

# 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

## 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®
$I_{F(AV)}$	80 A
$V_R$	400 V
$V_F$ at $I_F$	0.92 V
$t_{rr}$ (typ.)	See recovery table
$T_J$ max.	175 °C
Diode variation	Single die

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		400	V
Continuous forward current	$I_{F(AV)}$	$T_C = 122\text{ °C}$	80	A
Single pulse forward current	$I_{FSM}$	$T_C = 25\text{ °C}$	800	
Maximum repetitive forward current	$I_{FRM}$	Square wave, 20 kHz	160	
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	$V_{BR}, V_r$	$I_R = 100\text{ }\mu\text{A}$	400	-	-	V
Forward voltage	$V_F$	$I_F = 80\text{ A}$	-	1.1	1.3	
		$I_F = 80\text{ A}, T_J = 175\text{ °C}$	-	0.92	1.08	
		$I_F = 80\text{ A}, T_J = 125\text{ °C}$	-	0.98	1.15	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	-	50	$\mu\text{A}$
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	-	2	mA
Junction capacitance	$C_T$	$V_R = 200\text{ V}$	-	50	-	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	$t_{rr}$	$I_F = 1\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	50	-	ns
		$T_J = 25\text{ }^{\circ}\text{C}$	-	87	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	151	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	9.3	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	17.2	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	405	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	1300	-	

**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	$R_{thJC}$		-	-	0.5	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction 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®	80EBU04H			

