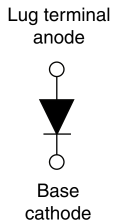
HEXFRED®
Ultrafast Soft Recovery Diode, 180 A

HALF-PAK (D-67)



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

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

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.

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 °C	395	A
		T_C = 100 °C	200	
Single pulse forward current	I_{FSM}	Limited by junction temperature	1200	
Non-repetitive avalanche energy	E_{AS}	L = 100 µH, duty cycle limited by maximum T_J	1.4	mJ
Maximum power dissipation	P_D	T_C = 25 °C	657	W
		T_C = 100 °C	263	
Operating junction and storage temperature range	T_J, T_{Stg}		-55 to +150	°C

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	I_R = 100 µA		400	-	-	V
Maximum forward voltage	V_{FM}	I_F = 180 A	See fig. 1	-	1.08	1.46	
		I_F = 360 A		-	1.22	1.8	
		I_F = 180 A, T_J = 125 °C		-	0.99	1.34	
Maximum reverse leakage current	I_{RM}	T_J = 125 °C, V_R = 400 V	See fig. 2	-	-	4	mA
Junction capacitance	C_T	V_R = 200 V	See fig. 3	-	370	500	pF
Series inductance	L_S	From top of terminal hole to mounting plane		-	6.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time See fig. 5	t_{rr}	T_J = 25 °C	I_F = 135 A dI_F/dt = 200 A/μs V_R = 200 V	-	90	140	ns
		T_J = 125 °C		-	280	440	
Peak recovery current See fig. 6	I_{RRM}	T_J = 25 °C		-	9	16	A
		T_J = 125 °C		-	18	32	
Reverse recovery charge See fig. 7	Q_{rr}	T_J = 25 °C		-	300	950	nC
		T_J = 125 °C		-	2650	6300	
Peak rate of recovery current See fig. 8	$dI_{(rec)M}/dt$	T_J = 25 °C		-	300	-	A/μs
		T_J = 125 °C		-	290	-	

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER		**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum junction and storage temperature range		T_J, T_{Stg}		-55 to +150	°C
Maximum thermal resistance, junction to case		R_{thJC}	DC operation See fig. 4	0.19	°C/W
Typical thermal resistance, case to heatsink		R_{thCS}	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)		

