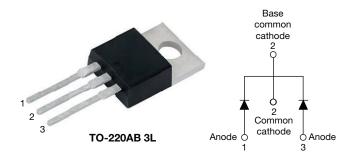


Hyperfast Rectifier, 2 x 15 A FRED Pt®



PRIMARY CHARACTERISTICS									
I _{F(AV)}	2 x 15 A								
V_R	300 V								
V _F at I _F	0.85 V								
t _{rr} typ.	See Recovery table								
T _J max.	175 °C								
Package	TO-220AB 3L								
Circuit configuration	Common cathode								

FEATURES

- Hyperfast recovery time
- Low forward voltage drop
- 175 °C operating junction temperature

• Low leakage current



- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION / APPLICATIONS

300 V series are the state of the art hyperfast recovery rectifiers designed with optimized performance of forward voltage drop and hyperfast 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	VALUES	UNITS					
Peak repetitive reverse voltage		V_{RRM}		300	V					
Average rectified forward current	per diode		T _C = 153 °C	15						
Average rectilled forward current	per device	I _{F(AV)}		30	Α					
Non-repetitive peak surge current	I _{FSM}	T _C = 25 °C	150							
Operating junction and storage tem	T _J , T _{Stg}		-65 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	Ι _R = 100 μΑ	300	-	-	.,			
Forward voltage	V _F	I _F = 15 A	-	1.0	1.25	V			
		I _F = 15 A, T _J = 125 °C	-	0.85	0.95				
Dovorno logicado gurrent	,	$V_R = V_R$ rated	-	-	40				
Reverse leakage current	I _R	T _J = 125 °C, V _R = V _R rated	-	8	200	μA			
Junction capacitance	apacitance C _T V _R = 300 V		-	38	-	pF			
Series inductance	L _S	Measured lead to lead 5 mm from package body	-	8	-	nH			



DYNAMIC RECOVERY CHARACTERISTICS (T _C = 25 °C unless otherwise specified)										
PARAMETER	SYMBOL	TEST CO	MIN.	TYP.	MAX.	UNITS				
	t _{rr}	$I_F = 1 A, dI_F/dt = 50$	ı	-	36					
Reverse recovery time		$I_F = 1 A, dI_F/dt = 10$	•	-	30	ns				
		T _J = 25 °C		ı	33	-	A			
		T _J = 125 °C		-	48	-				
Peak recovery current	I _{RRM}	T _J = 25 °C	l _F = 15 A dl _F /dt = 200 A/μs	-	2.8	-				
		T _J = 125 °C	$V_{\rm R} = 200 \text{ V}$	-	6.5	-				
Reverse recovery charge	Q _{rr}	T _J = 25 °C		-	46	-	nC			
		T _J = 125 °C		-	160	-	nC nC			

THERMAL MECHANICAL SPECIFICATIONS										
PARAMETER SYMBOL MIN. TYP. MAX. UNITS										
Maximum junction and storage temperature range	T _J , T _{Stg}	-65	-	175	°C					
Thermal resistance, junction to case per diode	R _{thJC}	-	-	1.4	°C/W					
Marking device		Case style TO-220AB 3L 30CTH03								

