

ROHS

HALOGEN FREE

Hyperfast Rectifier, 30 A FRED Pt® G5



LINKS TO ADDITIONAL RESOURCES





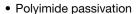
PRIMARY CHARACTERISTICS						
I _{F(AV)}	30 A					
V _R	600 V					
V _F at I _F at 125 °C	1.15 V					
t _{rr} (typ.)	25					
I _{FSM}	330					
T _J max.	175 °C					
Package	TO-247AD 2L					
Circuit configuration	Single					

FEATURES

- Hyperfast and optimized Q_{rr}
- Best in class forward voltage drop and switching losses trade off







- AEC-Q101 qualified meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

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 efficiency of high speed LLC output rectification stages of EV / HEV on-board battery chargers

MECHANICAL DATA

Case: TO-247AD 2L

Molding compound meets UL 94 V-0 flammability rating **Terminal:** 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	I _{F(AV)}	T _C = 123 °C, D = 0.50	30				
Non-repetitive peak surge current	I _{FSM}	$T_C = 25$ °C, $t_p = 10$ ms, sine wave	330	А			
Repetitive peak forward current	I _{FRM}	$T_C = 123 ^{\circ}\text{C}, D = 0.50, f = 20 \text{kHz}$	60				
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 = 100 μA	600	-	-			
Forward voltage	V _F	I _F = 30 A	-	1.3	1.6	V		
		I _F = 30 A, T _J = 125 °C	-	1.15	-			
Б	I _R	$V_R = V_R$ rated	-	-	20			
Reverse leakage current		T _J = 125 °C, V _R = V _R rated	-	-	500	μA		
Junction capacitance	C _T	V _R = 200 V	-	36	-	pF		
Series inductance	L _S	Measured to lead 5 mm from package body	-	8	-	nH		



DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
		$I_F = 1.0 \text{ A}, dI_F/dt = 100$) A/μs, V _R = 30 V	-	25	-	
Reverse recovery time	t _{rr}	T _J = 25 °C		-	41	-	ns
		T _J = 125 °C		-	58	-	1
Dook recovery ourrent		T _J = 25 °C	$I_F = 20 \text{ A},$	-	19	-	A
Peak recovery current	I _{RRM}	T _J = 125 °C	$dI_F/dt = 1000 \text{ A/}\mu\text{s},$ $V_R = 400 \text{ V}$	-	32	-	
Poverse receivent charge	0	T _J = 25 °C		-	419	-	nC
Reverse recovery charge	Q _{rr}	T _J = 125 °C		-	1176	-	
Deviana nagavani tima		T _J = 25 °C		-	46	-	ns
Reverse recovery time	t _{rr}	T _J = 125 °C		-	65	-	
Deals received a surrent		T _J = 25 °C	$I_F = 30 \text{ A},$ $dI_F/dt = 1000 \text{ A/}\mu\text{s},$ $V_R = 400 \text{ V}$	-	21	-	۸
Peak recovery current	I _{RRM}	T _J = 125 °C		-	36	-	Α
Reverse recovery charge	0	T _J = 25 °C		-	550	-	nC
	Q _{rr}	T _J = 125 °C			1560	-	

THERMAL - MECHANICAL SPECIFICATIONS								
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS		
Thermal resistance, junction-to-case	R _{thJC}		-	-	1.1	°C/W		
Weight			-	5.5		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-247AD 2L	E5PH3006LH					

