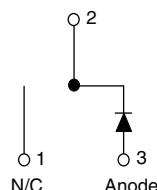
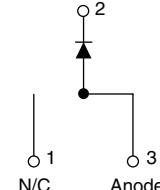


Hyperfast Rectifier, 15 A FRED Pt™

15ETH03S

Base
cathode

D²PAK

15ETH03-1


TO-262

FEATURES

- Hyperfast 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 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	$I_{F(AV)}$	$T_C = 142^\circ\text{C}$	15	A
Non-repetitive peak surge current	I_{FSM}	$T_J = 25^\circ\text{C}$	140	
Operating junction and storage temperatures	T_J, T_{Stg}		- 65 to 175	°C

ELECTRICAL SPECIFICATIONS ($T_J = 25^\circ\text{C}$ 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	$I_F = 15 \text{ A}$	-	1.05	1.25	
		$I_F = 15 \text{ A}, T_J = 125^\circ\text{C}$	-	0.85	1.00	
Reverse leakage current	I_R	$V_R = V_R \text{ rated}$	-	0.05	40	μA
		$T_J = 125^\circ\text{C}, V_R = V_R \text{ rated}$	-	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

15ETH03S/15ETH03-1

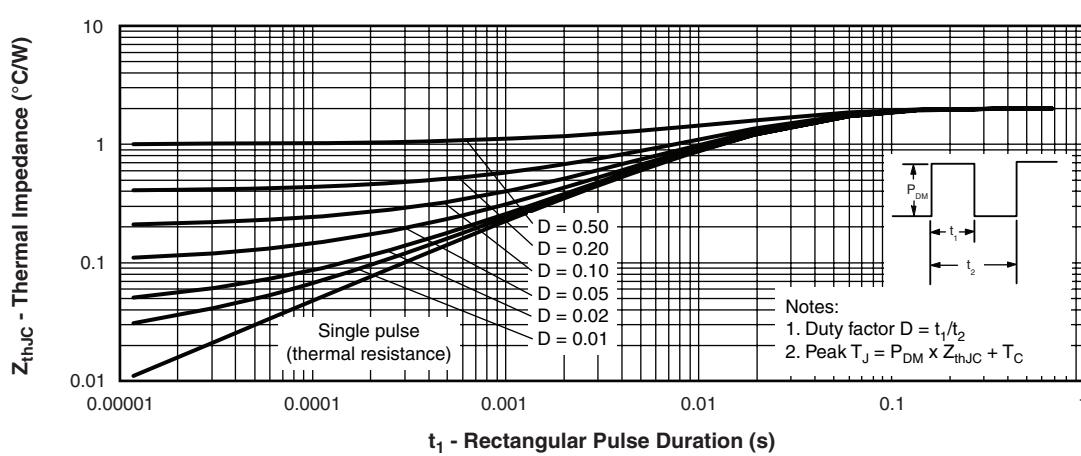
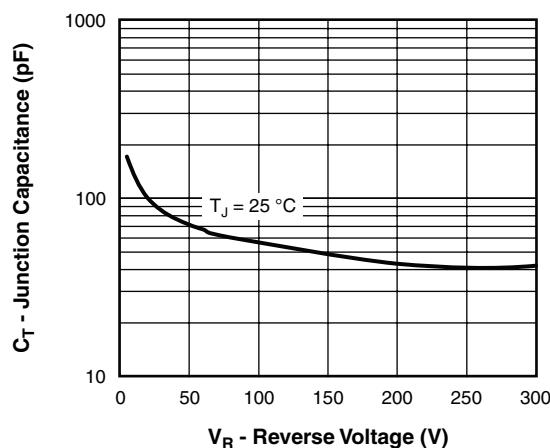
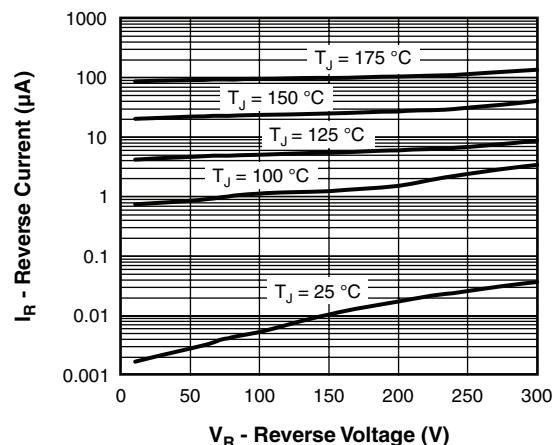
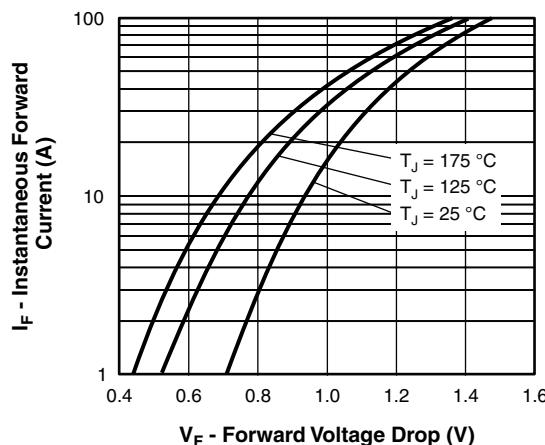
Vishay High Power Products

