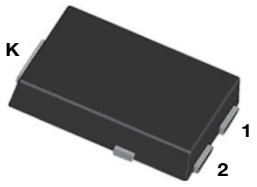
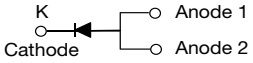
Fast Switching Avalanche Surface-Mount Rectifiers

eSMP® Series



SMPC (TO-277A)



ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	4.0 A
V_{RRM}	800 V, 1000 V
I_{FSM}	65 A
t_{rr}	120 ns
E_{AS}	20 mJ
V_F at I_F = 4.0 A	1.27 V
T_J max.	175 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT HALOGEN FREE

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Glass passivated pellet chip junction
- Fast reverse recovery time
- Controlled avalanche characteristics
- Low leakage current
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

For use in lighting, fast switching rectification of power supplies, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

MECHANICAL DATA

Case: SMPC (TO-277A)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
Base P/NHM3_X - halogen-free, RoHS-compliant and AEC-Q101 qualified
("_X" denotes revision code e.g. A, B,.....)

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

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

PARAMETER		SYMBOL	AR4PK	AR4PM	UNIT
Device marking code			AR4K	AR4M	
Maximum repetitive peak reverse voltage		V_{RRM}	800	1000	V
Maximum DC forward current (fig. 1)		I_F (1)	4.0		A
		I_F (2)	1.8		
Peak forward surge current 10 ms single half sine-wave superimposed on rated load		I_{FSM}	65		A
Non-repetitive avalanche energy at T_J = 25 °C	I_{AS} = 2.5 A max.	E_{AS}	20		mJ
	I_{AS} = 1.0 A typ.		30		
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +175		°C

Notes
(1) Mounted on 30 mm x 30 mm pad areas, 1 oz. FR4 PCB
(2) Free air, mounted on recommended pad area

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)						
PARAMETER	**TEST CONDITIONS**		**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Instantaneous forward voltage	I_F = 4.0 A	T_A = 25 °C	V_F (1)	1.66	1.9	V
		T_A = 125 °C		1.27	1.6	
Reverse current	Rated V_R	T_A = 25 °C	I_R (2)	0.42	10	μA
		T_A = 125 °C		96.3	500	
Maximum reverse recovery time	I_F = 0.5 A, I_R = 1.0 A, I_{rr} = 0.25 A		t_{rr}	79	120	ns
Typical junction capacitance per diode	Rated V_R = 4.0 V, 1 MHz		C_J	55	-	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**	**AR4PK**	**AR4PM**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)	85		°C/W
	$R_{\theta JM}$ (2)	5		

Notes

(1) Free air, mounted on recommended PCB 1 oz. pad are; thermal resistance $R_{\theta JA}$ - junction to ambient

(2) Units mounted on PCB with 30 mm x 30 mm copper pad areas; $R_{\theta JM}$ - junction to mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
AR4PM-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
AR4PM-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
AR4PMHM3_A/H (1)	0.10	H	1500	7" diameter plastic tape and reel
AR4PMHM3_A/I (1)	0.10	I	6500	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

