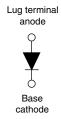


# HEXFRED® Ultrafast Soft Recovery Diode, 210 A





HALF-PAK (D-67)

PRIMARY CHARACTERISTICS				
I <sub>F</sub> (maximum)	210 A			
$V_{R}$	400 V			
I <sub>F(DC)</sub> at T <sub>C</sub>	106 A at 100 °C			
Package	HALF-PAK (D-67)			
Circuit configuration	Single diode			

#### **FEATURES**

- Very low Q<sub>rr</sub> and t<sub>rr</sub>
- Designed and qualified for industrial level



- UL approved file E222165
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

#### **BENEFITS**

- Reduced RFI and EMI
- Reduced snubbing

#### **DESCRIPTION**

HEXFRED® diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. An extensive characterization of the recovery behavior for different values of current, temperature and dI<sub>F</sub>/dt simplifies the calculations of losses in the operating conditions. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for power converters, motors drives and other applications where switching losses are significant portion of the total losses.

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Cathode to anode voltage	V <sub>R</sub>		400	V	
Continuous forward current	I <sub>F</sub>	T <sub>C</sub> = 25 °C	210		
Continuous forward current		T <sub>C</sub> = 100 °C	106	Α	
Single pulse forward current	I <sub>FSM</sub>	Limited by junction temperature	600		
Non-repetitive avalanche energy	E <sub>AS</sub>	$L = 100 \mu H$ , duty cycle limited by maximum $T_J$	1.4	mJ	
Marrian and a sure discipation	$P_{D}$	T <sub>C</sub> = 25 °C	329	w	
Maximum power dissipation		T <sub>C</sub> = 100 °C	132	VV	
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		-55 to +150	°C	

<b>ELECTRICAL SPECIFICATIONS</b> (T <sub>J</sub> = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	$V_{BR}$	Ι <sub>R</sub> = 100 μΑ		400	-	-	
Maximum forward voltage	V <sub>FM</sub>	I <sub>F</sub> = 90 A		-	1.06	1.45	V
		I <sub>F</sub> = 180 A	See fig. 1	-	1.2	1.67	
		I <sub>F</sub> = 90 A, T <sub>J</sub> = 125 °C		-	0.96	1.23	
Maximum reverse leakage current	I <sub>RM</sub>	$T_J = 125 ^{\circ}\text{C},  V_R = 400 ^{\circ}\text{V}$	See fig. 2	-	0.6	2	mA
Junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 200 V	See fig. 3	-	180	260	pF
Series inductance	L <sub>S</sub>	From top of terminal hole to mounting plane		-	7.0	-	nΗ



<b>DYNAMIC RECOVERY CHARACTERISTICS</b> (T <sub>J</sub> = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	+	T <sub>J</sub> = 25 °C		-	90	140	20
See fig. 5	t <sub>rr</sub>	T <sub>J</sub> = 125 °C	I <sub>F</sub> = 90 A dI <sub>F</sub> /dt = 200 A/μs	-	158	240	ns
Peak recovery current See fig. 6	I <sub>RRM</sub>	T <sub>J</sub> = 25 °C		-	9	17	А
		T <sub>J</sub> = 125 °C		-	15	30	
Reverse recovery charge		T <sub>J</sub> = 25 °C	V <sub>R</sub> = 200 V	-	420	1100	nC
See fig. 7		T <sub>J</sub> = 125 °C		-	1200	3200	110
Peak rate of recovery current See fig. 8	dI <sub>(rec)M</sub> /dt	T <sub>J</sub> = 25 °C		-	370	-	- A/μs
		T <sub>J</sub> = 125 °C		-	270	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER		SYMBOL TEST CONDITIONS		VALUES	UNITS	
Maximum junction and storage temperature range		T <sub>J</sub> , T <sub>Stg</sub>		-55 to 150	°C	
Maximum thermal resistance, junction to case		R <sub>thJC</sub>	DC operation See fig. 4	0.38	°C/W	
Typical thermal resistance, case to heatsink		R <sub>thCS</sub>	Mounting surface, flat, smooth, and greased	0.05	- C/VV	
Aitit				30	g	
Approximate weight				1.06	OZ.	
Marinting taxaria	minimum		Non-lubricated threads	3 (26.5)		
Mounting torque	maximum			4 (35.4)	N⋅m	
To control la constant	minimum			3.4 (30)	(lbf · in)	
Terminal torque maxim				5 (44.2)		
Case style			HALF-PAK (D-67)			

