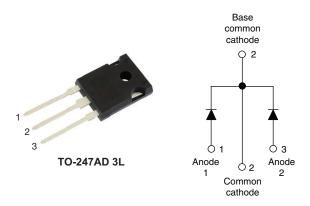
Vishay Semiconductors

Ultrafast Rectifier, 2 x 30 A FRED Pt®



www.vishay.com

PRODUCT SUMMARY						
Package	TO-247AD 3L					
I _{F(AV)}	2 x 30 A					
V _R	600 V					
V _F at I _F	1.75 V					
t _{rr} typ.	26 ns					
T _J max.	175 °C					
Diode variation	Common cathode					

FEATURES

- Ultrafast recovery time
- · Low forward voltage drop
- 175 °C operating junction temperature
- Designed and qualified according to commercial qualification
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTIONS / APPLICATIONS

VS-CPU60... series are the state of the art ultrafast recovery rectifiers designed with optimized performance of forward voltage drop and ultrafast recovery time.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in the output rectification stage of SMPS, UPS, DC/DC converters as well as freewheeling diodes in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

ABSOLUTE MAXIMUM RATINGS								
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS				
Repetitive peak reverse voltage	V _{RRM}		600	V				
Average rectified forward current per leg	I _{F(AV)}	T _C = 131 °C	30	٨				
Non-repetitive peak surge current per leg	I _{FSM}	T_{C} = 25 °C, t_{p} = 8.3 ms half sine wave	250	A				
Operating junction and storage temperatures	T _J , T _{Stg}		-55 to +175	°C				

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)								
PARAMETER	SYMBOL	SYMBOL TEST CONDITIONS		TYP.	MAX.	UNITS		
Breakdown voltage, blocking voltage	V _{BR} , V _R	I _R = 100 μA		-	-			
Forward voltage	V _F	I _F = 30 A	-	1.4	1.75	V		
Forward voltage	٧F	I _F = 30 A, T _J = 150 °C	-	1.1	1.4			
		$V_{R} = V_{R}$ rated	-	0.02	30			
Reverse leakage current	I _R	$T_J = 150 \text{ °C}, V_R = V_R \text{ rated}$	-	30	200	μΑ		
Junction capacitance	C _T	V _R = 600 V	-	20	-	pF		

Revision: 31-Jan-17 Document Number: 95946 For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishav.com/doc?91000





www.vishay.com

Vishay Semiconductors

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25$ °C unless otherwise specified)									
PARAMETER	SYMBOL	TEST C	MIN.	TYP.	MAX.	UNITS			
		I _F = 1.0 A, dI _F /dt =	I_F = 1.0 A, dI _F /dt = 100 A/µs, V _R = 30 V		26	-			
Reverse recovery time	t _{rr}	$T_J = 25 \ ^\circ C$		-	42	-	ns		
		T _J = 125 °C		-	100	-			
Poole recovery ourrent	1	T _J = 25 °C	I _F = 30 A dI _F /dt = - 200 A/µs V _R = 200 V	-	5	-	А		
Peak recovery current	IRRM	T _J = 125 °C		-	10	-	A		
Powerce receivery charge	0	T _J = 25 °C		-	125	-			
Reverse recovery charge	Q _{rr}	T _J = 125 °C		-	580	-	nC		

THERMAL - MECHANICAL SPECIFICATIONS								
PARAMETER	SYMBOL	SYMBOL TEST CONDITIONS		TYP.	MAX.	UNITS		
Maximum junction and storage temperature range	T _J , T _{Stg}		-55	-	175	°C		
Thermal resistance, junction to case per leg	R _{thJC}		-	0.7	1			
Thermal resistance, junction to ambient per leg	R _{thJA}	Typical socket mount	-	-	70	°C/W		
Thermal resistance, case to heat sink	R _{thCS}	Mounting surface, flat, smooth, and greased	-	0.5	-			
Waight			-	6.0	-	g		
Weight			-	0.21	-	oz.		
Mounting torque			6.0 (5.0)	-	12 (10)	kgf ⋅ cm (lbf ⋅ in)		
Marking device		Case style TO-247AD 3L	CPU6006L					



VS-CPU6006L-N3

Vishay Semiconductors

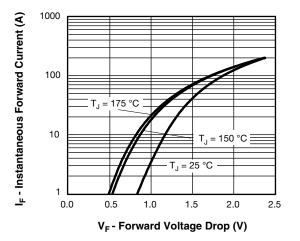


Fig. 1 - Typical Forward Voltage Drop Characteristics

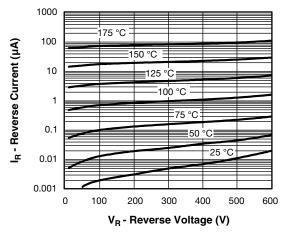


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

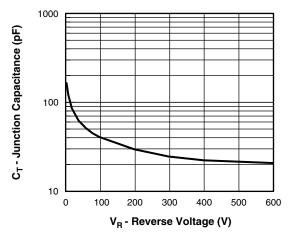


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

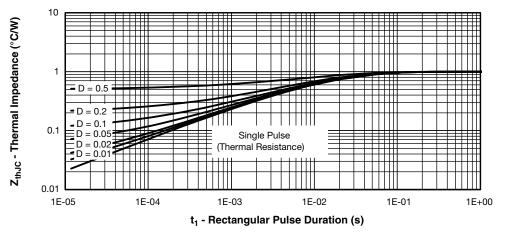
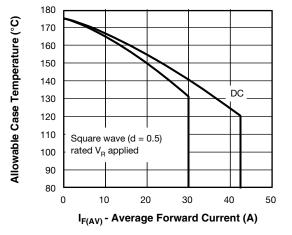
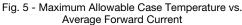


