High Current Density Surface Mount Ultrafast Rectifiers

eSMP® Series



SMP (DO-220AA)

Cathode ○—▶|—○ Anode

FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT HALOGEN FREE

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Glass passivated pellet chip junction
- Ultrafast recovery times for high efficiency
- Low forward voltage, 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

LINKS TO ADDITIONAL RESOURCES

3D Models

TYPICAL APPLICATIONS

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.0 A
V_{RRM}	100 V, 150 V, 200 V
t_{rr}	15 ns
V_F at I_F	0.92 V
T_J max.	150 °C
Package	SMP (DO-220AA)
Circuit configuration	Single

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 the cathode end

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	ES1PB	ES1PC	ES1PD	UNIT
Device marking code		EB	EC	ED	
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}	30			A
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150			°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 = 0.6 A	T_J = 25 °C	V_F (1)	0.865	V
	I_F = 1 A			0.920	
Maximum reverse current at rated V_R		T_J = 25 °C	I_R (2)	5.0	µA
		T_J = 125 °C		500	
Maximum reverse recovery time	I_F = 0.5 A, I_R = 1 A, I_{rr} = 0.25 A		t_{rr}	15	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		30	
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}	8	nC
		T_J = 100 °C		10	
Typical junction capacitance	4.0 V, 1 MHz		C_J	10	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**	**ES1PB**	**ES1PC**	**ES1PD**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)	105			°C/W
	$R_{\theta JL}$ (1)	15			
	$R_{\theta JC}$ (1)	20			

Note
(1) Thermal resistance from junction to ambient and junction to lead mounted on PCB with 5.0 mm 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 center of the body

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
ES1PB-M3/84A	0.024	84A	3000	7" diameter plastic tape and reel
ES1PB-M3/85A	0.024	85A	10 000	13" diameter plastic tape and reel
ES1PBHM3/84A (1)	0.024	84A	3000	7" diameter plastic tape and reel
ES1PBHM3/85A (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)

