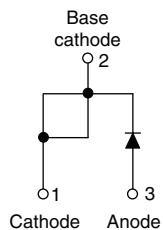


HEXFRED®

Ultrafast Soft Recovery Diode, 8 A


TO-220AC

FEATURES

- Ultrafast recovery
- Ultrasoft recovery
- Very low I_{RRM}
- Very low Q_{rr}
- Specified at operating conditions
- Lead (Pb)-free
- Designed and qualified for industrial level


RoHS*
COMPLIANT

BENEFITS

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

DESCRIPTION

HFA08TB120 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 HFA08TB120 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 HFA08TB120 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	
V_R	1200 V
V_F at 8 A at 25 °C	3.3 V
$I_{F(AV)}$	8 A
t_{rr} (typical)	28 ns
T_J (maximum)	150 °C
Q_{rr} (typical)	140 nC
$dI_{(rec)M}/dt$ (typical) at 125 °C	85 A/μs
I_{RRM} (typical)	4.5 A

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

* Pb containing terminations are not RoHS compliant, exemptions may apply

HFA08TB120PbF

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	$I_R = 100 \mu\text{A}$	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	
		$I_F = 8.0 \text{ A}, T_J = 125^\circ\text{C}$	-	2.4	3.1	
Maximum reverse leakage current	I_{RM}	$V_R = V_R \text{ rated}$	-	0.31	10	μA
		$T_J = 125^\circ\text{C}, V_R = 0.8 \times V_R \text{ rated}$	-	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

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	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}	$T_J = 25^\circ\text{C}$	-	63	95	
	t_{rr2}	$T_J = 125^\circ\text{C}$	-	106	160	
Peak recovery current	I_{RRM1}	$T_J = 25^\circ\text{C}$	-	4.5	8.0	A
	I_{RRM2}	$T_J = 125^\circ\text{C}$	-	6.2	11	
Reverse recovery charge	Q_{rr1}	$T_J = 25^\circ\text{C}$	-	140	380	nC
	Q_{rr2}	$T_J = 125^\circ\text{C}$	-	335	880	
Peak rate of recovery current during t_b	$dl_{(rec)M}/dt1$	$T_J = 25^\circ\text{C}$	-	133	-	$\text{A}/\mu\text{s}$
	$dl_{(rec)M}/dt2$	$T_J = 125^\circ\text{C}$	-	85	-	

THERMAL - MECHANICAL SPECIFICATIONS

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)	$\text{k}\text{gf} \cdot \text{cm}$ (lbf · in)
Marking device		Case style TO-220AC	HFA08TB120			

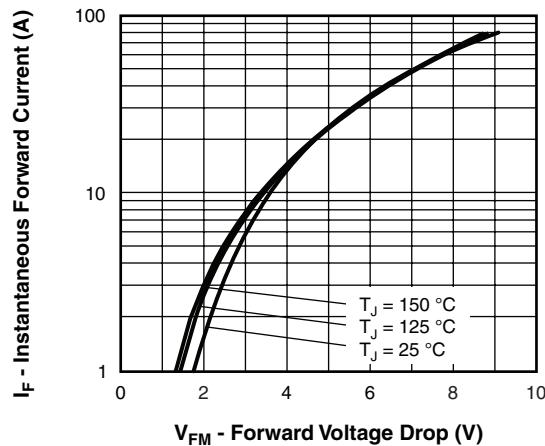
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Fig. 1 - Maximum Forward Voltage Drop Characteristics