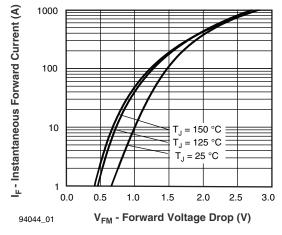


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

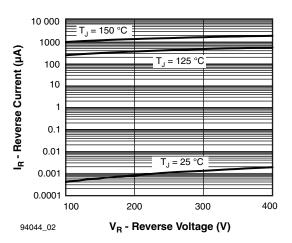


Fig. 2 - Typical Reverse Current vs. Reverse Voltage



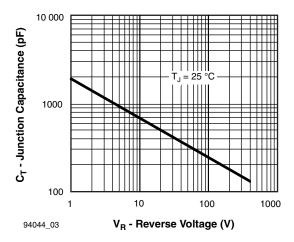


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

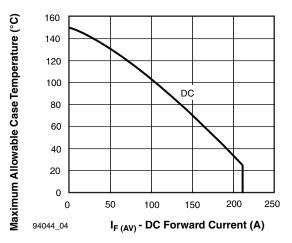


Fig. 4 - Maximum Allowable Case Temperature vs. DC Forward Current

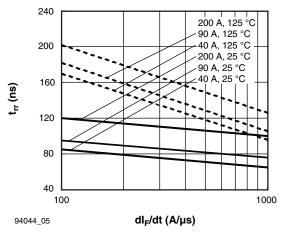


Fig. 5 - Typical Reverse Recovery Time vs. dl<sub>F</sub>/dt

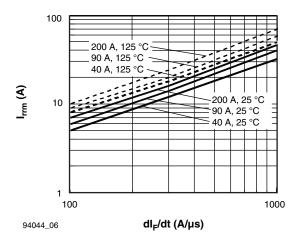


Fig. 6 - Typical Recovery Current vs. dl<sub>F</sub>/dt

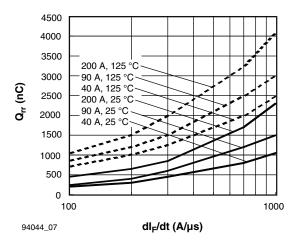


Fig. 7 - Typical Stored Charge vs. dl<sub>F</sub>/dt

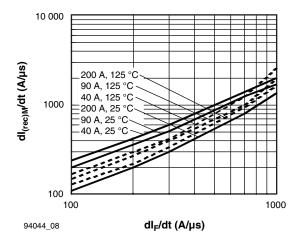


Fig. 8 - Typical dl<sub>(rec)M</sub>/dt vs. dl<sub>F</sub>/dt

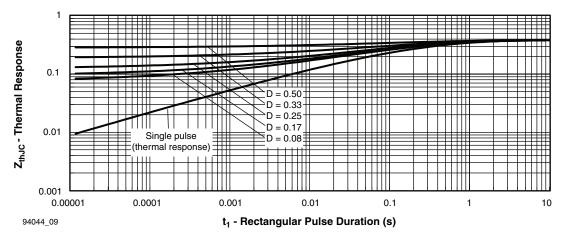


Fig. 9 - Maximum Thermal Impedance ZthJC Characteristics (Per Leg)

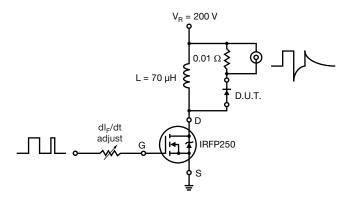
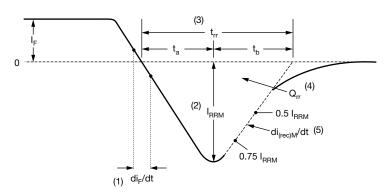


Fig. 10 - Reverse Recovery Parameter Test Circuit



- (1) di<sub>F</sub>/dt rate of change of current through zero crossing
- (2) I<sub>RRM</sub> peak reverse recovery current
- (3) t<sub>rr</sub> reverse recovery time measured from zero crossing point of negative going I<sub>F</sub> to point where a line passing through 0.75 I<sub>RRM</sub> and 0.50 I<sub>RRM</sub> extrapolated to zero current.
- (4)  $\mathbf{Q}_{\rm rr}$  area under curve defined by  $\mathbf{t}_{\rm rr}$  and  $\mathbf{I}_{\rm RRM}$

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

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

Fig. 11 - Reverse Recovery Waveform and Definitions



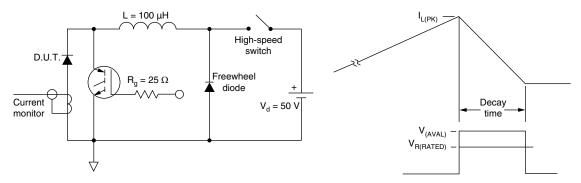
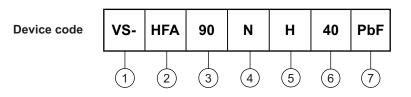


Fig. 12 - Avalanche Test Circuit and Waveforms

#### **ORDERING INFORMATION TABLE**



1 - Vishay Semiconductors product

2 - HEXFRED® family

Average current rating

4 - N = not isolated

5 - H = HALF-PAK (D-67)

6 - Voltage rating (400 V)

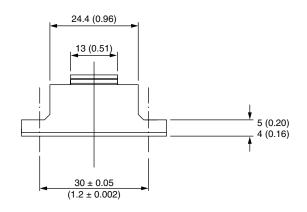
7 - Lead (Pb)-free

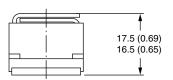
LINKS TO RELATED DOCUMENTS				
Dimensions	www.vishay.com/doc?95020			

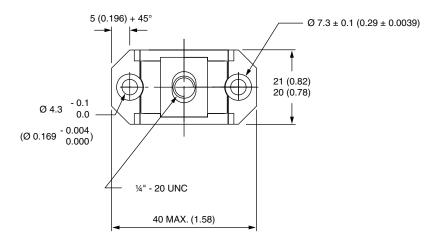


## **D-67 HALF-PAK**

#### **DIMENSIONS** in millimeters (inches)









## **Legal Disclaimer Notice**

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