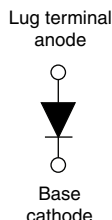


# HEXFRED® Ultrafast Soft Recovery Diode, 180 A


**HALF-PAK (D-67)**


## FEATURES

- Very low  $Q_{rr}$  and  $t_{rr}$
- Designed and qualified for industrial level
- UL approved file E222165 
- 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
- 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  $di_F/dt$  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.

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	180 A
$V_R$	400 V
$I_{F(DC)}$ at $T_C$	200 A at 100 °C
Package	HALF-PAK (D-67)
Circuit configuration	Single diode

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		400	V
Continuous forward current	$I_F$	$T_C = 25\text{ °C}$	395	A
		$T_C = 100\text{ °C}$	200	
Single pulse forward current	$I_{FSM}$	Limited by junction temperature	1200	
Non-repetitive avalanche energy	$E_{AS}$	$L = 100\text{ }\mu\text{H}$ , duty cycle limited by maximum $T_J$	1.4	mJ
Maximum power dissipation	$P_D$	$T_C = 25\text{ °C}$	657	W
		$T_C = 100\text{ °C}$	263	
Operating junction and storage temperature range	$T_J, T_{Stg}$		-55 to +150	°C

## ELECTRICAL SPECIFICATIONS ( $T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	$V_{BR}$	$I_R = 100\text{ }\mu\text{A}$	400	-	-	V
Maximum forward voltage	$V_{FM}$	$I_F = 180\text{ A}$	-	1.08	1.46	
		$I_F = 360\text{ A}$	-	1.22	1.8	
		$I_F = 180\text{ A}, T_J = 125\text{ °C}$	-	0.99	1.34	
Maximum reverse leakage current	$I_{RM}$	$T_J = 125\text{ °C}, V_R = 400\text{ V}$	-	-	4	mA
Junction capacitance	$C_T$	$V_R = 200\text{ V}$	-	370	500	pF
Series inductance	$L_S$	From top of terminal hole to mounting plane	-	6.0	-	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 See fig. 5	$t_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$ $T_J = 125\text{ }^{\circ}\text{C}$	-	90 280	140 440	ns
Peak recovery current See fig. 6	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$ $T_J = 125\text{ }^{\circ}\text{C}$	-	9 18	16 32	A
Reverse recovery charge See fig. 7	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$ $T_J = 125\text{ }^{\circ}\text{C}$	-	300 2650	950 6300	nC
Peak rate of recovery current See fig. 8	$di_{(rec)M}/dt$	$T_J = 25\text{ }^{\circ}\text{C}$ $T_J = 125\text{ }^{\circ}\text{C}$	-	300 290	- -	A/ $\mu\text{s}$

**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	0.19	°C/W
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased	0.05	
Approximate weight			30	g
			1.06	oz.
Mounting torque	minimum		3 (26.5)	N · m (lbf · in)
	maximum		4 (35.4)	
Terminal torque	minimum		3.4 (30)	
	maximum		5 (44.2)	
Case style		HALF-PAK (D-67)		

