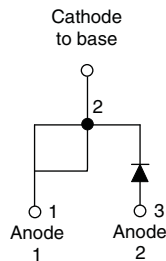


## HEXFRED® Ultrafast Soft Recovery Diode, 8 A



TO-247AC modified


**FEATURES**

- Ultrafast and ultrasoft recovery
- Very low  $I_{RRM}$  and  $Q_{rr}$
- Designed and qualified according to JEDEC-JESD47
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**BENEFITS**

- Reduced RFI and EMI
- Reduced power loss in diode and switching transistor
- Higher frequency operation
- Reduced snubbing
- Reduced parts count

**DESCRIPTION**

VS-HFA08PB120... is a state of the art ultrafast recovery diode. Employing the latest in epitaxial construction and advanced processing techniques it features a superb combination of characteristics which result in performance which is unsurpassed by any rectifier previously available. With basic ratings of 1200 V and 8 A continuous current, the VS-HFA08PB120... is especially well suited for use as the companion diode for IGBTs and MOSFETs. In addition to ultrafast recovery time, the HEXFRED® product line features extremely low values of peak recovery current ( $I_{RRM}$ ) and does not exhibit any tendency to “snap-off” during the  $t_b$  portion of recovery. The HEXFRED features combine to offer designers a rectifier with lower noise and significantly lower switching losses in both the diode and the switching transistor. These HEXFRED advantages can help to significantly reduce snubbing, component count and heatsink sizes. The HEXFRED VS-HFA08PB120... is ideally suited for applications in power supplies and power conversion systems (such as inverters), motor drives, and many other similar applications where high speed, high efficiency is needed.

**PRODUCT SUMMARY**

Package	TO-247AC modified (2 pins)
$I_{F(AV)}$	8 A
$V_R$	1200 V
$V_F$ at $I_F$	3.3 V
$t_{rr}$ typ.	28 ns
$T_J$ max.	150 °C
Diode variation	Single die

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	$V_R$		1200	V
Maximum continuous forward current	$I_F$	$T_C = 100\text{ °C}$	8	A
Single pulse forward current	$I_{FSM}$		130	
Maximum repetitive forward current	$I_{FRM}$		32	
Maximum power dissipation	$P_D$	$T_C = 25\text{ °C}$	73.5	W
		$T_C = 100\text{ °C}$	29	
Operating junction and storage temperature range	$T_J, T_{Stg}$		- 55 to + 150	°C



<b>ELECTRICAL SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	$V_{BR}$	$I_R = 100\text{ }\mu\text{A}$	1200	-	-	V
Maximum forward voltage	$V_{FM}$	$I_F = 8.0\text{ A}$	-	2.6	3.3	
		$I_F = 16\text{ A}$	-	3.4	4.3	
		$I_F = 8.0\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	2.4	3.1	
Maximum reverse leakage current	$I_{RM}$	$V_R = V_R\text{ rated}$	-	0.31	10	$\mu\text{A}$
		$T_J = 125\text{ }^\circ\text{C}, V_R = 0.8 \times V_R\text{ rated}$	-	135	1000	
Junction capacitance	$C_T$	$V_R = 200\text{ V}$	-	11	20	pF
Series inductance	$L_S$	Measured lead to lead 5 mm from package body	-	8.0	-	nH

