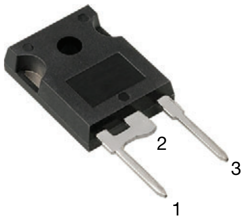
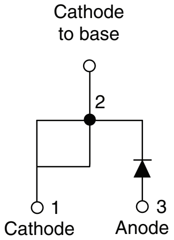
HEXFRED®
Ultrafast Soft Recovery Diode, 8 A



TO-247AC modified



FEATURES

- Ultrafast and ultrasoft recovery
- Very low I_{RRM} and Q_{rr}
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization:
  for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e3
RoHS
COMPLIANT
HALOGEN
FREE
Available

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	2.4 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 °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

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		1200	-	-	V
Maximum forward voltage	V_{FM}	I_F = 8.0 A	See fig. 1	-	2.6	3.3	
		I_F = 16 A		-	3.4	4.3	
		I_F = 8.0 A, T_J = 125 °C		-	2.4	3.1	
Maximum reverse leakage current	I_{RM}	V_R = V_R rated	See fig. 2	-	0.31	10	μA
		T_J = 125 °C, V_R = 0.8 x V_R rated		-	135	1000	
Junction capacitance	C_T	V_R = 200 V	See fig. 3	-	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 °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 A, dI_F/dt = 200 A/μs, V_R = 30 V		-	28	-	ns
	t_{rr1}	T_J = 25 °C	I_F = 8.0 A dI_F/dt = 200 A/μs V_R = 200 V	-	63	95	
	t_{rr2}	T_J = 125 °C		-	106	160	
Peak recovery current See fig. 6	I_{RRM1}	T_J = 25 °C		-	4.5	8.0	A
	I_{RRM2}	T_J = 125 °C		-	6.2	11	
Reverse recovery charge See fig. 7	Q_{rr1}	T_J = 25 °C		-	140	380	nC
	Q_{rr2}	T_J = 125 °C		-	335	880	
Peak rate of recovery current during t_b See fig. 8	$dI_{(rec)M}/dt1$	T_J = 25 °C		-	133	-	A/μs
	$dI_{(rec)M}/dt2$	T_J = 125 °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	°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			

