

# Hyperfast Rectifier, 3 A FRED Pt®

## eSMP® Series



Top View

Bottom View

SlimSMAW (DO-221AD)

## LINKS TO ADDITIONAL RESOURCES



3D Models

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	3 A
$V_R$	100 V, 200 V
$V_F$ at $I_F$	0.71 V
$I_{FSM}$	70 A
$t_{rr}$ (typ.)	16 ns
$T_J$ max.	175 °C
Package	SlimSMAW (DO-221AD)
Circuit configuration	Single

## FEATURES

- Low profile package
- Ideal for automated placement
- Low forward voltage drop, low power losses
- Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Class 2 whisker test
- Compatible to SOD-128 package case outline
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


RoHS  
COMPLIANT  
HALOGEN  
FREE

## DESCRIPTION / APPLICATIONS

For use in high frequency, freewheeling, DC/DC converters, PFC, and in snubber industrial, and automotive applications.

## MECHANICAL DATA

**Case:** SlimSMAW

Molding compound meets UL 94 V-0 flammability rating  
Halogen-free, RoHS-compliant

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

**Polarity:** color band denotes cathode end

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	$V_{RRM}$		100	V
VS-3EYH01-M3 VS-3EYH02-M3			200	
Average rectified forward current	$I_{F(AV)}^{(1)}$	$T_C = 137\text{ °C}$	3	A
Non-repetitive peak surge current	$I_{FSM}$	$T_J = 25\text{ °C}$ , 10 ms sine pulse wave	70	
Operating junction and storage temperatures	$T_J, T_{Stg}$		-55 to +175	°C

### Note

<sup>(1)</sup> Mounted on infinite heatsink

## ELECTRICAL SPECIFICATIONS ( $T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	$V_{BR}, V_R$	$I_R = 100\text{ }\mu\text{A}$	100	-	-	V
VS-3EYH01-M3 VS-3EYH02-M3			200	-	-	
Forward voltage, per diode	$V_F$	$I_F = 3\text{ A}$	-	0.86	0.95	
		$I_F = 3\text{ A}$ , $T_J = 150\text{ °C}$	-	0.71	0.79	
Reverse leakage current, per diode	$I_R$	$V_R = V_R$ rated	-	-	2	$\mu\text{A}$
		$T_J = 150\text{ °C}$ , $V_R = V_R$ rated	-	-	20	
Junction capacitance	$C_T$	$V_R = 200\text{ V}$	-	16	-	pF

<b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_J = 25^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	$t_{rr}$	$I_F = 1.0\text{ A}$ , $dI_F/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	22	-	ns
		$I_F = 1.0\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	16	-	
		$I_F = 0.5\text{ A}$ , $I_R = 1\text{ A}$ , $I_{rr} = 0.25\text{ A}$	-	-	30	
		$T_J = 25^\circ\text{C}$	-	18	-	
		$T_J = 125^\circ\text{C}$	-	30	-	
Peak recovery current	$I_{RRM}$	$T_J = 25^\circ\text{C}$	-	2.5	-	A
		$T_J = 125^\circ\text{C}$	-	4	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25^\circ\text{C}$	-	23	-	nC
		$T_J = 125^\circ\text{C}$	-	60	-	

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>		-55	-	175	°C
Thermal resistance, junction to mount	R <sub>thJM</sub> <sup>(1)</sup>	Infinite heatsink	-	12	15	°C/W
Thermal resistance, junction to ambient	R <sub>thJA</sub>	Device mounted on FR4 PCB, 2 oz. standard footprint	-	120	150	
Marking device	VS-3EYH01-M3	Case style SlimSMAW (DO-221AD)	3H1			
	VS-3EYH02-M3		3H2			

**Note**

<sup>(1)</sup> Thermal resistance junction to mount follows JEDEC® 51-14 transient dual interface test method (TDIM)

