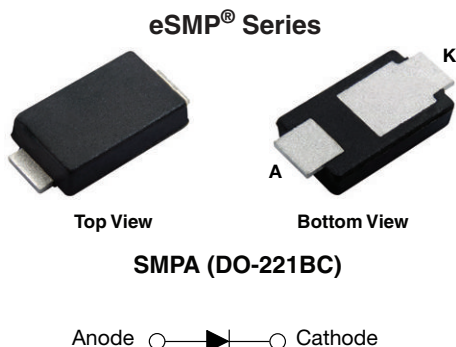


# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier



## FEATURES

- Very low profile - typical height of 0.95 mm
- 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: 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**

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** SMPA (DO-221BC)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

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 JESD22-B102

M3 and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	5.0 A
$V_{RRM}$	200 V
$I_{FSM}$	90 A
$V_F$ at $I_F = 5.0$ A ( $T_A = 125$ °C)	0.69 V
$T_J$ max.	175 °C
Package	SMPA (DO-221BC)
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	V5PA22	UNIT
Device marking code		V522	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	V
Maximum DC forward current	$I_{F(AV)}^{(1)}$	5.0	A
	$I_{F(AV)}^{(2)}$	2.3	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	90	A
Operating junction temperature range	$T_J^{(3)}$	-40 to +175	°C
Storage temperature range	$T_{STG}$	-40 to +175	°C

### Notes

(1) Mounted on 3 cm x 3 cm copper pad area PCB

(2) Free air, mounted on recommended copper pad area

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

ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.76	-	V
	I <sub>F</sub> = 5.0 A			0.82	0.9	
	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 125 °C		0.61	-	
	I <sub>F</sub> = 5.0 A			0.69	0.77	
Reverse current	V <sub>R</sub> = 160 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.001	-	mA
		T <sub>A</sub> = 125 °C		0.3	-	
	V <sub>R</sub> = 200 V	T <sub>A</sub> = 25 °C		-	0.05	
		T <sub>A</sub> = 125 °C		0.7	3.0	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	240	-	pF

**Notes**

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

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)			
PARAMETER	SYMBOL	V5PA22	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	100	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	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; thermal resistance  $R_{\theta JA}$  - junction to ambient  
(3) Units mounted on 3 cm x 3 cm aluminum PCB; thermal resistance  $R_{\theta JM}$  - junction to mount

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V5PA22-M3/I	0.032	I	14 000	13" diameter plastic tape and reel
V5PA22HM3_A/I <sup>(1)</sup>	0.032	I	14 000	13" diameter plastic tape and reel

**Note**

- (1) AEC-Q101 qualified

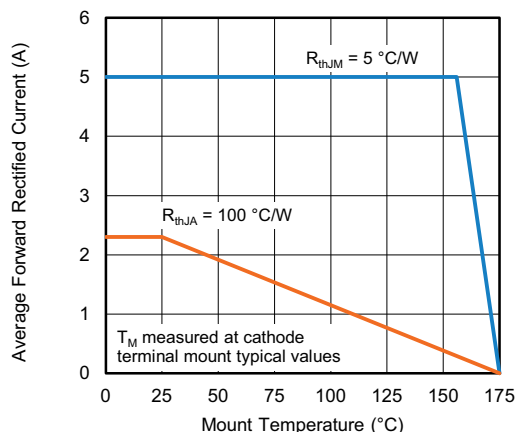
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)


