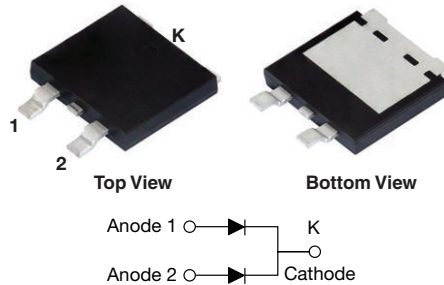


# Hyperfast Rectifier, 2 x 15 A FRED Pt<sup>®</sup>

## eSMP<sup>®</sup> Series SMPD (TO-263AC)



### FEATURES

- Hyperfast recovery time, reduced  $Q_{rr}$ , and soft recovery
- 175 °C maximum operating junction temperature
- For PFC CRM, snubber operation
- Low forward voltage drop
- Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- 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**

### LINKS TO ADDITIONAL RESOURCES



### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 15 A
$V_R$	600 V
$V_F$ at $I_F$ ( $T_J = 150$ °C)	1.22 V
$t_{rr}$	30 ns
$T_J$ max.	175 °C
Package	SMPD (TO-263AC)
Circuit configuration	Common cathode

### DESCRIPTION / APPLICATIONS

State of the art hyperfast recovery rectifiers designed with optimized performance of forward voltage drop and ultrafast 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, lighting, in the AC/DC section of SMPS, freewheeling and clamp diodes.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce power dissipation in the switching element and snubbers.

### MECHANICAL DATA

**Case:** SMPD (TO-263AC)

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

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

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	$V_{RRM}$		600	V
Average rectified forward current	$I_{F(AV)}$ <sup>(1)</sup>	$T_C = 130$ °C	30	A
per device			15	
Non-repetitive peak surge current, per diode	$I_{FSM}$	$T_J = 25$ °C, 10 ms sine pulse	160	

### 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	600	-	-	V
Forward voltage, per diode	$V_F$	$I_F = 15$ A	-	1.63	2.15	
		$I_F = 15$ A, $T_J = 150$ °C	-	1.22	1.65	
Reverse leakage current, per diode	$I_R$	$V_R = V_R$ rated	-	-	20	$\mu$ A
		$T_J = 150$ °C, $V_R = V_R$ rated	-	-	500	
Junction capacitance, per diode	$C_T$	$V_R = 600$ V	-	16	-	pF

#### Note

(1) Mounted on infinite heatsink



<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 per diode	$t_{rr}$	$I_F = 1\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	30	-	ns
		$I_F = 0.5\text{ A}$ , $I_R = 1\text{ A}$ , $I_{rr} = 0.25\text{ A}$	-	-	30	
		$T_J = 25\text{ }^\circ\text{C}$	-	41	-	
		$T_J = 125\text{ }^\circ\text{C}$	-	92	-	
Peak recovery current per diode	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	-	7	-	A
		$T_J = 125\text{ }^\circ\text{C}$	-	13	-	
Reverse recovery charge per diode	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	-	150	-	nC
		$T_J = 125\text{ }^\circ\text{C}$	-	590	-	

<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, per diode	$R_{thJM}$		-	1.2	1.7	$^\circ\text{C}/\text{W}$
Approximate weight			0.55			g
			0.02			oz.
Marking device		Case style SMPD (TO-263AC)	30CDH06			

