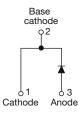
Vishay Semiconductors

HEXFRED[®], Ultrafast Soft Recovery Diode, 6 A



www.vishay.com



PRIMARY CHARACTERISTICS					
I _{F(AV)}	6 A				
V _R	1200 V				
V _F at I _F	3.0 V				
t _{rr} typ.	26 ns				
T _J max.	150 °C				
Package	TO-220AC 2L				
Circuit configuration	Single				

FEATURES

- Ultrafast and ultrasoft recovery
- Very low I_{RRM} and Q_{rr}
- Designed and qualified according to JEDEC[®]-JESD 47



FREE

• Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

BENEFITS

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

DESCRIPTION

VS-HFA06TB120 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 6 A continuous current, the VS-HFA06TB120 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_{BBM}) 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-HFA06TB120 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		1200	V			
Maximum continuous forward current	I _F	T _C = 100 °C	6				
Single pulse forward current	I _{FSM}		80	А			
Maximum repetitive forward current	I _{FRM}		24				
Maximum power dissipation	Р	T _C = 25 °C	62.5	w			
Maximum power dissipation	PD	T _C = 100 °C	25	vv			
Operating junction and storage temperature range	T _J , T _{Stg}		-55 to +150	°C			

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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	-	-			
		I _F = 6.0 A	-	2.7	3.0	V		
Maximum forward voltage	V _{FM}	I _F = 12 A	-	3.5	3.9			
		I _F = 6.0 A, T _J = 125 °C	-	2.4	2.8			
Maximum reverse		$V_{R} = V_{R}$ rated	-	0.26	5.0	μA		
leakage current	I _{RM}	$T_J = 125 \text{ °C}, V_R = 0.8 \text{ x } V_R \text{ rated}$	-	110	500	μΑ		
Junction capacitance	CT	V _R = 200 V	-	9.0	14	pF		
Series inductance	L _S	Measured lead to lead 5 mm from package body	-	8.0	-	nH		

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25 \text{ °C}$ unless otherwise specified)									
PARAMETER	SYMBOL	TEST CO	NDITIONS	MIN.	TYP.	MAX.	UNITS		
	t _{rr}	$I_F = 1.0 \text{ A}, \ dI_F/dt = 200$	A/μs, V _R = 30 V	-	26	-			
Reverse recovery time	t _{rr1}	T _J = 25 °C		-	53	80	ns - A		
	t _{rr2}	T _J = 125 °C	I _F = 6.0 A dI _F /dt = 200 A/μs V _R = 200 V	-	87	130			
De als vie a su an a surra at	I _{RRM1}	T _J = 25 °C		-	4.4	8.0			
Peak recovery current	I _{RRM2}	T _J = 125 °C		-	5.0	9.0			
Povereo recovery obergo	Q _{rr1}	T _J = 25 °C		-	116	320	nC		
Reverse recovery charge	Q _{rr2}	T _J = 125 °C		-	233	585	no		
Peak rate of recovery current	dl _{(rec)M} /dt1	T _J = 25 °C		-	180	-	A/110		
during t _b	dl _{(rec)M} /dt2	T _J = 125 °C		-	100	-	A∕µs		

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}		-	-	2.0			
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		
weight			-	0.07	-	oz.		
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)		
Marking device		Case style 2L TO-220AC		HFA06	TB120			



VS-HFA06TB120-M3

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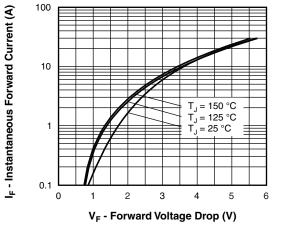


Fig. 1 - Typical Forward Voltage Drop Characteristics

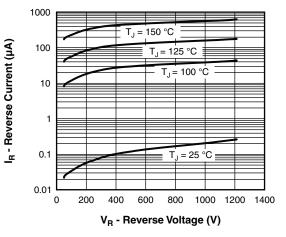


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

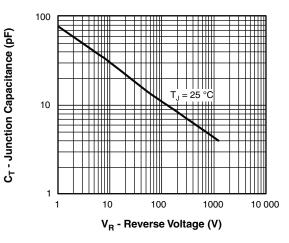


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

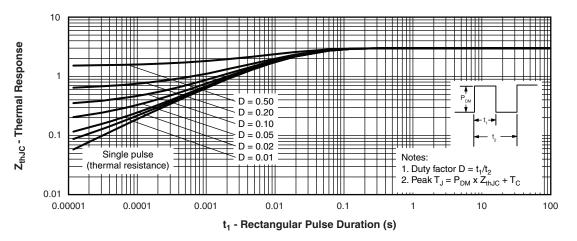
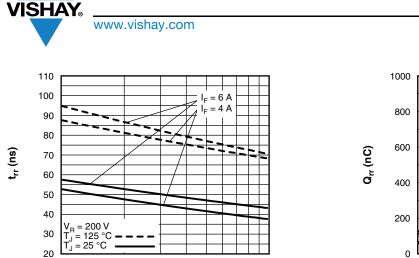