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

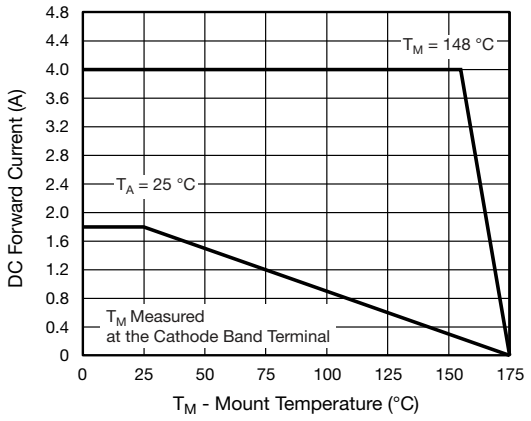

Fig. 1 - Maximum DC Forward Current Derating Curve

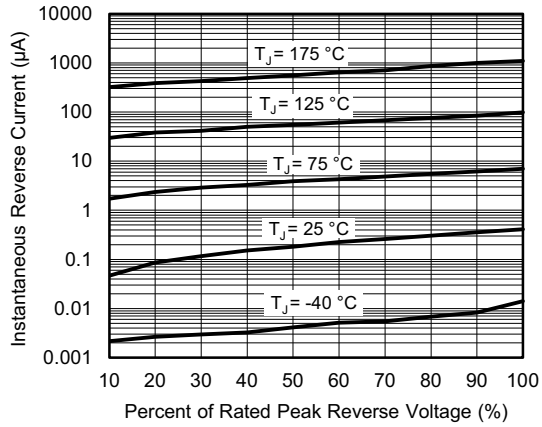

Fig. 4 - Typical Reverse Leakage Characteristics

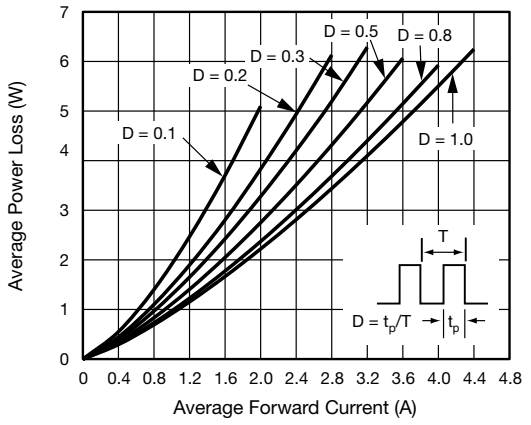

Fig. 2 - Average Power Loss Characteristics

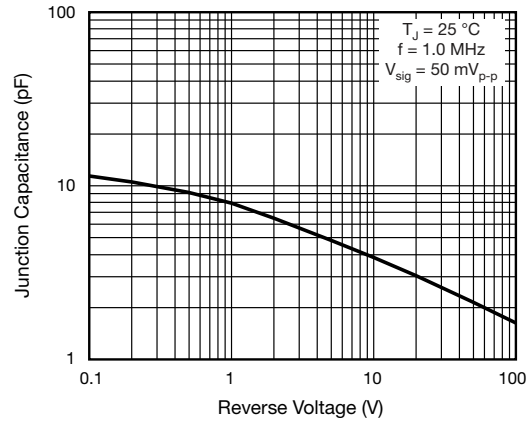

Fig. 5 - Typical Junction Capacitance

