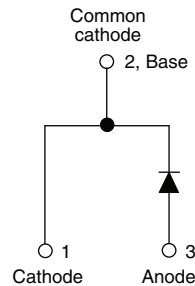


## Ultrafast Rectifier, 30 A FRED Pt<sup>®</sup>


**TO-247AC 2L**


### FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Low leakage current
- Designed and qualified according to JEDEC<sup>®</sup>-JESD 47
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### DESCRIPTION / APPLICATION

300 V series are the state of the art ultrafast recovery rectifiers designed with optimized performance of forward voltage drop and ultrafast 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	
$I_{F(AV)}$	30 A
$V_R$	300 V
$V_F$ at $I_F$	0.9 V
$t_{rr}$ typ.	See Recovery table
$T_J$ max.	175 °C
Package	TO-247AC 2L
Circuit configuration	Single

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	$V_{RRM}$		300	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 143$ °C	30	A
Non-repetitive peak surge current	$I_{FSM}$	$T_J = 25$ °C, $t_p = 10$ ms	300	
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	$V_{BR}, V_R$	$I_R = 100$ $\mu$ A	300	-	-	V
Forward voltage	$V_F$	$I_F = 30$ A	-	1.08	1.25	V
		$I_F = 30$ A, $T_J = 125$ °C	-	0.9	1.00	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	0.05	60	$\mu$ A
		$T_J = 125$ °C, $V_R = V_R$ rated	-	280	600	
Junction capacitance	$C_T$	$V_R = 300$ V	-	90	-	pF
Series inductance	$L_S$	Measured lead to lead 5 mm from package body	-	3.5	-	nH



DYNAMIC RECOVERY CHARACTERISTICS ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	$t_{rr}$	$I_F = 1.0\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$		-	-	55	ns
		$T_J = 25\text{ }^\circ\text{C}$	$I_F = 30\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$ $V_R = 200\text{ V}$	-	38	-	
		$T_J = 125\text{ }^\circ\text{C}$		-	52	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 30\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$ $V_R = 200\text{ V}$	-	2.8	-	A
		$T_J = 125\text{ }^\circ\text{C}$		-	7.3	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 30\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$ $V_R = 200\text{ V}$	-	53	-	nC
		$T_J = 125\text{ }^\circ\text{C}$		-	190	-	

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$			-65	-	175	$^\circ\text{C}$
Thermal resistance, junction to case per leg	$R_{thJC}$			-	0.5	0.9	$^\circ\text{C}/\text{W}$
Thermal resistance, junction to ambient	$R_{thJA}$	Typical socket mount		-	-	40	
Thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, flat, smooth and greased		-	0.4	-	
Weight				-	6.0	-	g
				-	0.22	-	oz.
Mounting torque				6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-247AC 2L		30EPH03			

