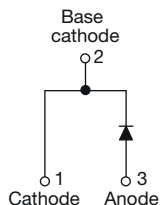


# Hyperfast Rectifier, 15 A FRED Pt®



TO-220AC 2L



## FEATURES

- Hyperfast soft recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Low leakage current
- True 2 pin package
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	15 A
$V_R$	600 V
$V_F$ at $I_F$	1.25 V
$t_{rr}$ (typ.)	21 ns
$T_J$ max.	175 °C
Package	TO-220AC 2L
Circuit configuration	Single

## DESCRIPTION / APPLICATIONS

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.

The 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	$V_{RRM}$		600	V
Average rectified forward current in DC	$I_{F(AV)}$	$T_C = 149\text{ °C}$	15	A
Non-repetitive peak surge current	$I_{FSM}$	$T_J = 25\text{ °C}$	160	
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	$V_{BR}, V_R$	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Forward voltage	$V_F$	$I_F = 15\text{ A}$	-	1.8	2.45	
		$I_F = 15\text{ A}, T_J = 150\text{ °C}$	-	1.25	1.6	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	0.01	15	$\mu\text{A}$
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	20	200	
Junction capacitance	$C_T$	$V_R = 600\text{ V}$	-	12	-	pF
Series inductance	$L_S$	Measured lead to lead 5 mm from package body	-	8	-	nH

**DYNAMIC RECOVERY CHARACTERISTICS** ( $T_J = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	$t_{rr}$	$I_F = 1\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	21	26	ns
		$I_F = 15\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	25	36	
		$T_J = 25\text{ }^{\circ}\text{C}$	-	29	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	65	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	3.9	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	7.0	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	60	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	240	-	
Reverse recovery time	$t_{rr}$	$T_J = 125\text{ }^{\circ}\text{C}$	-	42	-	ns
Peak recovery current	$I_{RRM}$		-	21	-	A
Reverse recovery charge	$Q_{rr}$		-	480	-	nC

**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	$T_J$ , $T_{Stg}$		-65	-	175	$^{\circ}\text{C}$
Thermal resistance, junction-to-case	$R_{thJC}$		-	1.2	1.4	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction-to-ambient	$R_{thJA}$	Typical socket mount	-	-	70	
Typical thermal resistance, case-to-heatsink	$R_{thCS}$	Mounting surface, flat, smooth and greased	-	0.5	-	
Weight			-	2	-	g
			-	0.07	-	oz.
Mounting torque			6 (5)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-220AC 2L	ETH1506			

