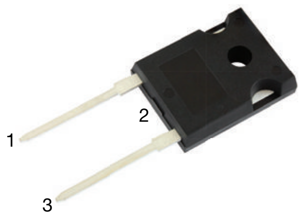
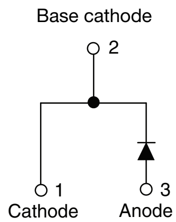
Hyperfast Rectifier, 75 A FRED Pt® Gen 5



TO-247AD 2L



LINKS TO ADDITIONAL RESOURCES

3D Models
Application Notes

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

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

Pb-free
RoHS COMPLIANT
HALOGEN FREE

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 °C, D = 0.50	75	A
Non-repetitive peak surge current	I_{FSM}	T_C = 45 °C, t_p = 10 ms, sine wave	395	
Repetitive peak forward current	I_{FRM}	T_C = 90 °C, D = 0.50, f = 20 kHz	150	
Operating junction and storage temperature	T_J, T_{Stg}		-55 to +175	°C

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	I_R = 100 μA	1200	-	-	V
Forward voltage	V_F	I_F = 75 A	-	2.7	3.3	
		I_F = 75 A, T_J = 125 °C	-	2.3	-	
Reverse leakage current	I_R	V_R = V_R rated	-	-	50	μA
		T_J = 125 °C, V_R = V_R rated	-	-	500	
Junction capacitance	C_T	V_R = 200 V	-	36	-	pF
Series inductance	L_S	Measured to lead 5 mm from package body	-	8	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	I_F = 1.0 A, dI_F/dt = 100 A/μs, V_R = 30 V		-	32	-	ns
		T_J = 25 °C	I_F = 50 A dI_F/dt = 600 A/μs V_R = 400 V	-	140	-	
		T_J = 125 °C		-	200	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	18	-	A
		T_J = 125 °C		-	35	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	1100	-	nC
		T_J = 125 °C		-	3550	-	
Reverse recovery time	t_{rr}	T_J = 25 °C	I_F = 75 A dI_F/dt = 1000 A/μs V_R = 800 V	-	100	-	ns
		T_J = 125 °C		-	154	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	31	-	A
		T_J = 125 °C		-	58	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	1820	-	nC
		T_J = 125 °C		-	5300	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction-to-case	R_{thJC}		-	-	0.36	°C/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	°C
Marking device		Case style: TO-247AD 2L	E5PX7512L			

