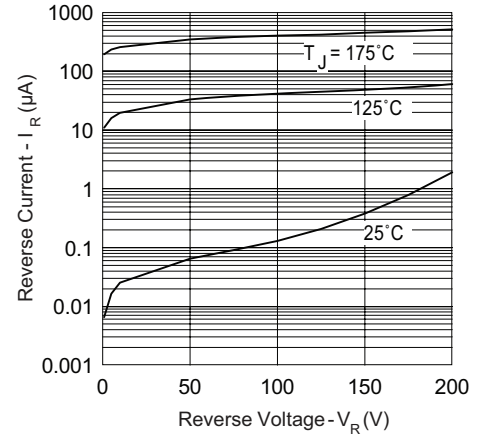


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

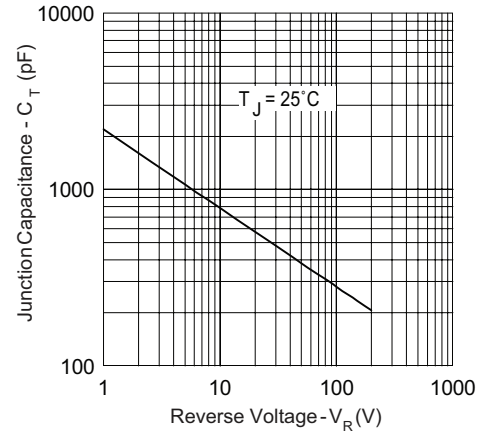


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

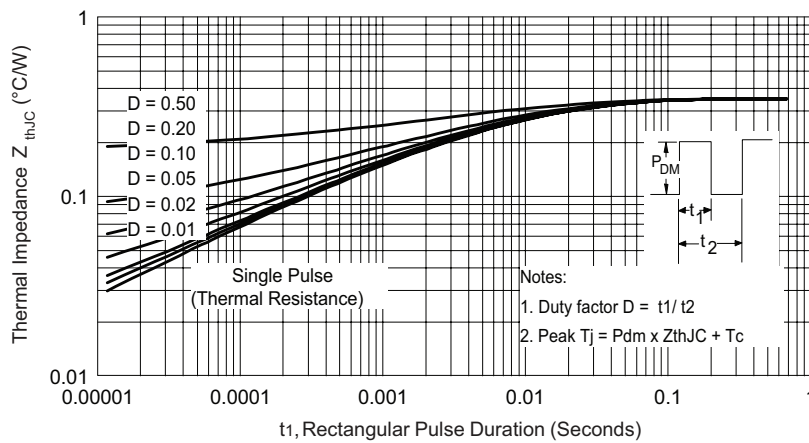


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

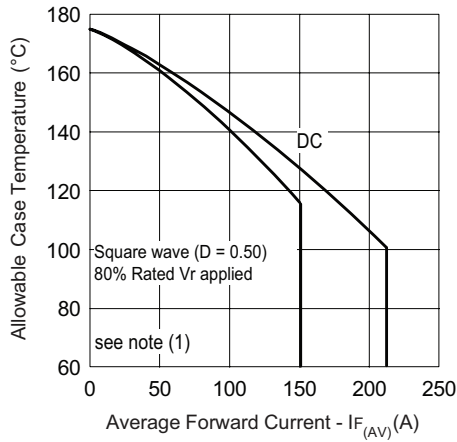


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

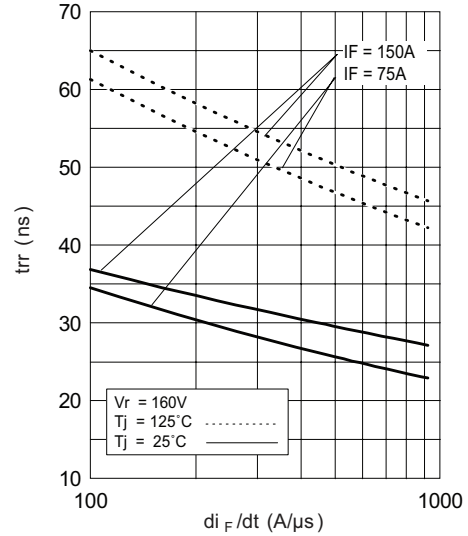


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

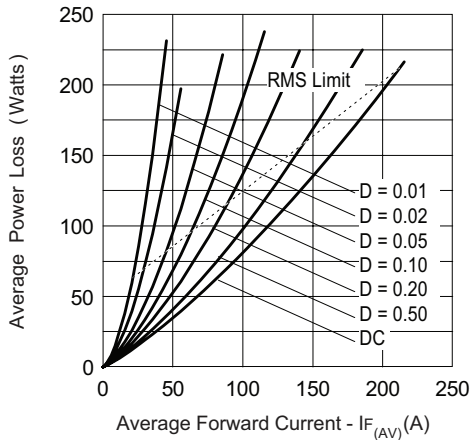


Fig. 6 - Forward Power Loss Characteristics

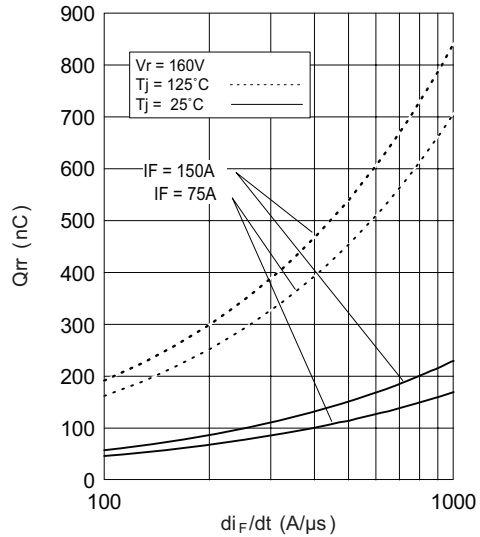


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$

**Note**

- (1) Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$ ;  
 $Pd$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $Pd_{REV}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$

## Ultrafast Soft Recovery Diode, Vishay High Power Products 150 A FRED Pt™

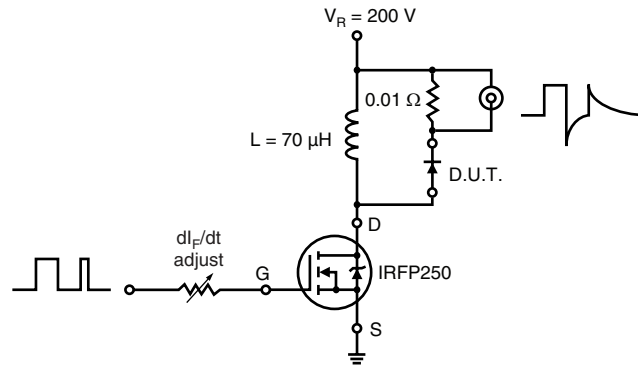