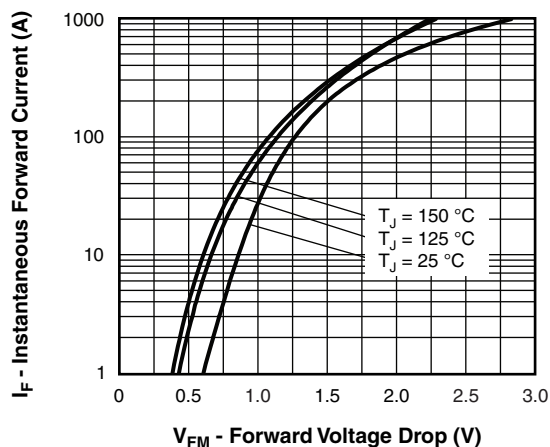


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

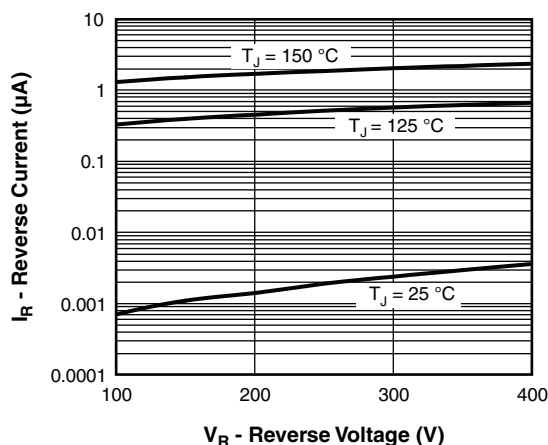


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

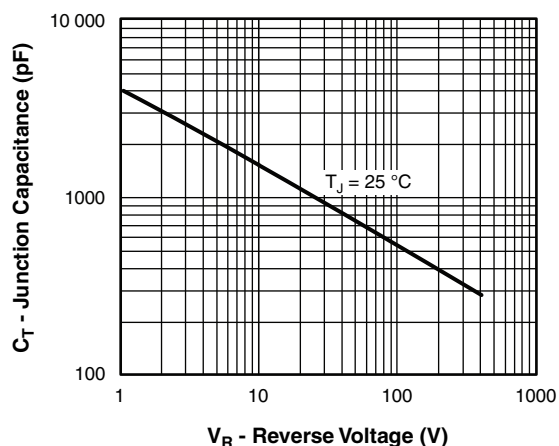


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

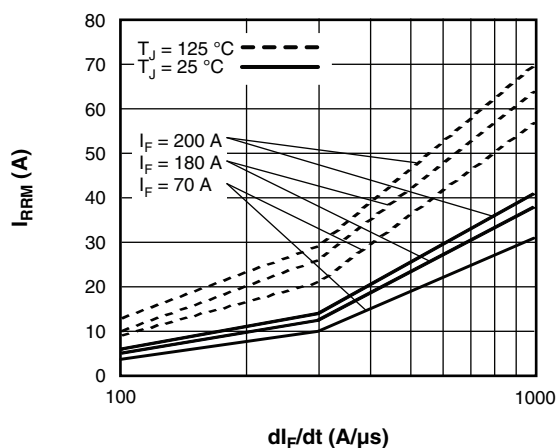


Fig. 6 - Typical Recovery Current vs.  $dl_F/dt$

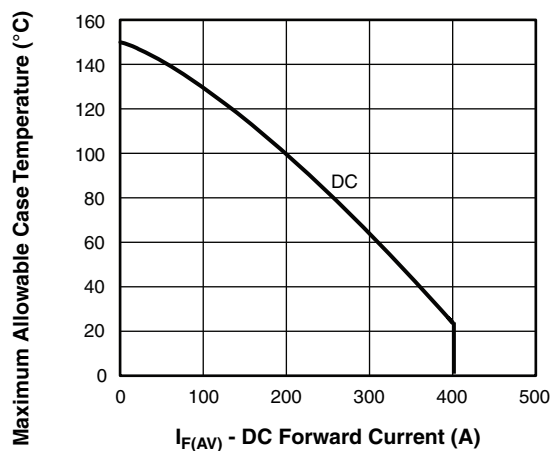


Fig. 4 - Maximum Allowable Case Temperature vs. DC Forward Current

