



ESH1PB, ESH1PC & ESH1PD

New Product

Vishay General Semiconductor

High Current Density Surface Mount Ultrafast Rectifiers

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



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
- Solder Dip 260 °C, 40 seconds



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

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

Maximum Ratings

($T_A = 25\text{ °C}$ unless otherwise specified)

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

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

Parameter	Test condition	Symbol	Value	Unit
Maximum instantaneous forward voltage ⁽¹⁾	at $I_F = 0.7\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$ at $I_F = 1\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$	V_F	0.86 0.90	V
Maximum reverse current at rated V_R ⁽¹⁾ voltage	$T_J = 25\text{ }^\circ\text{C}$ $T_J = 125\text{ }^\circ\text{C}$	I_R	1.0 25	μA
Maximum reverse current	at $V_R = 20\text{ V}$, $T_J = 150\text{ }^\circ\text{C}$	I_R	50	μA
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 = $50\text{ A}/\mu\text{s}$, $I_{rr} = 10\%$ IRM $T_J = 25\text{ }^\circ\text{C}$ at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = $50\text{ A}/\mu\text{s}$, $I_{rr} = 10\%$ IRM $T_J = 100\text{ }^\circ\text{C}$	t_{rr}	25 35	ns
Typical reverse recovery time	at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = $50\text{ A}/\mu\text{s}$, $I_{rr} = 10\%$ IRM $T_J = 25\text{ }^\circ\text{C}$ at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = $50\text{ A}/\mu\text{s}$, $I_{rr} = 10\%$ IRM $T_J = 100\text{ }^\circ\text{C}$	Q_{rr}	10 15	nC
Typical junction capacitance	at 4.0 V , 1 MHz	C_J	25	pF

Thermal Characteristics

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

Parameter	Symbol	ESH1PB	ESH1PC	ESH1PD	Unit
Typical thermal resistance ⁽²⁾	$R_{\theta JA}$ $R_{\theta JL}$ $R_{\theta JC}$		105 15 20		$^\circ\text{C}/\text{W}$

Notes:

(1) Pulse test: $300\text{ }\mu\text{s}$ pulse width, 1 % duty cycle

(2) Thermal resistance from junction to ambient and junction to lead mounted on P.C.B. with $5.0 \times 5.0\text{ mm}$ 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