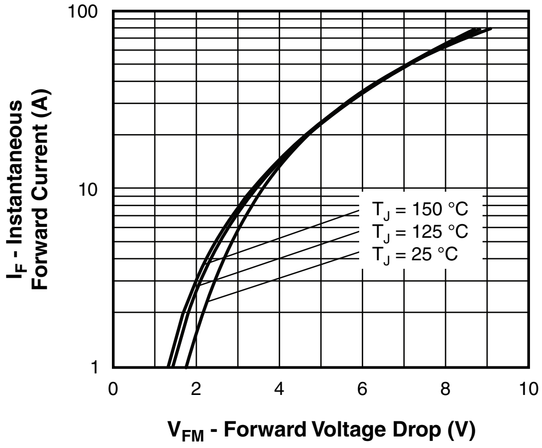


Fig. 1 - Maximum Forward Voltage Drop Characteristics

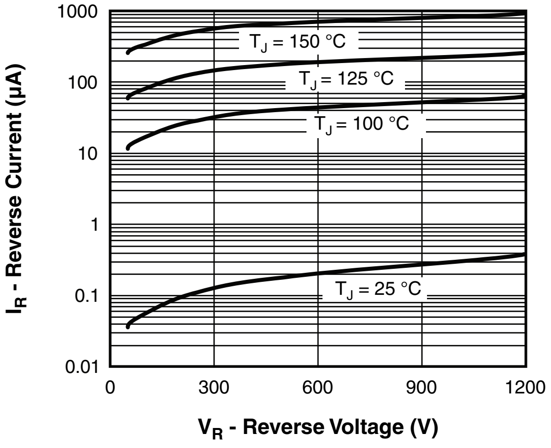


Fig. 2 - Values of Reverse Current vs. Reverse Voltage

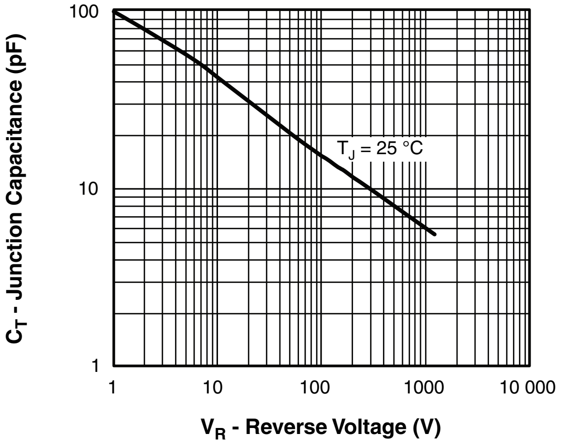


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

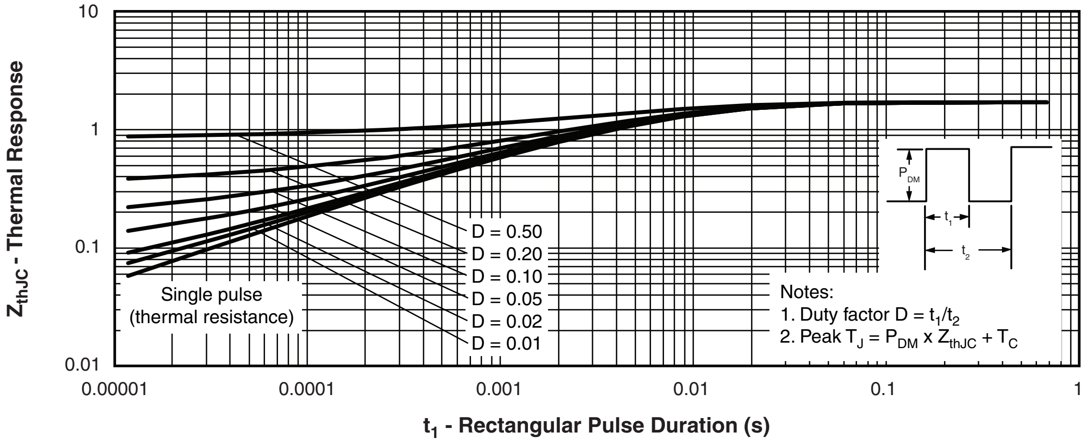


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

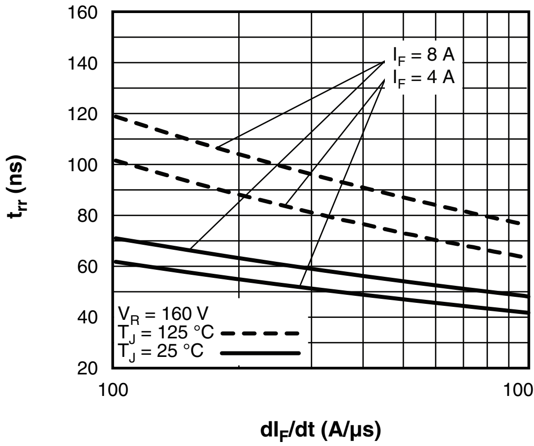


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

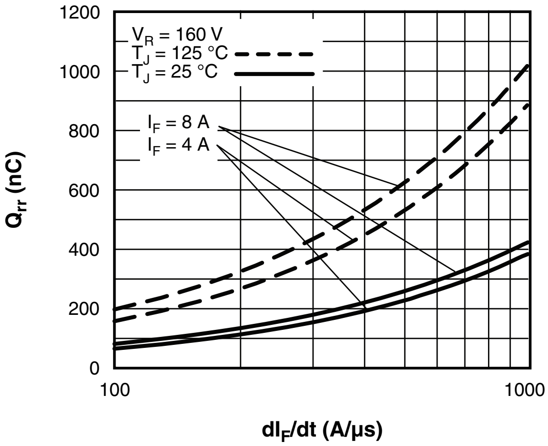


Fig. 7 - Typical Stored Charge vs. dI_F/dt

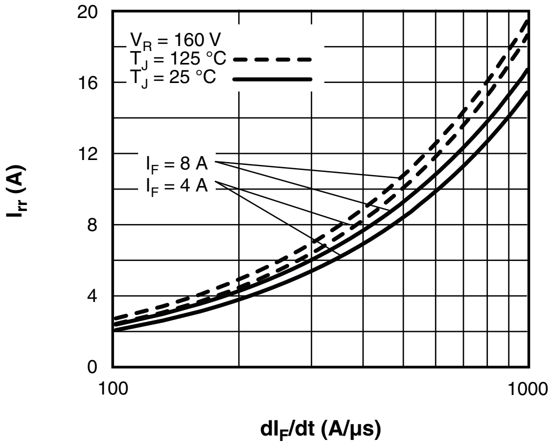


Fig. 6 - Typical Recovery Current vs. dI_F/dt

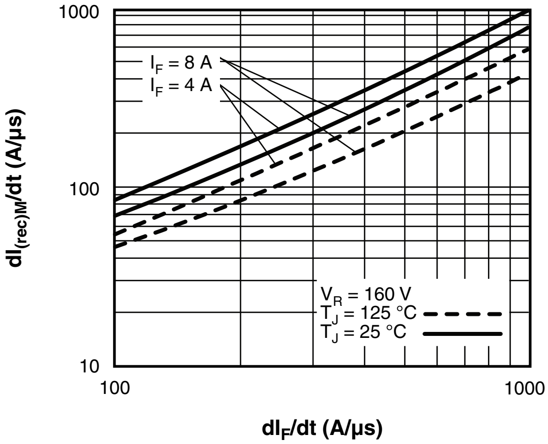


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt

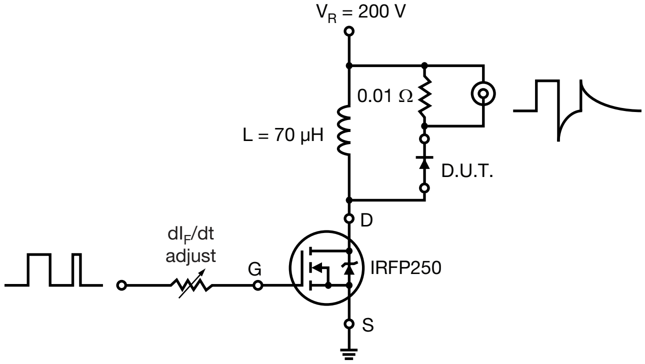
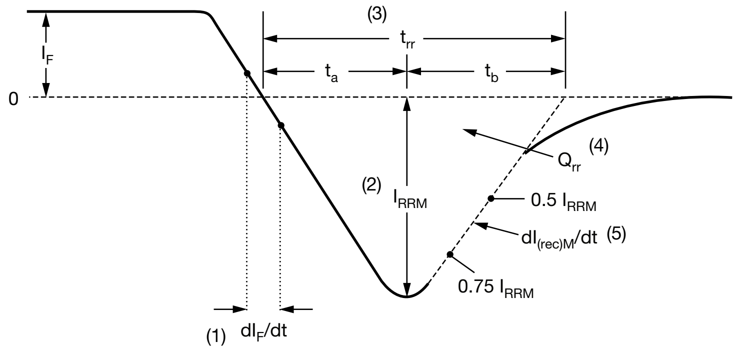


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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	VS-	HF	A	08	PB	120	PbF
	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

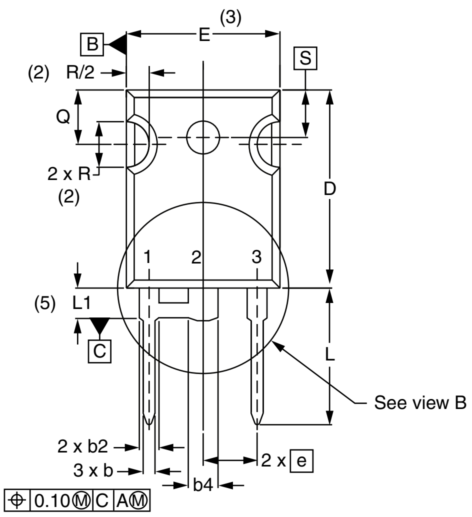
ORDERING INFORMATION (Example)

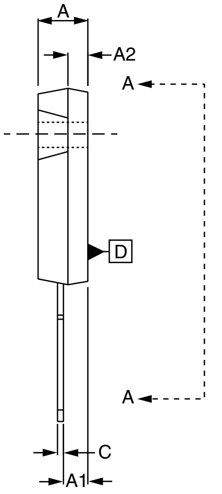
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-HFA08Pb120PbF	25	500	Antistatic plastic tube
VS-HFA08Pb120-N3	25	500	Antistatic plastic tube

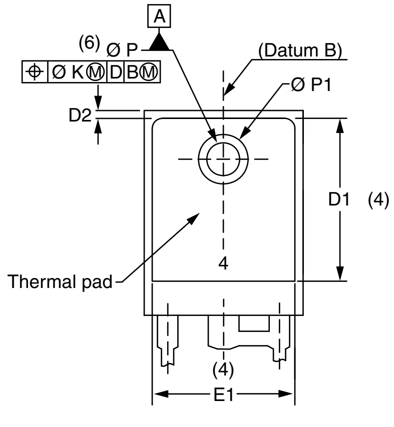
LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95541
Part marking information	TO-247AC modified PbF	www.vishay.com/doc?95255
	TO-247AC modified -N3	www.vishay.com/doc?95442

TO-247AC modified - 50 mils L/F

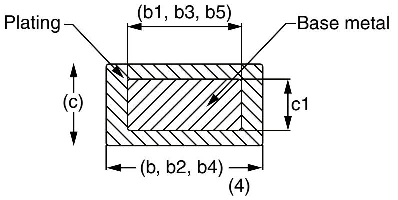
DIMENSIONS in millimeters and inches



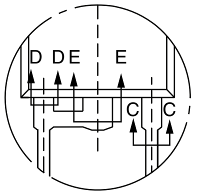




View A - A



Section C - C, D - D, E - E



View B

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.17	1.37	0.046	0.054	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.34	0.065	0.092	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.89	0.015	0.035	
c1	0.38	0.84	0.015	0.033	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.35	0.020	0.053	
E	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
e	5.46 BSC		0.215 BSC		
Ø K	0.254		0.010		
L	14.20	16.10	0.559	0.634	
L1	3.71	4.29	0.146	0.169	
Ø P	3.56	3.66	0.14	0.144	
Ø P1	-	7.39	-	0.291	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		

Notes

(1) Dimensioning and tolerance per ASME Y14.5M-1994

(2) Contour of slot optional

(3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body

(4) Thermal pad contour optional with dimensions D1 and E1

(5) Lead finish uncontrolled in L1

(6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")

(7) Outline conforms to JEDEC® outline TO-247 with exception of dimension c and Q

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