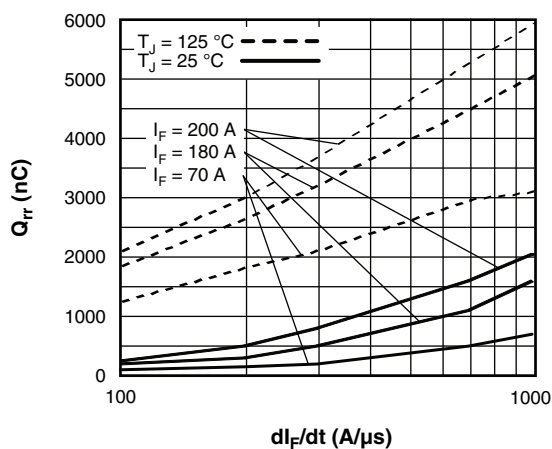


Fig. 7 - Typical Stored Charge vs.  $dl_F/dt$

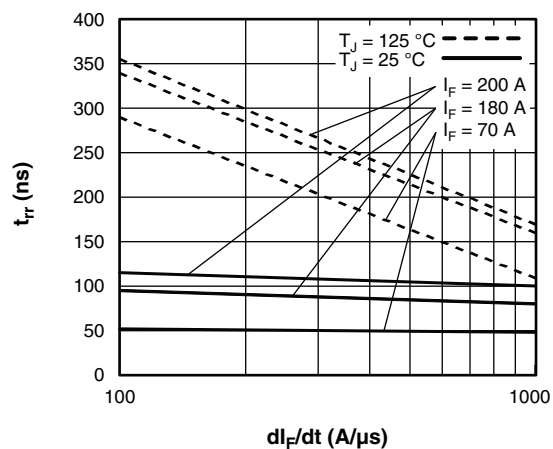


Fig. 5 - Typical Reverse Recovery Time vs.  $dl_F/dt$

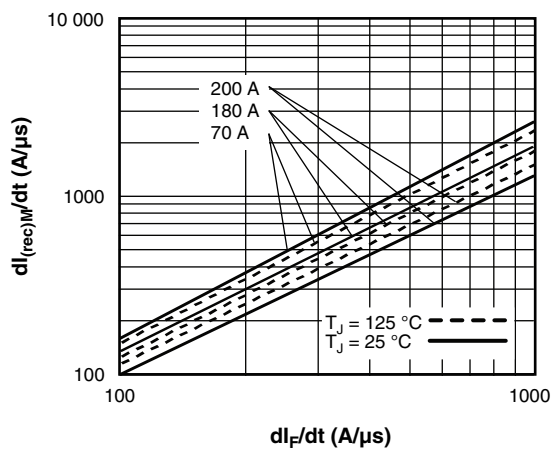


Fig. 8 - Typical  $dl_{(rec)M}/dt$  vs.  $dl_F/dt$

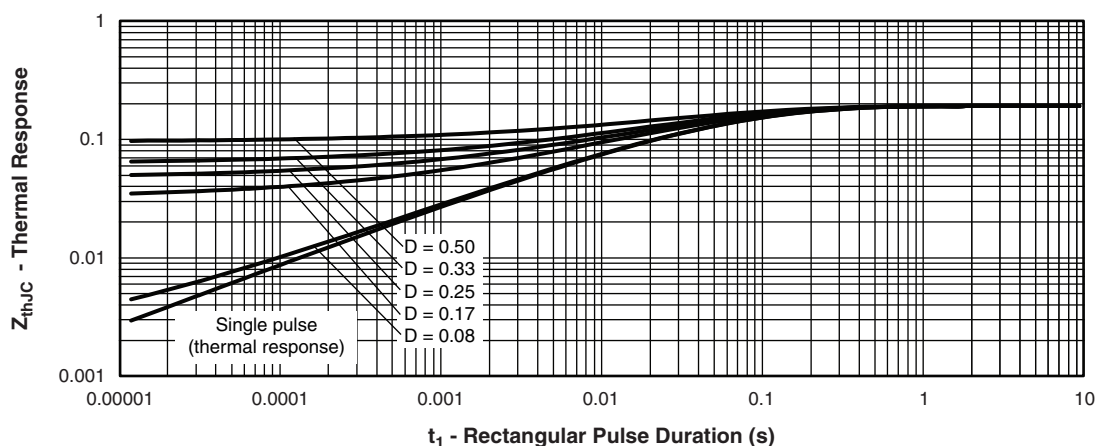


Fig. 9 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

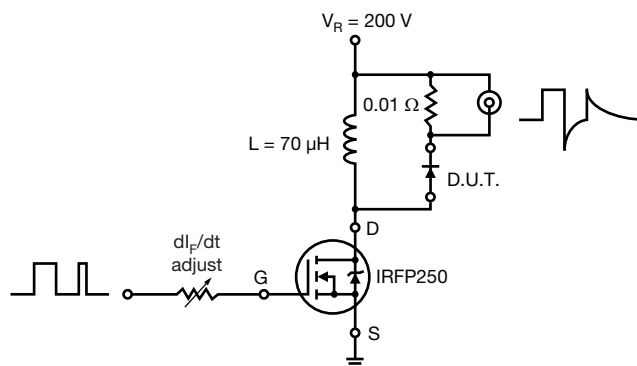


Fig. 10 - Reverse Recovery Parameter Test Circuit