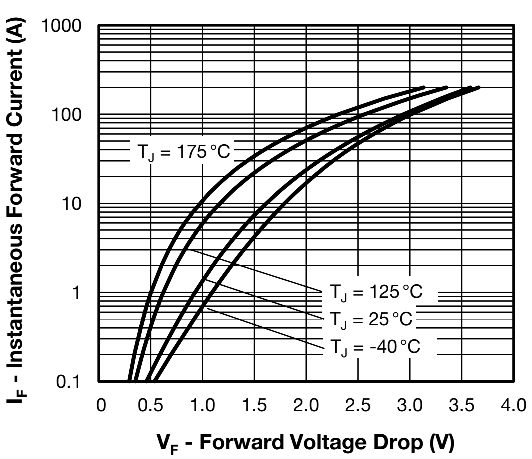


Fig. 1 - Forward Voltage Drop Characteristics

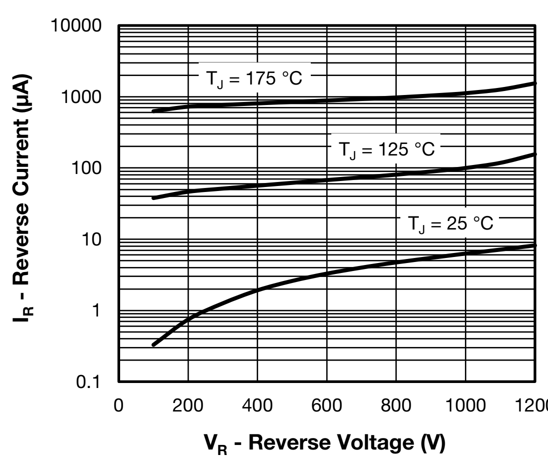


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

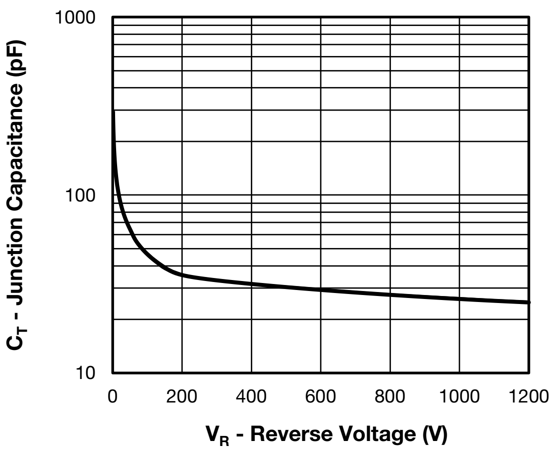


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

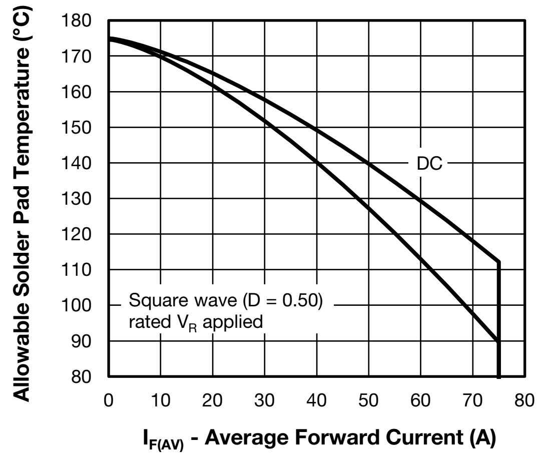


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

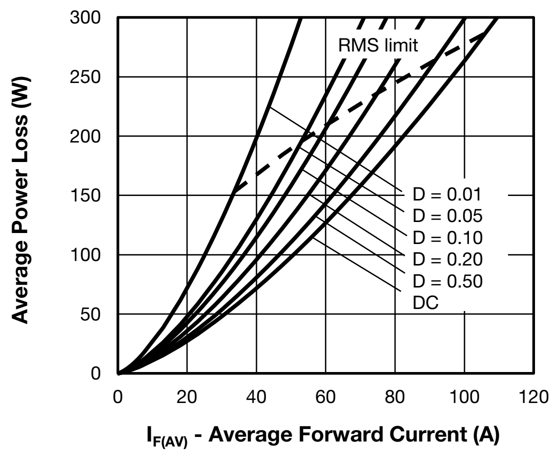


Fig. 5 - Forward Power Loss Characteristics

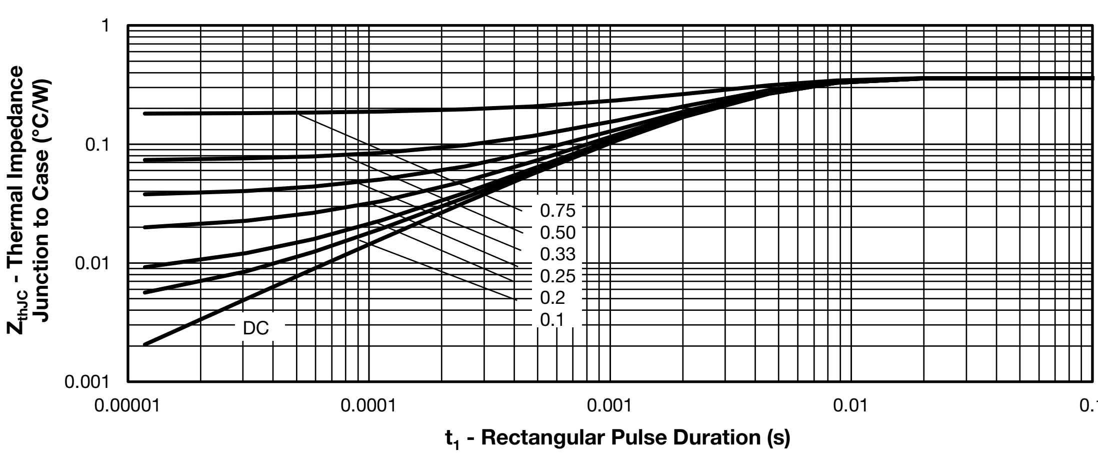


Fig. 6 - Transient Thermal Impedance, Junction to Case

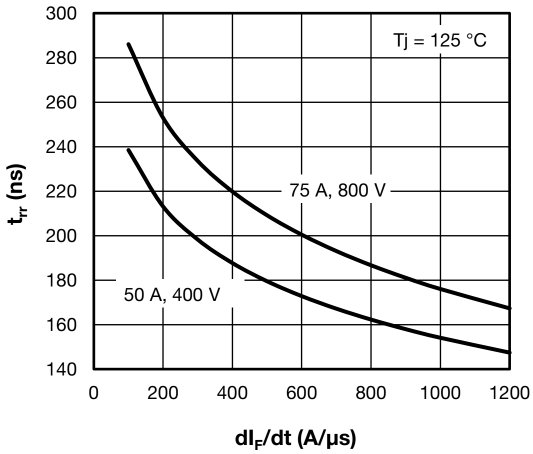


