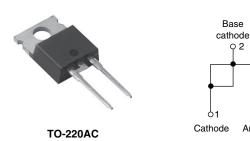


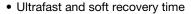
Ultrafast Rectifier, 8 A FRED Pt®

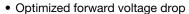
Anode

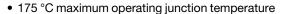


PRODUCT SUMMARY						
Package	TO-220AC					
I _{F(AV)}	8 A					
V_{R}	1200 V					
V _F at I _F at 125 °C	1.95 V					
t _{rr}	42 ns					
T _J max.	175 °C					
Diode variation	Single die					

FEATURES







Polyimide passivation

• Rugged design

Good thermal performance

• AEC-Q101 qualified available

• Meets JESD 201 class 2 whisker test

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

Pb-free



ROHS COMPLIANT HALOGEN

FREE

DESCRIPTION / APPLICATIONS

Ultrafast recovery rectifiers designed with optimized forward voltage drop, ultrafast recovery time and soft recovery.

Polyimide passivated with a planar structure and platinum-doped lifetime control guarantee ruggedness, reliability and offer a solid value for efficiency and thermal performance.

These devices are intended for use in the boost stage in the AC/DC section of SMPS, high frequency output rectification of battery chargers, inverters for solar inverters or as freewheeling diodes in motor drives.

ABSOLUTE MAXIMUM RATINGS							
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS			
Repetitive peak reverse voltage	V_{RRM}		1200	V			
Average rectified forward current	I _{F(AV)}	T _C = 140 °C, D = 0.50	8				
Non repetitive peak surge current	I _{FSM}	$T_C = 25$ °C, $t_p = 10$ ms, sine wave	80	Α			
Repetitive peak forward current	I _{FM}		16				
Operating junction and storage temperature	T _J , T _{Stg}		-55 to +175	°C			

ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Breakdown voltage, blocking voltage	V _{BR} , V _R	I _R = 200 μA	1200	-	-		
Forward voltage	V _F	I _F = 8 A	-	2.05	2.55	V	
		I _F = 8 A, T _J = 125 °C	-	1.95	2.37		
Deverage legisage everent	I _R	$V_R = V_R$ rated	-	-	55		
Reverse leakage current		$T_J = 125$ °C, $V_R = V_R$ rated	-	-	100	μA 00	
Junction capacitance	C _T	V _R = 200 V	-	8	-	pF	
Series inductance	L _S	Measured lead to lead 5 mm from package body	-	8.0	-	nH	



DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)								
PARAMETER	SYMBOL	TEST COI	MIN.	TYP.	MAX.	UNITS		
		$I_F = 1.0 \text{ A}, dI_F/dt = 100$		-	42	-		
Reverse recovery time	t _{rr}	T _J = 25 °C	I _F = 8 A dI _F /dt = 100 A/μs V _R = 390 V	-	144	-	ns	
		T _J = 125 °C		-	204	-		
Peak recovery current	I _{RRM}	T _J = 25 °C		-	5	-	А	
		T _J = 125 °C		-	7.2	-		
Reverse recovery charge	Q _{rr}	T _J = 25 °C		-	370	-	nC	
		T _J = 125 °C		=	745	-		

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Maximum junction and storage temperature range	T _J , T _{Stg}		-55	-	175	°C	
Thermal resistance, junction to case	R _{thJC}		-	1.25	1.5		
Thermal resistance, junction to ambient	R _{thJA}	Typical socket mount	-	54	60	°C/W	
Thermal resistance, case to heatsink	R _{thCS}	Mounting surface, flat, smooth, and greased	-	0.18	0.4		
Weight			-	0.2	-	g	
vveignt			-	0.07	-	OZ.	
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)	
Marking device		Case style: TO-220AC	8ETU12H				

