

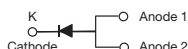
# High Current Density Surface Mount Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.51$  V at  $I_F = 6$  A

TMBS® eSMP® Series



TO-277A (SMPC)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## 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
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

## TYPICAL APPLICATIONS

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

## 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

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	12 A
$V_{RRM}$	120 V
$I_{FSM}$	150 A
$E_{AS}$	100 mJ
$V_F$ at $I_F = 12$ A	0.63 V
$T_J$ max.	150 °C

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

PARAMETER	SYMBOL	V12P12	UNIT
Device marking code		V1212	
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	12	A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	150	A
Non-repetitive avalanche energy at $I_{AS} = 2.0$ A, $L = 50$ mH, $T_J = 25$ °C	$E_{AS}$	100	mJ
Peak repetitive reverse current at $t_p = 2$ $\mu$ s, 1 kHz, $T_J = 38$ °C $\pm$ 2 °C	$I_{RRM}$	0.5	A
Operating junction and storage temperature range	$T_J, T_{STG}$	- 40 to + 150	°C

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Breakdown voltage	I <sub>R</sub> = 1.0 mA	T <sub>A</sub> = 25 °C	V <sub>BR</sub>	120 (minimum)	-	V
Instantaneous forward voltage	I <sub>F</sub> = 6 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.57	-	V
	I <sub>F</sub> = 12 A			0.72	0.80	
	I <sub>F</sub> = 6 A	T <sub>A</sub> = 125 °C		0.51	-	
	I <sub>F</sub> = 12 A			0.63	0.70	
Reverse current	V <sub>R</sub> = 90 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	13	-	μA
		T <sub>A</sub> = 125 °C		7	-	mA
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C		50	500	μA
		T <sub>A</sub> = 125 °C		16	50	mA

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ **THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	SYMBOL	V12P12	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	60	$^{\circ}\text{C/W}$
	$R_{\theta JL}$	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
V12P12-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
V12P12-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
V12P12HM3/86A <sup>(1)</sup>	0.10	86A	1500	7" diameter plastic tape and reel
V12P12HM3/87A <sup>(1)</sup>	0.10	87A	6500	13" diameter plastic tape and reel

