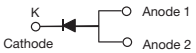
AR3PD, AR3PG, AR3PJ

Vishay General Semiconductor

Fast Switching Avalanche Surface Mount Rectifiers

eSMP® Series

TO-277A (SMPC)



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	3.0 A
V_{RRM}	200 V, 400 V, 600 V
I_{FSM}	50 A
t_{rr}	140 ns
E_{AS}	20 mJ
V_F at I_F = 3.0 A	1.04 V
T_J max.	175 °C

TYPICAL APPLICATIONS

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

FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Glass passivated 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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

MECHANICAL DATA

Case: TO-277A (SMPC)
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 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

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

PARAMETER	SYMBOL	AR3PD	AR3PG	AR3PJ	UNIT
Device marking code		AR3D	AR3G	AR3J	
Maximum repetitive peak reverse voltage	V_{RRM}	200	400	600	V
Maximum DC forward current (fig. 1)	I_F (1)	3.0			A
	I_F (2)	1.8			
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	50			A
Non-repetitive avalanche energy at T_J = 25 °C, I_{AS} = 2.5 A max.	E_{AS}	20			mJ
Non-repetitive avalanche energy at T_J = 25 °C, 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 14 mm x 14 mm pad areas, 1 oz. FR4 PCB
(2) Free air, mounted on recommended pad area

For technical questions within your region, please contact one of the following:
DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

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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 = 3.0 A	T_A = 25 °C	V_F (1)	1.24	1.6	V
		T_A = 125 °C		1.04	1.20	
Reverse current	Rated V_R	T_A = 25 °C	I_R (2)	0.33	10	µA
		T_A = 125 °C		44	250	
Maximum reverse recovery time	I_F = 0.5 A, I_R = 1.0 A, I_{rr} = 0.25 A		t_{rr}	122	140	ns
Typical junction capacitance per diode	Rated V_R = 4.0 V, 1 MHz		C_J	44	-	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**	**AR3PD**	**AR3PG**	**AR3PJ**	**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 14 mm x 14 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**
AR3PJ-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
AR3PJ-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
AR3PJHM3/86A (1)	0.10	86A	1500	7" diameter plastic tape and reel
AR3PJHM3/86A (1)	0.10	87A	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)