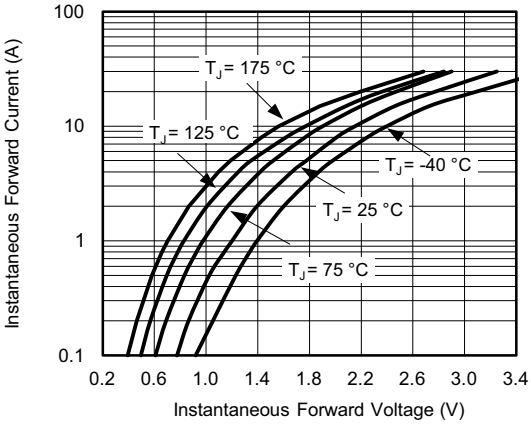

Fig. 3 - Typical Instantaneous Forward Characteristics

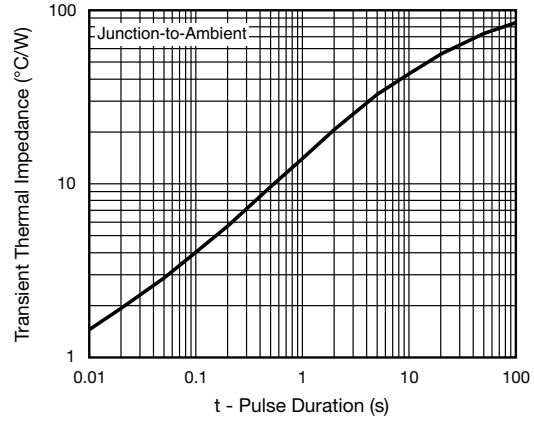

Fig. 6 - Typical Transient Thermal Impedance

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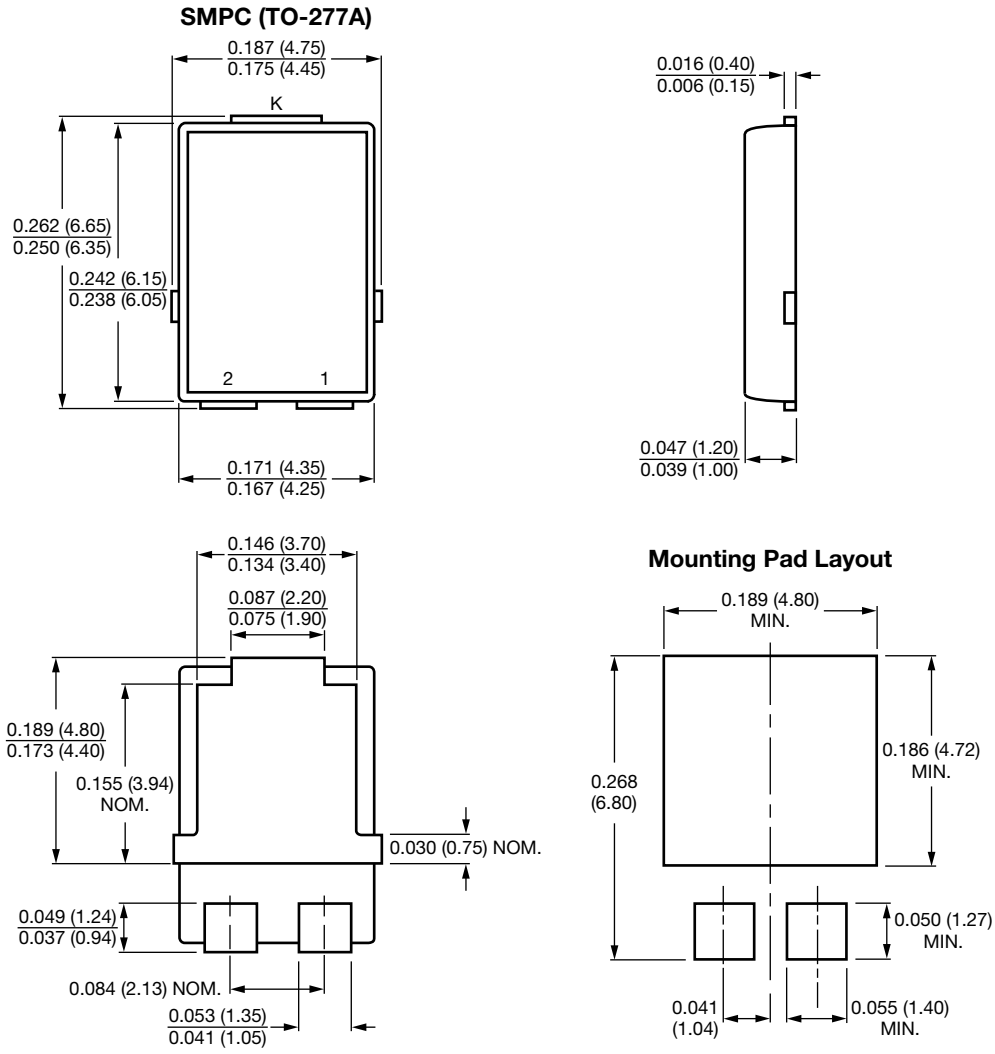
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A

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