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

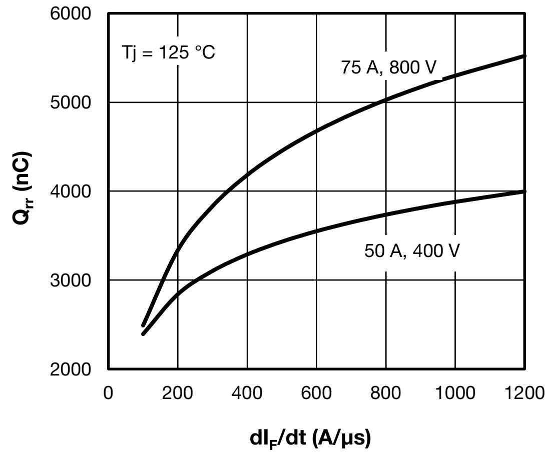


Fig. 8 - Typical Reverse Recovery Charge vs. dI_F/dt

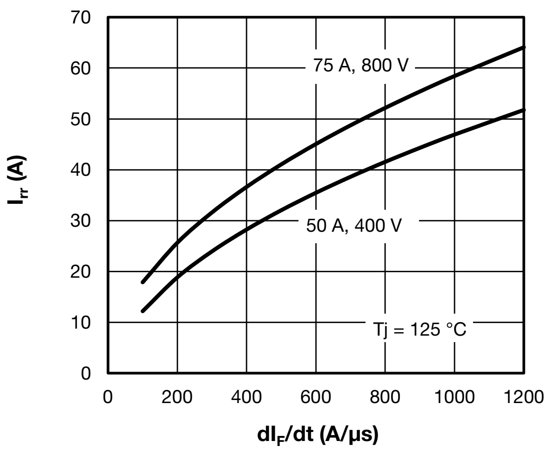


Fig. 9 - Typical Reverse Recovery Current vs. dI_F/dt

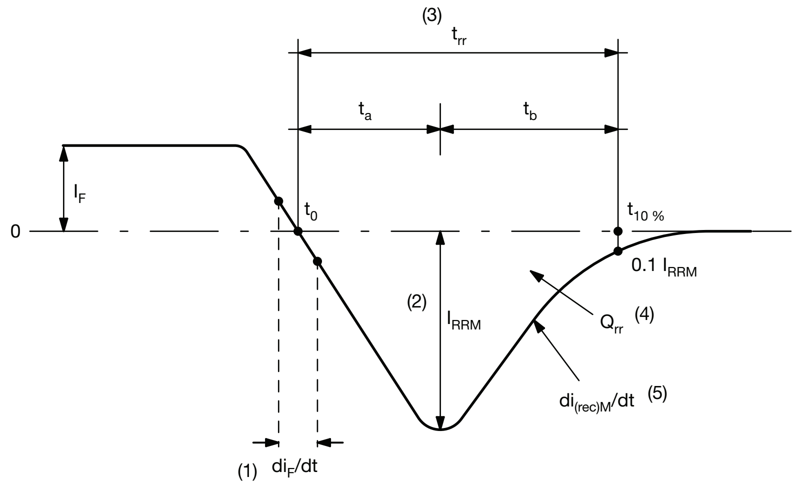


Fig. 10 - Reverse Recovery Waveform and Definitions

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) $di_{(rec)}M/dt$ - 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
	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	www.vishay.com/doc?95536
Part marking information	www.vishay.com/doc?95648

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