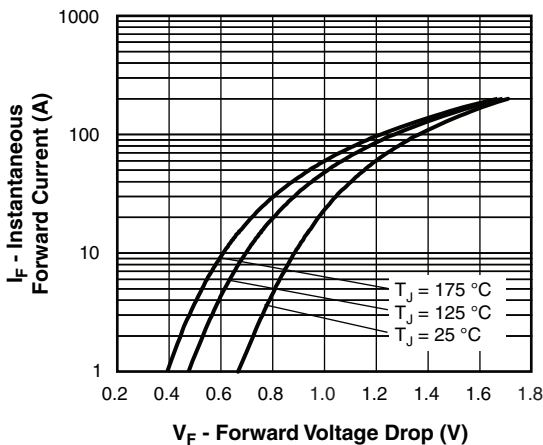


Fig. 1 - Typical Forward Voltage Drop Characteristics

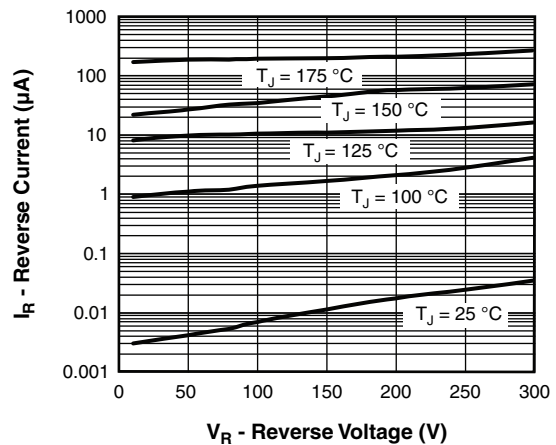


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

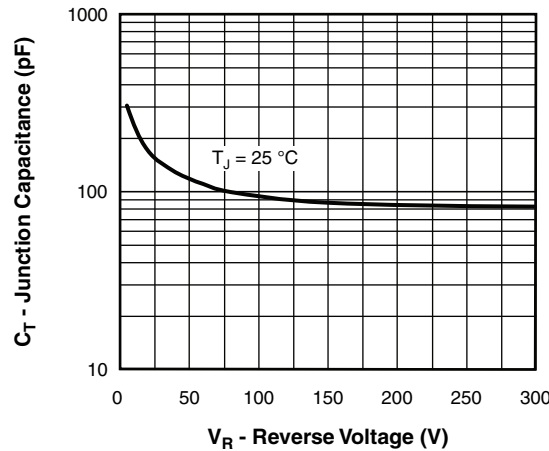


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

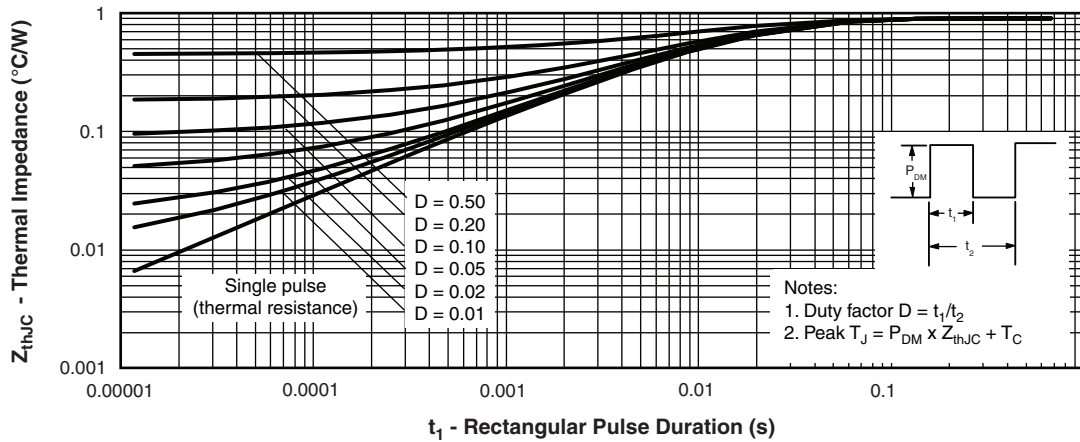


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

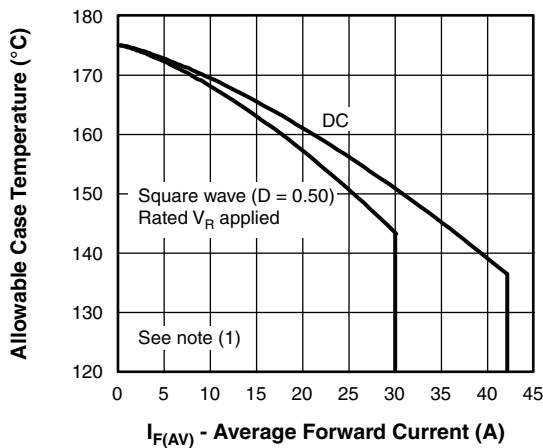


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

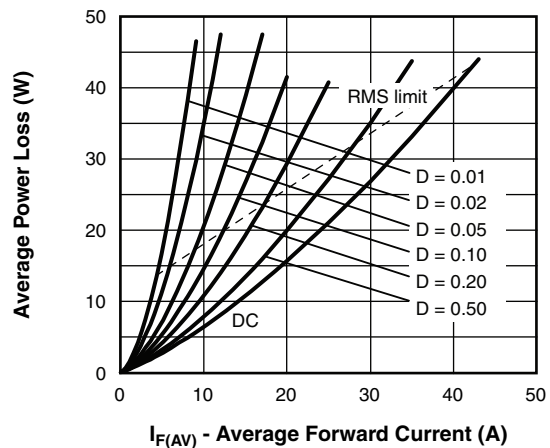


Fig. 6 - Forward Power Loss Characteristics

**Note**

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

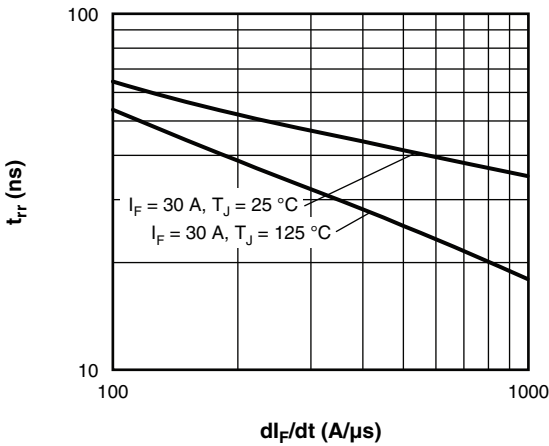


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

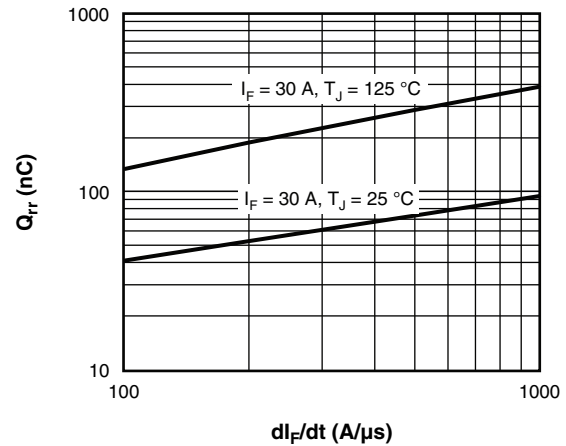