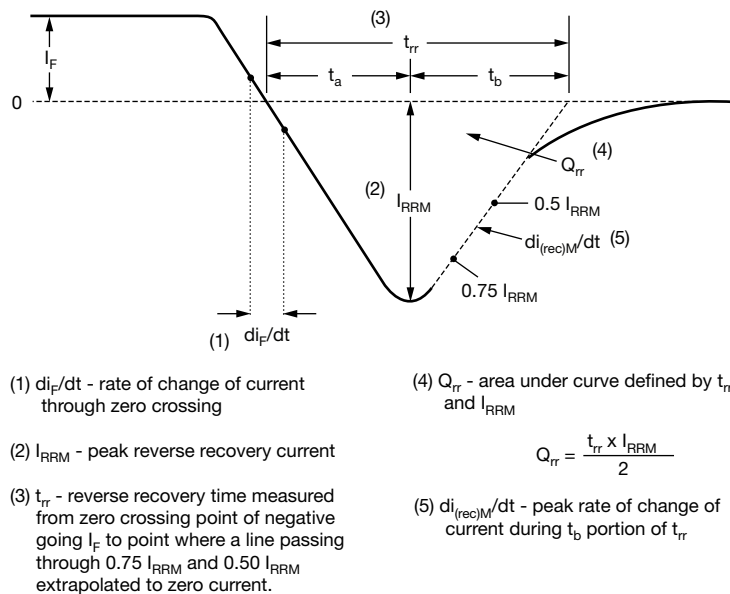


Fig. 11 - Reverse Recovery Waveform and Definitions

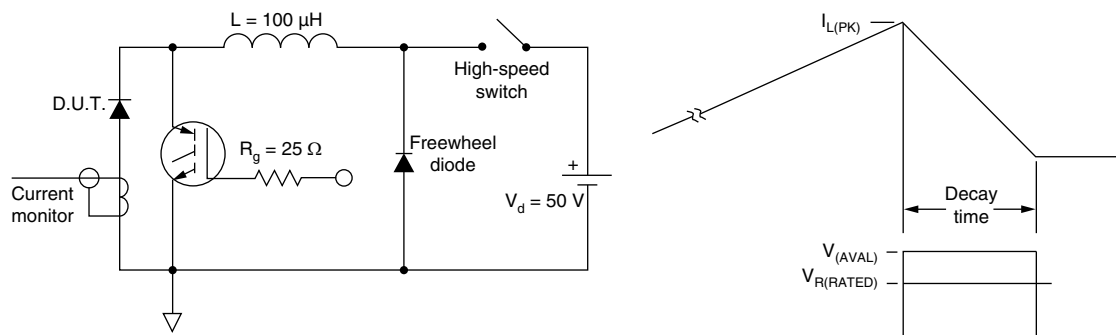


Fig. 12 - Avalanche Test Circuit and Waveforms

## ORDERING INFORMATION TABLE

Device code	VS-	HFA	180	N	H	40	PbF
	1	2	3	4	5	6	7
1	Vishay Semiconductors product						
2	HEXFRED® family, electron irradiated						
3	Average current rating						
4	N = not isolated						
5	H = HALF-PAK (D-67)						
6	Voltage rating (400 V)						
7	Lead (Pb)-free						

