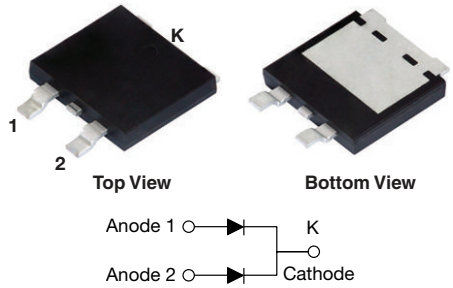
Hyperfast Rectifier, 2 x 15 A FRED Pt®

eSMP® 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

AUTOMOTIVE GRADE

RoHS COMPLIANT

HALOGEN FREE

LINKS TO ADDITIONAL RESOURCES

3D Models

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	per device	$I_{F(AV)}$ (1)	T_C = 130 °C	30	A
	per diode			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 µA	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	µA
		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

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time per diode	t_{rr}	I_F = 1 A, dI_F/dt = 50 A/µs, V_R = 30 V		-	30	-	ns
		I_F = 0.5 A, I_R = 1 A, I_{rr} = 0.25 A		-	-	30	
		T_J = 25 °C	I_F = 15 A, dI_F/dt = 500 A/µs, V_R = 400 V	-	41	-	
		T_J = 125 °C		-	92	-	
Peak recovery current per diode	I_{RRM}	T_J = 25 °C		-	7	-	A
		T_J = 125 °C		-	13	-	
Reverse recovery charge per diode	Q_{rr}	T_J = 25 °C		-	150	-	nC
		T_J = 125 °C		-	590	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-55	-	+175	°C
Thermal resistance, junction to mount, per diode	R_{thJM}		-	1.2	1.7	°C/W
Approximate weight			0.55			g
			0.02			oz.
Marking device		Case style SMPD (TO-263AC)	30CDH06			