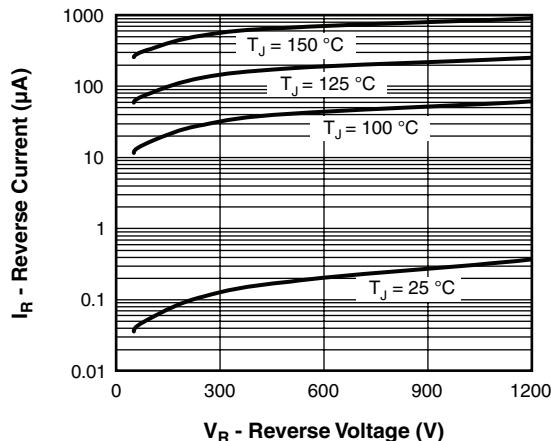


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

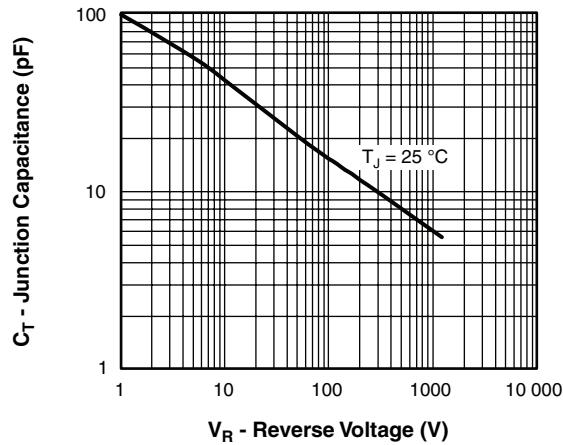
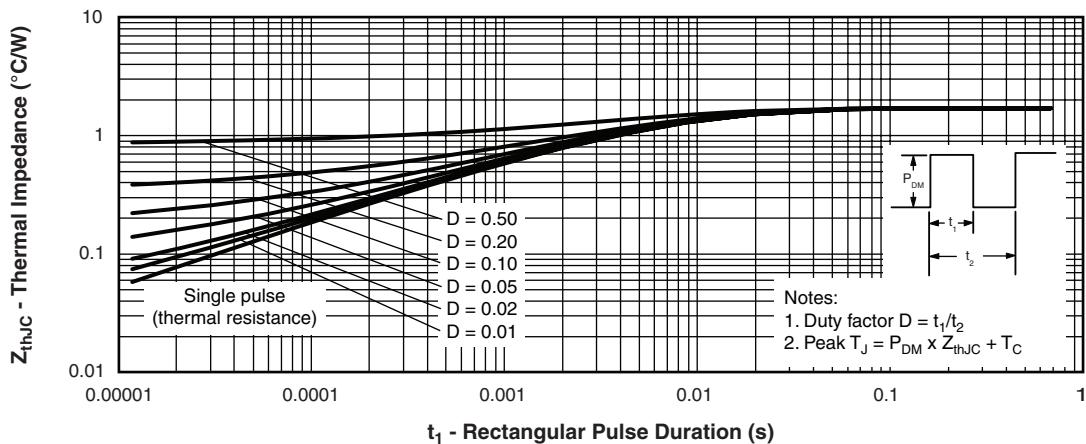


