

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

$I_{F(AV)}$	2 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

TYPICAL APPLICATIONS

For use in secondary rectification and free-wheeling 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	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 ⁽¹⁾	at $I_F = 2$ A, $T_J = 25$ °C at $I_F = 2$ A, $T_J = 125$ °C	V_F	0.90 0.75	0.98 0.82	V
Maximum reverse current ⁽¹⁾	at rated V_R $T_J = 25$ °C $T_J = 125$ °C	I_R	0.2 12.6	1.0 25	μA
Maximum reverse recovery time	at $I_F = 0.5$ A, $I_R = 1$ A, $t_{rr} = 0.25$ A	t_{rr}	-	25	ns

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)					
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Typical reverse recovery time	at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = 50 A/ μs , $I_{rr} = 10\% I_{RM}$ $T_j = 25\text{ }^{\circ}\text{C}$ at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = 50 A/ μs , $I_{rr} = 10\% I_{RM}$ $T_j = 100\text{ }^{\circ}\text{C}$	t_{rr}	- -	25 35	ns
Typical stored charge	at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = 50 A/ μs , $I_{rr} = 10\% I_{RM}$ $T_j = 25\text{ }^{\circ}\text{C}$ at $I_F = 1.0\text{ A}$, $V_R = 30\text{ V}$ di/dt = 50 A/ μs , $I_{rr} = 10\% I_{RM}$ $T_j = 100\text{ }^{\circ}\text{C}$	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	ESH2PB	ESH2PC	ESH2PD	UNIT
Typical thermal resistance ⁽¹⁾	R _{θJA}	80			°C/W
	R _{θJL}	15			
	R _{θJC}	22			

Note:(1) Thermal resistance from junction to ambient and junction to lead mounted on P.C.B. with 6.0 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 centre of the body

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
ESH2PB-E3/84A	0.024	84A	3000	7" Diameter Plastic Tape & Reel
ESH2PB-E3/85A	0.024	85A	10000	13" Diameter Plastic Tape & Reel
ESH2PBHE3/84A ⁽¹⁾	0.024	84A	3000	7" Diameter Plastic Tape & Reel
ESH2PBHE3/85A ⁽¹⁾	0.024	85A	10000	13" Diameter Plastic Tape & Reel

Note:

(1) Automotive grade AEC Q101 qualified

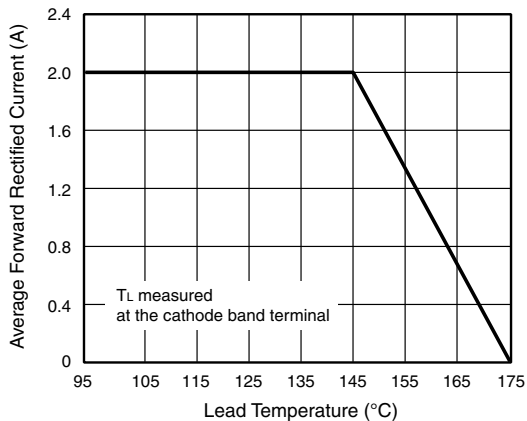
RATINGS AND CHARACTERISTICS CURVES($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Figure 1. Forward Current Derating Curve

