



High Current Density Surface Mount Ultrafast Rectifiers

eSMP™ Series



DO-220AA (SMP)

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.0 A
V_{RRM}	100 V, 150 V, 200 V
t_{rr}	25 ns
V_F	0.90 V
$T_J \text{ max.}$	175 °C

TYPICAL APPLICATIONS

For use in secondary rectification and freewheeling for ultrafast switching speeds of ac-to-ac and dc-to-dc converters in high temperature conditions for both consumer and automotive applications.

FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Glass passivated chip junction
- Ultrafast recovery times for high frequency
- Low forward voltage drop, low power loss
- Low thermal resistance
- Meets MSL level 1 per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**
- Find out more about Vishay's Automotive Grade Product requirements at: www.vishay.com/applications



RoHS
COMPLIANT
HALOGEN
FREE

AUTOMOTIVE
GRADE
Available

MECHANICAL DATA

Case: DO-220AA (SMP)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free and RoHS compliant, commercial grade

Base P/NHM3 - halogen-free and RoHS compliant, automotive grade

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

Polarity: Color band denotes cathode end

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted)					
PARAMETER	SYMBOL	ESH1PB	ESH1PC	ESH1PD	UNIT
Device marking code		PB	PC	PD	
Maximum repetitive peak reverse voltage	V_{RRM}	100	150	200	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	1.0			A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	50			A
Operating junction and storage temperature range	T_J, T_{STG}	- 55 to + 175			°C

ESH1PB, ESH1PC & ESH1PD

Vishay General Semiconductor



ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)					
PARAMETER	TEST CONDITIONS		SYMBOL	VALUE	UNIT
Maximum instantaneous forward voltage ⁽¹⁾	I _F = 0.7 A I _F = 1 A	T _J = 25 °C	V _F	0.86 0.90	V
Maximum reverse current at rated V _R voltage ⁽²⁾		T _J = 25 °C T _J = 125 °C	I _R	1.0 25	μA
Maximum reverse current	V _R = 20 V	T _J = 150 °C	I _R	50	μA
Maximum reverse recovery time	I _F = 0.5 A, I _R = 1 A, I _{rr} = 0.25 A		t _{rr}	25	ns
Typical reverse recovery time	I _F = 1.0 A, V _R = 30 V, dI/dt = 50 A/μs, I _{rr} = 10 % I _{RM}	T _J = 25 °C T _J = 100 °C	t _{rr}	25 35	ns
Typical stored charge	I _F = 1.0 A, V _R = 30 V, dI/dt = 50 A/μs, I _{rr} = 10 % I _{RM}	T _J = 25 °C T _J = 100 °C	Q _{rr}	10 15	nC
Typical junction capacitance	4.0 V, 1 MHz		C _J	25	pF

Notes:

- ⁽¹⁾ Pulse test: 300 μs pulse width, 1 % duty cycle
- ⁽²⁾ Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	ESH1PB	ESH1PC	ESH1PD	UNIT
Typical thermal resistance ⁽¹⁾	R _{θJA}		105		°C/W
	R _{θJL}		15		
	R _{θJC}		20		

Note:

- ⁽¹⁾ Thermal resistance from junction to ambient and junction to lead mounted on P.C.B. with 5.0 mm x 5.0 mm copper pad areas. R_{θJL} is measured at the terminal of cathode band. R_{θJC} is measured at the top center of the body

ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
ESH1PB-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel	
ESH1PB-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel	
ESH1PBHM3/84A ⁽¹⁾	0.024	84A	3000	7" diameter plastic tape and reel	
ESH1PBHM3/85A ⁽¹⁾	0.024	85A	10 000	13" diameter plastic tape and reel	

Note:

- ⁽¹⁾ Automotive grade

RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

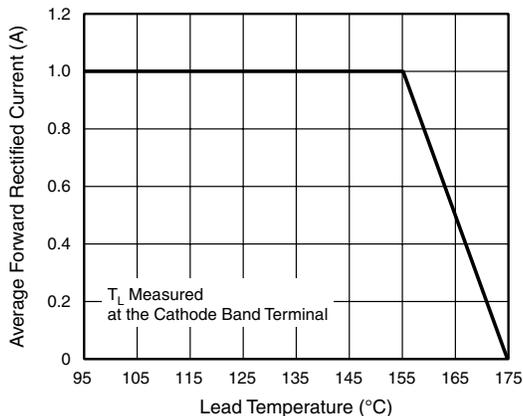


Figure 1. Forward Current Derating Curve

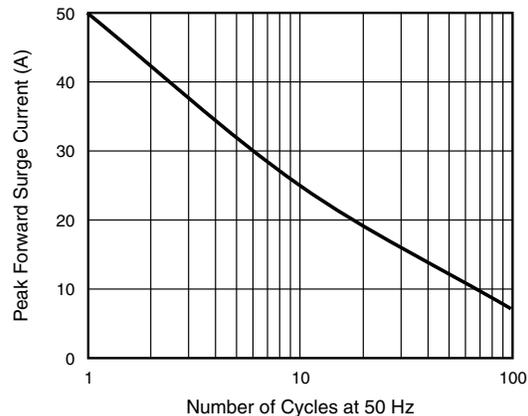


Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

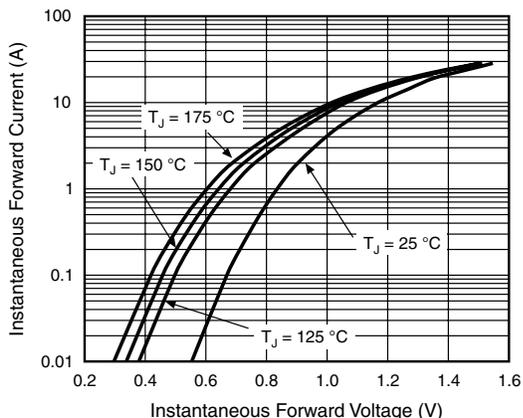


Figure 3. Typical Instantaneous Forward Characteristics

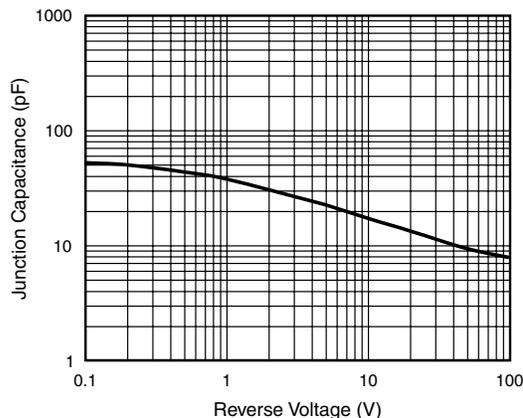


Figure 5. Typical Junction Capacitance

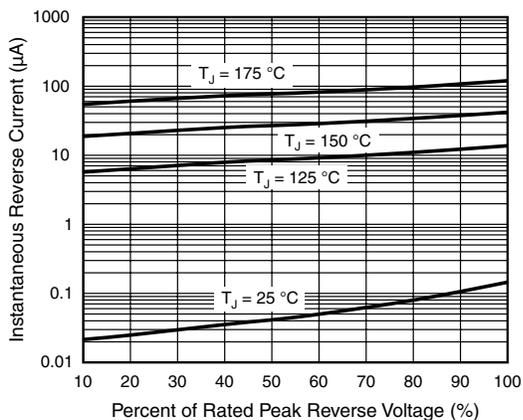


Figure 4. Typical Reverse Leakage Characteristics

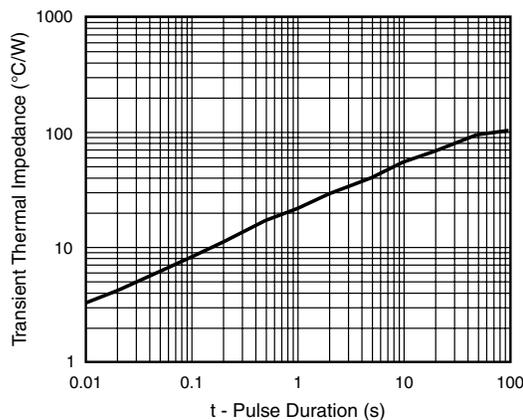
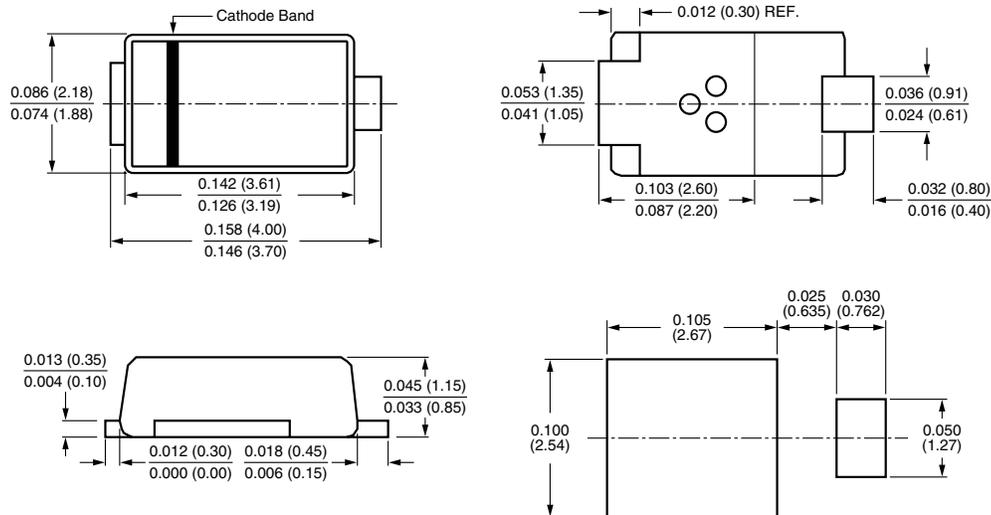


Figure 6. Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-220AA (SMP)





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