<b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time See fig. 5, 10	$t_{rr}$	$I_F = 1.0\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 30\text{ V}$	-	28	-	ns
	$t_{rr1}$	$T_J = 25\text{ }^\circ\text{C}$	-	63	95	
	$t_{rr2}$	$T_J = 125\text{ }^\circ\text{C}$	-	106	160	
Peak recovery current See fig. 6	$I_{RRM1}$	$T_J = 25\text{ }^\circ\text{C}$	-	4.5	8.0	A
	$I_{RRM2}$	$T_J = 125\text{ }^\circ\text{C}$	-	6.2	11	
Reverse recovery charge See fig. 7	$Q_{rr1}$	$T_J = 25\text{ }^\circ\text{C}$	-	140	380	nC
	$Q_{rr2}$	$T_J = 125\text{ }^\circ\text{C}$	-	335	880	
Peak rate of recovery current during $t_b$ See fig. 8	$di_{(rec)M}/dt1$	$T_J = 25\text{ }^\circ\text{C}$	-	133	-	$\text{A}/\mu\text{s}$
	$di_{(rec)M}/dt2$	$T_J = 125\text{ }^\circ\text{C}$	-	85	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Lead temperature	$T_{lead}$	0.063" from case (1.6 mm) for 10 s	-	-	300	$^\circ\text{C}$
Thermal resistance, junction to case	$R_{thJC}$		-	-	1.7	K/W
Thermal resistance, junction to ambient	$R_{thJA}$	Typical socket mount	-	-	40	
Thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, flat, smooth and greased	-	0.25	-	
Weight			-	6.0	-	g
			-	0.21	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-247AC modified (JEDEC)	HFA08PB120			