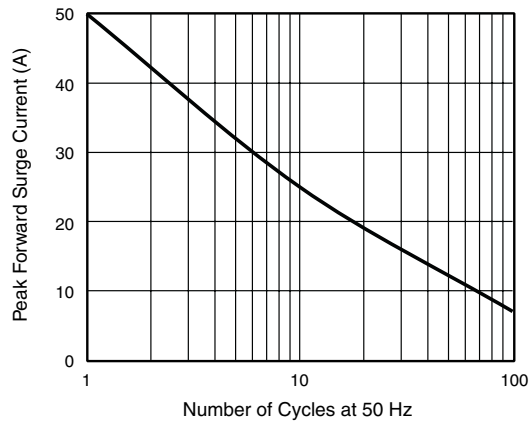


Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

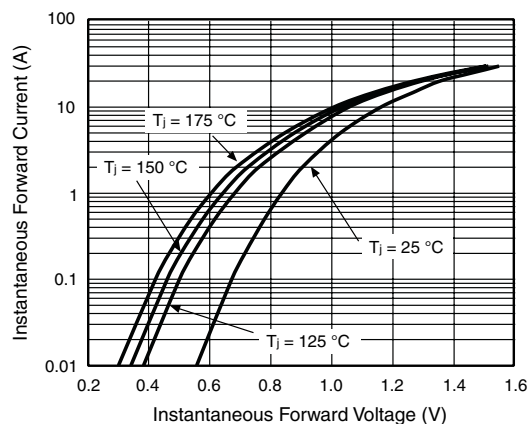


Figure 3. Typical Instantaneous Forward Characteristics

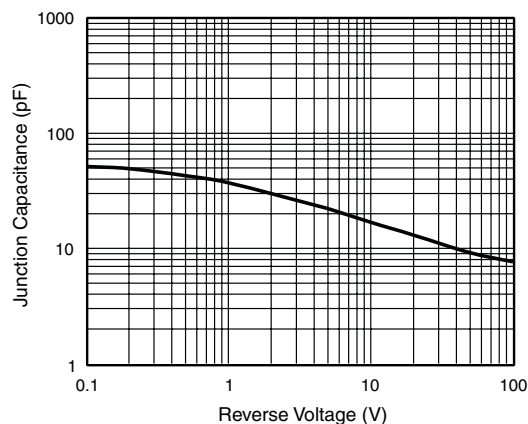


Figure 5. Typical Junction Capacitance

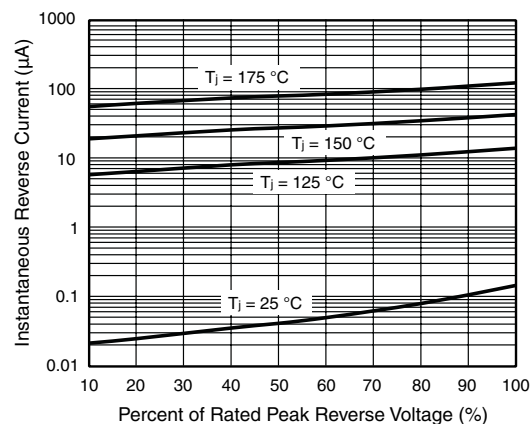
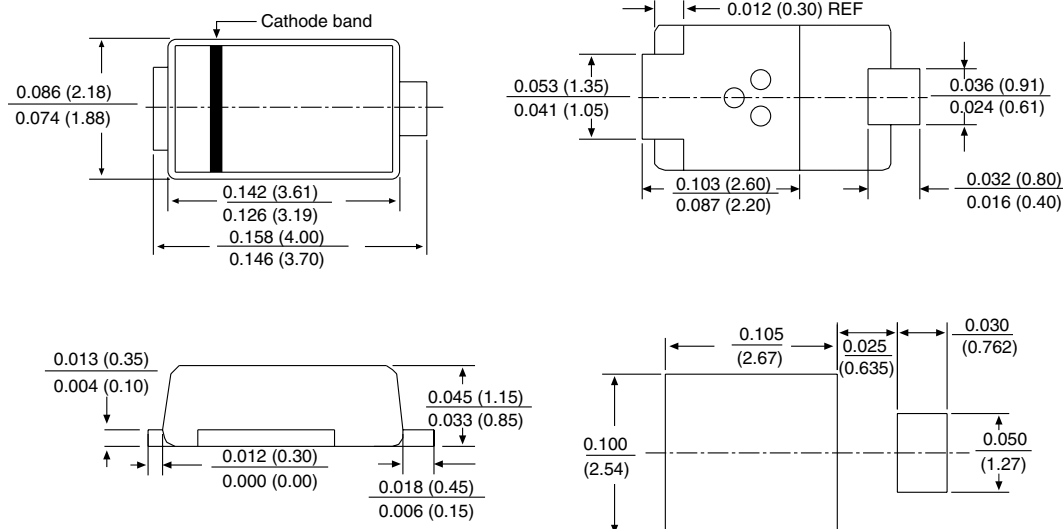


Figure 4. Typical Reverse Leakage Characteristics

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-220AA (SMP)





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