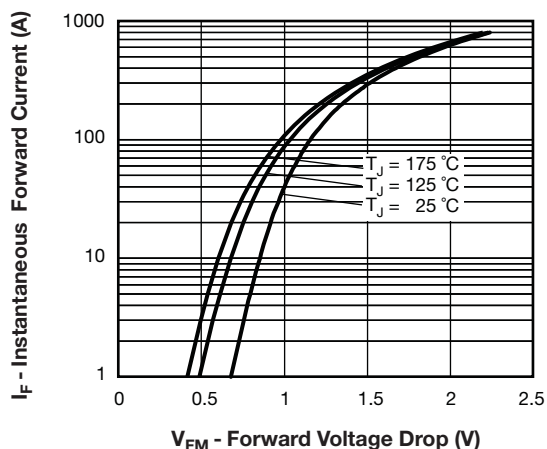


Fig. 1 - Maximum Forward Voltage Drop Characteristics

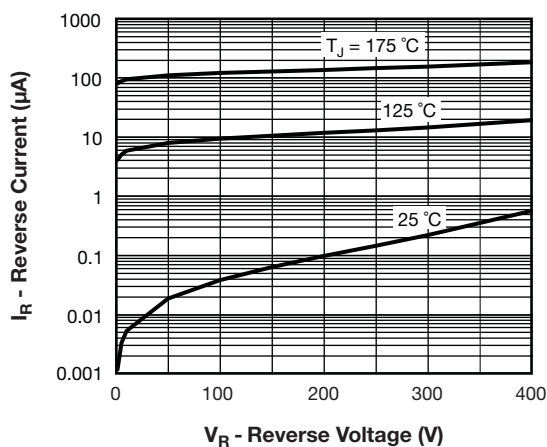


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

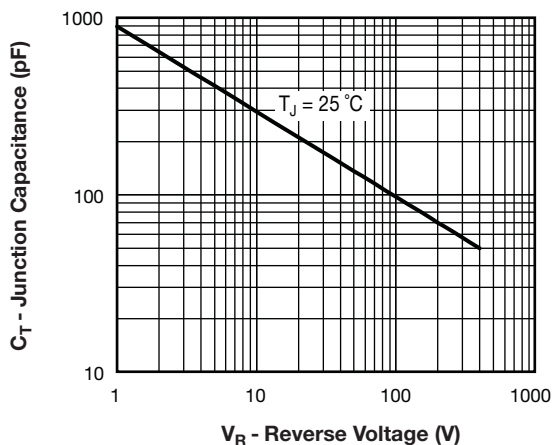


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

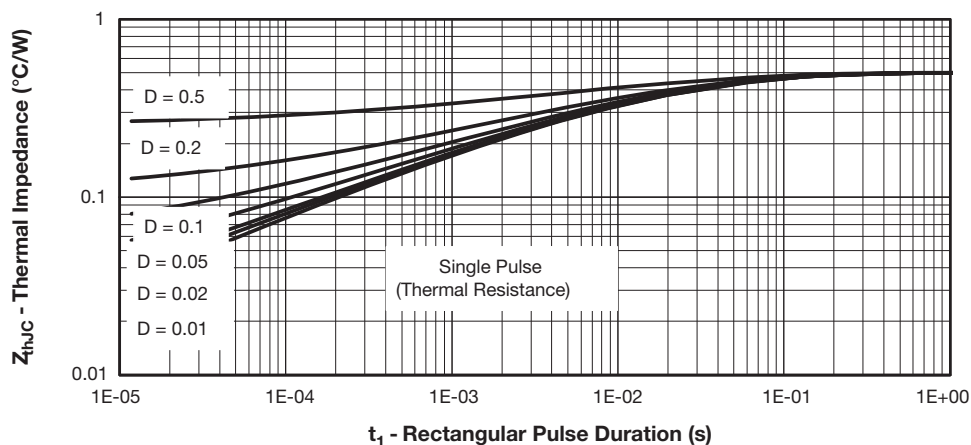


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

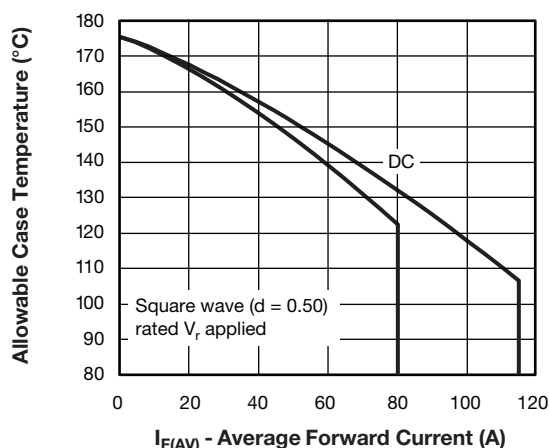


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

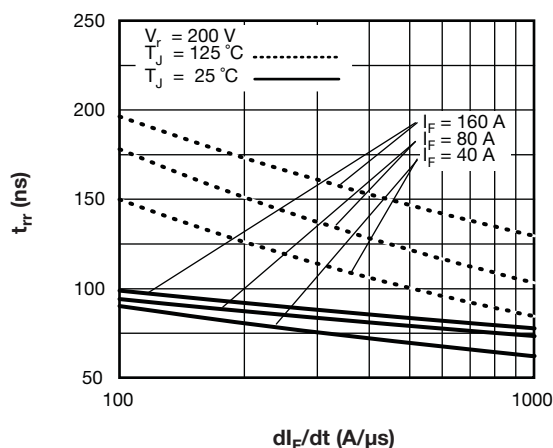


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$

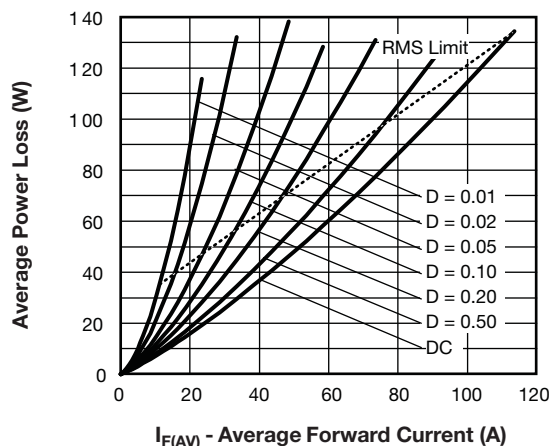


Fig. 6 - Forward Power Loss Characteristics

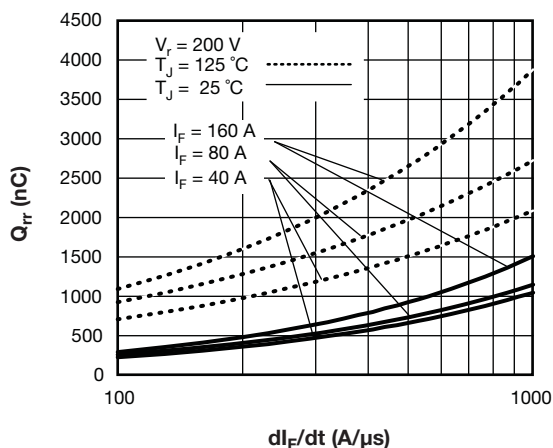


