Vishay Semiconductors

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Hyperfast Rectifier, 30 A FRED Pt[®]



PRIMARY CHARACTERISTICS				
I _{F(AV)}	30 A			
V _R	650 V			
V _F at I _F at 125 °C	1.6 V			
t _{rr}	27 ns			
T _J max.	175 °C			
Package	TO-220AC 2L			
Circuit configuration	Single			

FEATURES

- · Hyper fast and soft recovery time
- Low forward voltage drop
- 175 °C maximum operating junction temperature
- · Low leakage current
- True 2 pin package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION / APPLICATIONS

Ultra low V_F, soft-switching hyper fast rectifiers optimized for discontinuous (critical) mode (DCM) power factor correction (PFC).

The minimized conduction loss, optimized stored charge and low recovery current minimized the switching losses and reduce over dissipation in the switching element and snubbers.

The device is also intended for use as a freewheeling diode in power supplies and other power switching applications.

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Repetitive peak reverse voltage	V _{RRM}		650	V
Average rectified forward current	I _{F(AV)}	T _C = 120 °C	30	٨
Non-repetitive peak surge current	I _{FSM}	T _C = 25 °C	210	A
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 = 250 μA	650	-	-	
Forward voltage	V	I _F = 30 A	-	2.1	2.5	V
Forward voltage V _F	I _F = 30 A, T _J = 125 °C	-	1.6	1.7		
Poverse leekage ourrent		$V_{R} = V_{R}$ rated	-	0.02	30	
Reverse leakage current I _R		$T_J = 150 \text{ °C}, V_R = V_R \text{ rated}$	-	50	300	μA
Junction capacitance	CT	V _R = 200 V	-	22	-	pF
Series inductance	L _S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

Revision: 11-Jan-2022 1

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DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 $^{\circ}$ C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t _{rr}	T _J = 25 °C	$I_F = 1 A$ $dI_F/dt = 100 A/\mu s$ $V_R = 30 V$	-	35	-	ns
·····		T _J = 25 °C	l _F = 30 A dl _F /dt = 1000 A/μs V _R = 400 V	-	27	-	
		T _J = 125 °C		-	88	-	
Pook receivery ourrent	I _{RRM}	T _J = 25 °C		- 15	15	-	А
Peak recovery current		T _J = 125 °C		-	24	-	
Deverse measure shares	0	T _J = 25 °C		-	330	-	nC
Reverse recovery charge	Q _{rr}	$T_{\rm J} = 125 \ ^{\circ}{\rm C}$	-	1350	-	nC	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	R _{thJC}		-	1.0	1.3	
Thermal resistance, junction to ambient	R _{thJA}	Typical socket mount	-	-	70	°C/W
Thermal resistance, case to heat sink	R _{thCS}	Mounting surface, flat, smooth, and greased	-	-	0.5	
Weight			-	0.2	-	g
Weight			-	0.07	-	oz.
Mounting torgue			6.0	_	12	kgf · cm
			(5.0)		(10)	(lbf · in)
Maximum junction and storage temperature range	T _J , T _{Stg}		-55	-	175	°C
Marking device		Case style: TO-220AC 2L		ETX	3007	

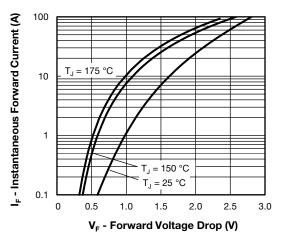


Fig. 1 - Typical Forward Voltage Drop Characteristics

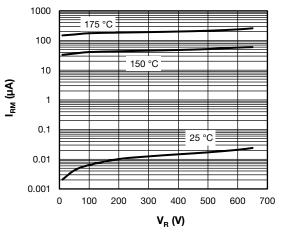


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage



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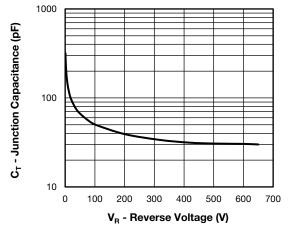


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

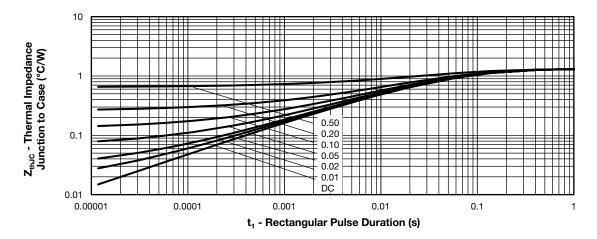
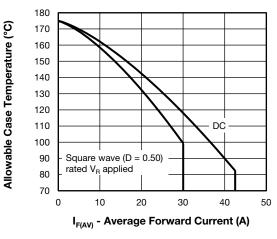


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics



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

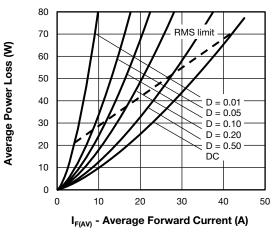


Fig. 6 - Forward Power Loss Characteristics

Revision: 11-Jan-2022

3

Document Number: 96065

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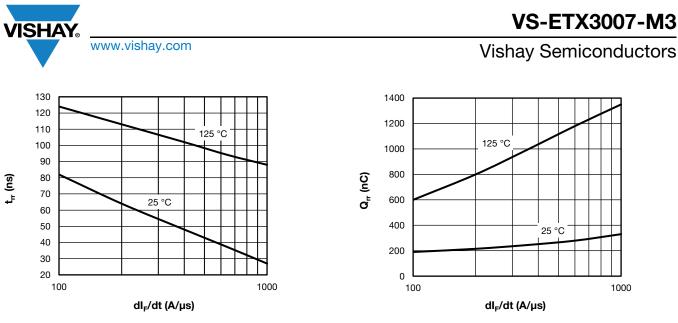
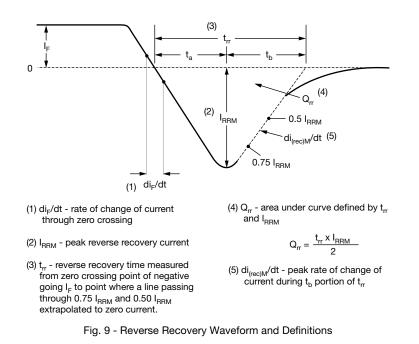


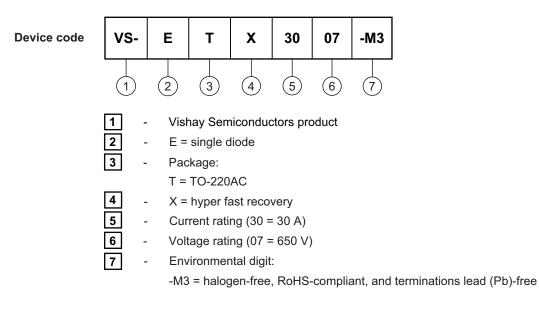
Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

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



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ORDERING INFORMATION TABLE



ORDERING INFORMATION (Example)				
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION		
VS-ETX3007-M3	50	Antistatic plastic tubes		

LINKS TO RELATED DOCUMENTS				
Dimensions www.vishay.com/doc?96156				
Part marking information	www.vishay.com/doc?95391			
SPICE model	www.vishay.com/doc?96532			





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1