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

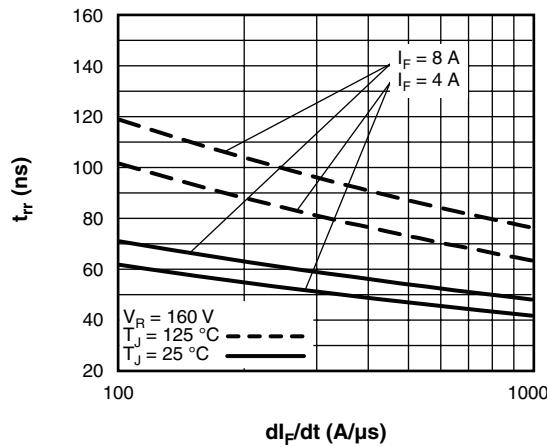


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

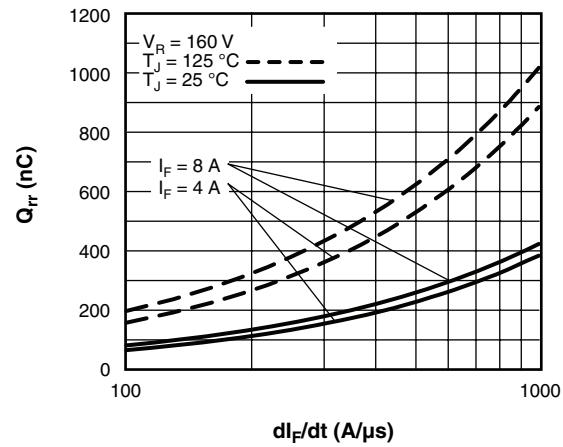


Fig. 7 - Typical Stored Charge vs. dI_F/dt

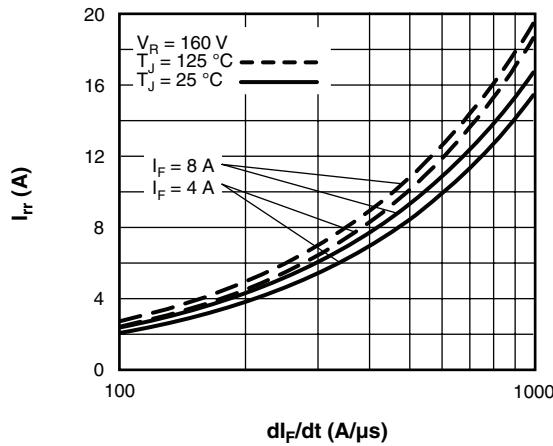


Fig. 6 - Typical Recovery Current vs. dI_F/dt

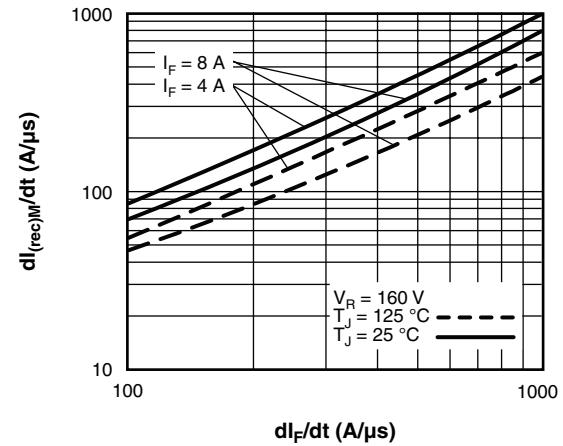


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt

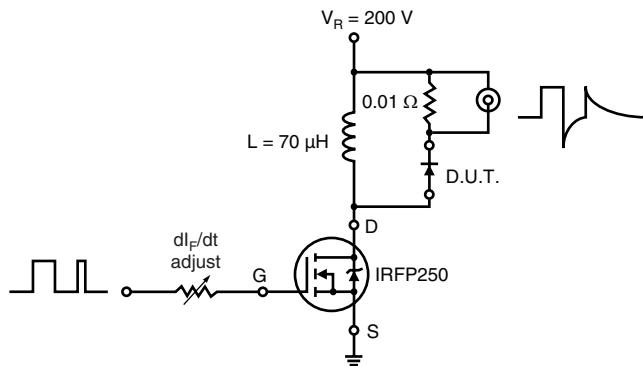
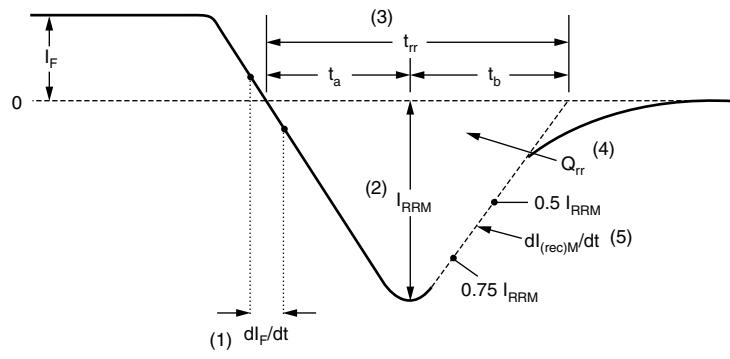


Fig. 9 - Reverse Recovery Parameter Test Circuit



(1) dl_F/dt - rate of change of current through zero crossing

(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}

(2) I_{RRM} - peak reverse recovery current

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

(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.

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

Fig. 10 - Reverse Recovery Waveform and Definitions

HFA08TB120PbF

Vishay High Power Products

HEXFRED®
Ultrafast Soft Recovery Diode, 8 A



ORDERING INFORMATION TABLE

Device code	HF	A	08	TB	120	PbF
	1	2	3	4	5	6

- 1** - HEXFRED® family
- 2** - Process designator A = subs. elec. irrad.
B = subs. platinum
- 3** - Current rating (08 = 8 A)
- 4** - Package outline (TB = TO-220, 2 leads)
- 5** - Voltage rating (120 = 1200 V)
- 6** - • None = Standard production
• PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95221
Part marking information	http://www.vishay.com/doc?95224

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