

# Surface Mount Trench MOS Barrier Schottky Rectifiers

## TMBS® eSMP® Series



Top view

Bottom view

### SMF (DO-219AB)

Cathode  Anode

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

## FEATURES

- Trench MOS Schottky technology
- Low profile package
- Ideal for automated placement
- Low forward voltage drop, low power losses
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Wave and reflow solderable
- AEC-Q101 qualified available  
- Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc299912](http://www.vishay.com/doc299912)

## DESIGN SUPPORT TOOLS

[click logo to get started](#)
**3D**  
Models  
Available

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** SMF (DO-219AB)

Molding compound meets UL 94 V-0 flammability rating

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

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 and HM3 suffix meet JESD 201 class 2 whisker test

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	3.0 A
$V_{RRM}$	120 V
$I_{FSM}$	60 A
$V_F$ at $I_F = 3$ A ( $T_A = 125$ °C)	0.64 V
$T_J$ max.	175 °C
Package	SMF (DO-219AB)
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	V3FM12	UNIT
Device marking code		3MS	
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum average forward rectified current (fig.1)	$I_{F(AV)}^{(1)}$	2.5	A
	$I_{F(AV)}^{(2)}$	3.0	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	60	A
Operating junction temperature range	$T_J^{(3)}$	-40 to +175	°C
Storage temperature range	$T_{STG}$	-55 to +175	

## Notes

(1) Free air, mounted on FR4 PCB, 2 oz. standard footprint

(2) Mounted on FR4 PCB, 2 oz.10 mm x 10 mm 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> = 1.5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.65	-	V
	I <sub>F</sub> = 3.0 A			0.84	0.94	
	I <sub>F</sub> = 1.5 A	T <sub>A</sub> = 125 °C		0.55	-	
	I <sub>F</sub> = 3.0 A			0.64	0.72	
Reverse current	V <sub>R</sub> = 90 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.7	-	μA
		T <sub>A</sub> = 125 °C		550	-	
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C		-	100	
		T <sub>A</sub> = 125 °C		950	3000	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	220	-	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 noted)			
PARAMETER	SYMBOL	V3FM12	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	125	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	22	

**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) Device mounted on FR4 PCB, 2 oz. standard footprint, thermal resistance  $R_{\theta JA}$  – junction-to-ambient  
 (3) Device mounted on 10 mm x 10 mm pad size area footprint; thermal resistance  $R_{\theta JM}$  – junction-to-mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V3FM12-M3/H	0.015	H	3000	7" diameter plastic tape and reel
V3FM12-M3/I	0.015	I	10 000	13" diameter plastic tape and reel
V3FM12HM3/H <sup>(1)</sup>	0.015	H	3000	7" diameter plastic tape and reel
V3FM12HM3/I <sup>(1)</sup>	0.015	I	10 000	13" diameter plastic tape and reel

**Note**

- (1) AEC-Q101 qualified

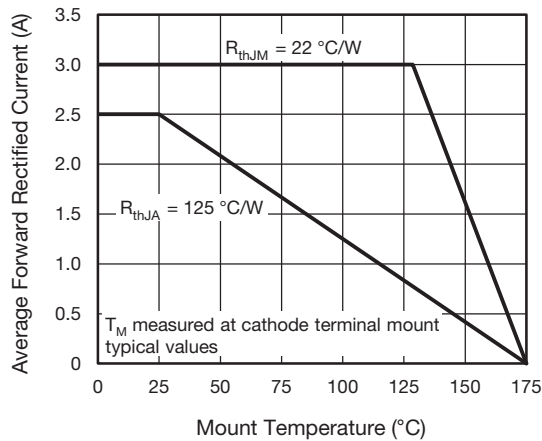
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

