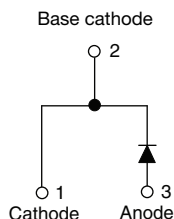
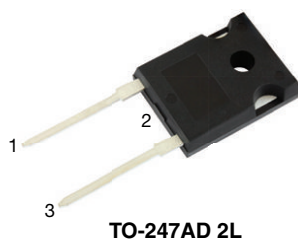


# Hyperfast Rectifier, 75 A FRED Pt® Gen 5



## FEATURES

- Hyperfast and optimized  $Q_{rr}$
- Best in class forward voltage drop and switching losses trade off
- Optimized for high speed operation
- 175 °C maximum operating junction temperature
- Polyimide passivation
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	75 A
$V_R$	1200 V
$V_F$ at $I_F$ at 125 °C	2.3 V
$t_{rr}$	32 ns
$T_J$ max.	175 °C
Package	TO-247AD 2L
Circuit configuration	Single

## DESCRIPTION / APPLICATIONS

Featuring a unique combination of low conduction and switching losses, this rectifier is the right choice for high frequency converters, both soft switched / resonant. Specifically designed to improve efficiency of PFC and output rectification stages of EV / HEV battery charging stations, booster stage of solar inverters and UPS applications, these devices are perfectly matched to operate with MOSFETs or high speed IGBTs.

## MECHANICAL DATA

**Case:** TO-247AD 2L

Molding compound meets UL 94 V-0 flammability rating

**Terminals:** matte tin plated leads, solderable per J-STD-002

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Repetitive peak reverse voltage	$V_{RRM}$		1200	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 90\text{ °C}$ , $D = 0.50$	75	A
Non-repetitive peak surge current	$I_{FSM}$	$T_C = 45\text{ °C}$ , $t_p = 10\text{ ms}$ , sine wave	395	
Repetitive peak forward current	$I_{FRM}$	$T_C = 90\text{ °C}$ , $D = 0.50$ , $f = 20\text{ kHz}$	150	
Operating junction and storage temperature	$T_J$ , $T_{Stg}$		-55 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	$V_{BR}$ , $V_R$	$I_R = 100\text{ }\mu\text{A}$	1200	-	-	V
Forward voltage	$V_F$	$I_F = 75\text{ A}$	-	2.7	3.3	
		$I_F = 75\text{ A}$ , $T_J = 125\text{ °C}$	-	2.3	-	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	-	50	$\mu\text{A}$
		$T_J = 125\text{ °C}$ , $V_R = V_R$ rated	-	-	500	
Junction capacitance	$C_T$	$V_R = 200\text{ V}$	-	36	-	pF
Series inductance	$L_S$	Measured 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	$t_{rr}$	$I_F = 1.0\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	32	-	ns
		$T_J = 25\text{ }^{\circ}\text{C}$	-	140	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	200	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	18	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	35	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	1100	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	3550	-	
Reverse recovery time	$t_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	100	-	ns
		$T_J = 125\text{ }^{\circ}\text{C}$	-	154	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	31	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	58	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^{\circ}\text{C}$	-	1820	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	5300	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction-to-case	$R_{thJC}$		-	-	0.36	$^{\circ}\text{C}/\text{W}$
Weight			-	5.5	-	g
			-	0.2	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Maximum junction and storage temperature range	$T_J$ , $T_{Stg}$		-55	-	175	$^{\circ}\text{C}$
Marking device		Case style: TO-247AD 2L	E5PX7512L			