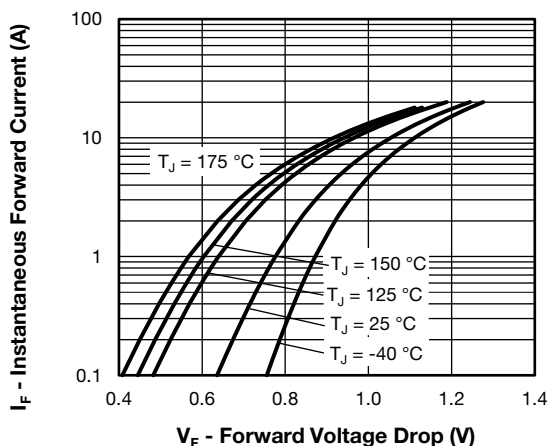


Fig. 1 - Typical Forward Voltage Drop Characteristics

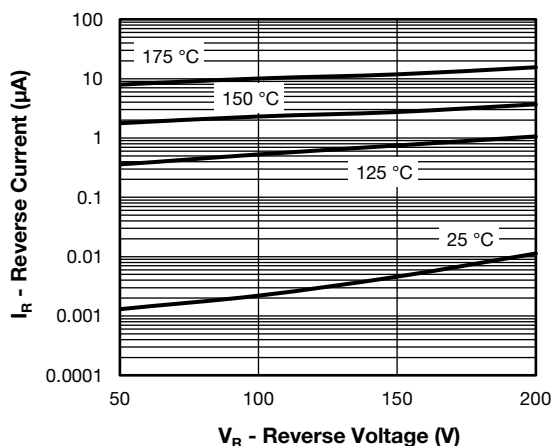


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

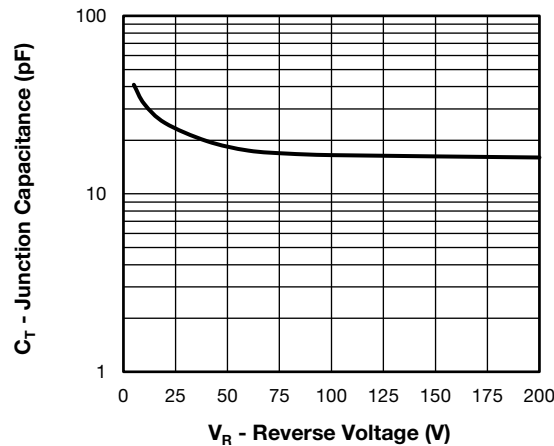


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

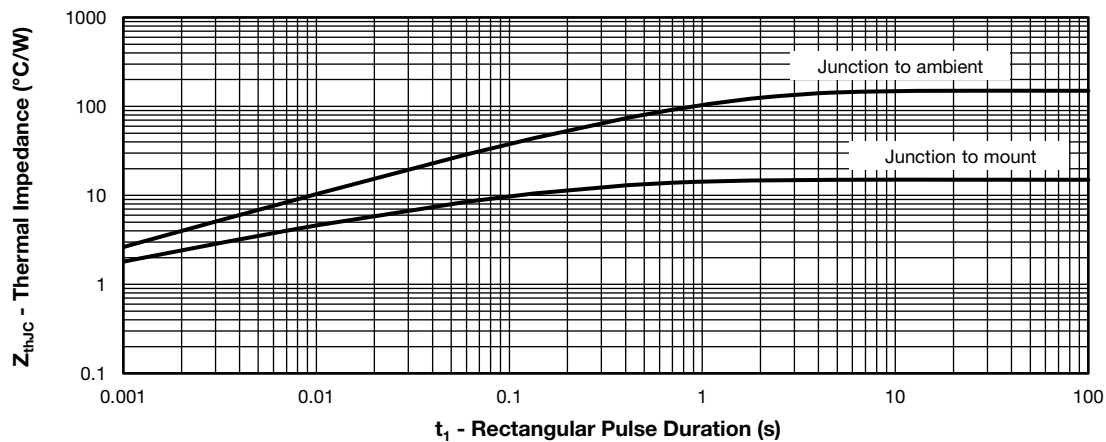
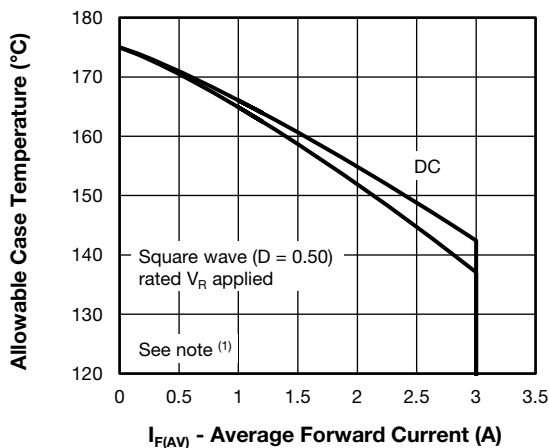

Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics


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

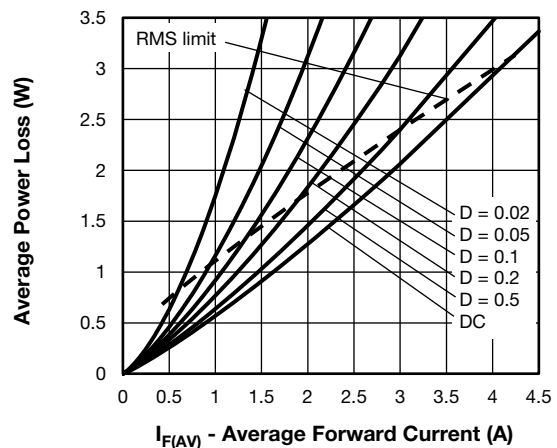
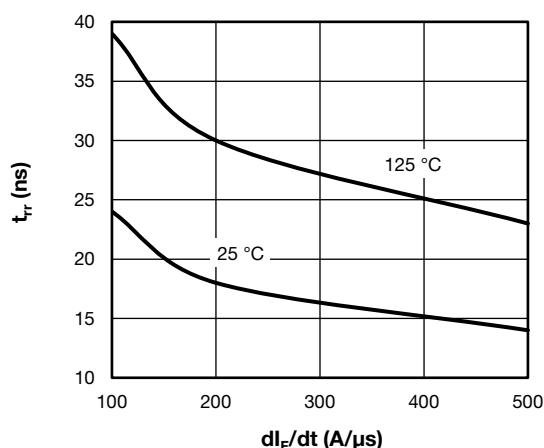
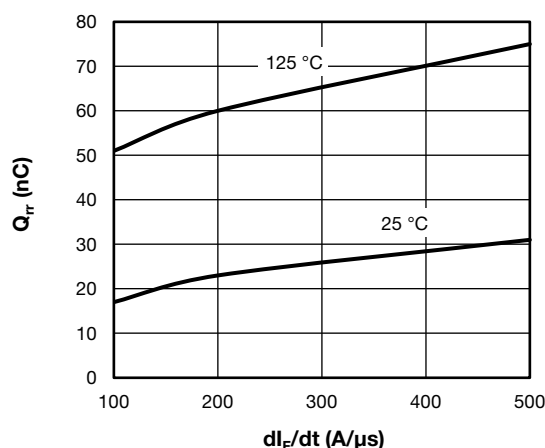


