

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

## eSMP<sup>®</sup> Series


**SMP (DO-220AA)**

Cathode Anode

### FEATURES

- Low profile package
- Trench MOS Schottky technology
- Low power losses, high efficiency
- Low forward voltage drop
- 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)

 AUTOMOTIVE  
GRADE  
Available

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

### LINKS TO ADDITIONAL RESOURCES



3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	3.0 A
$V_{RRM}$	200 V
$I_{FSM}$	60 A
$V_F$ at $I_F = 3.0$ A	0.70 V
$T_J$ max.	175 °C
Package	SMP (DO-220AA)
Circuit configuration	Single

### TYPICAL APPLICATIONS

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

### MECHANICAL DATA

**Case:** SMP (DO-220AA)

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

**Polarity:** color band denotes the cathode end

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	V3P22	UNIT
Device marking code		V3D	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	V
Maximum DC forward current	$I_{F(AV)}$ <sup>(1)</sup>	3	A
	$I_{F(AV)}$ <sup>(2)</sup>	1.7	A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	60	A
Operating junction and storage temperature range	$T_J$ <sup>(3)</sup>	-40 to +175	°C
Operating junction and storage temperature range	$T_{STG}$	-55 to +175	°C

#### Notes

<sup>(1)</sup> Mounted on 10 mm x 10 mm PCB pad area

<sup>(2)</sup> Free air, mounted on recommended copper pad area

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



ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 1.5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.78	-	V
	$I_F = 3\text{ A}$			0.85	0.94	
	$I_F = 1.5\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.62	-	
	$I_F = 3\text{ A}$			0.70	0.78	
Reverse current	$V_R = 160\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	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	mA
		$T_A = 125\text{ }^\circ\text{C}$		0.7	3.0	
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	120	-	pF

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
(2) Pulse test: pulse width  $\leq 5\text{ ms}$

THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified)			
PARAMETER	SYMBOL	V3P22	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	125	$^\circ\text{C/W}$
	$R_{\theta JM}^{(3)}$	15	

**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; thermal resistance  $R_{\theta JA}$  - junction-to-ambient  
(3) Mounted on 10 mm x 10 mm aluminum PCB; thermal resistance  $R_{\theta JM}$  - junction-to-mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V3P22-M3/H	0.024	H	3000	7" diameter plastic tape and reel
V3P22-M3/I	0.024	I	10 000	13" diameter plastic tape and reel
V3P22HM3_A/H <sup>(1)</sup>	0.024	H	3000	7" diameter plastic tape and reel
V3P22HM3_A/I <sup>(1)</sup>	0.024	I	10 000	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)

