

High Current Density Surface-Mount Ultrafast Rectifiers

eSMP® Series


SMP (DO-220AA)

Cathode  Anode

FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Glass passivated pellet 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



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 max.	175 °C
Package	SMP (DO-220AA)
Circuit configuration	Single

TYPICAL APPLICATIONS

For use in secondary rectification and freewheeling for ultrafast switching speeds of AC/AC and DC/DC converters in high temperature conditions for both consumer and automotive applications.

MECHANICAL DATA

Case: SMP (DO-220AA)

Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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

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

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

Polarity: color band denotes cathode end

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

PARAMETER	TEST CONDITIONS		SYMBOL	VALUE	UNIT
Maximum instantaneous forward voltage	$I_F = 0.7 \text{ A}$	$T_J = 25^\circ\text{C}$	V_F ⁽¹⁾	0.86	V
	$I_F = 1 \text{ A}$			0.90	
Maximum reverse current at rated V_R voltage		$T_J = 25^\circ\text{C}$	I_R ⁽²⁾	1.0	μA
		$T_J = 125^\circ\text{C}$		25	
Maximum reverse current	$V_R = 20 \text{ V}$	$T_J = 150^\circ\text{C}$	I_R	50	μA
Maximum reverse recovery time	$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}, I_{rr} = 0.25 \text{ A}$		t_{rr}	25	ns
Typical reverse recovery time	$I_F = 1.0 \text{ A}, V_R = 30 \text{ V},$ $dI/dt = 50 \text{ A}/\mu\text{s}, I_{rr} = 10\% I_{RM}$	$T_J = 25^\circ\text{C}$	t_{rr}	25	ns
		$T_J = 100^\circ\text{C}$		35	
Typical stored charge	$I_F = 1.0 \text{ A}, V_R = 30 \text{ V},$ $dI/dt = 50 \text{ A}/\mu\text{s}, I_{rr} = 10\% I_{RM}$	$T_J = 25^\circ\text{C}$	Q_{rr}	10	nC
		$T_J = 100^\circ\text{C}$		15	
Typical junction capacitance	$4.0 \text{ V}, 1 \text{ MHz}$		C_J	25	pF

Notes

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

(2) Pulse test: Pulse width $\leq 40 \text{ ms}$

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

PARAMETER	SYMBOL	ESH1PB	ESH1PC	ESH1PD	UNIT
Typical thermal resistance	$R_{\theta JA}$ ⁽¹⁾	105			$^\circ\text{C}/\text{W}$
	$R_{\theta JM}$ ⁽²⁾	15			

Notes

(1) Thermal resistance from junction to ambient on free air

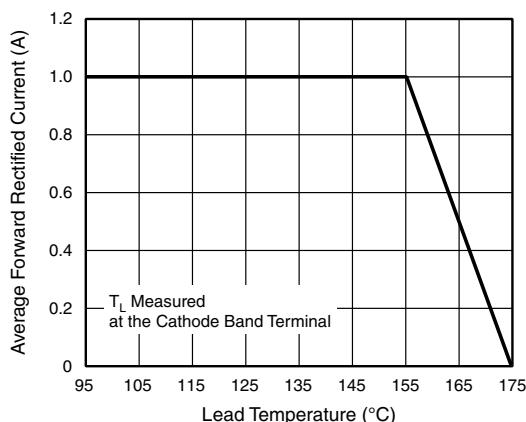
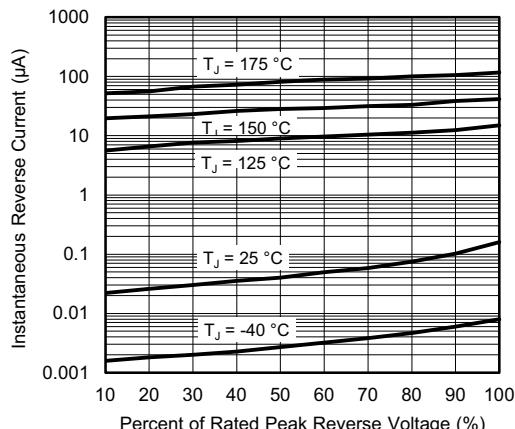
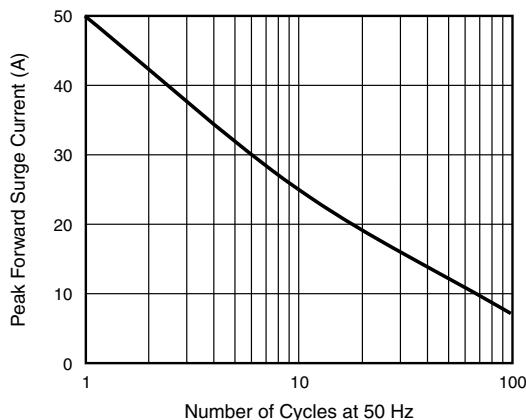
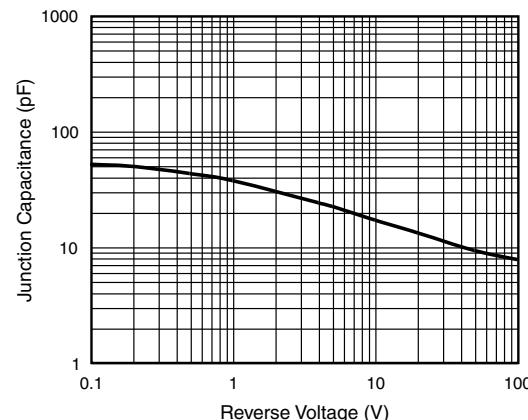
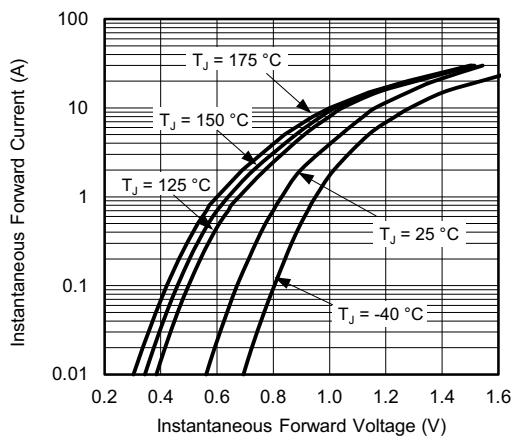
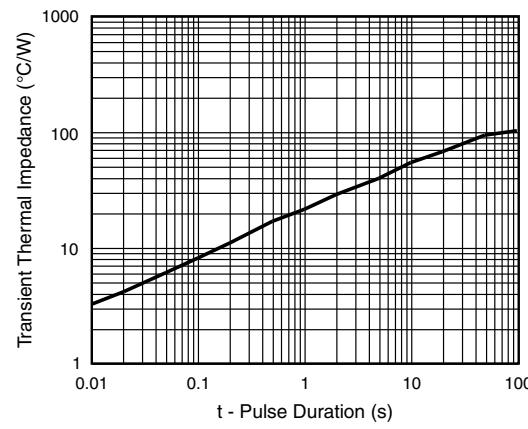
(2) Mounted on 5 mm x 5 mm pad size from junction to mount