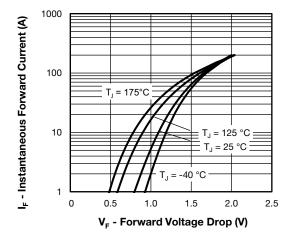


Fig. 1 - Forward Voltage Drop Characteristics

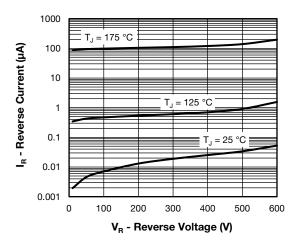


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

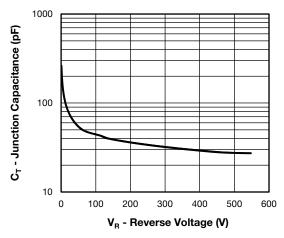


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

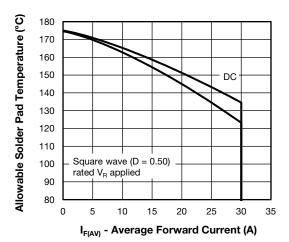


Fig. 4 - Maximum Allowable Case Temperature vs.
Average Forward Current

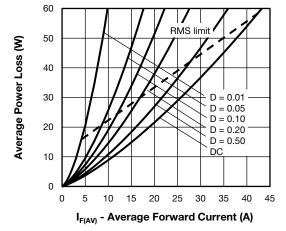


Fig. 5 - Forward Power Loss Characteristics

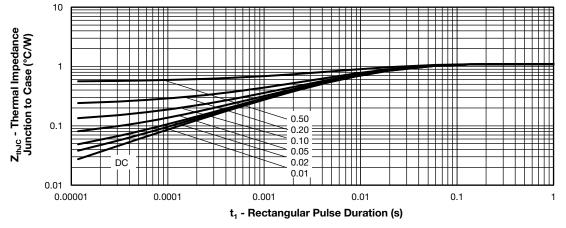


Fig. 6 - Transient Thermal Impedance, Junction to Case

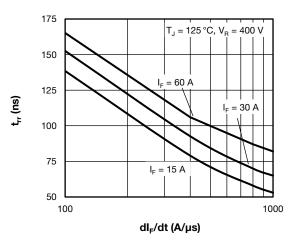


Fig. 7 - Typical Reverse Recovery Time vs. dI_E/dt

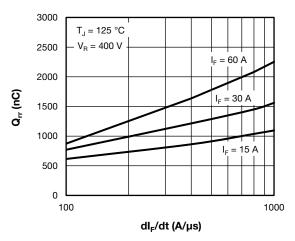


Fig. 8 - Typical Reverse Recovery Charge vs. dl_F/dt

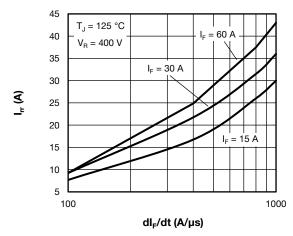


Fig. 9 - Typical Reverse Recovery Current vs. dl_F/dt

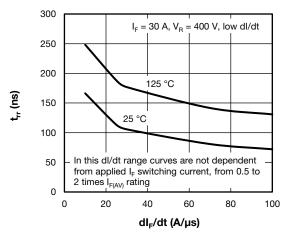


Fig. 10 - Typical Reverse Recovery Time vs. dl_F/dt

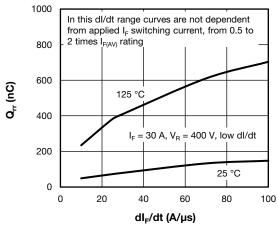


Fig. 11 - Typical Reverse Recovery Charge vs. dl_F/dt

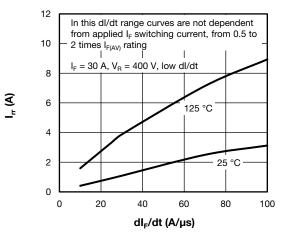


Fig. 12 - Typical Reverse Recovery Current vs. dl_F/dt

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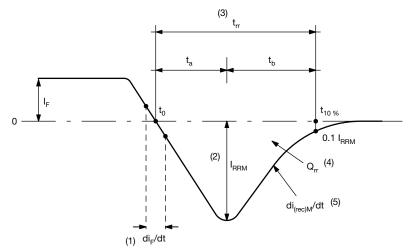


Fig. 13 - Reverse Recovery Waveform and Definitions

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}
- $^{(4)}$ Q_{rr} area under curve defined by t_0 and $t_{10\ \%}$

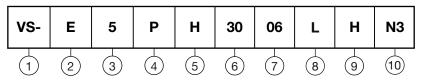
$$Q_{rr} = \int_{t_0}^{t_{10}\%} I(t)dt$$

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



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

Circuit configuration
E = single diode

3 - FRED Pt® Gen 5

- P = TO-247 package

5 - Process type:

H = hyperfast recovery

6 - Current rating (30 = 30 A)

Voltage rating (06 = 600 V)
 Package: L = long lead (TO-247AD)

9 - H = AEC-Q101 qualified

- Environmental digit:

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

ORDERING INFORMATION (Example)							
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION				
VS-E5PH3006LHN3	25	500	Antistatic plastic tube				

LINKS TO RELATED DOCUMENTS					
Dimensions	www.vishay.com/doc?95536				
Part marking information	www.vishay.com/doc?95648				

TO-247AD 2L

DIMENSIONS in millimeters and inches



View B

SYMBOL	MILLIN	IETERS	INC	NOTES	
SYMBOL	MIN.	MAX.	MIN.	MAX.	NOTES
А	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.34	0.065	0.092	
С	0.38	0.89	0.015	0.035	
c1	0.38	0.84	0.015	0.033	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4
D2	0.51	1.35	0.020	0.053	

Section C - C, D - D

SYMBOL	MILLIN	IETERS	INC	HES	NOTES
STWIDOL	MIN.	MAX.	MIN.	MAX.	NOTES
Е	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
е	5.46	BSC	0.215	BSC	
ØK	0.2	0.254		10	
L	19.81	20.32	0.780	0.800	
L1	3.71	4.29	0.146	0.169	
ØΡ	3.56	3.66	0.14	0.144	
Ø P1	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		
	•		•	•	

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) Dimension D and E do not include mold flash. These dimensions are measured at the outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC® outline TO-247 with exception of dimension A min., D, E min., Q min., S, and note 4



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