

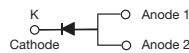
# High Current Density Surface Mount Trench MOS Barrier Schottky Rectifier

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

## TMBS® eSMP® Series



TO-277A (SMPC)



AUTOMOTIVE  
GRADE  
Available



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 available  
- Automotive ordering code; base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### 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 AEC-Q101 qualified

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

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
Package	TO-277A (SMPC)
Diode variations	Single die

### TYPICAL APPLICATIONS

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

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	$I_R = 1.0\text{ mA}$	$T_A = 25\text{ }^\circ\text{C}$	$V_{BR}$	120 (minimum)	-	V
Instantaneous forward voltage	$I_F = 6\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.57	-	V
	$I_F = 12\text{ A}$			0.72	0.80	
	$I_F = 6\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.51	-	
	$I_F = 12\text{ A}$			0.63	0.70	
Reverse current	$V_R = 90\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	13	-	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		7	-	mA
	$V_R = 120\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$		50	500	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		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
V12P12HM3_A/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
V12P12HM3_A/I <sup>(1)</sup>	0.10	I	6500	13" diameter plastic tape and reel

**Note**

- (1) AEC-Q101 qualified

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

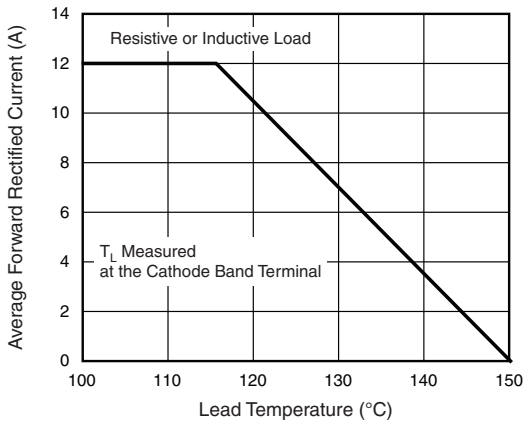


Fig. 1 - Maximum Forward Current Derating Curve

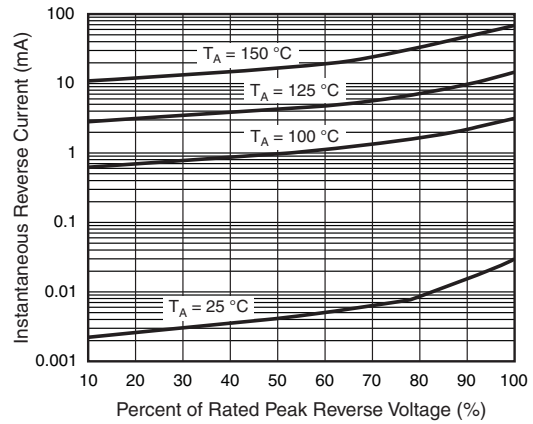


Fig. 4 - Typical Reverse Characteristics

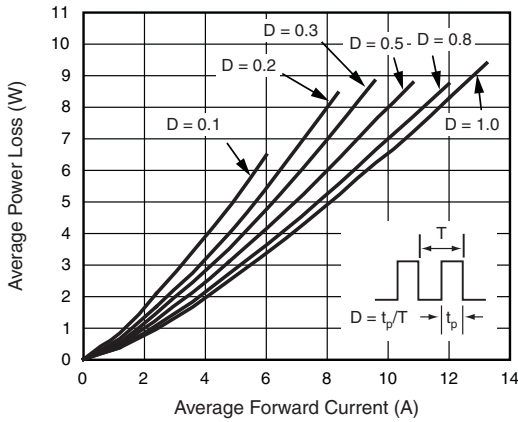


Fig. 2 - Forward Power Loss Characteristics

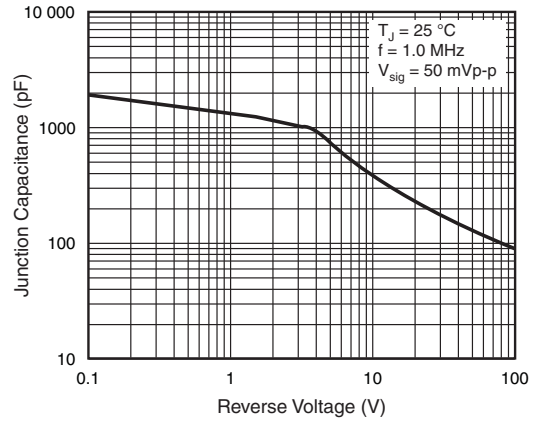


Fig. 5 - Typical Junction Capacitance

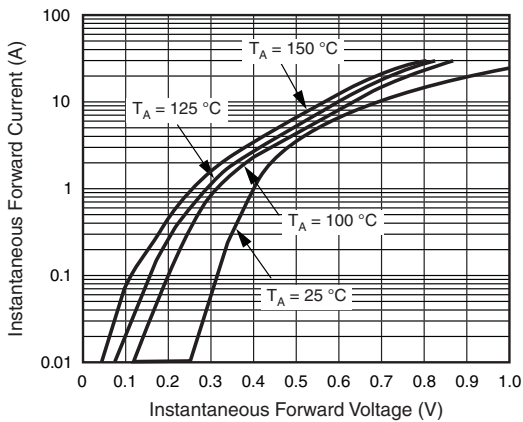


Fig. 3 - Typical Instantaneous Forward Characteristics

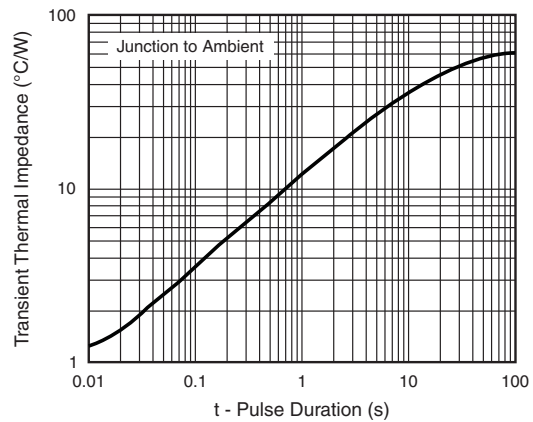
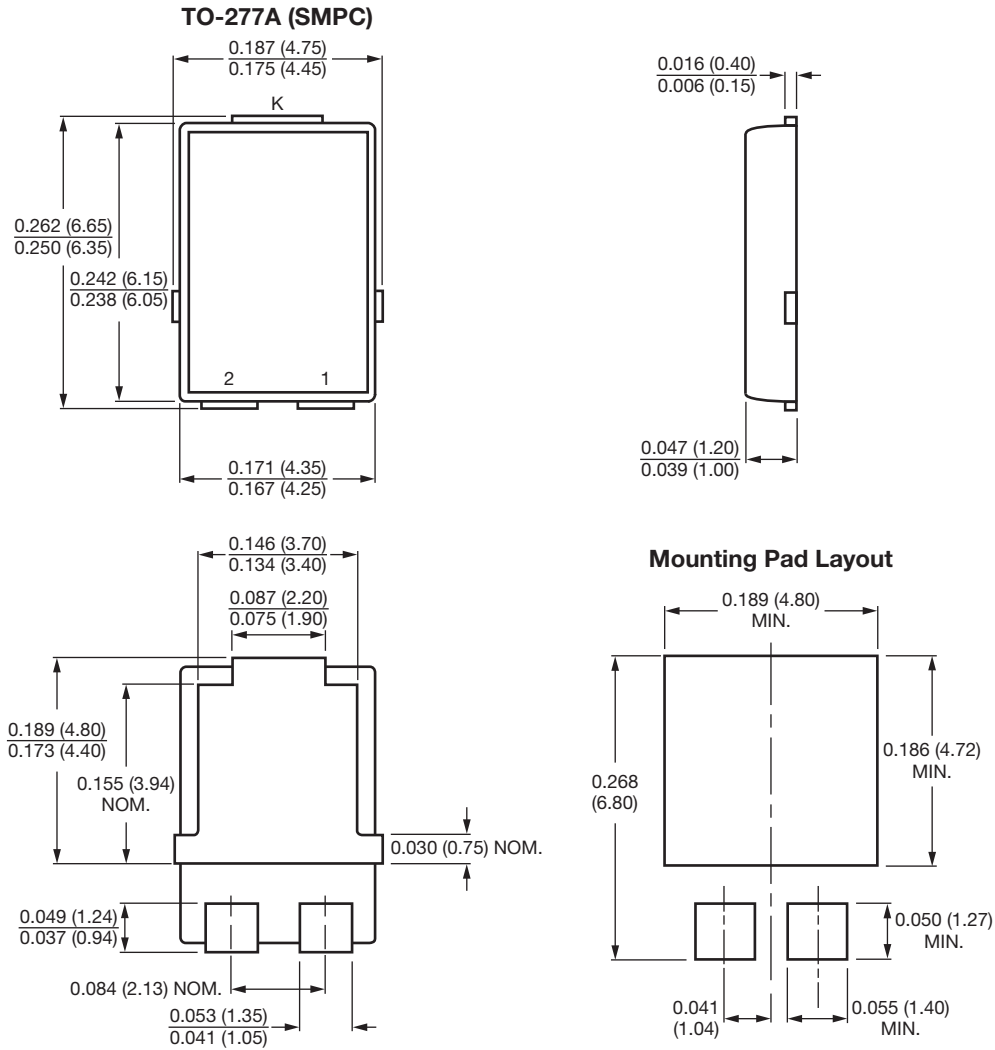


Fig. 6 - Typical Transient Thermal Impedance

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





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