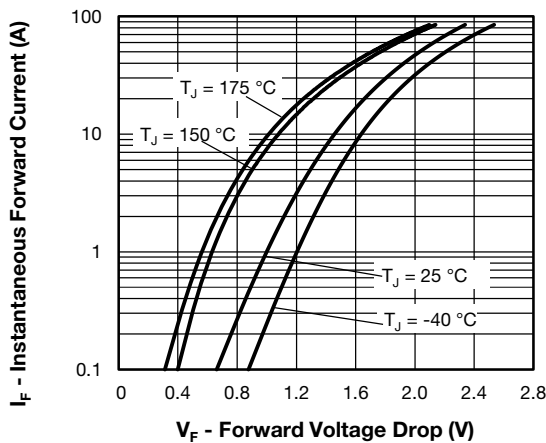


Fig. 1 - Typical Forward Voltage Drop Characteristics, Per Diode

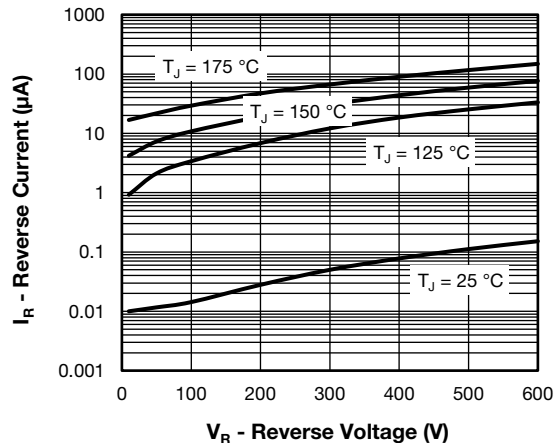


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage, Per Diode

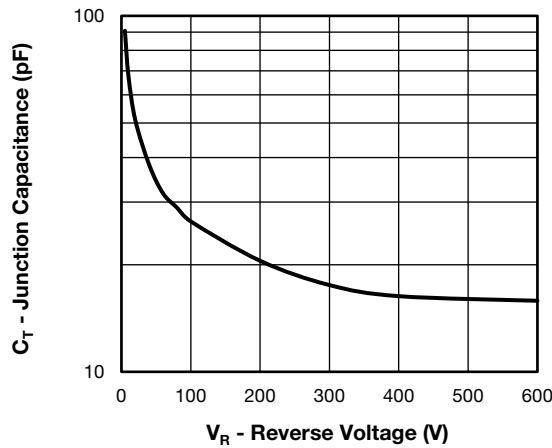


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, Per Diode

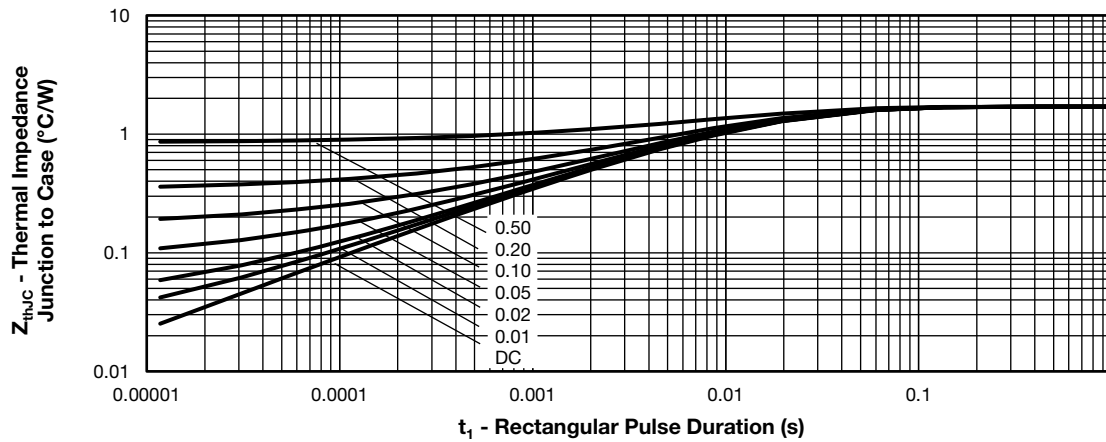


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics, Per Diode

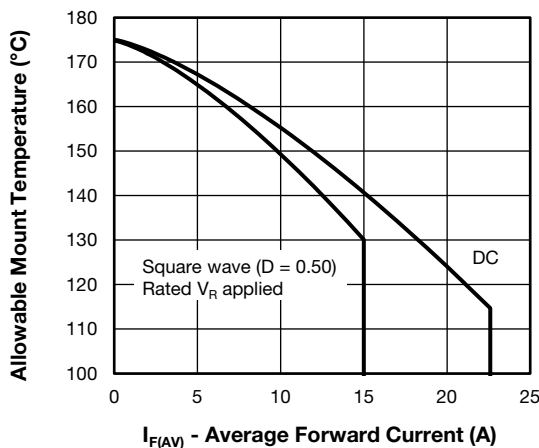


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current, Per Diode

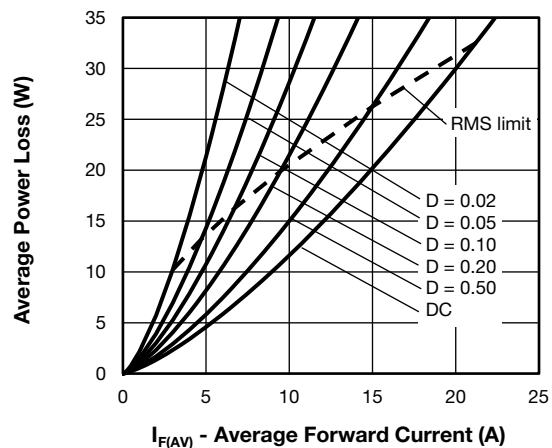


Fig. 6 - Forward Power Loss Characteristics, Per Diode

**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  $V_R$

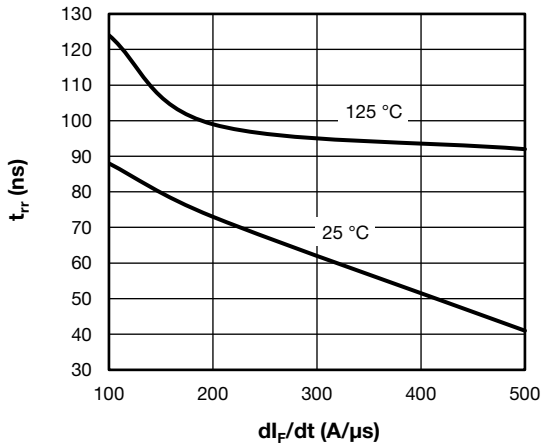