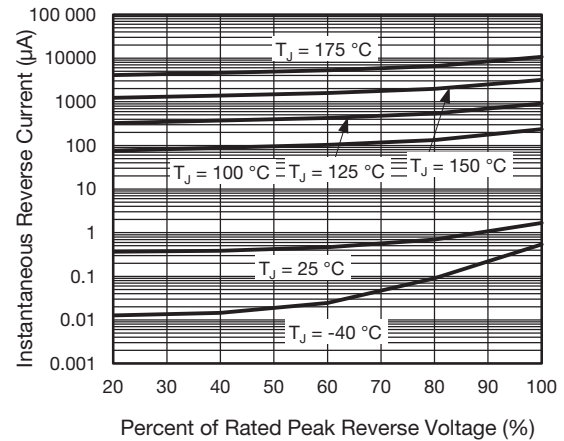


Fig. 4 - Typical Reverse Leakage Characteristics

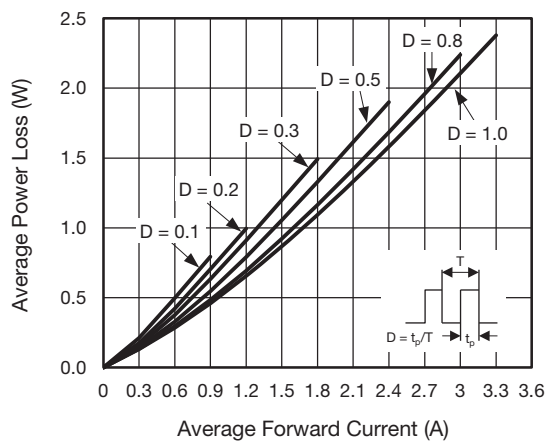


Fig. 2 - Average Power Loss Characteristics

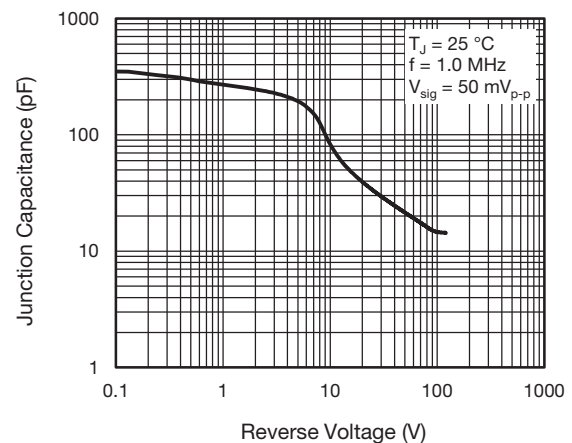


Fig. 5 - Typical Junction Capacitance

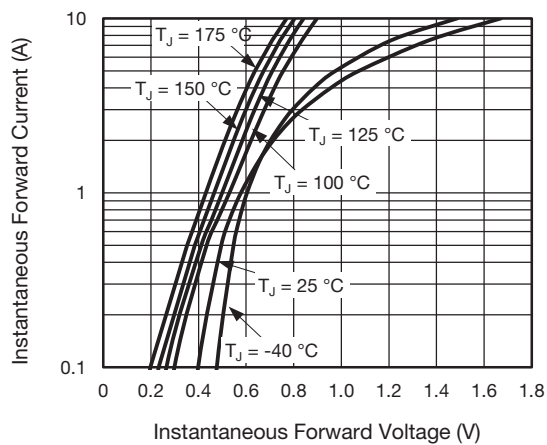


Fig. 3 - Typical Instantaneous Forward Characteristics

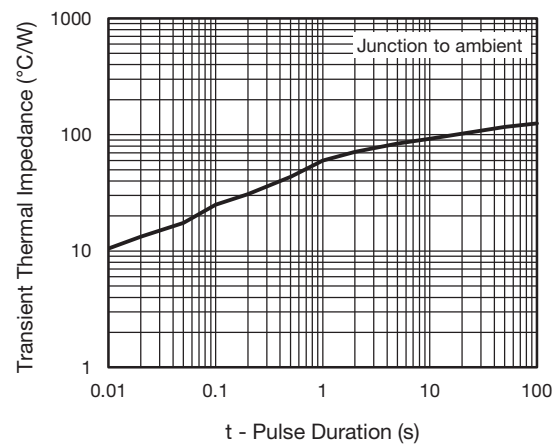
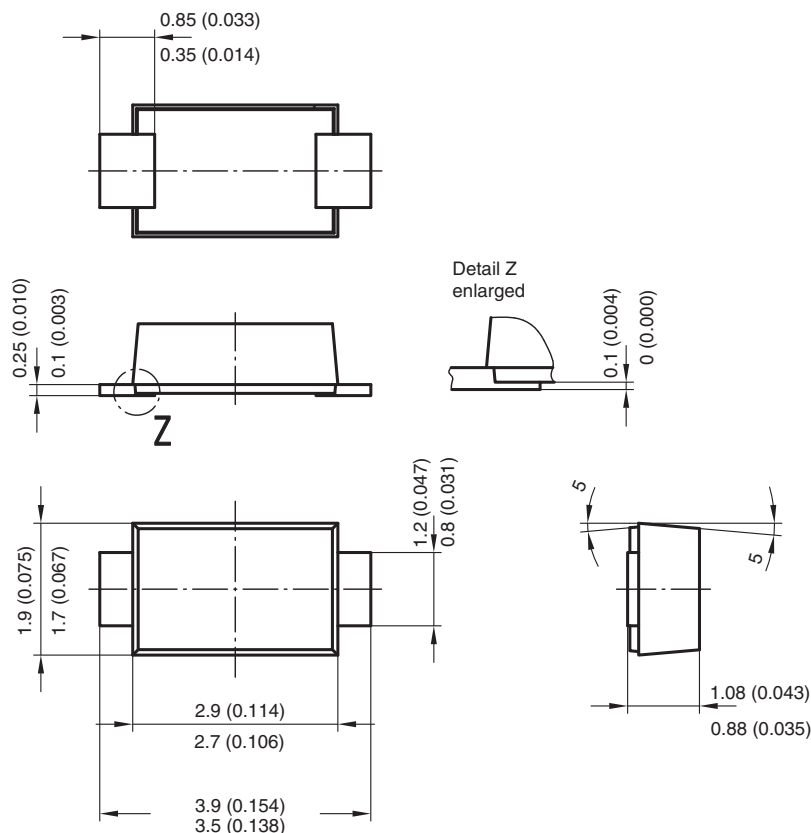
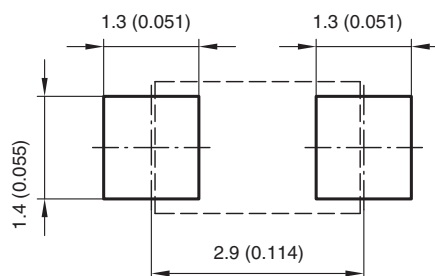


