

## Hyperfast Rectifier, 3 A FRED Pt<sup>®</sup>

### eSMP<sup>®</sup> Series



Top View

Bottom View

### SlimSMAW (DO-221AD)



### 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
- AEC-Q101 qualified, 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)

 AUTOMOTIVE  
GRADE

**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 (DO-221AD)

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

### LINKS TO ADDITIONAL RESOURCES



### 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

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	$V_{RRM}$		100	V
			200	
Average rectified forward current	$I_{F(AV)}$ <sup>(1)</sup>	$T_C = 137$ °C	3	A
Non-repetitive peak surge current	$I_{FSM}$	$T_J = 25$ °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 ( $T_J = 25$ °C unless otherwise specified)

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



<b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	$t_{rr}$	$I_F = 1.0\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	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		
		$T_J = 25\text{ }^\circ\text{C}$	-	18	-		
		$T_J = 125\text{ }^\circ\text{C}$	-	30	-		
Peak recovery current	$I_{RRM}$	$I_F = 3\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 100\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	2.5	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	4	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	$T_J = 25\text{ }^\circ\text{C}$	-	23	-	nC
			$T_J = 125\text{ }^\circ\text{C}$	-	60	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		-55	-	175	$^\circ\text{C}$
Thermal resistance, junction to mount	$R_{thJM}^{(1)}$	Infinite heatsink	-	12	15	$^\circ\text{C}/\text{W}$
Thermal resistance, junction to ambient	$R_{thJA}$	Device mounted on FR4 PCB, 2 oz. standard footprint	-	120	150	
Marking device	VS-3EYH01HM3	Case style SlimSMAW (DO-221AD)	3H1			
	VS-3EYH02HM3		3H2			