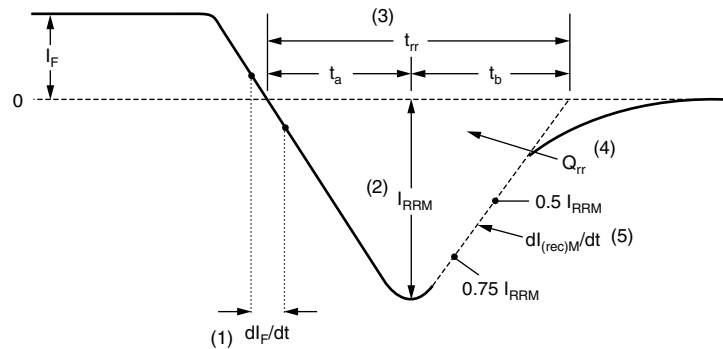


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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 zero crossing point of negative going  $I_F$  to point where a line passing through  $0.75 I_{RRM}$  and  $0.50 I_{RRM}$  extrapolated to zero current.

(4)  $Q_{rr}$  - area under curve defined by  $t_{rr}$  and  $I_{RRM}$

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

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

Fig. 10 - Reverse Recovery Waveform and Definitions

## ORDERING INFORMATION TABLE

Device code	150	E	B	U	02
	①	②	③	④	⑤

- 1** - Current rating (150 = 150 A)
- 2** - Single diode
- 3** - PowerTab™ (ultrafast/hyperfast only)
- 4** - Ultrafast recovery
- 5** - Voltage rating (02 = 200 V)

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95240">http://www.vishay.com/doc?95240</a>
Part marking information	<a href="http://www.vishay.com/doc?95370">http://www.vishay.com/doc?95370</a>



## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.