

## 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	$V_{BR}, V_f$	$I_R = 100\text{ }\mu\text{A}$	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	
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 <sub>J</sub> = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 1 A, di <sub>F</sub> /dt = 200 A/μs, V <sub>R</sub> = 30 V	-	50	-	ns	
		T <sub>J</sub> = 25 °C	-	87	-		
		T <sub>J</sub> = 125 °C	-	151	-		
Peak recovery current	I <sub>RRM</sub>	I <sub>F</sub> = 80 A V <sub>R</sub> = 200 V di <sub>F</sub> /dt = 200 A/μs	T <sub>J</sub> = 25 °C	-	9.3	-	A
			T <sub>J</sub> = 125 °C	-	17.2	-	
Reverse recovery charge	Q <sub>rr</sub>	I <sub>F</sub> = 80 A V <sub>R</sub> = 200 V di <sub>F</sub> /dt = 200 A/μs	T <sub>J</sub> = 25 °C	-	405	-	nC
			T <sub>J</sub> = 125 °C	-	1300	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	R <sub>thJC</sub>		-	-	0.5	°C/W
Thermal resistance, junction to heatsink	R <sub>thCS</sub>	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			

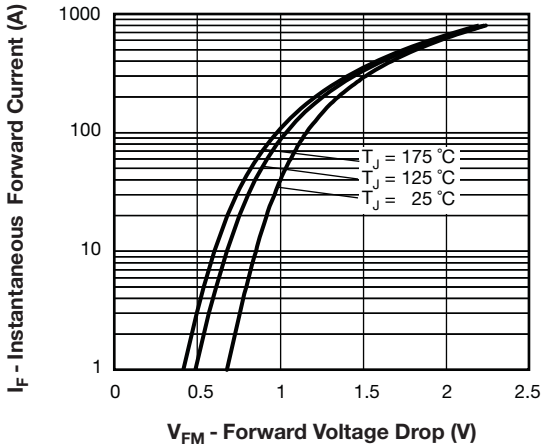


Fig. 1 - Maximum Forward Voltage Drop Characteristics

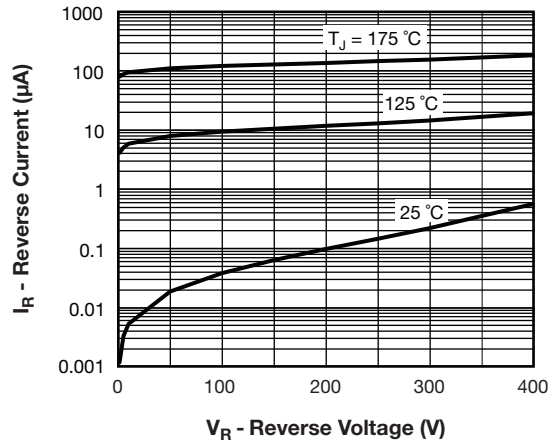


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

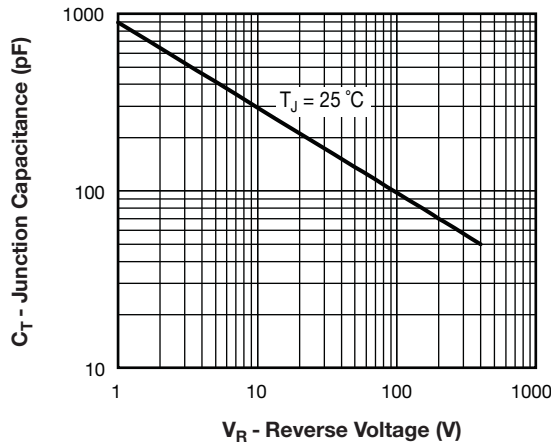


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

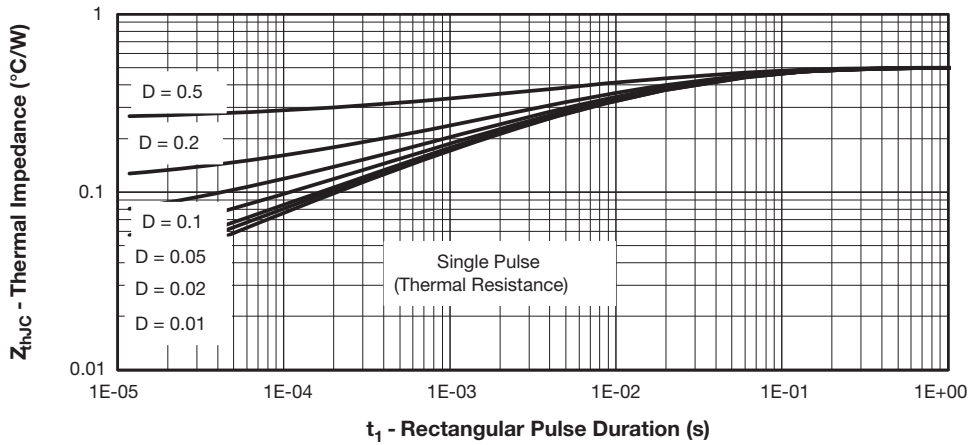


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

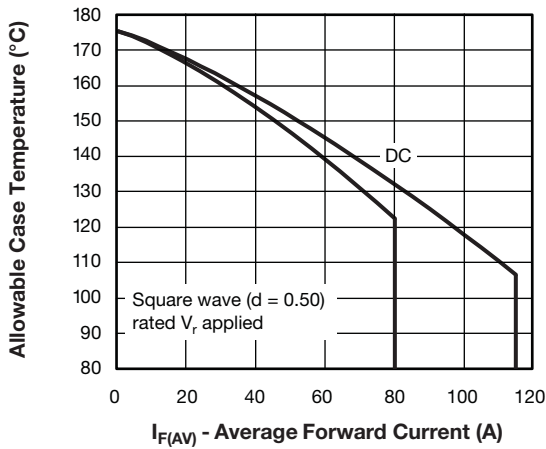


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

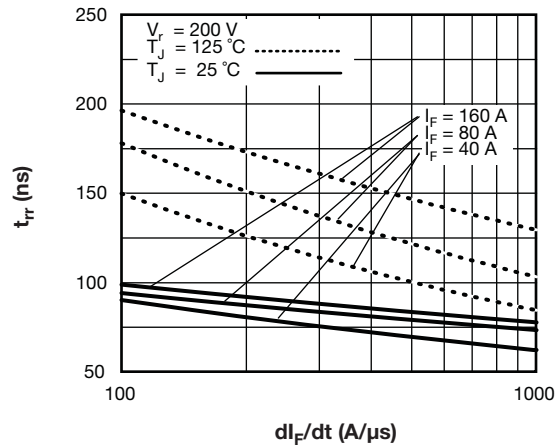


Fig. 7 - Typical Reverse Recovery Time vs.  $di_f/dt$

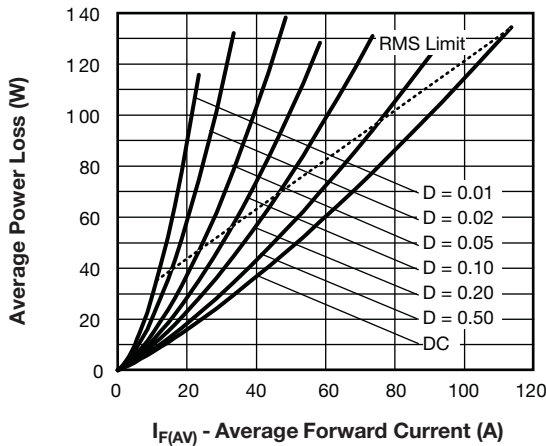


Fig. 6 - Forward Power Loss Characteristics

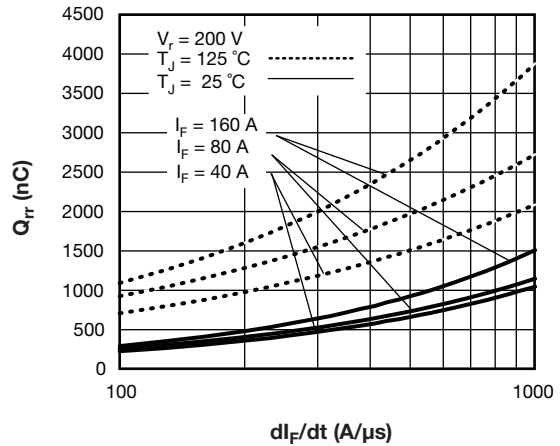
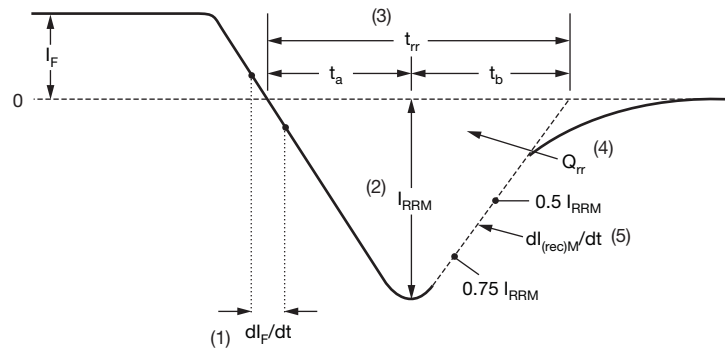


