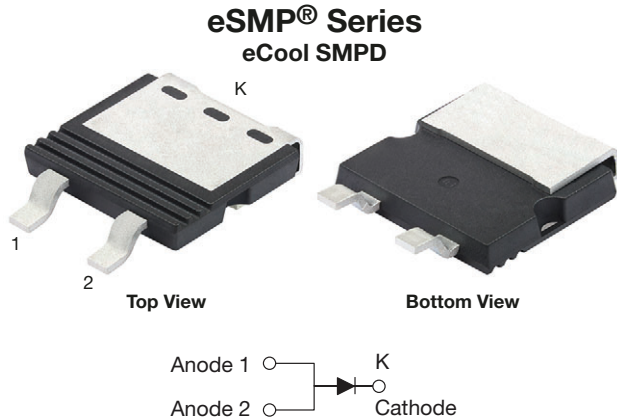


# High-Voltage TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

 Ultra Low  $V_F = 0.40\text{ V}$  at  $I_F = 5.0\text{ A}$ 


## FEATURES

- Top side cool
- Trench MOS Schottky technology
- Ideal for automated placement
- 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)

 AUTOMOTIVE  
GRADE  
Available

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

## TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection in commercial, industrial, and automotive application.

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
$V_{RRM}$	100 V
$I_{FSM}$	280 A
$V_F$ at $I_F = 20\text{ A}$ ( $T_J = 125\text{ °C}$ )	0.58 V
$T_J$ max.	150 °C
Package	eCool SMPD
Circuit configuration	Single

## MECHANICAL DATA

**Case:** eCool SMPD

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:** as marked

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V20C103	UNIT
Device marking code		V20C103	
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}^{(1)}$	20	A
	$I_{F(AV)}^{(2)}$	9.1	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	280	A
Operating junction temperature range	$T_J^{(3)}$	-40 to +150	°C
Storage temperature range	$T_{STG}$	-55 to +150	

### Notes

- (1) Mounted on infinite heatsink
- (2) Free air, mounted on FR4 PCB, 2 oz., standard footprint with top side aluminum cooling
- (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>J</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 5 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.50	-	V
	I <sub>F</sub> = 10 A			0.56	-	
	I <sub>F</sub> = 20 A			0.66	0.71	
	I <sub>F</sub> = 5 A	T <sub>J</sub> = 125 °C		0.40	-	
	I <sub>F</sub> = 10 A			0.48	-	
	I <sub>F</sub> = 20 A			0.58	0.62	
Reverse current at rated V <sub>R</sub>	V <sub>R</sub> = 70 V	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.009	-	mA
		T <sub>J</sub> = 125 °C		3.2	-	
	V <sub>R</sub> = 100 V	T <sub>J</sub> = 25 °C		-	0.45	
		T <sub>J</sub> = 125 °C		8	25	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	2480	-	pF

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)(2)</sup>	26.5	34	°C/W
	R <sub>θJC</sub> <sup>(3)</sup>	1.2	1.5	

Notes

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub> - junction-to-ambient
- (2) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz. standard footprint with top-side aluminum cooling heatsink size L 35 mm x W 20 mm x H 10 mm
- (3) Thermal resistance junction-to-top case to follow JEDEC® 51-14 transient dual interface test method (TDIM)

ORDERING INFORMATION TABLE

Device code

V	20	C	10	3	H	M3
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①      ②      ③      ④      ⑤      ⑥      ⑦

- 1** - Vishay TMBS product
- 2** - Current rating (20 = 20 A)
- 3** - Package type (C = eCool SMPD package)
- 4** - Voltage rating (10 = 100 V)
- 5** - TMBS generation option (3 = gen 3)
- 6** - Quality grade (H = AEC-Q101 qualified, - = industry grade)
- 7** - Material / Environment category  
(M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V20C103-M3/I	0.66	I	2000/reel	13" diameter plastic tape and reel
V20C103HM3/I <sup>(1)</sup>	0.66	I	2000/reel	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)