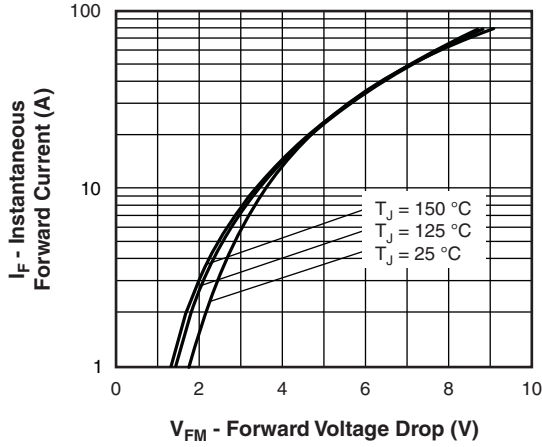


Fig. 1 - Maximum Forward Voltage Drop Characteristics

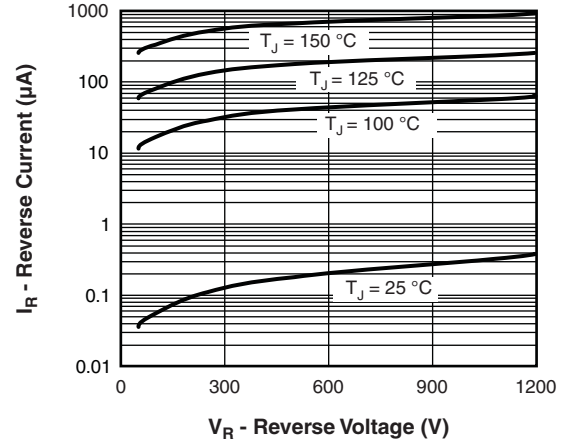


Fig. 2 - Values of Reverse Current vs. Reverse Voltage

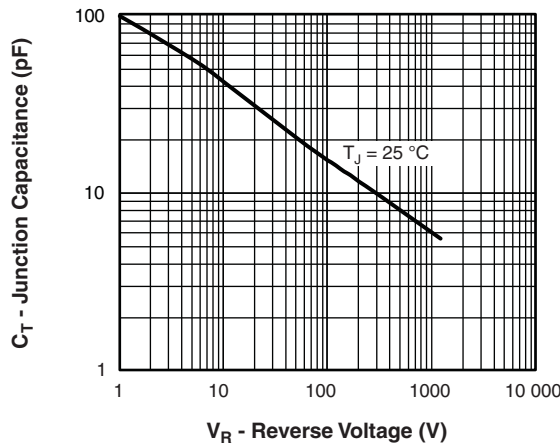


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

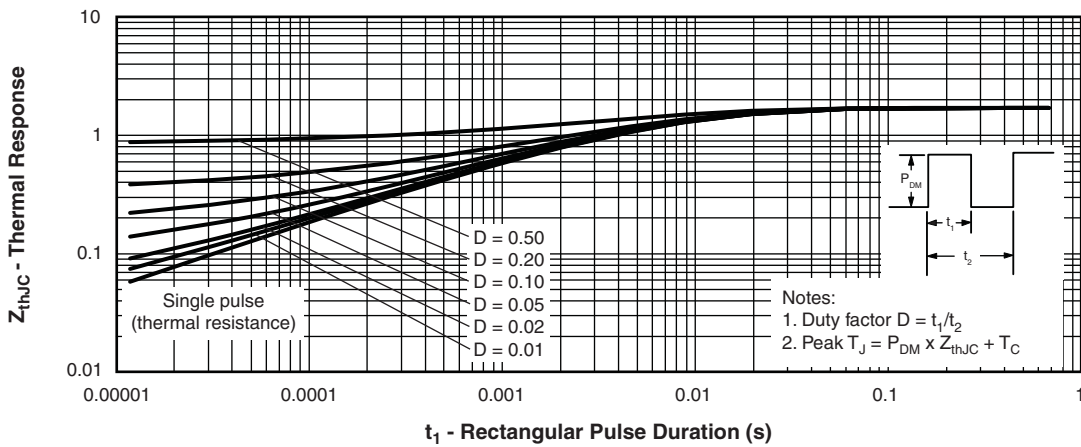


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

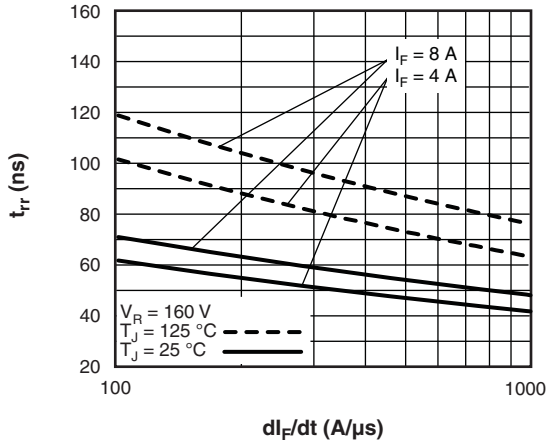


Fig. 5 - Typical Reverse Recovery Time vs.  $dI_F/dt$

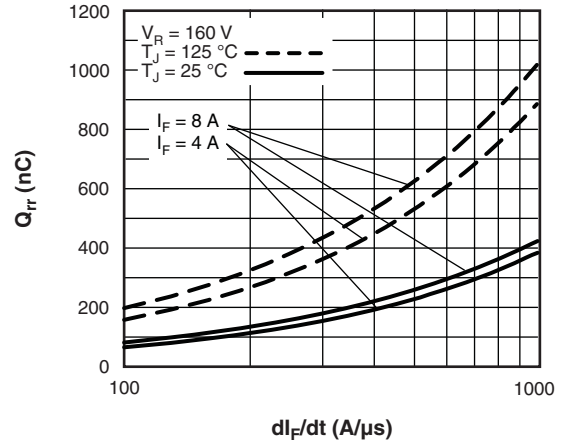


Fig. 7 - Typical Stored Charge vs.  $dI_F/dt$

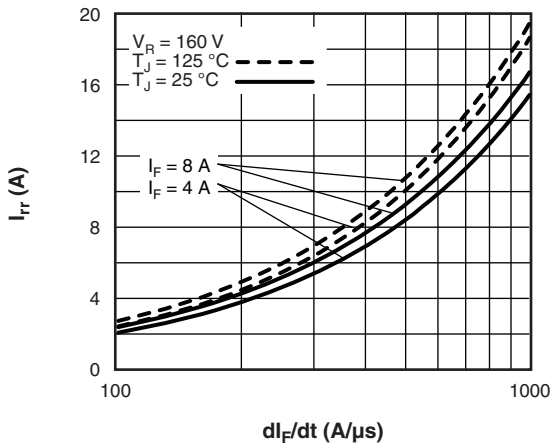


Fig. 6 - Typical Recovery Current vs.  $dI_F/dt$

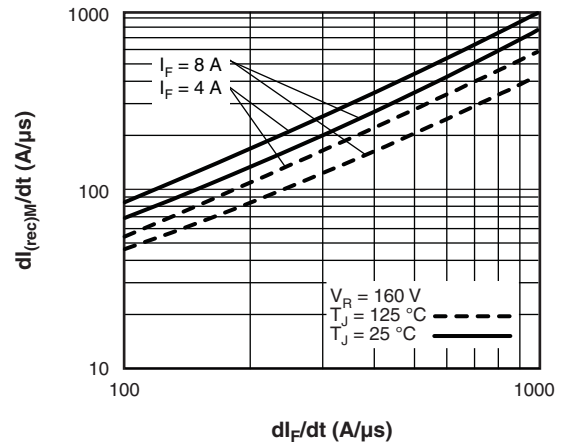


Fig. 8 - Typical  $dI_{(rec)M}/dt$  vs.  $dI_F/dt$

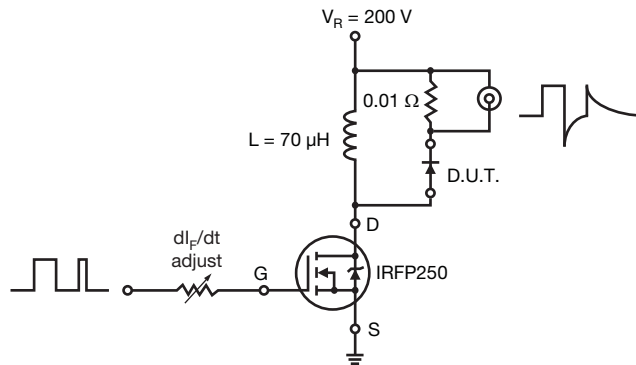
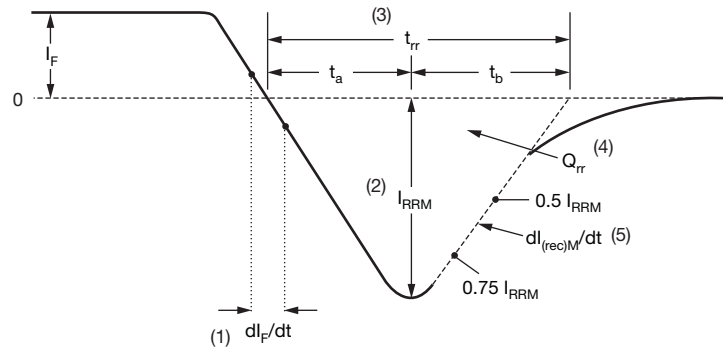


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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. 10 - Reverse Recovery Waveform and Definitions

### ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>HF</b>	<b>A</b>	<b>08</b>	<b>PB</b>	<b>120</b>	<b>PbF</b>
	①	②	③	④	⑤	⑥	⑦

- ① - Vishay Semiconductors product
- ② - HEXFRED® family
- ③ - Electron irradiated
- ④ - Current rating (08 = 8A)
- ⑤ - PB = TO-247AC modified
- ⑥ - Voltage rating: (120 = 1200 V)
- ⑦ - Environmental digit:

PbF = Lead (Pb)-free and RoHS compliant

-N3 = Halogen-free, RoHS compliant and totally lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-HFA08Pb120PbF	25	500	Antistatic plastic tube
VS-HFA08Pb120-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95541">www.vishay.com/doc?95541</a>
Part marking information	TO-247AC modified PbF <a href="http://www.vishay.com/doc?95255">www.vishay.com/doc?95255</a>
	TO-247AC modified -N3 <a href="http://www.vishay.com/doc?95442">www.vishay.com/doc?95442</a>





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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**



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- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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