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$  Per Diode

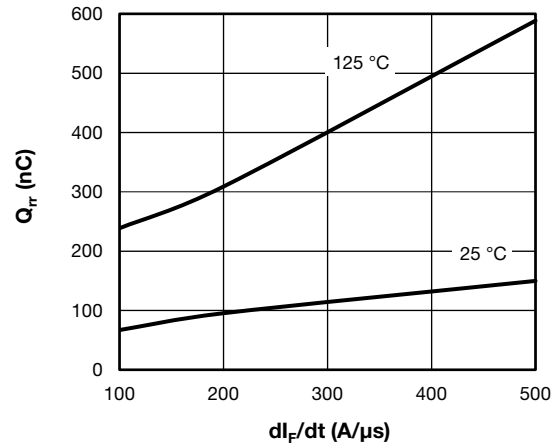


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$  Per Diode

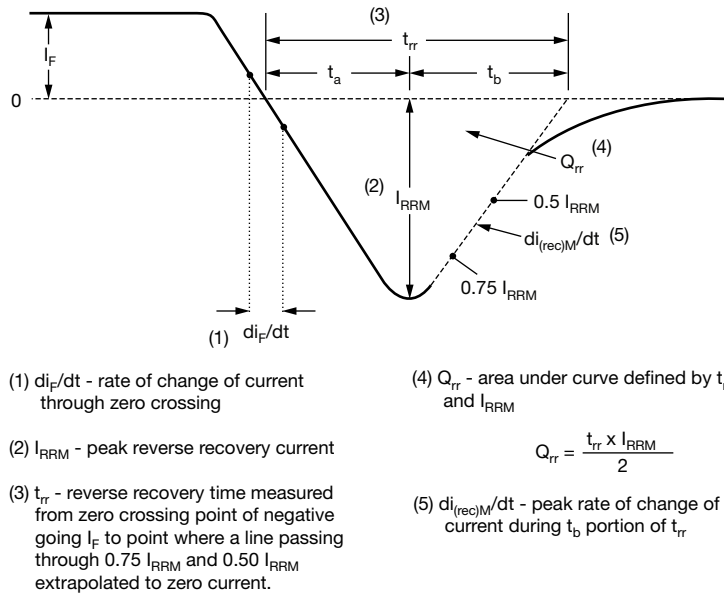
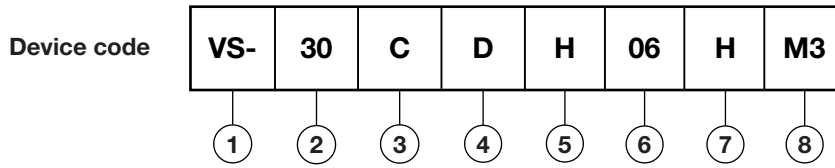


Fig. 9 - Reverse Recovery Waveform and Definitions



**ORDERING INFORMATION TABLE**



- 1** - Vishay Semiconductors product
- 2** - Current rating (30 A)
- 3** - Circuit configuration:  
C = common cathode
- 4** - D = SMPD package
- 5** - Process type,  
H = hyperfast recovery
- 6** - Voltage code (06 = 600 V)
- 7** - H = AEC-Q101 qualified
- 8** - M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	QUANTITY PER REEL	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-30CDH06HM3/I <sup>(1)</sup>	2000	2000	13" diameter plastic tape and reel

