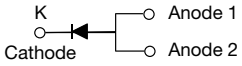
High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low V_F = 0.51 V at I_F = 5 A

eSMP® Series

SMPC (TO-277A)



FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- 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

AUTOMOTIVE GRADE Available

RoHS COMPLIANT
HALOGEN FREE

ADDITIONAL RESOURCES

3D Models

TYPICAL APPLICATIONS

For use in low voltage high frequency inverters, freewheeling, DC/DC converters and polarity protection applications.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	10 A
V_{RRM}	120 V
I_{FSM}	160 A
E_{AS}	100 mJ
V_F at I_F = 10 A	0.62 V
T_J max.	150 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

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 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

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

PARAMETER	SYMBOL	V10P12	UNIT
Device marking code		V1012	
Maximum repetitive peak reverse voltage	V_{RRM}	120	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	10	A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	160	A
Non-repetitive avalanche energy at I_{AS} = 2.0 A, T_J = 25 °C	E_{AS}	100	mJ
Peak repetitive reverse current at t_p = 2 μs, 1 kHz, T_J = 38 °C ± 2 °C	I_{RRM}	0.5	A
Operating junction and storage temperature range	T_J, T_{STG}	-40 to +150	°C

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)						
PARAMETER	**TEST CONDITIONS**		**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 1.0 mA	T_A = 25 °C	V_{BR}	120 (minimum)	-	V
Instantaneous forward voltage	I_F = 5 A	T_A = 25 °C	V_F (1)	0.57	-	V
	I_F = 10 A			0.74	0.82	
	I_F = 5 A	T_A = 125 °C		0.51	-	
	I_F = 10 A			0.62	0.70	
Reverse current	V_R = 90 V	T_A = 25 °C	I_R (2)	6	-	µA
		T_A = 125 °C		4.5	-	mA
	V_R = 120 V	T_A = 25 °C		16	400	µA
		T_A = 125 °C		8.5	30	mA

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**	**V10P12**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)	60	°C/W
	$R_{\theta JL}$	4	

Note

(1) Units mounted on recommended PCB 1 oz. pad layout

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
V10P12-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
V10P12-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
V10P12HM3_A/H (1)	0.10	H	1500	7" diameter plastic tape and reel
V10P12HM3_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)