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$

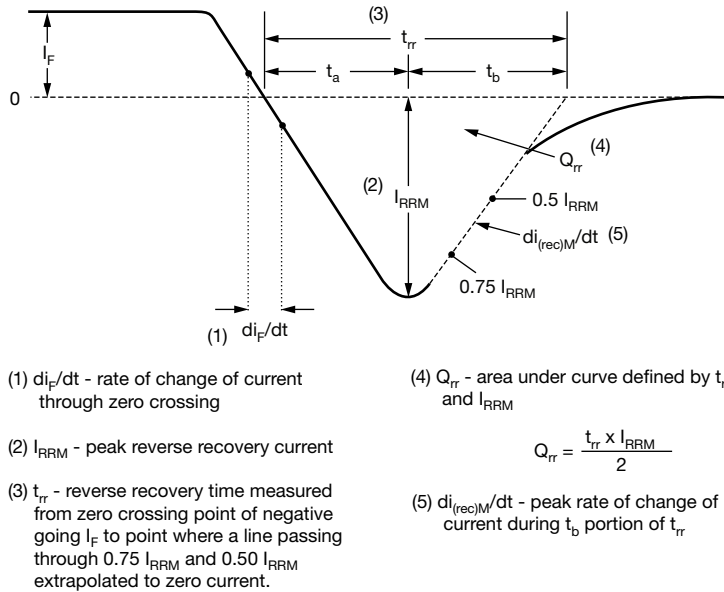
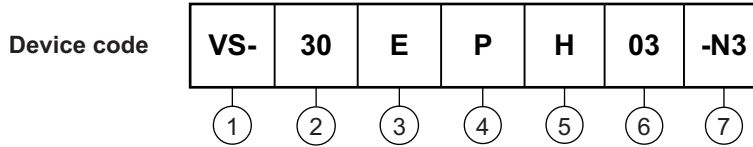


Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (30 = 30 A)
- 3** - Circuit configuration:  
E = single diode
- 4** - Package:  
P = TO-247AC modified
- 5** - H = hyperfast recovery
- 6** - Voltage rating (03 = 300 V)
- 7** - Environmental digit:  
-N3 = halogen-free, RoHS-compliant and totally lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-30EPH03-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?96144">www.vishay.com/doc?96144</a>
Part marking information	<a href="http://www.vishay.com/doc?95648">www.vishay.com/doc?95648</a>





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