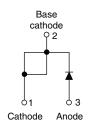


HEXFRED® Ultrafast Soft Recovery Diode, 8 A





PRODUCT SUMMARY					
Package	TO-220AC				
I _{F(AV)}	8 A				
V_{R}	600 V				
V _F at I _F	1.4 V				
t _{rr} typ.	18 ns				
T _J max.	150 °C				
Diode variation	Single die				

FEATURES

- Ultrafast and ultrasoft recovery
- Very low I_{RRM} and Q_{rr}
- AEC-Q101 qualified meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912





ROHS COMPLIANT HALOGEN FREE

BENEFITS

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

DESCRIPTION

VS-HFA08TB60... 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 600 V and 8 A continuous current, the VS-HFA08TB60... 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 (IRRM) and does not exhibit any tendency to "snap-off" during the tb 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-HFA08TB60... 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.

ABSOLUTE MAXIMUM RATINGS							
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS			
Cathode to anode voltage	V _R		600	V			
Maximum continuous forward current	I _F	T _C = 100 °C	8				
Single pulse forward current	I _{FSM}		60	Α			
Maximum repetitive forward current	I _{FRM}		24				
Maximum navay discination	P _D	T _C = 25 °C	36	W			
Maximum power dissipation		T _C = 100 °C	14	- vv			
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		600	-	-	
Maximum forward voltage		I _F = 8.0 A	See fig. 1	-	1.4	1.7	V
	Maximum forward voltage $V_{FM} = I_F = 16 \text{ A}$ $I_F = 8.0 \text{ A}, T_J = 125 \text{ °C}$	I _F = 16 A		-	1.7	2.1	
			-	1.4	1.7		
Maximum reverse		$V_R = V_R$ rated	$V_R = V_R$ rated		0.3	5.0	
leakage current	I _{RM}	$T_J = 125 ^{\circ}\text{C}, V_R = 0.8 ^{\circ}\text{X} V_R \text{ rated}$	See fig. 2	-	100	500	μA
Junction capacitance	C _T	V _R = 200 V See fig. 3		=	10	25	pF
Series inductance	L _S	Measured lead to lead 5 mm from package bod		-	8.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)								
PARAMETER	SYMBOL	TEST CO	MIN.	TYP.	MAX.	UNITS		
	t _{rr}	$I_F = 1.0 \text{ A}, dI_F/dt = 200 \text{ A}$	A/μs, V _R = 30 V	-	18	-		
Reverse recovery time	t _{rr1}	T _J = 25 °C	I _F = 8.0 A	-	37	-	ns	
	t _{rr2}	T _J = 125 °C		-	55	-		
Peak recovery current	I _{RRM1}	T _J = 25 °C		-	3.5	-	Α	
	I _{RRM2}	T _J = 125 °C		-	4.5	-		
Reverse recovery charge	Q _{rr1}	T _J = 25 °C	dI _F /dt = 200 A/μs V _R = 200 V	-	65	-	nC	
neverse recovery charge	Q _{rr2}	T _J = 125 °C		-	124	-	110	
Peak rate of fall of recovery current during t _b	dI _{(rec)M} /dt1	T _J = 25 °C		-	240	-	A/µs	
	dI _{(rec)M} /dt2	T _J = 125 °C		-	210	-	-νμ5	

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}		-	-	3.5		
Thermal resistance, junction to ambient	R _{thJA}	Typical socket mount	-	-	80	K/W	
Thermal resistance, case to heatsink	R _{thCS}	Mounting surface, flat, smooth and greased	-	0.5	-		
Weight			-	2.0	-	g	
vveigni			-	0.07	-	oz.	
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)	
Marking device		Case style TO-220AC	HFA08TB60H				

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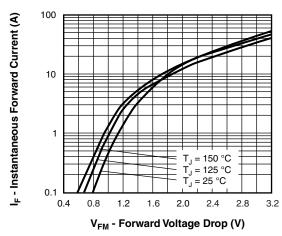


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

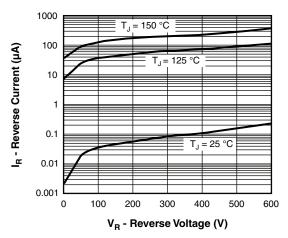


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

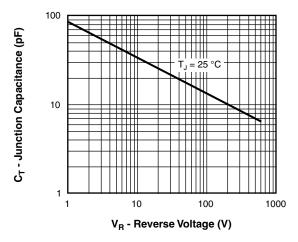


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

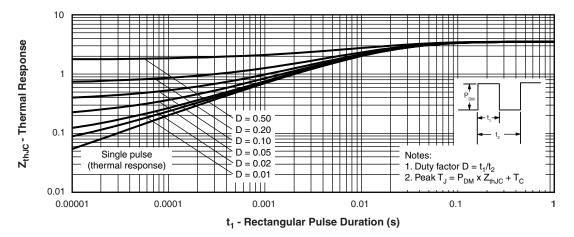


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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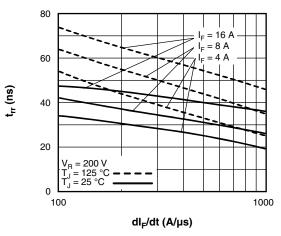


