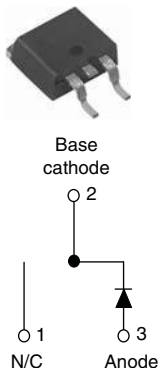


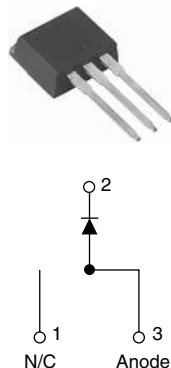
## Hyperfast Rectifier, 15 A FRED Pt™

15ETH03SPbF



D<sup>2</sup>PAK

15ETH03-1PbF



TO-262

### FEATURES

- Hyperfast recovery time
- Low forward voltage drop
- Low leakage current
- 175 °C operating junction temperature
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for Q101 level



RoHS\*  
COMPLIANT

### 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

$t_{rr}$	40 ns
$I_{F(AV)}$	15 A
$V_R$	300 V

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Repetitive peak reverse voltage	$V_{RRM}$		300	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 142\text{ °C}$	15	A
Non-repetitive peak surge current	$I_{FSM}$	$T_J = 25\text{ °C}$	140	
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	$V_{BR}, V_R$	$I_R = 100\text{ }\mu\text{A}$	300	-	-	V
Forward voltage	$V_F$	$I_F = 15\text{ A}$	-	1.05	1.25	
		$I_F = 15\text{ A}, T_J = 125\text{ °C}$	-	0.85	1.00	
Reverse leakage current	$I_R$	$V_R = V_R\text{ rated}$	-	0.05	40	$\mu\text{A}$
		$T_J = 125\text{ °C}, V_R = V_R\text{ rated}$	-	12	400	
Junction capacitance	$C_T$	$V_R = 300\text{ V}$	-	45	-	pF
Series inductance	$L_S$	Measured lead to lead 5 mm from package body	-	8	-	nH

\* Pb containing terminations are not RoHS compliant, exemptions may apply

DYNAMIC RECOVERY CHARACTERISTICS (T <sub>J</sub> = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 1.0 A, dI <sub>F</sub> /dt = 50 A/μs, V <sub>R</sub> = 30 V	-	-	40	ns
		T <sub>J</sub> = 25 °C	-	32	-	
		T <sub>J</sub> = 125 °C	-	45	-	
Peak recovery current	I <sub>RRM</sub>	T <sub>J</sub> = 25 °C	-	2.4	-	A
		T <sub>J</sub> = 125 °C	-	6.1	-	
Reverse recovery charge	Q <sub>rr</sub>	T <sub>J</sub> = 25 °C	-	38	-	nC
		T <sub>J</sub> = 125 °C	-	137	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		- 65	-	175	°C
Thermal resistance, junction to case per leg	R <sub>thJC</sub>		-	1.02	2.0	°C/W
Thermal resistance, junction to ambient per leg	R <sub>thJA</sub>	Typical socket mount	-	-	70	
Thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, flat, smooth and greased	-	0.2	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style D <sup>2</sup> PAK	15ETH03S			
		Case style TO-262	15ETH03-1			