Fig. 4 - Maximum Thermal Impedance ZthJC Characteristics

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1000

dl_F/dt (A/µs)

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

100

I_{rr} (A)

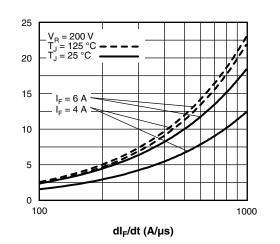
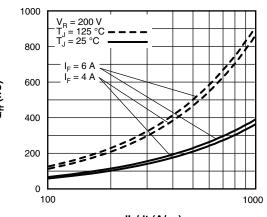


Fig. 6 - Typical Recovery Current vs. dl_F/dt



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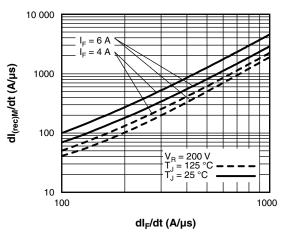


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt

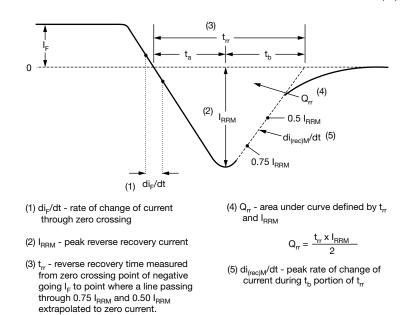


Fig. 9 - Reverse Recovery Waveform and Definitions

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VS-HFA06TB120-M3



ORDERING INFORMATION TABLE

Device code	VS-	HF	Α	06	тв	120	-M3
	1	2	3	4	5	6	7
	1	- Visł	nay Sem	nicondu	ctors pr	oduct	
	2	- HEX	XFRED [®]	family			
	3	- Elec	ctron irra	adiated			
	4	- Cur	rent rati	ng (06 =	= 6 A)		
	5	- Pac	kage:				
		TB	= 2L TO	-220AC			
	6	- Vol	tage rati	ng (120	= 1200	V)	
	7	- Env	ironmer	ntal digit	:		
		-M3	s = halog	gen-free	, RoHS	-complia	ant, and

ORDERING INFORMATION (Example)					
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION			
VS-HFA06TB120-M3	50	Antistatic plastic tube			

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

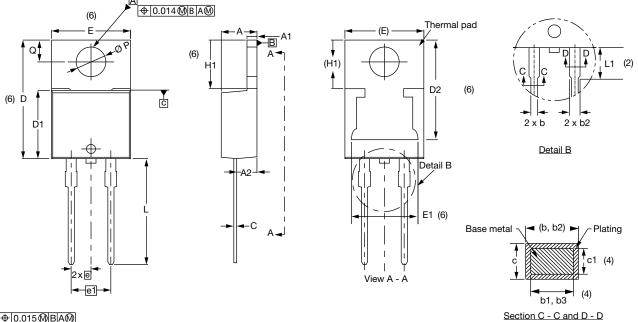




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TO-220AC 2L

DIMENSIONS in millimeters and inches



⊕0.015@BA@



SYMBOL	MILLIN	IETERS	INC	HES	NOTES
STMBOL	MIN.	MAX.	MIN.	MAX.	NOTES
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.50	2.92	0.098	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	15.35	0.585	0.604	3
D1	8.38	9.02	0.330	0.355	

Conforms to JEDEC	® outline TO-220AC

SYMBOL	MILLIN	IETERS	INC	INCHES			
STMBOL	MIN.	MAX.	MIN.	MAX.	NOTES		
D2	11.68	13.30	0.460	0.524	6, 7		
E	10.11	10.51	0.398	0.414	3, 6		
E1	6.86	8.89	0.270	0.350	6		
е	2.41	2.67	0.095	0.105			
e1	4.88	5.28	0.192	0.208			
H1	6.09	6.48	0.240	0.255	6		
L	13.52	14.02	0.532	0.552			
L1	3.32	3.82	0.131	0.150	2		
ØР	3.54	3.91	0.139	0.154			
Q	2.60	3.00	0.102	0.118			

Notes

 $^{(1)}\,$ Dimensioning and tolerancing as per ASME Y14.5M-1994

⁽²⁾ Lead dimension and finish uncontrolled in L1

⁽⁴⁾ Dimension b1, b3, and c1 apply to base metal only

(5) Controlling dimensions: inches

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

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⁽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



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