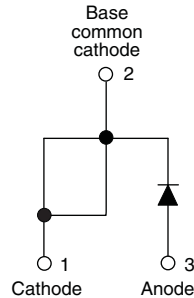


Hyperfast Rectifier, 30 A FRED Pt®



TO-247AC modified



FEATURES

- Hyperfast recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Low leakage current
- Single diode device
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for industrial level



RoHS
COMPLIANT

DESCRIPTION/APPLICATIONS

State of the art hyperfast recovery rectifiers designed with optimized performance of forward voltage drop, hyperfast recovery time and soft recovery.

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 PFC boost stage in the AC/DC section of SMPS, inverters or as freewheeling diodes.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

PRODUCT SUMMARY	
Package	TO-247AC modified (2 pins)
$I_{F(AV)}$	30 A
V_R	600 V
V_F at I_F	2.6 V
t_{rr} typ.	See Recovery table
T_J max.	175 °C
Diode variation	Single die

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}		600	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 116$ °C	30	A
Non-repetitive peak surge current	I_{FSM}	$T_J = 25$ °C	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	$I_R = 100$ μ A	600	-	-	V
Forward voltage	V_F	$I_F = 30$ A	-	2.0	2.6	
		$I_F = 30$ A, $T_J = 150$ °C	-	1.34	1.75	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	0.3	50	μ A
		$T_J = 150$ °C, $V_R = V_R$ rated	-	60	500	
Junction capacitance	C_T	$V_R = 600$ V	-	33	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	3.5	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	t _{rr}	I _F = 1.0 A, di _F /dt = 50 A/μs, V _R = 30 V	-	28	35	ns	
		T _J = 25 °C	-	31	-		
		T _J = 125 °C	-	77	-		
Peak recovery current	I _{RRM}	I _F = 30 A di _F /dt = 200 A/μs V _R = 200 V	T _J = 25 °C	-	3.5	-	A
			T _J = 125 °C	-	7.7	-	
Reverse recovery charge	Q _{rr}		T _J = 25 °C	-	65	-	nC
			T _J = 125 °C	-	345	-	

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	°C/W
Thermal resistance, junction to ambient per leg	R _{thJA}	Typical socket mount	-	-	70	
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 modified	30EPH06			

