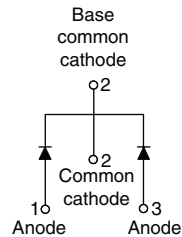


## Hyperfast Rectifier, 2 x 15 A FRED Pt™


**TO-220AB**


### FEATURES

- Hyperfast recovery time
- Low forward voltage drop
- Low leakage current
- 175 °C operating junction temperature
- Designed and qualified for AEC Q101 level

### DESCRIPTION/APPLICATIONS

300 V series are the state of the art hyperfast recovery rectifiers designed with optimized performance of forward voltage drop and hyperfast 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.

### PRODUCT SUMMARY

$t_{rr}$ (maximum)	36 ns
$I_{F(AV)}$	2 x 15 A
$V_R$	300 V

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	$V_{RRM}$		300	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 153\text{ °C}$	15	A
			30	
Non-repetitive peak surge current	$I_{FSM}$	$T_C = 25\text{ °C}$	150	
Operating junction and storage temperatures	$T_J, T_{Stg}$		- 65 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	$V_{BR}, V_R$	$I_R = 100\ \mu\text{A}$	300	-	-	V
Forward voltage	$V_F$	$I_F = 15\text{ A}$	-	1.0	1.25	V
		$I_F = 15\text{ A}, T_J = 125\text{ °C}$	-	0.85	0.95	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	-	40	$\mu\text{A}$
		$T_J = 125\text{ °C}, V_R = V_R$ rated	-	8	200	
Junction capacitance	$C_T$	$V_R = 300\text{ V}$	-	38	-	pF
Series inductance	$L_S$	Measured lead to lead 5 mm from package body	-	8	-	nH



<b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	$t_{rr}$	$I_F = 1\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	-	36	ns
		$I_F = 1\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	-	30	
		$T_J = 25\text{ }^\circ\text{C}$	-	33	-	
		$T_J = 125\text{ }^\circ\text{C}$	-	48	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	-	2.8	-	A
		$T_J = 125\text{ }^\circ\text{C}$	-	6.5	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	-	46	-	nC
		$T_J = 125\text{ }^\circ\text{C}$	-	160	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	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 diode	$R_{thJC}$	-	-	1.4	$^\circ\text{C}/\text{W}$	
Marking device		Case style TO-220AB		30CTH03		

Hyperfast Rectifier,  
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Vishay High Power Products

