

High Current Density Surface Mount Ultrafast Rectifiers

eSMP® Series



DO-220AA (SMP)



RoHS
COMPLIANT
HALOGEN
FREE

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 losses
- 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/DC and DC/DC converters in high temperature for both consumer and automotive applications.

MECHANICAL DATA

Case: DO-220AA (SMP)

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 the cathode end

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2.0 A
V_{RRM}	100 V, 150 V, 200 V
t_{rr}	25 ns
V_F at $I_F = 2$ A	0.75 V
T_J max.	175 °C
Package	DO-220AA (SMP)
Diode variations	Single die

MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted)					
PARAMETER	SYMBOL	ESH2PB	ESH2PC	ESH2PD	UNIT
Device marking code		P2B	P2C	P2D	
Maximum repetitive peak reverse voltage	V_{RRM}	100	150	200	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	2.0			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 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Maximum instantaneous forward voltage	I _F = 2 A	T _J = 25 °C	V _F ⁽¹⁾	0.90	0.98	V
		T _J = 125 °C		0.75	0.82	
Maximum reverse current at rated V _R		T _J = 25 °C	I _R ⁽²⁾	0.2	1.0	µA
		T _J = 125 °C		12.6	25	
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 _{rr}	25	-	ns
		T _J = 100 °C		35	-	
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	Q _{rr}	10	-	nC
		T _J = 100 °C		15	-	
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 $\leq 40\text{ ms}$

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	ESH2PB	ESH2PC	ESH2PD	UNIT
Typical thermal resistance	R _{θJA} ⁽¹⁾	80			°C/W
	R _{θJL} ⁽¹⁾	15			
	R _{θJC} ⁽¹⁾	22			

Note

- (1) Thermal resistance from junction to ambient and junction to lead mounted on PCB with 6.0 mm x 6.0 mm copper pad areas. $R_{\theta JL}$ is measured at the terminal of cathode band. $R_{\theta JC}$ 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
ESH2PB-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel
ESH2PB-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel
ESH2PBHM3/84A ⁽¹⁾	0.024	84A	3000	7" diameter plastic tape and reel
ESH2PBHM3/85A ⁽¹⁾	0.024	85A	10 000	13" diameter plastic tape and reel