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics







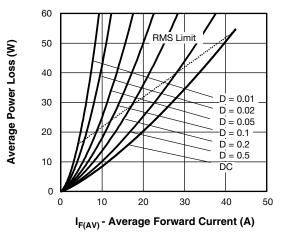


Fig. 6 - Forward Power Loss Characteristics

Note

⁽¹⁾ Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$; $\begin{array}{l} \mathsf{Pd} = \mathsf{Forward} \ \mathsf{power} \ \mathsf{loss} = \mathsf{I}_{\mathsf{F}(\mathsf{AV})} \, x \, \mathsf{V}_{\mathsf{FM}} \ \mathsf{at} \ (\mathsf{I}_{\mathsf{F}(\mathsf{AV})}/\mathsf{D}) \ (\mathsf{see} \ \mathsf{fig.} \ \mathsf{6}); \\ \mathsf{Pd}_{\mathsf{REV}} = \mathsf{Inverse} \ \mathsf{power} \ \mathsf{loss} = \mathsf{V}_{\mathsf{R1}} \, x \, \mathsf{I}_{\mathsf{R}} \ (\mathsf{1} - \mathsf{D}); \ \mathsf{I}_{\mathsf{R}} \ \mathsf{at} \ \mathsf{V}_{\mathsf{R1}} = \mathsf{Rated} \ \mathsf{V}_{\mathsf{R}} \end{array}$

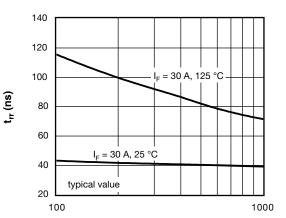




Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

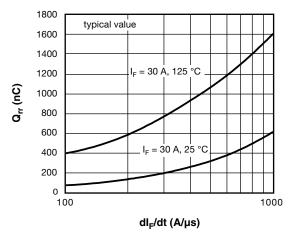


Fig. 8 - Typical Stored Charge vs. dl_F/dt

VS-CPU6006L-N3

Vishay Semiconductors

Revision: 31-Jan-17 Document Number: 95946 For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishav.com/doc?91000

4

VS-CPU6006L-N3

Vishay Semiconductors

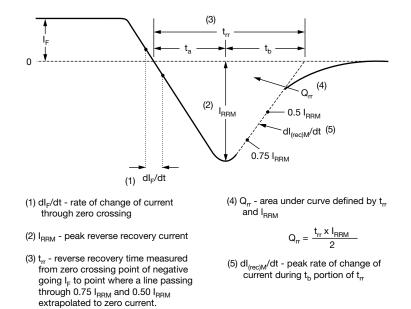


Fig. 9 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

www.vishay.com

Device code	VS-	С	Р	U	60	06	L	-N3
		(2)	(3)	(4)	(5)	(6)		(8)
	\cup		\bigcirc	4	\bigcirc	\bigcirc	()	\bigcirc
	1	- Vis	hay Ser	nicondu	ctors pro	oduct		
	2	- Cir	cuit con	figuratio	n:			
		C =	commo	on catho	de			
	3	- P=	TO-24	7				
	4	- U =	ultrafas	st recove	ery time			
	5	- Cu	rrent co	de (60 =	2 x 30 /	۹)		
	6	- Vol	tage co	de (06 =	600 V)			
	7	- L=	long lea	ad				
	8	- Env	/ironme	ntal digi	:			
		-N3	= halog	gen-free	, RoHS-	complia	int, and	totally I

ORDERING INFORMATION (Example)							
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION				
VS-CPU6006L-N3	25	500	Antistatic plastic tube				

LINKS TO RELATED DOCUMENTS					
Dimensions	TO-247AD 3L	www.vishay.com/doc?95626			
Part marking information	TO-247AD 3L	www.vishay.com/doc?95007			

Revision: 31-Jan-17

Document Number: 95946

For technical questions within your region: <u>DiodesAmericas@vishay.com</u>, <u>DiodesAsia@vishay.com</u>, <u>DiodesEurope@vishay.com</u> THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT <u>www.vishay.com/doc?91000</u>



Vishay Semiconductors

TO-247AD 3L

DIMENSIONS in millimeters and inches



View B

SYMBOL	MILLIN	IETERS	INCHES		NOTES
STIVIBOL	MIN.	MAX.	MIN.	MAX.	NOTES
А	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
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	
с	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

(2, 52, 51) (4) Section C - C, D - D, E - E

SYMBOL	MILLIN	IETERS	INC	HES	NOTES
STNIBOL	MIN.	MAX.	MIN.	MAX.	NOTES
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
е	5.46	5.46 BSC		5 BSC	
ØК	0.2	0.254		010	
L	19.81	20.32	0.780	0.800	
L1	3.71	4.29	0.146	0.169	
ØР	3.56	3.66	0.14	0.144	
Ø P1	-	6.98	-	0.275	
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 tolerancing per ASME Y14.5M-1994

(2) Contour of slot optional

- ⁽³⁾ Dimension D and E do not include mold flash. 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 A min., D, E min., Q min., S, and note 4

 Revision: 06-Mar-2020
 1
 Document Number: 95626

 For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
 DiodesEurope@vishay.com

 THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000



Vishay

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2025 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED

Revision: 01-Jan-2025

1