**Note**

(1) Automotive grade

## RATINGS AND CHARACTERISTICS CURVES

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

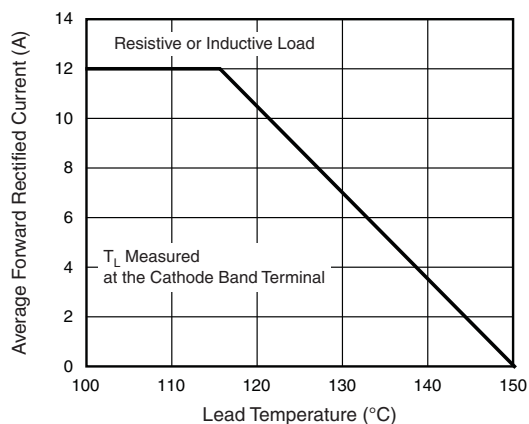


Fig. 1 - Maximum Forward Current Derating Curve

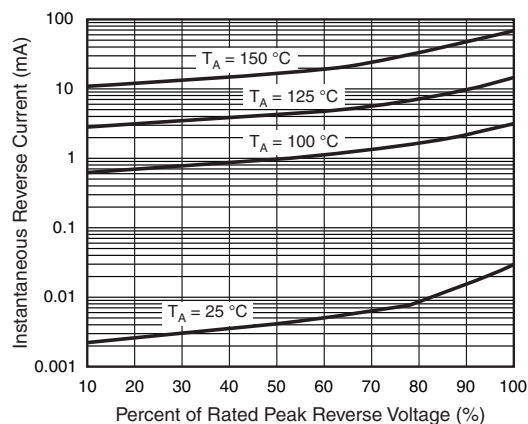


Fig. 4 - Typical Reverse Characteristics

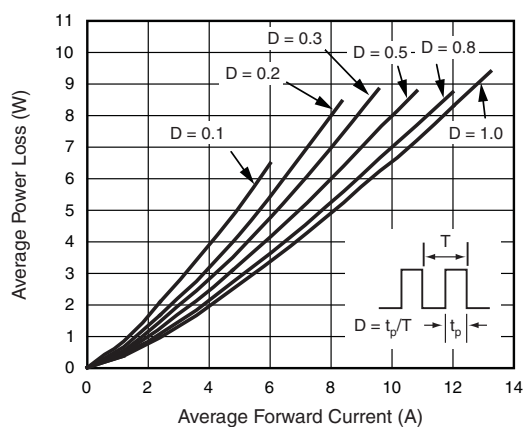


Fig. 2 - Forward Power Loss Characteristics

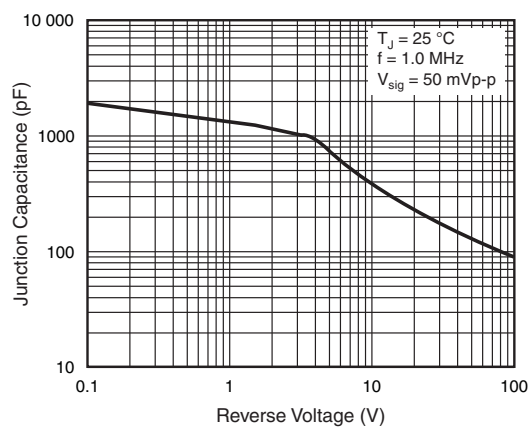


Fig. 5 - Typical Junction Capacitance

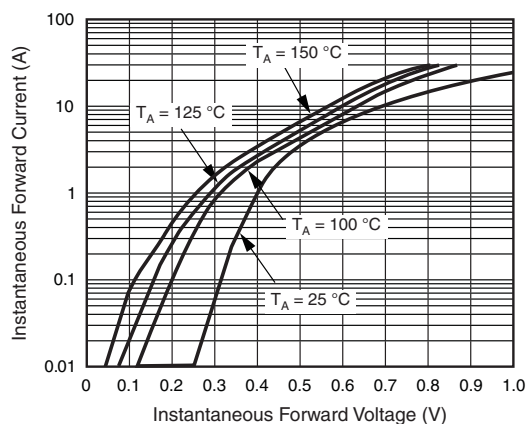


Fig. 3 - Typical Instantaneous Forward Characteristics

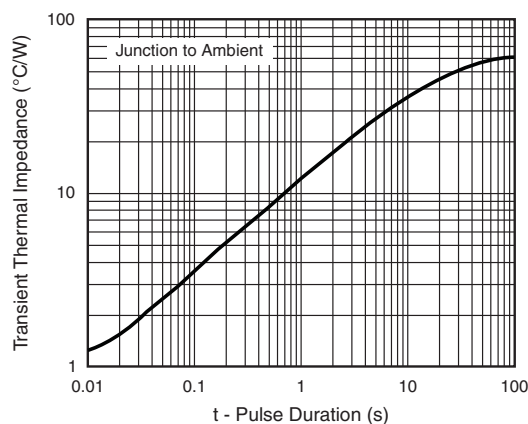
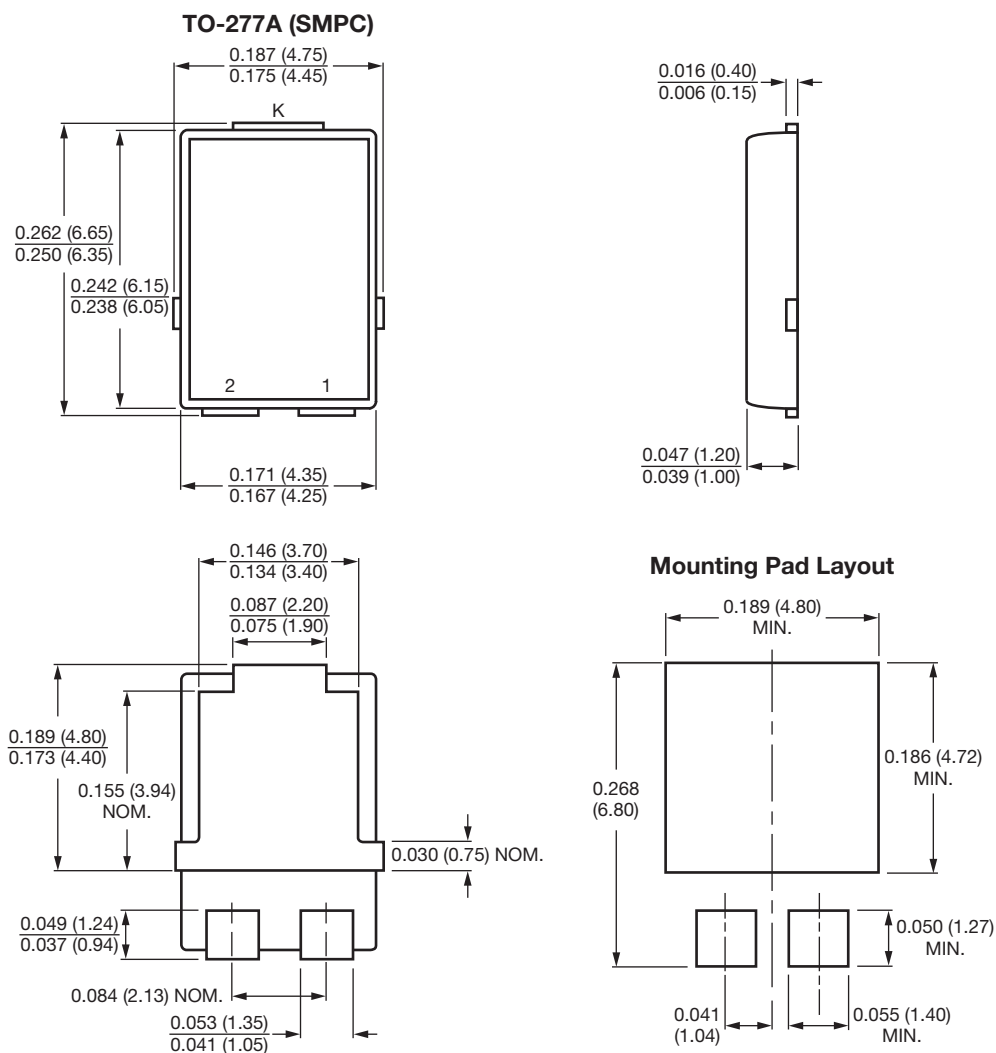


Fig. 6 - Typical Transient Thermal Impedance

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)




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