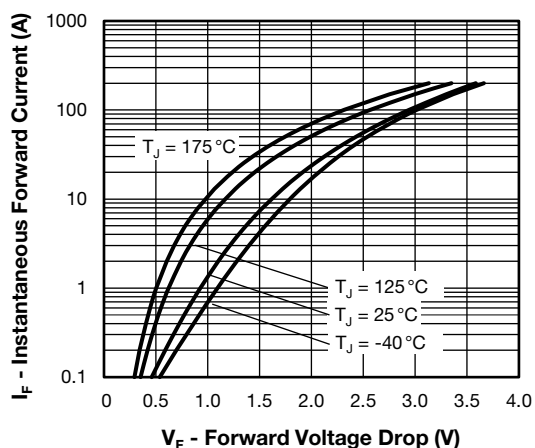


Fig. 1 - Forward Voltage Drop Characteristics

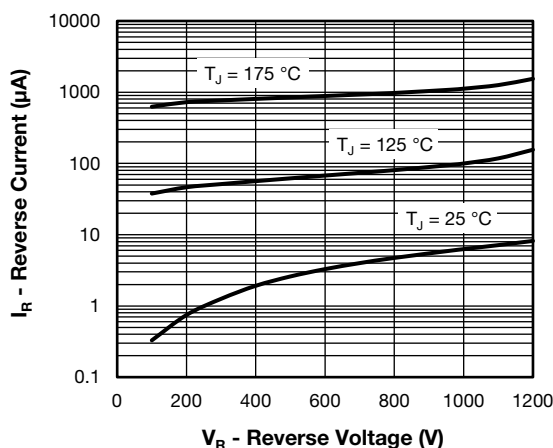


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

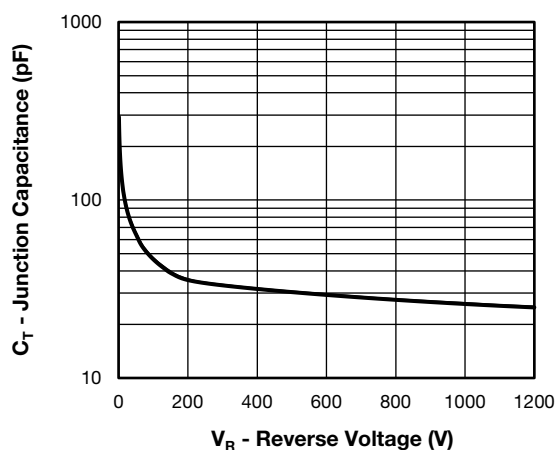


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

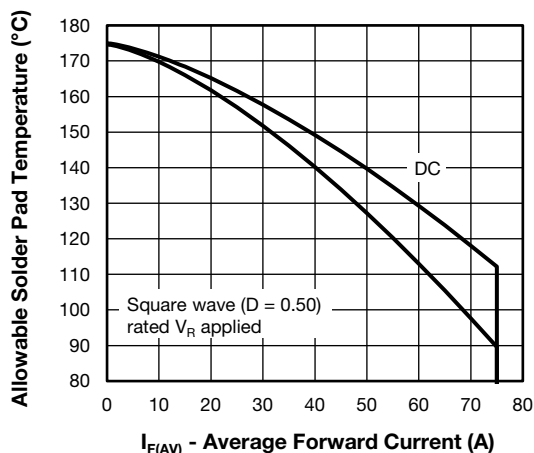


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

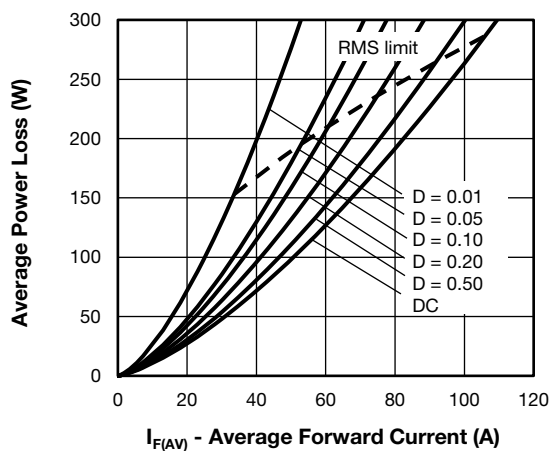


Fig. 5 - Forward Power Loss Characteristics

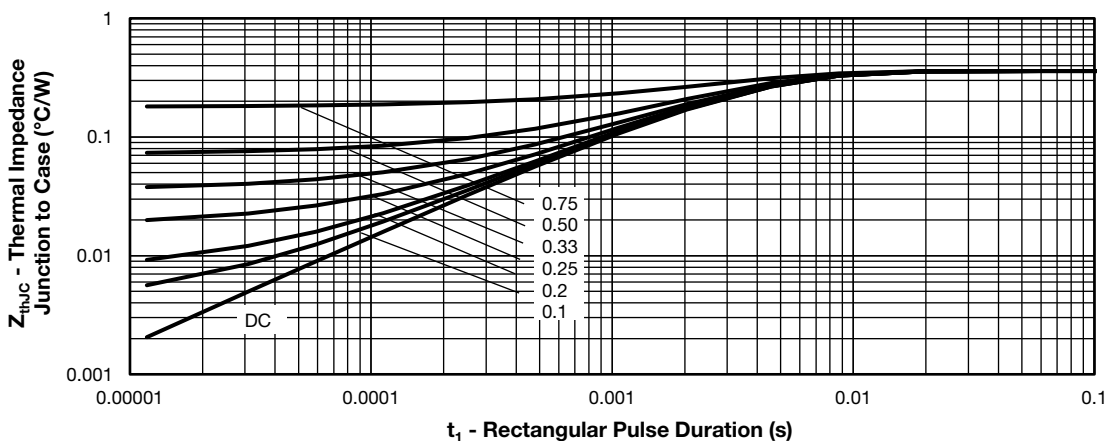
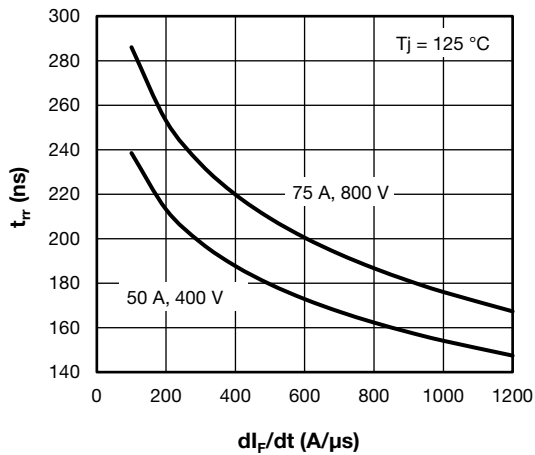
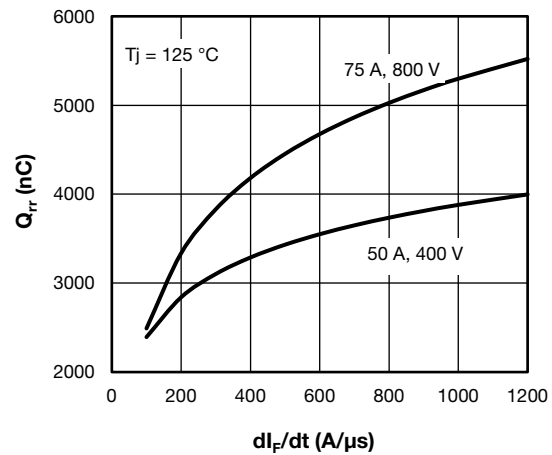
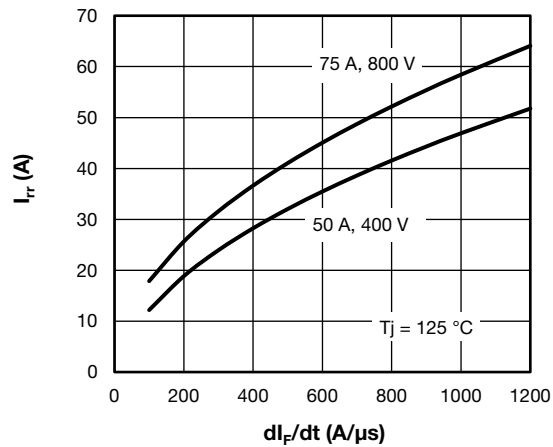