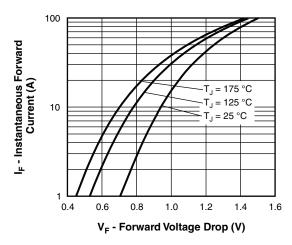


Fig. 1 - Typical Forward Voltage Drop Characteristics

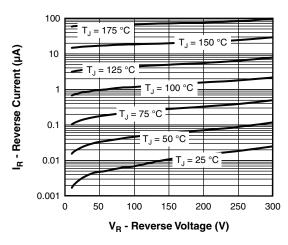


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

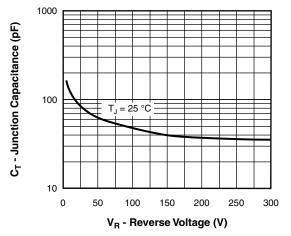


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

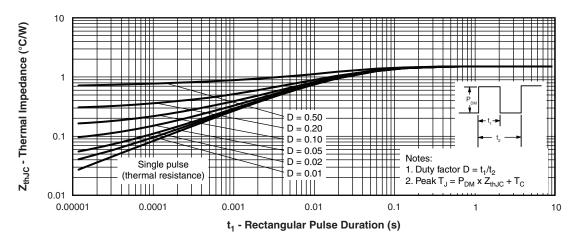


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

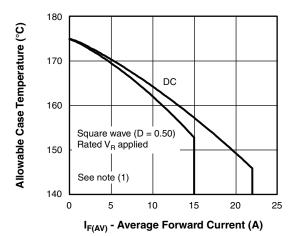


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

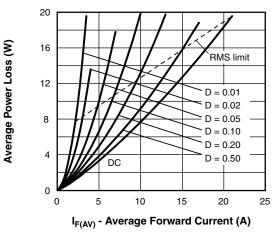


Fig. 6 - Forward Power Loss Characteristics

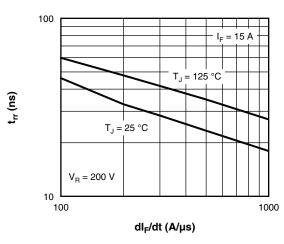


Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

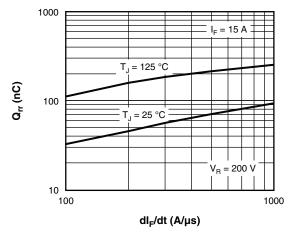
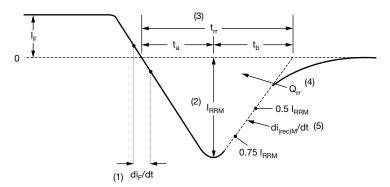


Fig. 8 - Typical Stored Charge vs. dl_F/dt

Note

 $[\]begin{array}{ll} \text{(1)} & \text{Formula used: } T_C = T_J - (\text{Pd} + \text{Pd}_{\text{REV}}) \times R_{\text{thJC}}; \\ \text{Pd} = & \text{forward power loss} = I_{\text{F(AV)}} \times V_{\text{FM}} \text{ at } (I_{\text{F(AV)}}/D) \text{ (see fig. 6)}; \\ \text{Pd}_{\text{REV}} = & \text{inverse power loss} = V_{\text{R1}} \times I_{\text{R}} \text{ (1 - D)}; I_{\text{R}} \text{ at } V_{\text{R1}} = \text{rated } V_{\text{R}} \\ \end{array}$



- (1) di_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) $\rm t_{rr}$ reverse recovery time measured from zero crossing point of negative going $\rm l_F$ to point where a line passing through 0.75 $\rm l_{RRM}$ and 0.50 $\rm l_{RRM}$ extrapolated to zero current.
- (4) $\mathbf{Q}_{\rm rr}$ area under curve defined by $\mathbf{t}_{\rm rr}$ and $\mathbf{I}_{\rm RRM}$

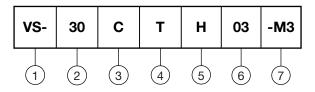
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(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





- Vishay Semiconductors product
- 2 Current rating (30 = 30 A)
- Circuit configuration:

C = common cathode

4 - Package:

T = 3L TO-220AB

5 - H = hyperfast recovery

6 - Voltage rating (03 = 300 V)

7 - Environmental digit:

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

ORDERING INFORMATION (Example)									
PREFERRED P/N BASE QUANTITY PACKAGING DESCRIPTION									
VS-30CTH03-M3	50	Antistatic plastic tubes							

LINKS TO RELATED DOCUMENTS								
Dimensions <u>www.vishay.com/doc?96154</u>								
Part marking information	www.vishay.com/doc?95028							



TO-220AB 3L

DIMENSIONS in millimeters and inches





Conforms to JEDEC® outline TO-220AB

SYMBOL	MILLIM	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
STMBOL	MIN.	MAX.	MIN.	MAX.	NOTES		STIMIBUL	MIN.	MAX.	MIN.	MAX.	NOTES
Α	4.25	4.65	0.167	0.183			D2	11.68	13.30	0.460	0.524	6, 7
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
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



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Vishay

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