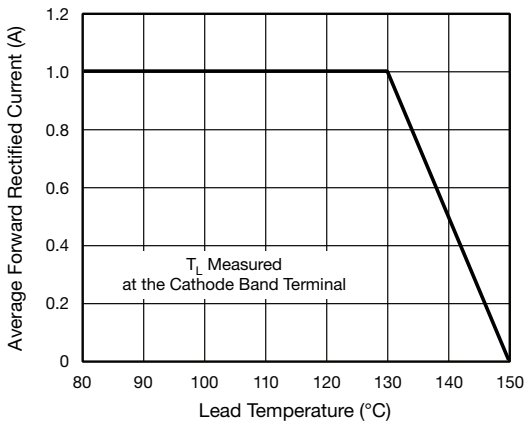


Fig. 1 - Maximum Forward Current Derating Curve

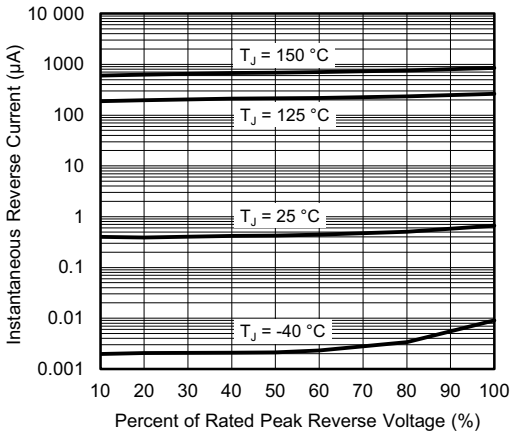


Fig. 4 - Typical Reverse Leakage Characteristics

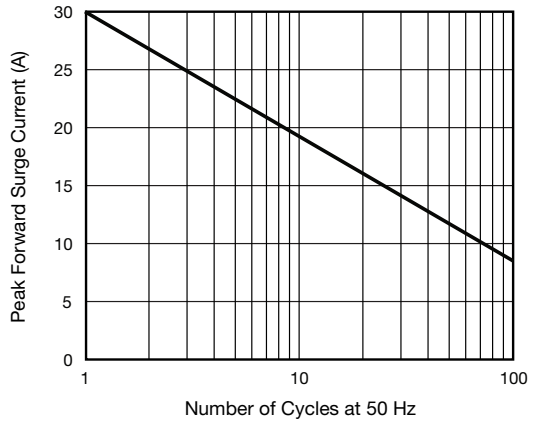


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

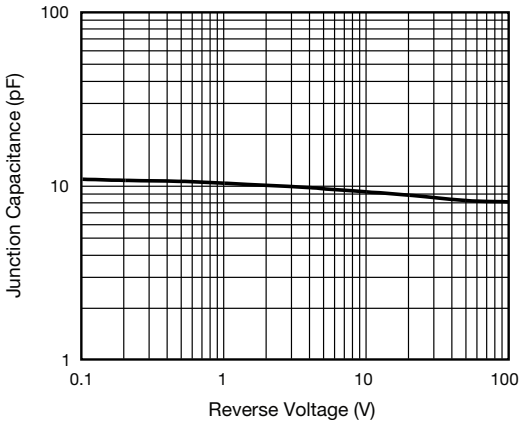


Fig. 5 - Typical Junction Capacitance

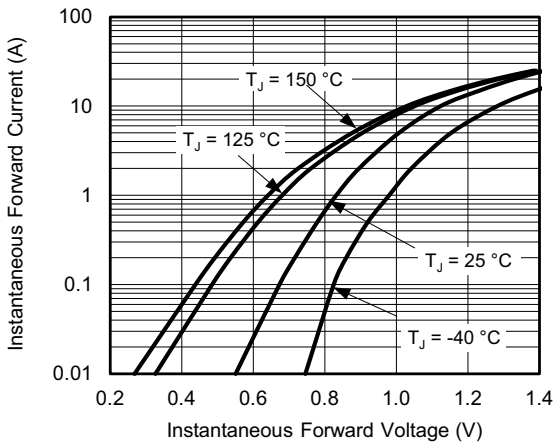


Fig. 3 - Typical Instantaneous Forward Characteristics

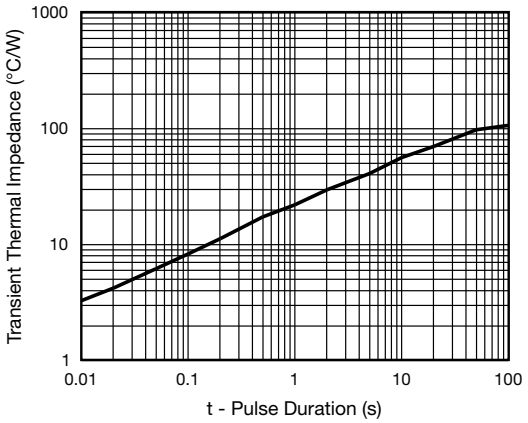


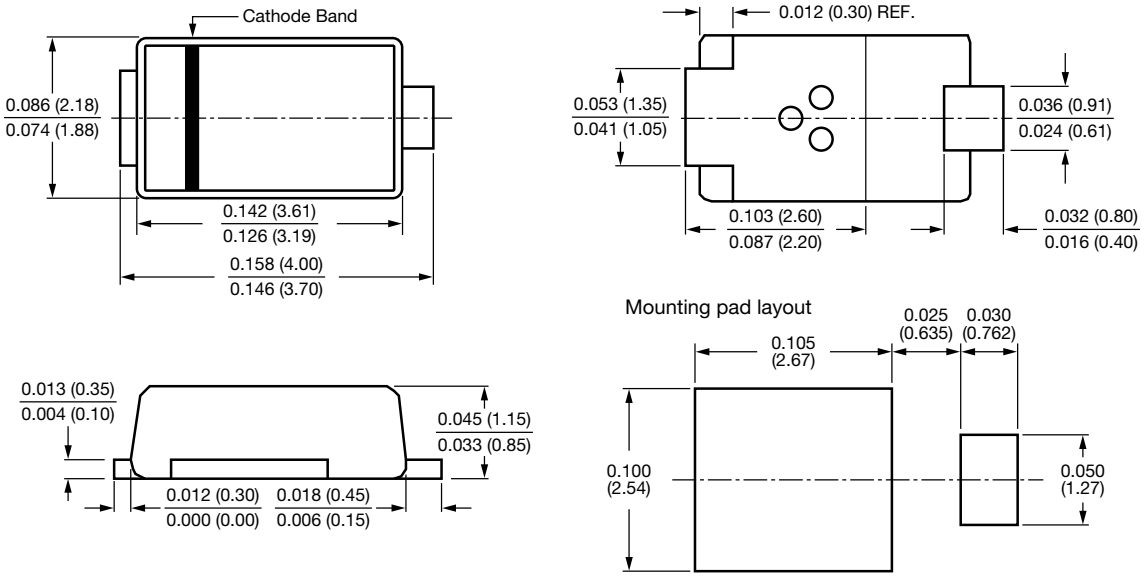
Fig. 6 - Typical Transient Thermal Impedance

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

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