

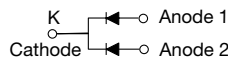
# High Current Density Surface-Mount TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.58$  V at  $I_F = 1$  A

## eSMP<sup>®</sup> Series



### SMPC (TO-277A)



**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
- 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)

## TYPICAL APPLICATIONS

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

## 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 and HM3 suffix meets JESD 201 class 2 whisker test

## ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 2.0 A
$V_{RRM}$	200 V
$I_{FSM}$	60 A
$V_F$ at $I_F = 2$ A	0.65 V
$T_J$ max.	175 °C
Package	SMPC (TO-277A)
Circuit configuration	Common cathode

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	V4P22C	UNIT
Device marking code		V422C	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	V
Maximum average forward rectified current per device (fig. 1)	$I_{F(AV)}$ <sup>(1)</sup>	4.0	A
	$I_{F(AV)}$ <sup>(2)</sup>	2.8	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	$I_{FSM}$	60	A
Operating junction temperature range	$T_J$ <sup>(3)</sup>	-40 to +175	°C
Storage temperature range	$T_{STG}$	-55 to +175	°C

## Notes

(1) Mounted on 30 mm x 30 mm pad areas aluminum PCB

(2) Free air, mounted on recommended pad area

(3) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	$I_F = 1\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.74	-	V
	$I_F = 2\text{ A}$			0.79	0.87	
	$I_F = 1\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.58	-	
	$I_F = 2\text{ A}$			0.65	0.73	
Reverse current per diode	$V_R = 160\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	0.001	-	mA
		$T_A = 125\text{ }^\circ\text{C}$		0.3	-	
	$V_R = 200\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$		-	0.05	
		$T_A = 125\text{ }^\circ\text{C}$		0.7	3	
Typical junction capacitance per diode	4.0 V, 1 MHz		$C_J$	125	-	pF

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
(2) Pulse test: pulse width  $\leq 40\text{ ms}$

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified)			
PARAMETER	SYMBOL	V4P22C	UNIT
Typical thermal resistance per device	$R_{\theta JA}^{(1)(2)}$	85	$^\circ\text{C/W}$
	$R_{\theta JM}^{(3)}$	5	

**Notes**

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$   
(2) Free air, mounted on recommended copper pad area, 2 oz., FR4 PCB, thermal resistance  $R_{\theta JA}$  - junction-to-ambient  
(3) Units mounted on 30 mm x 30 mm aluminum PCB, thermal resistance  $R_{\theta JM}$  - junction-to-mount

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V4P22C-M3/H	0.10	H	1500	7" diameter plastic tape and reel
V4P22C-M3/I	0.10	I	6500	13" diameter plastic tape and reel
V4P22CHM3_A/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
V4P22CHM3_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)