**Note**

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

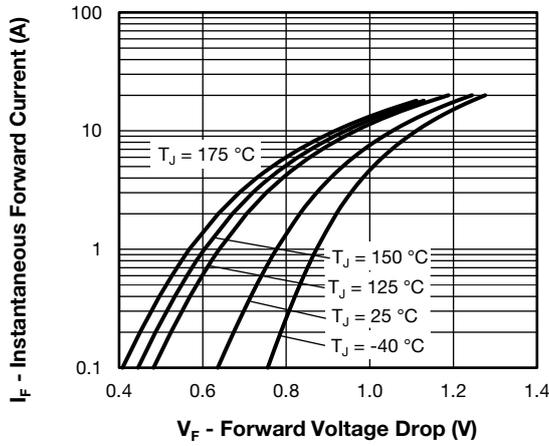


Fig. 1 - Typical Forward Voltage Drop Characteristics

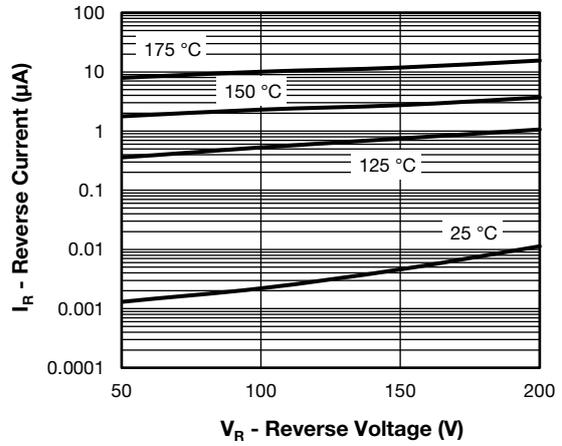


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

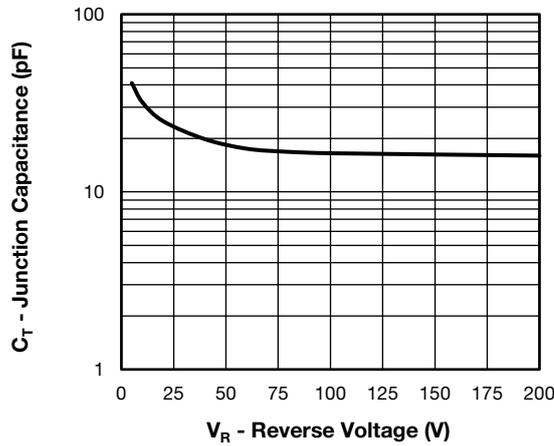


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

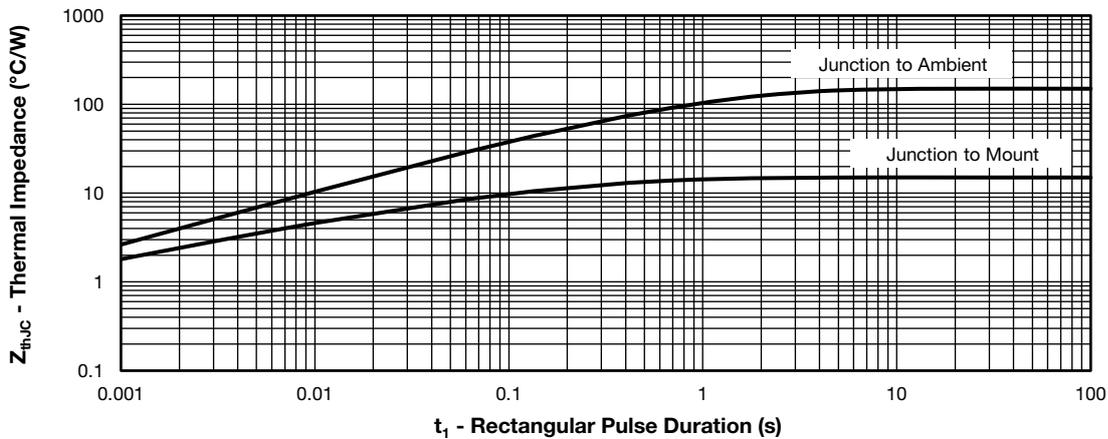


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

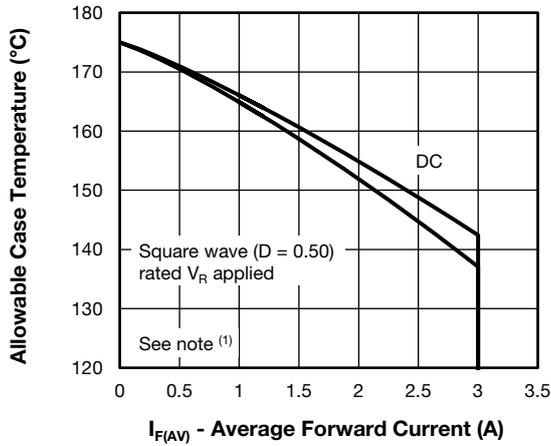


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

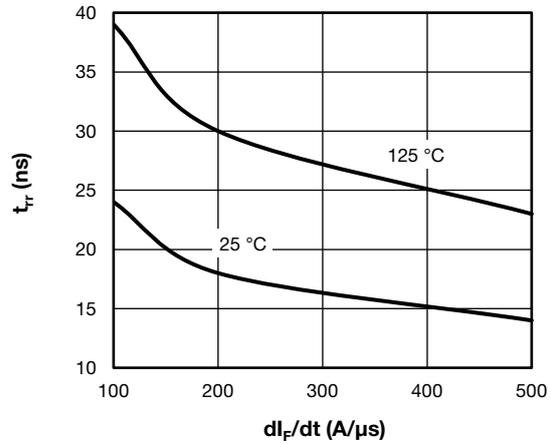


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

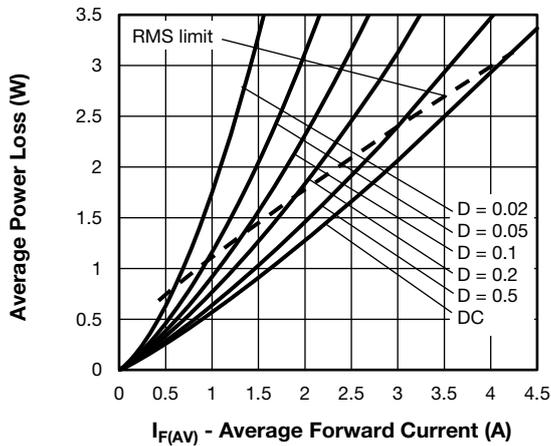


Fig. 6 - Forward Power Loss Characteristics

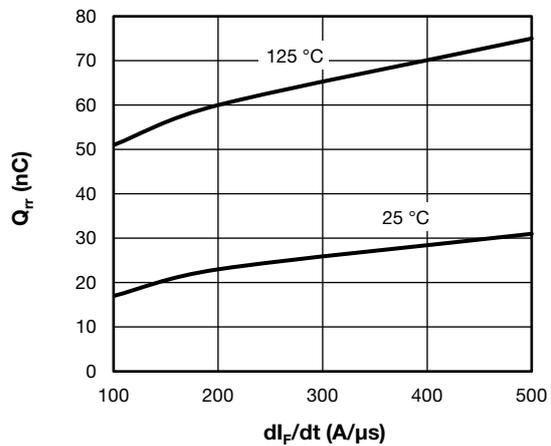


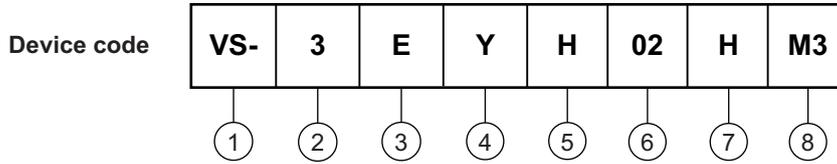
Fig. 8 - Typical Stored Charge vs.  $di_F/dt$

**Note**

(1) Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$ ;  
 $Pd$  = forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 5);  
 $Pd_{REV}$  = inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = rated  $V_R$



## ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (3 = 3 A)
- 3** - Circuit configuration:  
E = single diode
- 4** - Y = SlimSMAW (DO-221AD)
- 5** - Process type,  
H = hyperfast recovery
- 6** - Voltage code (02 = 200 V)
- 7** - H = AEC-Q101 qualified
- 8** - M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	PACKAGING DESCRIPTION
VS-3EYH01HM3/H	0.033	H	3500	7" diameter plastic tape and reel
VS-3EYH01HM3/I	0.033	I	14 000	13" diameter plastic tape and reel
VS-3EYH02HM3/H	0.033	H	3500	7" diameter plastic tape and reel
VS-3EYH02HM3/I	0.033	I	14 000	13" diameter plastic tape and reel

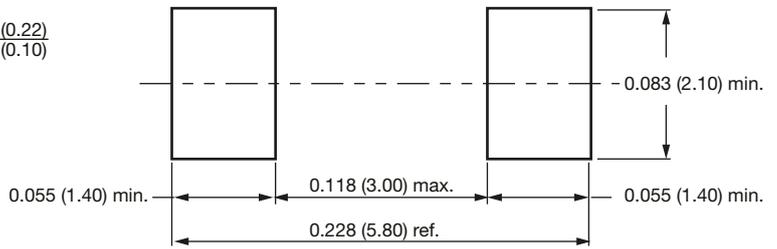
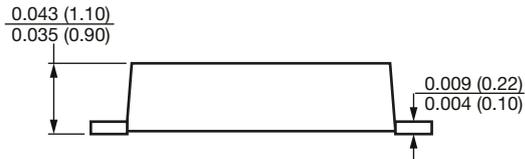
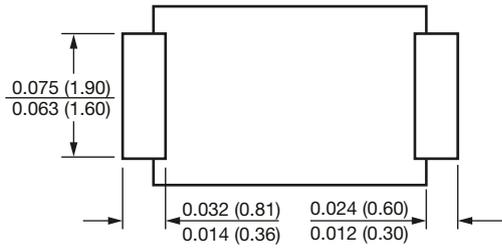
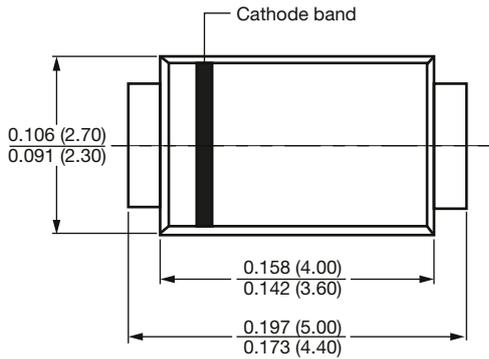
LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?96582">www.vishay.com/doc?96582</a>
Part marking information	<a href="http://www.vishay.com/doc?95562">www.vishay.com/doc?95562</a>
Packaging information	<a href="http://www.vishay.com/doc?88869">www.vishay.com/doc?88869</a>
SPICE 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**



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