Hyperfast Rectifier, 12 A FRED Pt[®] G5



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TO-220 FullPAK 2L

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS						
I _{F(AV)}	12 A					
V _R	600 V					
V _F at I _F at 125 °C	1.36 V					
t _{rr} (typ.)	17 ns					
T _J max.	175 °C					
Package	TO-220 FullPAK 2L					
Circuit configuration	Single					

FEATURES

- Best in class forward voltage drop and switching losses trade off
- Optimized for high speed operation
- 175 °C maximum operating junction temperature
- Polyimide passivation
- Fully isolated package (V_{INS} =2500 V_{RMS})
- True 2 pin package
- Designed and qualified according to JEDEC® JESD 47
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

DESCRIPTION / APPLICATIONS

Featuring a unique combination of low conduction and switching losses, this rectifier is the right choice for soft switched and resonant converters, as well as medium frequency hard switching converters. This device is specifically designed to improve as output rectifier for DC/DC stage in resonant converters and as PFC rectifier for aircon and industrial power supplies.

MECHANICAL DATA

Case: TO-220 FullPAK 2L

Molding compound meets UL 94 V-0 flammability rating

Terminals: matte tin plated leads, solderable per J-STD-002

ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS		
Repetitive peak reverse voltage	V _{RRM}		600	V		
Average rectified forward current in DC	I _{F(AV)}	T _C = 110 °C, DC	12	٨		
Non-repetitive peak surge current	I _{FSM}	$T_C = 25 \text{ °C}, t_p = 10 \text{ ms}, \text{ sine wave}$	155	A		
Operating junction and storage temperature	T _J , T _{Stg}		-55 to +175	°C		

ELECTRICAL SPECIFICATIONS ($T_J = 25 \text{ °C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Breakdown voltage, blocking voltage	V _{BR} , V _R	I _R = 100 μA	600	-	-		
Forward voltage	VF	I _F = 12 A	-	1.66	2.23	V	
Forward voltage	۷F	I _F = 12 A, T _J = 125 °C	-	1.36	-		
Povoroo lookogo ourront	1	$V_{R} = V_{R}$ rated	-	-	10		
Reverse leakage current I _R		$T_J = 125 \text{ °C}, V_R = V_R \text{ rated}$	-	-	500	μA	
Junction capacitance	CT	V _R = 600 V	-	10	-	pF	
Series inductance	L _S	Measured to lead 5 mm from package body	-	8	-	nH	

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 1
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COMPLIANT

HALOGEN

FREE





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DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST	CONDITIONS	MIN.	TYP.	MAX.	UNITS
		$I_F = 1.0 \text{ A,dI}_F/c$	lt = 100 A/µs, V _R = 30 V	-	17	-	ns
Reverse recovery time	t _{rr}	T _J = 25 °C		-	26	-	
		T _J = 125 °C		-	37	-	
Peak recovery current		T _J = 25 °C	I _F = 8 A dI _F /dt = 1000 A/μs V _R = 400 V	-	11	-	A
Peak recovery current	I _{RRM}	T _J = 125 °C		-	17	-	
Poverse recovery charge	0	T _J = 25 °C		-	130	-	nC
Reverse recovery charge	Q _{rr}	T _J = 125 °C		-	380	-	
Reverse recovery time	+	T _J = 25 °C	I _F = 12 A dI _F /dt = 1000 A/μs V _B = 400 V	-	29	-	ns
Reverse recovery time	t _{rr}	T _J = 125 °C		-	43	-	115
Poak receivery ourrent		T _J = 25 °C		-	12	-	A nC
Peak recovery current	I _{RRM}	T _J = 125 °C		-	18	-	
Reverse recovery charge	0	T _J = 25 °C		-	150	-	
	Q _{rr}	T _J = 125 °C		-	480	-	

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Thermal resistance, junction-to-case	R _{thJC}		-	-	3.5	°C/W	
Weight			-	2.0	-	g	
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)	
Maximum junction and storage temperature range	T _J , T _{Stg}		-55	-	175	°C	
Marking device		Case style TO-220 FullPAK 2L	E5TX1206FP				

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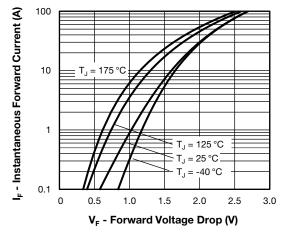


