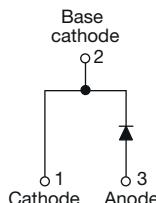


Hyperfast Rectifier, 8 A FRED Pt®



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



RoHS
COMPLIANT
HALOGEN
FREE

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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	8 A
V_R	300 V
V_F at I_F	0.83 V
t_{rr} typ.	See Recovery table
T_J max.	175 °C
Package	TO-220AC 2L
Circuit configuration	Single

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Repetitive peak reverse voltage	V_{RRM}		300	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 155$ °C	8	A
Non-repetitive peak surge current	I_{FSM}	$T_C = 25$ °C	100	
Operating junction and storage temperatures	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	$I_R = 100$ µA	300	-	-	V
Forward voltage	V_F	$I_F = 8$ A	-	1.0	1.25	
		$I_F = 8$ A, $T_J = 125$ °C	-	0.83	1.00	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	0.02	20	µA
		$T_J = 125$ °C, $V_R = V_R$ rated	-	6.0	200	
Junction capacitance	C_T	$V_R = 300$ V	-	31	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8	-	nH

DYNAMIC RECOVERY CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 1 \text{ A}$, $dI_F/dt = -50 \text{ A}/\mu\text{s}$, $V_R = 30 \text{ V}$	-	-	35	ns
		$T_J = 25^\circ\text{C}$	-	27	-	
		$T_J = 125^\circ\text{C}$	-	40	-	
Peak recovery current	I_{RRM}	$T_J = 25^\circ\text{C}$	-	2.2	-	A
		$T_J = 125^\circ\text{C}$	-	5.3	-	
		$V_R = 200 \text{ V}$	-	30	-	
Reverse recovery charge	Q_{rr}	$T_J = 25^\circ\text{C}$	-	106	-	nC
		$T_J = 125^\circ\text{C}$	-	-	-	

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-65	-	175	°C
Thermal resistance, junction to case per leg	R_{thJC}		-	1.45	2.5	°C/W
		Typical socket mount	-	-	70	
		Mounting surface, flat, smooth, and greased	-	0.2	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-220AC 2L			8ETH03	