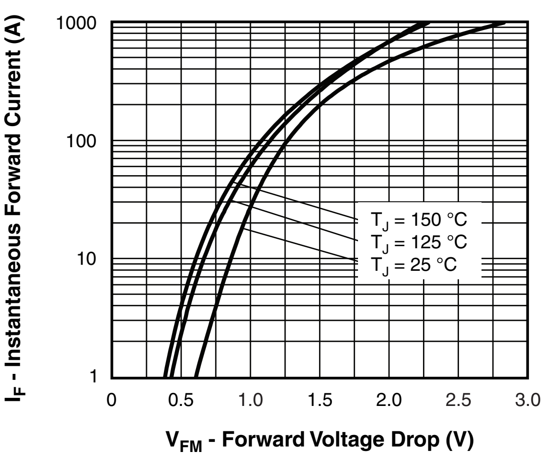


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

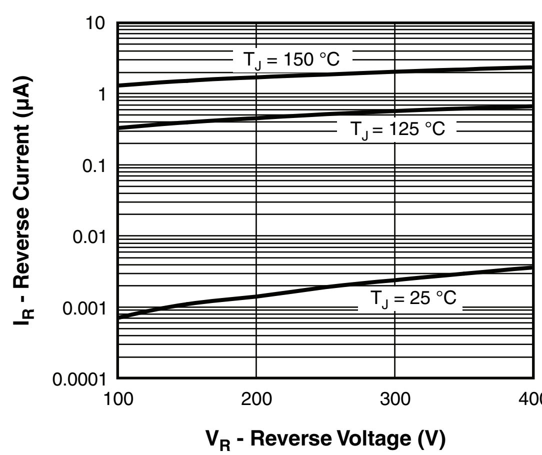


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

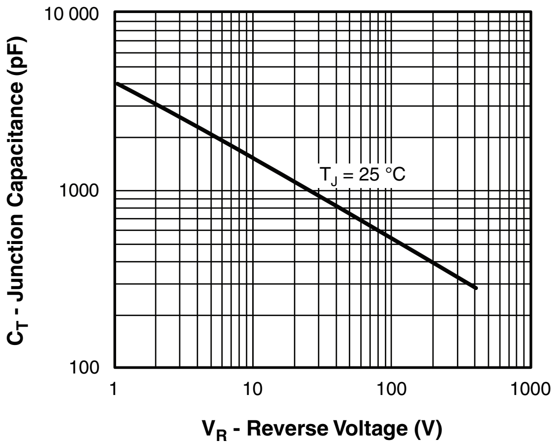


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

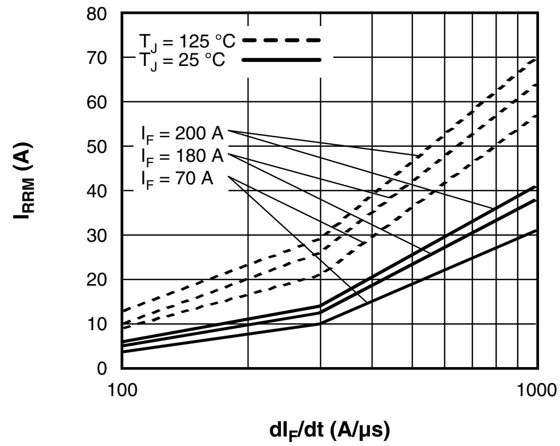


Fig. 6 - Typical Recovery Current vs. dI_F/dt

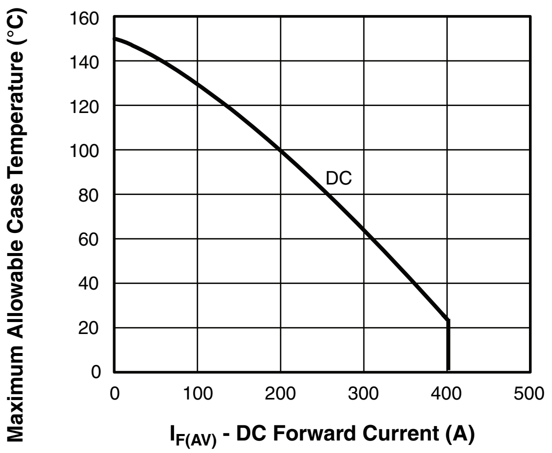


Fig. 4 - Maximum Allowable Case Temperature vs. DC Forward Current