Fig. 1 - Maximum Forward Current Derating Curve

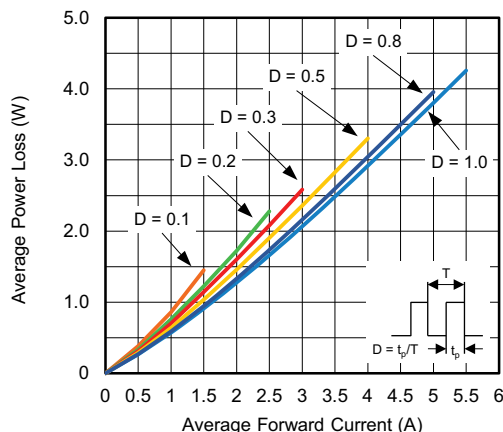


Fig. 2 - Forward Power Loss Characteristics

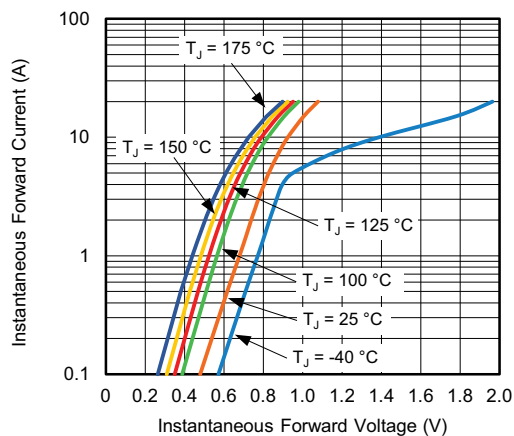


Fig. 3 - Typical Instantaneous Forward Characteristics

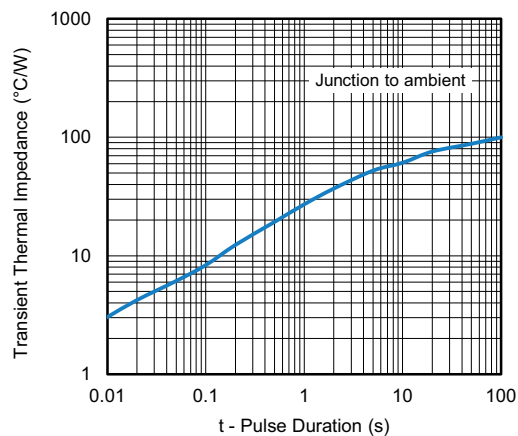


Fig. 6 - Typical Transient Thermal Impedance

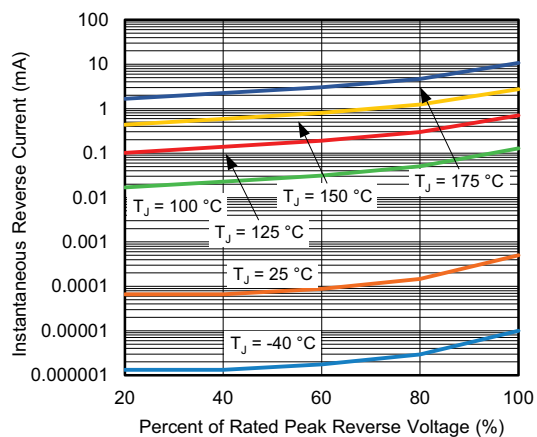


Fig. 4 - Typical Reverse Leakage Characteristics

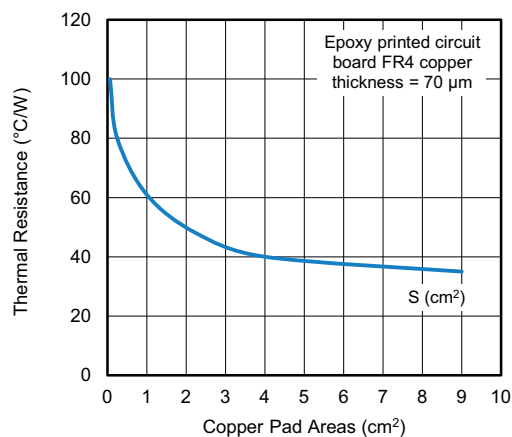


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Areas

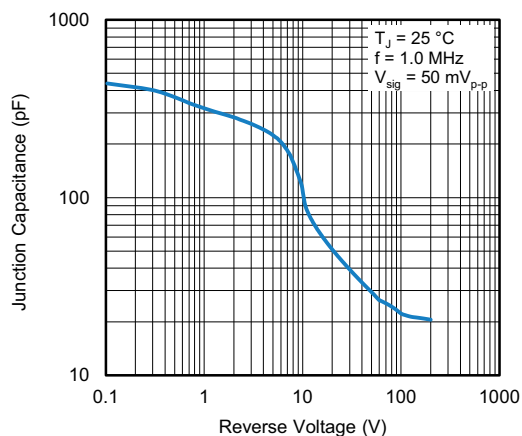
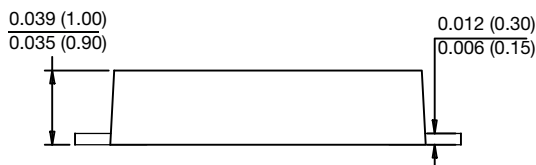
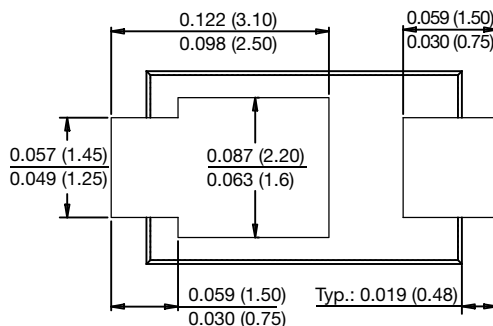
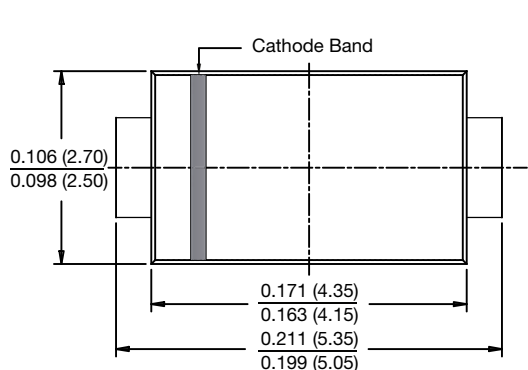


Fig. 5 - Typical Junction Capacitance

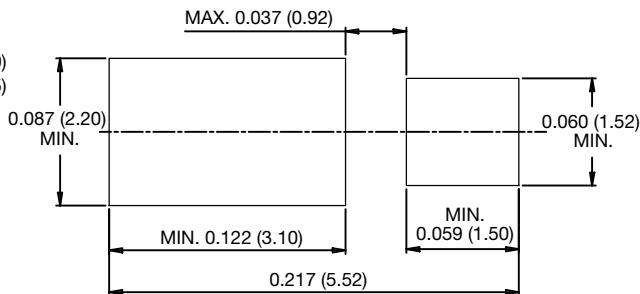


**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SMPA (DO-221BC)**



**Mounting Pad Layout**





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