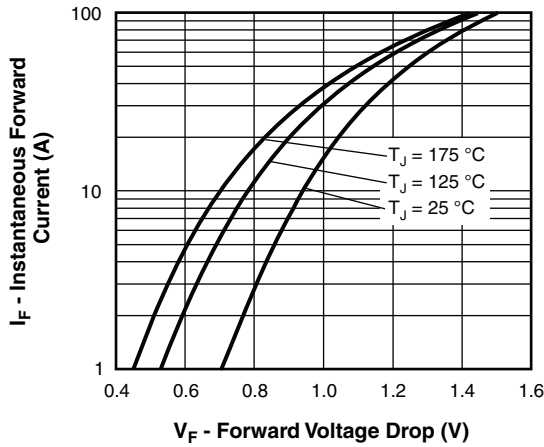


Fig. 1 - Typical Forward Voltage Drop Characteristics

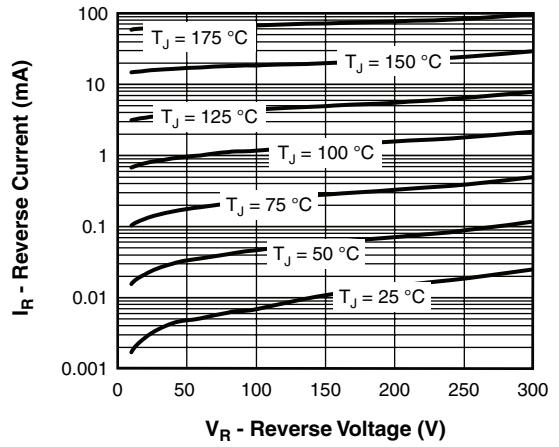


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

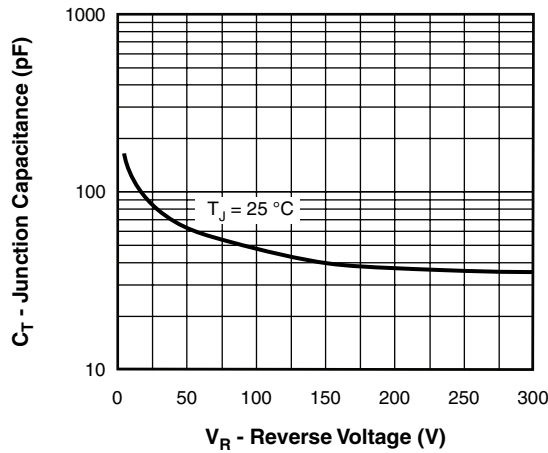


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

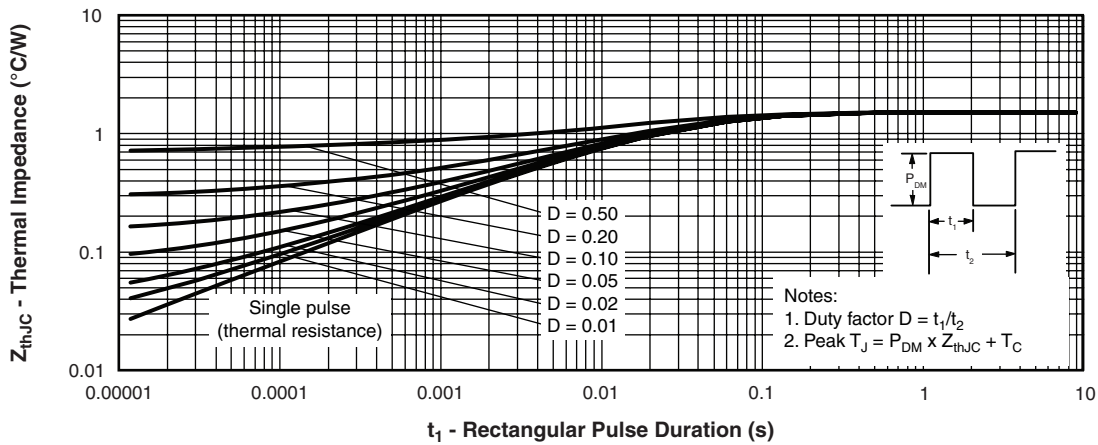


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

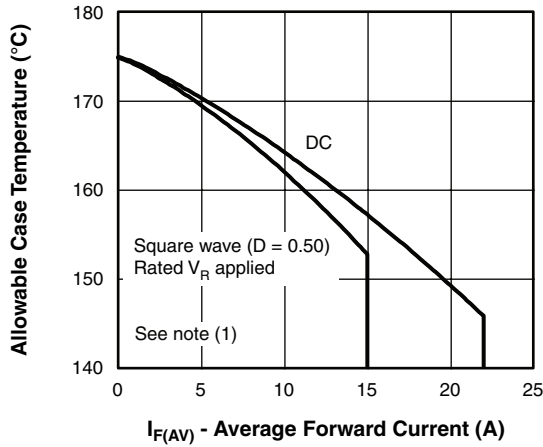


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

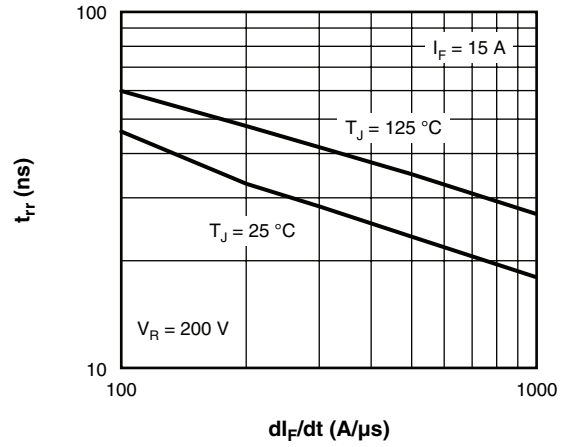


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

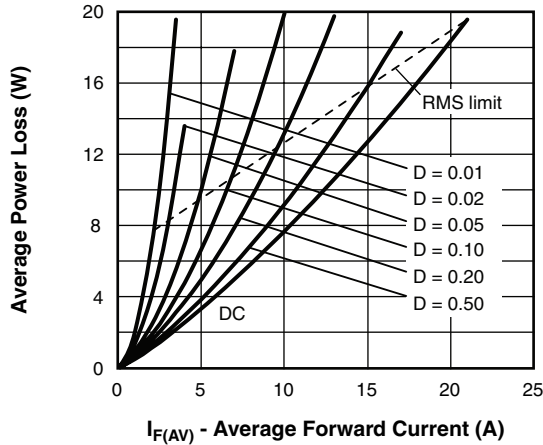


Fig. 6 - Forward Power Loss Characteristics

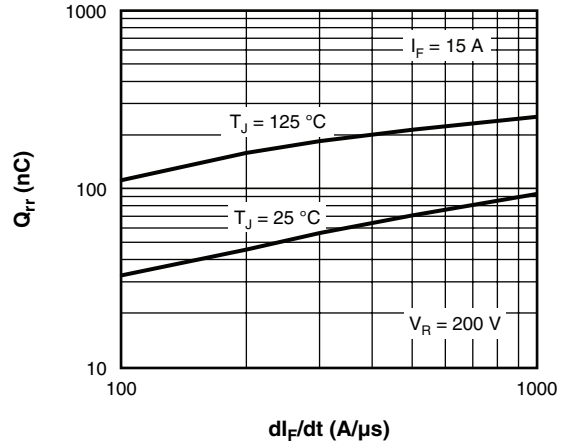


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$

**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  $V_R$

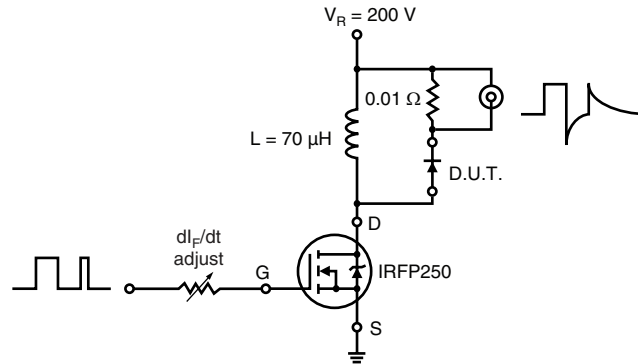
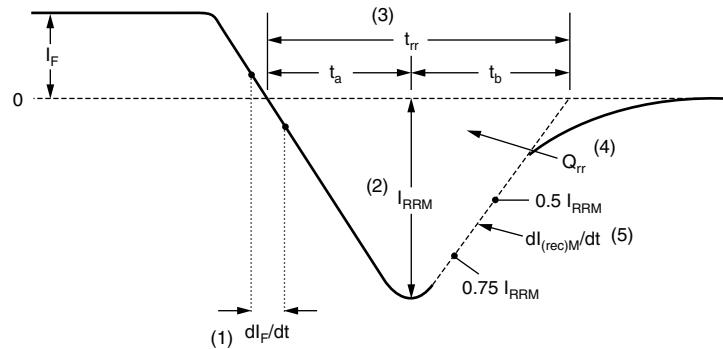


Fig. 9 - Reverse Recovery Parameter Test Circuit



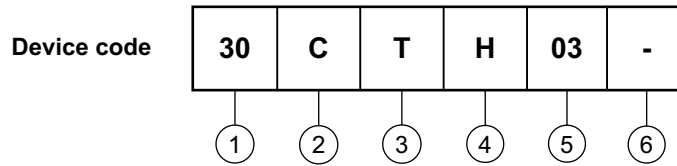
- (1)  $di_F/dt$  - rate of change of current through zero crossing
- (2)  $I_{RRM}$  - peak reverse recovery current
- (3)  $t_{rr}$  - reverse recovery time measured from zero crossing point of negative going  $I_F$  to point where a line passing through  $0.75 I_{RRM}$  and  $0.50 I_{RRM}$  extrapolated to zero current.
- (4)  $Q_{rr}$  - area under curve defined by  $t_{rr}$  and  $I_{RRM}$
- (5)  $dl_{(rec)M}/dt$  - peak rate of change of current during  $t_b$  portion of  $t_{rr}$

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

Fig. 10 - Reverse Recovery Waveform and Definitions



## ORDERING INFORMATION TABLE



- 1** - Current rating (30 = 30 A)
- 2** - C = Common cathode
- 3** - Package:
  - T = TO-220
- 4** - H = Hyperfast recovery
- 5** - Voltage rating (03 = 300 V)
- 6** -
  - None = Standard production
  - PbF = Lead (Pb)-free

Tube standard pack quantity: 50 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95222">http://www.vishay.com/doc?95222</a>
Part marking information	<a href="http://www.vishay.com/doc?95267">http://www.vishay.com/doc?95267</a>



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