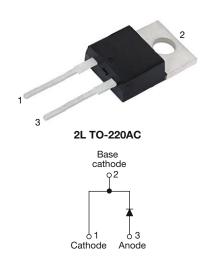


HEXFRED® Ultrafast Soft Recovery Diode, 8 A



PRIMARY CHARACTERISTICS								
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							
Package	2L TO-220AC							
Circuit configuration	Single							

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



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	А					
Maximum repetitive forward current	I _{FRM}		24						
Maximum naviar dissination	В	T _C = 25 °C	36	10/					
Maximum power dissipation	P _D	T _C = 100 °C	14	W					
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	V _{FM}	I _F = 8.0 A		-	1.4	1.7	V		
		I _F = 16 A	See fig. 1	-	1.7	2.1			
		I _F = 8.0 A, T _J = 125 °C		-	1.4	1.7			
Maximum reverse		$V_R = V_R$ rated	See fig. 2	-	0.3	5.0	μA		
leakage current	I _{RM}	$T_J = 125 ^{\circ}\text{C}$, $V_R = 0.8 \text{x} V_R$ rated	See lig. 2	-	100	500	μΑ		
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 p	ackage body	-	8.0	-	nΗ		

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)									
PARAMETER	SYMBOL	TEST CO	NDITIONS	MIN.	TYP.	MAX.	UNITS		
	t _{rr}	$I_F = 1.0 \text{ A}, dI_F/dt = 200 \text{ A/}\mu\text{s}, V_R = 30 \text{ V}$		-	18	-			
Reverse recovery time	t _{rr1}	T _J = 25 °C		-	37	55	ns		
	t _{rr2}	T _J = 125 °C		-	55	90			
Dook roopyony ourrent	I _{RRM1}	T _J = 25 °C		-	3.5	5.0	- A - nC - A/μs		
Peak recovery current	I _{RRM2}	T _J = 125 °C	$I_F = 8.0 \text{ A}$ $dI_F/dt = 200 \text{ A/}\mu\text{s}$ $V_R = 200 \text{ V}$	-	4.5	8.0			
Dovorgo rocovery charge	Q _{rr1}	T _J = 25 °C		-	65	138			
Reverse recovery charge	Q _{rr2}	T _J = 125 °C		-	124	360			
Peak rate of fall of recovery current during t _b	dI _{(rec)M} /dt1	T _J = 25 °C		-	240	-			
	dI _{(rec)M} /dt2	T _J = 125 °C		-	210	-			

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}	JA 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			
vveignt			-	0.07	-	OZ.			
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)			
Marking device		Case style 2L TO-220AC	HFA08TB60						