Fig. 6 - Transient Thermal Impedance, Junction to Case


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

Fig. 8 - Typical Reverse Recovery Charge vs.  $dI_F/dt$ 

Fig. 9 - Typical Reverse Recovery Current vs.  $dI_F/dt$

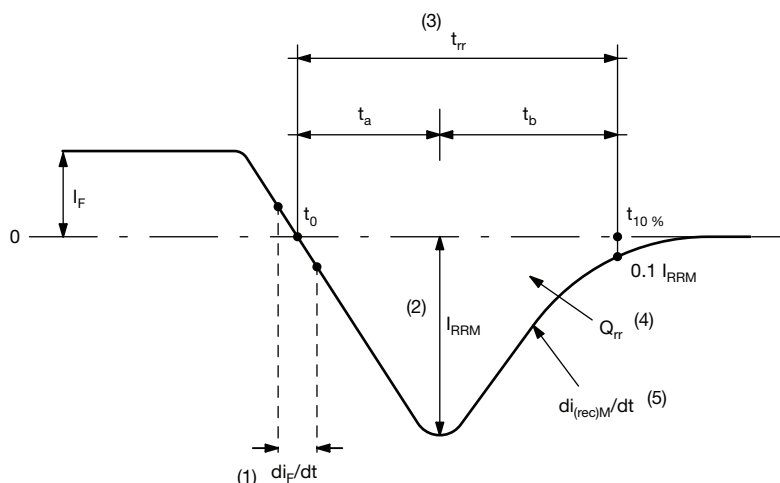


Fig. 10 - Reverse Recovery Waveform and Definitions

**Notes**

- (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  $t_0$ , crossing point of negative going  $I_F$ , to point  $t_{10\%}$ ,  $0.1 I_{RRM}$
- (4)  $Q_{rr}$  - area under curve defined by  $t_0$  and  $t_{10\%}$

$$Q_{rr} = \int_{t_0}^{t_{10\%}} I(t) dt$$

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

**ORDERING INFORMATION TABLE**

Device code

VS-	E	5	P	X	75	12	L	N3
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1 2 3 4 5 6 7 8 9

- 1 - Vishay Semiconductors product
- 2 - Circuit configuration:  
E = single diode, 2 pins
- 3 - FRED Pt Gen 5
- 4 - P = TO-247 package
- 5 - Process type:  
X = hyperfast recovery
- 6 - Current rating (75 = 75 A)
- 7 - Voltage rating (12 = 1200 V)
- 8 - L = long lead
- 9 - Environmental digit:  
N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free

**ORDERING INFORMATION (Example)**

PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-E5PX7512L-N3	25	500	Antistatic plastic tube

**LINKS TO RELATED DOCUMENTS**

Dimensions	<a href="http://www.vishay.com/doc?95536">www.vishay.com/doc?95536</a>
Part marking information	<a href="http://www.vishay.com/doc?95648">www.vishay.com/doc?95648</a>



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