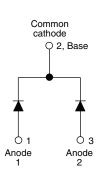
VS-HFA30PA60C-N3

Vishay Semiconductors

HEXFRED[®] Ultrafast Soft Recovery Diode, 2 x 15 A



www.vishay.com



PRIMARY CHARACTERISTICS								
I _{F(AV)}	2 x 15 A							
V _R	600 V							
V _F at I _F	1.2 V							
t _{rr} typ.	19 ns							
T _J max.	150 °C							
Package	TO-247AC 3L							
Circuit configuration	Common cathode							

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 <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-HFA30PA60C... is a state of the art center tap 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 15 A per leg continuous current, the VS-HFA30PA60C... 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-HFA30PA60C... 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 currentper leg	I_	T _C = 100 °C	15						
per device	IF	$1_{\rm C} = 100 {\rm C}$	30	А					
Single pulse forward current	I _{FSM}	t _p = 10 ms	150	A					
Maximum repetitive forward current	I _{FRM}		60						
Maximum power dissipation	D_	T _C = 25 °C	74	W					
	PD	T _C = 100 °C	29	٧V					
Operating junction and storage temperature range	T _J , T _{Stg}		-55 to +150	°C					

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ELECTRICAL SPECIFICATIONS PER LEG (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 = 15 A		-	1.3	1.7	V		
		I _F = 30 A	See fig. 1	-	1.5	2.0			
		I _F = 15 A, T _J = 125 °C		-	1.2	1.6			
Maximum reverse	I _{RM}	$V_R = V_R$ rated	See fig. 0	-	1.0	10	μA		
leakage current		T_J = 125 °C, V_R = 0.8 x V_R rated	See fig. 2	-	400	1000			
Junction capacitance	CT	V _R = 200 V See fi		-	25	50	pF		
Series inductance	L _S	Measured lead to lead 5 mm from p	ackage body	-	12	-	nH		

DYNAMIC RECOVERY CHARACTERISTICS PER LEG ($T_J = 25 \text{ °C}$ unless otherwise specified)									
PARAMETER	SYMBOL	TEST CO	MIN.	TYP.	MAX.	UNITS			
Reverse recovery time See fig. 5, 10	t _{rr}	$I_F = 1.0 \text{ A}, \text{ d}I_F/\text{d}t = 200$	A/μs, V _R = 30 V	-	19	-			
	t _{rr1}	T _J = 25 °C	I _F = 15 A dI _F /dt = 200 A/μs V _R = 200 V	-	42	60	ns		
	t _{rr2}	T _J = 125 °C		-	70	120	1		
Peak recovery current See fig. 6	I _{RRM1}	T _J = 25 °C		-	4.0	6.0	A nC		
	I _{RRM2}	T _J = 125 °C		-	6.5	10			
Reverse recovery charge	Q _{rr1}	T _J = 25 °C		-	80	180			
See fig. 7	Q _{rr2}	T _J = 125 °C	VR - 200 V	-	220	600			
Peak rate of fall of recovery current during t _b See fig. 8	dl _{(rec)M} /dt1	T _J = 25 °C		-	250	-			
	dl _{(rec)M} /dt2	T _J = 125 °C		-	160	-	A/µs		

THERMAL-MECHANICAL SPECIFICATIONS PER LEG										
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS				
Lead temperature	T _{lead}	0.063" from case (1.6 mm) for 10 s	-	-	300	°C				
Junction to case, single leg conduction			-	-	1.7					
Junction to case, both legs conducting	RthJC		-	-	0.85	κ/w				
Thermal resistance, junction to ambient	R _{thJA}	Typical socket mount	-	-	40	- r∖/vv				
Thermal resistance, case to heatsink	R _{thCS}	Mounting surface, flat, smooth, and greased	-	0.25	-					
Weight			-	6.0	-	g				
weight			-	0.21	-	oz.				
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)				
Marking device		Case style TO-247AC 3L		HFA30PA60C						

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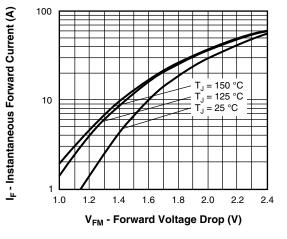


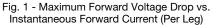
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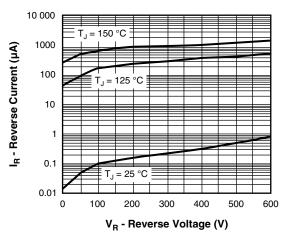


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Leg)