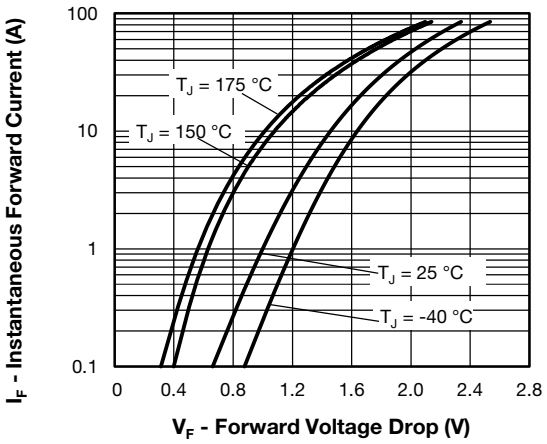


Fig. 1 - Typical Forward Voltage Drop Characteristics, Per Diode

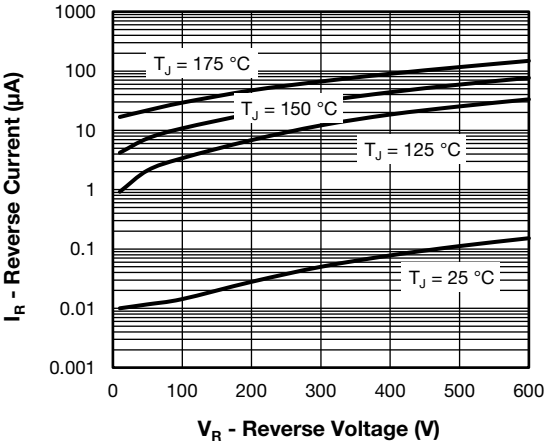


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage, Per Diode

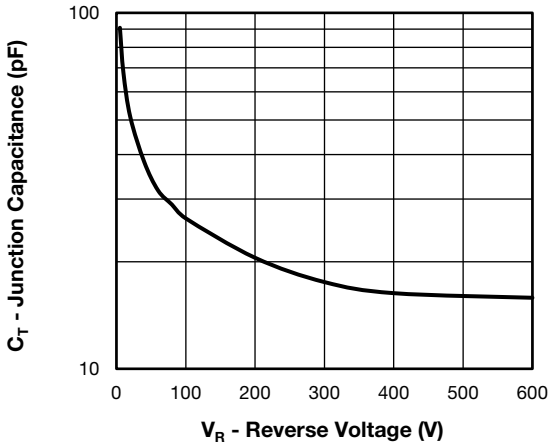


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, Per Diode

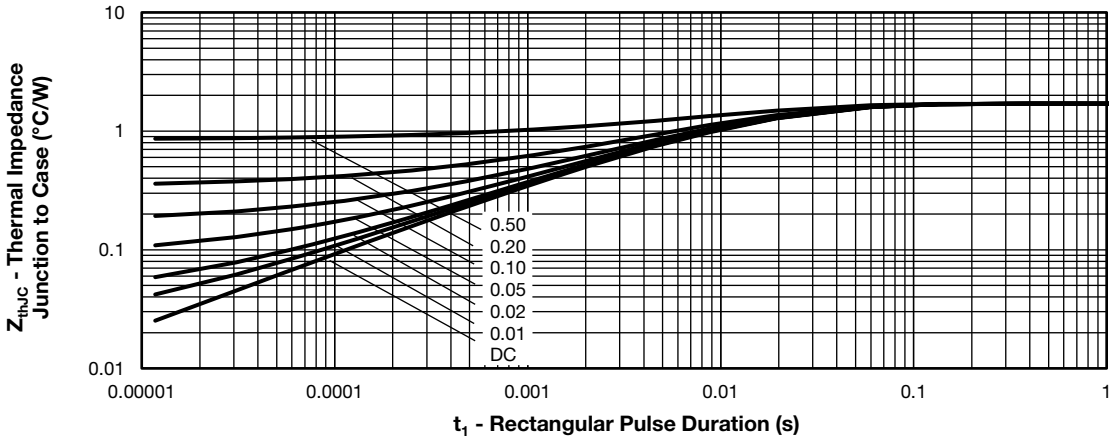


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics, Per Diode

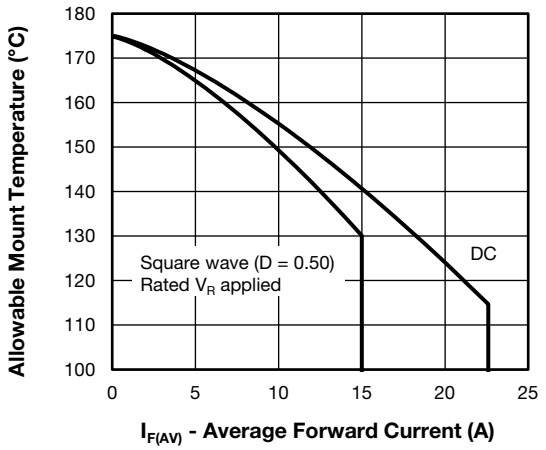


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current, Per Diode

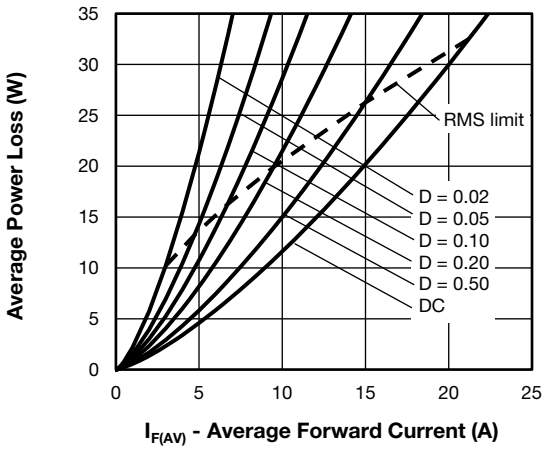


Fig. 6 - Forward Power Loss Characteristics, Per Diode

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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

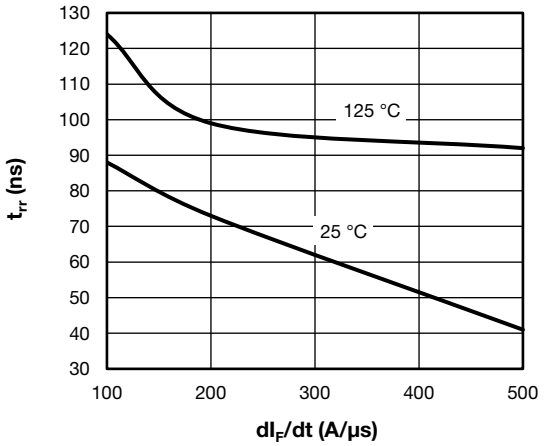


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt Per Diode

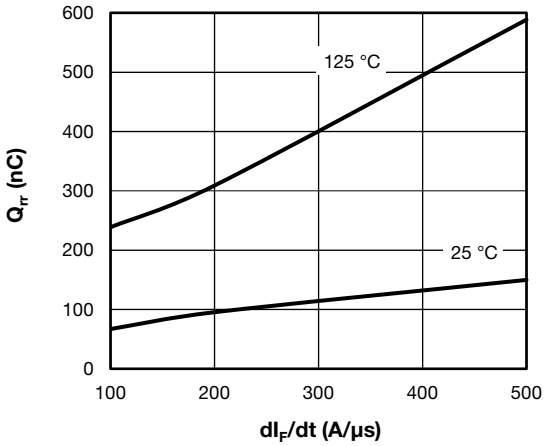
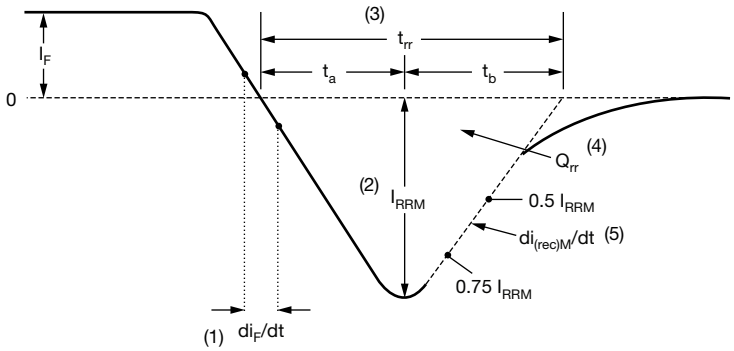


Fig. 8 - Typical Stored Charge vs. dI_F/dt Per Diode



(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 zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current.