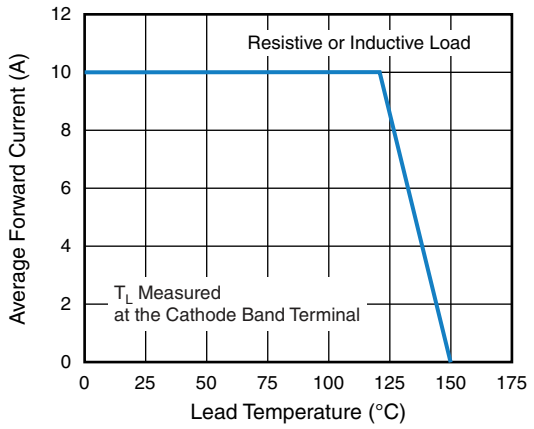

Fig. 1 - Maximum Forward Current Derating Curve

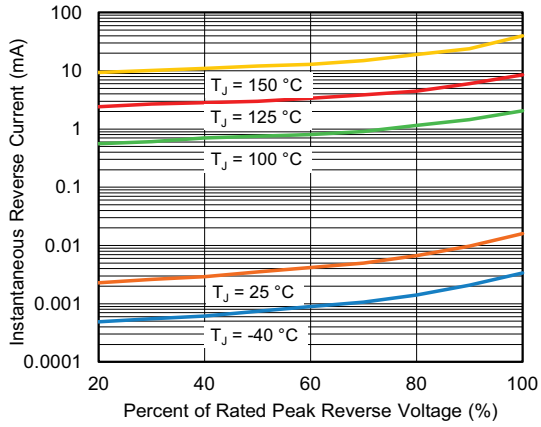

Fig. 4 - Typical Reverse Characteristics

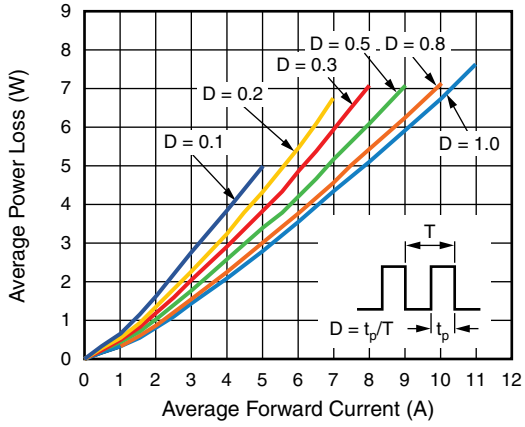

Fig. 2 - Forward Power Loss Characteristics

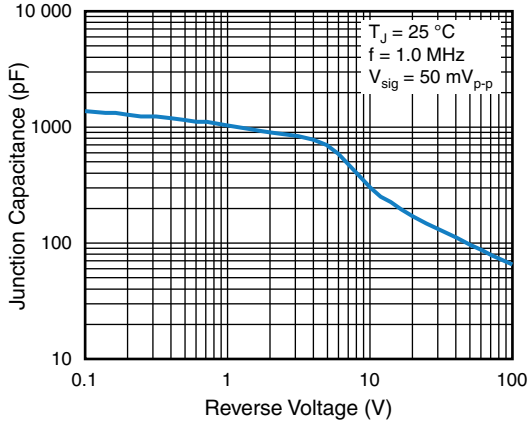

Fig. 5 - Typical Junction Capacitance

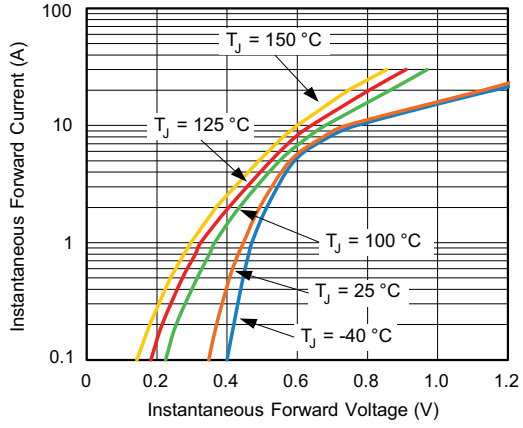

Fig. 3 - Typical Instantaneous Forward Characteristics

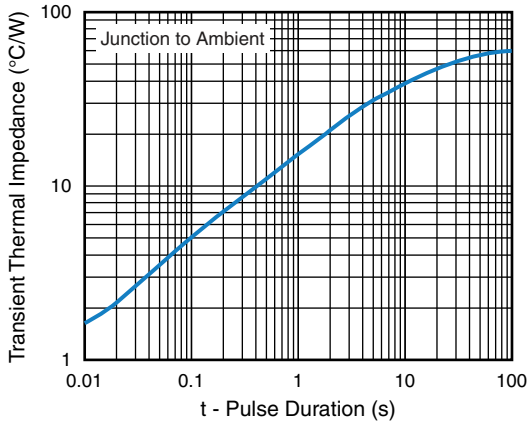

Fig. 6 - Typical Transient Thermal Impedance

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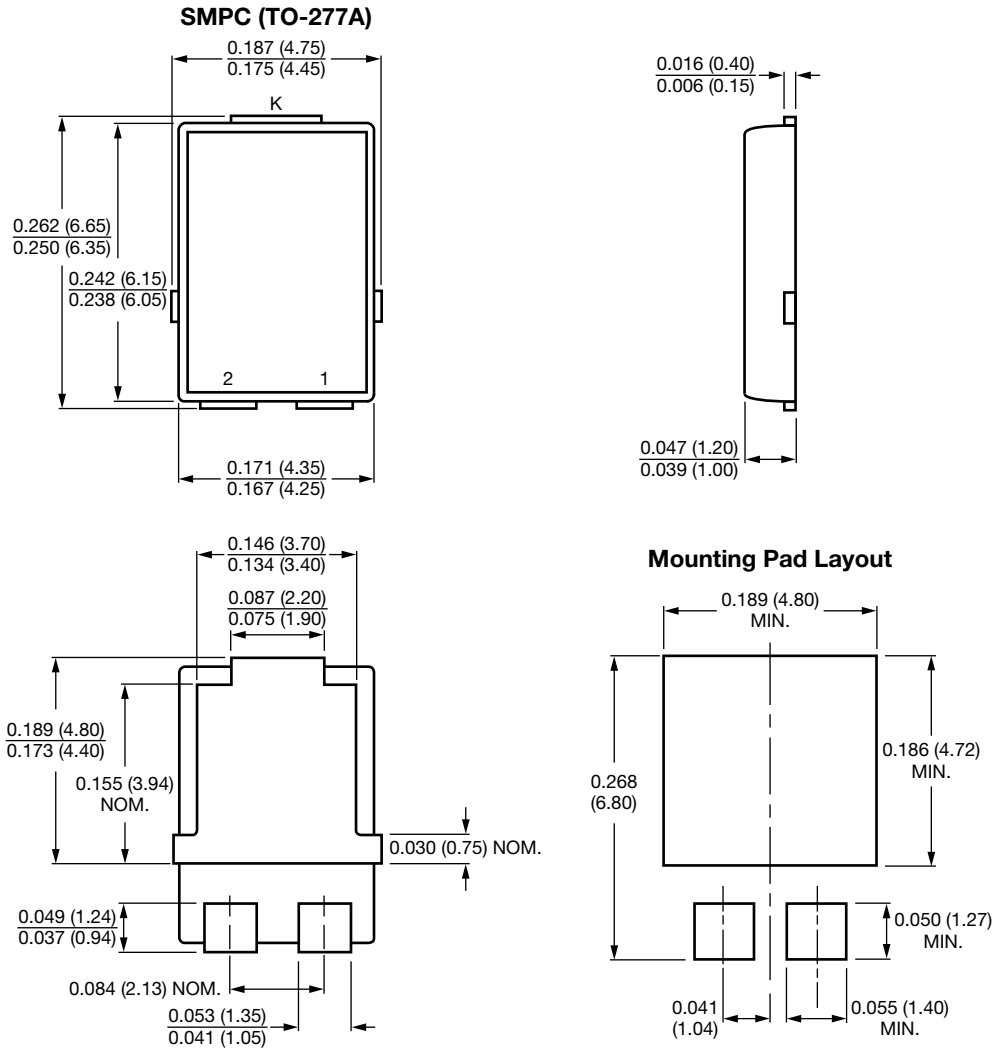
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A

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