Note

- (1) Automotive grade



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

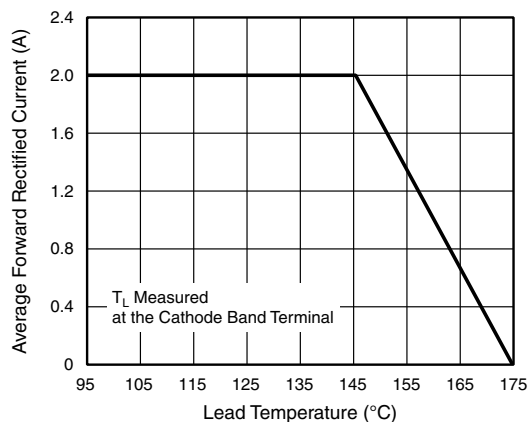


Fig. 1 - Maximum Forward Current Derating Curve

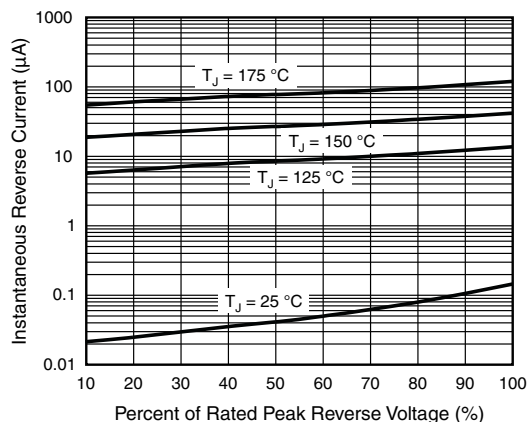


Fig. 4 - Typical Reverse Leakage Characteristics

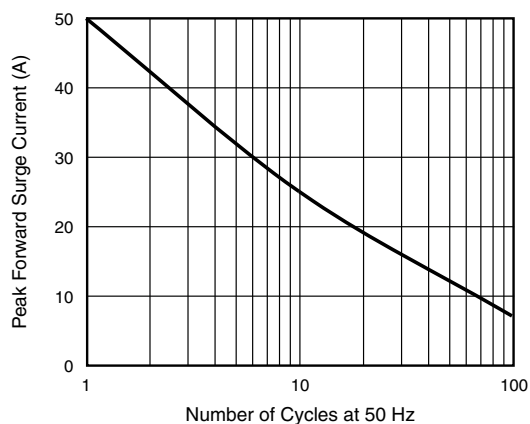


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

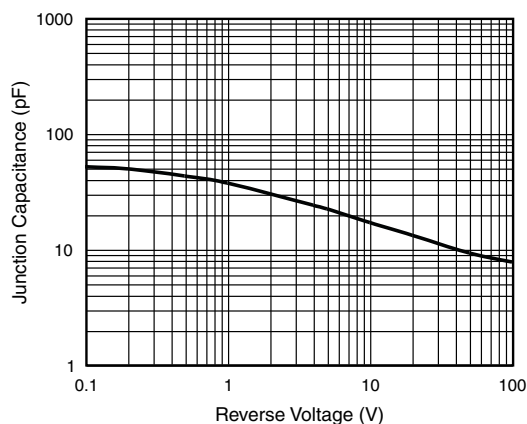


Fig. 5 - Typical Junction Capacitance

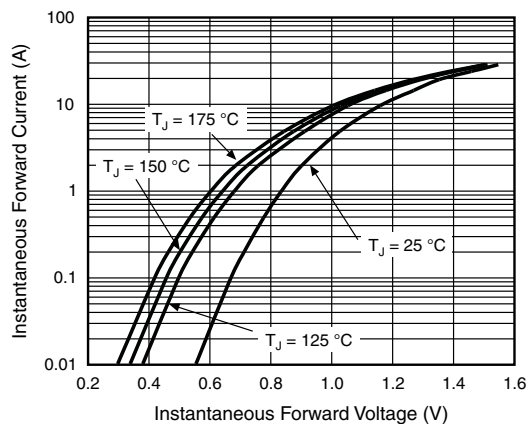
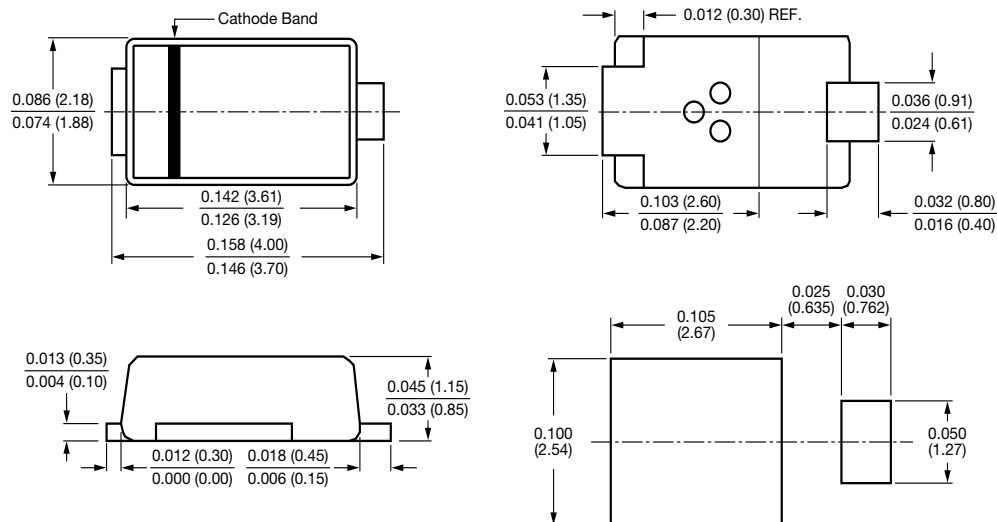


Fig. 3 - Typical Instantaneous Forward Characteristics



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-220AA (SMP)





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<u>ESH2PB-E3/84A</u>	<u>ESH2PB-E3/85A</u>	<u>ESH2PBHE3/84A</u>	<u>ESH2PBHE3/85A</u>	<u>ESH2PC-E3/84A</u>	<u>ESH2PC-E3/85A</u>
<u>ESH2PCHE3/84A</u>	<u>ESH2PCHE3/85A</u>	<u>ESH2PD-M3/84A</u>	<u>ESH2PD-E3/84A</u>	<u>ESH2PD-E3/85A</u>	<u>ESH2PDHE3/84A</u>
<u>ESH2PDHE3/85A</u>	<u>ESH2PDHM3/84A</u>	<u>ESH2PCHM3/84A</u>	<u>ESH2PC-M3/85A</u>	<u>ESH2PB-M3/84A</u>	<u>ESH2PCHM3/85A</u>
<u>ESH2PD-M3/85A</u>	<u>ESH2PBHM3/84A</u>	<u>ESH2PDHM3/85A</u>	<u>ESH2PBHM3/85A</u>	<u>ESH2PB-M3/85A</u>	<u>ESH2PC-M3/84A</u>