

# Ultrafast Soft Recovery Diode, 80 A FRED Pt®



PowerTab®



## FEATURES

- Ultrafast recovery time
- 175 °C max. operating junction temperature
- Screw mounting only
- AEC-Q101 qualified
- PowerTab® package
- 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	
$I_{F(AV)}$	80 A
$V_R$	600 V
$V_F$ at $I_F$	1.53 V
$t_{rr}$ (typ.)	46 ns
$T_J$ max.	175 °C
Package	PowerTab®
Circuit configuration	Single die

## 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.

## MECHANICAL DATA

**Case:** PowerTab®

Molding compound meets UL 94 V-0 flammability rating

**Terminal:** nickel plated, screwable

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		600	V
Continuous forward current	$I_{F(AV)}$	$T_C = 113\text{ °C}$	80	A
Single pulse forward current	$I_{FSM}$	$T_C = 25\text{ °C}$	750	
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	$V_F$	$I_F = 80\text{ A}$	-	1.25	1.53	
		$I_F = 80\text{ A}, T_J = 125\text{ °C}$	-	1.13	1.35	
		$I_F = 80\text{ A}, T_J = 175\text{ °C}$	-	1.07	1.25	
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	$C_T$	$V_R = 600\text{ V}$	-	39	-	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	$t_{rr}$	$I_F = 1.0\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	46	-	ns
		$I_F = 1.0\text{ A}$ , $dI_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	36	-	
		$T_J = 25\text{ }^{\circ}\text{C}$	-	100	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	190	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	10	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	17.5	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	520	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	1650	-	

**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	$R_{thJC}$		-	-	0.5	K/W
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, flat, smooth and greased	-	0.2	-	
Weight			-	-	5.02	g
Mounting torque			1.2 (10)	-	2.4 (20)	N · m (lbf · in)
Marking device		Case style PowerTab®	EBU8006H			