Fig. 5 - Typical Reverse Recovery Time vs. dl_F/dt

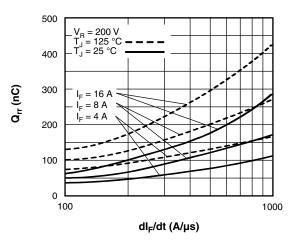


Fig. 7 - Typical Stored Charge vs. dl_F/dt

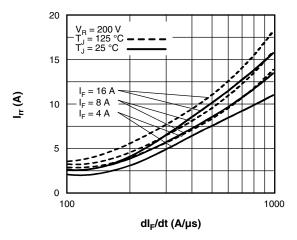


Fig. 6 - Typical Recovery Current vs. dl_F/dt

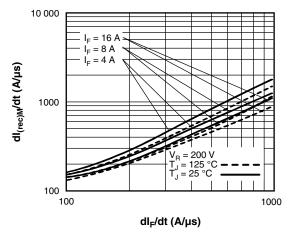
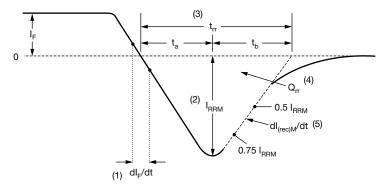


Fig. 8 - Typical dl_{(rec)M}/dt vs. dl_F/dt



- (1) dl_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) $\rm t_{rr}$ reverse recovery time measured from zero crossing point of negative going $\rm I_F$ to point where a line passing through 0.75 $\rm I_{RRM}$ and 0.50 $\rm I_{RRM}$ extrapolated to zero current.
- (4) $\mathbf{Q}_{\rm rr}$ area under curve defined by $\mathbf{t}_{\rm rr}$ and $\mathbf{I}_{\rm RRM}$

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

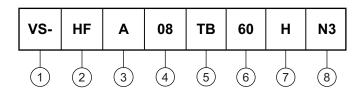
(5) dl_{(rec)M}/dt - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

- HEXFRED® family

3 - Electron irradiated

Current rating (08 = 8 A)

5 - Package:

TB = TO-220AC

6 - Voltage rating (60 = 600 V)

7 - H = AEC-Q101 qualified

8 - Environmental digit:

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

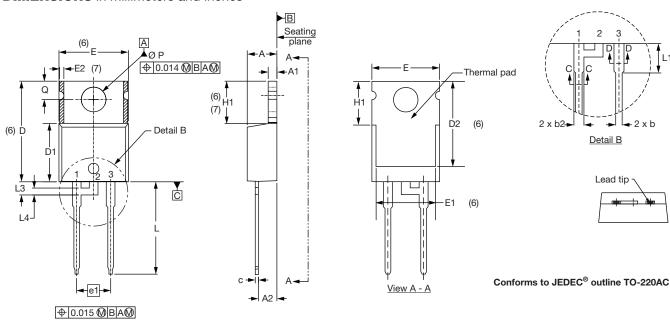
ORDERING INFORMATION (Example)							
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION				
VS-HFA08TB60HN3	50	1000	Antistatic plastic tube				

LINKS TO RELATED DOCUMENTS					
Dimensions		www.vishay.com/doc?95221			
Part marking information	TO-220AC-N3	www.vishay.com/doc?95068			



TO-220AC

DIMENSIONS in millimeters and inches



SYMBOL	MILLIN	IETERS	INCHES		NOTES	
STIVIBUL	MIN.	MAX.	MIN.	MAX.	NOTES	
Α	4.25	4.65	0.167	0.183		
A1	1.14	1.40	0.045	0.055		
A2	2.56	2.92	0.101	0.115		
b	0.69	1.01	0.027	0.040		
b1	0.38	0.97	0.015	0.038	4	
b2	1.20	1.73	0.047	0.068		
b3	1.14	1.73	0.045	0.068	4	
С	0.36	0.61	0.014	0.024		
c1	0.36	0.56	0.014	0.022	4	
D	14.85	15.25	0.585	0.600	3	
D1	8.38	9.02	0.330	0.355		
D2	11.68	12.88	0.460	0.507	6	
Е	10.11	10.51	0.398	0.414	3, 6	

MILLIMETERS		INCHES		NOTES	
MIN.	MAX.	MIN.	MAX.	110120	
6.86	8.89	0.270	0.350	6	
-	0.76	-	0.030	7	
4.88	5.28	0.192	0.208		
5.84	6.86	0.230	0.270	6, 7	
13.52	14.02	0.532	0.552		
3.32	3.82	0.131	0.150	2	
1.78	2.13	0.070	0.084		
0.76	1.27	0.030	0.050	2	
3.54	3.73	0.139	0.147		
2.60	3.00	0.102	0.118		
	MIN. 6.86 - 4.88 5.84 13.52 3.32 1.78 0.76 3.54	MIN. MAX. 6.86 8.89 - 0.76 4.88 5.28 5.84 6.86 13.52 14.02 3.32 3.82 1.78 2.13 0.76 1.27 3.54 3.73	MIN. MAX. MIN. 6.86 8.89 0.270 - 0.76 - 4.88 5.28 0.192 5.84 6.86 0.230 13.52 14.02 0.532 3.32 3.82 0.131 1.78 2.13 0.070 0.76 1.27 0.030 3.54 3.73 0.139	MIN. MAX. MIN. MAX. 6.86 8.89 0.270 0.350 - 0.76 - 0.030 4.88 5.28 0.192 0.208 5.84 6.86 0.230 0.270 13.52 14.02 0.532 0.552 3.32 3.82 0.131 0.150 1.78 2.13 0.070 0.084 0.76 1.27 0.030 0.050 3.54 3.73 0.139 0.147	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 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) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimension: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- (7) Dimension E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC TO-220, D2 (minimum) where dimensions are derived from the actual package outline



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