Hyperfast Rectifier,
15 A FRED PtTM**DYNAMIC RECOVERY CHARACTERISTICS** ($T_J = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 1.0 \text{ A}$	$dI_F/dt = 50 \text{ A}/\mu\text{s}$	-	-	40	ns
		$T_J = 25^\circ\text{C}$	$I_F = 15 \text{ A}$ $dI_F/dt = -200 \text{ A}/\mu\text{s}$ $V_R = 200 \text{ V}$	-	32	-	
		$T_J = 125^\circ\text{C}$		-	45	-	
Peak recovery current	I_{RRM}	$T_J = 25^\circ\text{C}$	$I_F = 15 \text{ A}$ $dI_F/dt = -200 \text{ A}/\mu\text{s}$ $V_R = 200 \text{ V}$	-	2.4	-	A
		$T_J = 125^\circ\text{C}$		-	6.1	-	
Reverse recovery charge	Q_{rr}	$T_J = 25^\circ\text{C}$	$I_F = 15 \text{ A}$ $dI_F/dt = -200 \text{ A}/\mu\text{s}$ $V_R = 200 \text{ V}$	-	38	-	nC
		$T_J = 125^\circ\text{C}$		-	137	-	

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}		-	1.02	2.0	°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	-	0.2	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style D ² PAK	15ETH03S			
		Case style TO-262	15ETH03-1			