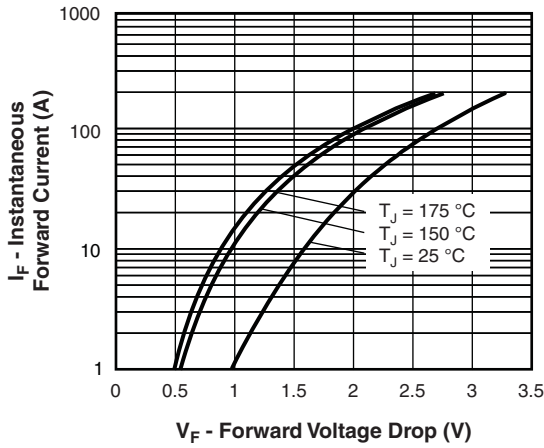


Fig. 1 - Typical Forward Voltage Drop Characteristics

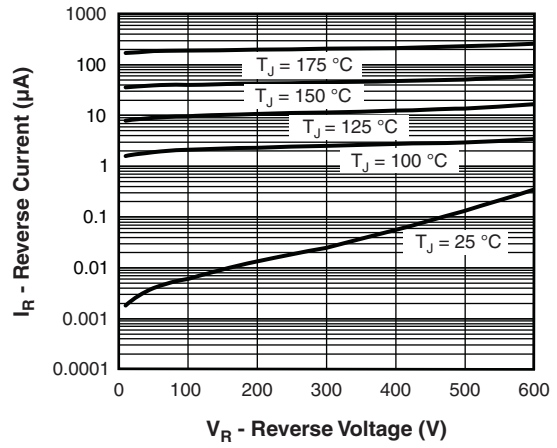


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

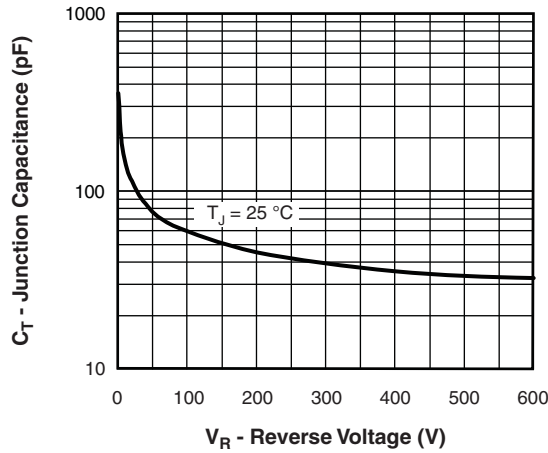
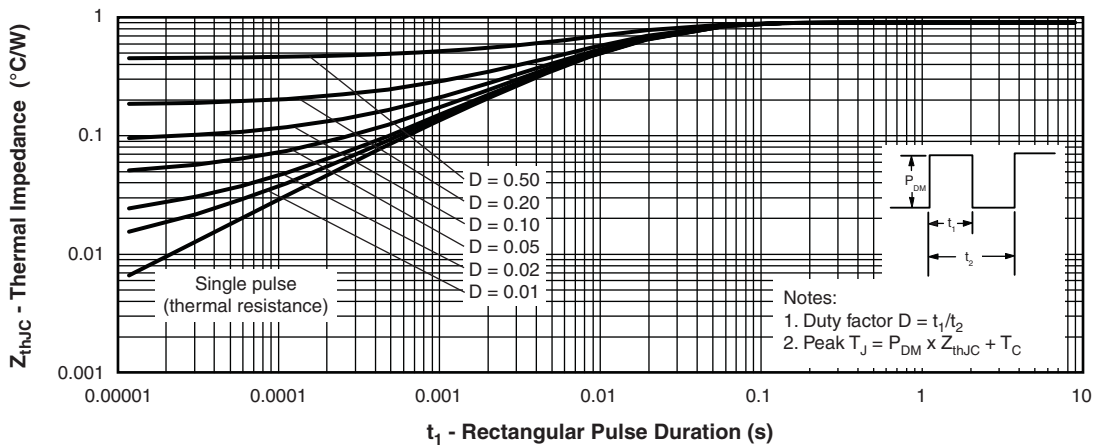