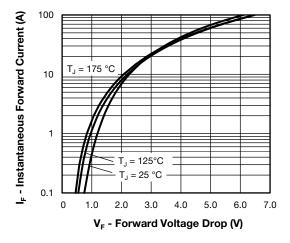


Fig. 1 - Typical Forward Voltage Drop Characteristics

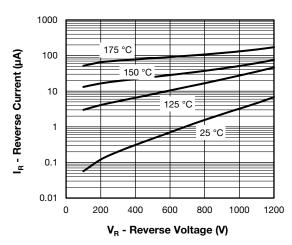


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

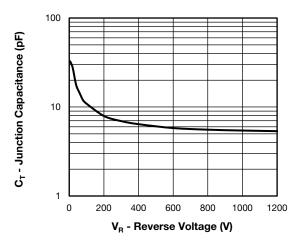


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

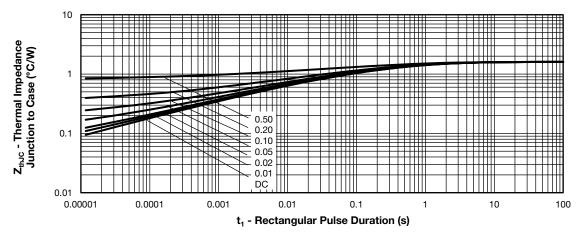


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

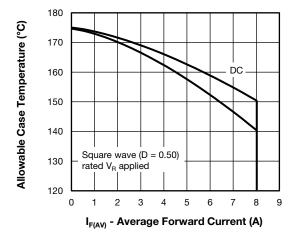


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

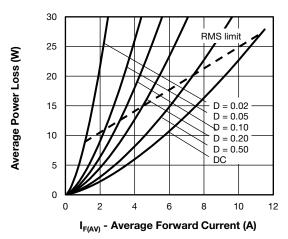


Fig. 6 - Forward Power Loss Characteristics

www.vishay.com

Vishay Semiconductors

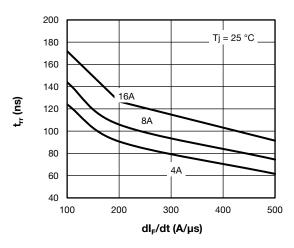


Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

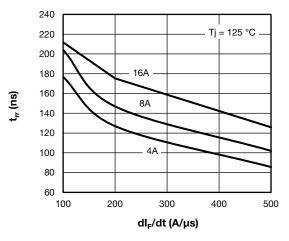


Fig. 8 - Typical Reverse Recovery Time vs. dl_F/dt

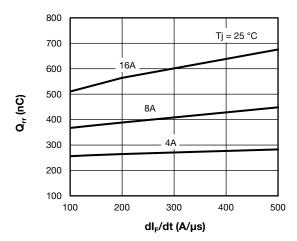


Fig. 9 - Typical Stored Charge vs. dl_F/dt

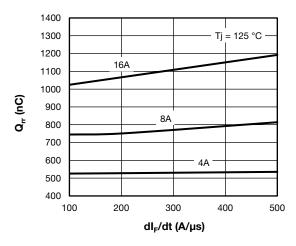


Fig. 10 - Typical Stored Charge vs. dl_F/dt

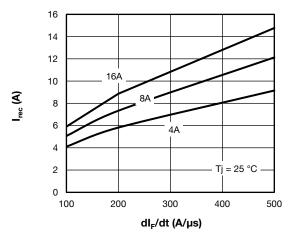


Fig. 11 - Typical Reverse Current vs. dI_F/dt

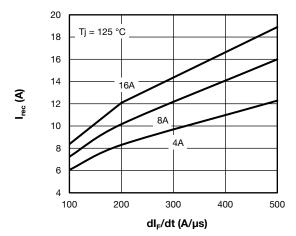
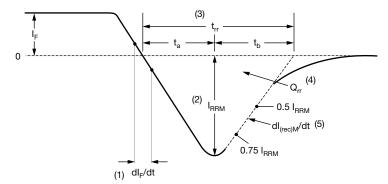


Fig. 12 - Typical Reverse Current vs. dl_F/dt



- (1) dl_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_{RRM} and 0.50 I_{RRM} extrapolated to zero current.
- (4) ${\rm Q_{rr}}$ area under curve defined by ${\rm t_{rr}}$ and ${\rm I_{RRM}}$

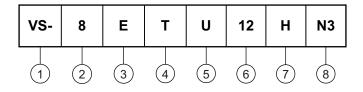
$$Q_{rr} = \frac{t_{rr} x I_{RRM}}{2}$$

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

Fig. 13 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code



- 1 Vishay Semiconductors product
- **2** Current rating (8 = 8 A)
- Circuit configuration: E = single diode
- 4 Package:

T = TO-220

- 5 U = ultrafast recovery
- 6 Voltage rating (12 = 1200 V)
- 7 H = AEC-Q101 qualified
- 8 Environmental digit:

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

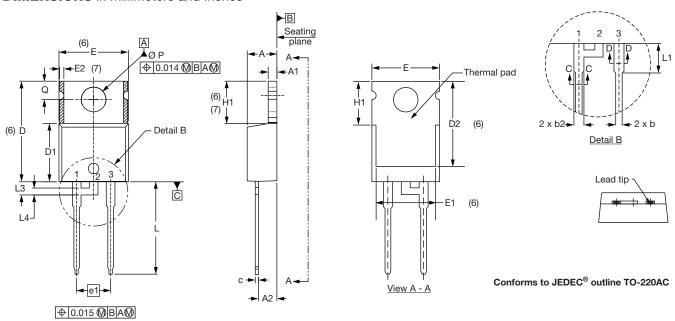
ORDERING INFORMATION (Example)						
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION			
VS-8ETU12HN3	50	1000	Antistatic plastic tube			

LINKS TO RELATED DOCUMENTS					
Dimensions <u>www.vishay.com/doc?95221</u>					
Part marking information	www.vishay.com/doc?95068				



TO-220AC

DIMENSIONS in millimeters and inches



SYMBOL	MILLIM	IETERS	INCHES		NOTES
STINIBUL	MIN.	MAX.	MIN.	MAX.	NOIES
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

SYMBOL	MILLIN	IETERS	INC	NOTES	
STINIBUL	MIN.	MAX.	MIN.	MAX.	NOTES
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e1	4.88	5.28	0.192	0.208	
H1	5.84	6.86	0.230	0.270	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
L3	1.78	2.13	0.070	0.084	
L4	0.76	1.27	0.030	0.050	2
ØΡ	3.54	3.73	0.139	0.147	
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
- (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



Legal Disclaimer Notice

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.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. 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.