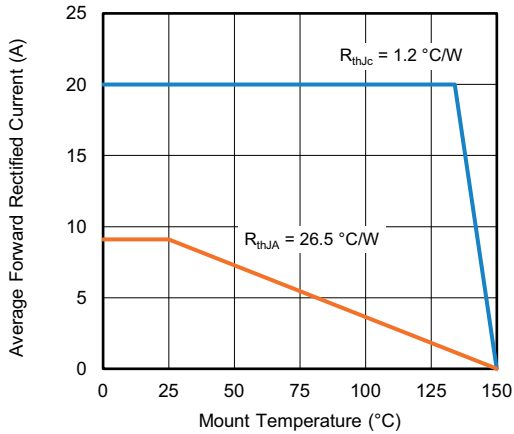


Fig. 1 - Maximum Forward Current Derating Curve

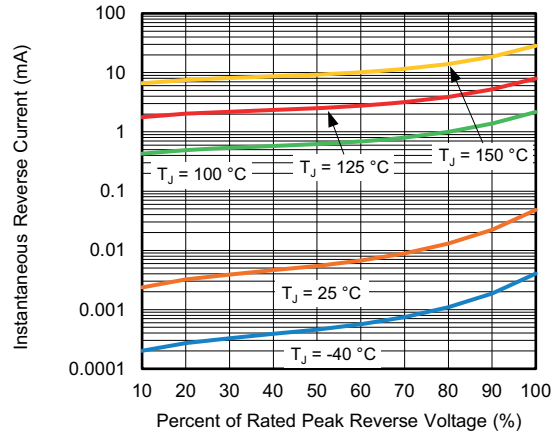


Fig. 4 - Typical Reverse Leakage Characteristics

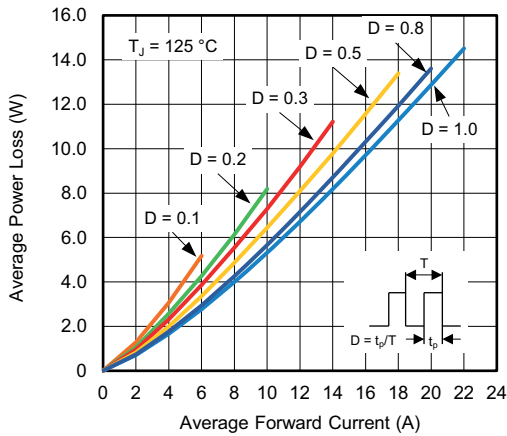


Fig. 2 - Average Power Loss Characteristics

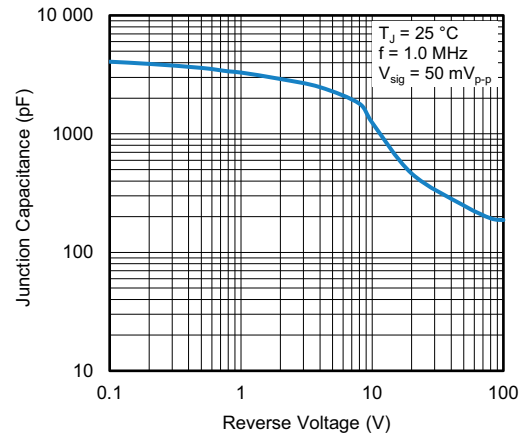


Fig. 5 - Typical Junction Capacitance

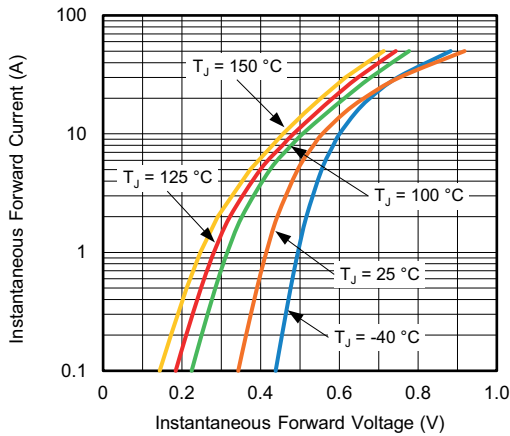


Fig. 3 - Typical Instantaneous Forward Characteristics

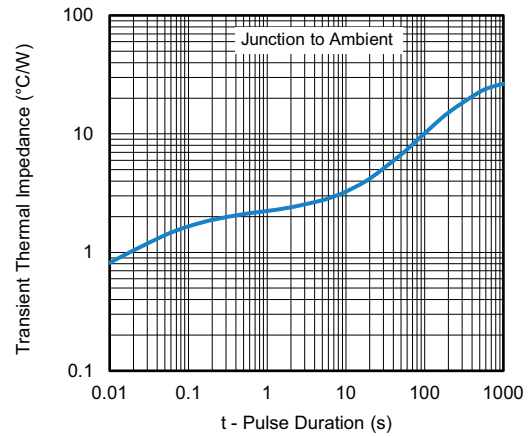