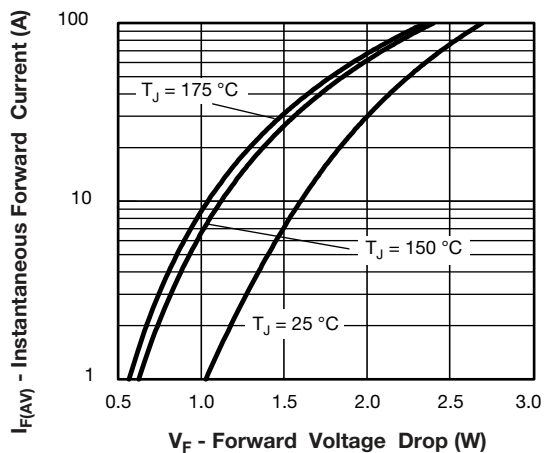


Fig. 1 - Typical Forward Voltage Drop Characteristics

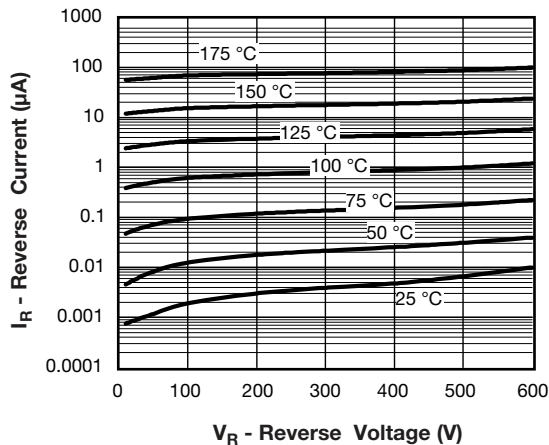


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

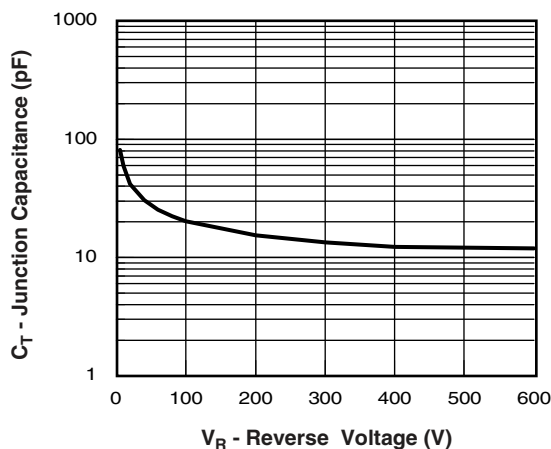
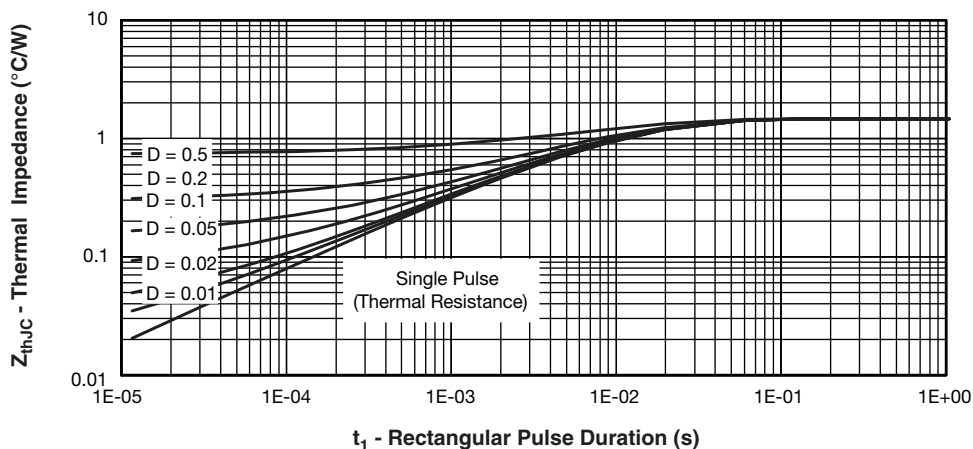