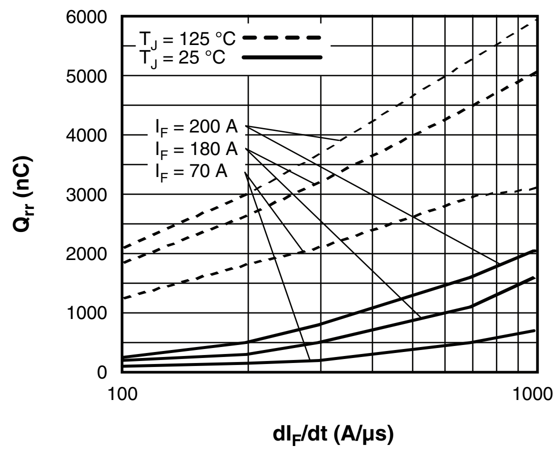


Fig. 7 - Typical Stored Charge vs. dI_F/dt

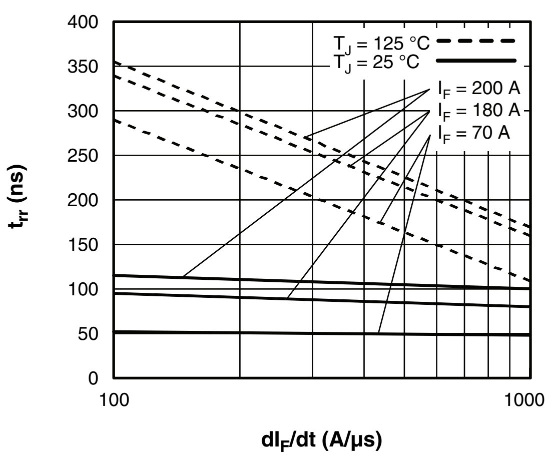


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

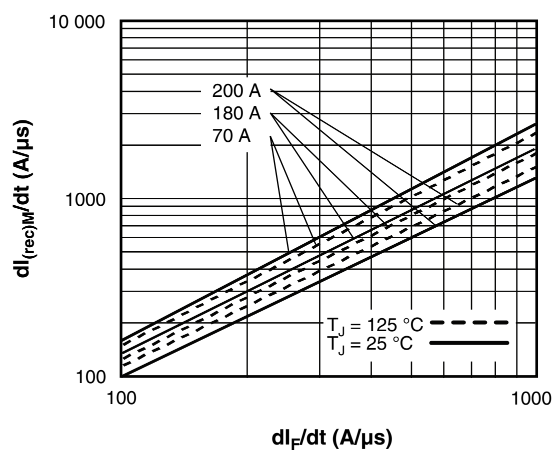


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt

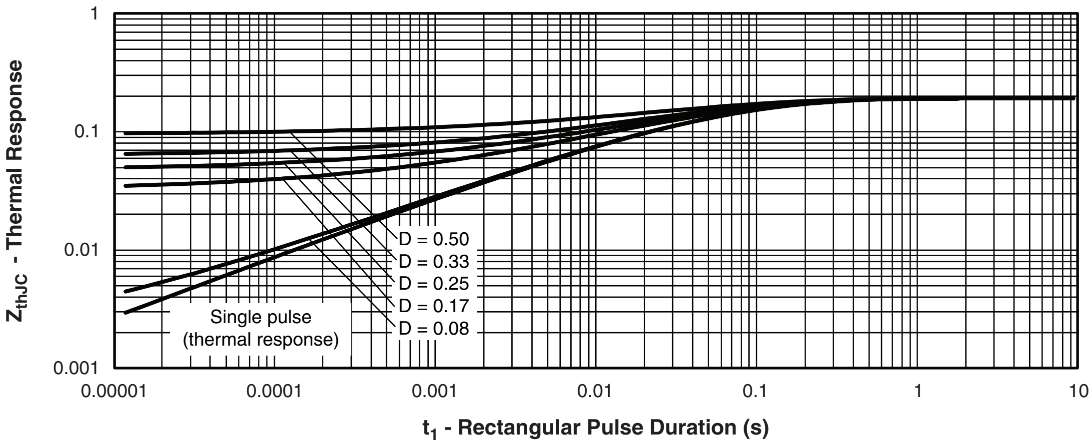


Fig. 9 - Maximum Thermal Impedance Z_{thJC} Characteristics

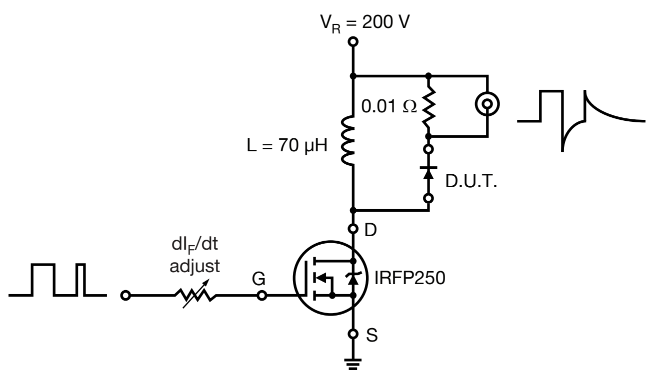
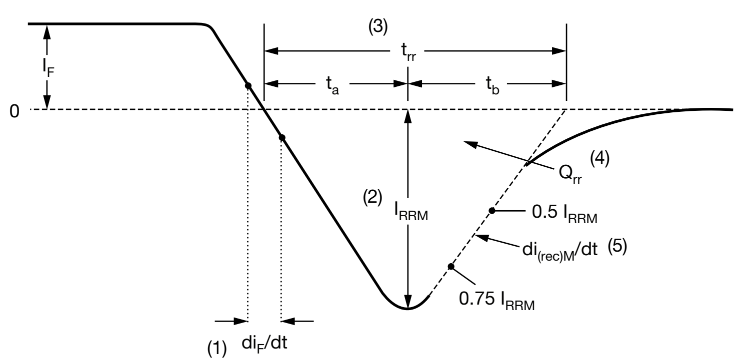