Fig. 1 - Forward Voltage Drop Characteristics

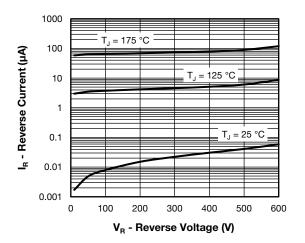


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

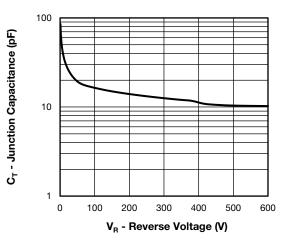


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

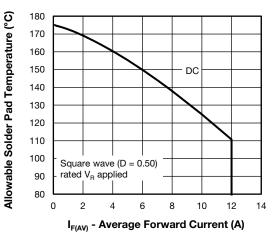


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

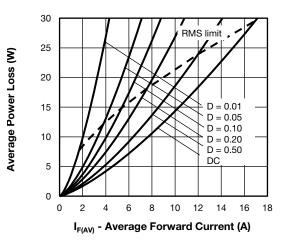


Fig. 5 - Forward Power Loss Characteristics

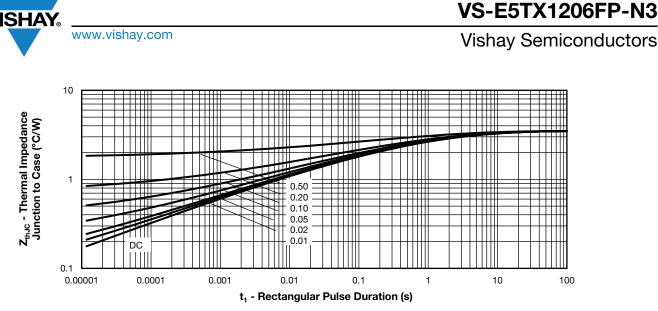


Fig. 6 - Transient Thermal Impedance, Junction to Case

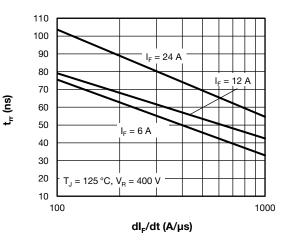


Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

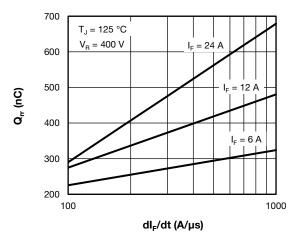


Fig. 8 - Typical Reverse Recovery Charge vs. dl_F/dt

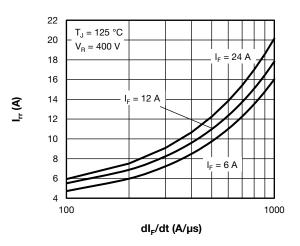


Fig. 9 - Typical Reverse Recovery Current vs. dl_F/dt

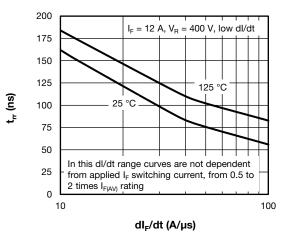


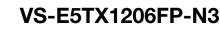
Fig. 10 - Typical Reverse Recovery Time vs. dI_F/dt

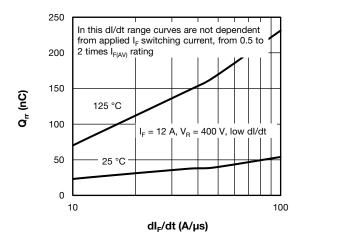
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Fig. 11 - Typical Reverse Recovery Charge vs. dl_F/dt

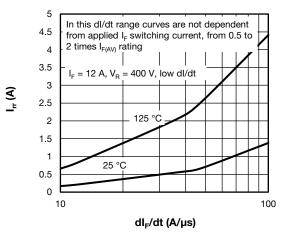


Fig. 12 - Typical Reverse Recovery Current vs. dl_F/dt

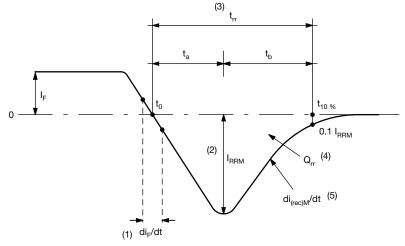


Fig. 13 - Reverse Recovery Waveform and Definitions

Notes

- (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 t_0 , crossing point of negative going I_F , to point $t_{10\%}$, 0.1 I_{RRM}
- $^{(4)}$ \dot{Q}_{rr} area under curve defined by t_0 and $t_{10~\%}$

$$Q_{rr} = \int_{t_0}^{t_{10}\%} I(t)dt$$

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





ORDERING INFORMATION TABLE

Device code	VS-	E	5	т	x	12	06	FP	-N3
		2	3	4	5	6	7	8	9
	1 -	· Visł	nay Sem	niconduc	ctors pro	oduct			
	2 -	• E=	single c	liode					
	3 -	- 5 =	5 = FRED generation 5						
	4 -		Package: T = TO-220 package						
	5 -	• X =	X = hyperfast recovery						
	6 -	- Cur	Current rating (12 = 12 A)						
	7 -	Vol	Voltage rating (06 = 600 V)						
	8 -	· FP	FP = TO-220 FullPAK 2L						
	9 -	· Env	ironmer	ntal digit	:				
		N3	= halog	en-free,	RoHS-o	complia	nt, and	totally I	ead (Pb)

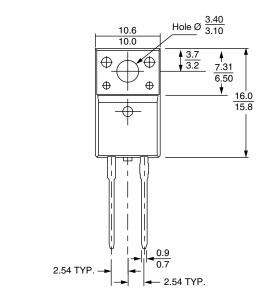
ORDERING INFORMATION (Example)						
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION			
VS-E5TX1206FP-N3	50	1000	Antistatic plastic tube			

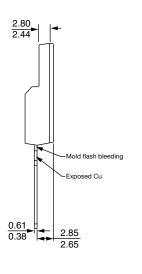
LINKS TO RELATED DOCUMENTS					
Dimensions	www.vishay.com/doc?96157				
Part marking information	www.vishay.com/doc?95392				

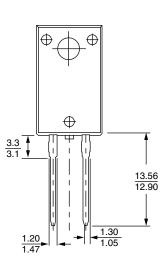


2L TO-220 FullPAK

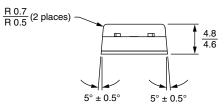
DIMENSIONS in millimeters







Bottom view





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