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

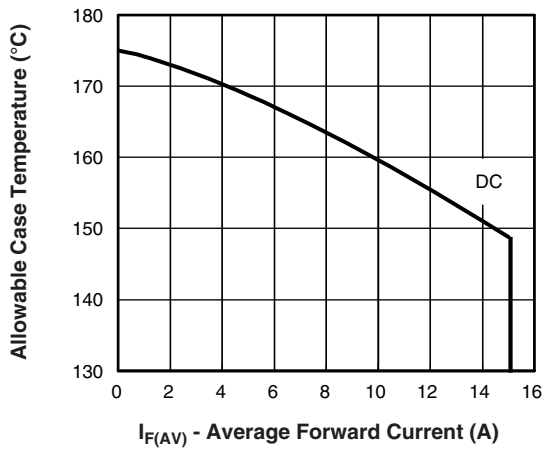


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

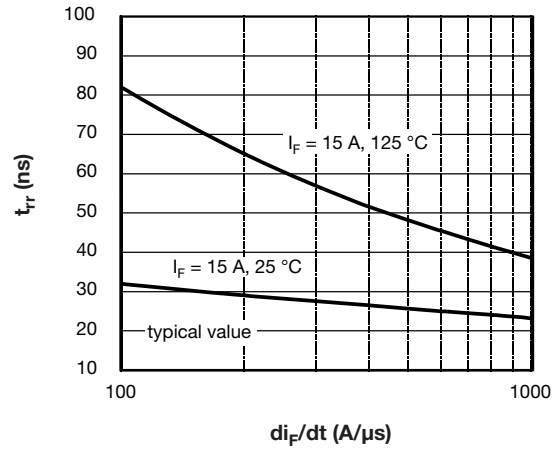


Fig. 7 - Typical Reverse Recovery vs.  $di_F/dt$

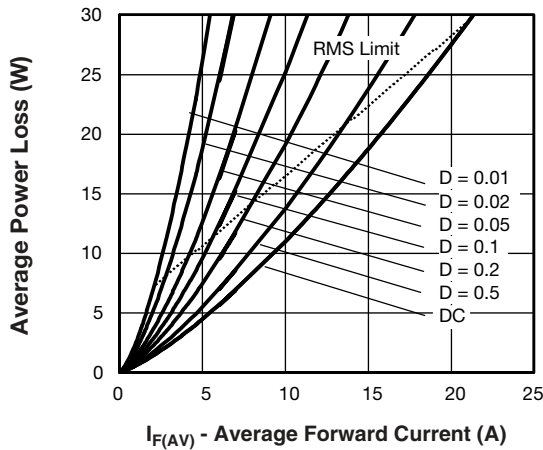


Fig. 6 - Forward Power Loss Characteristics

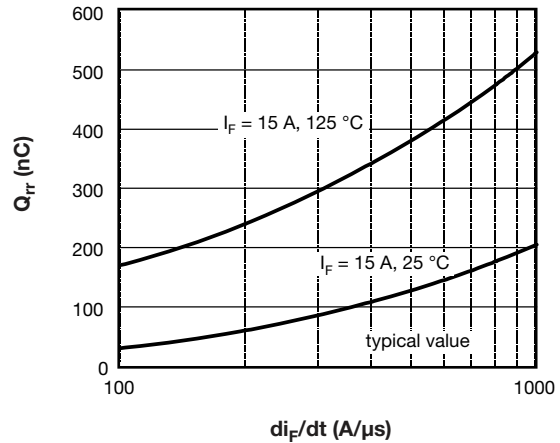


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$

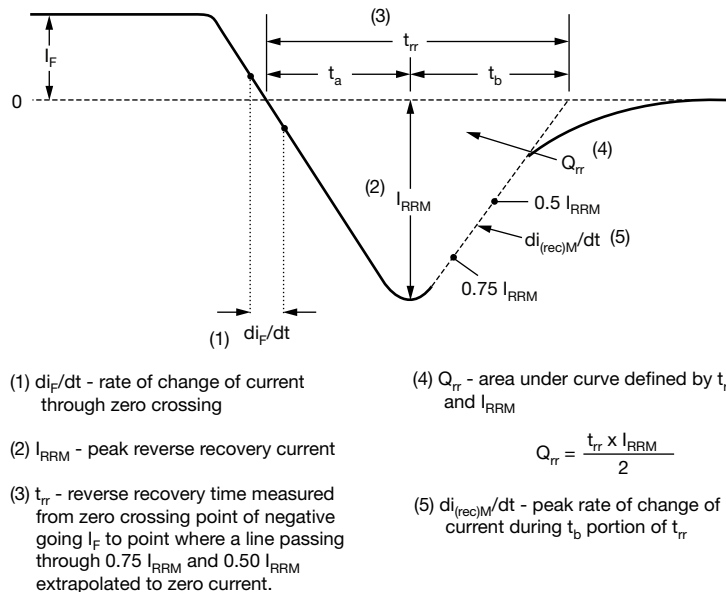


Fig. 9 - Reverse Recovery Waveform and Definitions



## ORDERING INFORMATION TABLE

Device code	VS-	E	T	H	15	06	-M3
	1	2	3	4	5	6	7
1	- Vishay Semiconductors product						
2	- Circuit configuration: E = single						
3	- T = 2L TO-220AC						
4	- H = hyperfast recovery time						
5	- Current code: 15 = 15 A						
6	- Voltage code: 06 = 600 V						
7	- Environmental digit: -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free						

### ORDERING INFORMATION (Example)

PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-ETH1506-M3	50	Antistatic plastic tubes

### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?96156">www.vishay.com/doc?96156</a>
Part marking information	<a href="http://www.vishay.com/doc?95391">www.vishay.com/doc?95391</a>



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