Ratings and Characteristics Curves

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

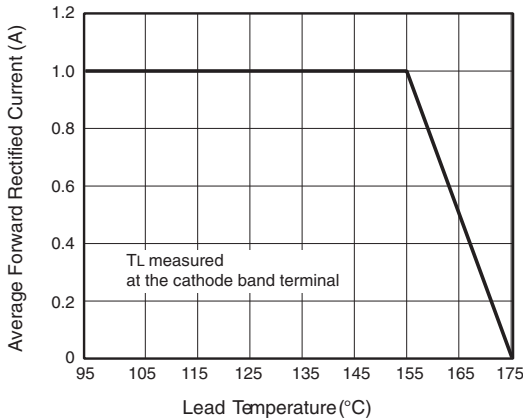


Figure 1. Forward Current Derating Curve

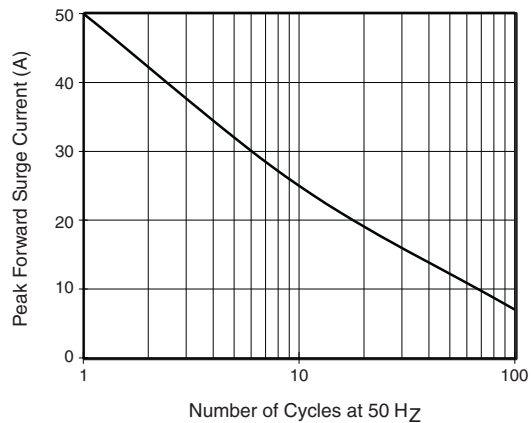


Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

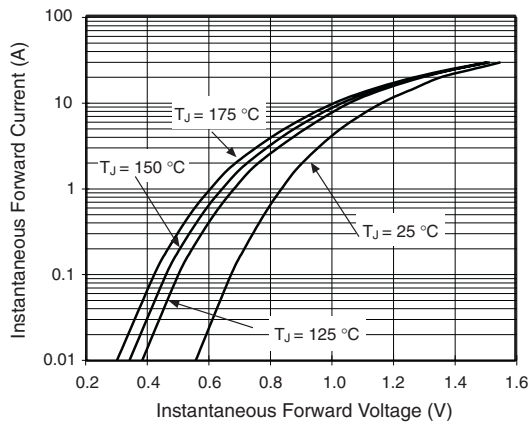


Figure 3. Typical Instantaneous Forward Characteristics

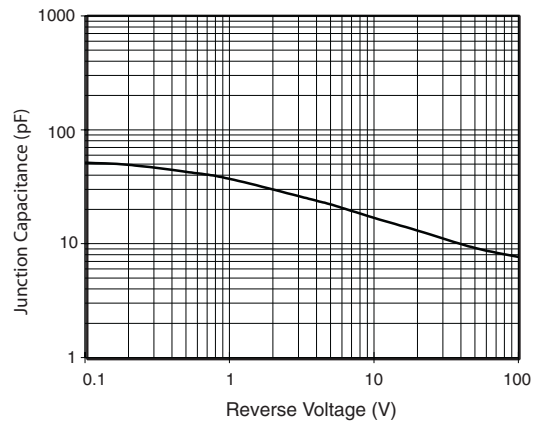


Figure 5. Typical Junction Capacitance

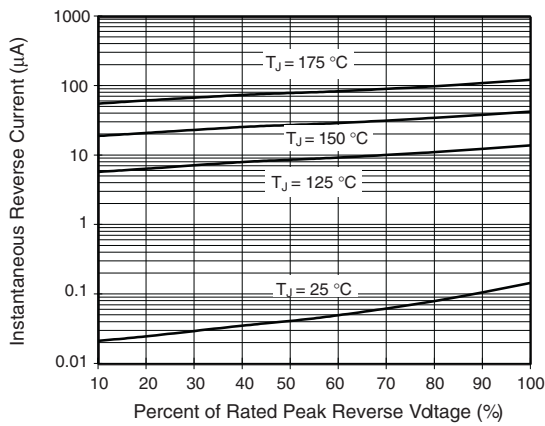


Figure 4. Typical Reverse Leakage Characteristics

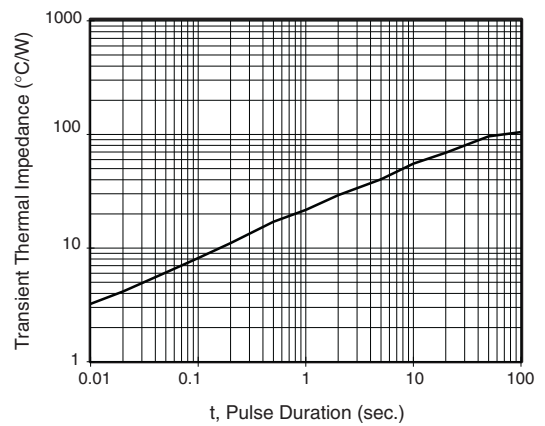
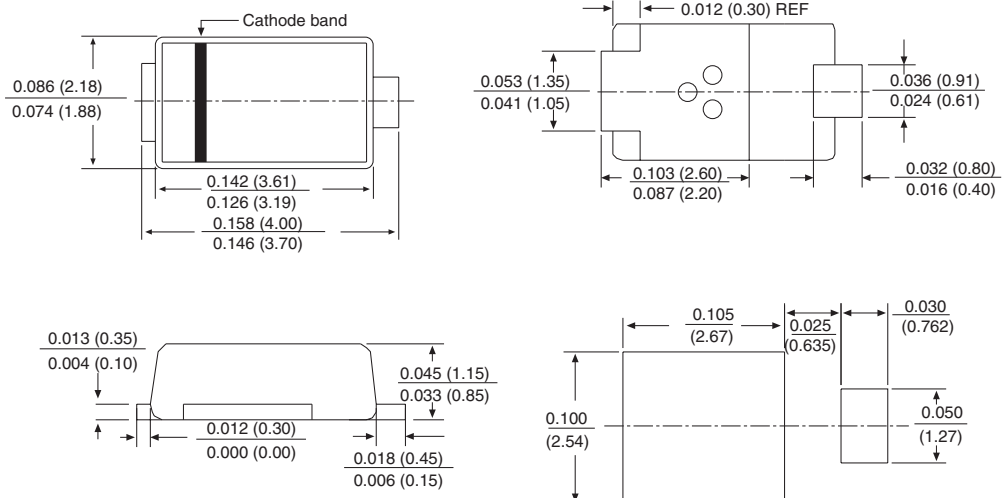


Figure 6. Typical Transient Thermal impedance

Package dimensions in inches (millimeters)

DO-220AA (SMP)





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