**Hyperfast Rectifier,
15 A FRED PtTM**
Vishay High Power Products


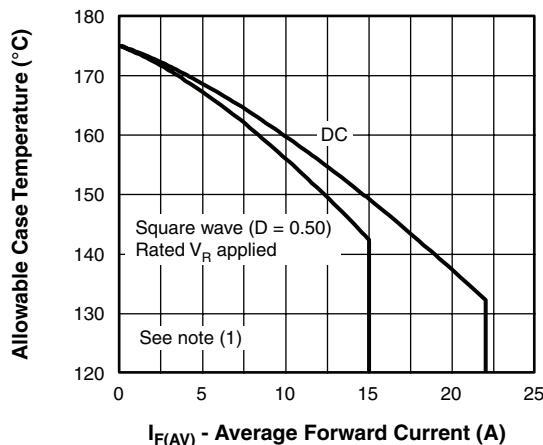


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

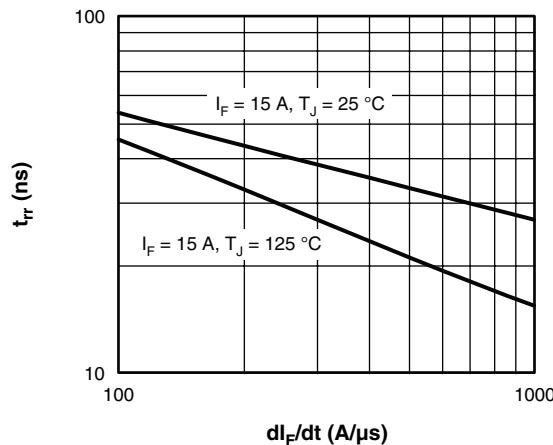


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

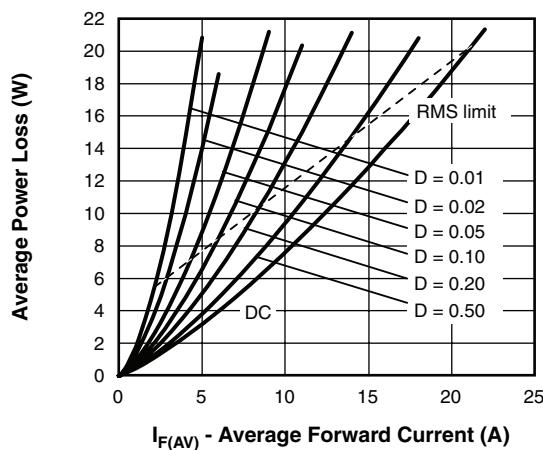


Fig. 6 - Forward Power Loss Characteristics

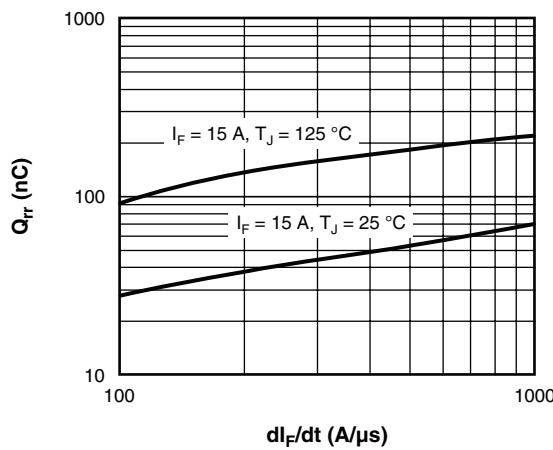


Fig. 8 - Typical Stored Charge vs. dI_F/dt

Note

(1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 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

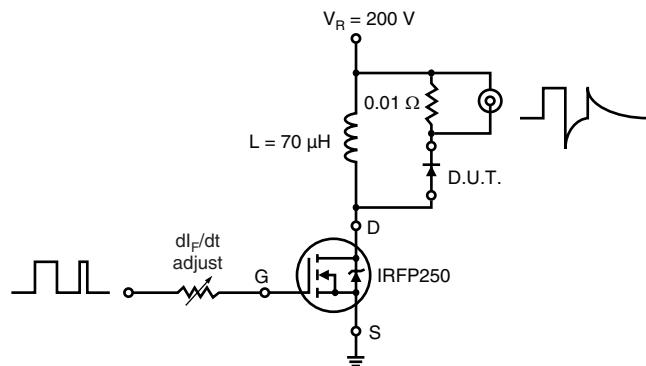
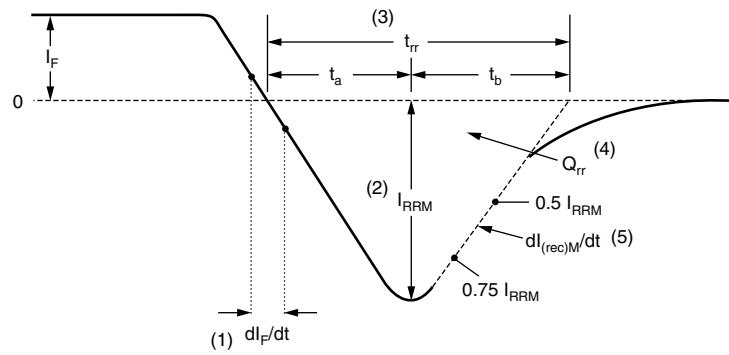


Fig. 9 - Reverse Recovery Parameter Test Circuit



(1) dl_F/dt - rate of change of current through zero crossing

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

(2) I_{RRM} - peak reverse recovery current

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

(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.

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

Fig. 10 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

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

- 1** - Current rating (15 A)
- 2** - E = Single diode
- 3** - T = TO-220, D²PAK
- 4** - H = Hyperfast rectifier
- 5** - Voltage rating (03 = 300 V)
- 6** - • S = D²PAK
• -1 = TO-262
- 7** - • None = Tube (50 pieces)
• TRL = Tape and reel (left oriented, for D²PAK package)
• TRR = Tape and reel (right oriented, for D²PAK package)
- 8** - • None = Standard production
• PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95014
Part marking information	http://www.vishay.com/doc?95008
Packaging information	http://www.vishay.com/doc?95032

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