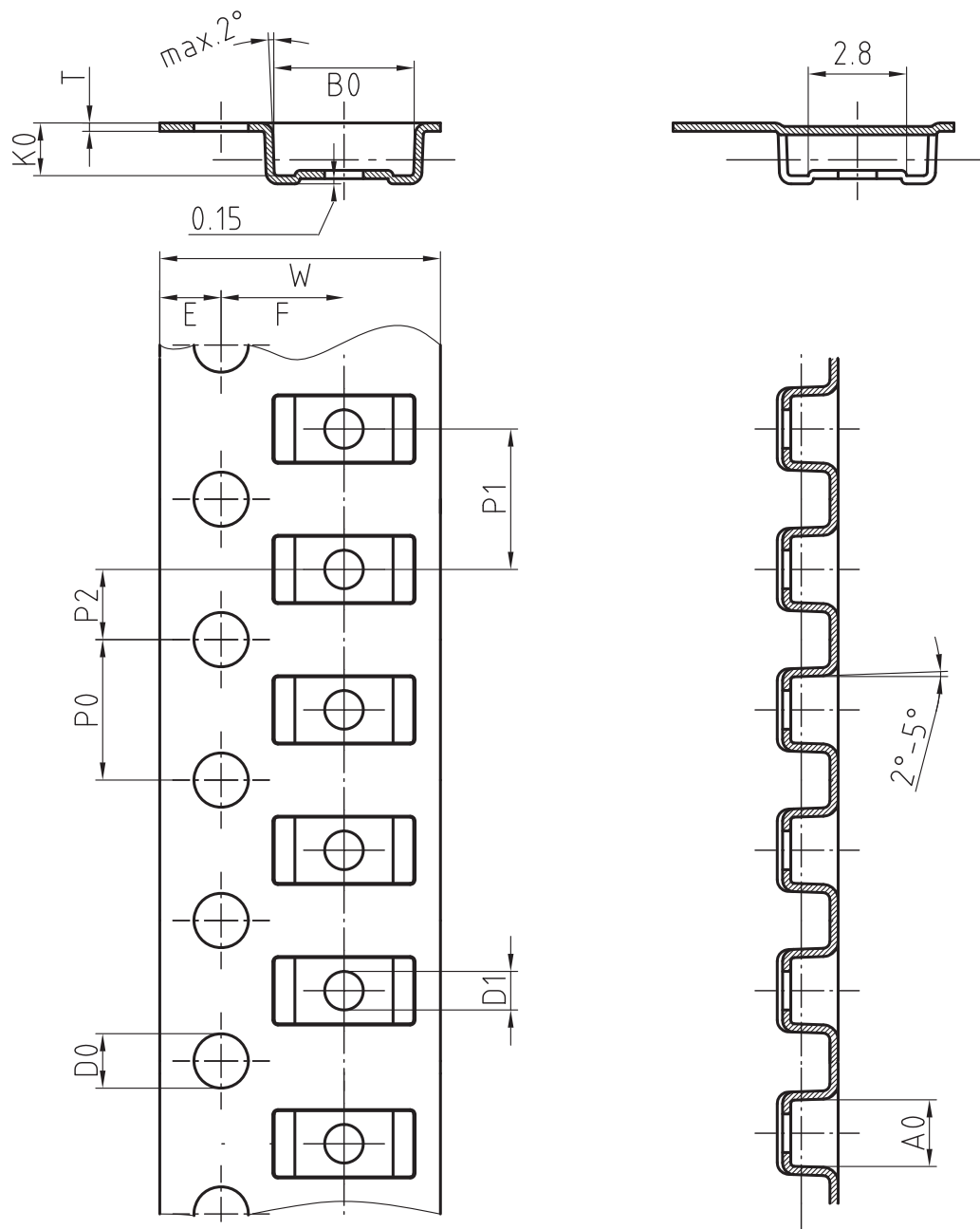
Fig. 6 - Typical Transient Thermal Impedance

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


Foot print recommendation:



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17247

**BLISTERTAPE DIMENSIONS** in millimeters: **SMF (DO-219AB)**


Mat:	A0	B0	K0	W	T	P0	P2	P1	D0	D1	E	F
PS	1.9	4.0	1.5	8.0	0.235	4.0	2.0	4.0	1.5	1	1.75	3.5

Document-No.: S8-V-3717.02-001 (3)

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