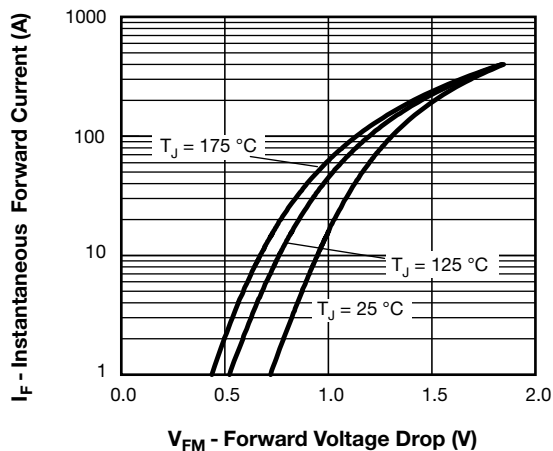


Fig. 1 - Maximum Forward Voltage Drop Characteristics

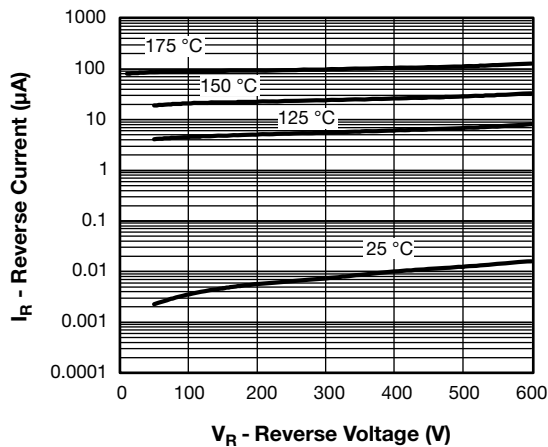


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

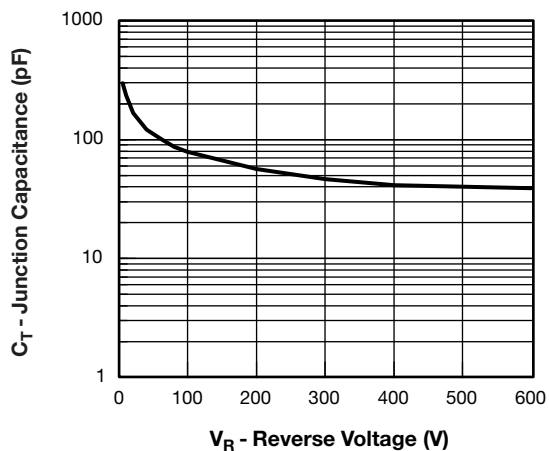


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

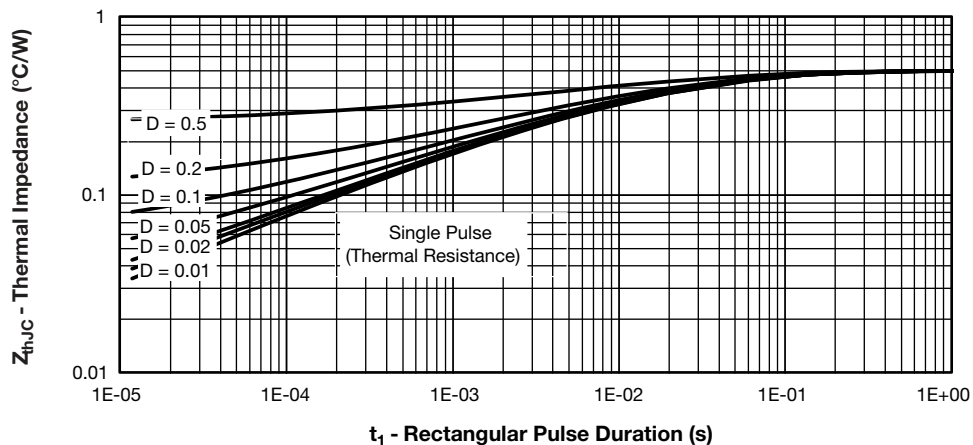


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

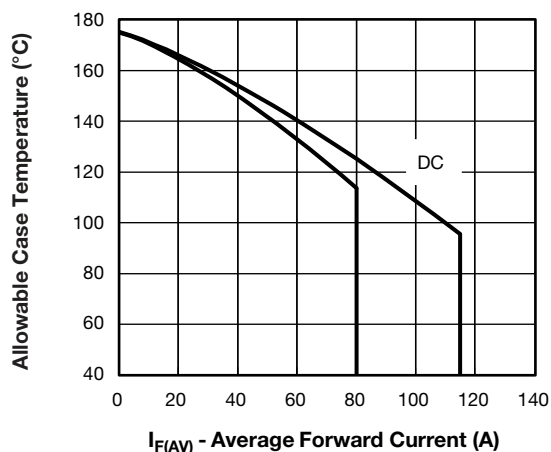


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

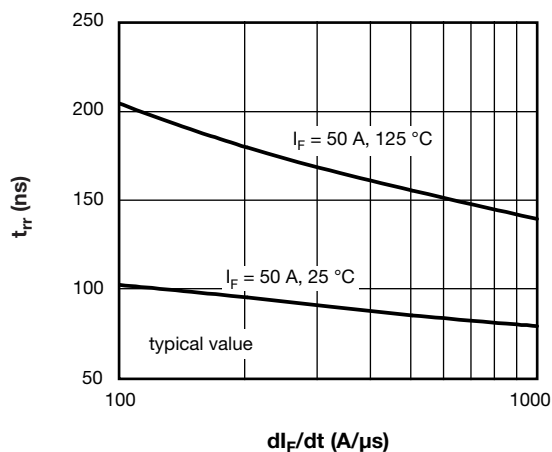


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$

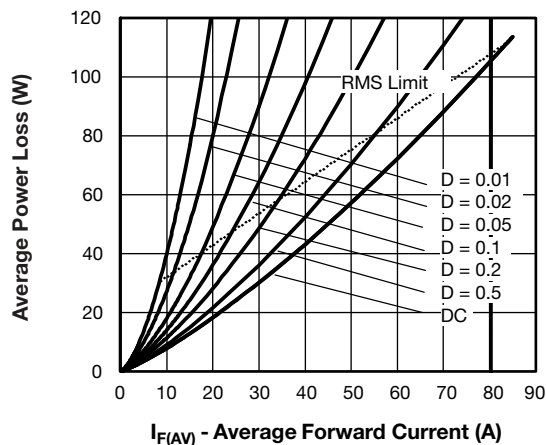


Fig. 6 - Forward Power Loss Characteristics

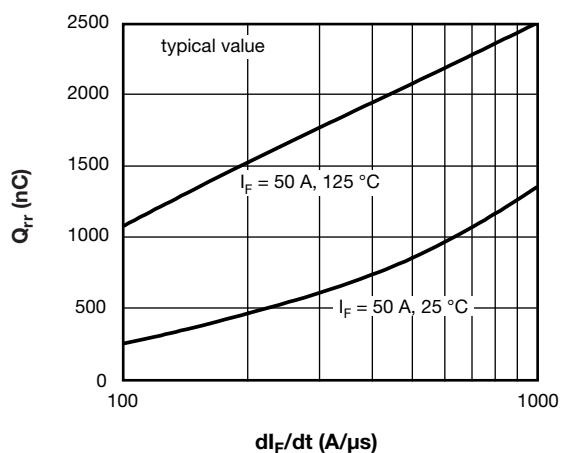
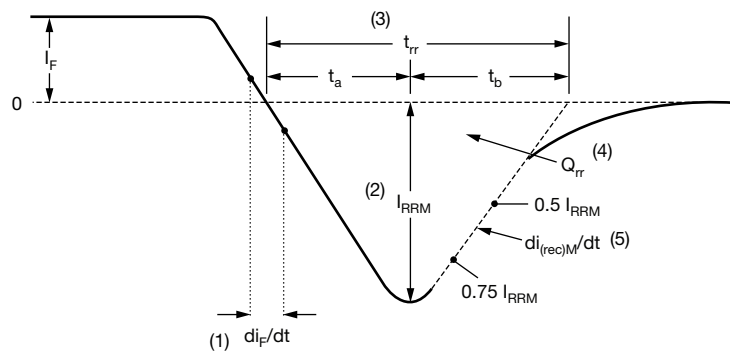


Fig. 8 - Typical Stored Charge vs.  $dI_F/dt$



(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. 9 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>E</b>	<b>B</b>	<b>U</b>	<b>80</b>	<b>06</b>	<b>H</b>	<b>N4</b>
	①	②	③	④	⑤	⑥	⑦	⑧

- |          |   |   |
|----------|---|---|
| <b>1</b> | - | Vishay Semiconductors product   |
| <b>2</b> | - | Single diode  |
| <b>3</b> | - | PowerTab®   |
| <b>4</b> | - | Ultrafast recovery  |
| <b>5</b> | - | Current rating (80 = 80 A)  |
| <b>6</b> | - | Voltage rating (06 = 600 V)   |
| <b>7</b> | - | H = AEC-Q101 qualified  |
| <b>8</b> | - | Environmental digit:<br>-N4 = Halogen-free, RoHS-compliant and totally lead (Pb)-free |

<b>ORDERING INFORMATION</b> (Example)		
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-EBU8006HN4	25/tube	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>	
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)



#### Note:

Outline conform to JEDEC® TO-275, except for dimension "G" only



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