Fig. 8 - Typical Stored Charge vs.  $di_f/dt$



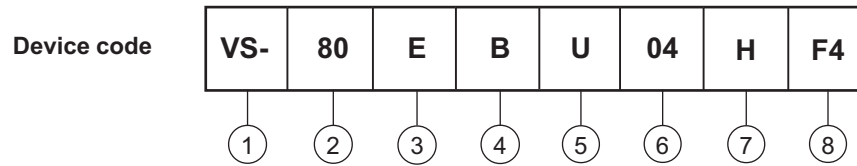
- (1)  $di_f/dt$  - rate of change of current through zero crossing
- (2)  $I_{RRM}$  - peak reverse recovery current
- (3)  $t_{rr}$  - reverse recovery time measured from zero crossing point of negative going  $I_F$  to point where a line passing through  $0.75 I_{RRM}$  and  $0.50 I_{RRM}$  extrapolated to zero current.
- (4)  $Q_{rr}$  - area under curve defined by  $t_{rr}$  and  $I_{RRM}$
- (5)  $dl_{(rec)M}/dt$  - peak rate of change of current during  $t_b$  portion of  $t_{rr}$

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

Fig. 9 - Reverse Recovery Waveform and Definitions



**ORDERING INFORMATION TABLE**



- 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

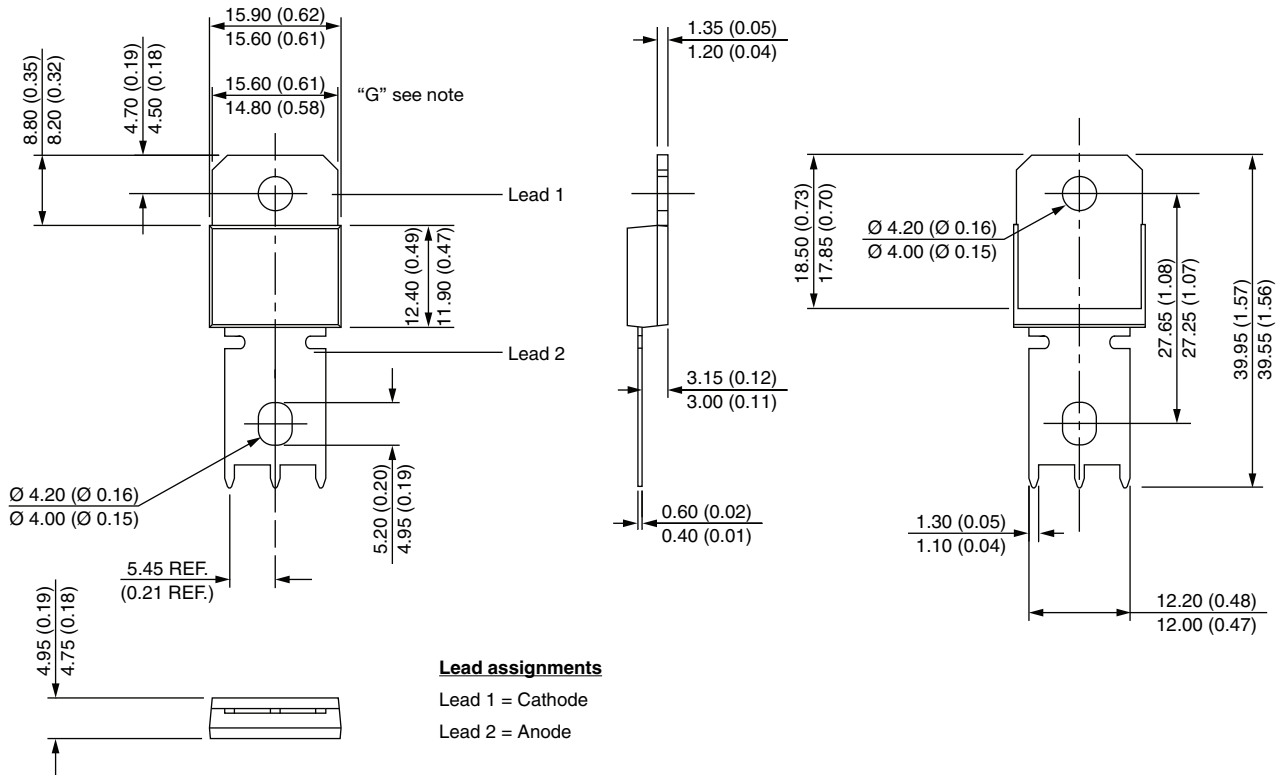
<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-80EBU04HF4	25	375	Antistatic plastic tube

<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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