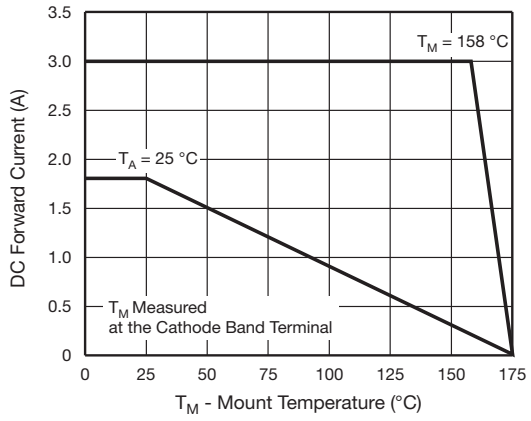

Fig. 1 - Maximum Forward Current Derating Curve

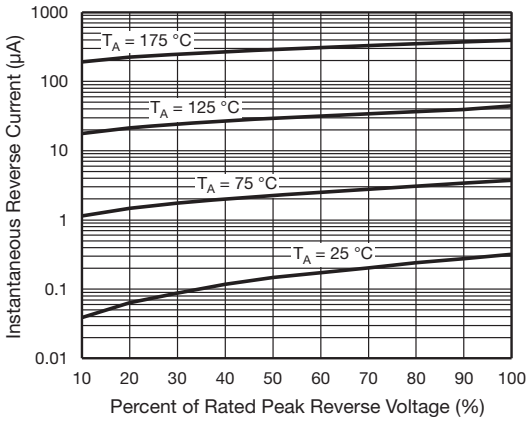

Fig. 4 - Typical Reverse Leakage Characteristics

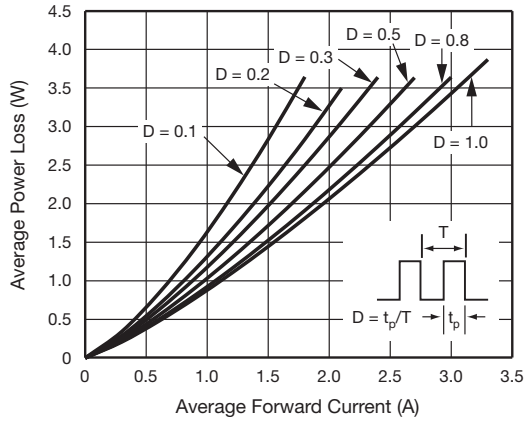

Fig. 2 - Average Power Loss Characteristics

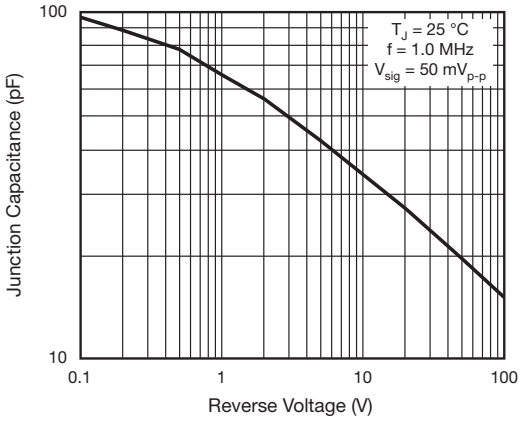

Fig. 5 - Typical Junction Capacitance

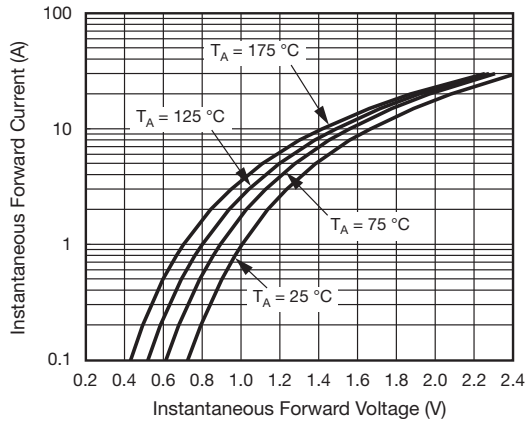

Fig. 3 - Typical Instantaneous Forward Characteristics

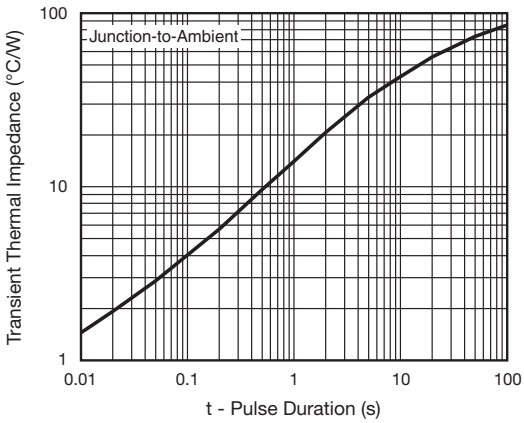

Fig. 6 - Typical Transient Thermal Impedance

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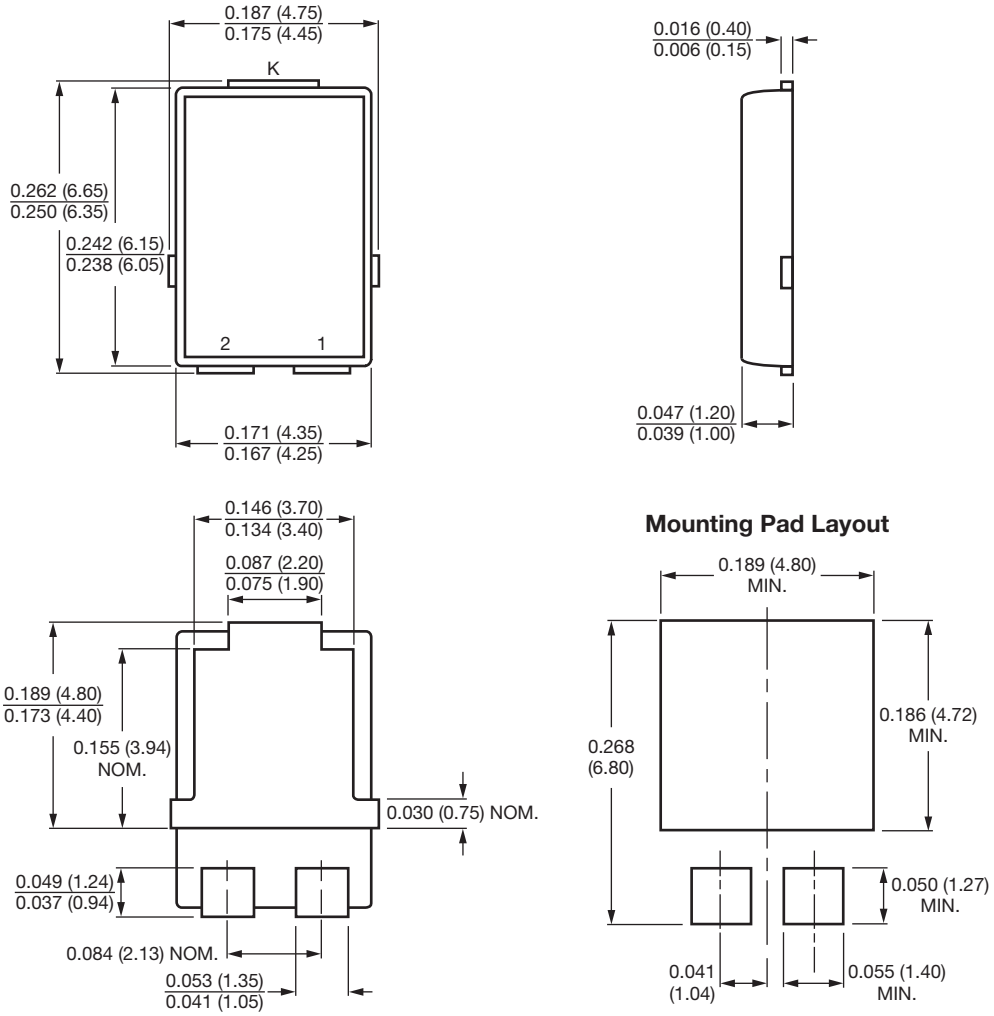
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-277A (SMPC)



Mounting Pad Layout

Conform to JEDEC TO-277A

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