



New Product

ESH1PB, ESH1PC & ESH1PD

Vishay General Semiconductor

High Current Density Surface Mount Ultrafast Rectifiers

eSMP™ Series



DO-220AA (SMP)

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-020C, LF max peak of 260 °C
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



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.

MECHANICAL DATA

Case: DO-220AA (SMP)

Epoxy meets UL-94V-0 flammability rating

Terminals: Matte tin plated leads, solderable per J-STD-002B and JESD22-B102D

E3 suffix for commercial grade, HE3 suffix for high reliability grade (AEC Q101 qualified)

Polarity: Color band denotes cathode end

MAJOR RATINGS AND CHARACTERISTICS	
$I_{F(AV)}$	1 A
V_{RRM}	100 V, 150 V, 200 V
t_{rr}	25 ns
V_F	0.90 V
$T_J \text{ max.}$	175 °C

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

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ °C}$ unless otherwise noted)				
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Maximum instantaneous forward voltage (1)	at $I_F = 0.7\text{ A}$, $T_J = 25\text{ °C}$ at $I_F = 1\text{ A}$, $T_J = 25\text{ °C}$	V_F	0.86 0.90	V
Maximum reverse current at rated V_R (1) voltage	$T_J = 25\text{ °C}$ $T_J = 125\text{ °C}$	I_R	1.0 25	μA
Maximum reverse current	at $V_R = 20\text{ V}$, $T_J = 150\text{ °C}$	I_R	50	μA

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ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)				
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Maximum reverse recovery time	at $I_F = 0.5\text{ A}$, $I_R = 1\text{ A}$, $I_{rr} = 0.25\text{ A}$	t_{rr}	25	ns
Typical reverse recovery time	at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = $50\text{ A}/\mu\text{s}$, $I_{rr} = 10\%$ I_{RM} $T_j = 25\text{ }^\circ\text{C}$	t_{rr}	25	ns
	at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = $50\text{ A}/\mu\text{s}$, $I_{rr} = 10\%$ I_{RM} $T_j = 100\text{ }^\circ\text{C}$		35	
Typical reverse recovery time	at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = $50\text{ A}/\mu\text{s}$, $I_{rr} = 10\%$ I_{RM} $T_j = 25\text{ }^\circ\text{C}$	Q_{rr}	10	nC
	at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = $50\text{ A}/\mu\text{s}$, $I_{rr} = 10\%$ I_{RM} $T_j = 100\text{ }^\circ\text{C}$		15	
Typical junction capacitance	at 4.0 V , 1 MHz	C_J	25	pF

Note:

(1) Pulse test: 300 μs pulse width, 1 % duty cycle

THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
PARAMETER	SYMBOL	ESH1PB	ESH1PC	ESH1PD	UNIT
Typical thermal resistance ⁽¹⁾	$R_{\theta JA}$		105		$^\circ\text{C}/\text{W}$
	$R_{\theta JL}$		15		
	$R_{\theta JC}$		20		

Note:

(1) Thermal resistance from junction to ambient and junction to lead mounted on P.C.B. with 5.0 x 5.0 mm copper pad areas. $R_{\theta JL}$ is measured at the terminal of cathode band. $R_{\theta JC}$ is measured at the top centre of the body

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
ESH1PB-E3/84A	0.024	84A	3000	7" Diameter Plastic Tape & Reel
ESH1PB-E3/85A	0.024	85A	10000	13" Diameter Plastic Tape & Reel
ESH1PBHE3/84A ⁽¹⁾	0.024	84A	3000	7" Diameter Plastic Tape & Reel
ESH1PBHE3/85A ⁽¹⁾	0.024	85A	10000	13" Diameter Plastic Tape & Reel

Note:

(1) Automotive grade AEC Q101 qualified

RATINGS AND CHARACTERISTICS CURVES

($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

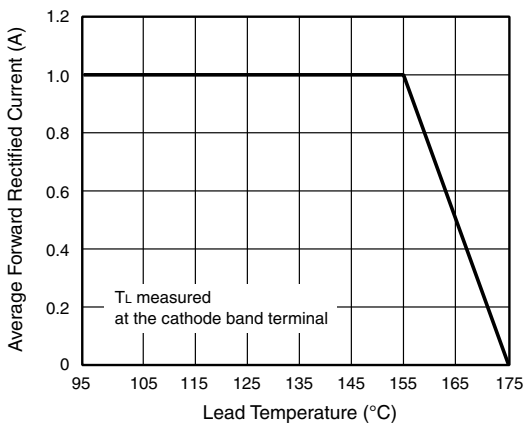


Figure 1. Forward Current Derating Curve

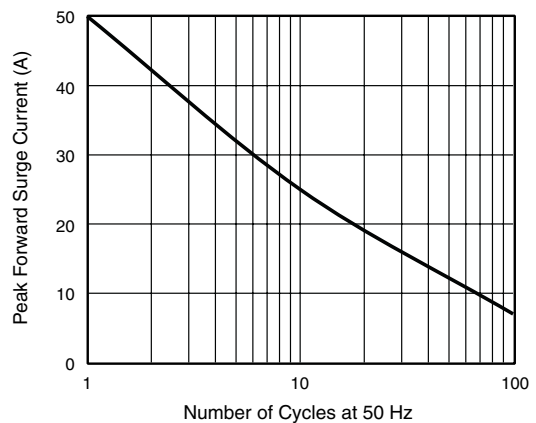


Figure 2. Maximum Non-Repetitive Peak Forward Surge Current



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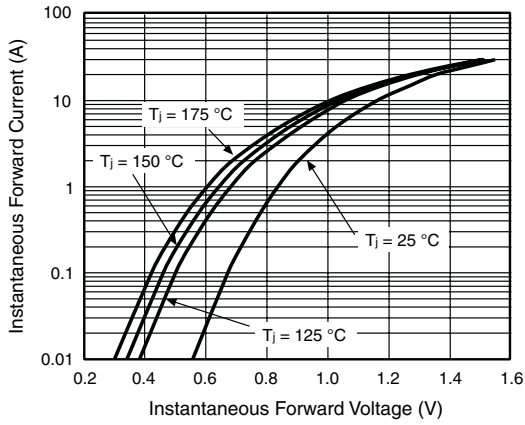


Figure 3. Typical Instantaneous Forward Characteristics

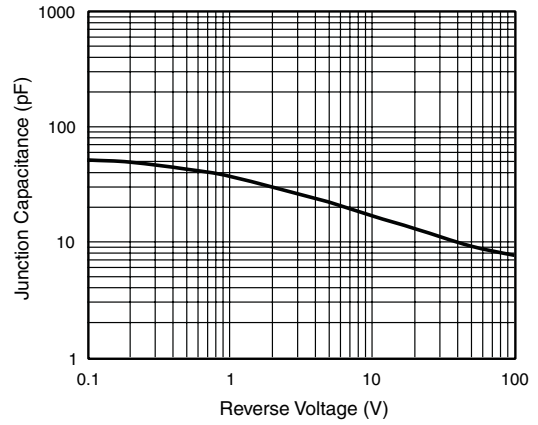


Figure 5. Typical Junction Capacitance

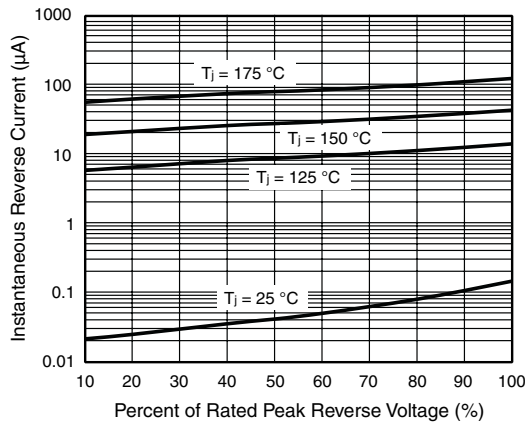


Figure 4. Typical Reverse Leakage Characteristics

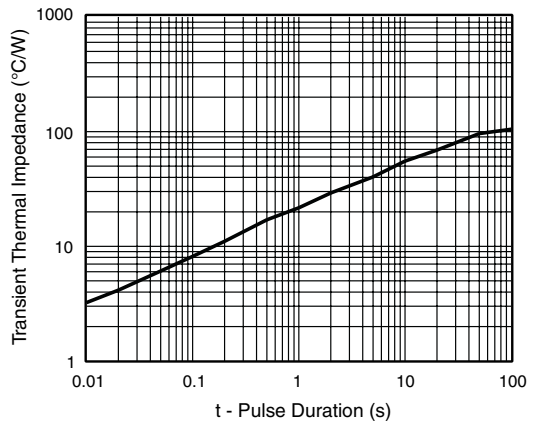
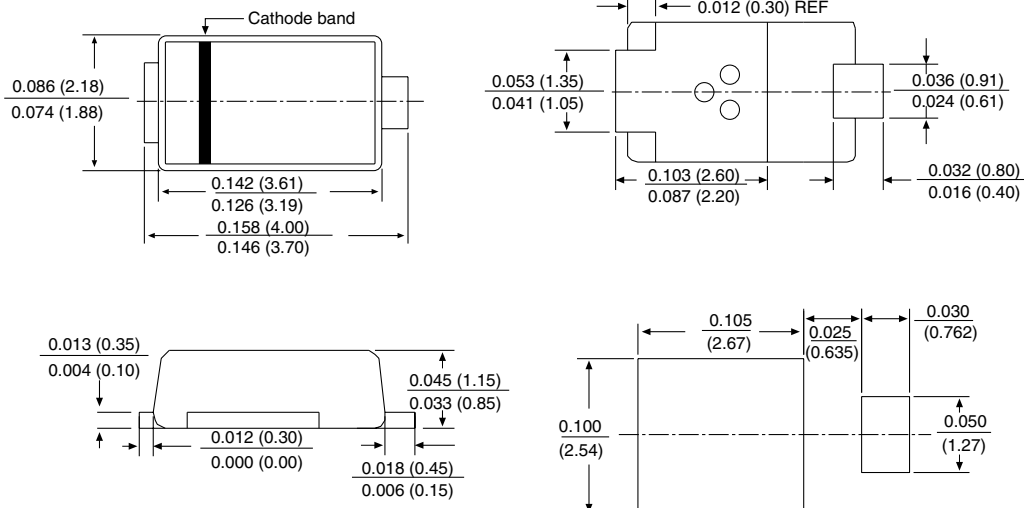


Figure 6. Typical Transient Thermal impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-220AA (SMP)





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