Fig. 6 - Forward Power Loss Characteristics

#### 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. 5);  
 $P_{dREV}$  = inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = rated  $V_R$


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

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

## ORDERING INFORMATION TABLE

Device code	VS-	3	E	Y	H	02	-	M3
	①	②	③	④	⑤	⑥		⑦
	1	2	3	4	5	6		7
	<ul style="list-style-type: none"> <li>1 - Vishay Semiconductors product</li> <li>2 - Current rating (3 = 3 A)</li> <li>3 - Circuit configuration: E = single diode</li> <li>4 - Y = SlimSMAW (DO-221AD)</li> <li>5 - Process type, H = hyperfast recovery</li> <li>6 - Voltage code (02 = 200 V)</li> <li>7 - M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free</li> </ul>							

## ORDERING INFORMATION (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	PACKAGING DESCRIPTION
VS-3EYH01-M3/H	0.033	H	3500	7" diameter plastic tape and reel
VS-3EYH01-M3/I	0.033	I	14 000	13" diameter plastic tape and reel
VS-3EYH02-M3/H	0.033	H	3500	7" diameter plastic tape and reel
VS-3EYH02-M3/I	0.033	I	14 000	13" diameter plastic tape and reel

## LINKS TO RELATED DOCUMENTS

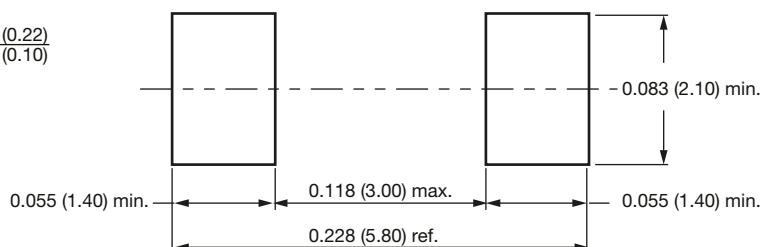
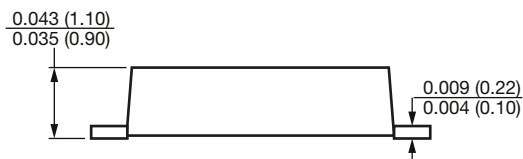
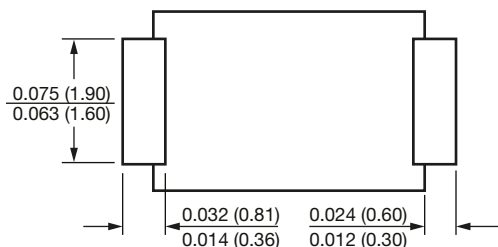
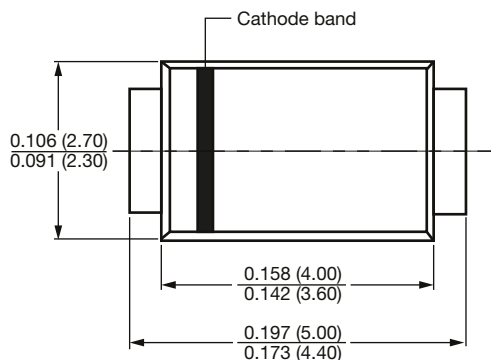
Dimensions	<a href="http://www.vishay.com/doc?96582">www.vishay.com/doc?96582</a>
Part marking information	<a href="http://www.vishay.com/doc?95562">www.vishay.com/doc?95562</a>
Packaging information	<a href="http://www.vishay.com/doc?88869">www.vishay.com/doc?88869</a>
SPICE model	<a href="http://www.vishay.com/doc?96586">www.vishay.com/doc?96586</a>



## SlimSMAW (DO-221AD)

**DIMENSIONS** in inches (millimeters)

### SlimSMAW (DO-221AD)



Mounting pad layout



## Disclaimer

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