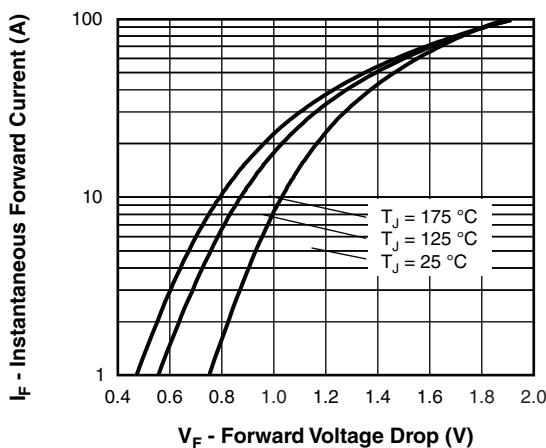


Fig. 1 - Typical Forward Voltage Drop Characteristics

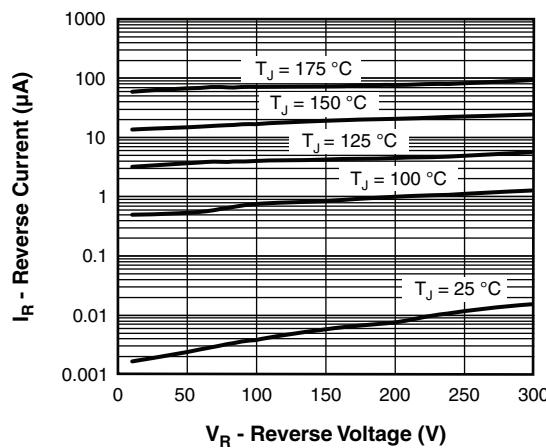


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

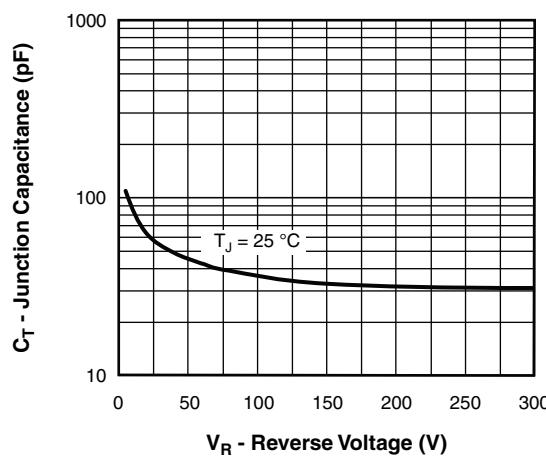


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

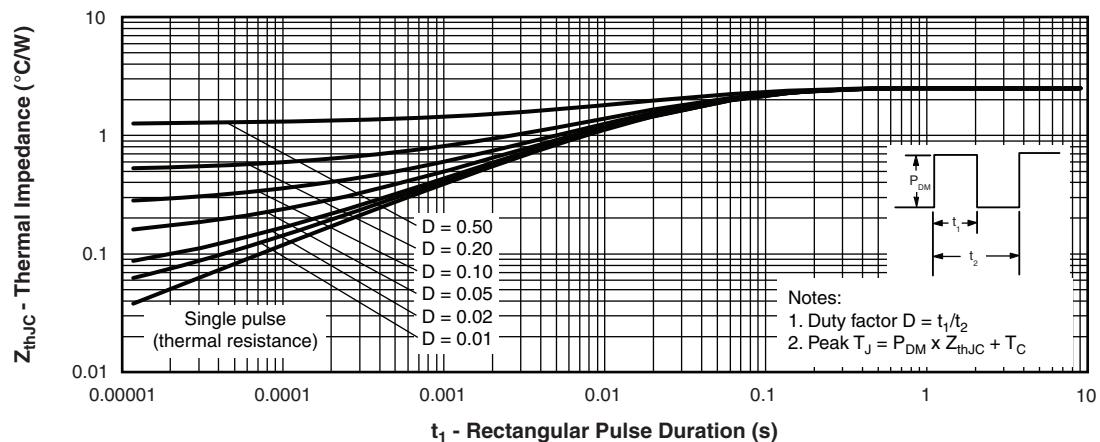


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

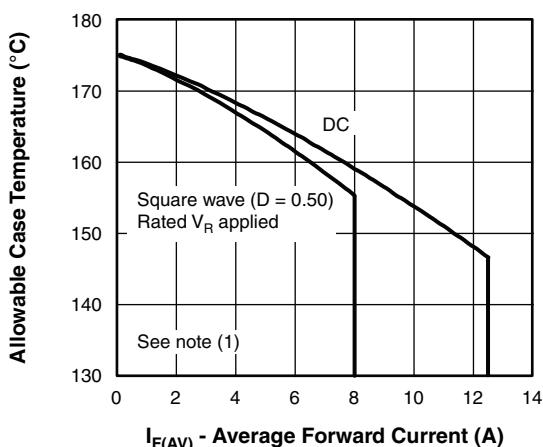


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

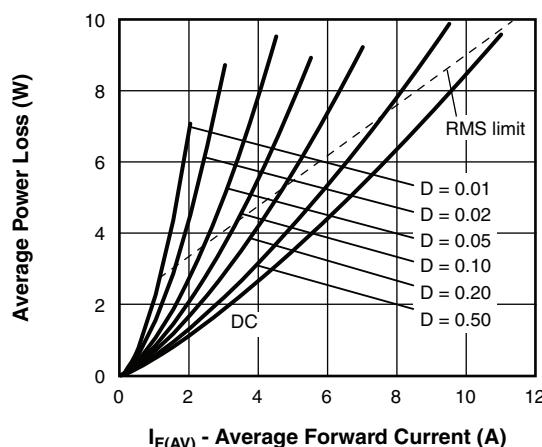


Fig. 6 - Forward Power Loss Characteristics

Note

(1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 $P_d = \text{forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D)$ (see fig. 6);
 $P_{dREV} = \text{inverse power loss} = V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = rated V_R