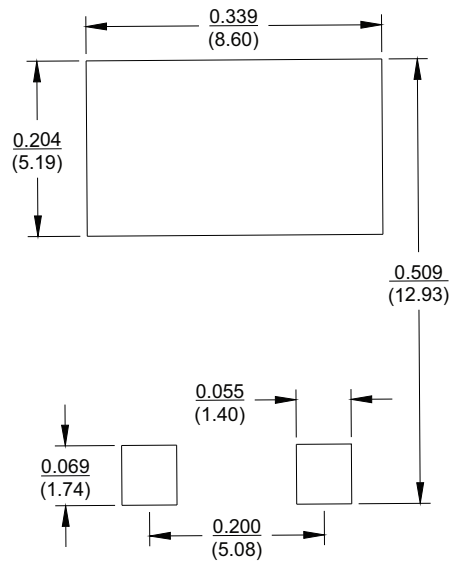
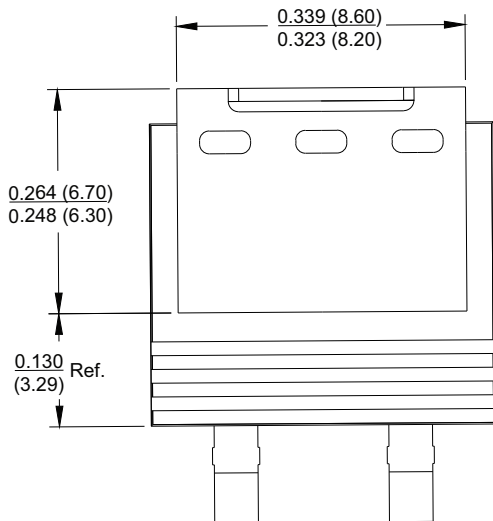
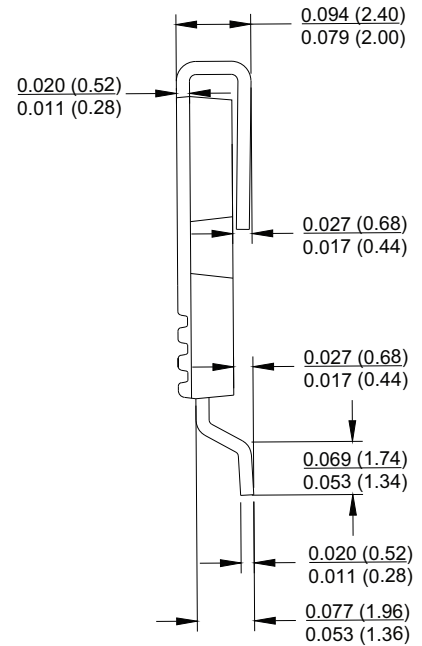
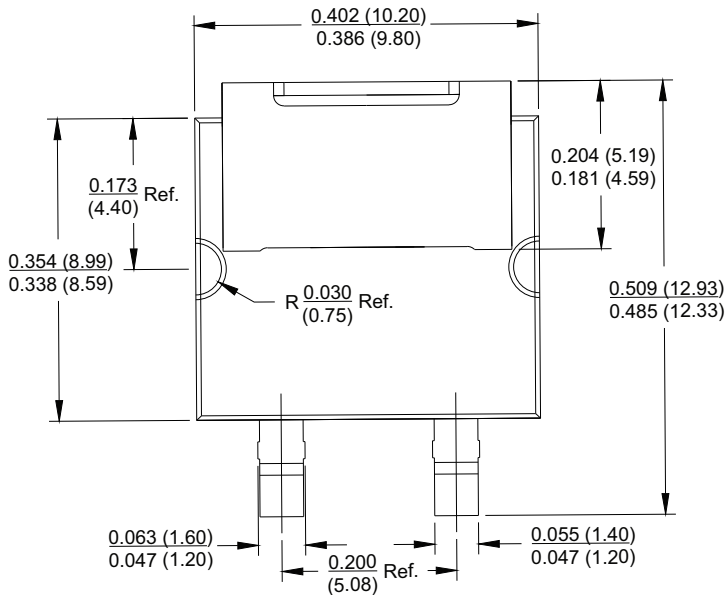


Fig. 6 - Typical Transient Thermal Impedance

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

**eCool SMPD**



**Note**

- The suggested mounting pad layout is provided for reference only, as actual pad layouts may vary depending on application



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