High Current Density Surface Mount Ultrafast Rectifiers

eSMP™ Series

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, LF max peak of 260 °C
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

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 max.	175 °C

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.

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

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 °C unless otherwise noted)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Maximum instantaneous forward voltage (1)	at I_F = 0.7 A, T_j = 25 °C at I_F = 1 A, T_j = 25 °C	V_F	0.86 0.90	V
Maximum reverse current at rated V_R (1) voltage	T_j = 25 °C T_j = 125 °C	I_R	1.0 25	µA
Maximum reverse current	at V_R = 20 V, T_j = 150 °C	I_R	50	µA

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)				
PARAMETER	**TEST CONDITIONS**	**SYMBOL**	**VALUE**	**UNIT**
Maximum reverse recovery time	at I_F = 0.5 A, I_R = 1 A, I_{rr} = 0.25 A	t_{rr}	25	ns
Typical reverse recovery time	at I_F = 1.0 A, V_R = 30 V di/dt = 50 A/µs, I_{rr} = 10 % I_{RM} T_j = 25 °C at I_F = 1.0 A, V_R = 30 V di/dt = 50 A/µs, I_{rr} = 10 % I_{RM} T_j = 100 °C	t_{rr}	25 35	ns
Typical reverse recovery time	at I_F = 1.0 A, V_R = 30 V di/dt = 50 A/µs, I_{rr} = 10 % I_{RM} T_j = 25 °C at I_F = 1.0 A, V_R = 30 V di/dt = 50 A/µs, I_{rr} = 10 % I_{RM} T_j = 100 °C	Q_{rr}	10 15	nC
Typical junction capacitance	at 4.0 V, 1 MHz	C_J	25	pF

Note:

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

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)					
PARAMETER	**SYMBOL**	**ESH1PB**	**ESH1PC**	**ESH1PD**	**UNIT**
Typical thermal resistance (1)	$R_{\theta JA}$ $R_{\theta JL}$ $R_{\theta JC}$	105 15 20			°C/W

Note:

(1) Thermal resistance from junction to ambient and junction to lead mounted on P.C.B. with 5.0 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 centre of the body

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
ESH1PB-E3/84A	0.024	84A	3000	7" Diameter Plastic Tape & Reel
ESH1PB-E3/85A	0.024	85A	10000	13" Diameter Plastic Tape & Reel
ESH1PBHE3/84A (1)	0.024	84A	3000	7" Diameter Plastic Tape & Reel
ESH1PBHE3/85A (1)	0.024	85A	10000	13" Diameter Plastic Tape & Reel

Note:

(1) Automotive grade AEC Q101 qualified

RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

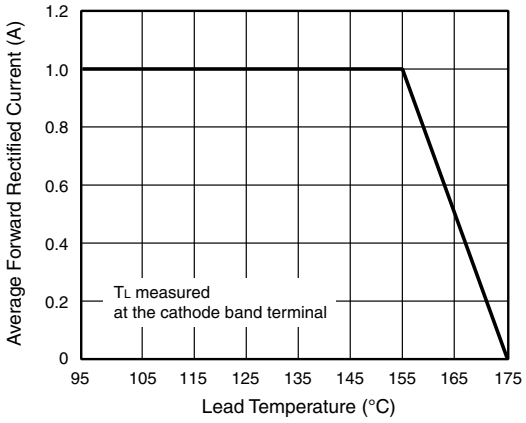

Figure 1. Forward Current Derating Curve

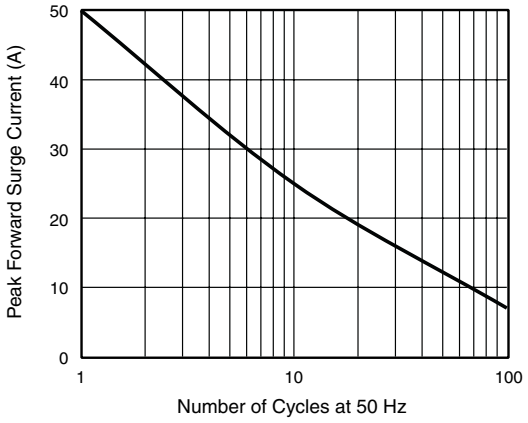

Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

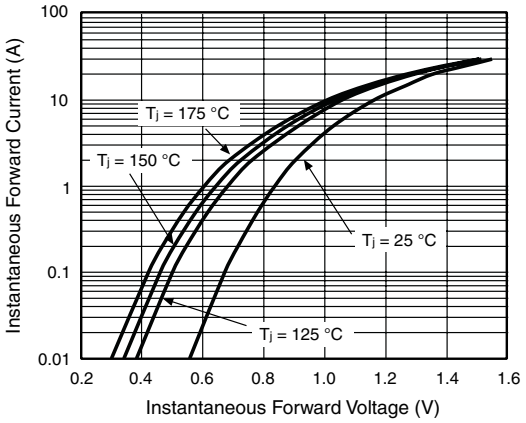

Figure 3. Typical Instantaneous Forward Characteristics

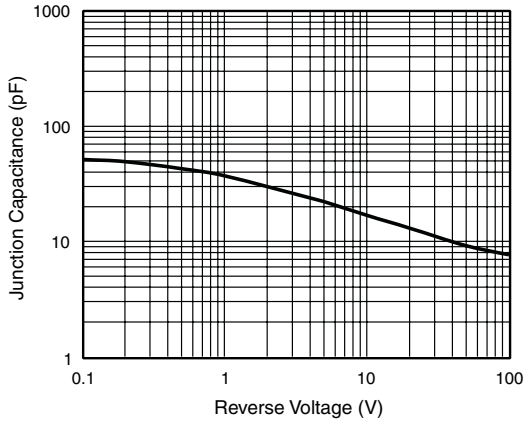

Figure 5. Typical Junction Capacitance

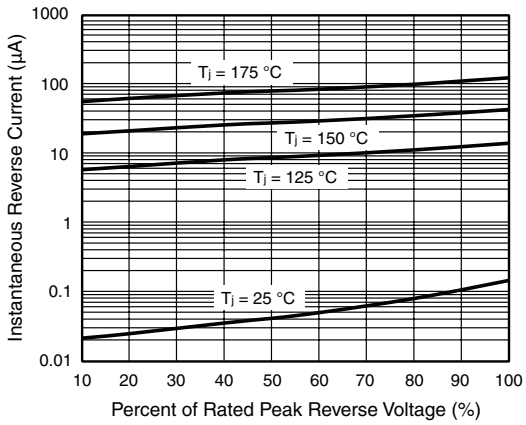

Figure 4. Typical Reverse Leakage Characteristics

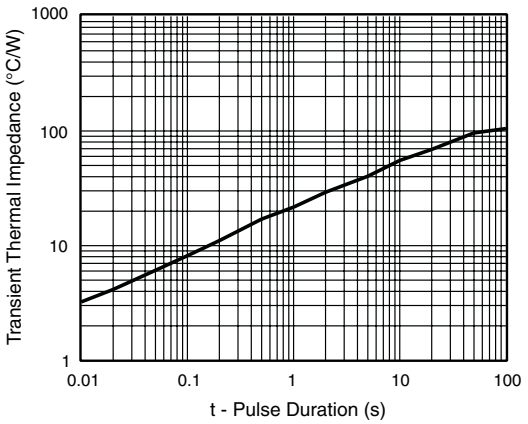

Figure 6. Typical Transient Thermal impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-220AA (SMP)