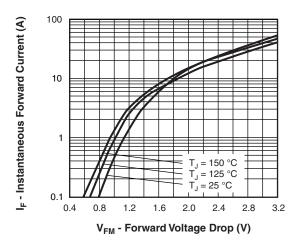


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

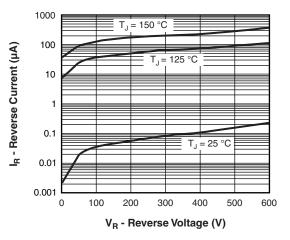


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

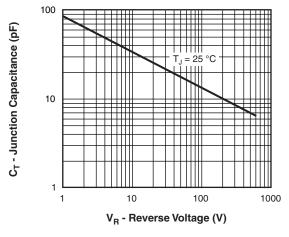


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

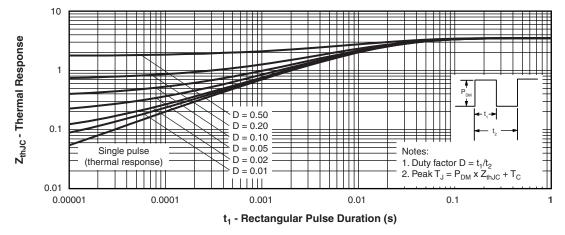


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

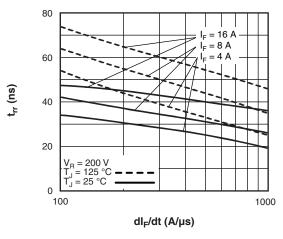


Fig. 5 - Typical Reverse Recovery Time vs. dl_E/dt

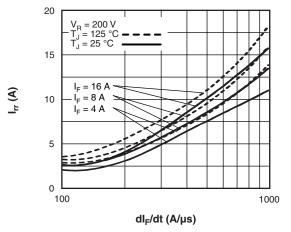


Fig. 6 - Typical Recovery Current vs. dl_F/dt

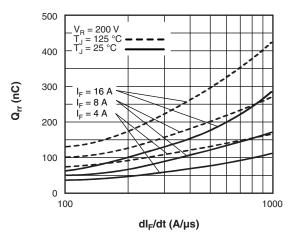


Fig. 7 - Typical Stored Charge vs. dl_F/dt

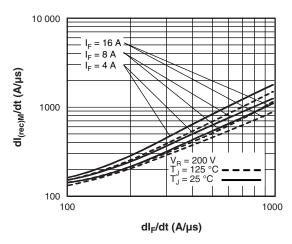
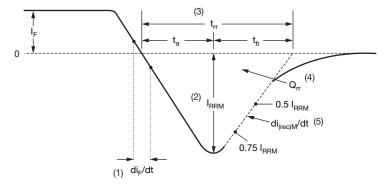


Fig. 8 - Typical dI_{(rec)M}/dt vs. dI_F/dt



- (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_{RBM} and 0.50 I_{RBM} extrapolated to zero current.
- (4) \mathbf{Q}_{rr} area under curve defined by \mathbf{t}_{rr} and \mathbf{I}_{RRM}

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

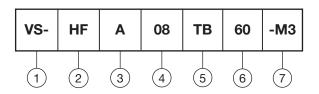
(5) $di_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - HEXFRED® family

3 - Electron irradiated

- Current rating (08 = 8 A)

5 - Package:

TB = 2L TO-220AC

6 - Voltage rating (60 = 600 V)

7 - Environmental digit:

-M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

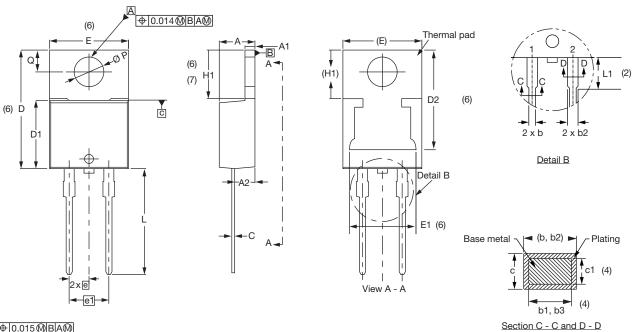
ORDERING INFORMATION (Example)									
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION						
VS-HFA08TB60-M3	50	1000	Antistatic plastic tube						

LINKS TO RELATED DOCUMENTS							
Dimensions <u>www.vishay.com/doc?96156</u>							
Part marking information	www.vishay.com/doc?95391						

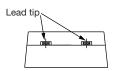


2L TO-220AC

DIMENSIONS in millimeters and inches



⊕ 0.015 **M** B A **M**



Conforms to JEDEC® outline TO-220AC

SYMBOL	MILLIM	IETERS	INC	HES	NOTES	NOTES	SYMBOL	MILLIN	IETERS	INC	HES	NOTES
STMBOL	MIN.	MAX.	MIN.	MAX.	NOTES		STIVIBOL	MIN.	MAX.	MIN.	MAX.	NOTES
Α	4.25	4.65	0.167	0.183			D2	11.68	12.88	0.460	0.507	6
A1	1.14	1.40	0.045	0.055			Е	10.11	10.51	0.398	0.414	3, 6
A2	2.50	2.92	0.098	0.115			E1	6.86	8.89	0.270	0.350	6
b	0.69	1.01	0.027	0.040			е	2.41	2.67	0.095	0.105	
b1	0.38	0.97	0.015	0.038	4		e1	4.88	5.28	0.192	0.208	
b2	1.20	1.73	0.047	0.068			H1	6.09	6.48	0.240	0.255	6, 7
b3	1.14	1.73	0.045	0.068	4		L	13.52	14.02	0.532	0.552	
С	0.36	0.61	0.014	0.024			L1	3.32	3.82	0.131	0.150	2
c1	0.36	0.56	0.014	0.022	4		ØΡ	3.54	3.91	0.139	0.154	
D	14.85	15.35	0.585	0.604	3		Q	2.60	3.00	0.102	0.118	
D1	8.38	9.02	0.330	0.355			·					

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
- Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2, and E1
- (7) Outline conforms to JEDEC® TO-220, except D2 (minimum)



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Vishay

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