Fig. 10 - Reverse Recovery Parameter Test Circuit



(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}

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

(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

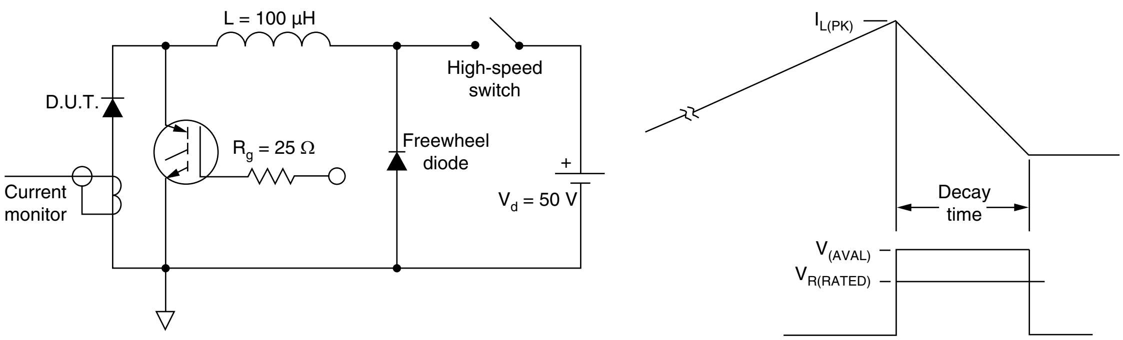


Fig. 12 - Avalanche Test Circuit and Waveforms

ORDERING INFORMATION TABLE

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)

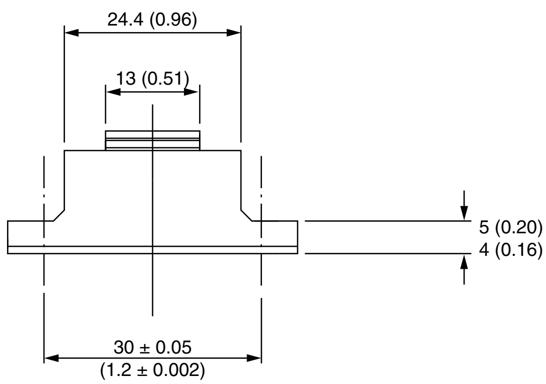
6 - Voltage rating (400 V)

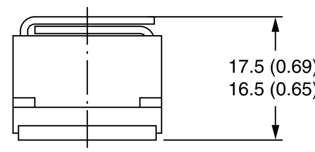
7 - Lead (Pb)-free

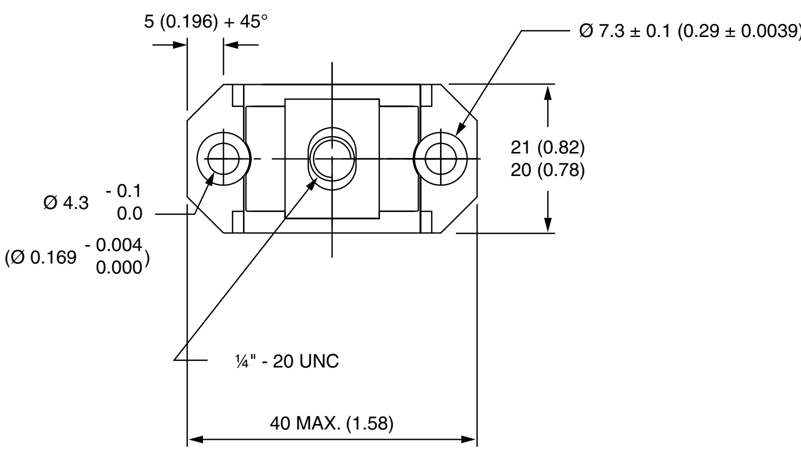
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95020

D-67 HALF-PAK

DIMENSIONS in millimeters (inches)







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