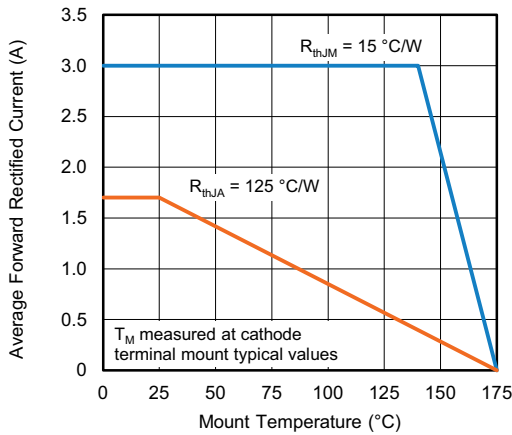


Fig. 1 - Maximum Forward Current Derating Curve

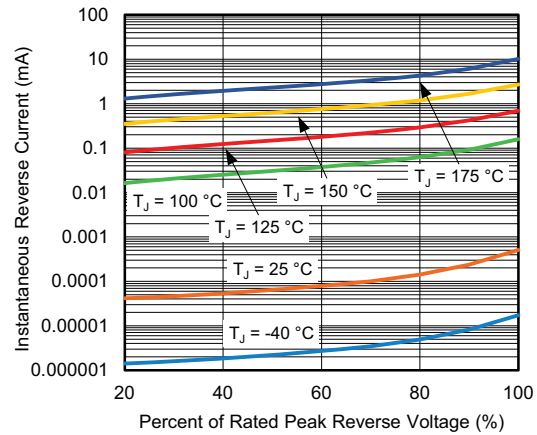


Fig. 4 - Typical Reverse Characteristics

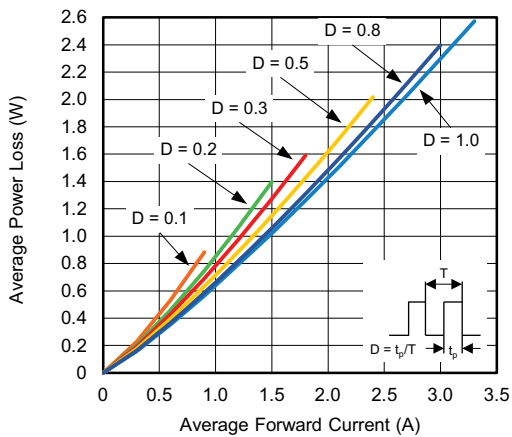


Fig. 2 - Forward Power Loss Characteristics

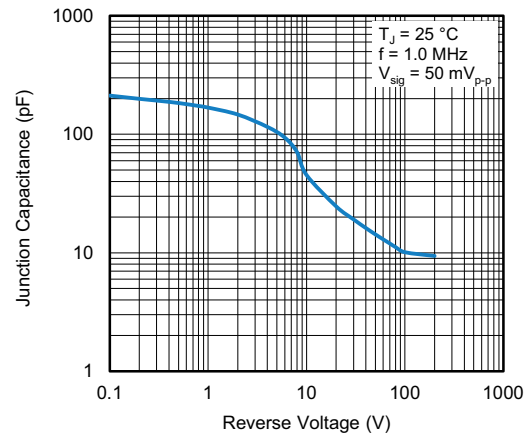


Fig. 5 - Typical Junction Capacitance

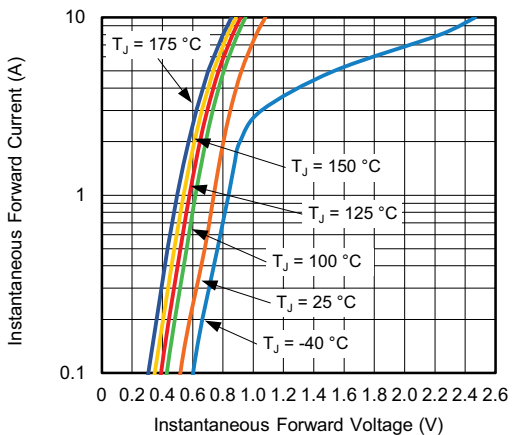


Fig. 3 - Typical Instantaneous Forward Characteristics

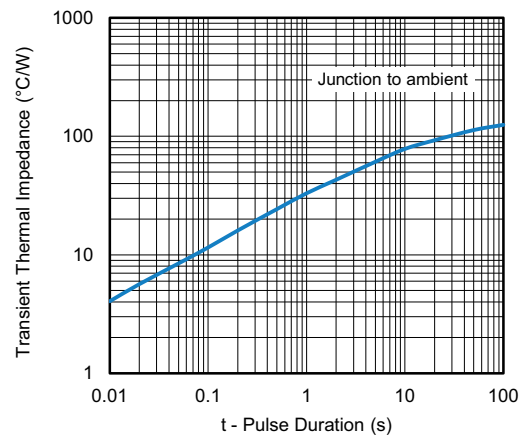
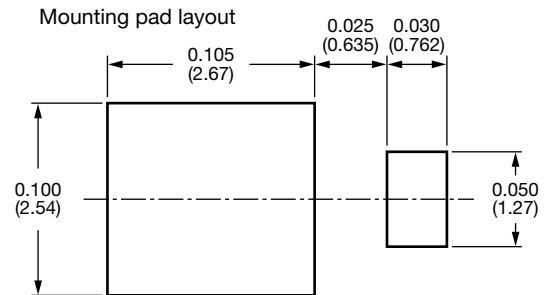
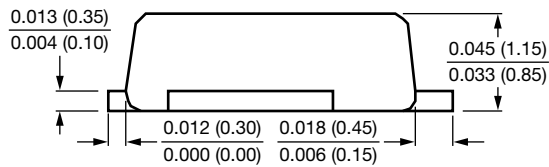
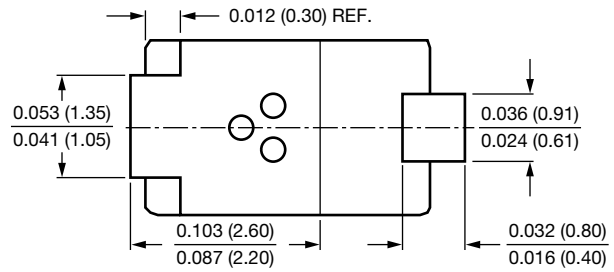
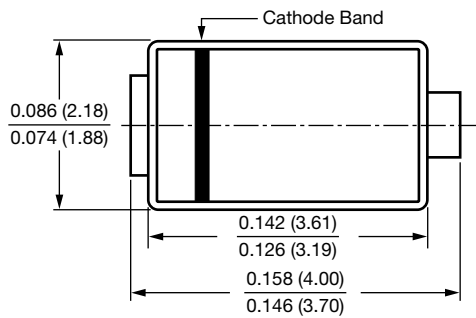


Fig. 6 - Typical Transient Thermal Impedance

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

**SMP (DO-220AA)**





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