RoHS

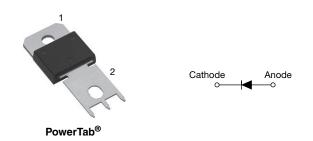
COMPLIANT

HALOGEN FREE



Vishay Semiconductors

Ultrafast Soft Recovery Diode, 150 A FRED Pt®



LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS				
I _{F(AV)}	150 A			
V _R	200 V			
V _F at I _F	0.79 V			
t _{rr} (typ.)	See recovery table			
T _J max.	175 °C			
Package	PowerTab [®]			
Circuit configuration	Single			

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.vishav.com/doc?99912

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		200	V
Continuous forward current	I _{F(AV)}	T _C = 116 °C	150	
Single pulse forward current	I _{FSM}	T _C = 25 °C	1600	Α
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 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS MIN. TYP.		TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR} , V_{R}	Ι _R = 100 μΑ	200	-	-	.,
Forward voltage		I _F = 150 A	-	0.99	1.13	V
Forward voltage V _F	I _F = 150 A, T _J = 175 °C	-	0.79	0.90		
Devenue legisere eviment	_	$V_R = V_R$ rated	-	-	50	μA
Reverse leakage current	I _R	$T_J = 150 ^{\circ}\text{C}, V_R = V_R \text{rated}$	-	-	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



DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
			$I_F = 1.0 \text{ A}, dI_F/dt = 200 \text{ A/}\mu\text{s}, V_R = 30 \text{ V}$		-	45	
Reverse recovery time	t _{rr}	T _J = 25 °C		-	34	-	ns
		T _J = 125 °C	I _F = 150 A V _R = 160 V dI _F /dt = 200 A/μs	-	58	-	
Dook recovery current	Deal recovery and the second	T _J = 25 °C		-	4.5	-	А
Peak recovery current	I _{RRM}	T _J = 125 °C		-	9.0	-	
Reverse recovery charge Q _{rr}	0	T _J = 25 °C		-	87	-	nC
	T _J = 125 °C		-	300	-] 110	

THERMAL - MECHANICAL SPECIFICATIONS						
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	-	IV VV
Weight			-	-	5.02	g
Mounting torque			1.2 (10)	-	2.4 (20)	N ⋅ m (lbf ⋅ in)
Marking device		Case style PowerTab®		150E	BU02	

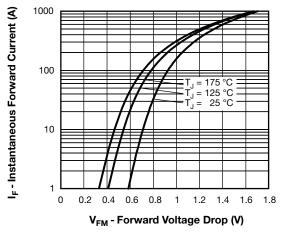


Fig. 1 - Maximum Forward Voltage Drop Characteristics

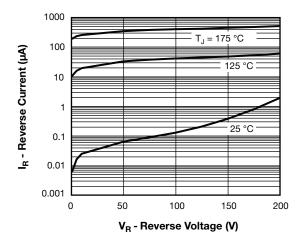


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

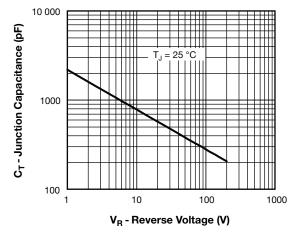


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

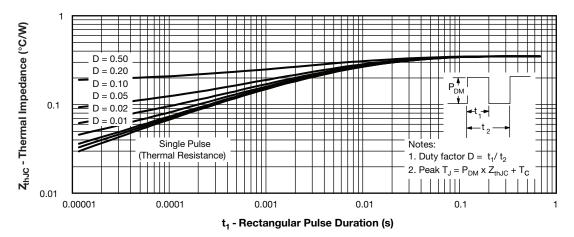


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

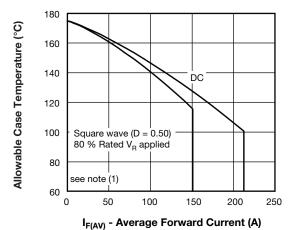


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

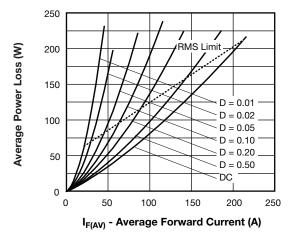


Fig. 6 - Forward Power Loss Characteristics

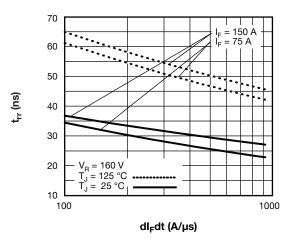


Fig. 7 - Typical Reverse Recovery Time vs. dI_{F}/dt

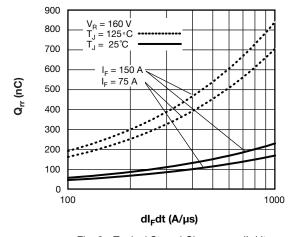
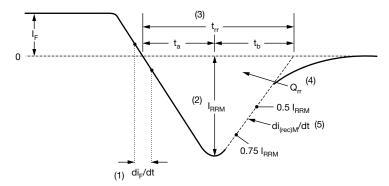


Fig. 8 - Typical Stored Charge vs. dI_F/dt

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



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

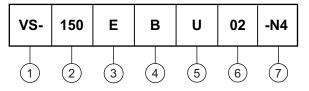
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(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



- 1 Vishay Semiconductors product
- 2 Current rating (150 = 150 A)
- 3 Single diode
- PowerTab[®] (ultrafast/hyperfast only)
- 5 Ultrafast recovery
- 6 Voltage rating (02 = 200 V)
- 7 Environmental digit:
 - -N4 = halogen-free, RoHS-compliant, and totally lead(Pb)-free

ORDERING INFORMATION (Example)				
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION		
VS-150EBU02-N4	25/tube	Antistatic plastic tube		

LINKS TO RELATED DOCUMENTS				
Dimensions	www.vishay.com/doc?95240			
Part marking information	www.vishay.com/doc?95467			
Application note	www.vishay.com/doc?95179			
SPICE model	www.vishay.com/doc?96503			



PowerTab®

DIMENSIONS in millimeters (inches)



Note:

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



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Vishay

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