**Note**

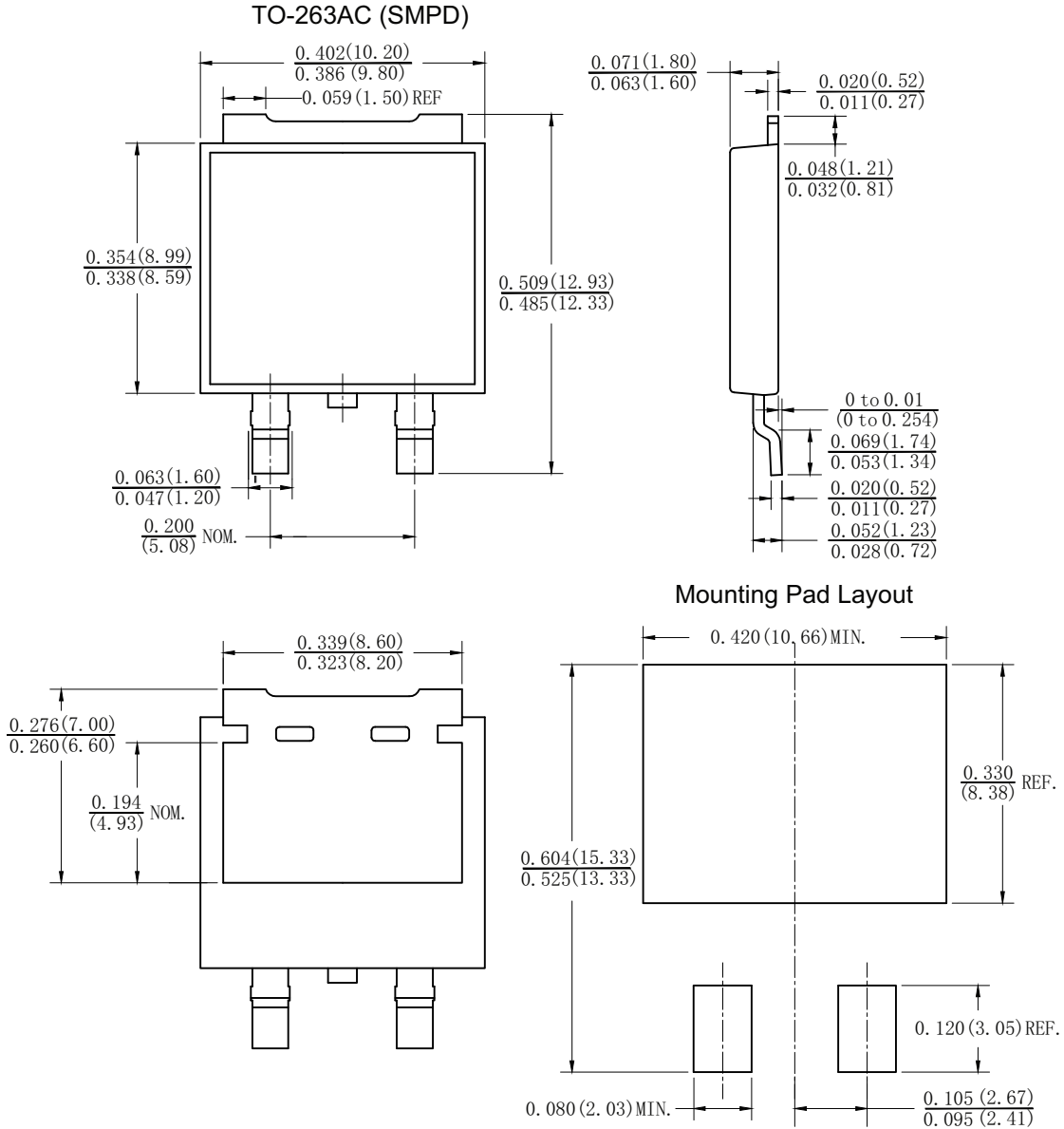
<sup>(1)</sup> AEC-Q101 qualified

<b>LINKS TO RELATED DOCUMENTS</b>	
Dimensions	<a href="http://www.vishay.com/doc?95604">www.vishay.com/doc?95604</a>
Part marking information	<a href="http://www.vishay.com/doc?95566">www.vishay.com/doc?95566</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?96776">www.vishay.com/doc?96776</a>



### TO-263AC (SMPD)

**DIMENSIONS** in inches (millimeters)





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