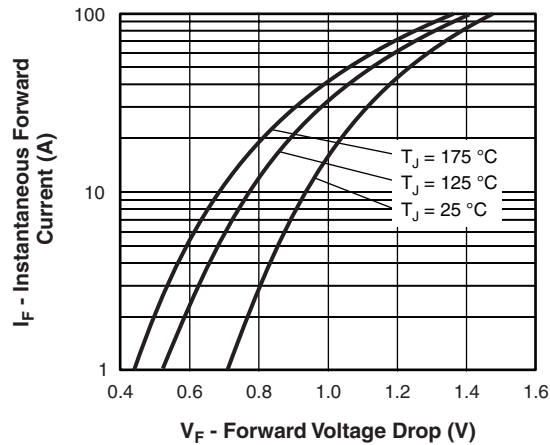


Fig. 1 - Typical Forward Voltage Drop Characteristics

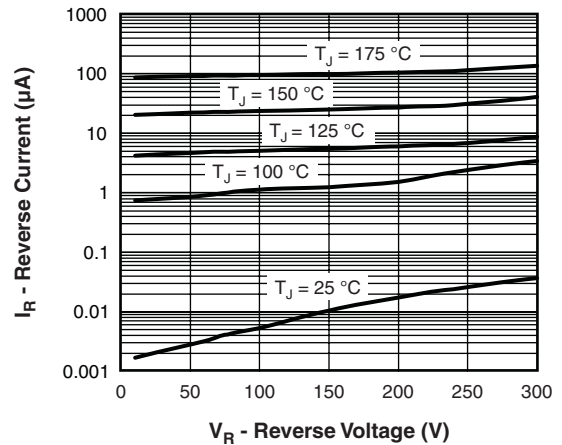


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

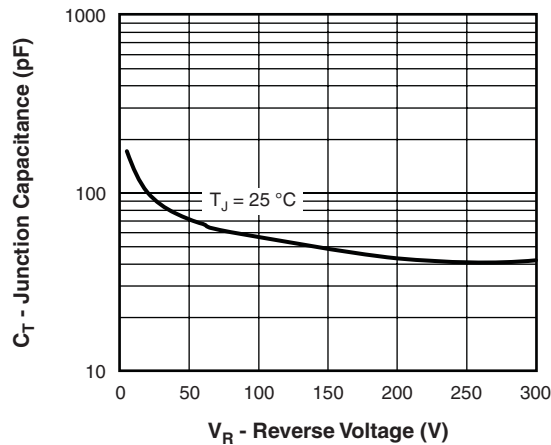


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

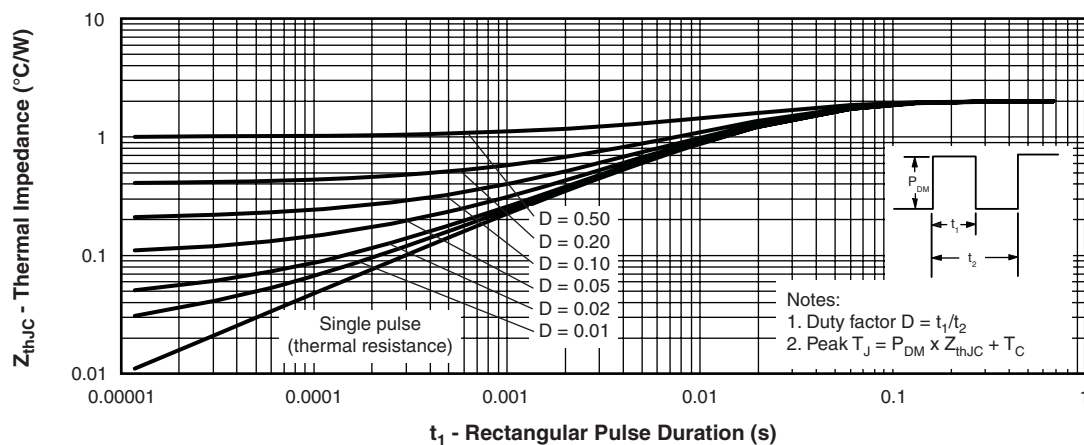


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

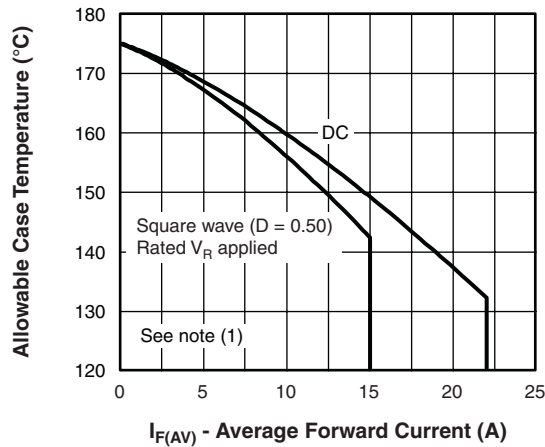


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

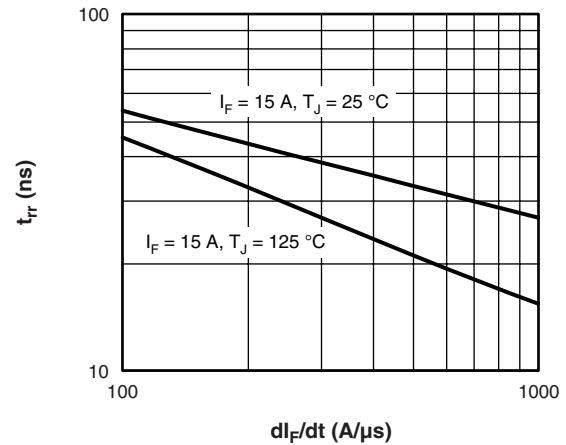


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$

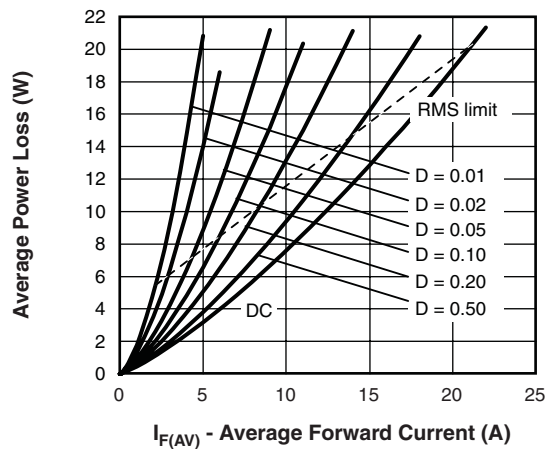


Fig. 6 - Forward Power Loss Characteristics

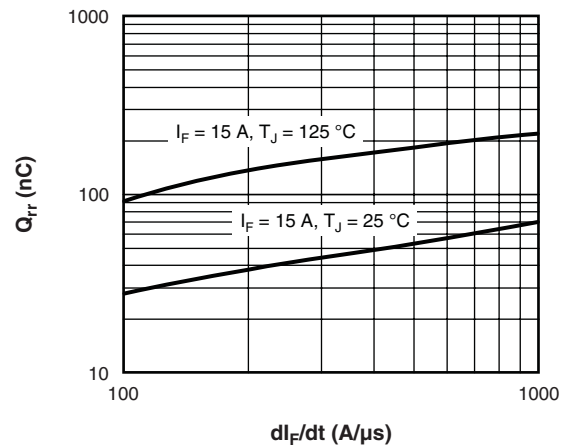


Fig. 8 - Typical Stored Charge vs.  $dI_F/dt$

## Note

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

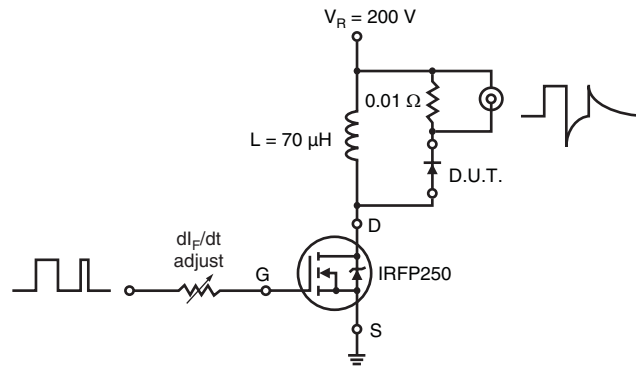


Fig. 9 - Reverse Recovery Parameter Test Circuit

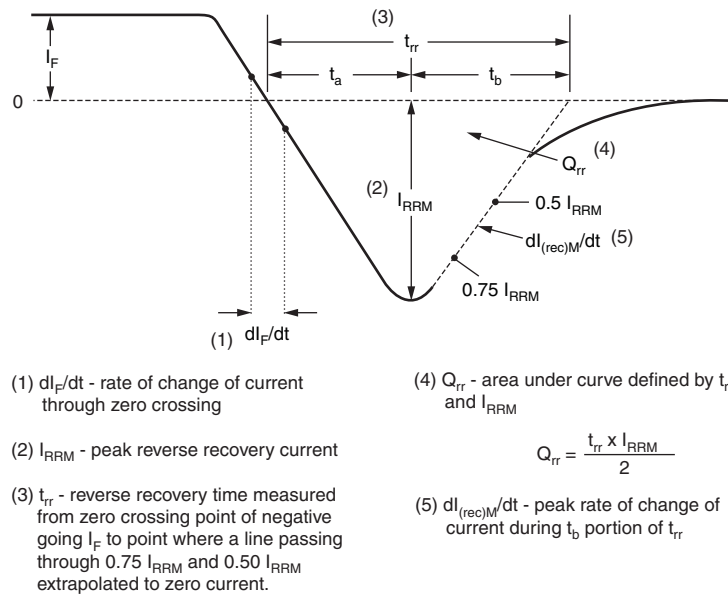


Fig. 10 - Reverse Recovery Waveform and Definitions

# 15ETH03SPbF/15ETH03-1PbF

Vishay High Power Products

Hyperfast Rectifier,  