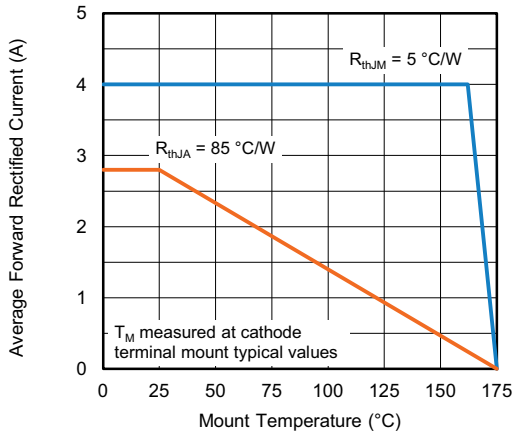


Fig. 1 - Maximum Forward Current Derating Curve

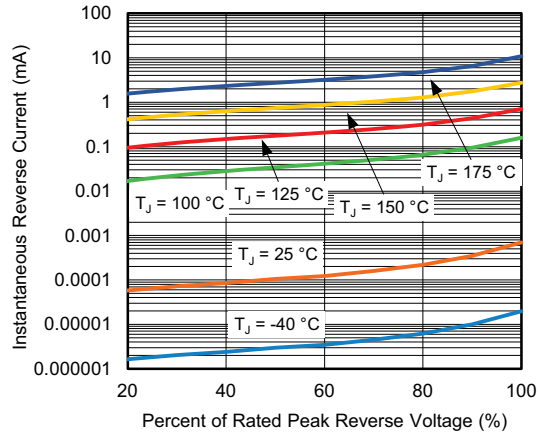


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

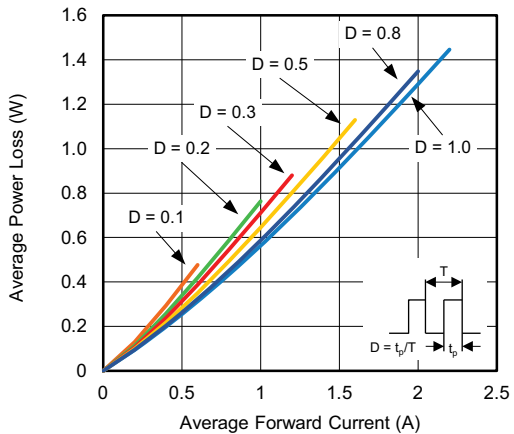


Fig. 2 - Forward Power Loss Characteristics Per Diode

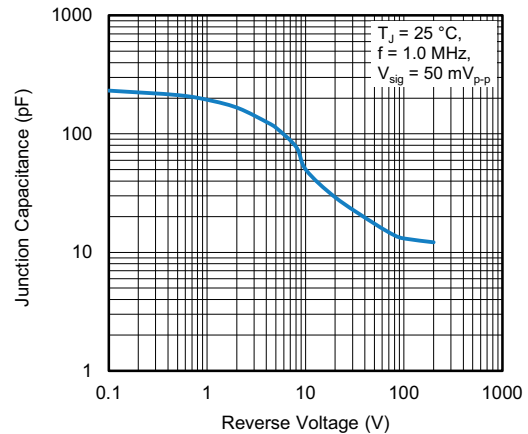


Fig. 5 - Typical Junction Capacitance Per Diode

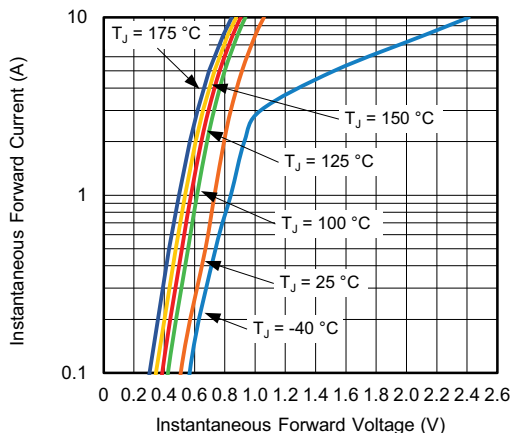


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

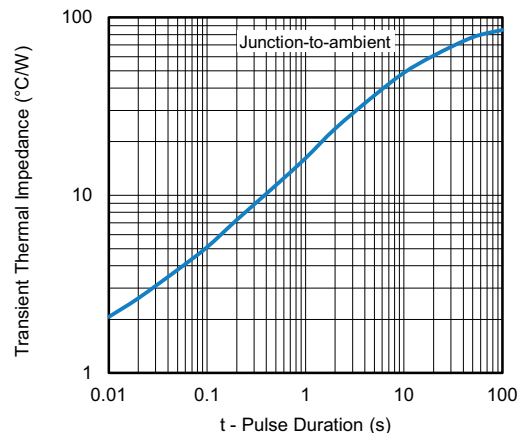
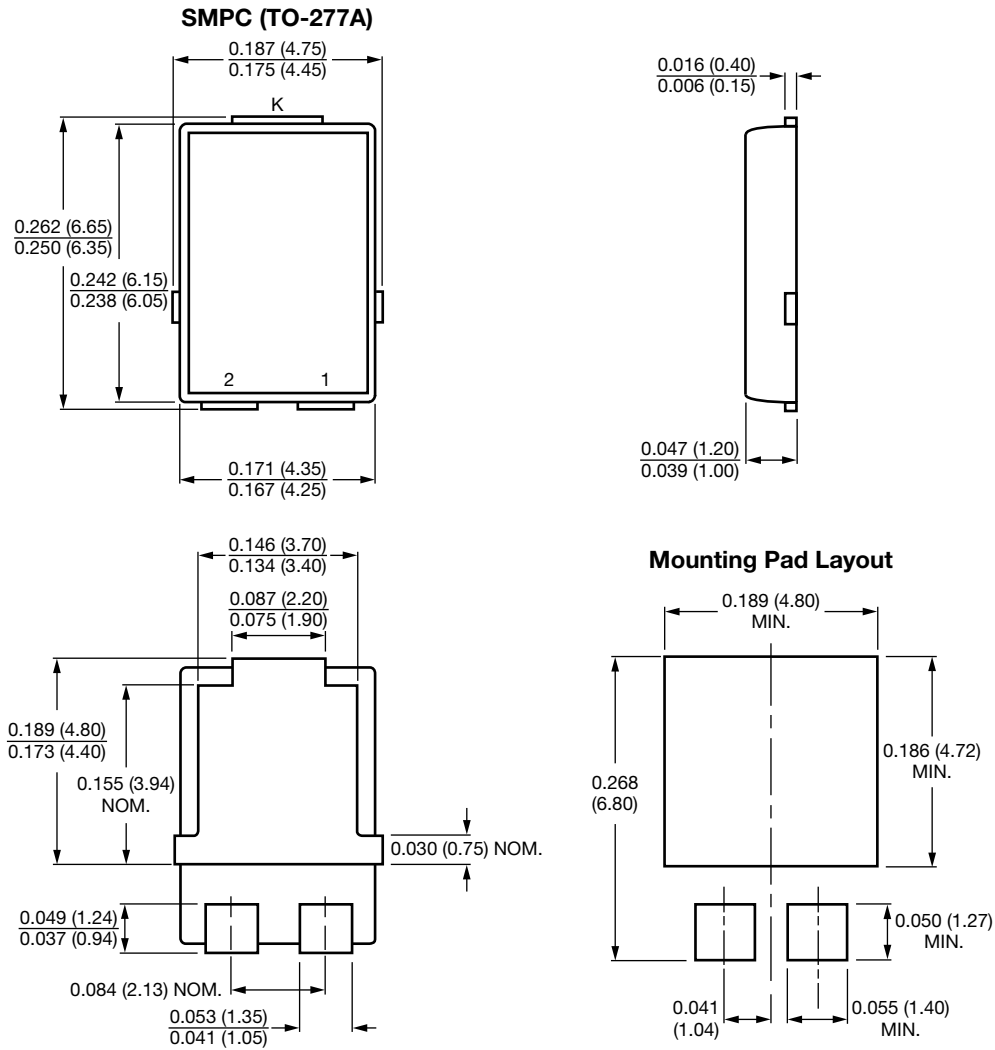


Fig. 6 - Typical Transient Thermal Impedance

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



Conform to JEDEC® TO-277A



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