(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}

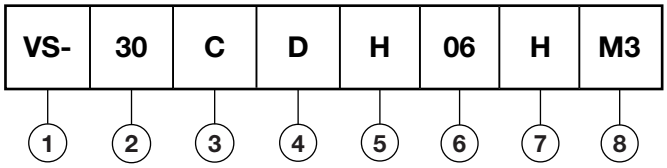
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

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

Fig. 9 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code



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

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

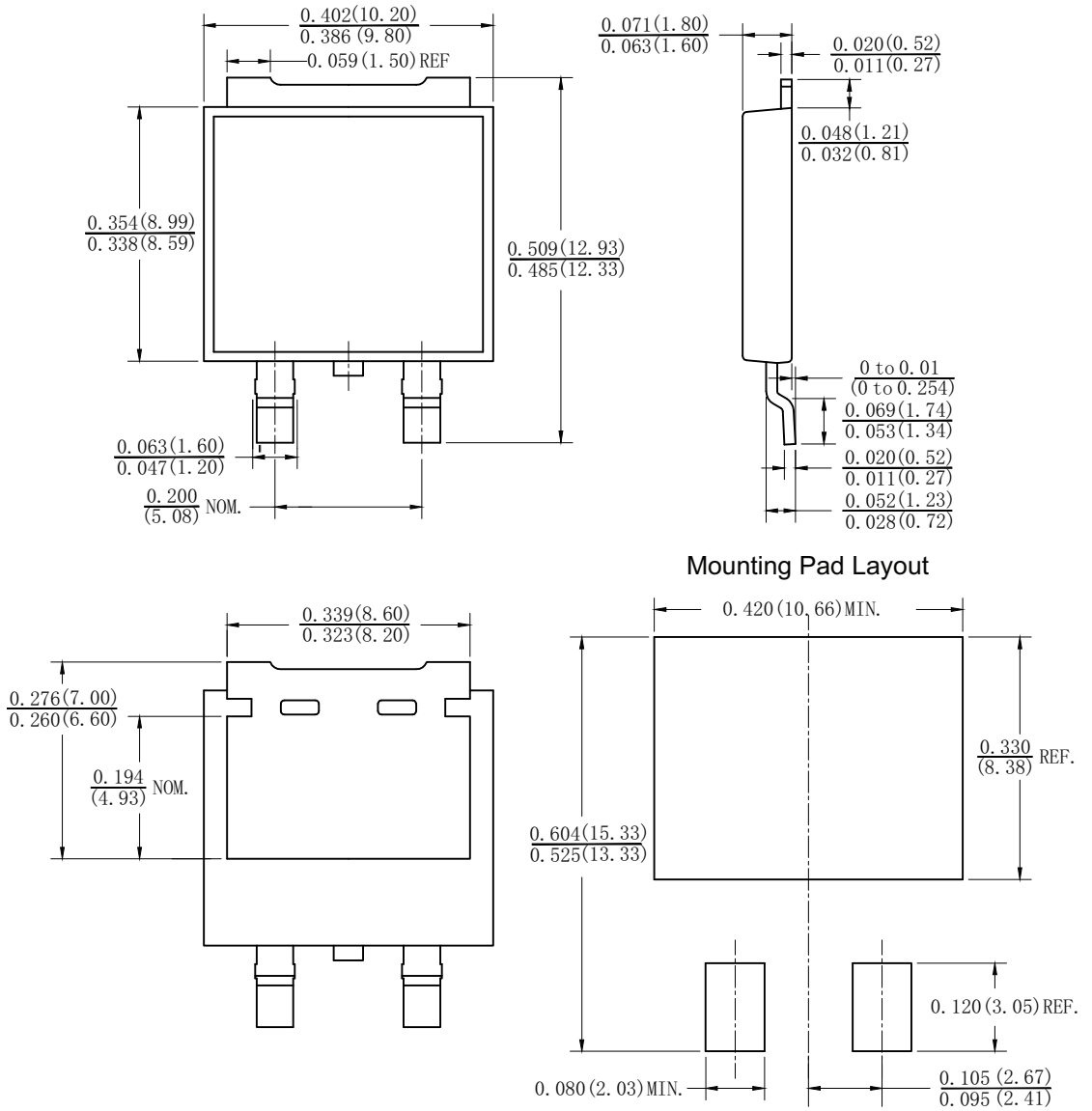
Note
[1] AEC-Q101 qualified

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95604
Part marking information	www.vishay.com/doc?95566
Packaging information	www.vishay.com/doc?88869
SPICE model	www.vishay.com/doc?96776

TO-263AC (SMPD)

DIMENSIONS in inches (millimeters)

TO-263AC (SMPD)



Mounting Pad Layout

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