15 A FRED Pt™



## ORDERING INFORMATION TABLE

Device code	15	E	T	H	03	S	TRL	PbF
	1	2	3	4	5	6	7	8

- |   |   |  |
|---|---|--|
| 1 | - | Current rating (15 A)  |
| 2 | - | E = Single diode   |
| 3 | - | T = TO-220, D <sup>2</sup> PAK   |
| 4 | - | H = Hyperfast rectifier  |
| 5 | - | Voltage rating (03 = 300 V)  |
| 6 | - | <ul style="list-style-type: none"><li>S = D<sup>2</sup>PAK</li><li>-1 = TO-262</li></ul>   |
| 7 | - | <ul style="list-style-type: none"><li>None = Tube (50 pieces)</li><li>TRL = Tape and reel (left oriented, for D<sup>2</sup>PAK package)</li><li>TRR = Tape and reel (right oriented, for D<sup>2</sup>PAK package)</li></ul> |
| 8 | - | <ul style="list-style-type: none"><li>None = Standard production</li><li>PbF = Lead (Pb)-free</li></ul>  |

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95014">http://www.vishay.com/doc?95014</a>
Part marking information	<a href="http://www.vishay.com/doc?95008">http://www.vishay.com/doc?95008</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">http://www.vishay.com/doc?95032</a>



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