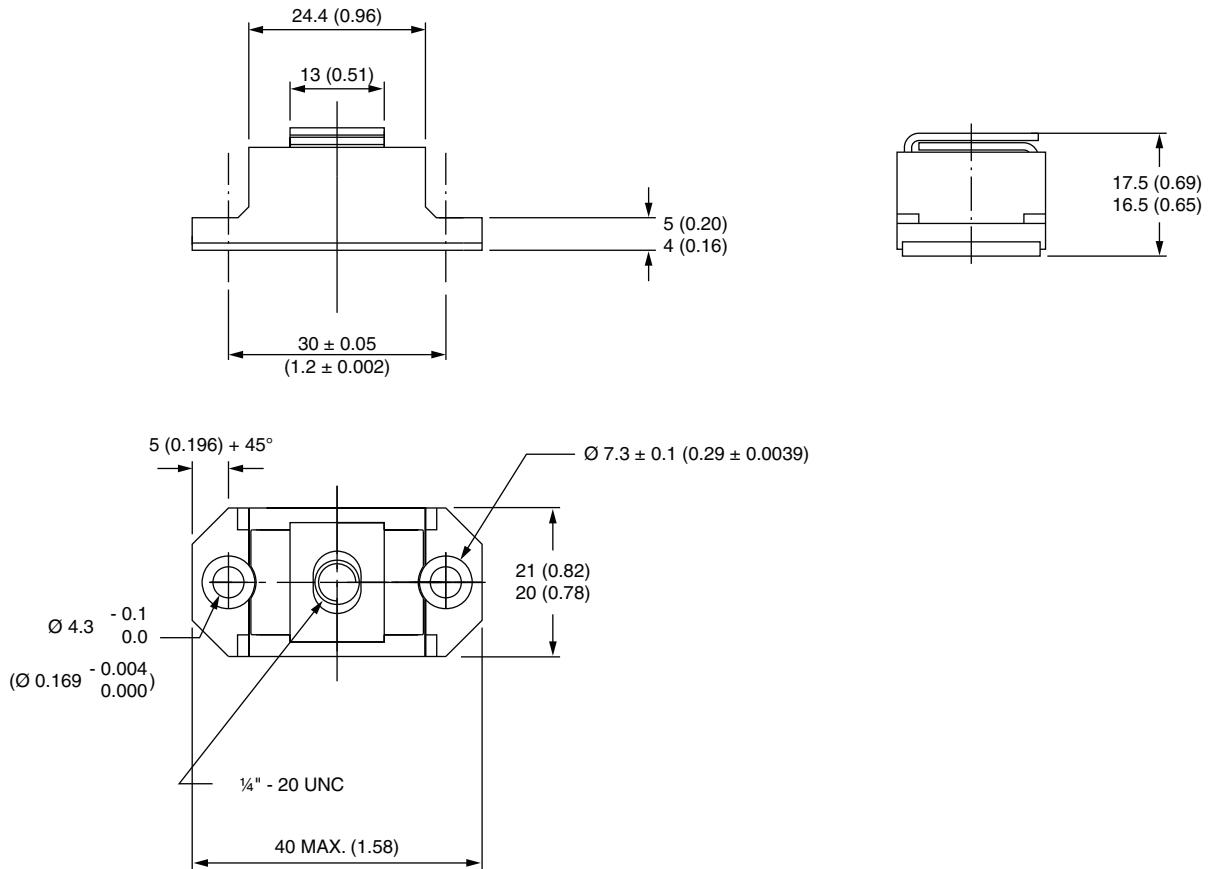
## LINKS TO RELATED DOCUMENTS

Dimensions

[www.vishay.com/doc?95020](http://www.vishay.com/doc?95020)

## D-67 HALF-PAK

**DIMENSIONS** in millimeters (inches)





## Disclaimer

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