ORDERING INFORMATION (Example)

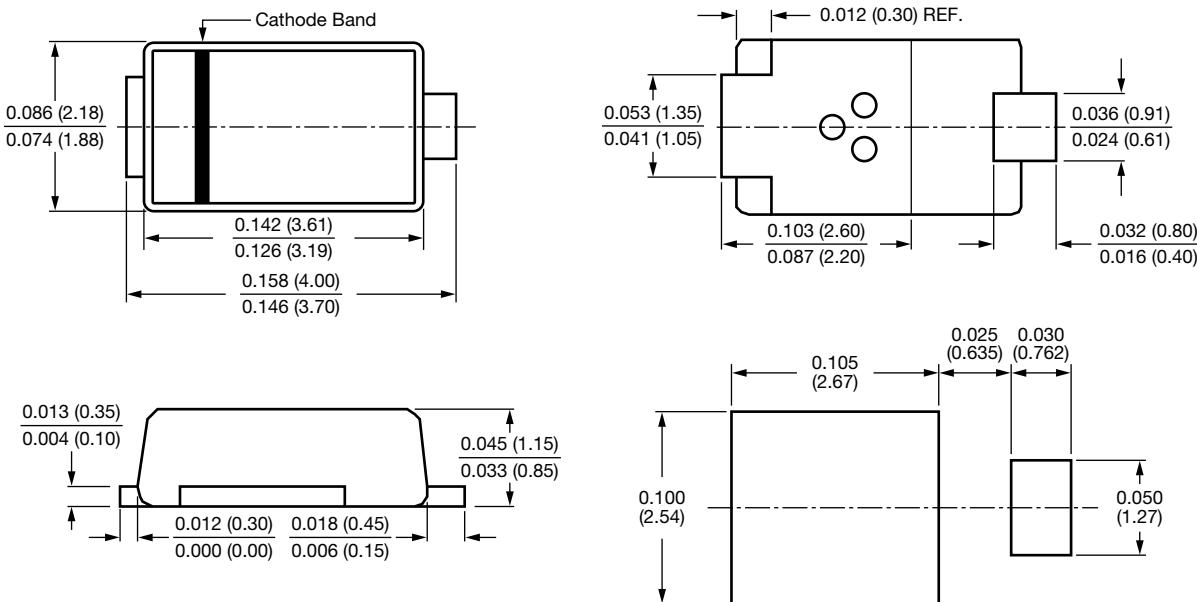
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
ESH1PB-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel
ESH1PB-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel
ESH1PBHM3/84A ⁽¹⁾	0.024	84A	3000	7" diameter plastic tape and reel
ESH1PBHM3/85A ⁽¹⁾	0.024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

Note

(1) Automotive grade

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

Fig. 1 - Forward Current Derating Curve

Fig. 4 - Typical Reverse Leakage Characteristics

Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

Fig. 5 - Typical Junction Capacitance

Fig. 3 - Typical Instantaneous Forward Characteristics

Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMP (DO-220AA)


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