

ESH1PB, ESH1PC, ESH1PD

Vishay General Semiconductor

AUTOMOTIVE GRADE

Available

RoHS COMPLIANT

HALOGEN

FREE

High Current Density Surface Mount Ultrafast Rectifiers



DESIGN SUPPORT TOOLS

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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				

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

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			А
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I _{FSM}	50			А
Operating junction and storage temperature range	T _J , T _{STG}	-55 to +175			°C

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ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT		
Maximum instantaneous forward voltage	I _F = 0.7 A	T _J = 25 °C	V _F ⁽¹⁾	0.86	V	
	I _F = 1 A			0.90		
Maximum reverse current at rated V _R voltage		T _J = 25 °C	I _R ⁽²⁾	1.0	μΑ	
iviaximum reverse current at rated v _R voltage		T _J = 125 °C	'R''	25		
Maximum reverse current	V _R = 20 V	T _J = 150 °C	I_R	50	μΑ	
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	$I_F = 1.0 \text{ A}, V_R = 30 \text{ V},$ $dI/dt = 50 \text{ A/}\mu\text{s}, I_{rr} = 10 \% I_{RM}$	T _J = 25 °C	- t _{rr}	25	- ns	
Typical reverse recovery time		T _J = 100 °C		35		
Typical stored charge	I _F = 1.0 A, V _R = 30 V,	T _J = 25 °C	0	10	nC	
i ypicai stored charge	$dI/dt = 50 A/\mu s$, $I_{rr} = 10 \% I_{RM}$	T _J = 100 °C	Q _{rr}	15	110	
Typical junction capacitance	4.0 V, 1 MHz		CJ	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 registeres	R _{0JA} (1)	105			°C/W
Typical thermal resistance	R _{0JM} (2)	15			C/VV

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	PREFERRED PACKAGE CODE BASE QUANTITY			
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

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RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

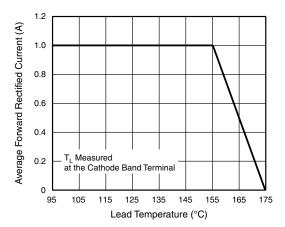


Fig. 1 - Forward Current Derating Curve

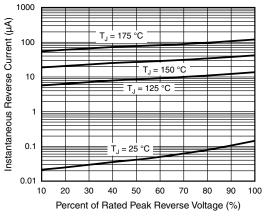


Fig. 4 - Typical Reverse Leakage Characteristics

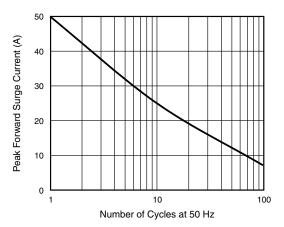


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

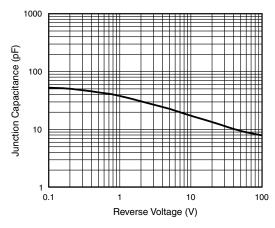


Fig. 5 - Typical Junction Capacitance

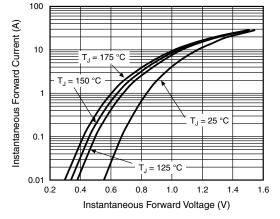


Fig. 3 - Typical Instantaneous Forward Characteristics

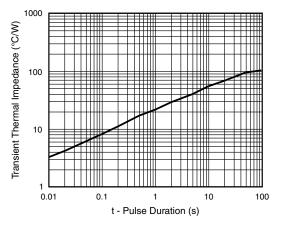


Fig. 6 - Typical Transient Thermal Impedance

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMP (DO-220AA) 0.012 (0.30) REF. Cathode Band 0.053 (1.35) 0.086 (2.18) 0.036 (0.91) 0.041 (1.05) 0.074 (1.88) 0.024 (0.61) 0.142 (3.61) 0.032 (0.80) 0.103 (2.60) 0.126 (3.19) 0.087 (2.20) 0.016 (0.40) 0.158 (4.00) 0.146 (3.70) 0.025 0.030 (0.635) (0.762) 0.105 (2.67) 0.013 (0.35) 0.004 (0.10) 0.045 (1.15) 0.033 (0.85) 0.050 0.100 (2.54)(1.27)0.012 (0.30) 0.018 (0.45) 0.000 (0.00) 0.006 (0.15)



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