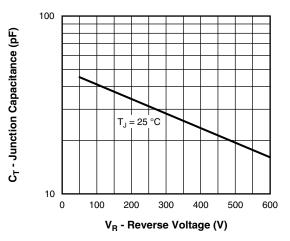


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

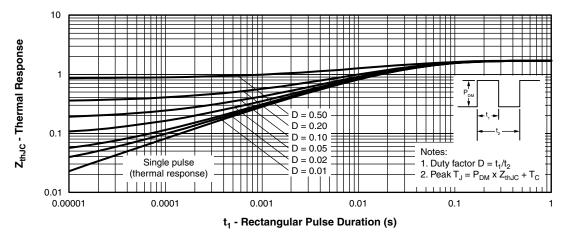


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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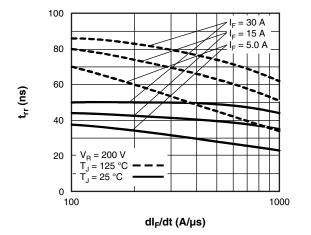


Fig. 5 - Typical Reverse Recovery Time vs. dl_F/dt (Per Leg)

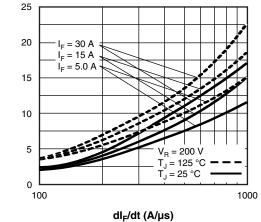


Fig. 6 - Typical Recovery Current vs. dl_F/dt (Per Leg)

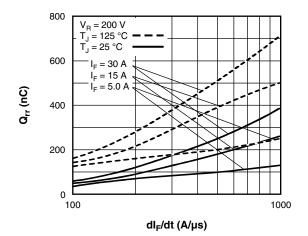


Fig. 7 - Typical Stored Charge vs. dl_F/dt (Per Leg)

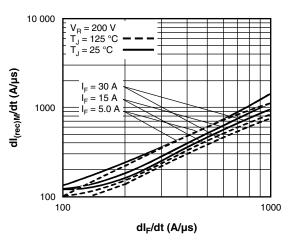


Fig. 8 - Typical dI_{(rec)M}/dt vs. dI_F/dt (Per Leg)

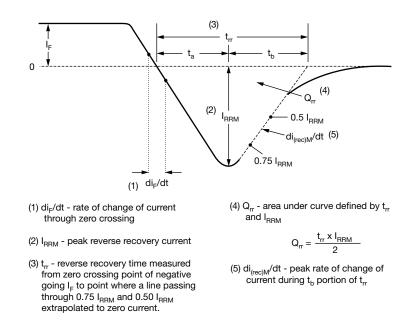


Fig. 9 - Reverse Recovery Waveform and Definitions

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ORDERING INFORMATION TABLE

Device code	VS-	HF	Α	30	PA	60	С	-N3
	1	2	3	4	5	6	7	8
	1 .	Visl	nay Sen	niconduo	ctors pro	oduct		
	2 -	HE	xfred [@]	[®] family				
	3 -	Ele	ctron irra	adiated				
	4 -	Cur	rent rati	ng (30 =	= 30 A)			
	5 -	PA	= TO-24	47AC, 3	pins			
	6 -	Volt	age rati	ng: (60	= 600 V)		
	7 -	Circ	uit conf	iguratior	า			
		C =	commo	n catho	de			
	8 -	Env	ironmer	ntal digit	:			
		-N3	= halog	en-free,	RoHS-	complia	nt, and	totally I

ORDERING INFORMATION (Example)								
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION					
VS-HFA30PA60C-N3	25	500	Antistatic plastic tube					

LINKS TO RELATED DOCUMENTS						
Dimensions	www.vishay.com/doc?96138					
Part marking information	www.vishay.com/doc?95007					
SPICE model	www.vishay.com/doc?96777					



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TO-247AC 3L

DIMENSIONS in millimeters and inches



SYMBOL	MILLIM	IETERS	INC	HES	NOTES	NOTES SYM		MILLIN	IETERS	INC	HES	NOTES
STWIDOL	MIN.	MAX.	MIN.	MAX.	NOTES		STWDOL	MIN.	MAX.	MIN.	MAX.	NOTES
A	4.65	5.31	0.183	0.209			D2	0.51	1.35	0.020	0.053	
A1	2.21	2.59	0.087	0.102			E	15.29	15.87	0.602	0.625	3
A2	1.17	1.37	0.046	0.054			E1	13.46	-	0.53	-	
b	0.99	1.40	0.039	0.055			е	5.46	BSC	0.215	5 BSC	
b1	0.99	1.35	0.039	0.053			ØК	0.2	254	0.0)10	
b2	1.65	2.39	0.065	0.094			L	14.20	16.10	0.559	0.634	
b3	1.65	2.34	0.065	0.092			L1	3.71	4.29	0.146	0.169	
b4	2.59	3.43	0.102	0.135			ØΡ	3.56	3.66	0.14	0.144	
b5	2.59	3.38	0.102	0.133			Ø P1	-	7.39	-	0.291	
С	0.38	0.89	0.015	0.035			Q	5.31	5.69	0.209	0.224	
c1	0.38	0.84	0.015	0.033			R	4.52	5.49	0.178	0.216	
D	19.71	20.70	0.776	0.815	3		S	5.51	BSC	0.217	' BSC	
D1	13.08	-	0.515	-	4							

Notes

⁽¹⁾ Dimensioning and tolerancing 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 Q

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