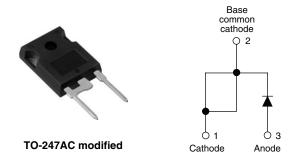


Vishay High Power Products

Ultrafast Rectifier, 30 A FRED PtTM



PRODUCT SUMMARY				
t _{rr}	55 ns			
I _{F(AV)}	30 A			
V _R	300 V			

FEATURES

- · Ultrafast recovery time
- · Low forward voltage drop
- · Low leakage current
- 175 °C operating junction temperature
- · Designed and qualified for industrial level

DESCRIPTION/APPLICATIONS

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-to-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.

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	^	
Non-repetitive peak surge current	I _{FSM}	T _J = 25 °C	300	A	
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	Ι _R = 100 μΑ	300	-	-	
Forward voltage V _F	I _F = 30 A	-	1.08	1.25	V	
	V F	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	
		$T_J = 125 ^{\circ}\text{C}, V_R = V_R \text{rated}$	-	280	600	μΑ
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

30EPH03

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DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
		$I_F = 1.0 \text{ A}, dI_F/dt = 50 \text{ A/}\mu\text{s}, V_R = 30 \text{ V}$		-	-	55	
Reverse recovery time	t _{rr}	T _J = 25 °C	I _F = 30 A dI _F /dt = - 200 A/μs V _R = 200 V	-	38	-	ns
		T _J = 125 °C		-	52	-	
Peak recovery current I _{RRM}	I _{RRM}	T _J = 25 °C		-	2.8	-	А
		T _J = 125 °C		-	7.3	-	_ ^
Reverse recovery charge Q _{rr}	Q _{rr}	T _J = 25 °C		-	53	-	nC
		T _J = 125 °C		-	190	-	I IIC

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}		-	0.5	0.9	
Thermal resistance, junction to ambient	R _{thJA}	Typical socket mount	-	-	40	°C/W
Thermal resistance, case to heatsink	R _{thCS}	Mounting surface, flat, smooth and greased	-	0.4	-	
Waight			-	6.0	=	g
Weight			-	0.22	-	OZ.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf ⋅ cm (lbf ⋅ in)
Marking device		Case style TO-247AC modified		30E	PH03	•

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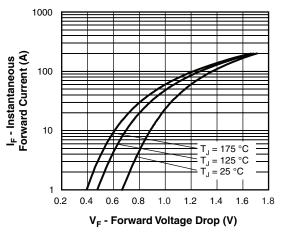


Fig. 1 - Typical Forward Voltage Drop Characteristics

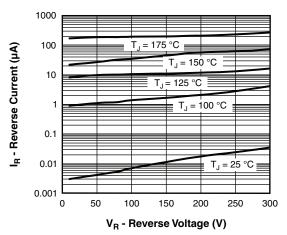


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

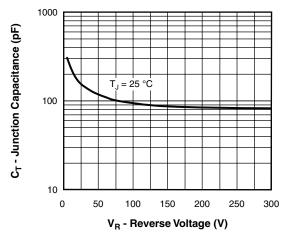


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

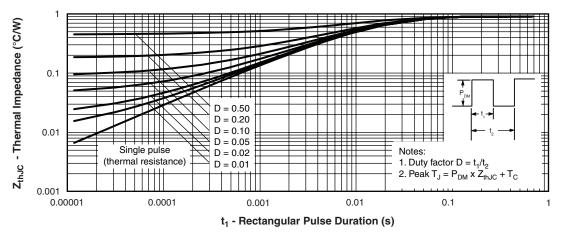


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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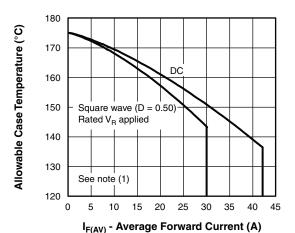


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

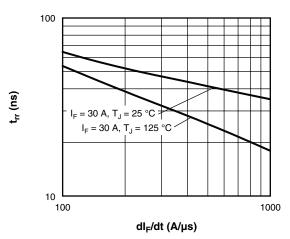


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

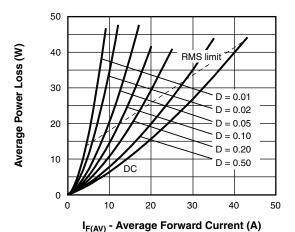


Fig. 6 - Forward Power Loss Characteristics

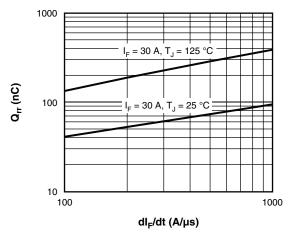


Fig. 8 - Typical Stored Charge vs. dl_F/dt

Note



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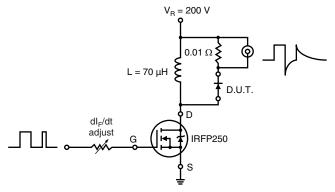
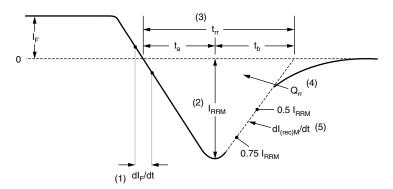


Fig. 9 - Reverse Recovery Parameter Test Circuit



- (1) dl_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) $\rm t_{rr}$ reverse recovery time measured from zero crossing point of negative going $\rm I_F$ to point where a line passing through 0.75 $\rm I_{RRM}$ and 0.50 $\rm I_{RRM}$ extrapolated to zero current.
- (4) $\mathbf{Q}_{\rm rr}$ area under curve defined by $\mathbf{t}_{\rm rr}$ and $\mathbf{I}_{\rm RRM}$

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

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

Fig. 10 - Reverse Recovery Waveform and Definitions

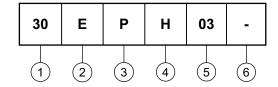
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ORDERING INFORMATION TABLE

Device code



- 1 Current rating (30 = 30A)
- **2** Circuit configuration:

E = Single diode

- Package:
 - P = TO-247AC modified
- 4 H = Hyperfast recovery
- 5 Voltage rating (03 = 300V)
- 6 • None = Standard production
 - PbF = Lead (Pb)-free

Tube standard pack quantity: 25 pieces

LINKS TO RELATED DOCUMENTS				
Dimensions http://www.vishay.com/doc?95253				
Part marking information	http://www.vishay.com/doc?95255			

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