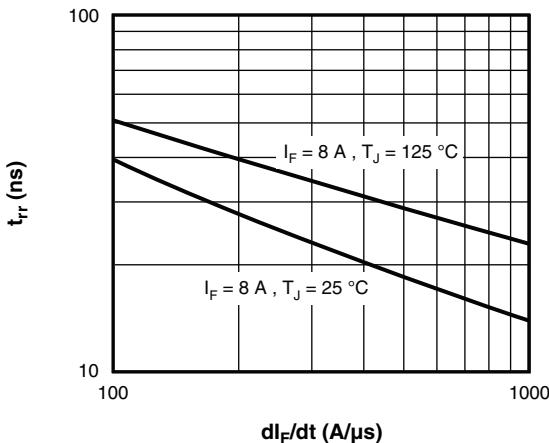


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

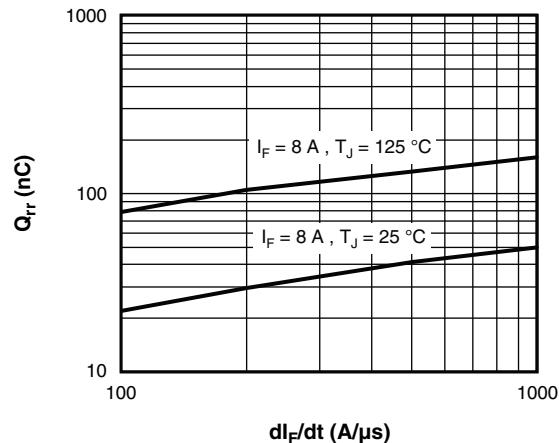
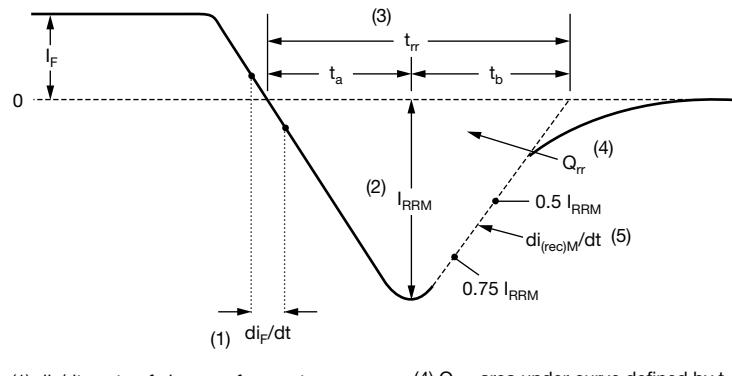


Fig. 8 - Typical Stored Charge vs. dI_F/dt



- (1) dI_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) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}
- (5) $dI_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 1 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	8	E	T	H	03	-M3
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	- Vishay Semiconductors product						
2	- Current rating (8 = 8 A)						
3	- E = single						
4	- Package: T = 2L TO-220AC						
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)

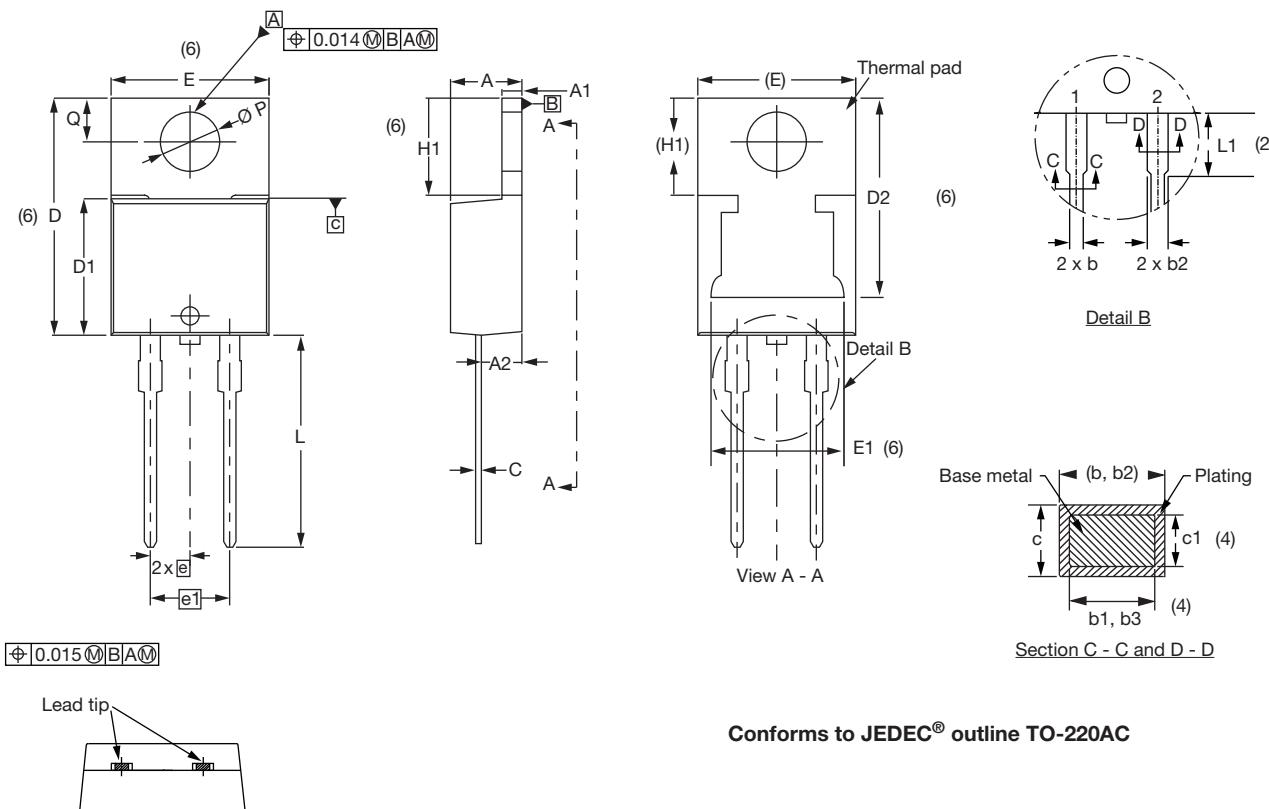
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-8ETH03-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?96156
Part marking information	www.vishay.com/doc?95391

2L TO-220AC

DIMENSIONS in millimeters and inches



Conforms to JEDEC® outline TO-220AC

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 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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