Fig. 8 - Typical Stored Charge vs.  $dI_F/dt$

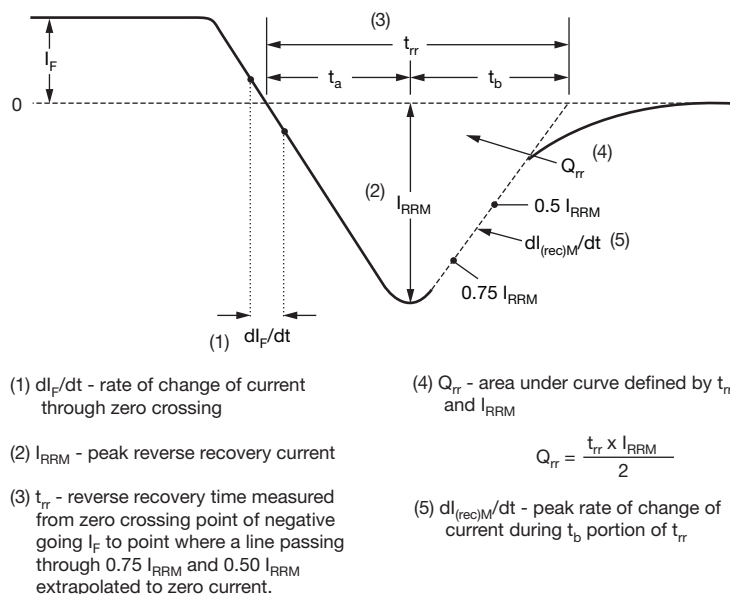


Fig. 9 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>80</b>	<b>E</b>	<b>B</b>	<b>U</b>	<b>04</b>	<b>H</b>	<b>F4</b>
	1	2	3	4	5	6	7	8
	1	-	Vishay Semiconductors product					
	2	-	Current rating (80 = 80 A)					
	3	-	Single diode					
	4	-	PowerTab®					
	5	-	Ultrafast recovery					
	6	-	Voltage rating (04 = 400 V)					
	7	-	H = AEC-Q101 qualified					
	8	-	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-80EBU04HF4	25	375	Antistatic plastic tube

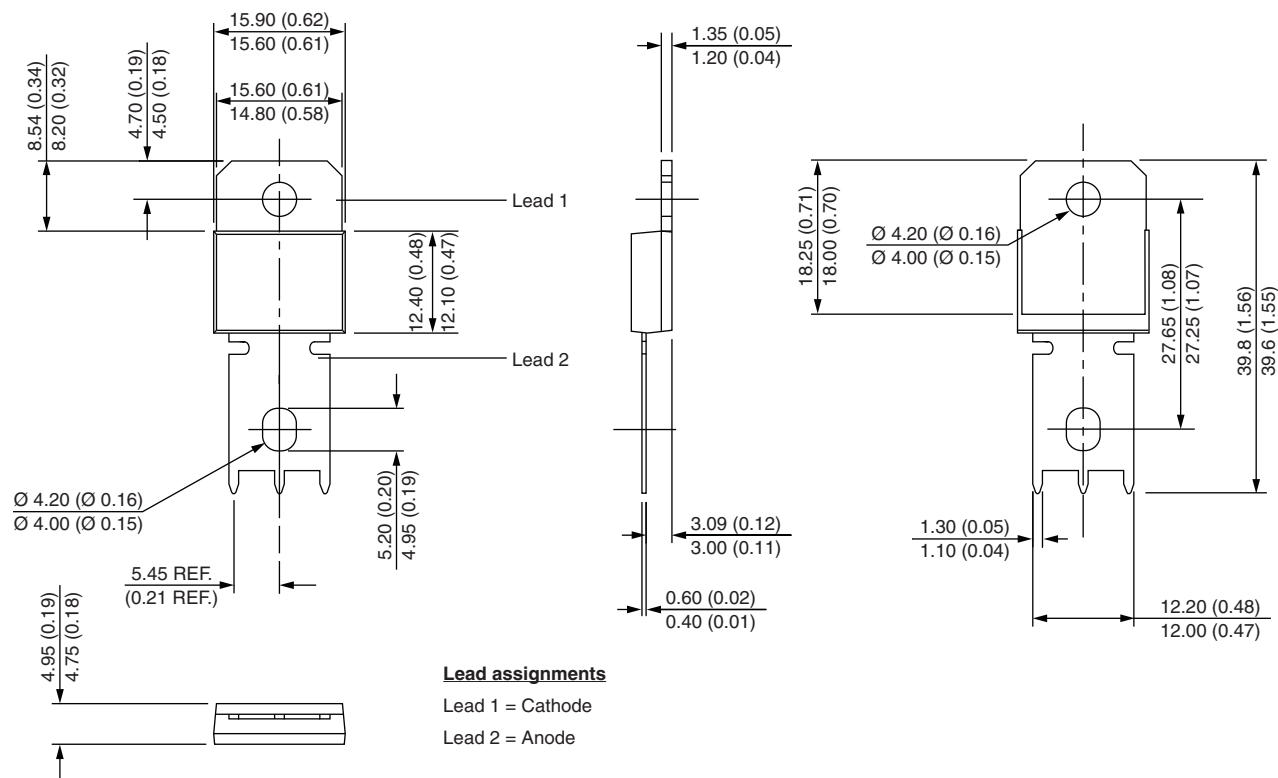
**LINKS TO RELATED DOCUMENTS**

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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