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

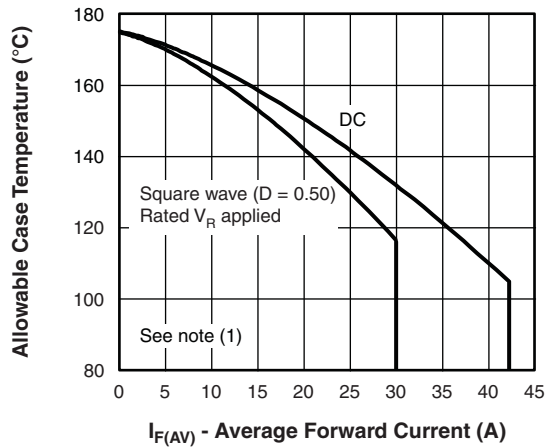


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

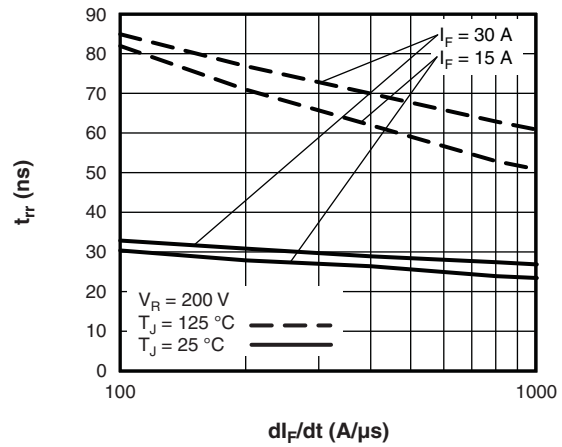


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

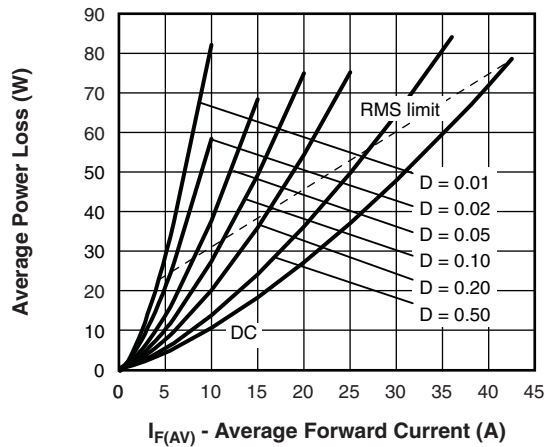


Fig. 6 - Forward Power Loss Characteristics

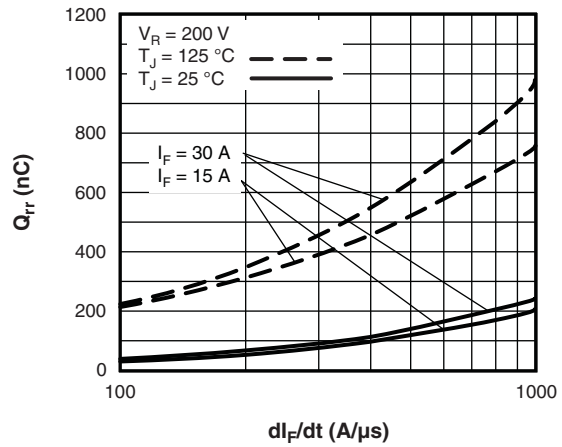


Fig. 8 - Typical Stored Charge vs. di_F/dt

Note

- (1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
 Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

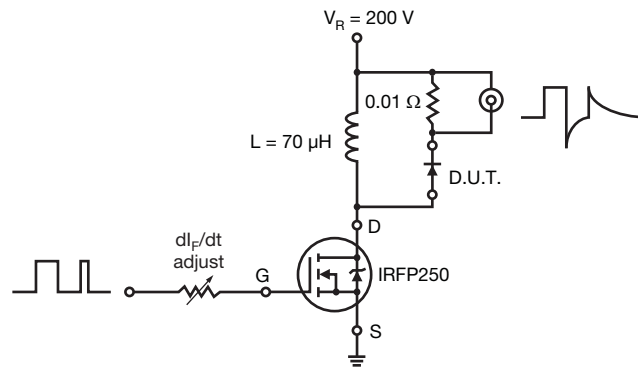
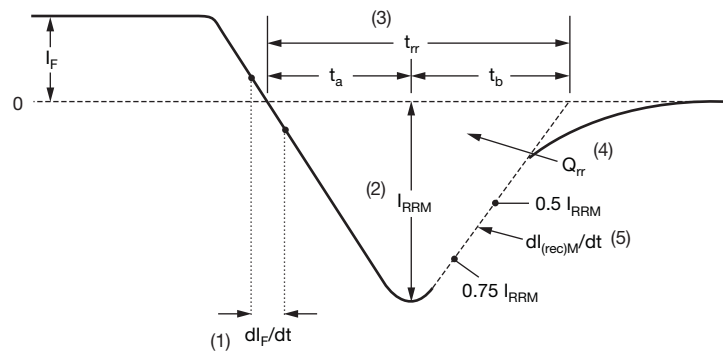


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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 zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.

(4) Q_{rr} - area under curve defined by t_{rr} and I_{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}

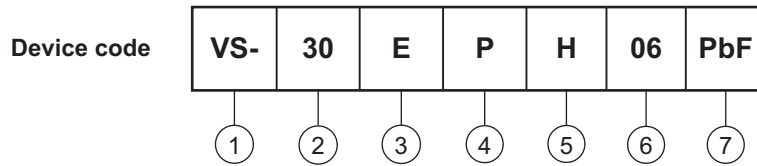
Fig. 10 - Reverse Recovery Waveform and Definitions

VS-30EPH06PbF

Vishay Semiconductors Hyperfast Rectifier, 30 A FRED Pt®



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 (06 = 600 V)
- 7** - PbF = Lead (Pb)-free

Tube standard pack quantity: 25 pieces

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



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